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Department of
Agriculture
Forest
Service

**Pacific
Northwest
Region**

Monitoring and Evaluation Report

Siuslaw National Forest
Fiscal Year 2009

Cape perpetua, Siuslaw National Forest
Central Coast Ranger District-Oregon Dunes National Recreation Area

August, 2010

Thank you for taking the time and interest in reviewing the results of the Siuslaw National Forest 2009 Monitoring Report. .

The report focuses on key monitoring activities and findings since the previous publication in September, 2009. It also summarizes some of our most successful restoration projects. As you read the report you will see where we are using our past successful restoration projects to build upon and improve restoration projects in the future.

The Forest still remains diligent in restoring fish and wildlife habitat including resident and anadromous fish species, northern spotted owl, marbled murrelet, and snowy plover habitat.

In the last several years the Forest built and maintained several partnerships, started and completed several successful restoration projects. In this report you will be able to review the outcome of this work.

The Siuslaw is currently scheduled to begin Forest Plan revision in 2014.

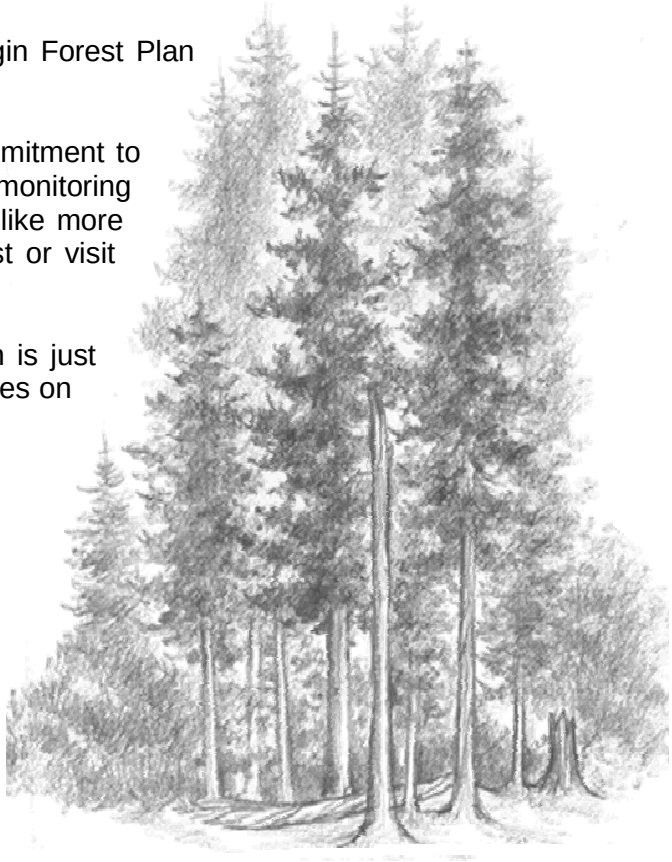
Until we begin Plan revision, it is my commitment to keep you informed of the results of monitoring through this report; however if you would like more information, feel free to contact the Forest or visit our website at www.fs.fed.us/r6/siulsaw.

Your continued interest in the Forest Plan is just one way for you to stay current with activities on your public lands.

Sincerely,

Jeremiah C. Ingersoll

JEREMIAH C. INGERSOLL
Forest Supervisor
Siuslaw National Forest



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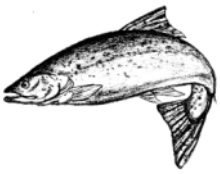
Introduction

This report provides information to the Regional Forester, Siuslaw forest managers and the public as to how well the Forest Plan is being implemented and if the Plan objectives are being met. Monitoring is intended to keep the Forest plan responsive to change and new information, and is therefore critical to adaptive management. Monitoring and evaluation may lead to changes in management practices or provide the basis for adjustments to the Plan. Practices will be changed when monitoring results indicate the practice or standards and guidelines are not working to meet the desired conditions.

Aquatic Group

The Forest Standards and Guidelines provide direction to enable the Forest to meet the goals of maintaining and improving water quality, fish habitat and other water related resource. Below is a summary of FY09 monitoring questions designed to assist the Forest in determining the effectiveness of the Forest Plan Standards and Guidelines to meet the goals of protecting, maintaining, and improving the physical environment of the Forest.



Monitoring Question: Anadromous Fish Habitat

How is anadromous fish habitat changing?

The Forest-wide Level II Stream Survey Program continues to be one of our most important aquatic monitoring tools on the Siuslaw National Forest. In 2009 we surveyed 15 miles of stream habitat on the southern portion of the Central Coast Ranger District. The survey data provides a record of current physical stream conditions and baseline information about the aquatic species present in the streams using physical survey protocol and divers snorkel surveys. This stream survey data will be especially useful to document current habitat before planning aquatic habitat restoration projects as well as a monitoring tool to document the success of past restoration projects. For long-term monitoring of change to fish habitat we will rely on the Aquatic and Riparian Effectiveness Monitoring Program (AREMP) which was developed to fulfill the monitoring component of the Northwest Forest Plan including the Aquatic Conservation Strategy. A 15-year assessment of watershed condition in 6th field watersheds with at least 25% federal ownership along the stream will be done in the fall of 2010. It is too early in the AREMP monitoring program to draw conclusions about changes to anadromous fish habitat on the Forest at this time.

In 2009 the MidCoast Watersheds Council proposed to expand the Green River monitoring effort with an Oregon Watershed Enhancement Board project to monitor coho juvenile salmon response to large wood placement when spawning coho salmon are expected to return in numbers that should approach full seeding. The proposal was funded by the Oregon Watershed Enhancement Board with the Siuslaw NF as a funding partner. Monitoring will be conducted in the summer of 2010 and the winter of 2011. Past monitoring to assess the effectiveness of the Green River large wood placement project and Tenmile Creek large wood placement (Johnson et al. 2005) has been highlighted in previous Forest Plan Monitoring Reports. The Green River monitoring documented a threefold increase in juvenile salmonids showing a dramatic difference between the pre-project over winter survival rates for coho and the post project over winter survival rates. More juvenile coho were retained at higher densities farther up in the river system after the wood placement. This supports the hypothesis that large wood is creating the low velocity habitats necessary for retaining over wintering populations of salmonids. We hope to report results from the expanded Green River monitoring effort in the near future.

In 2009 the Siuslaw National Forest staff in cooperation with our partners Oregon Department of Fish and Wildlife, Siuslaw Watershed Council, MidCoast Watersheds Council, Salmon-Drift Watershed Council and Partnership for Umpqua Rivers Watershed Council placed large wood in a combined 23 miles of anadromous and resident fish habitat.

In April 2009 NMFS initiated an ESA status review for Oregon Coast coho salmon to give themselves time to be more deliberative. On May 25, 2010 NMFS announced a proposed affirmation of the threatened ESA listing status of Oregon coast coho salmon. The status review included an assessment of freshwater habitat conditions throughout the range of the Oregon Coast coho salmon. Through analysis of Landsat imagery from 1986 to 2008, NMFS could conclude that the most intense land disturbance has moved from Federal land to private land. In conducting the habitat trend analysis NMFS used Oregon Department of Fish and Wildlife habitat survey data and their Habitat Limiting Factors Model version 7 (Anlauf et al. 2009) and a model developed by the Forest Service Aquatic and Riparian Effectiveness Monitoring Program (Reeves et al. 2004 and Reeves et al. 2006). The analysis indicated that habitat complexity over the ESU has not improved over the past decade, holding steady in some areas and declining in others. NMFS conclude that stream habitat restoration activities may be having a short-term positive effect in some areas, but the quantity of impaired habitat and the rate of continued disturbance outpace agencies' ability to conduct effective restoration.

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Monitoring Question: Lake Fish Habitat

How is the quality of lake fish habitat changing?

The primary influences on the quality of lake fish habitat are introduction of aquatic invasive species, chemical pollution, and increased rates of eutrophication caused by human nutrient inputs. Of these parameters only aquatic invasive species, particularly invasive plants, has been examined in any detail by the Forest. Although eutrophication has not been examined by the Forest, some inferences can be made from studies conducted at Tenmile Lakes.

Aquatic Invasive Species

Invasive species includes both plant and animals species that are both non-native and create a nuisance. Many invasive species come to dominate a landscape and alter the ecosystem to the detriment of other species or uses beneficial to humans. Some non-native species, such as tapegrass or water celery *Vallisnaria americana*, are not invasive because they are readily eaten by waterfowl. Other species, such as warm-water game fish, may come to dominate an ecosystem to the detriment of other species such as salmon, but are considered a desirable species instead of invasive. In some instances native species may be considered a nuisance by some people but, because they are native, they do not fit the definition of invasive.

Species of Concern – A variety of aquatic invasive species are of concern in lakes on the Oregon Coast. These include species that are already present in some of the lakes and streams in the area such as New Zealand mud snails *Potamopyrgus antipodarum*, Brazilian waterweed *Egeria densa*, parrot's feather *Myriophyllum aquaticum*, fragrant water lily *Nymphaea oderata*, and Fanwort *Cambomba caroliniana*; and species not yet known to inhabit the area, but could become a nuisance if introduced, such as Chinese mitten crabs *Eriocheir sinesis*, zebra and quagga mussels *Dreissena* spp, and hydrilla *Hydrilla verticillata*.

Aquatic Plant Surveys – The Forest contracted with Portland State University's Center for Lakes and Reservoirs (CLR) to conduct aquatic plant surveys in lakes on the central Oregon Coast with an emphasis on detecting the presence of aquatic weeds. In order to get a better understanding of the abundance and distribution of aquatic weeds, an effort was made to survey all lakes regardless of management jurisdiction. The surveys were conducted over three summers from 2003 to 2005. All told 134 separate bodies of water were surveyed for a total of 7,990 acres. Water bodies ranged from unnamed ponds less than a quarter acre in size to Siltcoos Lake at 3,164 acres.

Findings – The surveys documented a total of 55 species of aquatic plants. Of these 48 species were native; 4 species were non-native, nuisance species (invasive); and 3 species were non-native, non-nuisance species (non-invasive). Most of the invasive species were associated with lakes that had public boat ramps. This is most likely due to spread from plant fragments associated with trailered boats. Most of the larger lakes have one or more boat ramps and also contain one or more invasive plant species. Fragrant water lily,

a species commonly cultivated in ornamental ponds, was more closely associated with lakes that had large number of lakeside homes. The most likely cause for this is the intentional release of this plant by homeowners for aesthetic reasons.

The four invasive non-native nuisance species were not widely distributed. Brazilian waterweed was found in eight lakes and was always associated with a boat ramp.

Parrot's feather was found in six lakes. Fragrant water lily was the most commonly found invasive species having been found in a total of 18 lakes and ponds. Cambomba was found in three lakes; Sutton, Woahink, and Siltcoos lakes.

The affect that invasive aquatic plants are having on fish habitat is not entirely known but can be illustrated by one example at Loon (Erhart) Lake. The lake is a small, 5-acre lake just south of the Siltcoos River in Lane County, Oregon and should not be confused with the more well known and popular Loon Lake located south of the Umpqua River in Douglas County. Parrot's feather became established in Loon Lake in the mid-1990's. The method of introduction is unknown. By 2003 the perimeter of the lake was ringed by parrot's feather, although the deeper middle section of the lake appeared to be free of the plant. The lake had been popular with anglers, but due to the difficulty of reaching open water from the bank, the Oregon department of Fish and Wildlife decided to no longer stock the lake and interest in fishing became less popular. In 2004 the water level in the lake was drawn down and hand removal of the weed was attempted. This control effort was unsuccessful because hand pulling was ineffective at removing the plant's rhizome growing in the bed of the lake. Our monitoring in 2006 through 2008 found Parrot's feather still present in Loon Lake but at a much reduced level. Additional monitoring in 2009 found the plant to be on the increase. Control of the invasive Parrot's feather and monitoring work will continue at Loon Lake in an effort to restore the aquatic plant community and refine invasive plant treatment techniques.

Eutrophication

The Forest has not been systematically monitoring eutrophication rates associated with increased inputs of nutrients, however, inferences can be made by studies on the Tenmile Lakes conducted by the Tenmile Lakes Basin Partnership, and by delta monitoring in Mercer Lake conducted by the Forest.

The Tenmile Lakes study (Eilers et al. 2002) examined nutrient inputs from upstream forest and farm lands, and from areas along the lakeshore dominated by lakeside housing. In general the study found very little nutrient input from an unharvested forested watershed, an initial increase in sediment and nutrients from a recently harvested forest stand, a flush of nutrients associated with fall rains coming from predominantly agricultural (pasture) lands, and a relatively high contribution of nutrients associated with lakeside housing during the summer months when stream flow is lowest.

Other factors that were found to influence the rate of eutrophication in Tenmile Lakes included the channelization of streams, draining of wetland buffers, introduction of exotic aquatic macrophytes, and introduction of exotic fish. Stream channelization has increased erosion rates and led to increased sediment and nutrient transport to the lakes. The draining of wetlands to create farmland upstream from Tenmile Lakes has reduced the amount of sediment and nutrients filtered and sequestered from the stream from

previous freshwater marshes. Aquatic macrophytes have the ability to draw nutrients up from lake sediments and incorporate them into their tissues. When the plants senesce in the fall the nutrients contained within them are made available through decay. Exotic macrophytes such as E. densa are believed to be at much higher densities and contain much more biomass than native species, and thus have increased the amount of nutrients released from lake sediments of Tenmile Lakes than in prehistoric times. Introduced fish species such as bluegill Lepomis macrochirus and largemouth bass Micropterus salmoides compete and prey on native fish species such as coho salmon Oncorhynchus kisutch.

Although many of the smaller lakes on the central Oregon Coast are surrounded by land managed by the Forest Service, most of the shoreline on the larger lakes such as Tenmile, Tahkenitch, Siltcoos, Sutton, and Mercer is in private ownership. Effects from Forest Service management to these larger lakes are mostly limited to upslope forest and tributary stream activities. By inferring from the conclusions reached by the Tenmile Lakes study, Forest Service projects are lessening nutrient inputs into the lakes from Forest Lands. Nutrient inputs from timber harvest activities are less than those experienced at Tenmile Lakes due to streamside no-harvest buffers and the lack of burning activities associated with tree thinning projects. Projects such as the Bailey Creek restoration project at Mercer Lake reduce erosion from ditched streams and recreate nutrient retaining wetlands. However, even though these activities reduce nutrient loads to the larger lakes, they may represent a relatively small fraction of the total anthropogenic nutrient load.

Monitoring Question: Fish Populations

How are anadromous fish populations changing?

The National Marine Fisheries Service (NMFS) issued their determination of record to list the Oregon Coast Evolutionarily Significant Unit of coho salmon (*Onchorhynchus kisutch*), as threatened under the Endangered Species Act (ESA) on February 11, 2008 in response to a court ordered deadline. The protective regulations and designation of critical habitat was effective May 12, 2008. In April 2009 NMFS initiated an ESA status review for Oregon Coast coho salmon to give themselves time to be more deliberative. On May 25, 2010 NMFS announced a proposed affirmation of the threatened ESA listing status of Oregon coast coho salmon. Oregon coast coho salmon are a Forest Plan indicator species and are found in all major Ocean tributaries of the Forest and are most common in low gradient streams.

Coho salmon production for the Oregon Coast ESU has been in decline since the 1980's with very low wild coho returns in the 1990's. Returns since 2002 have shown improvement but it is much too early to draw conclusions about the status of this ESA listed fish. The Oregon Coast Coho Conservation Plan for the State of Oregon, March16, 2007 identifies the desired status for the ESU as: Populations of naturally produced coho salmon are sufficiently abundant, productive, and diverse (in terms of life histories and geographic distribution) such that the ESU as a whole is 1) self-sustaining into the foreseeable future, and 2) providing significant ecological, cultural, and economic benefits. The goal for returning wild spawners targets an average return that ranges from a low of greater than 100 thousand spawners when marine survival is extremely low to a high of 800 thousand spawners when marine survival is high. The 2009 estimated abundance of wild adult coho spawners in the Oregon coast ESU based on information from the Oregon Department of Fish and Wildlife Adult Salmon Inventory and Sampling Project is 265,735 coho.

Oregon coast coho salmon pre-harvest and spawning abundance shows negative trends from 1970 through 1999 (Stout et al., 2010). Trends in both Oregon coast pre-harvest and spawning abundance has improved in the period from 2000 to 2009, with 2007 being an exception. NMFS contributes the recent improving trends in abundance to the favorable marine productivity conditions of the last few years, not improvements in freshwater habitat.

A comprehensive summary of the status of native fishes on the central Oregon coast is provided in the 2005 Oregon Native Fish Status Report, Volume I Species management Unit Summaries, published by the Oregon Department of Fish and Wildlife, Fish Division. Their coastal species management unit corresponds closely with the Siuslaw National Forest extending both farther North and South with data summarized for 19 major Ocean tributaries with 12 found on the National Forest. The interim status for the non-listed anadromous fish species found on the Forest is as follows:

Chinook salmon (Onchorhynchus tshawytscha) on the Oregon coast display two life history types; fall-run and spring-run adult spawning return times. Fall Chinook salmon are found in large streams and river mainstems with eight populations found on the Forest; Nestucca, Salmon, Siletz, Yaquina, Alsea, Yachats, Siuslaw, lower Umpqua, and a few small Ocean tributaries such as Tenmile Creek. They typically return to fresh water to spawn in October through December. Fall Chinook salmon are considered Not at Risk.

Spring Chinook salmon are found in the Nestucca, Siletz, and Alsea rivers of the Siuslaw National Forest and is presumed extinct in the Siuslaw River basin. They typically return to fresh water in March through June and spawn in the late summer and early fall. The Siletz population passed all six criteria. The Alsea population passed 4 of 6 criteria and the Nestucca population passed only 3 of 6 risk criteria. Coastal Spring Chinook are considered At Risk.

The Oregon coast is on the southern end of the chum salmon (Onchorhynchus keta) distribution. Chum return to the lower reaches of small to moderate Ocean tributaries of the Oregon Coast in the fall of the year. Chum salmon are found in the Nestucca, Salmon, Siletz, and Yaquina rivers. They are presumed extinct in the Alsea River but our monitoring consistently finds a few individuals in Canal Creek, a tributary of the Alsea River. They are considered extinct in the Siuslaw River basin. The chum salmon are considered at Risk in the Coastal Species Management Unit by ODFW.

Steelhead trout (Onchorhynchus mykiss) on the Oregon coast display two life history types; fall-run and spring-run adult spawning return times. Winter steelhead trout are the most pervasive anadromous fish on the Siuslaw National Forest found in small to moderate sized river systems. They return to fresh water in the fall or winter and spawn in December through March. Natural spawning by hatchery fish is above 10% in the Siletz, Alsea, Yaquina, and Yachats Rivers causing these populations to fail the population independence risk criteria. The coastal winter steelhead trout are considered potentially at risk in the Coastal Species Management Unit by ODFW.

Summer steelhead trout return to fresh water in March through November and spawn from January through April and are only found in the Siletz River drainage of the Siuslaw National Forest. Coastal summer steelhead trout are considered potentially at risk by ODFW.

Coastal cutthroat trout (Onchorhynchus clarki clarki) exhibit several life history strategies including anadromy and are found throughout the Siuslaw National Forest. They are not considered at risk by ODFW but little data has been gathered about the searun cutthroat life history type.

Coastal Oregon pacific lampreys (Lampetra tridentate) as a group are considered at risk. They are present throughout most coastal streams but abundance is considered down even though population data is sparse.

North American green sturgeon (Acipenser medirostris) is an anadromous fish species that spends the majority of its adult life in the marine environment, occasionally entering fresh water, and can be found in near-shore marine waters, bays and estuaries on the Oregon Coast. The National Marine Fisheries Service listed North American green

sturgeon south of the Eel River, Calif., (the southern distinct population segment, or DPS) as threatened under the Endangered Species Act. The population of green sturgeon north of and including the Eel River (northern DPS) did not warrant listing under the ESA.

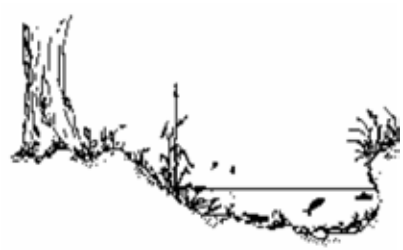
Green sturgeon spawning is not known to occur on the Siuslaw National Forest. Spawning has only been documented for members of the southern DPS in the Sacramento River system. Green sturgeon spawning of unidentified DPS has also been confirmed in the Rogue River and Klamath River systems.

Subadult and adult green sturgeon from both populations seeking summer time habitat could be found in estuaries of the Siuslaw National Forest. The coastal bays and estuaries in Oregon that are designated critical habitat for the green sturgeon Southern DPS are Coos Bay, Winchester Bay, and Yaquina Bay. Southern DPS green sturgeon has been confirmed to occupy Coos Bay, Winchester Bay, and the lower Columbia River estuary in Oregon. The coastal bays and estuaries excluded from designated critical habitat for the green sturgeon Southern DPS in Oregon are Tillamook Bay and the estuaries to the head of tide in the Rouge, Siuslaw, and Alsea rivers. A determination of the North American green sturgeon status was not made by the Oregon Department of Fish and Wildlife in the 2005 Native Fish Status Report. A conservative determination was made that their abundance might be low even though they are found throughout their historic range on the Oregon Coast.

Eulachon (Thaleichthys pacificus), commonly known as Pacific smelt or candlefish are a small anadromous fish that is known to spawn in small numbers in coastal rivers of the Siuslaw National Forest. Eulachon range from northern California to southwest Alaska into the Bearing Sea. They typically spend three to five years in the ocean before returning to freshwater to spawn in late winter through spring. NOAA Fisheries Service on March 9, 2009 proposed listing the southern distinct population segment (DPS) of Eulachon under the Endangered Species Act. The southern DPS ranges south from the Skeena River (inclusive) in British Columbia to northern California. Their distribution and population numbers are poorly documented on the Forest. Their probable ESA listing within the next year increases their importance for Forest level monitoring.

References

Stout, H.A. and 15 coauthors. 2010. Draft Updated Status Review of Oregon Coast Coho Salmon. National Marine Fisheries Service, Northwest Fisheries Science Center. Newport, Oregon. 227 p.



Monitoring Question: Water Quality

Is the water quality of perennial streams as measured by changes in water temperature, being maintained as predicted? And can long-term stream temperature monitoring sites be used as an indicator of climate change?

