United States Department of Agriculture Forest Service Pacific Northwest Region

Monitoring and Evaluation Report

Siuslaw National Forest

Fiscal Year 2013

Bailey Creek

July, 2014

Thank you for taking the time and interest in reviewing the results of the Siuslaw National Forest 2013 Monitoring Report. .

The report focuses on key monitoring activities and findings since the previous publication in September, 2013. 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.

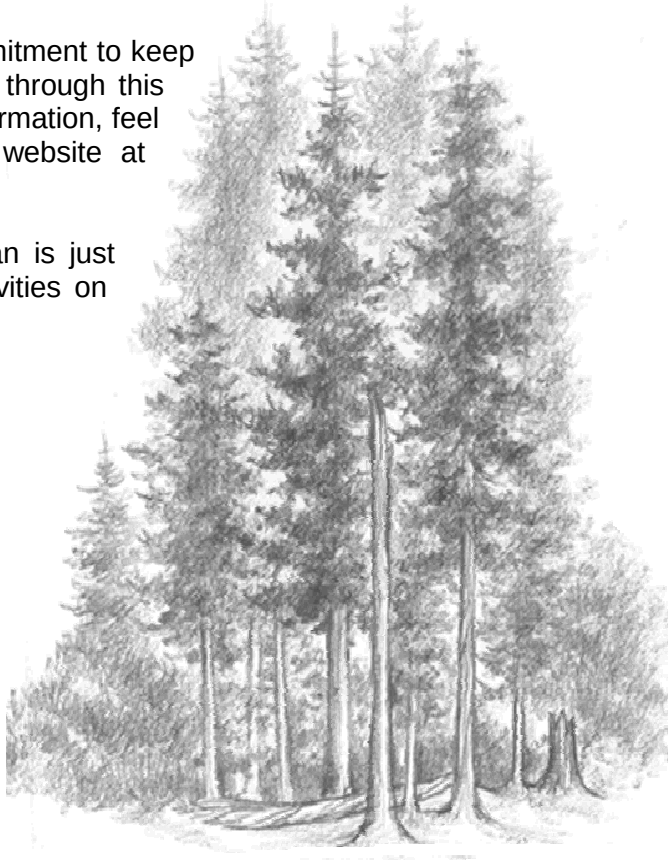
Until we begin Plan revision, it is my commitment to keep you informed of the results of monitoring through this report; however if you would like more information, feel free to contact the Forest or visit our website at http://www.fs.usda.gov/siuslaw.

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 FY13 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 2013, we surveyed 10 miles of stream habitat on the Hebo Ranger District in the Siuslaw River basin in Three Rivers and Erickson Creek. 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.

For long-term monitoring of change to fish habitat we 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 was done in the fall of 2010. A brief of this information noted that the "majority of watersheds had a positive change in condition scores" based on upslope and riparian data between 1994 and 2008. Although there were areas of the study areas with decreasing trend, most watersheds on the Siuslaw NF were ranked as improving (Lanigan 2011).

In 2013, the Siuslaw National Forest staff in cooperation with our partners Nestucca-Neskowin Watershed Council, the City of Corvallis, and the Oregon Watershed Enhancement Board removed or replaced 10 culverts or bridges making over 11 miles of stream habitat fully accessible to aquatic species. Access was opened in Farmer, Lewis, Wildcat, Bays, Bunn, Eckman, Bear, and Rock creeks and a tributary to Schooner Creek. In addition, large wood was placed in a combined 4 ½ miles of anadromous and resident fish habitat in cooperation with our partners Salmon-Drift Creek Watershed Council, Siuslaw Watershed Council, Siuslaw Institute, and the Oregon Watershed Enhancement Board. Wood was placed in North Fork Schooner, Fivemile, and Drift creeks.

In April 2009, the National Marine Fisheries Service 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. On May 16, 2011, NMFS issued their Draft Revised Report

of the Biological Review Team confirming these results (Stout et al. 2011). 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 concluded 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. Examination of invertebrate species such as freshwater mussels may, in some instances, be a useful tool in determining the health of aquatic ecosystem.

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. Waterbodies ranged from unnamed ponds less than a quarter acre in size to Siltcoos Lake at 3,164 acres. Plants surveys for some of the lakes were repeated in 2013 but results have yet to be analyzed.

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 the 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 with 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. Affects 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.

Native Mussels

The Forest has been actively working with the Pacific Northwest Research Station and the U.S. Geological Service in developing sampling methods to monitor native freshwater mussels. This has included making visual observations for adult mussels using snorkel and SCUBA gear, examining fish for the presence of juvenile mussels (glochidia) on gills, and taking tissue samples for DNA analysis. To date fourteen lakes have been sampled, seven of which have contained mussels in the genus Anodontia (Table 1).

Little is currently known about the abundance and distribution of mussels in Oregon. One of the life history requirements of Oregon's native mussels is the parasitic nature of the glochidia on the gills of fish. Without fish there can be no mussels. However, what species of fish can host the glochidia is not fully known, including whether fish species that are not native to a mussel species range, i.e., do not normally occur in the same area, can serve as suitable hosts for the glochidia.

Along these lines it was interesting to note that during the 2013 surveys, largemouth bass were the only fish species observed in Hall Lake and the lake had very few mussels, all of which were located near the inlet stream. Meanwhile, in Schuttpelz Lake, which lies immediately upstream from Hall Lake, but is separated from it by a ten foot waterfall, native cutthroat trout and sculpins were noted along with numerous mussels, but no bass.

One possible explanation for the paucity of mussels in Hall Lake, reached solely by conjecture, is that the bass are not a suitable host for the mussel glochidia, the bass have consume most if not all the native host fishes, and the adult mussels that were present near the inlet of Hall Lake washed down from Schuttpelz Lake. If this explanation were to hold true it would be yet another example of the unintended, indirect effects caused by exotic species introductions.

Table 1 Presence of freshwater mussels of the genus *Anotontia in a small number coastal Oregon lakes (arranged from north to south).*

Lake name	County	Sample Date(s)	Mussels Present?
Coffenbury	Clatsop	7/6/2010	Yes
Hidden	Lincoln	10/27/2009	No
Lotus	Lincoln	10/27/2009	No
Lily	Lane	9/9/2007	Yes
Alder	Lane	3/19/2008, 6/3/2009	Yes
		10/14/2009, 11/4/2009	Yes
Dune	Lane	3/19/2008, 10/14/2009	Yes
		11/4/2009	Yes
Cleawox	Lane	8/3/2010	No
Erhart	Lane	10/8/2009	No
Loon	Lane	10/8/2009	No
Carter	Douglas	7/8/2010	Yes
Lost	Douglas	7/22/2010	No
Schupelz	Coos	2013	Yes
Hall	Coos	2013	Yes
Butterfield	Coos	10/29/2009	No

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 (*Oncorhynchus 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 (Stout et al. 2010) which was confirmed in a draft revised report of the scientific conclusions on May 16, 2011 (Stout et al. 2011). Oregon coast coho salmon are a Forest Plan management 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 too early to draw conclusions about the status of this ESA listed fish. The Oregon Coast Coho Conservation Plan for the State of Oregon, March 16, 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 100,000 spawners when marine survival is extremely low to a high of 800,000 spawners when marine survival is high. The 2013 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 124,411 coho. This is a 25% increase from 2012, but still well below the three previous years when spawning numbers were at record high levels since monitoring began in 1950 averaging about 300,000 spawners.

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 2011, 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.