Water temperature

Thirty-seven sites were monitored for stream temperatures across the Siuslaw NationalForest during the months of June through September, 2009. Eleven sites have data for 11 years or longer, and are being monitored as long-term sites. Twelve sites have data for 5-10 years.

Comparing long-term Stream temperature monitoring sites

In the Coast Range, stream temperatures are not influenced by snow or glacial meltwater. Instead, air temperature seems to be a controlling factor. Over the years, and at several sites, paired air and water temperature monitoring data collectors have been installed. These sites show that water temperatures closely follow air temperatures, and have a similar, though not equation, diurnal fluctuation. Therefore, regardless of the amount of shade, summers with warmer air temperatures produce higher water temperatures. Since the air and water temperature are correlative in the Coast Range, it is possible that a long-term stream monitoring record could show a signature of climate change, and that climate change with the expected warming temperatures will have an effect on stream temperatures in the future. Figures 1 through 5 show graphs that compare air and water temperatures for two of the sites. Furthermore, data from the Cannibal Mountain RAWS weather station show that six out of the ten warmest summers have occurred since 2002 for a 35 year record. Three were in the decade of the 1970's, one was in the 1980's. One of the 10 coolest summers has occurred since 2000. Seven of the coolest summers were during the 1980's.

Paired air and water monitoring were continued at eight sites in 2010.

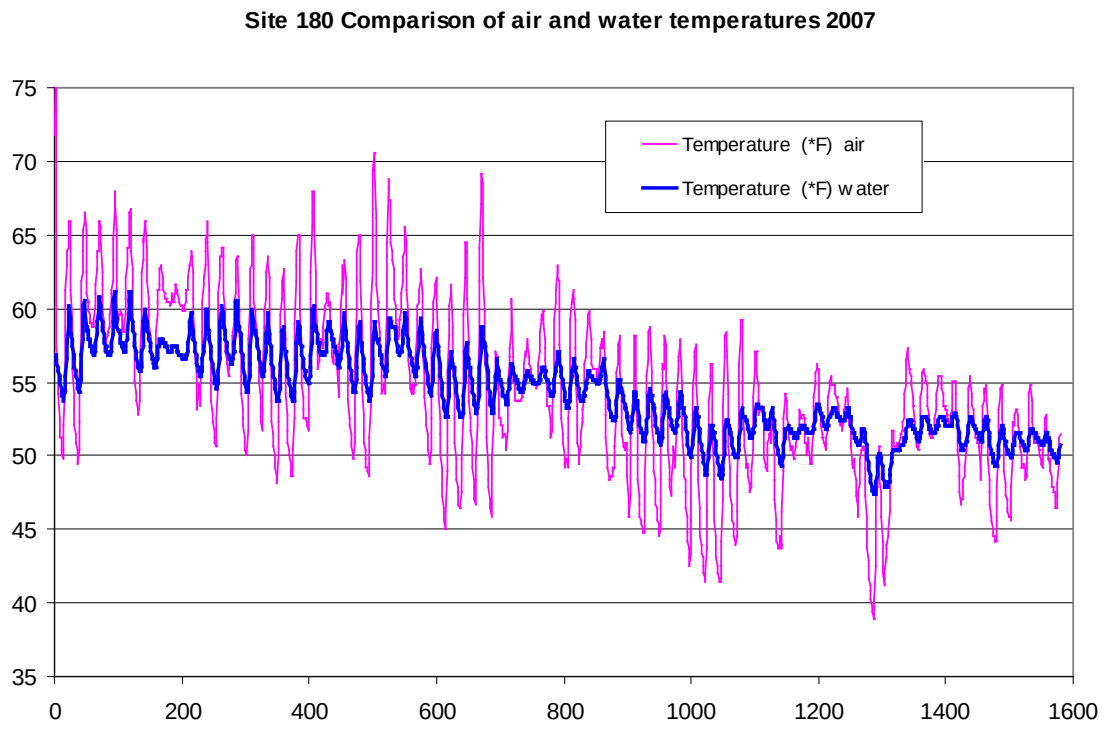


Figure 1: Comparison of air and water temperatures from August 12 through October 17, 2007 for Cape Creek. Cape Creek enters the Pacific Ocean near Heceta Head. The site is 2.4 km from the coast.

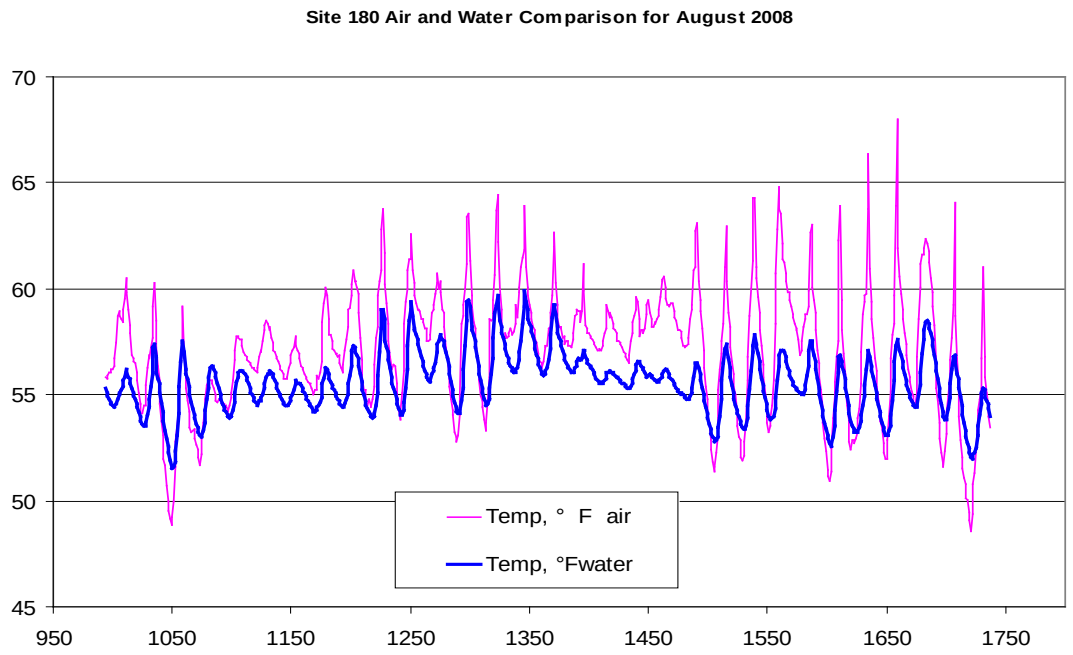


Figure 2: Cape Creek site with air and water temperature comparison for the month of August, 2008. Note the strong correlation between the air and water temperature peaks and valleys.

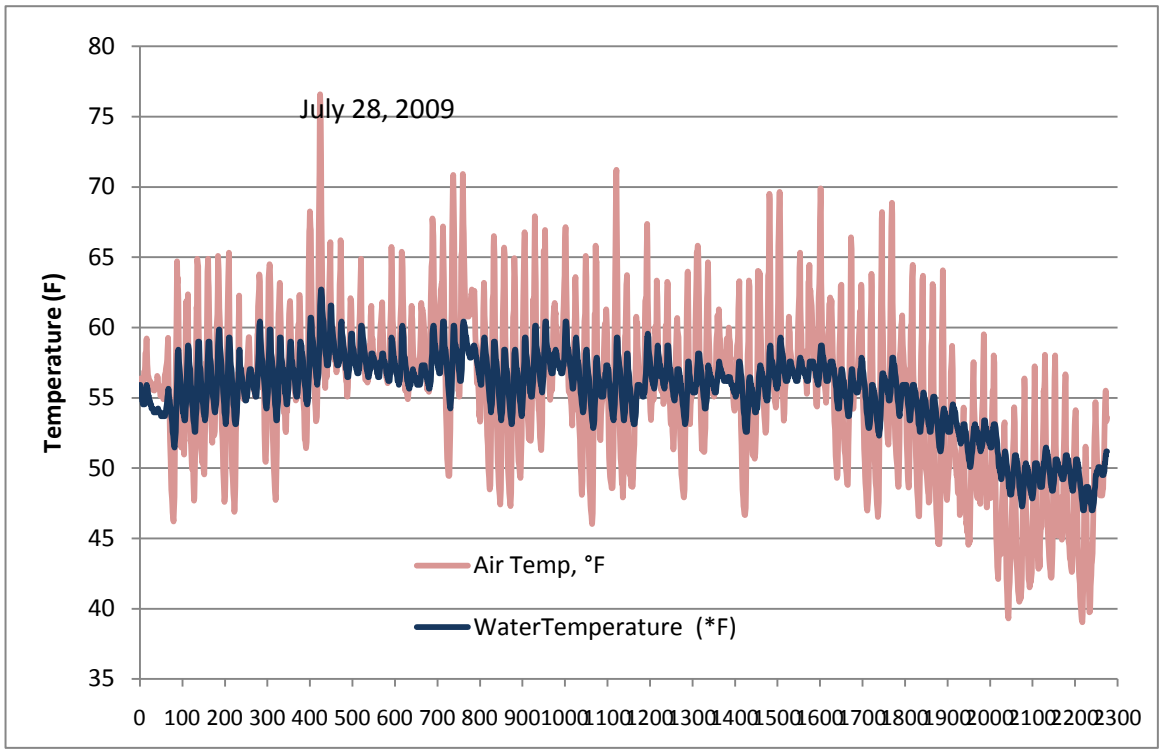


Figure 3: Site 180 Air and Water comparison between July 11 and October 13, 2009. The warmest day was July 28, 2009.

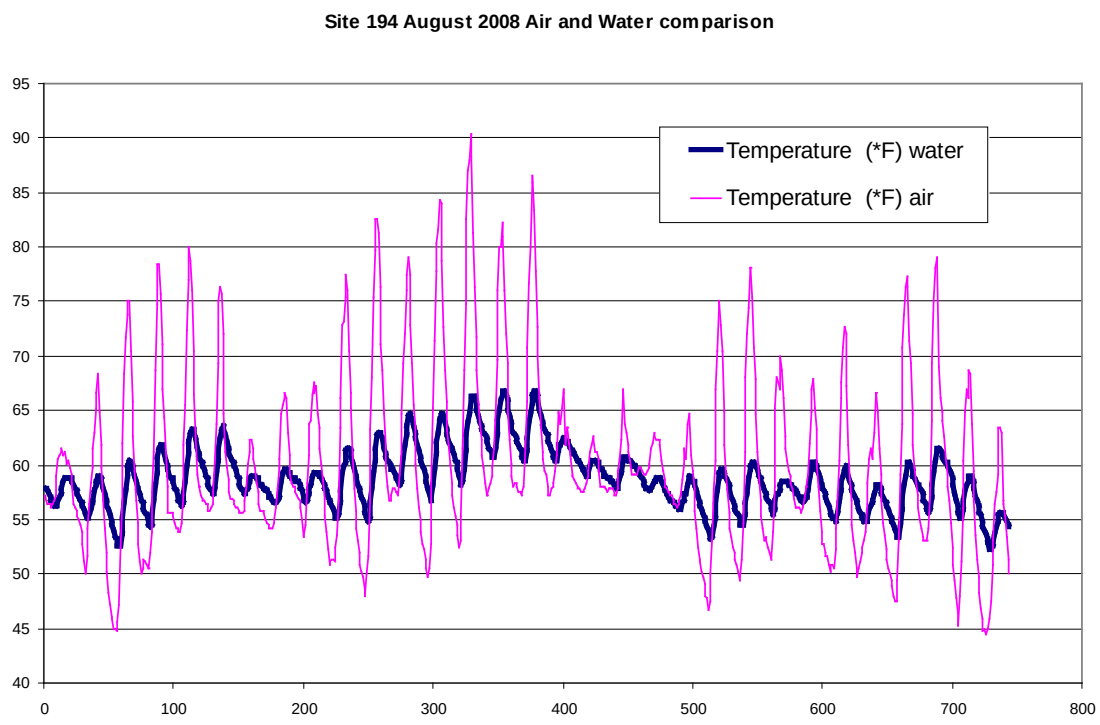


Figure 4: Drift Creek of the Alsea upstream of Gopher Creek for August, 2008. The site is 19.2 km from the coast.

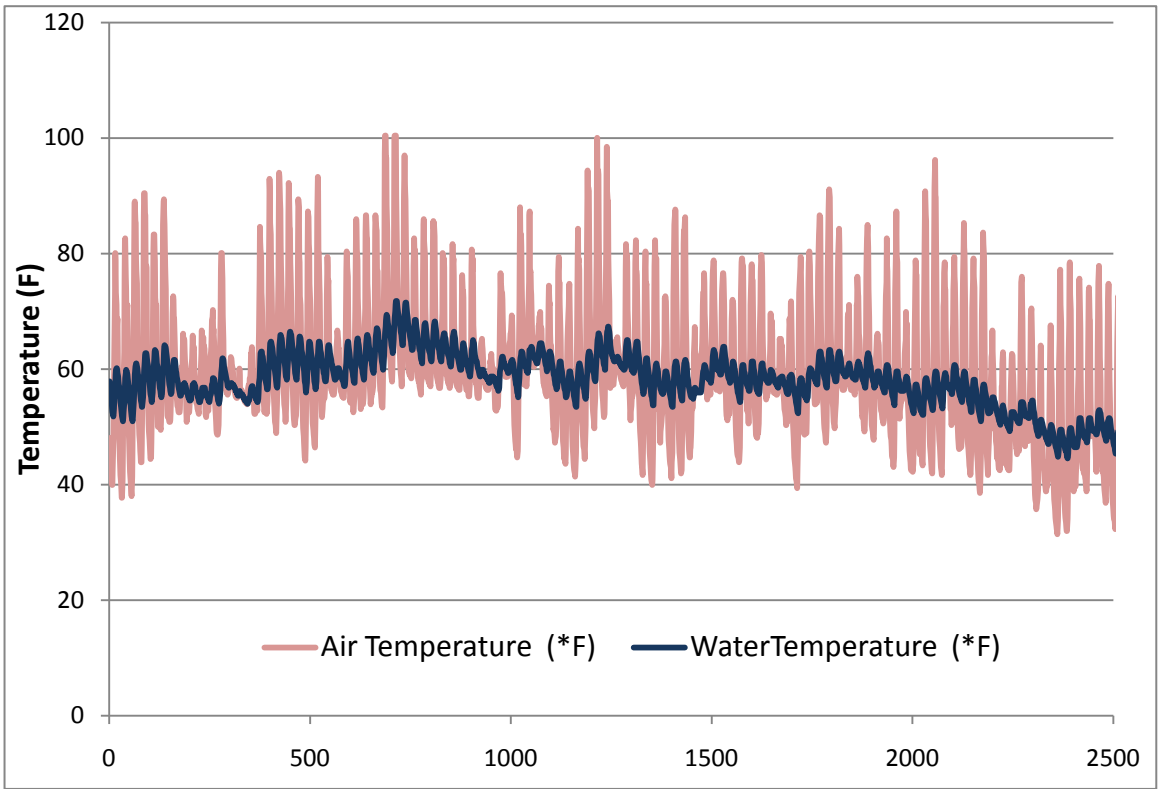


Figure 5: Air and Water temperature comparison for Drift Creek of the Alsea upstream of Gopher Creek (Site 194), June 29 to October 13, 2009.

Rank (Warmest to Coolest)	date	7-day average maximum temperature (F)		Rank (Warmest to Coolest)	date	7-day average maximum temperature (F)
1	7/23/2006	90.43		19	8/2/1993	81.29
2	8/7/1972	88.57		20	6/18/2004	81.29
3	7/30/2009	87.71		21	8/29/1987	81.14
4	9/25/2003	87.43		22	8/12/1997	81.14
5	7/11/2008	87.43		23	9/11/1999	80.29
6	8/11/2002	86.71		24	9/11/2001	79.86
7	8/9/1981	86.57		25	9/9/2007	79.71
8	8/1/1977	85.71		26	9/14/1989	78.71
9	7/29/2005	85.29		27	8/7/1986	78.14
10	9/10/1975	84.86		28	7/28/1980	77.57
11	7/25/1996	84.57		29	9/23/2000	77.14
12	7/31/1974	84.14		30	6/21/1982	74.00
13	8/31/1998	84.00		31	8/23/1985	76.14
14	7/23/1978	83.71		32	8/31/1976	75.00
15	7/23/1988	83.71		33	8/7/1984	74.14
16	9/10/1973	82.43		34	8/15/1983	72.29
17	7/19/1994	82.29		35	7/6/1979	66.57
18	6/29/1995	82.29				

Table 1: Seven-day average maximum temperature per year from Cannibal Mountain RAWS station between the months of July through September. Data is ranked from the warmest to the coolest summer.

Tables 2 and 3 show the characteristics and the data from the long-term monitoring sites, respectively. They cover a variety of bedrock types, drainage sizes, and distance from the coast, and whether they are within or outside of the coastal fog zone.

Creek name	**Site number**	**Watershed Area above monitoring site (square miles)**	**geology**	**Distance from Coast (miles)**	**management**	**Within Fog Zone?**
Wapitii	179	4.4	Tpb--basalt	1.5	Late Successional Reserve	yes
Cape Creek	180	6.8	Tpb--basalt	1.5	Late Successional Reserve	yes
Sampson	5	9.9	Siletz River Volcanics (basalt)	8.7	Lower watershed: Late Successional Reserve, Upper: private timberland	no
Upper Drift	4	11.2	Siletz River Volcanics (basalt)	8.7	Lower watershed: Late Successional Reserve, Upper: private timberland	no
North Cape	194	14.6	Tyee Fm	11.8	Late Successional Reserve, aprox. 25% of watershed is private timberland	no
Traxel	79	5.4	Tyee Fm	12.1	Late Successional Reserve and private timberland.	no
Powder	500	2.6	Yamhill Fm (fine-grained sedimentary)	14	roadless area	no

Table 2: Characteristics of the long-term stream temperature monitoring sites.

STREAM	STATION	**2000_7-day ave max temperature**	2001_7-day ave max temperature	2002_7-day average max temperature	2003_7-day ave max temperature	2004_7-day ave max temperature	2005_7-day ave max temperature	2006_7-day ave max temperature	2007_7-day ave max temperature	2008 7-day ave max temperature	2009 7-day ave max temperature
Wapiti (fog zone)	179	60.10	59.00	58.50	60.70	61.70	59.20	59.90	59.10	57.70	58.8
Cape (fog zone)	180	60.90	60.00	60.20	62.50	62.80	60.50	61.40	61.00	59.20	60.6
Sampson	5	62.00	60.00	61.10	62.90		60.80	63.60		60.00	
Upper Drift (Siletz)	4	64.40	62.60	62.90	65.30		60.90	66.10		62.80	
Drift	194	66.00	64.80	65.60	67.30		64.30	70.20	65.90	65.10	
North Cape Cr	2023	57.30	56.60	57.80	58.00	58.90	57.90	58.50	57.40	56.90	
Traxel Cr	79	58.90	57.80	57.60		59.80	57.50	60.20	57.40	57.30	
Powder Cr	500	62.80	61.50	64.10	66.50	64.10	62.10	68.50		62.50	70.2*

Table 3: Long-term stream temperature monitoring sites, with the 7-day average maximum temperature for each year between June and October. The numbers highlighted in yellow are the warmest recorded 7-day average maximum temperature for the stream, the numbers highlighted in blue are the coolest 7-day average maximum temperature for that site in the 8 years of record. Note that for half the sites, 2001 was the coolest year, and for the majority of the sites, 2006 was the warmest. The Cannibal Mountain RAWS station also recorded the warmest air temperatures in 2006 for its 37 year record. 2009 was the third warmest summer on record. Wapitii and Cape Creeks are within the fog zone, and are 1.5 miles from the coast. The fog zone may be the explanation for the reason that the warmest and coolest years for these sites are different from the other sites, which are not in the fog zone.

*The 2009 Powder Creek location was 1600 feet downstream of the other years' monitoring site.

Conclusion

The long-term monitoring sites vary in distance from the coast, watershed area, geology, and management. In spite of these differences, there seems to be an overall regional trend in warm vs. cool summers. The only sites that don't fit the overall trend are the two sites that are within the fog zone near the coast. More years of monitoring will help determine whether stream temperature can be used as a bellwether for climate change.

Watershed Monitoring for Stream Temperature

This section of the report focuses on stream temperature monitoring in three different watersheds. Drift Creek (Alsea River) was monitored in 2009 to measure whether or not the wilderness area had any effect on stream temperatures. The monitoring done in the Green River was conducted to understand variance in stream temperatures through the watershed. The stream temperature monitoring in the Karnowsky Creek watershed was done to monitor what changes might occur before and after a major restoration project was completed.

Drift Creek, Tributary to the Alsea River

The Drift Creek Wilderness is a 5790 acre block of land in the lower portion of the Drift Creek watershed. In 2009, the Drift Creek Wilderness Area was bracketed with temperature monitoring to see if the wilderness area had any effect on stream temperature. Sites were chosen just upstream and downstream of the wilderness boundary. Boulder Creek, a tributary watershed that has a full canopy, and no timber harvest since the late 1980's, enters Drift Creek in the middle of the wilderness. The drainage size of Boulder Creek is 4.3 square miles. Drift Creek above its confluence with Trout Creek has a drainage area of 53.2 square miles. Trout Creek is 6.7 square miles in size.

Two sites were monitored in the upper part of the watershed, 6.2 miles upstream of the wilderness. They are the mouth of Gopher Creek, and Drift Creek just upstream of Gopher Creek.

Data for the Drift Creek Watershed is shown in Table 4. The locations of the temperature monitoring sites in and around the Wilderness area are shown in Figures 6 and 7.

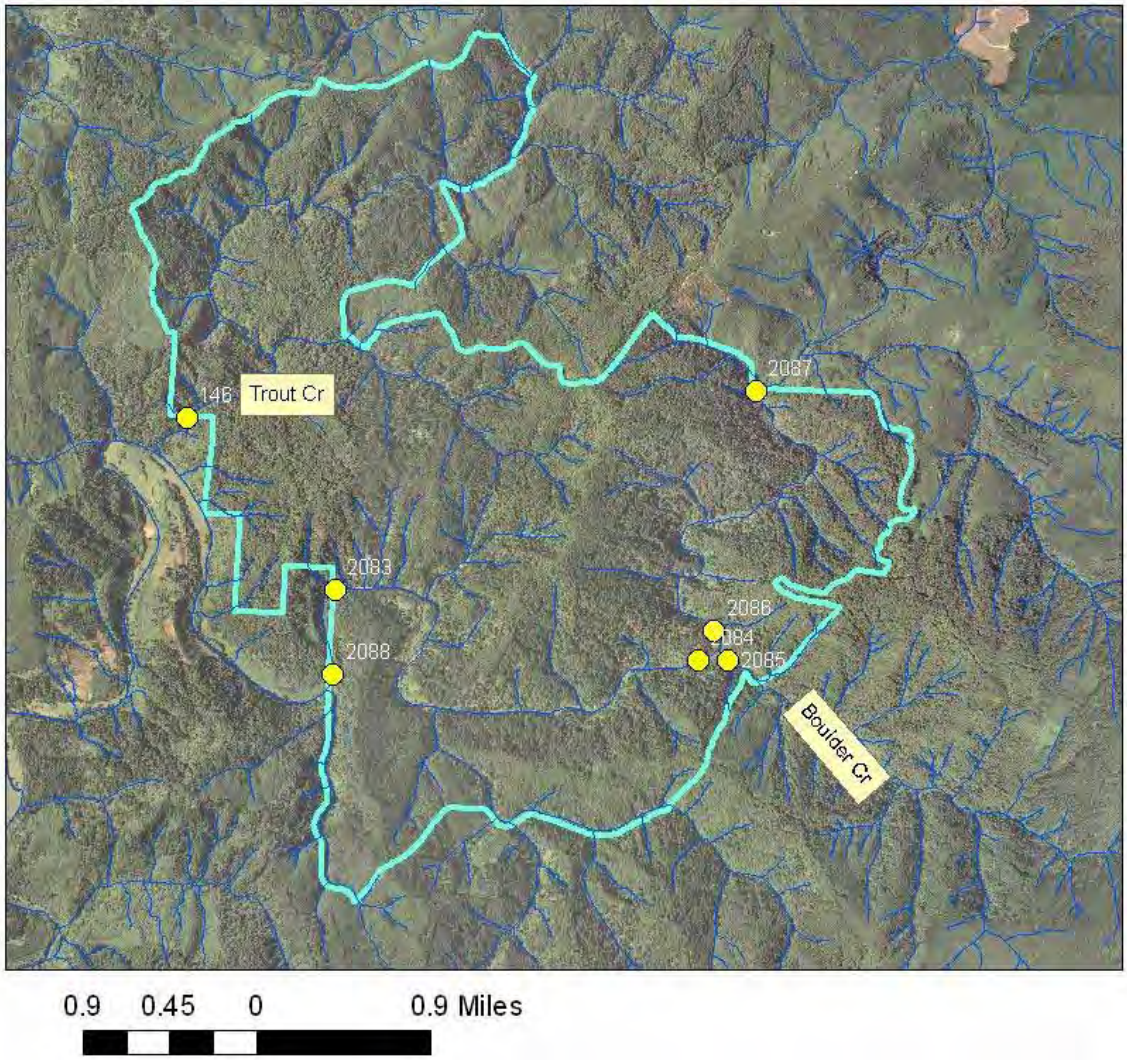


Figure 6: Air photo of the Drift Creek Wilderness showing the location and site numbers of the temperature monitoring locations.

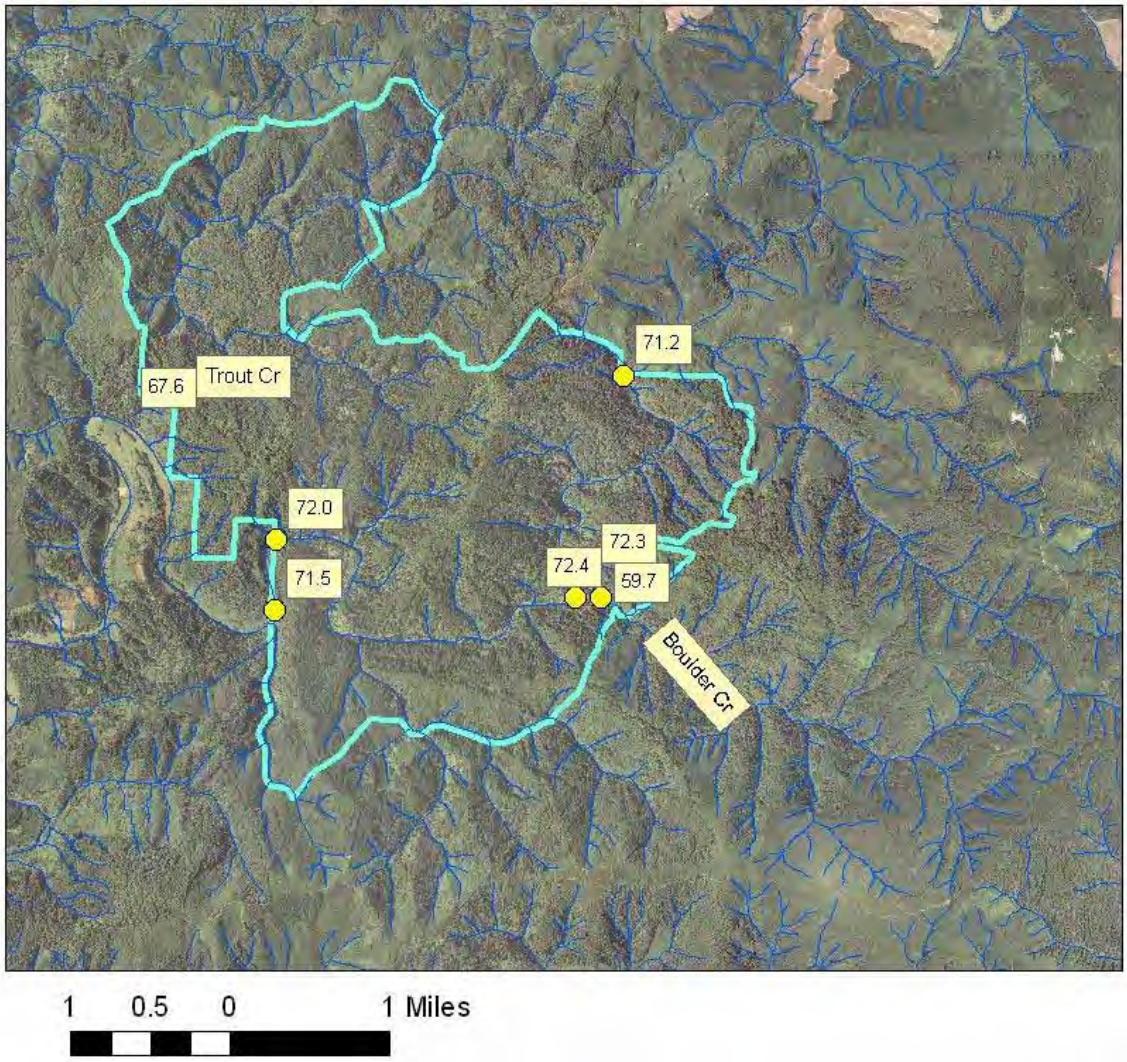


Figure 7: Air photo of the Drift Creek Wilderness stream temperatures (7-day average maximum temperatures in F) in the Drift Creek Wilderness

Stream	Location	Station number	2009 7-day average maximum temp	drainage area (sq miles)	2-year recurrence flow (cfs)
Trout	at mouth (part of this drainage is within the wilderness, the upper portion is not)	146	67.6	6.44	443
Gopher	at mouth (upstream of wilderness)	195	68.9	5.8	539
Drift Creek	upstream of Gopher Creek (upstream of wilderness)	194	69.2	14.6	1530

Stream	Location	Station number	2009 7-day average maximum temp	drainage area (sq miles)	2-year recurrence flow (cfs)
Boulder Creek	mouth	2085	59.7	4.32	358
Drift Creek	upstream of wilderness boundary	2087	71.2	39.9	3550
Drift Creek	upstream of Boulder Creek	2086	72.3	41.6	3680
Drift Creek	downstream of Boulder Creek	2084	72.4	46	3990
Drift Creek	upstream of south flowing reach in Wilderness	2083	72	51.1	4270
Drift Creek	downstream of south flowing reach in wilderness, near downstream boundary	2088	71.5	51.3	4290

Table 4: Stream temperature data for the Drift Creek (Alsea) Watershed for 2009, including the Drift Creek Wilderness.

The following graphs (Figure 8 to 14) show the diurnal temperature data for the individual sites in and around the Drift Creek Wilderness between July 10 and September 13, 2009. All of them show the warmest day was July 28, 2009. The maximum daily air temperatures for the Cannibal Mountain RAWS station is also shown for the same time period in 2009, and the two warmest days were July 28 and 29 at 98F (Figure 15).

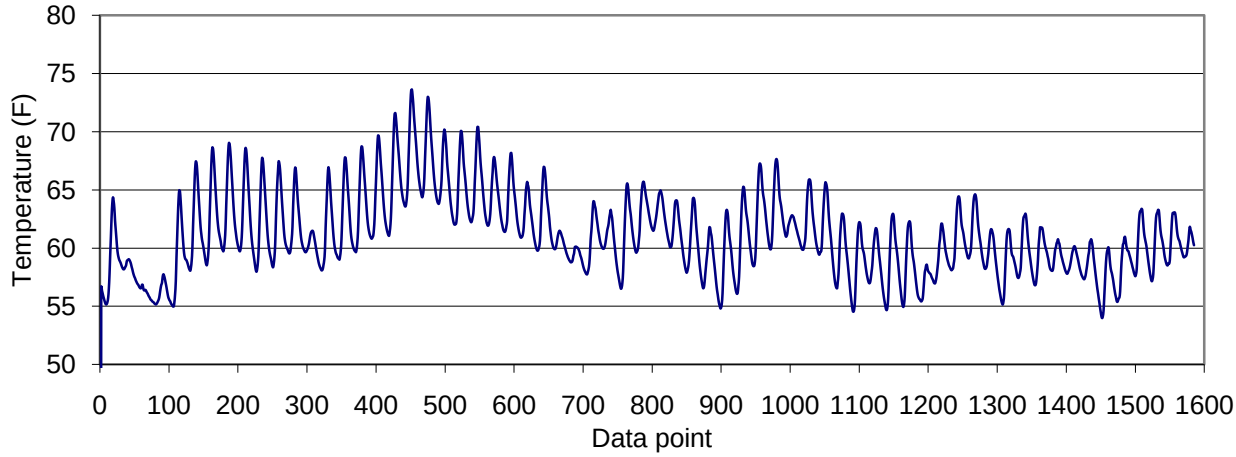


Figure 8: Drift Creek upstream of wilderness area, on boundary.

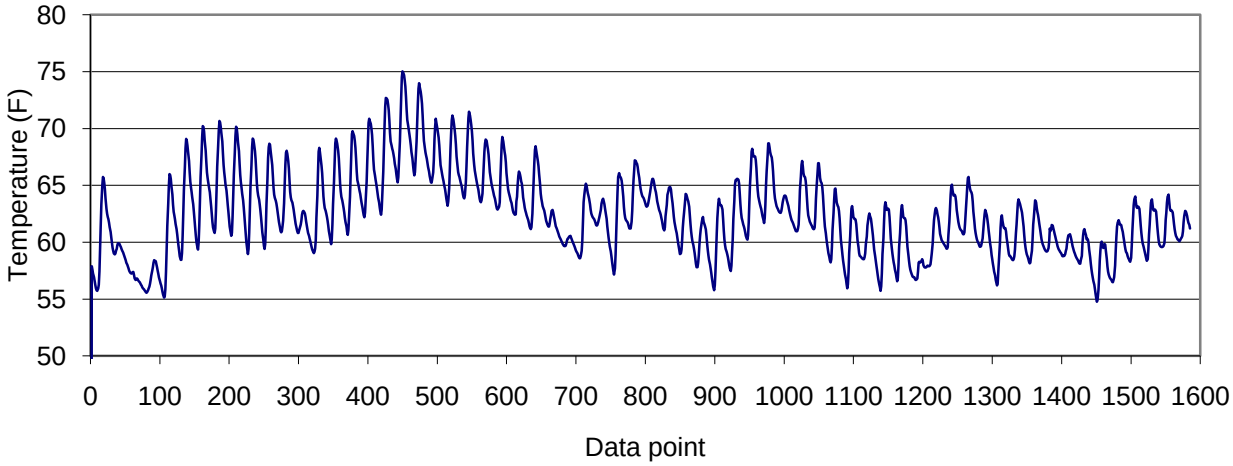


Figure 9: Drift Creek upstream of Boulder Creek (within Wilderness)

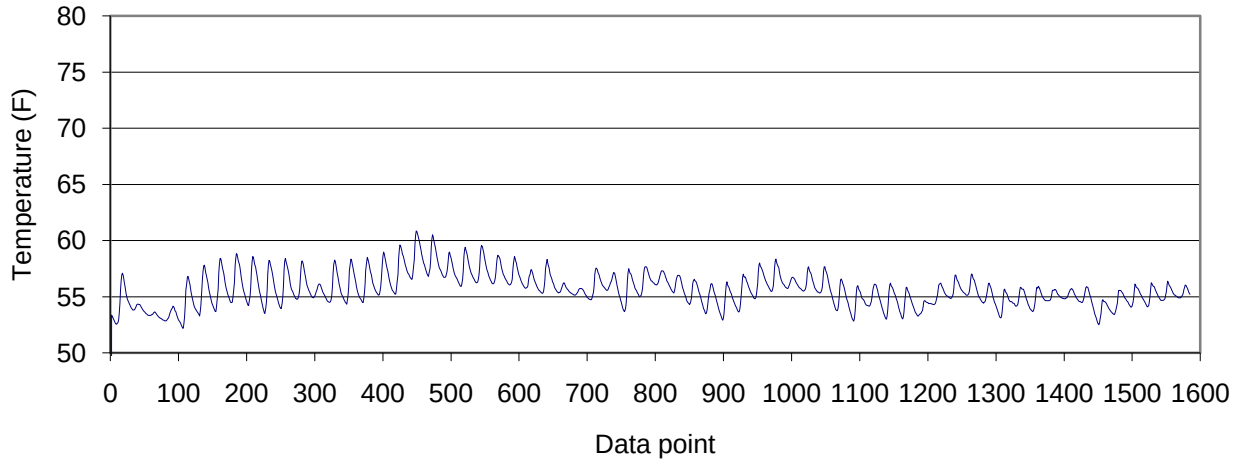


Figure 10: Boulder Creek (4.3 square miles drainage area)

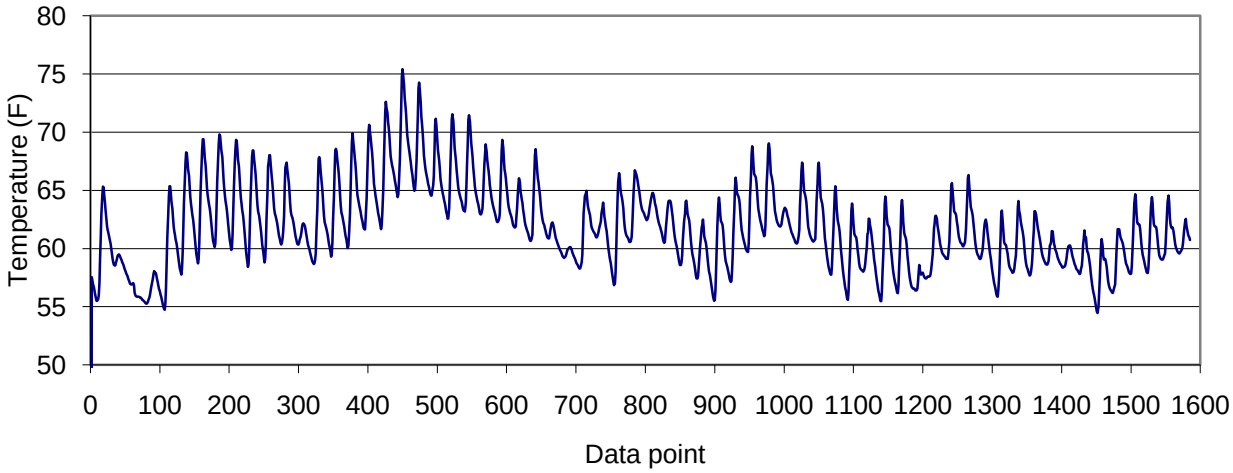


Figure 11: Drift Creek downstream of Boulder Creek (within Wilderness)

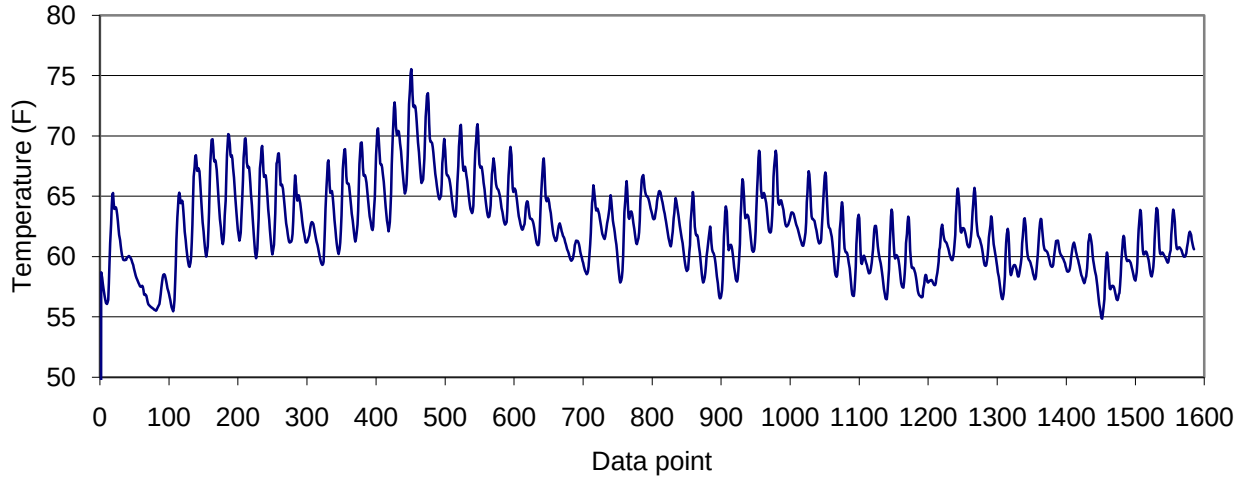


Figure 12: Drift Creek upstream of south-flowing reach within Wilderness

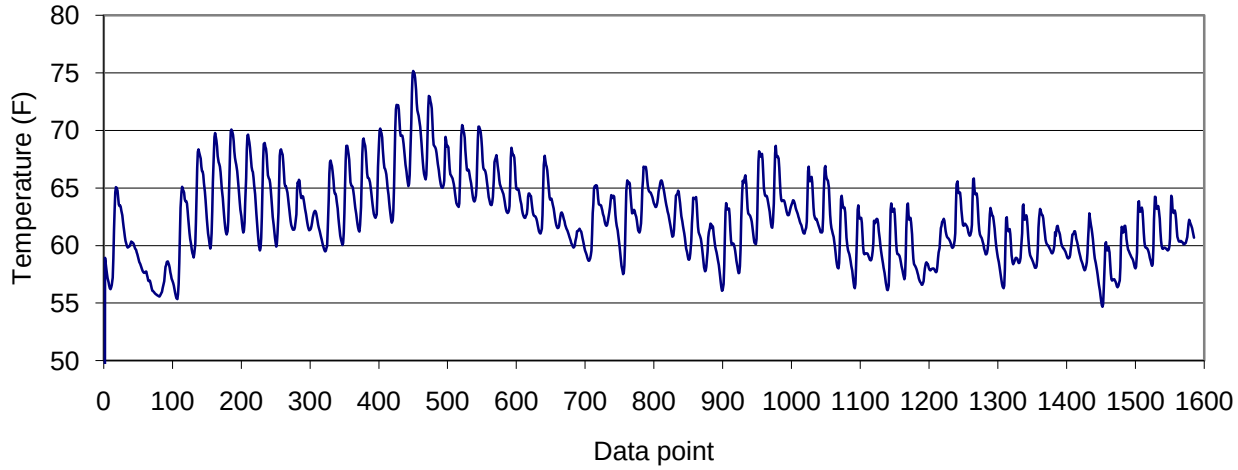


Figure 13: Drift Creek downstream of south-flowing reach within Wilderness.