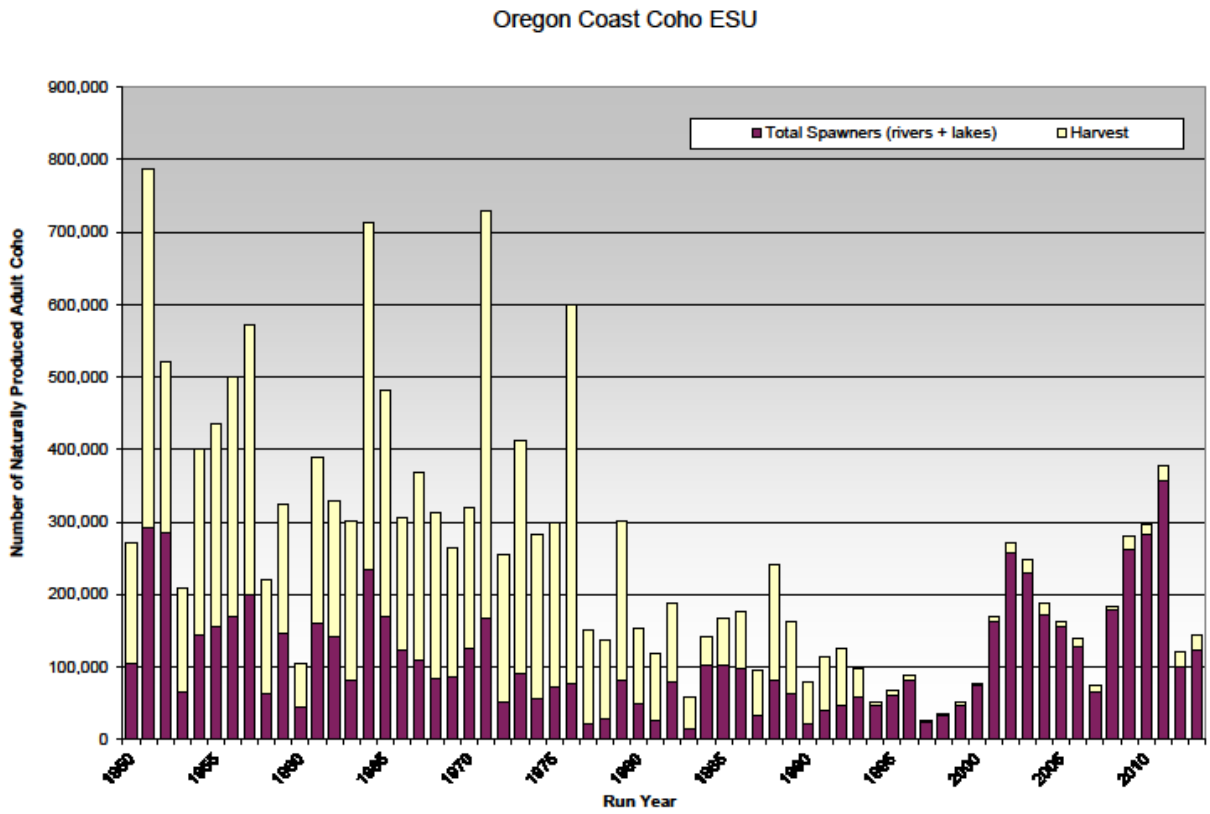

Figure 1. Estimated numbers of naturally produced adult coho in the Oregon Coast Coho ESU (run years 1950 to 2013). Number of adult coho spawning in the wild, and harvest impacts (both landed and non-landed).

Oregon Department of Fish and Wildlife, Oregon Adult Salmonid Inventory and Sampling Project

The southern distinct population segment (DPS) of eulachon (*Thaleichthys pacificus)* was listed as threatened under the Endangered Species Act effective May 17, 2010, in response to an abrupt decline in abundance throughout its range (Gustafson et al. 2010). Eulachon, 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. 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.

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 (*Oncorhynchus 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 are 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 (*Oncorhynchus 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 (*Oncorhynchus 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 (*Oncorhynchus clarkii clarkii)* 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.

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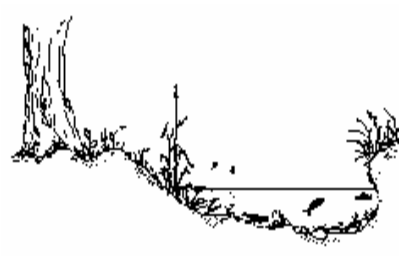


Monitoring Question: Water Quality

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?

On August 7, 2013, Karnowsky Creek was visited to assess the results of the restoration projects that were done in 2004. The following observations were made. Photos of the valley and stream channels are included.

Vegetation:

The trees, shrubs and willows were growing vigorously. Many of the alders, conifers and willows were over 15 feet high. There is some reed canary grass, but noxious weeds such as scotch broom and knotweed were not seen.

Wildlife observations:

Elk tracks were in abundance. A small black bear, possibly a yearling, was spotted crossing the Bernhardt Road east of Karnowsky Creek in the late afternoon. It had a very glossy black coat and looked to be in excellent health. Juvenile salmonids were noted in the new stream channel and ditch. Freshly cut branches and a new dam in the main channel just below Tributary 2 indicated recent beaver activity.

The new channels:

All of the channels are well vegetated. The mainstem near the ford did not show any signs of downcutting, the substrate consists of sand and small gravel. The transition between the ditch and the channel is smooth, and there's no sign of the log ramp was was built to step up the channel from the ditch to the constructed stream channel. It was completely buried by sediment.

The section of the ditch between Tributary 2 and Tributary 3 has a meandering low flow channel with alternating gravel bars.

The upper mainstem above Tributary 3 is aggrading as gravels move downstream. Only the lower end of the channel above Tributary 3 is still incised after the initial post-construction downcutting.

Gravels are moving down through Tributary 3. The lower portion of the channel is aggrading, there are some log steps in the middle of the channel's length that may undercut in the future. The vegetation and t rees on the Tributary 3's valley floor are growing vigorously, and it's hard to see the channel now.

Is the floodplain connected to the channel during bankful flows?

To answer this question, estimates of peak flows from the US Geological Survey's web-based program "Streamstats" and Manning's equation were used. Streamstats predicts the expected flow for a given return interval at a point on a stream, based on regional

regression equations. Mannings Equation was used to show what flow the channel is capable of carrying. The results are shown in Table 2.

The latest cross-sections available were measured in 2004. Even though the cross-sectional data isn't recent, the mainstem channel didn't appear to have changed noticeably at the locations of the two cross-sections in the Table 2.

Table 2 Results from using Mannings Equation

Cross-section	Cross-sectional area (sq ft)	Wetted Perimeter	Hydraulic Radius	Designed slope	Calculated flow from Mannings Equation (cfs)*	Calculated velocity from Mannings Equation	Q2 from Stream stats**	Q2 min	Q2 max
Cross-section 7, near ford, measured in 2004.	32	20	1.6	.0039	**100.25**	3.13	**135**	87	210
Cross-section 10, downstream from Tributary 2	17.85	17.38	1.03	.0039	**42.16**	2.36	**127**	82	198

**Assume a Mannings "n" of 0.04, the estimated number for gravel bottom channels*

***Prediction error is 27%, therefore Streamstats gives a minimum and maximum range of values.*

At both the upper and lower locations in the new channel, the predicted flow in the stream channel for a 2-year return interval flow based on Streamstats was more than the calculated channels capacit y. For example, cross-section 7 would have a top-of-bank calculated flow of 100.25 cfs, the 2-year flow from Streamstats is 135 cfs, suggesting that the banks would be overtopped, and water would be flowing on the floodplain at least once every two years, and probably more frequently than that.

Photos of the Karnowsky Creek valley and channels

Figure 1 View of vegetation in lower, tidally influenced valley from road.

Figure 3 Floodplain of Skunk Cabbage Creek upstream from road prism. Skunk cabbage plants have been grazed.

Figure 2 View downstream of main channel below the ford where the valley is narrow.

Figure 4 View upstream of main channel below the ford. Note the growth of the willows on the bank.

Figure 5 View upstream of main channel from middle of ford.

Figure 6 View downstream of main channel from middle of ford.

Figure 7 View upstream of main channel just upstream of ford.

Figure 8 Willow branch sprouting at ford.

Figure 9 Justin Fenton standing in front of willows along the stream bank that were planted in 2004/2005. Location is area above ford.

Figure 10 Beaver chewed branches along the channel

Figure 11 Willows and alder along stream bank, area is just upstream of ford

Figure 12 View upstream of ditch above the outtake area for the new channel. Note the alternating gravel bars and meandering channel that is forming.

Figure 13 Undercut log step in lower portion of upper main channel, just above Trib 3

Figure 14 Sediment wedge moving downstream in upper channel

Figure 15 Log step in upper channel

Figure 16 Dry pond in upper valley. It was part of the ditch prior to restoration

Figure 17 Log step capturing gravels in upper main channel

Figure 18 View upstream of lower portion of Trib 3. Note the log and rock steps

Figure 19 Log step in Trib 3, approximately half way up the channel. It is beginning to be undercut

Figure 20 View down the valley of Trib 3 from the top of the formerly cleared area

Figure 21 Large snag on hillslope of Trib 3.

Figure 22 View down the ditch below Trib 3.

Figure 23 View upstream of the main channel just below Trib 3. This is the point where the surface flow begins.

Figure 24 View downstream of a portion of the ditch below trib 3

Figure 25 View downstream of the ditch a couple hundred feet below trib 3. Fish were in this pool

Figure 26 View down the valley from near Trib 3

Figure 27 Fallen alder along the banks of the ditch, approximately midway down the ditch between Trib 3 and Trib 2.

Figure 28 View of the valley vegetation upstream from Skunk Cabbage Creek

Figure 29 View up the valley from the road just downstream of Skunk Cabbage Creek. The channel was visible from this point after it was built

Figure 30 View up the valley of the lower marsh from the footbridge

2013 Monitoring Report for Enchanted Valley Stream Restoration

BACKGROUND:

Between 1999 and 2002, a stream restoration project was implemented in the lower portion of Enchanted Valley. Approximately 5800 linear feet of new, meandering stream channel was constructed for Bailey Creek, which had been redirected into a ditch along the side of the valley when the valley was in agricultural use. Work included new channel construction in 1999, connecting the new channel to the old ditch and allowing water to flow through it in 2000, and placement of large wood in some of the new channel's pools in 2002. Riparian planting has been on ongoing and intermittent effort. In recent years, exclosure fences have been built to protect the plantings in two locations.