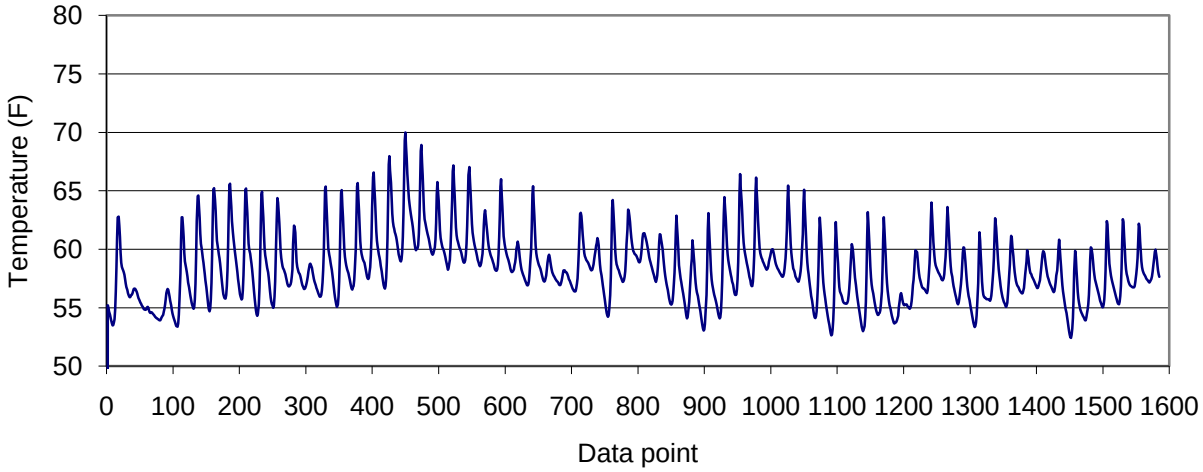


Figure 14: Trout Creek (6.7 square miles drainage area)

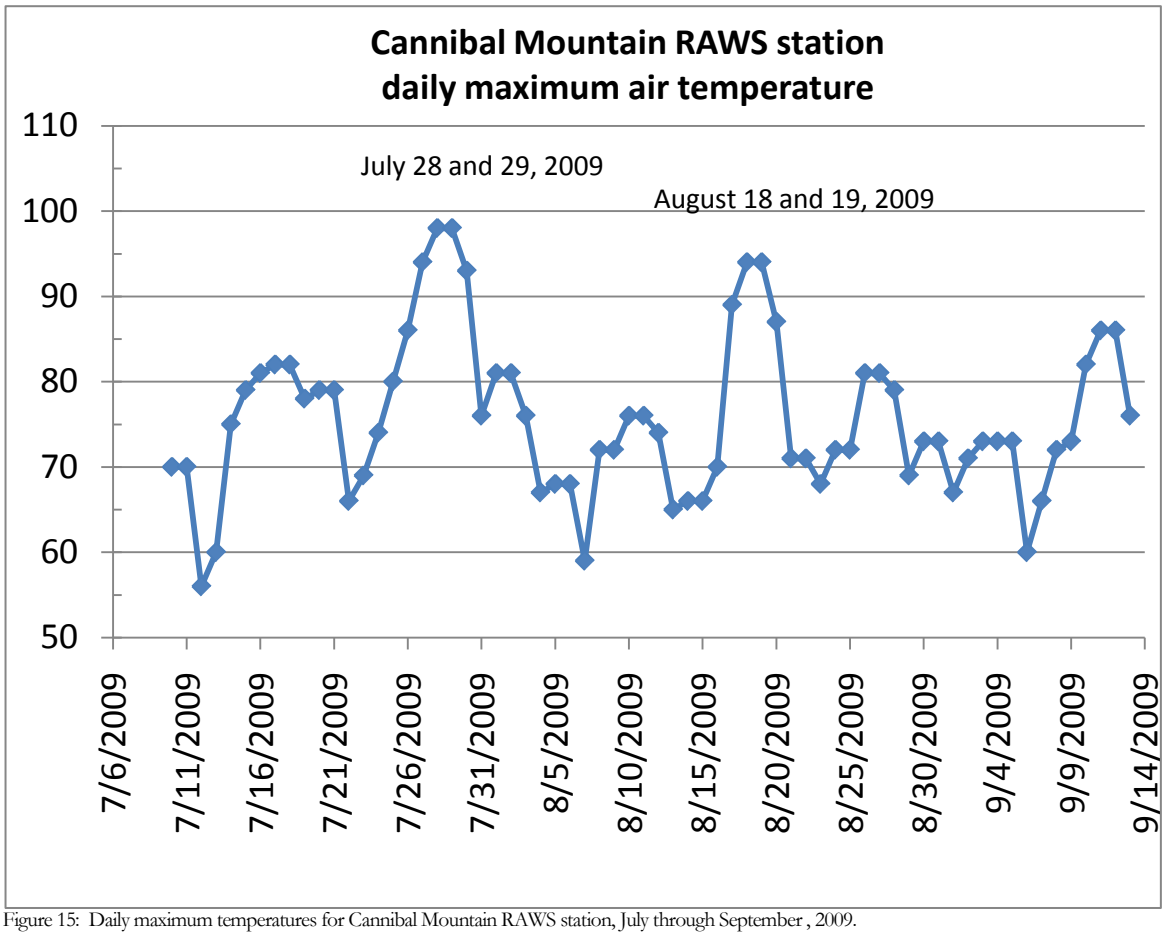


Figure 15: Daily maximum temperatures for Cannibal Mountain RAWS station, July through September , 2009.

Discussion: Drift Creek flows through the wilderness for 5.6 river miles. There was no significant difference in stream temperature between the upstream monitoring site and the downstream monitoring site. The water entering the wilderness was 71.2F, the water near the downstream boundary was 71.5F. Although Boulder Creek meets the water quality standards with a 7-day average maximum temperature of 59.7, its input had no effect on Drift Creek. At the point where it enters Drift Creek, the 2-year flow of Boulder Creek is approximately one tenth of the flow of Drift Creek.

Green River

Green River is a tributary to Five Rivers, a major tributary to the Alsea River. Sites 109 and 2012 bracket a former beaver pond that has filled in and become a "flat" in the stream gradient profile. Site 2012 is upstream of the flat; site 109 is downstream. Over the years, alder have colonized the site and shaded the stream channel. Site 2012 has retained a relatively constant temperature around 61F. In 2001, site 109 was 6.6F warmer than site 2012, but beginning in 2005, the temperature began to drop, and by 2008, it was almost the same as Site 2012, suggesting that the growth of the alder had reduced solar heating in this segment of stream. In 2009, all of the stream temperature sites were slightly warmer than 2008, as were the air temperatures. See Figure 16 for a map of the Green River watershed and temperature sites. Table 5 summarizes the watershed's data since 2000.

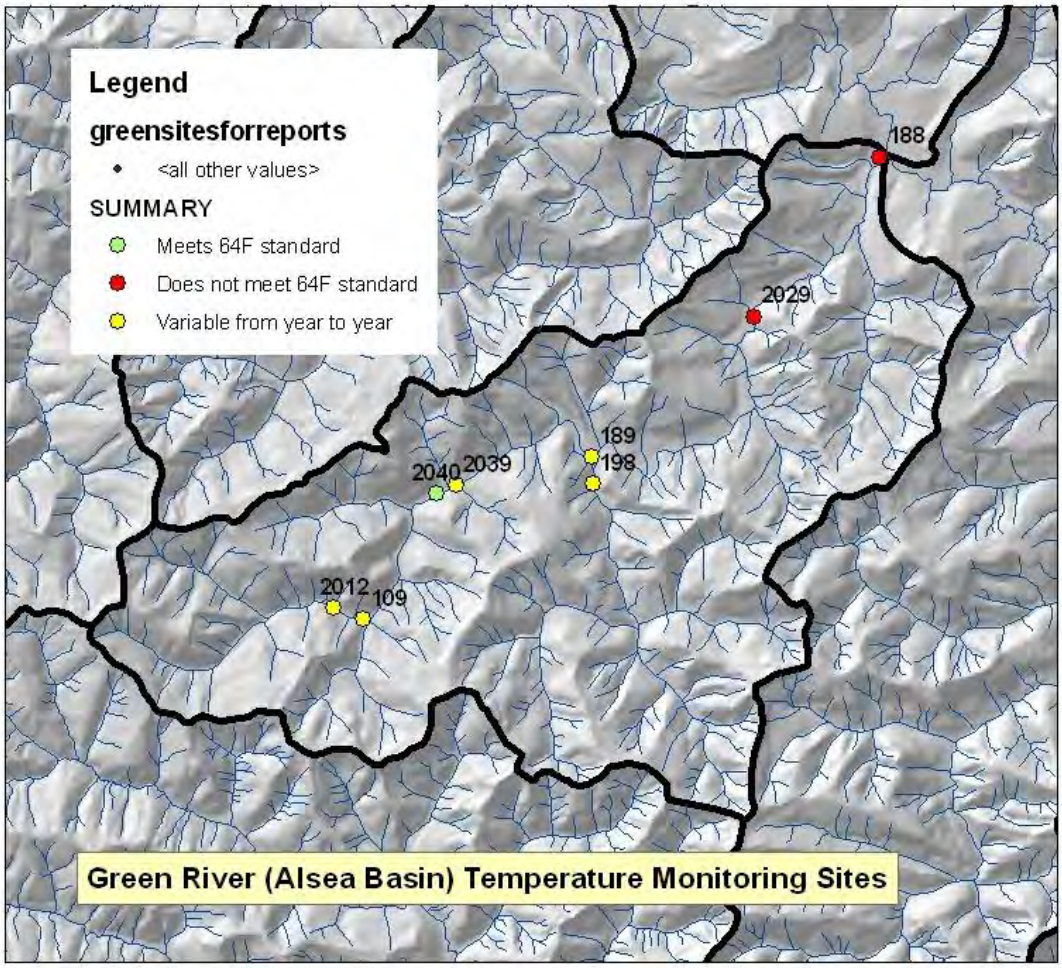


Figure 16: Map of the Green River stream temperature sites.

STREAM	STATION	2000_7-day	2001_7-day	2002_7-day	2003_7-day	2004_7-day	2005_7-day	2006_7-day	2007_7-day	2008 7-day ave max	2009 7-day av max	years of data as of 2009
North Fork Green River	109		67.70	67.30	67.40		61.10	63.70	60.60	59.50	60.7	10
Mouth of Green River	188						66.80	73.30		69.00	71.8	4
Mouth of Green River AIR TEMP	188								83.10	84.80	83.9	3
Green River upstream of East Fork	189	64.50		64.40	66.30	67.70	63.00	67.10	63.80	64.20	65.6	13
East Fork Green R at mouth	198	65.70		67.40	66.50	65.90	62.10	66.80	63.00	63.40	64.1	13
EF Green AIR TEMP	198								78.10	79.60	81.3	3
N Fk Green above wide opening	2012	62.80	61.10	61.60	61.90	61.90		61.60	58.80	59.30	61.1	11
NF Green R above wide opening AIR TEMP	2012								72.40	78.80	82.0	3
Green River, mile 1.5	2029	68.70	68.40	68.30	68.60	69.40	65.30	70.50	66.20	66.30	68.6	10
Green River mile 4.6	2039	64.60	66.40	64.50	64.00	64.10	62.40	65.60	61.60	61.40	63.1	10
Green River mile 4.7	2040	62.20	61.00	61.70	62.40	63.00	61.40	65.20	61.80	62.20	63.4	10

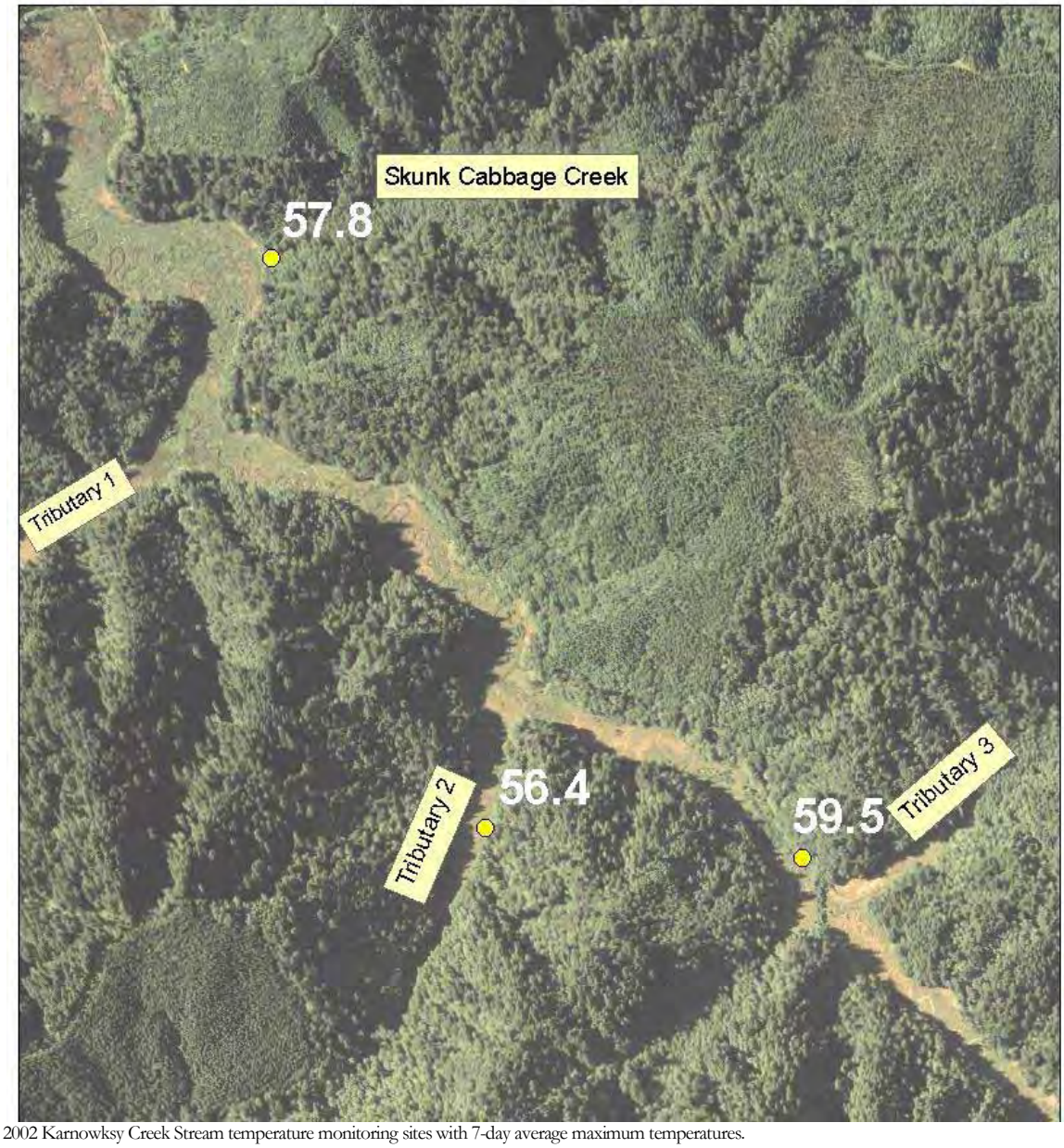
Table 5: Green River stream temperature data showing the yearly 7-day average maximum temperature. Wood was placed between sites 2039 and 2040 in 2002. Sites 109 and 2012 bracket a "flat".

Karnowsky Creek Stream Temperature Changes with Restoration Work

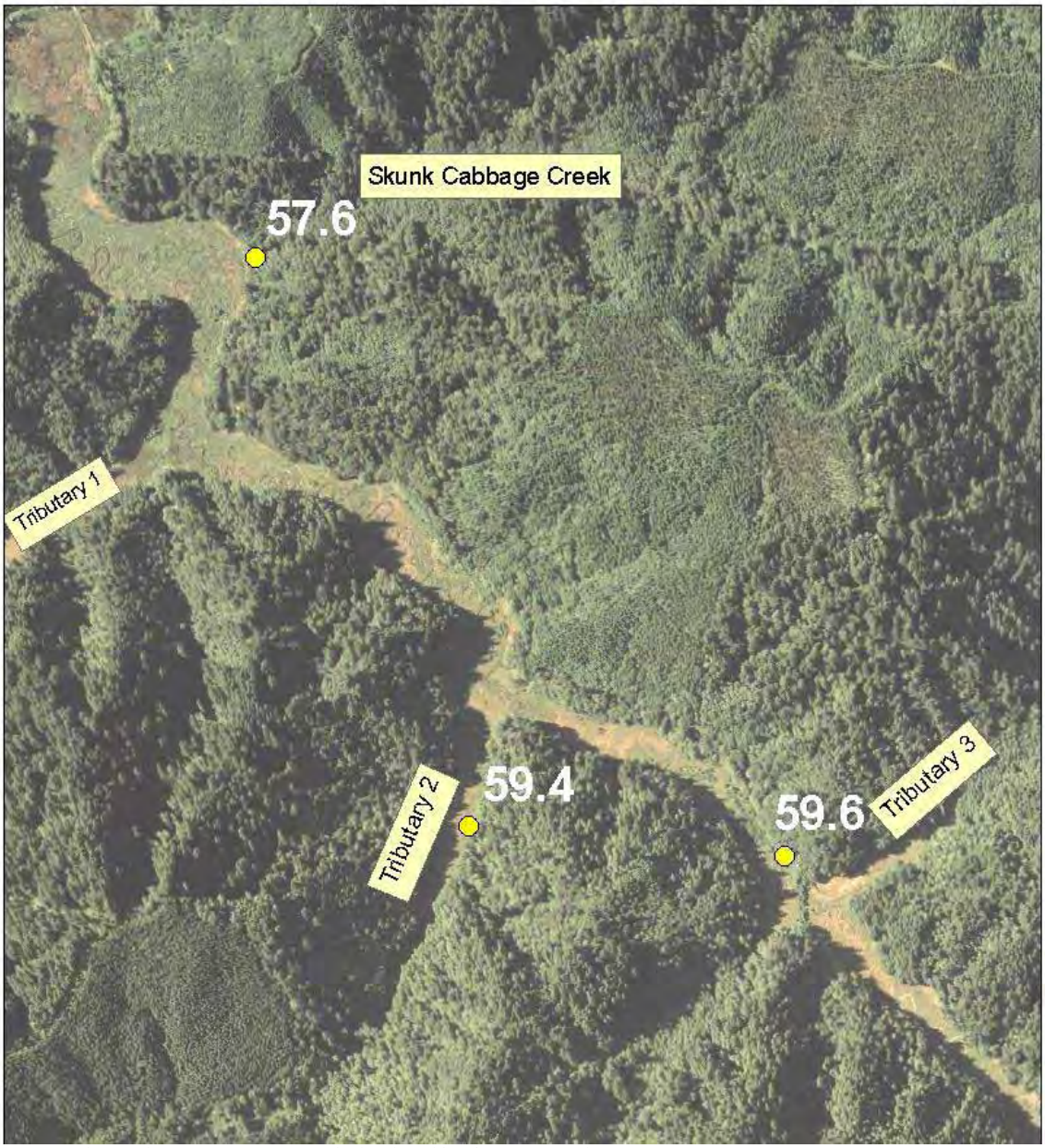
In the year prior to project implementation, 2002, water temperatures in the well-shaded ditches were in the high 50's F. Immediately after the new channel was dug in late 2002, and before the riparian vegetation had become established, water temperatures ranged from 59.2F to 73F in 2003, depending on location. As the vegetation grew and provided more shade, temperatures have dropped in subsequent years. In 2008, the highest 7-day average maximum temperature recorded was 63.7F just below Tributary 1. Some of the water temperature decrease may be due to raising the groundwater table, since the

meandering channel better at retaining and recharging the groundwater. The ditches were very efficient at draining the valley floor. 2009 stream temperatures are slightly warmer than they were in 2008. This result is similar to other long-term sites across the forest.

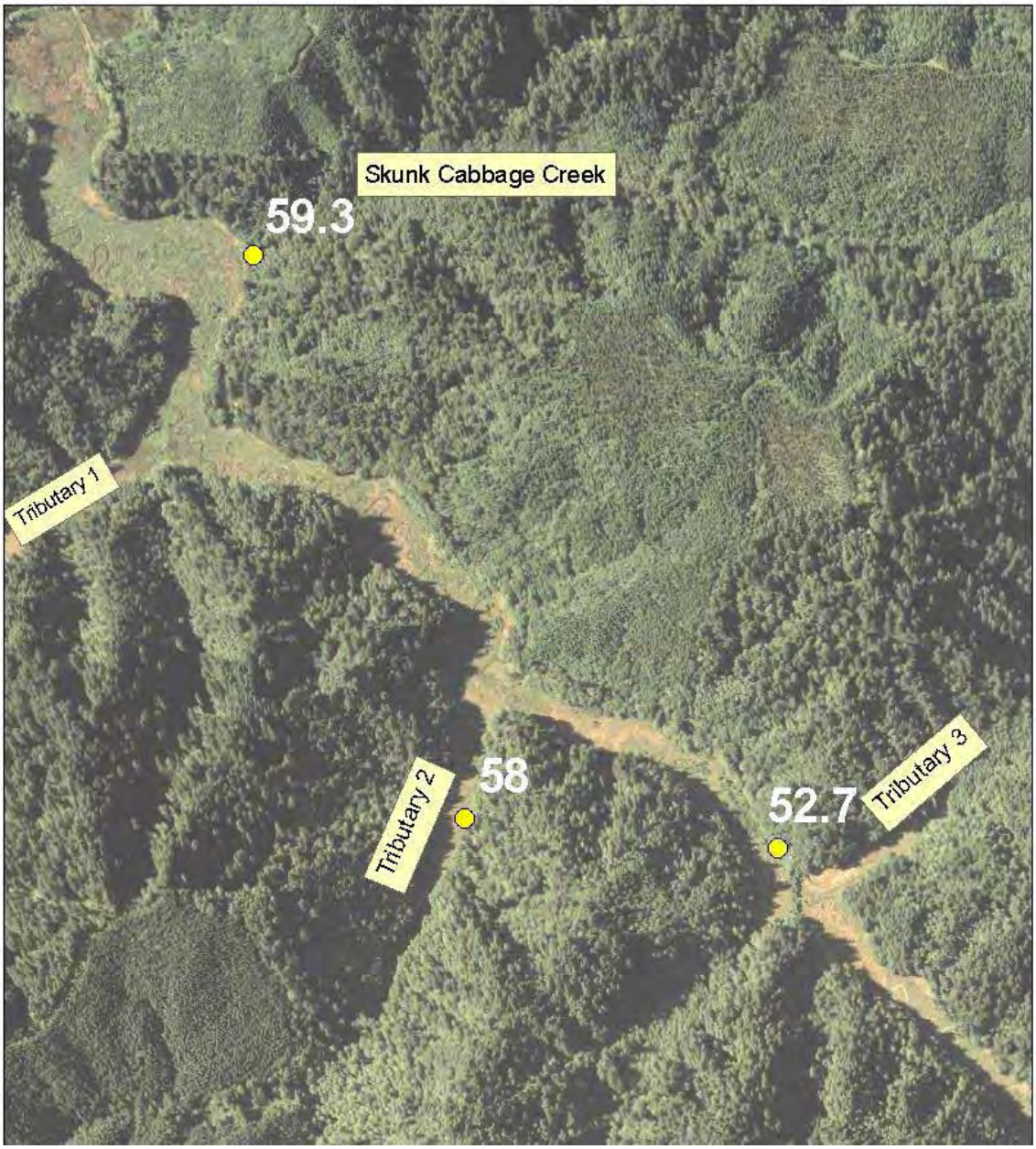
The following maps show the yearly temperature monitoring locations and the 7-day average maximum temperatures from 2002 through 2009.



2002 Karnowksy Creek Stream temperature monitoring sites with 7-day average maximum temperatures.

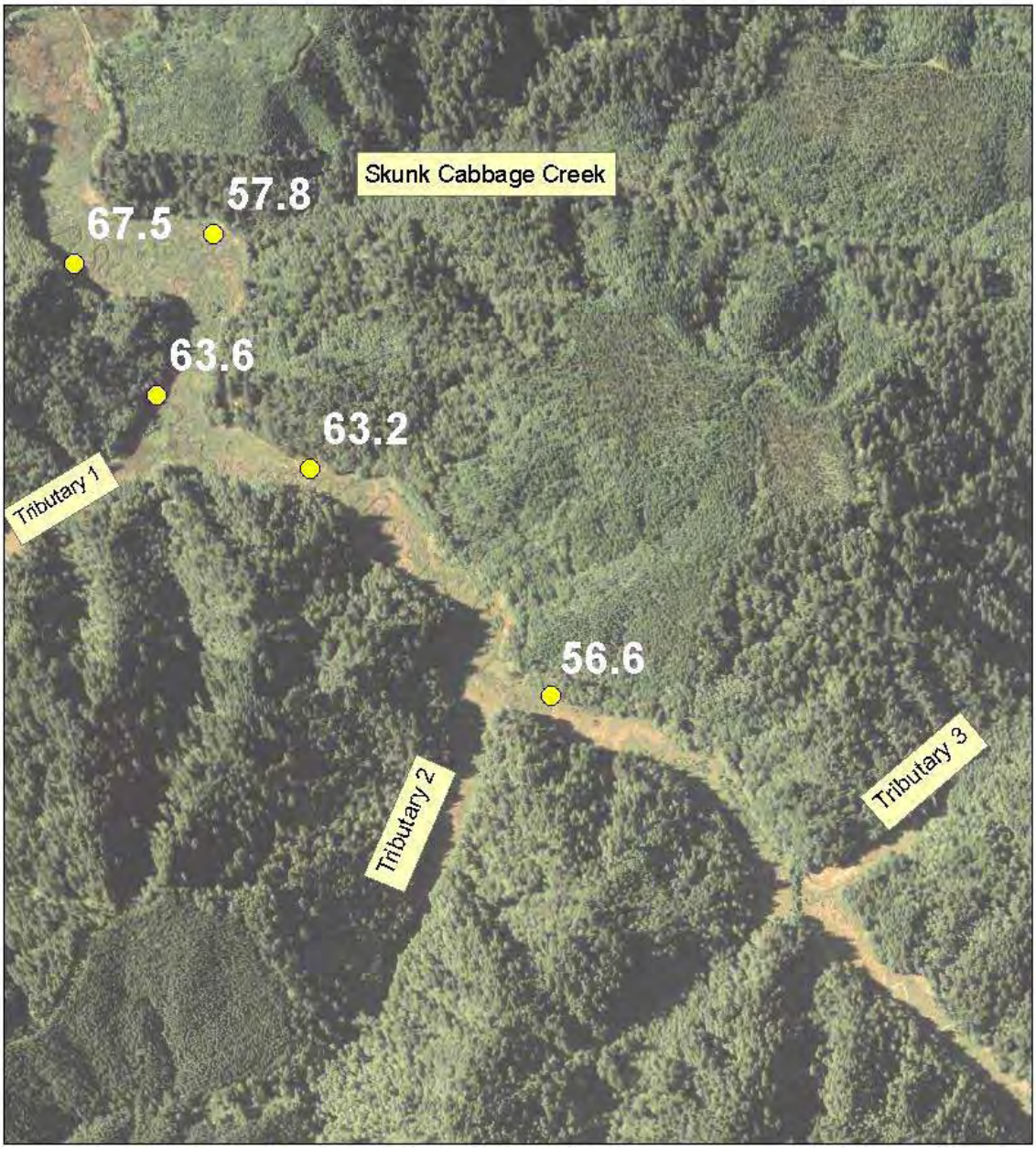


2003 Karnowksy Creek Stream temperature monitoring sites with 7-day average maximum temperatures.



2004 Karnowksy Creek Stream temperature monitoring sites with 7-day average maximum temperatures.

2005 Karnowksy Creek Stream temperature monitoring sites with 7-day average maximum temperatures.



2007 Karnowksy Creek Stream temperature monitoring sites with 7-day average maximum temperatures.

2008 Karnowksy Creek Stream temperature monitoring sites with 7-day average maximum temperatures.

2009 Karnowksy Creek Stream temperature monitoring sites with 7-day average maximum temperatures.

Terrestrial Group

The Forest Standards and Guidelines provide direction to enable the Forest to meet the goals of protecting and improving species populations and their habitat. Threatened, endangered, and sensitive species as well as ecological indicator species are monitored for species viability. Below is a summary of FY09 monitoring questions designed to assist the Forest in determining the effectiveness of the Forest Plan Standards and Guidelines in meeting the Forest's goals.

Monitoring Question: Forest Vegetation Condition

Is the forest seral stage distribution moving toward the desired future condition? Are forest stand composition and structure moving toward the desired condition?

The Forest is actively managing plantations through thinning, releasing and under-planting stands to accelerate the development of young stands towards late-successional habitat. Snags and down wood creation through Stewardship contracts or service contracts is accomplished in conjunction with commercial thinning timber sales.

Activity	Unit of Measure	Accomplished
Invasive Species Treatment	Acres	131
Commercial Thinning	Acres	1435
Tree Planting	Acres	9
Reforestation Enhancement	Acres	408
Animal Damage Control for Reforestation	Acres	691
Area release and weeding	Acres	491
Pre-commercial thinning	Acres	1489
Wildlife Habitat Improvement – large woody debris placement	Structures	6029
Wildlife Habitat Nest Structures	Structures	740
Wildlife Habitat Snags created	Structures	2732

Activity	Unit of Measure	Accomplished
Wildlife Habitat: Grasses and forbs	Acres	450
Anadromous Fish Habitat Improvement	Acres	12
Anadromous Fish: Thinning for Fish Habitat Improvement	Acres	22
Road Decommissioning	Miles	4.5

Monitoring Question: Plantation Management

Are plantations being managed at prescribed density levels?

Plantations are being managed through non-commercial thinning and commercial thinning. See table above. Monitoring by Contractor Officer Representatives for non-commercial thinning and Timber Sale Administrators for commercial thinning ensure that prescribed density levels are being met.

Monitoring Question: Suitable Timber Land

Has the suitable timber land base changed?

Two types of changes usually result in an alteration to the total suitable acres for timber harvest; a change in the ability to adequately reforest a site within 5 years or a change in the timber harvest objectives for a piece of land. Changes to the suitability of lands for timber production have not occurred.

Monitoring Question: Special Forest Products

Is moss being managed for harvest and long-term sustainability while comply with Standards and Guidelines? Are there any negative effects from harvest to the long-term sustainability of Matsutake mushroom resources?

Since 1996, two large stewardship areas in the North Coast Adaptive Management Area were set aside as moss harvest monitoring sites. Each area consists of clearcuts and young conifer forest, young to mature hardwood and mixed forest, and some older conifer forest. Each area has been divided into three harvest areas with different guidelines for each:

- Area 1. No harvest within 100 feet of a perennial stream, no harvest above 40 feet, and harvest less than 30 pounds of moss per acre (wet weight).
- Area 2. No harvest guidelines—harvest is at the discretion of the steward/harvester.
- Area 3. Left unharvested as a control area.

Within each stewardship area, 24 permanent plots were set up which require annual monitoring. Also, 30 upland plots were surveyed for the bryophyte communities on the forest floor, logs, trees, and shrubs, ten in each harvest area. Twenty-four riparian plots were surveyed for bryophyte communities, six each on four different streams.

This was set up as a co-operative study with JeriLynn Peck (a research epiphyte ecologist), Oregon Natural Heritage Program (ONHP) through a Regional Challenge Cost Share, and one local moss harvester. The ONHP fulfilled its commitment with the cost share agreement and chose to cease involvement with the study. However, JeriLynn Peck agreed to continue with the study in various capacities through the year 2004. Following the 2004 inventory monitoring of the plots, Ms. Peck began developing projections for moss harvest levels for the Hebo Ranger District.

On August 22, 2005, a letter from Regional Forester Linda Goodman established a regional policy to conduct moss inventories and analysis prior to issuance of any permit or contract to determine baseline levels. At that time, the Siuslaw National Forest suspended all commercial moss harvest permits.

In January 2006, the Forest began developing the Commercial Special Forest Products Program Environmental Assessment (EA). This EA included moss harvest levels. Ms. Peck provided the Forest moss sustainable harvest projections to complete the analysis. On May 18, 2007, the Decision was signed on the Commercial Special Forest Products Program Environmental Assessment. Commercial moss harvest was reduced to 16,000 pounds per year on the Hebo Ranger District. No commercial harvest will be allowed on the Central Coast Ranger District until inventory and analysis is completed.

On November 13, 2007, the manuscript, Using Inventory Projections to Evaluate Management Options for the Nontimber Forest Product of Epiphytic Moss, authored by Jerilyn Peck, Howard Hoganson, Patricia Muir, Alan Ek, and Lee Frelich was submitted to Forest Science. It was accepted on September 12, 2007. It was published in the April 2008 issue. This paper describes the analysis used to arrive at the sustainable harvest levels for the Hebo Ranger District. No moss was harvested in 2009.

The Matsutake mushroom harvest in the Oregon Dunes of up to 100 permits per year continues to maintain the long-term sustainability of the Matsutake. Seeing a need to

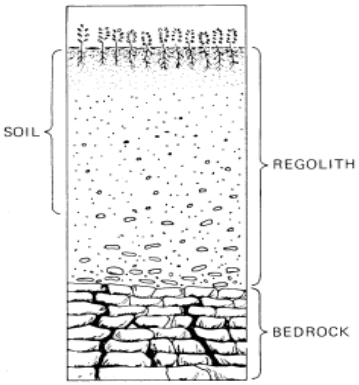
promote proper harvest techniques of Matsutake at the Oregon Dunes, John Getz, commercial Matsutake harvester and Oregon Dunes Matsutake expert, produced a DVD showing proper harvest techniques. His DVD was given to each permittee beginning in 2007 season. Proper harvesting techniques provide for the sustainability of the Matsutake mushroom.

Product	Quantity Sold	Number of Permits	Value
Alder puddle sticks	1,000 pieces	1	$20.00
Beach Grass & Carex Transplants	118,000 plants	4	$236.00
Boughs	10.5 tons	4	$210.00
Cascara Bark	8,000 lbs.	15	$400.00
Christmas Trees (includes RO collections)	489 tags	17	$4,890.00
Commercial “Other” Mushroom	16,565 lbs.	369	$16,565.00
Commercial Greenery (CCRD)	630 tons	210	$63,000.00
Commercial Greenery (Hebo)	63 tons	21	$6,300.00
Commercial Matsutake Mushroom (CCRD)	25,500 lbs.	51	$51,467.53
Commercial Transplants	2665 each	20	$3,180.00
Misc. Cuttings	17,000 lbs	18	$850.00
Misc. Grass and/or Plant Seed	none	none	$0.00
Misc. Root Species	700 lbs.	3	$70.00
Moss	none	none	$0.00
Commercial Firewood (CCRD)	680 cords	166	$6,800.00
Commercial Firewood (Hebo)	239 cords	28	$2,390.00
Personal Use Firewood (CCRD)	919 cords	395	$9,190.00
Personal Use Firewood (Hebo)	1157 cords	378	$11,570.00
Poles, Posts & Split Rails	1,300 poles	2	$65.00
Vine Maple limbs	2 tons	1	$20.00
Grand Total		1703	$177,223.53

* Note: Total Value for Botanical Products sold is $146,958.53

Free Use Permits Issued

Product	Quantity Issued	Number of Permits	Estimated Value
Misc. Non-Convertible Forest Products	varied by product	53	$738.00
Firewood (limbs, chunks, and bark)	CCF	21	$249.60
Total		74	$987

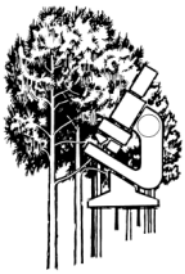


Monitoring Question: Soil Productivity

Is the long-term soil productivity of forest land being maintained?

Forest Plan Standards and Guidelines used to protect soil productivity are centered around limiting the extent of compaction and displacement related to the use of ground-based equipment on forest soils. The Forest Plan requires that no more than 15 percent of an area harvested by ground-based machines should be impacted by roads, landings, and skid trails on a given harvest unit.

Most yarding is accomplished by skyline or helicopter, however where ground-based equipment is utilized, skid trails are designated and approved by the Forest Service. The equipment is required to stay on the skid trails. This has led to soil impacts much less than 15 percent within harvest areas.



Monitoring Question: Research Natural Area Protection

Are Research Natural Areas being protected according to the RNA Establishment Records?

Marys Peak meadow restoration project

Monitoring meadow response-4th year

Meadow recovery after pile/burn or tree removal has been monitored on 3 sets of 1 meter plots on Marys Peak for 4 years. Each set had one control and a plot that was in a burn pile hand sown in 2005 with native fescue seed collected on the Peak. One plot (plot 4) was raked and seeded, but not burned. Plots were initially installed in 6/16/2006. Plots were remasured in 2007 2008, and 2009. Percent cover for species occurring in the squre meter plots were recorded. In 2006, bareground, charcoal, litter, and duff were also recorded.

While this small case study doesn't pretend to be statistically valid, the results suggest that the pile/burn treatment created significant bare soil, often removing much of the organic matter of the plot. Poorer moisture and nutrient conditions retard recolonization on those plots. The control plots have cover (summed from individual species covers) of 80 to 160% (2006-2009). The pile/burn/seed plots are recovering, but slowly (2009 cover of 19-85%). The plots with the most bare soil in 2006 are slower (1a and 3) than the plot with the least impact to ground cover (2a). Plots 3, 4, and 5 are a set in close proximity above the Meadow Edge Trail. The rake/seed plot had a thick layer of needles in 2006, and the low cover in succeeding years may reflect poor establishment through that layer, or there may be other reasons. The pile/burn plot there had an intermediate bare soil value. The control plot has the lower total cover among the 3 controls.

plot ID	treatment	%needles06	%bare06	%cover06	%cover07	%cover08	%cover09
MarysPeak1a	pile/burn/seed	10	90	trace	2	3	19
MarysPeak1b	control	30	0	137	146	128	147
MarysPeak2a	pile/burn/seed	40	55	10	62	48	85
MarysPeak2b	control	50	0	152	154	161	134
MarysPeak3	pile/burn/seed	25	75	1	27	47	55
MarysPeak4	rake/seed	98	1	5	23	37	29
MarysPeak5	control	4	0	80	90	105	91

Carex califorinica (California sedge) is slowly expanding in all 4 of the treated plots, most prominently in plot 4, followed by plot 3. The fescue (*Festuca roemeri*?—old *F. rubra*) is present in all plots, both controls and treated. My impression from the field is that the fescue in the seeded plots came in from the seeding, not from resprouting, or germination from a seed bank. Starry false solomon's seal, a dominant not only in the adjacent forest stand but in much of the open meadow, is colonizing only one of the pile/burn plots at this point. However, it is recolonzing meadow edges and tree islands outside of the plots. Other species increasing in the pile/burn plots include *Luzula*

campestris, Lilium columbianum, Achillea millefolium, Elumus glaucus, Viola adunca, Viola glabella, and the weedy *Rumex acetosella* (sheeps sorrel). The sheeps sorrel is present in all plots. It does not appear to be the kind of invasive that crowds out other species, however.

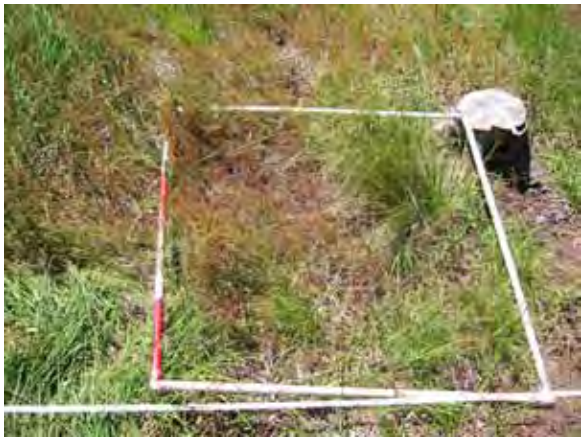
Plot 1a was the most impacted from burning. Fescue seeding was somewhat successful, but sedge has more cover in 2009. The slow sedge recolonization is most likely vegetative expansion from the edges of the plots. Seeding had most impact on Plot 2a, where the fescue established quickly and now dominates the plot.

There are a range of conditions along gradients of duff type and litter depth, shade, seed sources, growing season, and moisture availability. These can all affect recovery of meadow species on areas that were converting to forest.

Cleared forest edge with healthy crop of young noble firs. Some starry false Solomon's seal.

2005 fescue seeding adjacent to unseeded area at forest edge. Starry false Solomon's seal is revegetating—as forest or meadow species? Hard to say.

Meadow edge burned/raked/seeded in 2008. The seeding was a mix of native forbs and grasses, but that may not be the source of any/all of these new individuals.



Plot 3 pile/burn. Fescue (bright green clumps), sedge (broader leaves), and sheep sorrel (tan). This plot has not yet recovered the minor species present in its control plot (plot 5): anemone, strawberry, and woodrush.

Plot 4: rake/seed. California sedge is the most abundant species. Fescue, Columbia lily, woodrush, anemone, and sheep sorrel are also present at low cover. A noble fir seedling was pulled from the plot in 2008.

Plot 5 control California sedge and fescue are most abundant, followed by sheep sorrel. Minor species include anemone, woodrush, and strawberry (strawberry not recorded in 2009). Noble fir seedlings were pulled from the plot in 2007 and 2009.

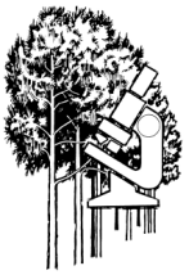
Plots 1a, 1b, 2a, 2b from tree island above Meadows Edge Trail

1a-pile/burn. Fescue upper right, with sedge and sheep sorrel. Trace of lily and woodrush. Note large amount of bare soil 4 years post-burn.

1b with 1a in background. Lush sedge, fescue, and significant starry false Solomon's seal. Tan tops are sheep sorrel.

2a pile/burn dominated by fescue from seeding. Natives: blue wild rye, California sedge, starry false Solon's seal, violets, lily, yarrow, and sedge. Sheep sorrel is minor. Noble fir seedlings were pulled in 2007 and 2008.

2b control has the same suite of species, plus bracken fern.



Monitoring Question: Air Quality

What is the status of and what are the trends in Air Quality?

Legal basis and purpose of the Siuslaw National Forest Air Program

Under provisions of the federal Clean Air Act, the Wilderness Act, the Organic Act, and the Regional Haze Rule, the Forest Service has responsibilities and authorities to mitigate potential air quality impacts on all national forest system lands.

Forest Service policy assigns Regional Foresters the responsibility to respond to States or the Federal EPA on issues or actions involving the Clean Air Act. Forest Supervisors are delegated the responsibility to take action to identify impacts and to protect National Forest System lands from adverse impacts which may result from air pollution (including atmospheric deposition).

Specific objectives for Forest level air resource management include:

Monitoring air pollutants when Forest Service goals and objectives are at risk and adequate data are not available.

Defining selected sensitive indicators of air quality called Air Quality Related Values (AQRV).

Monitoring AQRVs and establishing the acceptable level of protection needed to prevent adverse ecological, human (visitor experiences such as visibility or odors), or cultural (e.g. archeological) impacts.

Minimizing air pollutant impact from land management activities.

Managing smoke from management-ignited prescribed fires.

Air pollutants of concern

The principal air pollutants identified by the Clean Air Act, called the criteria pollutants, are: nitrogen oxides, sulfur dioxide, ozone, carbon monoxide, fine particulate matter (PM2.5 and PM10), and lead. Amendments to the CAA during the 1990s added additional toxic metals, notably mercury, and various semi-volatile organic pollutants (e.g., pesticides, PCBs, polycyclic aromatic hydrocarbons). Federal law dictates allowable concentrations of these pollutants in the air. Very little degradation is permitted in Class I Wilderness Areas, small increments of additional pollution are often permitted in Class II areas. Although the Siuslaw National Forest administers two Wilderness Areas: Rock Creek and Drift Creek, all of the Siuslaw National Forest is Class II. The pollutants of greatest concern are nitrogen oxides, ammonia, sulfur dioxide, toxic metals, and ozone.

Emissions of nitrogen oxides from fossil fuel combustion and ammonia from agriculture are the primary source of eutrophying pollutants from the atmosphere. These pollutants are deposited to forest ecosystems as nitrates and ammonium, primarily in rainfall and other types of precipitation.

Atmospheric transformations of nitrogen oxides and sulfur dioxide also produce nitric and sulfuric acids, the primary components of acid rain. Acid rain is more properly defined as 'acid deposition' because not only rain can become acidified, but also snow, fog, sleet and hail. Nitrogen oxides also interact with sunlight and heat to produce ozone.

Together, these eutrophying, acidifying and oxidizing pollutants are detrimental to Forest vegetation and aquatic systems. Elsewhere in the Pacific Northwest Region, smoke from wildfire and prescribed fire is a major concern, releasing carbon monoxide and particulate matter hazardous to human and wildlife health. Because forest fires are a relatively small and infrequent in the Oregon central Coast Range, these pollutants are of relatively minor concern on the Siuslaw National Forest.

Monitoring of Air Pollutants and Air Quality Related Values

Precipitation Chemistry (Fig. 1). Until recently, the Siuslaw National Forest hosted a National Atmospheric Deposition Program (NADP) monitor at the Alsea Ranger Station. NADP is a national program to monitor trends in acidity, nitrates, sulfates, ammonium ions and other inorganic pollutants in wet deposition (i.e. precipitation). National level budget cuts forced the dismantling of this monitor in 2008 after 27 years of operation.

AQRV Biomonitoring. Biomonitoring remains the primary method by which the Siuslaw National Forest monitors air quality. AQRVs monitored by the Siuslaw National Forest are vascular plants sensitive to ozone, and non-vascular plants (epiphytic lichens and mosses) sensitive to nitrogen- and sulfur- containing pollutants. Like the proverbial canaries used to alert miners of the presence of unhealthy air, monitoring responses of the plant species most sensitive to specific air pollutants allows early detection of adverse effects, providing lead time if action is needed.

Figure 1. The NADP monitor at Alsea Ranger Station measured air pollutants in precipitation from 1980-2007.

Ozone-sensitive plants (**Fig. 2**) are monitored by the Forest Inventory and Analysis (FIA)-Forest Health Monitoring program on a 15 yr rotation and 23 km grid. This program is administered by the USFS Pacific Northwest Research Station. The first ozone AQRV monitoring round was completed in 1997-2002.

Sulfur- and Nitrogen-sensitive non-vascular plants (**Fig. 3**) are monitored in coordination with the regional Forest Service Air Program on the 3.4 mile FIA grid, every 10 years. Loss of biodiversity and shifts in community composition from pollution-sensitive to pollution tolerant species provide evidence of adverse ecological effects due to air pollution. Elemental analysis of lichens is also used to assess spatial and temporal trends in the accumulation of sulfur, nitrogen, and metals in

vegetation across the Forest landscape. Round 2 of lichen AQRV monitoring was completed in 2004-2005.