When the project was first proposed in the mid-1990's, it was one of the first, if not the first, project to involve replacing a ditch with a constructed meandering channel in the area. There was a significant amount of skepticism about the project, both internally and externally. Some of the issues included concerns about increased sedimentation into Mercer Lake and loss of elk habitat. As a result, a compromise was developed that allowed the restoration of a meandering channel in the lower half of the open meadow above the lake, while leaving the upper half of the meadow as elk pasture.

However, one of the long-term lessons from this project is that water, gravity and sediment transport do not recognize artificial delineations on a landscape, and streams need to be regarded as holistic and integrated systems. The upstream half of the ditch has continued to erode the banks as the stream tries to re-establish a meander pattern, which generates sediment that has been deposited downstream in the new channel and associated floodplain. As a result, the new channel is approximately 50% narrower than when it was constructed in 1999.

In spite of the continuing erosion of the ditch in the upper meadow, the concerns with excessive sediment from the new channel have not been borne out. Prior to the construction of the new channel, the straightened ditch was a conduit for sediment into the lake, and a bird's foot delta was building at the mouth of the lake. A topographic survey that was done in 1999 and repeated in 2000 showed that approximately 600 cubic yards of sediment were added to the delta in one year (2002 Monitoring Report). Recent air photos of the mouth of the new Bailey Creek channel show some sediment, but very little compared to what was being deposited at the mouth of the ditch. Currently, the new channel and adjacent floodplain are capturing most of the sediment. It will be interesting to see if the new channel reaches its maximum capacity for sediment retention, and if the sediment transport into the lake increases over time.

While many of the trees that have been planted are doing well, especially the ones that are protected by recently built exclosures, the ground vegetation is dominated by reed canary grass throughout the entire valley. When the project was planned in the mid-1990's, the main concern and focus was on the design 2 of the new channel. The vegetation plan was not as robust as it needed to be to deal with the aggressive encroachment of the reed canary grass, and the elk browsing. This lesson was learned

quickly, and incorporated into the planning for the next project of this type, Karnowsky Creek.

The reed canary grass appears to be holding the banks in place, and preventing any lateral migration of the meander bends.

METHODOLOGY:

Enchanted Valley was revisited July 22-24, 2013. Data collected included the re-measurement of 5 cross-sections and numerous photographs. The upper valley ditch was visually monitored from the top of the meadow and ditch to the upper end of the new constructed channel. Photos were taken, and bankful widths and bank heights were measured in some locations.

The cross-sections were originally marked by metal fence posts (T-posts). During this monitoring effort, eight cross-section locations were located on the ground, five of them were re-surveyed. Due to limited time, it was not possible to measure all 24 cross-sections. The original benchmarks (control points) for the cross-sections either couldn't be found, or vegetation obscured the line of site from the cross-sections to the control point. Therefore, for the cross-sections in the upper part of the constructed channel, #3 and #4, it was assumed that the channel hadn't downcut significantly between 2006 and 2013, and the bottom of the channel was in approximately the same elevation. At cross-section 3, the fence posts were only exposed for 1.6 feet on either side of the channel, indicating at least a foot of floodplain deposition had taken place. For the lower channel cross-sections, #14, #15 and #16, it was assumed that the base of the fence posts were at approximately the same elevation. Therefore, the difference in width is assumed to be accurate, the aggradation or degradation of the channel may not be as accurate as previous years' data.

The following report is arranged in geographical order going downstream, from the top of the open meadow and the beginning of the old ditch, to the lower part of the constructed channel.

DISCUSSION

Erosion in the Upper Half of the Meadow and Ditch.

The transition area from the channel that was never ditched under the alders in the upper valley, to the beginning of the ditch has continued to erode the western bank, and deposit a point bar on the east side of the channel. The eroding bank is cutting back into an alluvial fan, so over time, the bank height has increased from 5 to 6 feet in 1999 to over 20 feet in 2013. Based on the average height of the bank over time, and the area of a poloygon outlining the eroded area, it is estimated that approximately 2000 cubic yards of sediment have been eroded away from this site. See the figures 31-33.

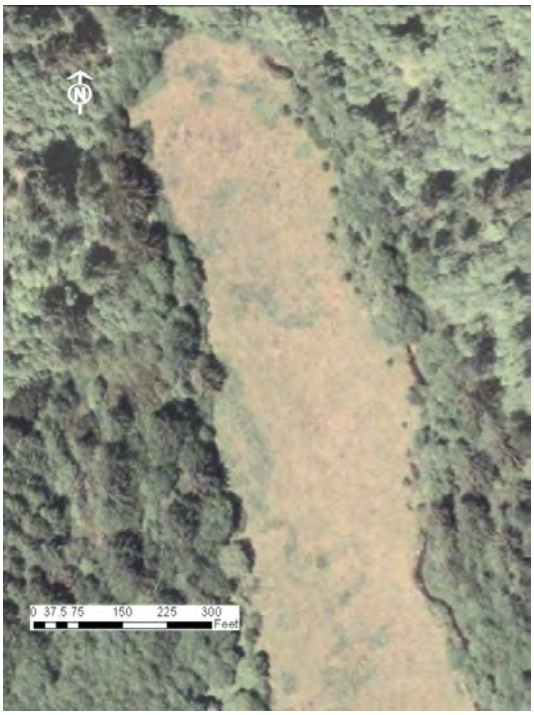


Figure 31 2007 air photo of upper valley

Figure 32 2012 air photo of upper valley

Figure 33 Annotated air photo from 2012. Close view of erosion at upper end of valley, banks are approximately 20 feet high, estimated amount of sediment removed is 2000 cubic yards. The black polygon outlines the area of erosion as the channel builds a meander at the upper end of the ditch. The same area is shown in 2007 in figure 32.

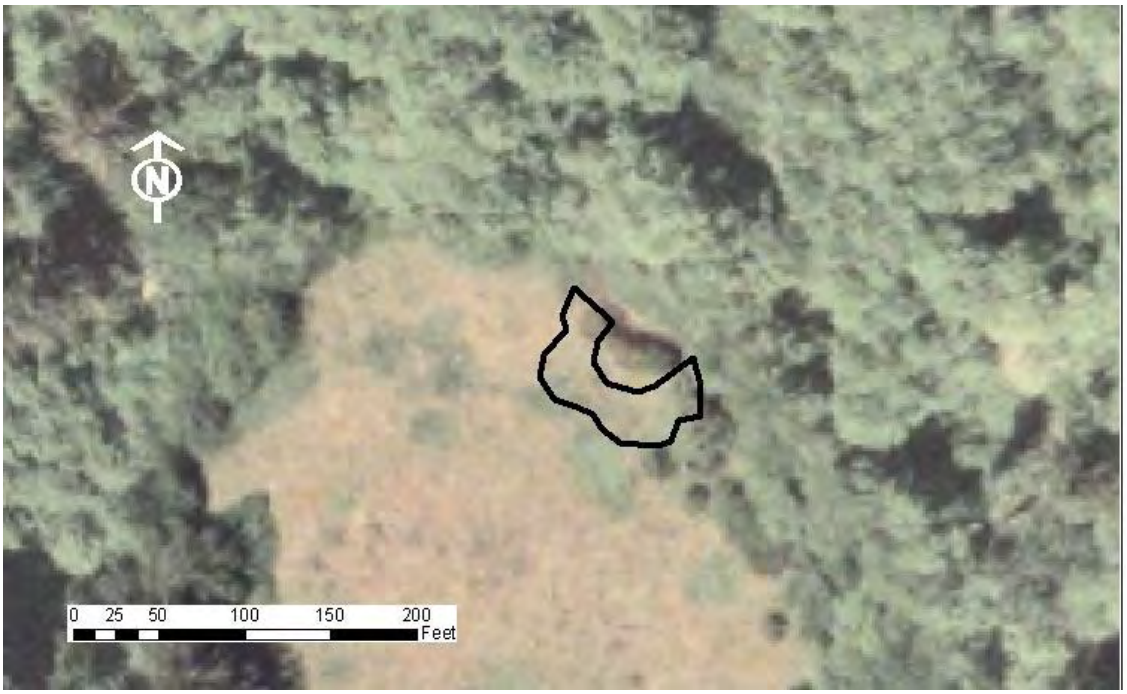


Figure 34 Same area in 2007, polygon outlined in black is the area of erosion shown in 2012 photo.

Figure 35 Ground view of eroded banks. Person in the photo is 5.5 feet tall.

Downstream from the large, eroded banks, a meandering channel is forming for the first 300 feet of the old ditch (Figure 36). Alternating gravel bars are being deposited, and the channel is wider here than the average width of the ditch. Figure 37 shows the location of measured widths of the ditch in 1999 and 2013. Note that in 2013, the upper ditch is 24 feet wide, compared with approximately 17 feet downstream. The average width of the ditch in 1995, when the project planning began, was 15 feet. It is assumed the channel widening and meander development will continue downstream through time.