Figure 2. Ozone injury symptoms on red alder following controlled exposure to 39 parts per million ozone over 28 days.

Figure 3. Epiphytic lichens, mosses and liverworts are a conspicuous component of Siuslaw National Forest vegetation, and highly sensitive to eutrophying and acidifying air pollutants. Photo © Stephen Sharnoff.

Monitoring results

Precipitation chemistry. During 27 years of precipitation chemistry monitoring at the Alsea Ranger Station (**Fig. 4**), pH, nitrates, sulfates and ammonia remained within ranges expected for unpolluted rain. No significant change was observed in pH, or levels of nitrates and ammonia in precipitation. Sulfates decreased at Alsea, consistent with regional decreases attributed to point source controls required by the Clean Air Act.

AQRV Monitoring.

Ozone effects on sensitive species. No evidence of ozone damage to ozone-sensitive vascular plant species was detected at any of the sites on the Siuslaw National Forest monitored by FIA-FHM program on the Siuslaw National Forest from 1997-2002. Indicator species in Oregon were Ponderosa pine, thimbleberry, quaking aspen, Scouler's willow, mountain snowberry, huckleberry , Pacific ninebark, blue elderberry, and chokecherry.

Nitrogen and Sulfur effects on sensitive species (Fig. 5). Monitoring of the ecological effects of acidifying and eutrophying (fertilizing) air pollutants on sensitive non-vascular plants occurred from 1994-1997 and 2004-2005. Survey data from10-year revisits to 27 lichen biomonitoring sites on the Siuslaw National Forest, including one site each in Drift and Rock Creek Wildernesses, indicated that lichen community composition either improved or showed no change at 22 sites. Slightly worse scores (favoring species of more eutrophic conditions) were observed at 5 sites but in no obvious pattern. Because most sites improved or did not change, no general concern is warranted.

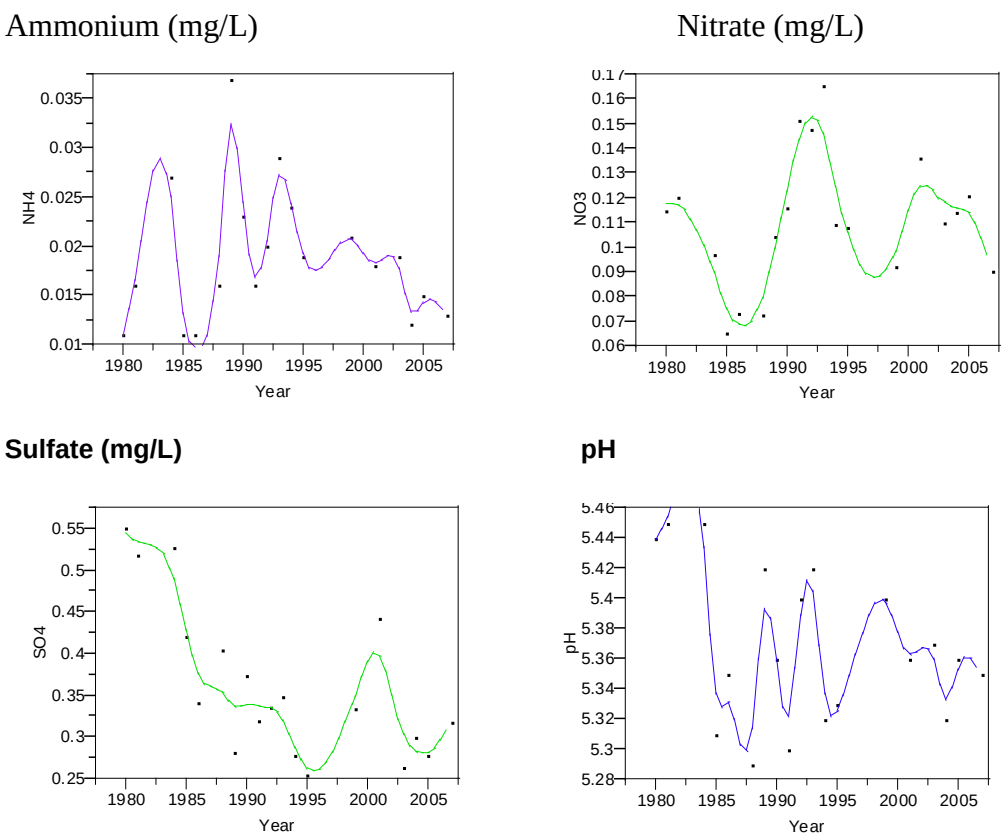


Figure 4. Continuous monitoring of precipitation chemistry from 1980 thru 2007 at the Alsea Ranger Station NADP monitor, in Alsea, Oregon show that nutrient concentrations are low but highly variable from year to year. Only sulfates decreased significantly during the monitoring period. The pH of unpolluted rain is generally between 5.2 and 5.6; yearly pH means at Alsea were always within this range.

Spatial and temporal trends nitrogen, sulfur, and metals accumulated by vegetation.

Nitrogen. Slight increases in atmospherically deposited nitrogen were observed in lichen thalli at most sites (consistent with regional trends) but the new levels were still within expected 'clean-site' ranges for lichen vegetation at all sites.

Sulfur. Sulfur deposition also increased at about half the sites, and about 25% of sites are now close to or above 'clean site ranges'. Sulfur is associated with marine aerosols and these increases, which contrast with decreases observed in much of the region, could be explained by higher storm intensity. Higher sulfur concentrations were also observed at mid to high elevations in the Cascades. These findings contrast with declines recorded by other NADP monitors (all at low elevations) and warrant further analysis.

Toxic Metals. Decreases were observed in chromium, nickel, titanium and vanadium levels in lichen vegetation, possibly a long-term environmental benefit of improved vehicle emission controls. Lead concentrations increased slightly at most sites but were still within clean site ranges at all sites. Cadmium and zinc also increased at most sites. Cadmium is associated with marine aerosols and may be related to climate change driven increases in storm intensity. No explanation is available yet for increased lead or zinc.

Implications for management

Since 1987, air quality in the Siuslaw National Forest has generally stayed the same, improved, or is still within clean site ranges for monitored pollutants. The condition, species diversity and abundance of the most air-pollution sensitive vegetation, indicates an overall steady state or slight improvement in air quality. Pollutants to watch include nitrogen, sulfur, lead, cadmium, and zinc, all of which are still low, but appear to be increasing in epiphytic vegetation. Although no trends data are available yet, mercury contamination of forested ecosystems is increasing nationally and also warrants continued monitoring. Of all pollutants measured, only sulfur may be approaching critical levels that could eventually adversely affect the distribution and abundance of sensitive species. Increases in this and metal-containing contaminants may be due to increased Pacific storm intensity which could be bringing larger amounts of marine aerosols deeper into the Forest and increases in trans-Pacific transport are also possible—nevertheless it is important to keep in mind that most contaminants originate from local and regional sources. Continued monitoring and further analysis of existing data is recommended. Managers may also wish to consider adding air quality objectives in the next revision of the Forest Plan.

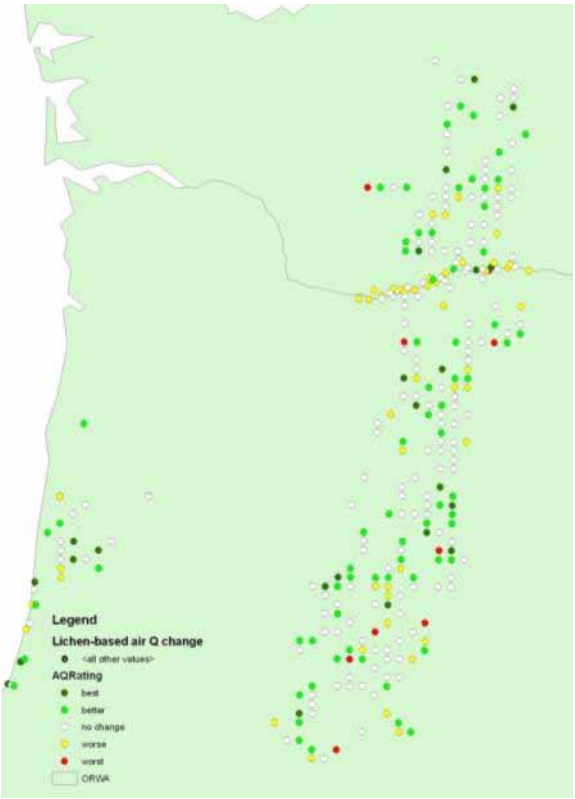
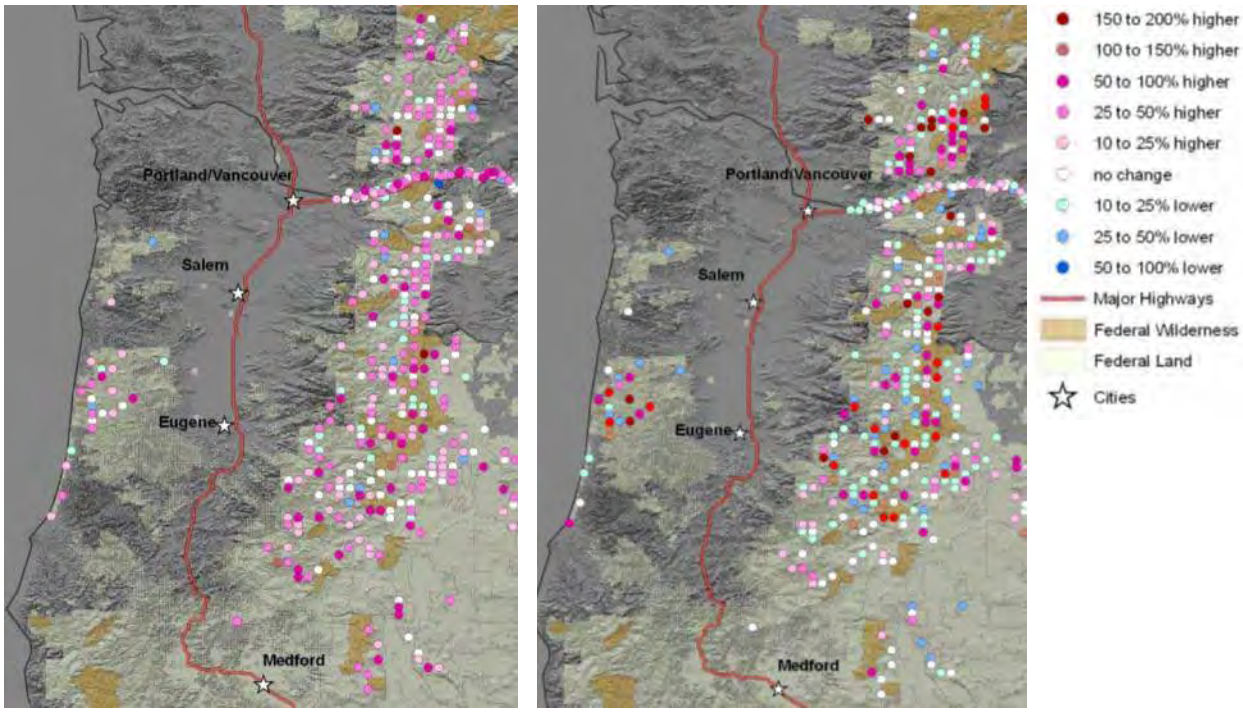
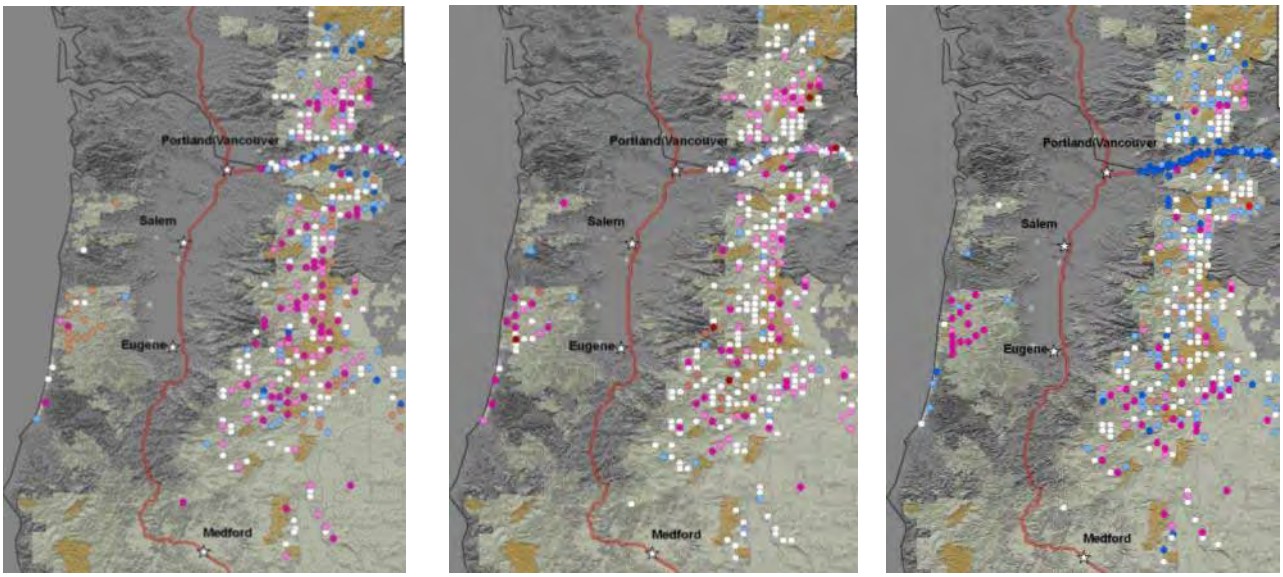


Figure 5. Lichen community-based air quality scores at most sites on the Siuslaw National Forest was either improved (green dots) or the same (white dots) in 2004-2005 compared to 1994-1997. Yellow and red dots show sites where lichen community composition indicates air quality declines.

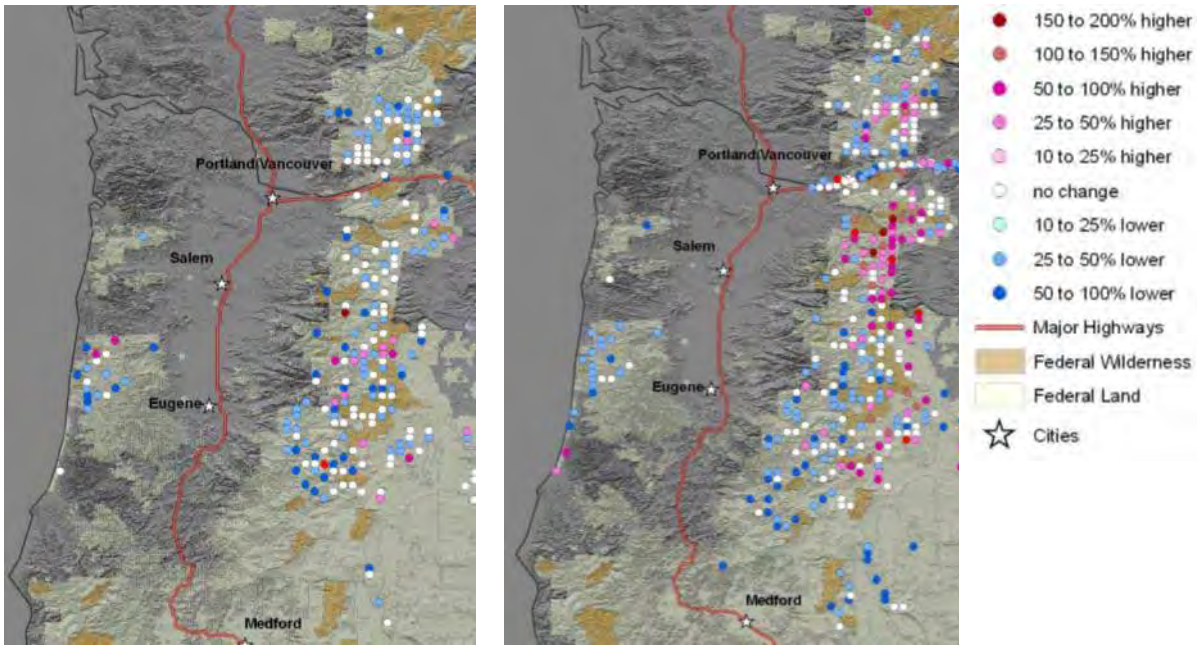


Nitrogen Sulfur

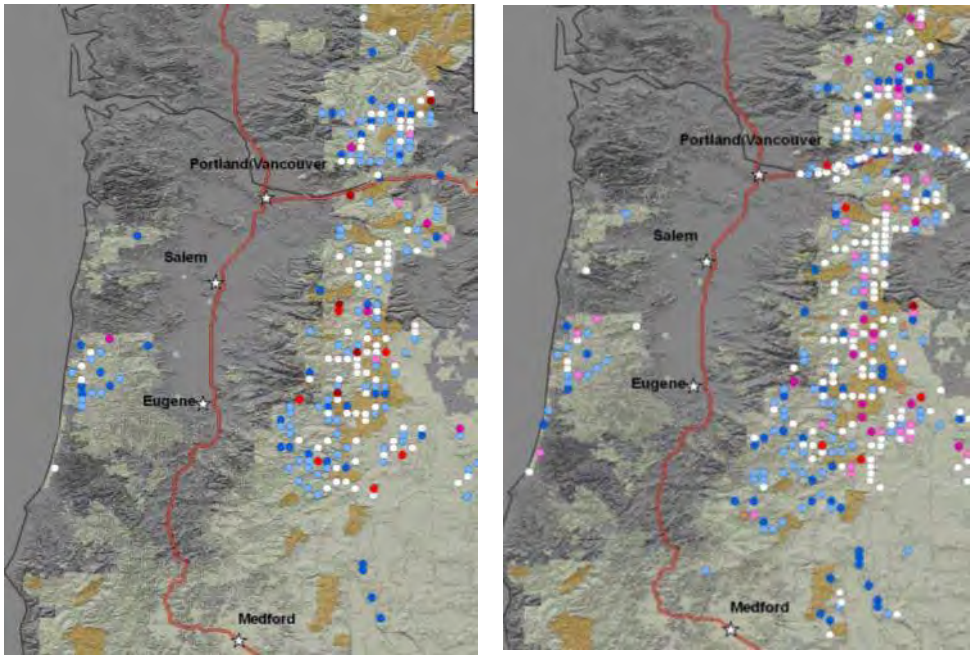


Cadmium Zinc Lead

Figure 6. Increasing atmospheric deposition of nitrogen, sulfur, chromium, lead, and zinc was observed on the Siuslaw National Forest and western Oregon and Washington between 1998 and 2008, indicated by levels of these elements in epiphytic vegetation. Levels of these elements were still within expected background ranges but the trends bear monitoring.



Nickel Vanadium



Titanium Chromium

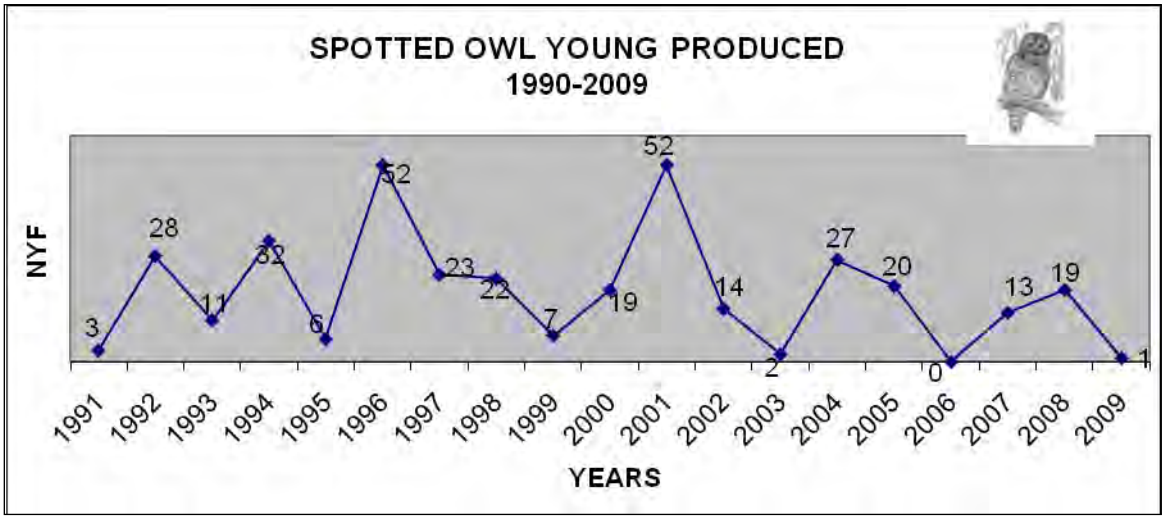
Figure 7. Decreasing atmospheric deposition of chromium, nickel, vanadium and titanium was observed on the Siuslaw National Forest between 1998 and 2005 , indicated by levels of these elements in epiphytic vegetation. Stricter vehicle emissions standards and removal of lead from gasoline likely explain improvements; climate warming in the Cascades may explain migration of some metals to higher elevations.

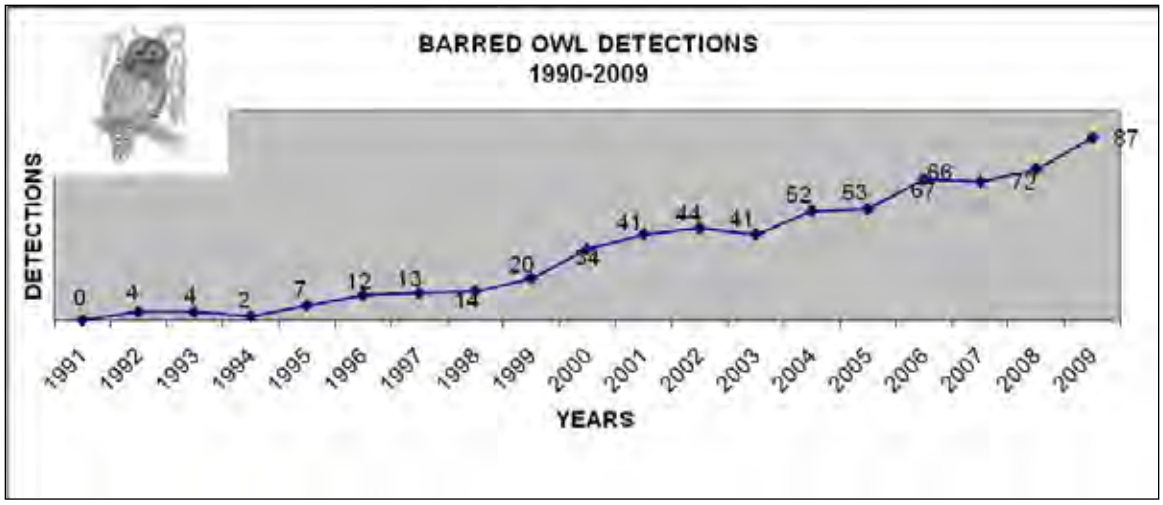
Monitoring Question: Northern Spotted Owl

What are the trends in habitat for northern spotted owl pairs and resident singles on the Forest landscape?

Monitoring of northern spotted owl population size and reproduction for the Forest relies 100 percent on the current PNW demographic study.

Below is a summary of these data trends. The amount of suitable habitat on the Siuslaw has been relatively stable for the last thirteen years. It is unknown if the declining trends are the result of residual effects from past harvest activities, or from the increase presence of barred owls on the forest. The amount of suitable habitat on the Siuslaw has been relatively stable for the last thirteen years. It is unknown if the declining trends are the result of residual effects from past harvest activities, or from the increase presence of barred owls on the forest. In the future, the interagency Effectiveness Monitoring workgroup for the northern spotted owl is developing methods for monitoring habitat and restoration at the province scale. The Forest will adopt these procedures to determine trends at the Forest.




BARRED OWL DETECTIONS
1990-2009
DETECTIONS
0
4
4
2
7
12
13
14
20
34
41
44
41
52
53
67
66
72
87
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEARS

Monitoring Question: Marbled Murrelet

What are the trends in marbled murrelet populations on the Forest?

The PNW Research Station conducts effectiveness monitoring for marbled murrelets. Effectiveness monitoring for the marbled murrelet has two facets: (1) assess population trends at sea by using a unified sampling design and standardized survey methods, and (2) establish a credible estimate of baseline nesting-habitat data by modeling habitat relations, and use the baseline to track habitat changes over time. The monitoring objective is to determine the status and trends of marbled murrelet populations and nesting habitat in the Plan area.

Suitable habitat on the Siuslaw National Forest has not changed measurably in recent years, but is projected to increase over the next 5 decades with the designation of Late Successional Reserves as part of the Northwest Forest Plan.

Monitoring Questions: Northern Bald Eagle

What are the trends in northern bald eagle populations on the Forest?

Bald eagles specifically use mature conifer or old growth habitat preferably along large rivers and major tributaries. The bald eagle habitat base (acres near large bodies of water and are capable of growing old growth habitat) on the Forest is fixed at approximately 153,200 acres. The amount of currently suitable bald eagle habitat within the bald eagle habitat base on the Siuslaw National Forest is 62,300 acres or 40.6 percent of capable. This figure has not been changed measurably in recent years, but is projected to increase over the next 5 decades with the designation of Late Successional Reserves as part of the Northwest Forest Plan.

Bald eagles were removed from the threatened species list by the US Fish and Wildlife Service in 2007. Bald eagles are protected through the Bald Eagle and Golden Eagle Act and are identified as a sensitive species on the Regional Foresters Sensitive Species list.

Monitoring Questions: Western Snowy Plover

What are the trends in western snowy plover breeding and winter in populations on the Forest?

Snowy Plover Monitoring Efforts: The western snowy plover nesting populations is co-operatively monitored1 each year. The populations that is monitored includes ocean shores administered by the Forest Service, Oregon Parks and Recreation Department and the Bureau of Land management. The health of the population is moderate over the short term. From 1990 to present the population has increased, but is less than levels documented in the mid-70's. The population of nesting and over wintering western snowy plovers is static on the beaches administered by the Siulsaw.

Restoration Efforts

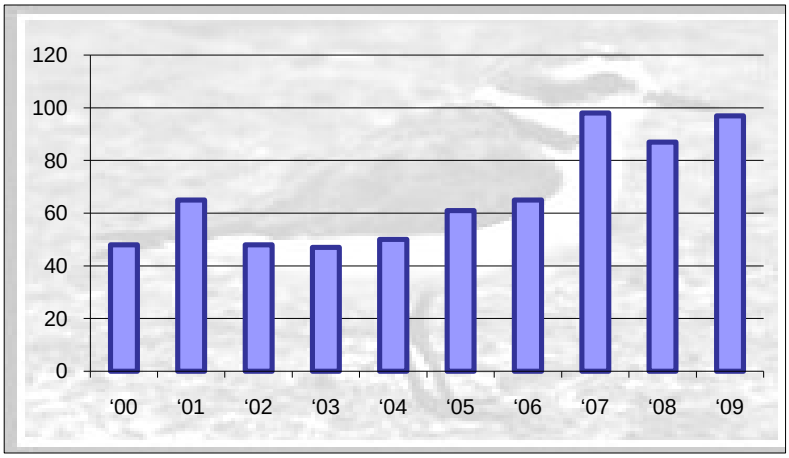
Over 80% of the open, relatively flat sandy areas where snowy plovers traditionally nested in coastal Oregon, have been invaded by European beach and succeeding vegetation over the years.

The Siuslaw National Forest has restored an average of 30 acres of nesting habitat each year for the past 10 years, removing predators from nesting areas and protected habitat by seasonally closing nesting areas to recreation use by people and their dogs, horse, and motor vehicles to prevent disturbances in key areas.

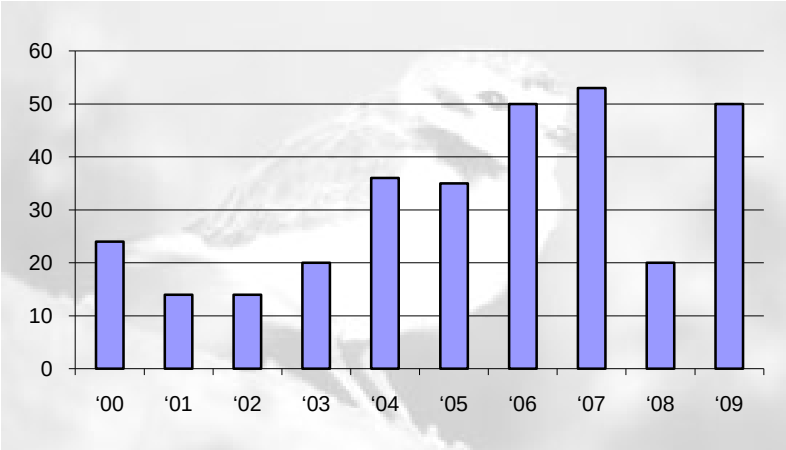
References:

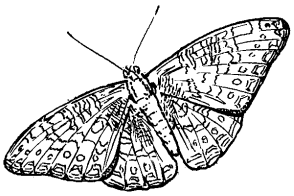
The Oregon Department of Fish and Wildlife, Oregon Natural Heritage Information Center, Central Coast Ranger District-Oregon Dunes NRA, U.S. Fish and Wildlife Service, Bureau of Land Management.

Western Snowy Plover Nesting Summary for Siuslaw NF



Fledgling Summary for Siuslaw NF





Monitoring Questions: Oregon Silverspot Butterfly

Are recovery plan objectives for the Oregon silverspot butterfly being met?

Silverspot butterfly Speyeria zerene hippolyta and its larval food plant early blue violet Viola adunca are monitored annually where existing populations of the butterfly are found at Rock Creek/Big Creek (Rock Creek), Bray's Point, Mt. Hebo, and Cascade Head. A previous Forest Monitoring and Evaluation Report for the Siuslaw National Forest for 2001-2004 compared the 2003 population status at each site to the mean population of the past 14 years. Rock Creek/Big Creek was 28% below the 14 year mean. Only 4 silverspot butterflies were observed at Bray's Point suggesting only a remnant population was present. The Mt. Hebo site was 6% above the 14 year mean. Cascade head was 44% below the 14 year mean.

Monitoring summarized in a 2006 monitoring report (Hammond, 2006) documented population levels dropping to low levels during the 2003-2004 years and critically low levels in 2005. Weather conditions along the Oregon coast were very unfavorable. The typical weather pattern is a cool rainy winter and a reasonably warm and moist spring. During 2004 and 2005 we experienced a combination of heat waves along the coast during the summer with a very cool rainy spring. The summer drought causes the violet plant to desiccate and dry up by mid-summer leaving the larvae silverspot with a limited food supply.

The Oregon Silverspot Workgroup made the decision to augment the Rock Creek and Brays point population with captive zoo-reared butterflies with stock obtained from the Mt. Hebo population in 2007, 2008 and 2009. The table below displays the Oregon Silverspot Index of Abundance counts between 1990 and 2009. The last three years show an increase, some of which is associated with the augmentation efforts at Rock Creek and Brays Point. Mt. Hebo is considered to be at a relatively stable level.

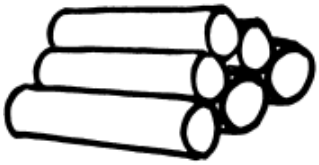
OSB Index of Abundance Counts 1990 - 2009

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mt. Hebo	1100	2888	2628	1041	2200	3413	2507	2664	2743	4983	2111	1402	2272	2625	588	657	2624	1473	1452	1411
Bray Point	169	280	265	81	81	53	146	101	46	2	9	0	2	3	2 **(5)**	0	0	21 **(123)**	82 **(300)**	124 **(1182 pupae +31 adults, +7 larvae)**
Rock Creek	142	113	242	35	65	374	356	332	257	149	108	192	139	136	131 **(47)**	55	25	202 **(153)**	219 **(199)**	437 **(813 larvae, +21 adults)**

Numbers in parenthesis are the number of augmented pupae that survived and were released as butterflies, plus released larvae or adults. These butterflies would have been included in the index counts if observed.

Social Group

This section of the monitoring report describes the resources and services the Forest provides its constituents. Recreation, timber, and roads provide direct benefits to many users of the forest. Benefits from other areas such as the cultural resources and research natural areas provide a more indirect benefit. Below is a summary of FY09 monitoring results designed to assist the Forest in determining the effectiveness of the Forest Plan Standards and Guidelines in providing expected resources and services to our constituents.



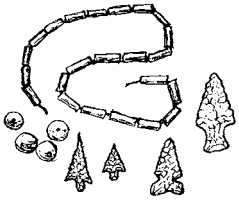
Monitoring Question: Commodity Production

Is the Forest providing commodities at levels projected in the Forest Plan?

The Forest offered and sold 39.7 MMBF of timber in 2009.

Special Forest Product sales include alder puddle sticks, boughs, cascara bark, Christmas trees, firewood, greenery, Matsutake mushrooms, other commercial mushrooms, posts and poles, roots, transplants vine maple limbs, seeds, and seed cones.

The Forest sold 1703 permits for a total of $177,223.53in 2009.



Monitoring Question: Cultural Resources

Are cultural and historical sites being used and protected as planned?

All archaeological resources recognized as Forest Priority Heritage Assets were monitored during the fiscal year to evaluate current conditions. These sites included eligible and listed National Register properties at Cape Perpetua, Tahkenitch Lake, Heceta Head, Bob Creek, Big Creek (Lane County), Tenmile Creek (Douglas County), Hauser, Siuslaw River, Umpqua River and the Salmon River. Ocean erosion was noted at three sites in the Cape Perpetua Scenic Area, Bob Creek, Big Creek, and at Heceta Head. River bank erosion was apparent at one site on the Salmon River, where mitigation (data recovery) to compensate for erosive impacts was undertaken in 2002. Mitigation options were discussed with State Historic Preservation Office specialists and tribal cultural resources staff with the Confederated Tribes of Siletz Indians and the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians. No indication of looting or unauthorized excavation was observed at any site. At two locations, interpretive signs which had been removed had not yet been replaced. Sites where interpretive signing was available appeared to be unaltered despite heavy public visitation.

Historic properties, especially Heceta Lightstation, Hebo Lake picnic shelter, Cascade Head Experimental Forest Station, Mapleton Ranger Station and Cape Perpetua West Shelter and CCC camp were inspected for structural integrity. Damp coastal conditions continue to deteriorate wood elements of these historic structures. Recommendations for in-kind repairs were discussed with the appropriate facilities manager.

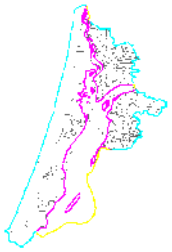
Heceta Lightstation B & B continued to attract thousands of visitors annually for overnight stays, daily summer interpretive tours, and special events (e.g., holiday celebrations, weddings). A portion of proceeds generated by the activities of the bed and breakfast, gift shop and event catering was obligated to fund on-going maintenance and restoration of the historic structure. The Heceta Head Keeper's House Master Development Plan was completed by the Trillium Corporation (Steven Bursey) this fiscal year, and a cultural landscape plan was initiated by the Forest's landscape architect and archaeologist to assess conditions and plan for future operations.

At the Cape Perpetua Visitor Center, the staff provided twice-daily educational programs and walks during the summer focused on the cultural resources within the Scenic Area. Volunteers provided site and exhibits interpretation during the winter months. Heritage training was again offered to the Cape staff and volunteers to assure current information is available to the public.

The Confederated Tribes of Siletz Indians Tribal Council and staff joined Forest staff during a visit to a tribal sacred site currently authorized under a special use permit for a sweat lodge. The site is used for religious purposes and has been maintained in accordance with conditions of the SUP.

Monitoring during project implementation was conducted at high probability areas for several projects such as snowy plover /dune grass habitat restoration, Pixieland restoration, Fraser Creek rechannelization, Tamara Quays dike removal, and trail

realignments. Tribal staff provided input and assisted during testing for the Heceta Head trail and parking project.
Otherwise, every attempt is made to protect known archaeological and historic resources from adverse impacts by identifying and withdrawing those cultural sites early in the project planning process.



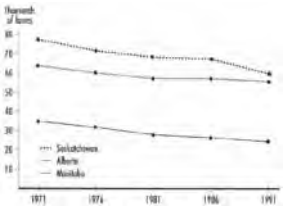
Monitoring Questions: Ownership status

Are the goals of Landownership Adjustment Plan being met?

The Forest no longer has a current Landownership Adjustment Plan. Developed in the early 1990's the Landownership Adjustment Plan is out of date relative to current landownership adjustment objectives and priorities. The Northwest Forest Plan (1994) amended the Siuslaw National Forest Land and Resource Management Plan (1990) changing the intent and focus of land adjustment efforts. In the past decade, based in part on Northwest Forest Plan direction and objectives, Forest acquisitions and land adjustments have focused primarily on riparian and stream restoration opportunities.

The Forest is currently involved in efforts to consolidate and reduce administrative sites. The former Alsea Ranger District site was sold in 1995 and about 3 acres at the Waldport administrative site were sold in 2007. The Gardiner administrative site (3.25 acres) and the Hillcrest administrative site in Mapleton (89 acres) are scheduled for conveyance in 2010.

Current Forest land adjustment priorities and objectives are being met, although they are not the ones originally set out in the Landownership Adjustment Plan. The most recent land acquisitions include the Fawn Creek property (93.61 acres), the Fivemile-Bell property (624.80 Acres) and the Drift Creek of the Alsea property (1342.16 acres). The Forest has active stream and/or riparian restoration projects currently under way on all of these parcels. In addition, the Forest currently has four high priority stream and/or riparian restoration parcels on which it is actively working with partners for acquisition via Land and Water Conservation Fund Act funds.



Monitoring Questions: Local Economies and Communities

Are local natural resource based economies and communities healthy

Stewardship contracting has helped develop local resources for stream restoration, road decommissioning and timber sales. The Resource Advisory Committees have utilized local resources for projects.

Monitoring Question: Public Coordination, Cooperation and Collaboration

Do Forest activities involve a broad range of publics and high level of interagency cooperation and collaboration?

The Coast Range Provincial Advisory Committee meets quarterly. Province Advisory Committee members have helped play an important part in the implementation of the Northwest Forest Plan. Advisory committee members help identify important forest-related matters that affect themselves, their colleagues, fellow tribal members, friends, and neighbors.

The Oregon Coast Province is bordered on the west by the Pacific Ocean, on the north by the Columbia River, and on the east by the crest of the Coast Mountain Range including all but a small portion of the Siuslaw National Forest. On the southern border it takes in the lower portion of the Umpqua River near Reedsport and crosses the North Umpqua River at Melrose just west of Roseburg. From there it passes just north of Wilber and on up to Sutherlin where it turns east up to Scott Mountain. From Scott Mountain it runs northeast then north to Harness Mountain where it turns west back along the Crest of the Coast Range north to the Columbia River. The Oregon Coast Province includes the following hydrologic units: Necanicum, Nehalem, Wilson-Trask-Nestucca, Siletz-Yaquina, Alsea, Siuslaw, and Umpqua. The Oregon Coast Province is approximately 3,918,700 acres including 540,200 acres of BLM ownership, 592,800 acres of USFS ownership, 100 acres of NPS ownership, 100 acres of USFWS ownership, and 1,400 acres of DOD ownership

To get the best information and to ensure that all views and interests are represented in the planning process, federally chartered advisory committees of up to 29 members were appointed from each province area (Currently 20 members). As their name implies, advisory committees are responsible for helping their province teams get the best information as quickly as possible about all aspects of their province. Each advisory committee member is expected to accurately represent the views of their community, tribe, state and local government, timber industry interest, recreation group, or environmental interest.

The Siuslaw Resource Advisory Committee meets yearly to review and accept project proposals. Public Law 106-393 creates a mechanism for local community collaboration with federal land managers in recommending projects to be conducted on federal lands or

that will benefit resources on federal lands. The geographic boundaries of the RACs are generally aligned with county boundaries, and each RAC is assigned a Designated Federal Official (DFO) to serve as the point of contact.

The committees' duties include reviewing proposed forest management projects in accordance with the Act and making recommendations to the Forest Service and providing opportunities for interested parties to participate in the project development process.

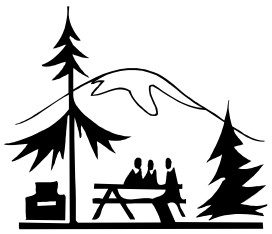
These committees are to be balanced and diverse with equal representation from industry, environmental groups, elected officials and local people. The composition of each RAC is to be balanced according to the following three interest categories identified in Public Law 106-393

There are three Stewardship Groups on the Forest, the Siuslaw Basin, Alsea and Marys Peak. These groups generally meet monthly.

Stewardship groups are collections of individuals and organizations from the local area working with the Forest Service and Bureau of Land Management to promote forest restoration that meets the needs of the local community.

The Forest participates in the Planning, Appeals, Litigation System database. This quarterly database lists the current projects on the Forest. The information is available on the Forest website. This information is also published in the Forest Update that is mailed to about 100 agencies, groups and individuals each quarter.

Scoping agencies, groups and individuals for specific projects through letters, news releases and ads provides opportunities for additional site-specific participation.



Monitoring Question: Recreation Diversity

Is the diversity of recreation opportunities provided for in the Forest Plan being supplied and used?

No specific monitoring of recreation diversity was done in 2009. Recreation construction projects within the National Forest are planned and reviewed for consistency with their recreation opportunity setting. This helps to ensure that the diversity of recreation settings on the Forest is retained.

Formal recreation use monitoring for Forest recreation sites is done as part of a national monitoring effort, last undertaken in 2006. This information was part of the monitoring report for 2006.

Monitoring Question: Recreation Off-highway Vehicles

Is off-highway vehicle use taking place as intended in the Forest Plan?

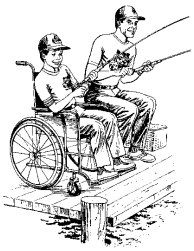
Off-Highway Vehicle (OHV) use in open sand riding areas at the Oregon Dunes NRA and Sand Lake Recreation Area is generally occurring as intended in the Forest Plan. Within the Oregon Dunes NRA a second category of lands is allocated to motorized/OHV use on designated routes only in order to minimize impacts to vegetation and habitats. To date very few routes have been designated in these areas. As a result, OHV riders have continued to use a myriad of user-developed unauthorized routes that existed prior to the 1994 Dunes Plan, as well as pioneering new unauthorized routes. Some of these routes constitute adverse impacts on plant and wildlife habitats. To move OHV use on these "designated route only" lands more toward what was intended in the Plan, the Forest is beginning a process to identify and designate routes in these areas in 2010. The Forest expects to complete that process in late 2011 or 2012. Once routes are identified and designated they will be shown on the Forest Motor Vehicle Use Map and become part of the Forest Travel Management system.
The Forest offers riding areas in 3 areas at the Oregon Dunes NRA, at Sand Lake, at Joshua Lane and at Collard Lake. The riding areas at the Oregon Dunes and at Sand Lake are extremely popular. The Forest monitors use relative to capacity in these areas and uses holiday weekend permits to limit use numbers at Sand Lake. NRA riding areas are approaching, but have not yet exceeded planned capacity (average of 2 riders/acre), as additional OHV campgrounds and staging facilities are constructed on non-federal lands immediately adjacent to the NRA.

Within designated riding areas regulations such as alcohol prohibition, engine noise standards, sand camping restrictions, and closure areas (e.g. noise buffers, tree islands, wetlands, etc.) are generally respected by visitors. Violation notices are issued when infractions are observed, but compliance is generally acceptable. Visitor safety and resource protection are at acceptable levels.

Joshua Lane and Collard Lake are small OHV riding areas (approximately 300 acres combined) in the Mapleton Complex near Florence. They are used by small numbers of primarily local riders, some of whom live immediately adjacent to the parcels. Small size, lack of legal motorized access and increasing residential development around Joshua Lane (with associated OHV noise and trespass issues) caused the Forest to review and analyze continued motorized use of these parcels as part of its Travel Management effort. Ultimately in its May 2009 Travel Management decision, the Forest concluded that due to their small size and numerous conflicts these areas are unsustainable as cross country motorized use areas, especially when other cross country motorized areas are within five miles south at the Oregon Dunes NRA

There is a small amount of unauthorized OHV use in non-designated areas on the Forest, such as around South Lake on the Hebo RD and at Woods Creek Trailhead on the Central Coast RD. There is unacceptable resource damage occurring in these localized situations.

The Forest plans to remedy these situations with implementation of the new Travel Management Rule in 2010. The May 2009 Travel Management decision also identified which Forest System Roads will provide "mixed use", including highway vehicles and non-street legal OHVs. Road miles available for non-street legal, off-highway vehicle use were reduced from 1,934 to 1,275. The Forest will produce its Motor Vehicle Use Map showing roads, trails and areas available for motorized use in early 2010 and expects good public compliance with these designations.