Figure 36 Development of the ditch into a meandering channel just downstream of the large eroding area. Note the alternating gravel bars

Figure 37 Another view of the gravel bar deposition and meandering channel development

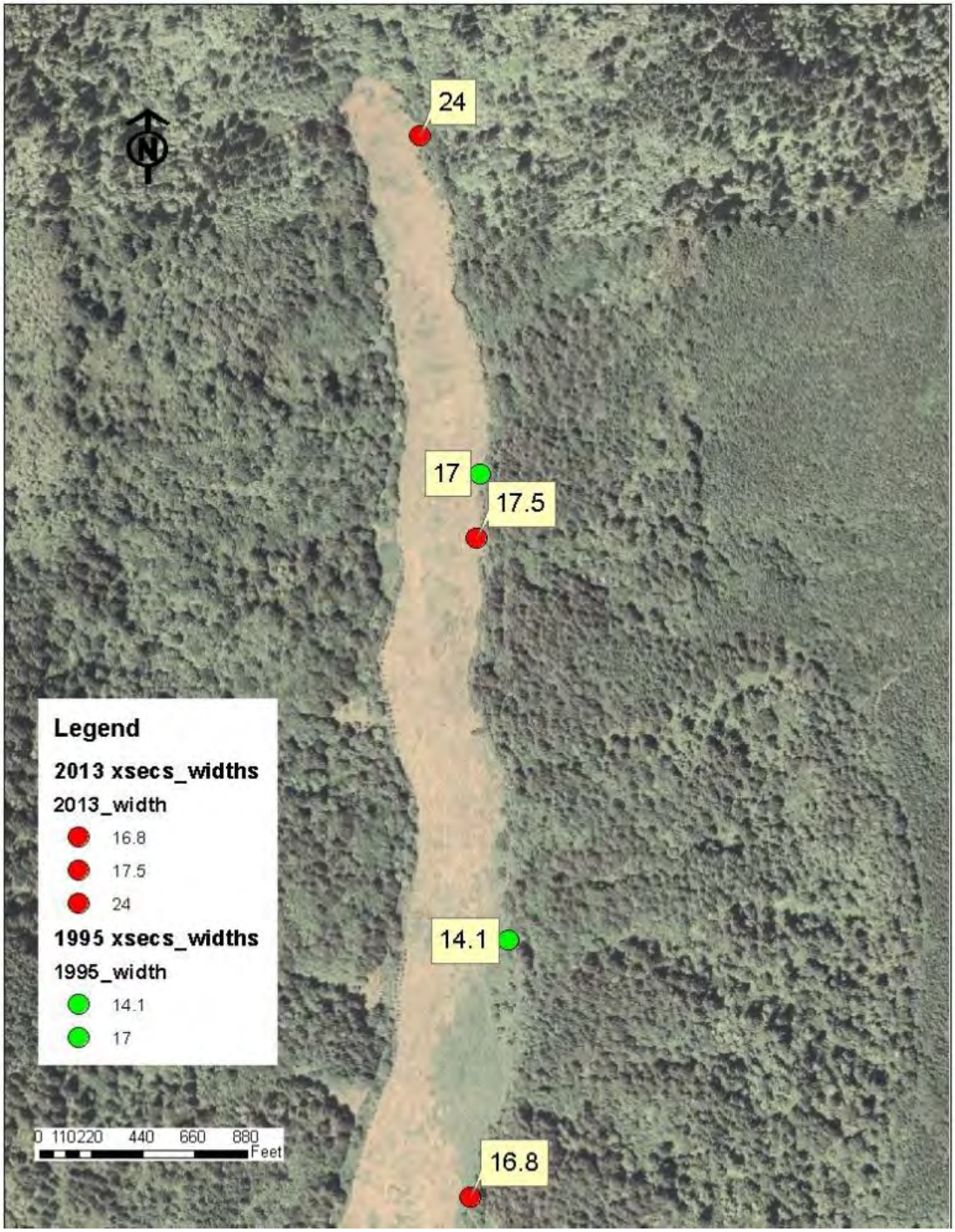


Figure 38 Aerial photo with widths of ditch measured in 1995 and 2013

Other intermittent areas along the length of the ditch between the large erosional banks and the new channel are also eroding and forming meanders. Most of the meander formation below the first 300 feet is occurring in conjunction with wood that was placed in the ditch in the early 1990's. In one place, approximately 720 feet downstream from the large eroding bank, 3 widely spaced logs placed in the channel have caused some

deposition of gravels downstream of the logs. The western bank is actively eroding (Figure 39). At another location, approximately 1400 feet downstream from the upstream end of the ditch and eroding banks, the ditch channel is eroding around the end of a log that was cabled into place in the early 1990's (Figure 40).

Figure 39 View downstream of three logs placed in ditch in early 1990's. Gravel deposition is occurring downstream of the logs, and the western (meadow side) bank has eroded. Person in photo is 5.5 feet tall.

Figure 40 Ditch channel has eroded around the end of a log placed in the early 1990's and cabled into place.

Figure 41 Bank heights in upper valley in remaining ditch

Bank Heights

With the exception of the large eroding banks at the uppermost end of the old ditch, which is eroding back into an alluvial fan that slopes toward the stream, the bank height for the length of the remaining ditch is between 5 and 6 feet. Figure 41 shows the

measured bank heights in the remaining ditch, figure 42 shows the measured bank heights in the new channel. Bank heights in the new channel and the old ditch are approximately the same height, suggesting that the channel has reached an equilibrium through the valley.

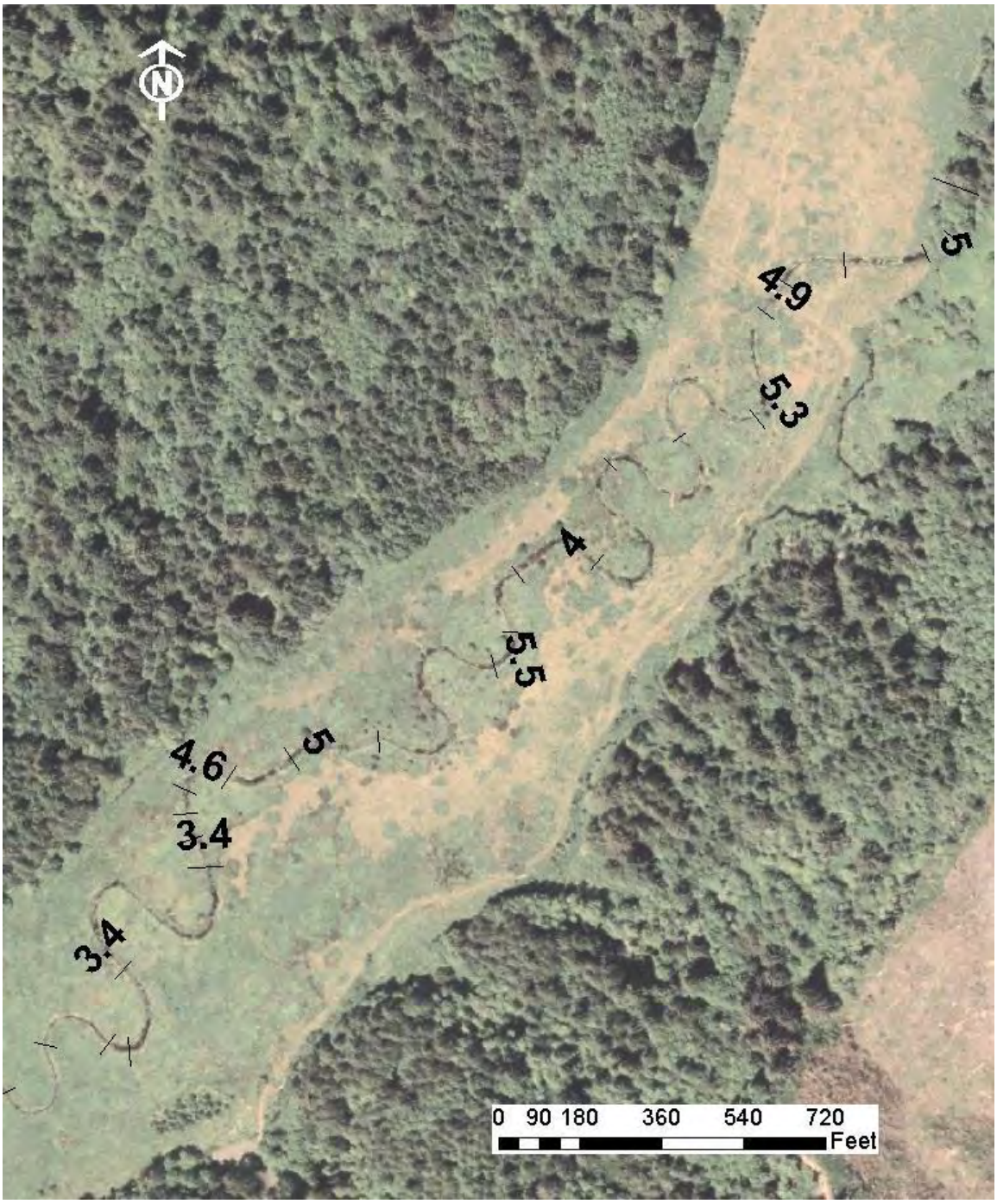


Figure 42 Bank heights in the new channel

Observations of the new channel and the cross-sections.