Monitoring Question: Accessibility

Are Forest recreation facilities, building, administrative sites and environmental education programs usable by all people regardless of physical and mental ability?

Evaluation Question 1: Are recreation sites and administrative facilities on the Siuslaw National Forest being brought to standard in accordance with the Forest Accessibility Transition Plan, 1996, and the Forest Service Outdoor Recreation Access Standards and Forest Service Trails Access Standards, 2006?

Monitoring Action: Review work done to improve accessibility since 2008, the last monitoring report.

Access Survey of Forest Recreation Sites

Original survey completed in 1996. This information shows work completed as of the end of 2009.

Campgrounds	**A**	**US**	**NA**	**NAC**
Hebo Ranger District	0	0	8	0
Central Coast Ranger District	2	2	19	0
Day Use Sites	**A**	**US**	**NA**	**NAC**
Hebo Ranger District	0	1	1	0
Central Coast Ranger District	7	17	15	2

Abbreviations

A Accessible. Meets UFAS/ADA standards. Benches and fishing platform railings and other similar structures, if any, do not meet most recent standards, but will be brought to standard as improvements, or replacements are made.

US Usable. Facility was developed to be accessible. People with some disabilities may have difficulties using the facility. One or more standards are not met.

NA Not accessible. Can be brought up to standard without unreasonable resource impacts.

NAC Not accessible. Cannot be brought up to standard without unreasonable resource impacts.

As portions of sites are reconstructed, new guidelines are being incorporated into site design for Forest sites, as appropriate to the various ROS settings on the Forest.

More campsites meeting access standards continue to be needed. Work is needed to continue to bring Forest recreation sites to standard. Recreation facility renovation work at Hebo Lake Campground was planned in 2008 and 2009 which will create some accessible camp units, and bring the campground to the current standard, including exceptions for terrain and preserving cultural values. It will include construction of a fishing platform to current standards. Planning work was done for recreation facility maintenance work at Hebo Lake and at fifteen other forest recreation sites. The work will include some improvements in campgrounds, generally to site roads or restrooms.

Trails

Forest Trails will continue to be surveyed and information about them documented as part of the updating information about National Forest recreation constructed facilities. This information will include information about slope and tread and other conditions which describe trails, and help people know how accessible or usable they will be to them, and helps the Forest Service plan for improvements to accessibility.

Evaluation Question 2: Are Forest environmental education programs available to people with disabilities?

Monitoring Action: No monitoring was done on Forest environmental education programs meeting accessibility in 2009.

The Forest has the objective and makes efforts to provide environmental education programs in which everyone can participate.

Monitoring Question: Access and Travel Management

Is the plan for long-term access roads sufficient for general public access needs?

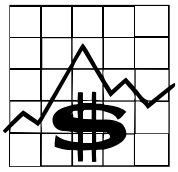
The Forest completed the Siuslaw Travel Management Project Environmental Assessment (EA) in May 2009. The project non-significantly amended the Siuslaw Forest Plan to prohibit motorized cross country travel on the Siuslaw except for Management Area 10B on the Oregon Dunes National Recreation Area and Sand Lake. The EA designated roads, trails and areas open for motorized travel and type of vehicle (highway legal or non-highway legal). The Siuslaw National Forest Motor Vehicle Map (MVUM) was made available to the public in April of 2010.

The Forest Roads Analysis (RA), completed in January 2003, validated the previous Access and Travel Management (1994) strategy by establishing a network of key and non-key road systems. The key roads provide the primary public access and receive priority for the Forest's limited maintenance budget. The key road system serves as the principal connections between communities and other roads maintained by public road agencies, major recreation sites and areas of the forest where constant access is needed for the general public, land management and project activities. The non key roads

generally are dead end or lower standard project access roads. Non key roads are maintained through project funding and may be closed for periods of time between projects. Potential changes for both road systems are considered when determining access needs during forest restoration project planning processes. The non key road system continues to be downsized to meet landscape level restoration needs for aquatic and terrestrial watershed health through decommissioning unneeded roads and periodic road closures, while the key road system is expected to remain near the existing mileage to meet recognized long term public and agency access needs. Currently about one-third of the Forest's 2215 miles of system roads are managed as key, the remaining system roads are non key.

Other Group

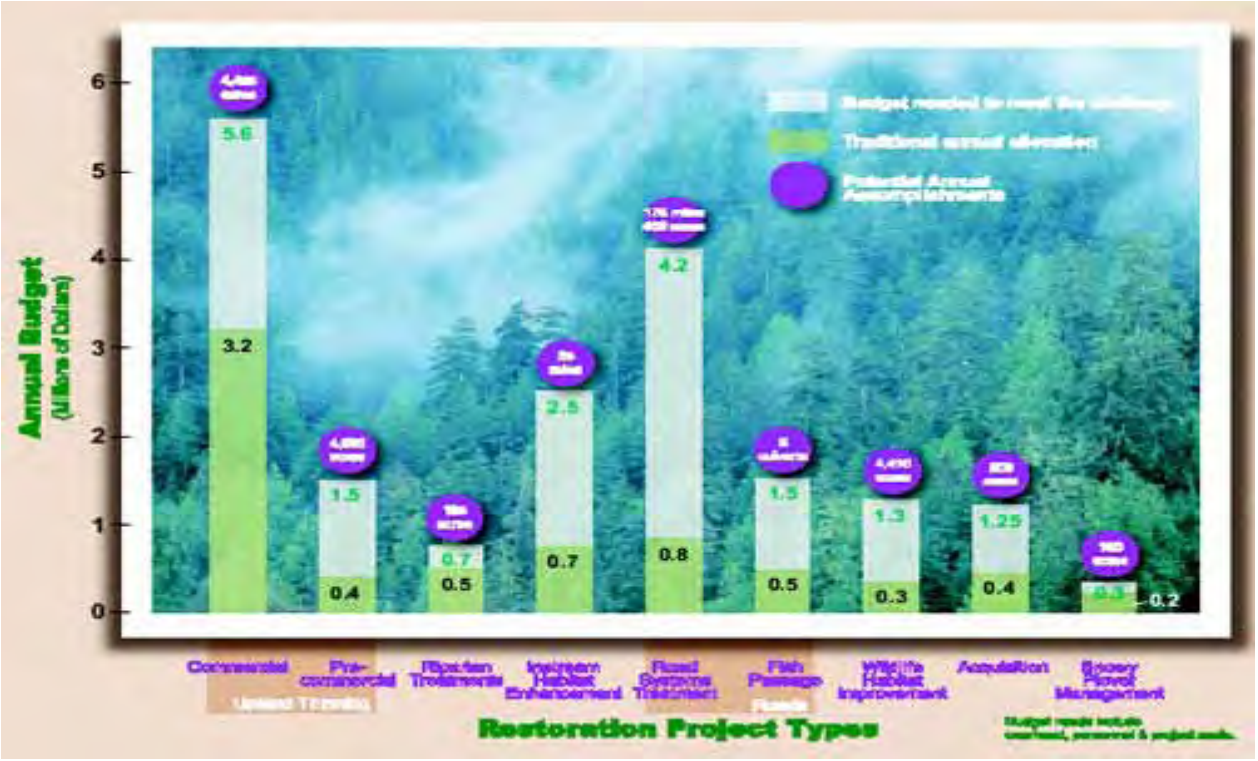
The Forest Standards and Guidelines provide direction to enable the Forest to meet the goals of finding and implementing new ways of meeting Forest goals. Below is a summary of FY08 monitoring questions designed to assist the Forest Supervisor in determining the effectiveness of the Forest Plan Standards and Guidelines in meeting the Forest's goals.



Monitoring Question: Programs and Budget

Are Forest programs and budgets providing the needs for the Forest Plan implementation?

The Forest budget has lagged behind the identified needs. For instance, in August 2006, the Forest developed the Meeting the Challenge brochure which compared the annual budget with costs related to identified restoration projects. The graph below is taken from Meeting the Challenge.



SIUSLAW NATIONAL FOREST Final Expenditures	
DESCRIPTION	FY09 Expenditures
PROGRAM NAMES	
Facilities Capital Improvs & Deferred Mtce	$1,731,100
Construction Emergency Supplemental	$116,000
Forest Products	$4,923,900
Land Management Planning	$69,900
Landownership Mgmt	$105,500
Minerals & Geology Mgmt	$21,700
Rec/Heritage/Wilderness	$1,002,000
Recreation Fee Demo	$1,601,800
Roads Capital Improvs & Mtce	$2,574,400
Trails Capital Improvs & Mtce	$255,000
Vegetation & Watershed Mgmt	$643,800
Wildland Fire, Preparedness	$1,086,100
Wildlife & Fisheries Habitat Mgmt	$1,378,600
Inventory and Monitoring	$345,100
Payments to Counties (Title II)	$366,000
American Recovery & Reinvestment Act	$573,600
Program Administration	$2,303,500
TOTAL	$19,098,000

Forest Leadership Team Site Monitoring

Lower Alsea – Drift Creek Monitoring Field Visit
June 17, 2009
Siuslaw National Forest Leadership Team

Series of Meadows:

1. Did we do what we said we would do?
   A. Yes –
      i. Reconnected channel
      ii. Leave trail intact for fishing access
      iii. Rehab road
2. Was it successful?
   A. Yes -
   i. Stream channel – yes, this was successful
   ii. Trail – there were a significant number of stakeholders who wanted access to the stream for fishing. We were able to work with adjoining private land owner to keep his cattle from grazing in the meadow. Previously, people thought the land was private, due to cattle grazing. They were pleased to know they didn't have to trespass on what was thought to have been private property. The trail is user developed and maintained trail.
   iii. Road – In a perfect world we would get rid of entire base of road. As long as vegetation grows on the road, it will decommission. There is disappointment in how many non-native species/vegetation is occurring. Over time, native species will take hold.
   iv. Meadow – Because it was human created by homesteading, will it stay intact? Some may, some may not. We have an agreement with Rocky Mountain Elk Foundation for some mowing of meadows.

Spruce Bog

1. Did we do what we said we would do?
   A. Yes –
2. Was it successful?
   A. Yes, Elk don't eat spruce

Meadow/Drift Creek –

1. Did we do what we said we would do?
   A. Yes –
      i. We pulled out tiles so channel and meadow wouldn't drain.
2. Was it successful?
   A. Yes –
      ii. District Hydrologist saw Great Blue Heron's hunting in the meadow the next day.

Reconnect channel by dispersed site next to bridge

1. Did we do what we said we would do?

   A. Yes –
2. Was it successful?
   A. No, it didn't work completely. We will have to take out substrate so fish can't get caught in a pocket of water during a very high tide.

Oxbow Meadow and Homestead –

1. Did we do what we said we would do?
   A. Yes –
      i. Took down dike to levy level
      ii. Removed culvert
2. Did it work?
   A. Yes –
      i. Cameras looked for fish
      ii. Wanted slough channel to become deep and narrow and it did
      iii. Placed wood has stayed in place
      iv. Meadow flooded the first winter and entire meadow was wet
   B. No –
      i. Burning the meadow was not successful – couldn't get it to burn. It's been mowed since 2005.
      ii. Many invasive plants established in meadow.

Rowdy Creek - Monitoring Field Visit
Siuslaw National Forest Leadership Team
July 29, 2009
Attendees – Forest Leadership Team, Kami Ellingson – technical expert

Rowdy Creek

What was the Problem? An undersized culvert and diversion ditch. Culvert was the wrong size to support water flow. Water traveled in undesired areas and flooded road.

What did we do?

Matched gradient and closed off diversion ditch

We were able to purchase culvert via ODOT in lieu of ODOT paying a fine to DEQ. Our healthy partnership with ODOT made this possible.

Was it successful?

Yes.

Instead of a fine, results occurred on the land.

Juvenile fish were marked with dye and then captured in other areas of the estuary.

It showed that time is needed in an estuary and proved that a healthy, functioning estuary is a holding pond for fish population.

Inappropriate water corridors were corrected.

Shortly after the culvert replacement, Rowdy Creek received a day of heavy rain which washed out a beaver dam upstream from culvert causing a large flow of water to flow successfully through the culvert.

Environmental Management Systems Monitoring

Two projects were monitored in July, 2009 for Environmental Management Systems monitoring (EMS) Pilot Program in Land Management for Vegetation Treatments Using Heavy Equipment. The projects monitored were the Earley School Thin Timber Sale and the Gauldy Thin Timber Sale. The Design Criteria (Mitigation Measures) that were monitored were focused on Riparian Management.

Earley School monitored:

Implement protective vegetation leave areas or buffers around all streams, potentially unstable areas, and wet sites to maintain stream temperature, maintain stream-adjacent slope stability (including headwalls), and protect riparian vegetation. These areas will not be commercially thinned. Determine width of no-harvest buffers based on site-specific factors such as stream order, presence or absence of conifers, and slope-stability conditions. Buffers will at least include the inner gorge adjacent to streams and the active floodplain. Locate buffers for all perennial streams at least 50 feet slope distance from the edge of the floodplain; for intermittent streams at least 15 feet from the edge. If no floodplain or slope break exists, retain at least two rows of conifer above streams. Buffers will be wider than these minimums where needed to avoid unstable areas (SFP: FW-087, -088, -089, -112).

Limit skyline corridors to between 10 and 20 feet wide. Corridor width may appear wider in areas where trees adjacent to the corridor are cut to meet the silviculture prescription. Where skyline corridors pass through riparian buffers, remove no more than 20% of the canopy in a given 1,000-foot reach of stream (SFP: FW-091) Corridors will not be directly over coho habitat.

Directionally fell trees away from buffers to protect riparian vegetation from damage. Retain trees accidentally felled into buffers to minimize stream sedimentation or damage to riparian vegetation. Some trees may be removed as determined by a fish biologist or hydrologist (SFP: FW-091).

The reason for monitoring these Design Criteria were due to the on-going discussions with NMFS regarding TMDL, particularly shade and development of future large coarse woody recruitment versus existing small wood recruitment.

Monitoring revealed that:

The Team reviewed Units 14, 15 and 16. The buffers met design criteria.

One end suspension of logs was not feasible across the northern riparian buffer in Unit 15. One end suspension did not occur; however, the fisheries biologist was present and observed that the objectives were met. Reviewed Unit 16 where a skyline corridor went through a riparian buffer. It met or exceeded the design criteria. Some corridors required no trees to be felled due to the skyline deflection. The logs were able to be fully suspended and yarded above the riparian corridor.

Units 14, 15 and 16 were reviewed. Trees were generally directionally felled away from riparian buffers. In some cases this was operationally not feasible.

Some comments from the Team included:

Specialists (Fisheries and Hydrologist) and the layout crew have a transition meeting to ensure compliance with design criteria for the buffers as described in NEPA. However this is not well documented. Suggest that these be documented and kept in either the NEPA folder or Presale folder. Team discussed reworking the design criteria wording. The challenge being rewording in such a manner that it is clear to the layout crew and is clear to the regulatory agencies such as NMFS.

The Sale Administrator documented that the purchaser removed three boundary trees next to the riparian buffer in corridor 7 in Unit 15 in the Daily Log and emails. He required the purchaser to leave an additional three trees that were included timber to mitigate for the loss. A field meeting with the Sale Administrator, FSR, purchaser and contract representative was held to discuss the issue.

Consider revising design criteria wording to state, “Directionally fell trees away from buffers to protect riparian vegetation from damage where operationally feasible,” or similar wording.

Gauldy monitored:

Areas along streams would not be harvested within commercial thinning units to protect physical integrity of the perennial and intermittent streams and banks, maintain shade, and minimize sediment input from commercial thin operations. These “no harvest areas” areas range from 15 to 200 feet on both sides of the stream channel based on local site conditions. (Page 2-13) Buffers will at least include the inner gorge adjacent to streams and the active floodplain. Minimum no-harvest buffer widths of 30 feet on perennial streams and 15 feet on intermittent streams will be implemented in all units. (Page 2-3)

Late-Successional Reserve harvest prescription. Trees 20 inches or greater at DBH will not be harvested, except within road and landing clearing limits.

The reason for monitoring these Design Criteria was due to:

The on-going discussions with NMFS regarding TMDL, particularly shade and development of future large coarse woody recruitment versus existing small wood recruitment.

Late-successional reserve assessment guideline in approval letter that said the LSRA and the REO commercial thinning criteria would be met. In 2007, that was amended to read “alternatively” instead of “and.” The Gauldy Sale is under the former guideline. Provides an opportunity to monitor what could be removed under the current guideline and what effect if any it would make.

Monitoring revealed that:

The Team reviewed Units 7, 15 and 20. Harvest buffers were implemented as prescribed.

The Team reviewed Units 7, 15 and 20. No stumps greater than 20 inches were located except in Unit 20. The 20 inch diameter log was left in place. Trees 20 inches DBH that were cut, but were not removed, were documented.

Some comments from the Team included:

The buffers met the design criteria in all cases. The fisheries biologist and hydrologist felt that in a few cases the buffers were too wide. The Team discussed reworking the design criteria wording. The challenge being rewording in such a manner that it is clear to the layout crew and is clear to the regulatory agencies such as NMFS.

The requirement to leave 20 inch diameter trees on site has clarified with the REO letter. It was determined that removal of the 20 inch diameter tree would not have had a significant effect.

Forest Plan Amendments

September 30, 1990. Vacates the 1988 ROD which amended the Regional Guide for the Pacific Northwest Region with regard to management of northern spotted owl habitat, and amends all final Forest Plans to vacate the SOHAs established in compliance with the 1988 ROD. Also adopts direction not inconsistent with the ISC recommendations during an interim period. This decision was later found illegal, and was replaced by Amendment #4.

May 22, 1992. Modifies some standards and guidelines to improve clarification and manageability: changes harvest constraints on subbasins to constraints on subbasin areas (FW-003) (2,000-5,000 acres in size); removes the statement that management plans would be made for potential peregrine nest sites; deletes FW-081 (redundant with FW-110, etc.); clarifies FW-083 seasonal restrictions on activities which disturb stream channels; clarifies FW-090 yarding corridors through riparian buffers to take advantage of natural openings; changes FW-107 (Soil Damage), changes definition of area from "within the project area" to "within each harvest unit, excluding roads and landings", describes detrimental conditions; increases minimum size of logs (large woody material) to be left in harvest units (FW-110); expands FW-123 (Streamside Stability) to include stream-adjacent slopes; deletes FW-152 (Letters of Authorization no longer used); MA 4, Bald Eagle Habitat, changes schedule for completion of management plans; adds some monitoring and evaluation questions; adds some definitions to glossary; other errata.

August 26, 1992. Modifies implementation activity schedules for watershed, fish and wildlife projects (Forest Plan Appendix B.)

April 13, 1994. Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl - adds land allocations and standards and guidelines to provide a comprehensive ecosystem management strategy for management of late-successional habitat and watersheds.

July 12, 1994. Oregon Dunes National Recreation Area Management Plan. Amends direction for the NRA contained in the Siuslaw Forest Plan as Management Area 10. A broad range of ORV and non-motorized recreation opportunities are maintained while enhancing conditions for plants, fish and wildlife. Tenmile RNA is recommended for establishment and two creeks, Tahkenitch and Tenmile, are recommended for addition to the Wild and Scenic River system.

March 2, 1995. Supplements the existing standards and guidelines for the regulation of special forest product collection on the Forest. Forest-wide standards and guidelines are added for all special forest products, and new guidelines are added to Management Areas 1, 4-10, 12, 13, and Riparian Reserves.

March 29, 1995. Establishes Sandlake Research Natural Area (241 acres) in Tillamook County. This area contains the best example of a parabola dune ecosystem along the Oregon coast.

July 17, 1996. Adds approximately 45 acres to the Siltcoos Recreation Corridor (Management Area 10-D) on the Oregon Dunes NRA, and reduces a corresponding

acreage in MA 10-C (ORVs restricted to Designated Routes). By the change, potential developed overnight capacity on the Dunes will be increased about 18%.

June 9, 1997. Establishes Reneke Creek Research Natural Area (480 acres) in Tillamook County and Tenmile Creek Research Natural Area (1190 acres) in Coos County. The Reneke Creek area is dominated by red alder and is drained by two matched perennial streams. The Tenmile Creek area provides an excellent representation of the coastal dune mosaic, including all major dune features, except a parabola dune. It also contains deflation plains in various successional stages.

May 21, 1999. Establishes Cummins/Gwynn Creeks Research Natural Area (6,530 acres) in Lane and Lincoln Counties. The area contains a western hemlock/swordfern forest and accompanying coastal stream system (first to third order stream system). The entire watershed of Cummins/Gwynn Creeks contains important functional ecological values and a diverse spectrum of coastal forest communities.

May 2, 2000, Changes the Dunes Management Plan management area designation for a three acre area adjacent to Hall Creek from MA 10-A, Non-Motorized Undeveloped Areas to MA 10-D, Developed Corridors. The change allows the development of Day Use Facilities as planned in the Dunes Management Plan.

August 22, 2002. Temporary amendment to the Oregon Dunes Natural Recreation Area Plan that changes the management area prescription for a 45 acre blow down area from MA 10 – f, Plant, Fish, and Wildlife Habitats to MA 15-Timber/wildlife/Fish/Dispersed Recreation. This temporary amendment will be effect until the blown down timber is salvaged. Upon completion the area will revert back to MA 10 –F.

January 4, 2005. Changes the Dunes Management plan to increase in the capacity of the Horsfall staging area from 42 sites to 70 sites.

May 18, 2007. Changes the Wildlife Forest Plan Standard and Guideline, “Prohibit(ing) collection and transportation of Special Forest Products by motorized means (i.e., chainsaws, vehicles, etc.) or firearms from March 1 to October 1 each year, except for use of roads by vehicles,” was amended to read, “There is also the potential to disturb nesting birds during the nesting season (March 1 to September 30). Disturbance events during the nesting season and associated with SFP harvest will comply with the most recent Biological Opinion for Disturbance Only Activities consulted on with the USFWS.” It also changes the Forest Plan Standards and Guidelines for MA 6 (Cascade Head Scenic Research Area) and MA 7 (Cascade Head Experimental Forest) to allow tribal collection.

May 1, 2009. Allows designation of Riley Ranch designated trail within Management Area 10C within the Oregon Dunes National Recreation Area.

May 11, 2009. Changes the direction for all or portions of six Management Areas (approximately 551,251 acres) from “motorized cross country use open, unless designated as closed” to “motorized cross country use closed, unless designated as open.”