Five of the original cross-sections were re-measured, and one new one between #15 and #16 was measured. Cross-sections 3, 4, 14, 15 and 16 were re-measured in 2013. Two of them were near the upstream end of the new channel, the others were in the lower part of the constructed channel. Figure 43 shows the cross-section locations. The graphs of the cross-sections , tables 3 to 8, follow the map.

All of the cross-sections show that the channel has narrowed due to sediment deposition. The banks are dominated by reed canary grass, which is probably helping to trap the sediment, build the banks, and narrow the channel.

The fence posts at cross-section 3, which is 37 feet downstream from the ford across the new channel, were only protruding 1.6 feet above the ground surface on either side of the channel. At least a foot of sediment deposition has occurred on the floodplain in this location. This cross-section has more floodplain deposition than other areas in the valley.

The new channel bottom substrate is still sand, no gravels are present. The pools and riffles seem to be moving downstream in a wave-like fashion. Cross-sections that were pools in 2002 are now riffles, and vice versa. See tables 3 – 8 for information on the cross-sections.

Figure 43 Location of cross-sections in Bailey Creek

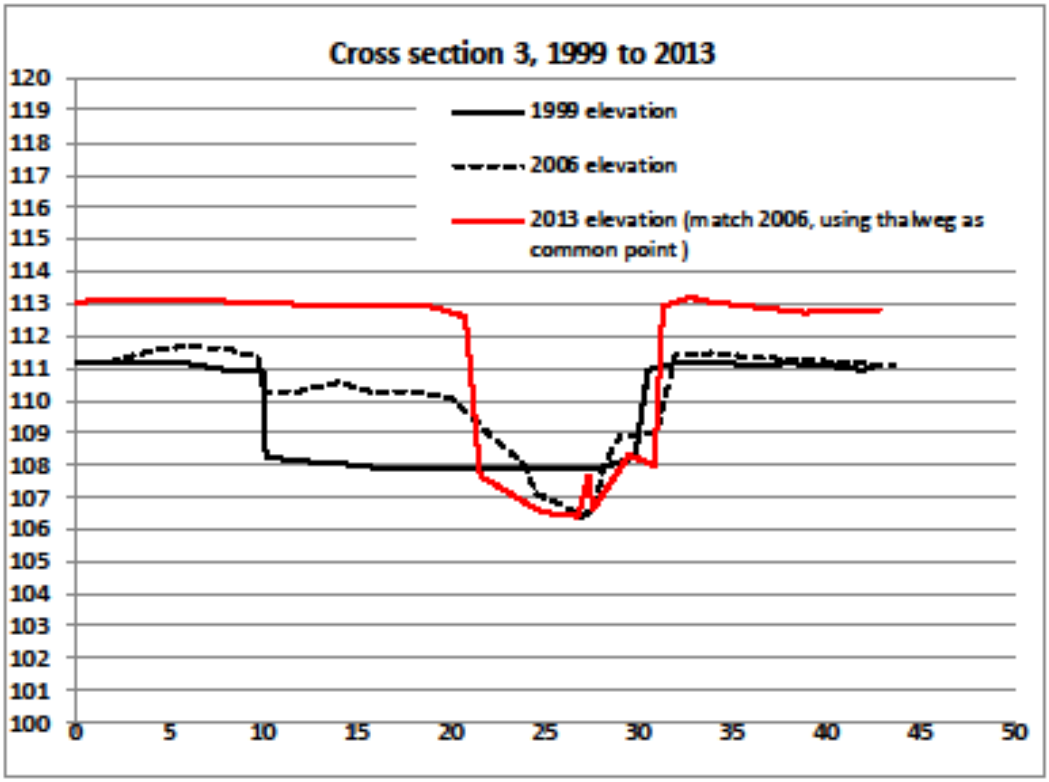


Table 3 Cross-section 3. Note the overbank deposits. Water depth was 2 feet deep in July 2013. This was a riffle in 2002, it's now a pool

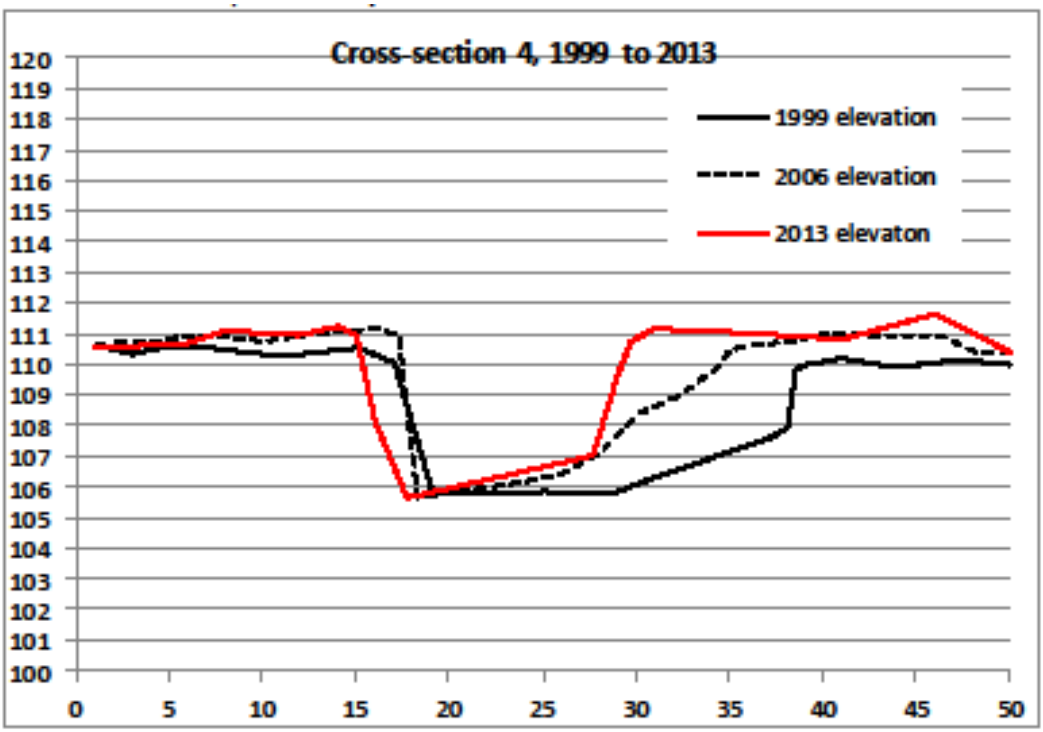


Table 4 Cross-section 4. Note that the channel is becoming more narrow through time. It was a pool in 2002, in 2013 it is a riffle area

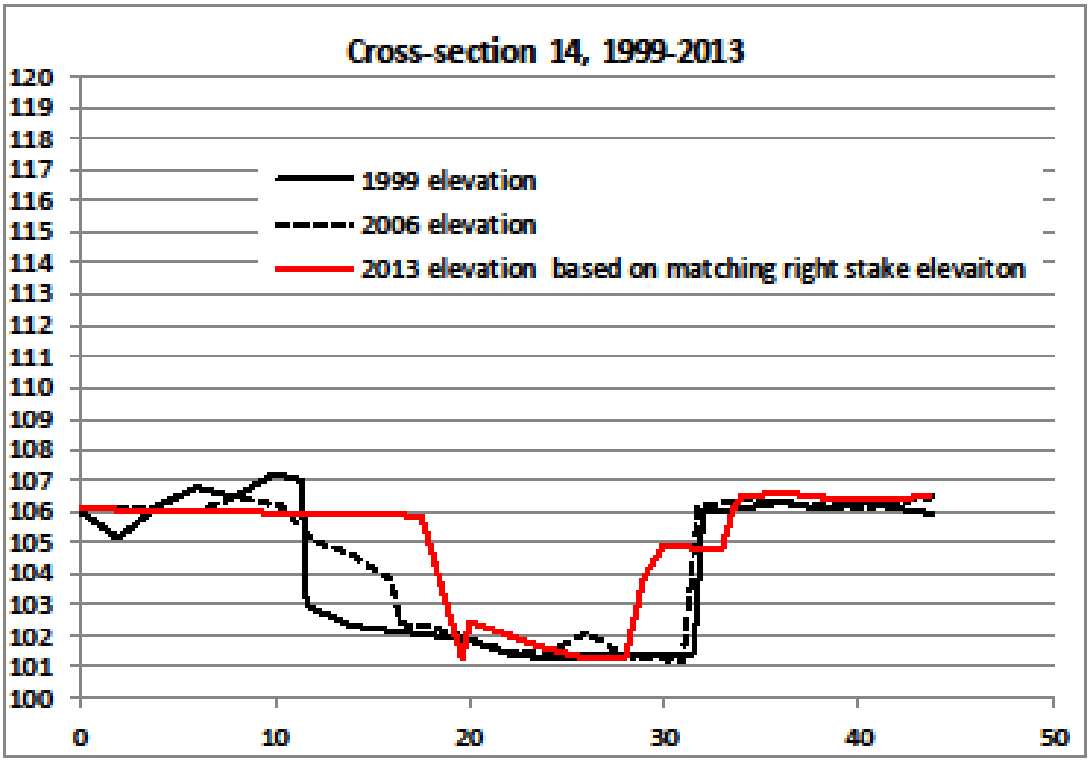


Table 5 Cross-section 14. This area is noted as a pool in 2002. Water depth is 1.4 feet in 2013

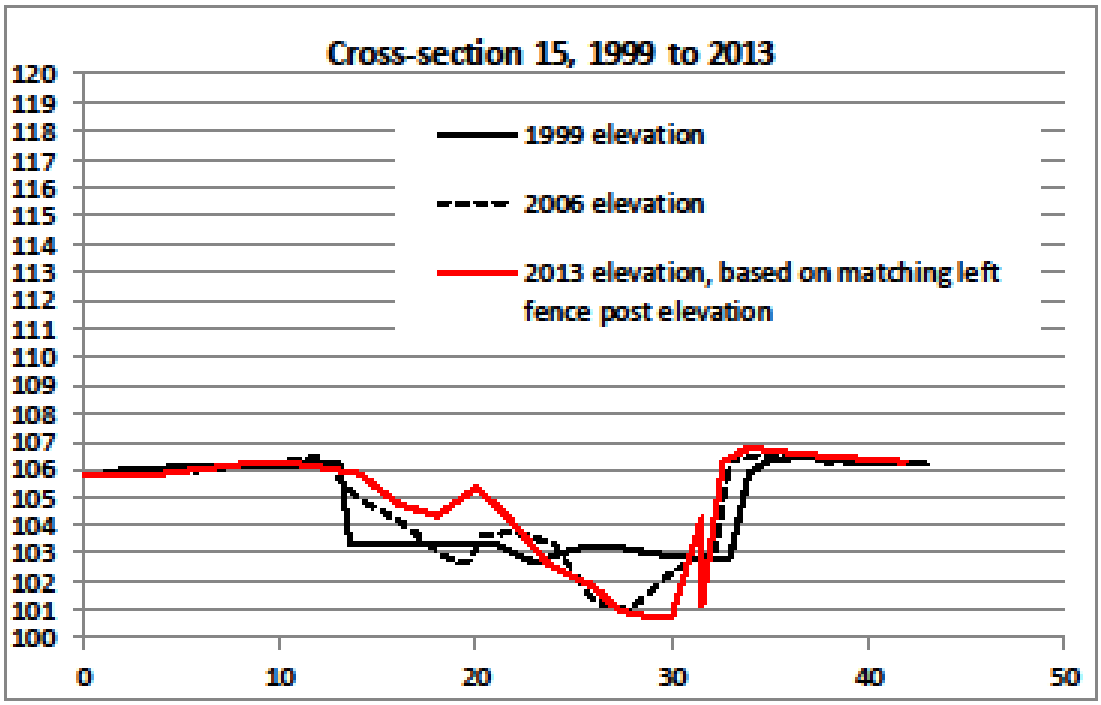


Table 6 Cross-section 15. In 2002, this was classified as the top of a long riffle, it is a pool in 2013. The riffle is just downstream, between cross-section 15 and the new cross-section between 15 and 16.

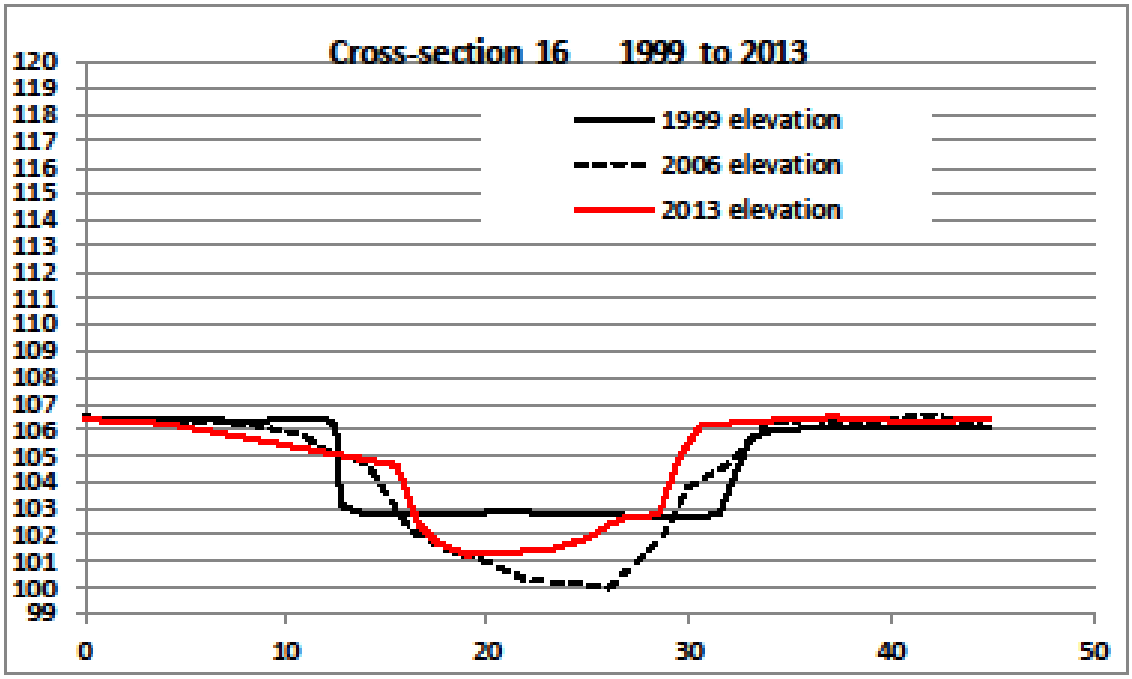


Table 7 Cross-section 16. Water depth is 1 foot in 2013. In 2002 it was classified as the bottom of a long riffle. It is the top of a riffle in 2013.

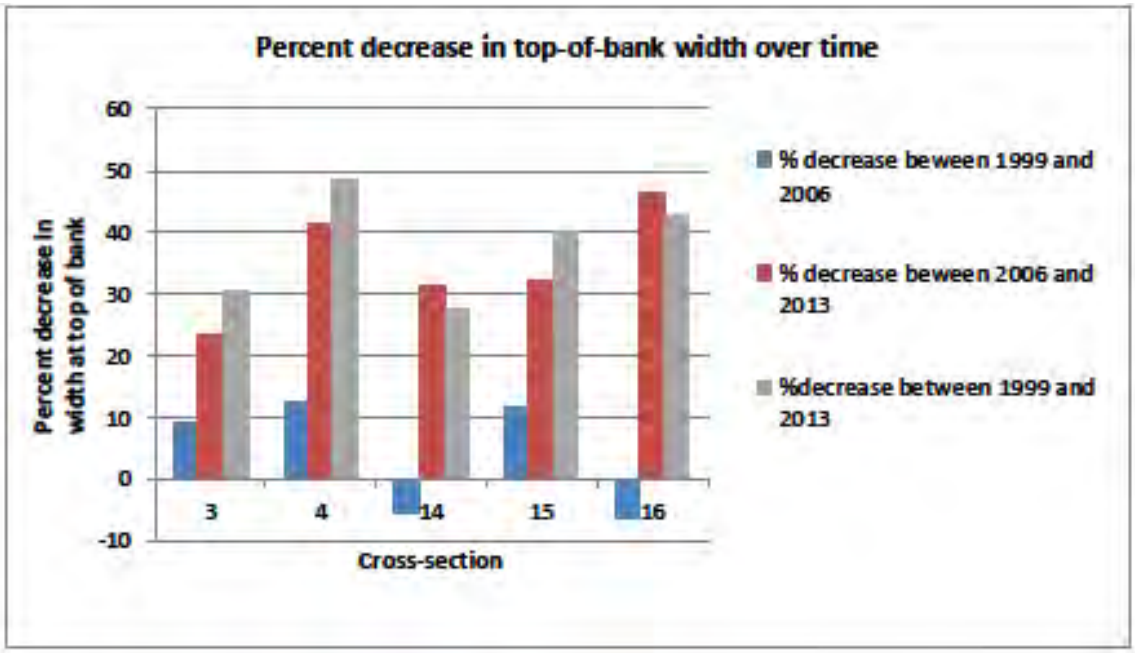


Table 8 Graph showing how the stream channel has narrowed over time. The width was measured at the top of the banks.

Figure 44View upstream at water level, cross-section 15. See appendix for more photos of the constructed channel.

Is the floodplain connected to the channel during bankful flows?

To answer this question, estimates of peak flows from the US Geological Survey's web-based program "Streamstats" and Manning's equation were used. Streamstats predicts the expected flow for a given return interval at a point on a stream, based on regional regression equations. Mannings Equation was used to show what flow the channel is capable of carrying. The results are shown in Table 9.

Table 9 Results from using Mannings Equation

Cross-section	Cross-sectional area (sq ft)	Wetted Perimeter	Hydraulic Radius	Assumed slope	Calculated flow from Mannings Equation (cfs)*	Calculated velocity from Mannings Equation (ft/sec)	Q2 from Stream stats**	Q2 min	Q2 max
3	35.15	19.11	3.04	.0015	**200.79**	3.45	**285**	185	440
16	79.65	19.8	4.02	.0015	**231.9**	2.91	**297**	193	459

**Assume a Mannings "n" of 0.035, the estimated number for channels in pastures with high grass, to account for the reed canary grass on the banks.*

***Prediction error is 27%, therefore Streamstats gives a minimum and maximum range of values.*

At both the upper and lower locations in the new channel, the predicted flow in the stream channel for a 2-year return interval flow based on Streamstats was more than the calculated channels capacity. For example, cross-section 3 would have a top-of-bank flow of 200 cfs, the 2-year flow is 285, suggesting that the banks would be overtopped, and water would be flowing on the floodplain at least once every two years, and probably more frequently than that.

Sediment input into Mercer Lake

The objective of limiting the amount of sediment entering Mercer Lake from Enchanted Valley has been achieved. The 2000 air photo (Figure 45) shows the fresh deposit of sediment at the end of the ditch 15

channel in the delta. By 2003, two years after the water flow was diverted into the new channel, the amount of sediment entering the lake was greatly reduced to non-existent. The 2012 air photo shows a small amount of sediment entering the lake from the end of the constructed channel that flows through the willow patch. The amount of sediment entering the lake from the new channel is not enough to build a delta similar to what was deposited at the end of the ditch, however.

It is uncertain whether the sediment that is being generated by the bank erosion in the upper valley's ditch will continue to be deposited on the floodplain and in the new channel. It is likely that the channel will eventually reach its capacity for sediment containment, and the yearly flows will maintain the certain channel cross-sectional area. In addition, natural levees along the new channel may be deposited, which will further constrain the flow in the new channel and require higher flows to overtop the banks and access the floodplain. If and when the channel and floodplain reach the capacity for sediment deposition, any excess sediment from eroding banks may reach Mercer Lake and resume building a delta.

To minimize possible future sediment input into Mercer Lake, restoring the ditch to a more natural channel configuration is recommended.

Figure 45 June 2000 air photo showing the birdsfoot delta built at the end of the ditch (lower channel). Note the fresh sediment at the end of the ditch channel. The new, sinuous channel ends at the willow patch in the upper half of the photo.

Figure 46 2003 air photo. Note that no fresh deposit of sediment is visible at the end of the ditch in the delta.

Figure 47 2012 air photo. Old and new mouths of bailey creek. In Mercer Lake. Two dominant channels are emerging from the willow patch at the end of the new channel. A small amount of sediment is visible in the water. The old ditch, which wasn't filled in, is visible to the right.

Figure 48 Close up view of Figure 47

RECOMMENDATIONS FOR FUTURE WORK

Two possible restoration alternatives for addressing the eroding ditch banks in the upper meadow are discussed below.

One alternative would be to design and build a meandering channel that is similar in plan view to the one shown in the 1956 air photo (see figure 49). The ditch would then be filled in as much as possible, and the new meandering channel would be out in the middle of the valley. It may be possible to transition the streamflow from the ditch into a new channel with a streambed at a higher elevation, using an amoured log ramp at the transition point similar to a design similar to the transition at Karnowsky Creek. Careful analysis would have to be given to the overall longitudinal profile from the stream channel above the upper meadow and ditch to the lower valley's stream channel elevations, and the possibility of downcutting should be carefully considered.

If the new stream channel could be designed to maintain itself in a less incised condition, and with lower banks, it might be possible to raise the groundwater table. This might aid the reed canary grass, however.

The reed canary grass is the dominant vegetation in this upper meadow, and the vegetation restoration plan would have to aggressively address this problem.

Pros:

- The 1956 photo could be used as a template for the plan view, size and shape of meanders could vary.
- The whole valley floor could be used as a "blank canvas".
- The construction zone for the new channel could be isolated from the streamflow easily.

Cons:

- The reed canary grass and the elk browse will be a challenge in establishing a new riparian zone.
- Given the extent of the reed canary grass, it is possible it will influence the morphology of the new channel, as it has in the lower valley.

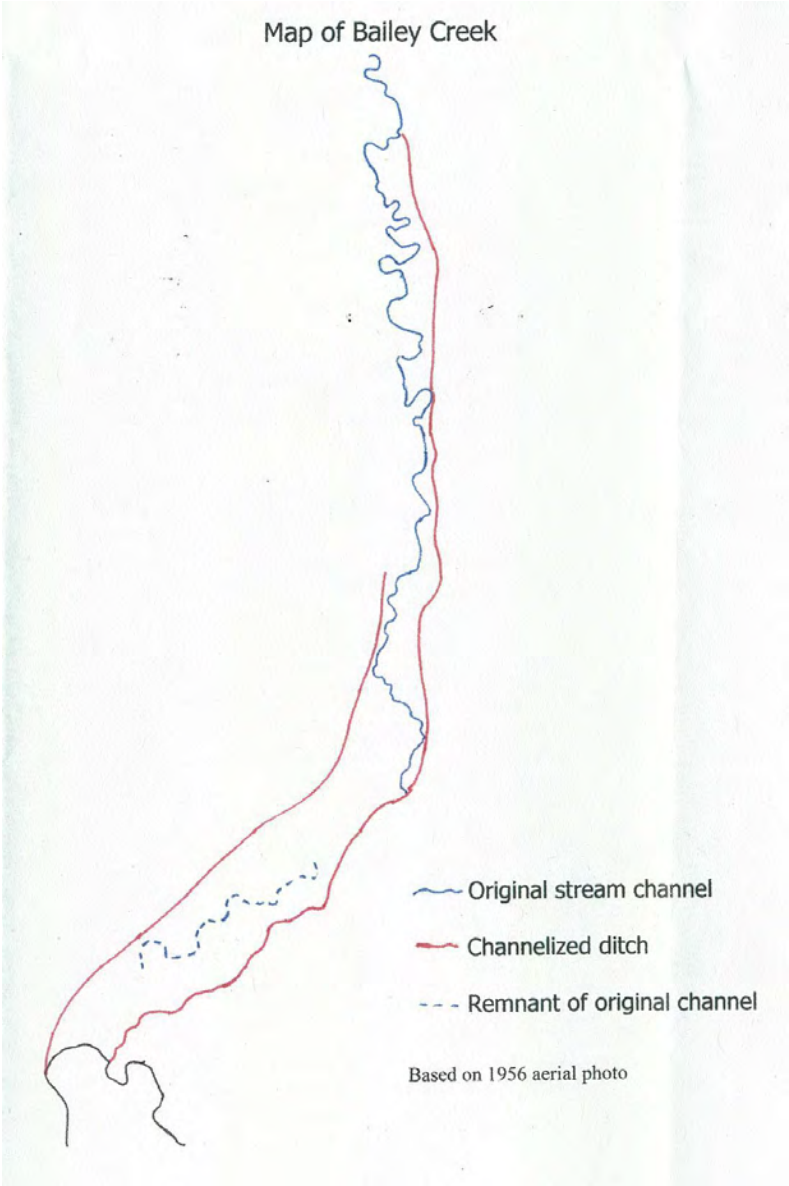


Figure 49 Map traced from 1956 air photo showing the relationship of the old channel and the ditches along the sides of the valley.

Another alternative would be to augment the sinuous channel that the ditch is currently developing, and build meanders off the existing ditch. The berm would be removed to restore connections to the floodplain. This approach would be similar to the strategy employed in the Tributary 1 channel in the Karnowsky Creek restoration project. Rather than re-build an entirely

new channel, 6 meander bends were incorporated into the existing channel. Excavated material was used to build the inside meander point bars. At Bailey Creek (Enchanted Valley), there is currently a functional and well-shaded riparian zone on the left bank and hillslope (eastern bank) of the ditch, so the vegetation restoration wouldn't be as challenging. In addition, most of the upper meadow would remain in its present condition and be available for continued meadow management for elk.

As for raising the groundwater table with this alternative, it would be more difficult to design a channel with a streambed at a higher elevation. The new meandering segments of the channel would connect with the existing ditch at several locations, making it more difficult to build a higher streambed without armoring each connection point.

Pros:

- The riparian zone on the adjacent hillside is mature trees, part of the riparian zone would be "ready made".
- The upper meadow could be maintained for elk forage, and accessed for mowing.

Cons:

- The new channel would not be isolated from the flow during the first winter, as previous projects have done. Water and sediment control during construction would have to be well planned.
- The design would be limited to a corridor along the side of the valley. It would have to be carefully designed to incorporate the appropriate meander size, radius of curvature, and spacing.
- The ability to raise the streambed elevation of the channel, and possibly raise the groundwater table would be more challenging.

See figures 50 and 51 for the two possible future channel locations.

For both alternatives, it is highly recommended that large wood is incorporated into the new channel and the floodplain.

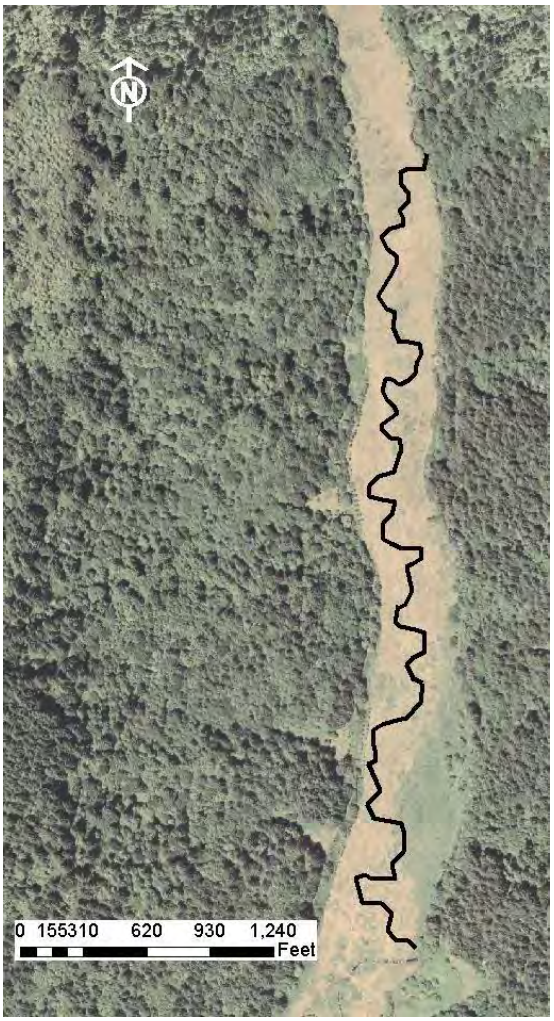


Figure 50 Conceptual map of a new channel in the middle of the upper meadow, using the 1956 photo and the low spots in the Lidar as a guide.

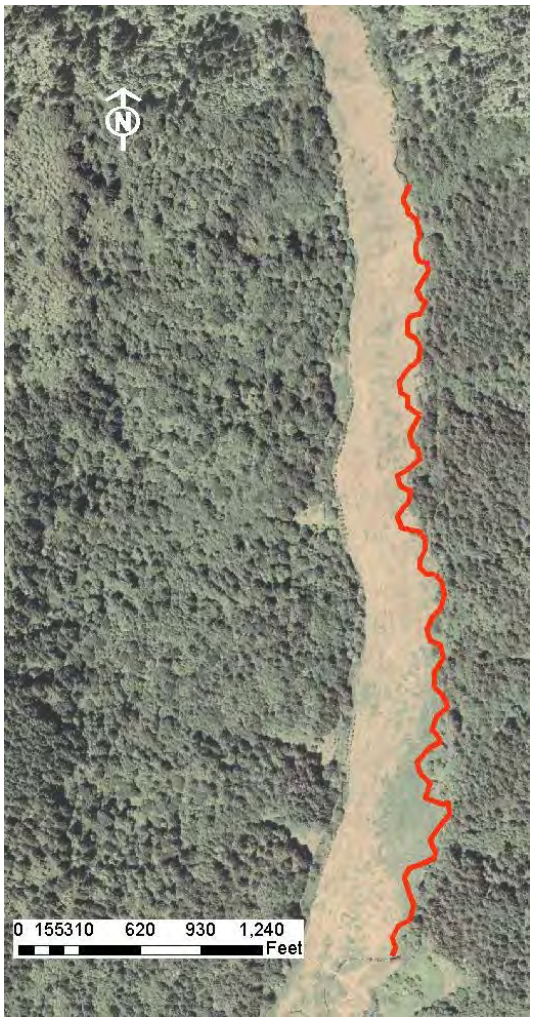


Figure 51 Conceptual map of a new channel that is constructed by building meanders off of the existing ditch. Meanders were drawn around the mouths of steep channels flowing off the hillslope to allow for future alluvial fan development at those locations.

Both alternatives will require the time and energy to do some careful planning.

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 FY13 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?

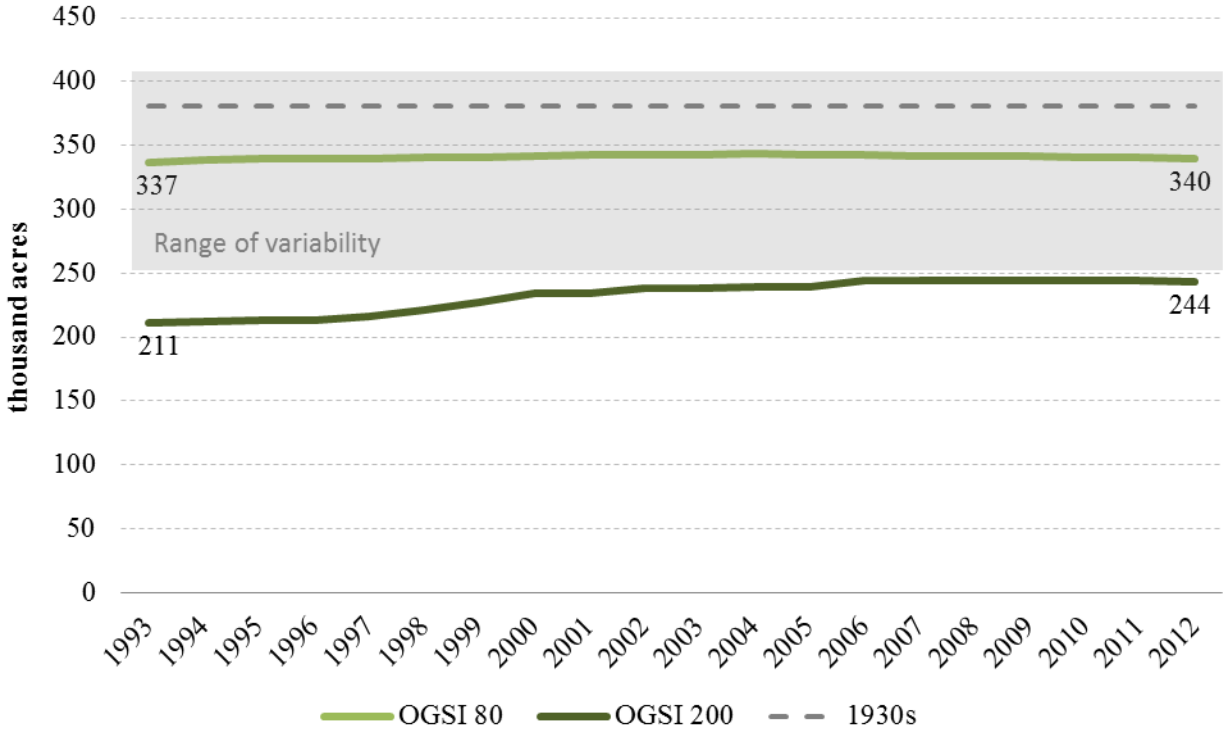
The Forest is actively managing plantations through thinning, releasing and under-planting stands to accelerate the development of young stands towards late-successional habitat. Snags and down wood creation through Stewardship contracts or service contracts is accomplished in conjunction with commercial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

Activity	Unit of Measure	Accomplished
Invasive Species Treatment (Mechanical)	Acres	93
Invasive Species Treatment (Herbicide)	Acres	419
Tree Planting	Acres	681
Reforestation Enhancement	Acres	189
Animal Damage Control for Reforestation	Acres	265
Area release and weeding	Acres	733
Pre-commercial thinning	Acres	277
Wildlife Habitat Improvement – large woody debris placement	Structures	225
Wildlife Habitat Snags created	Structures	1763

The desired future condition for seral stage distribution on the Siuslaw has evolved over time and is still evolving. Here we defer to the methods for assessing the maintenance of a functional and interconnected, late-successional forest ecosystem used for the Northwest Forest Plan (NWFP) (USDA/USDI 1994, pg. 3&4-34 of the Final Supplemental Environmental Impact Statement). Under this assessment, a regional average of 65 percent and an average low of 40 percent coverage by older forests were assumed. The objective of the NWFP was to restore and maintain old forests on federal lands to within or above this range. For further reference, we also provide the percentage of older forest on the Siuslaw based on a 1930s inventory. The 1930s inventory was conducted as part of a national survey of forest resources authorized by the McSweeney-McNary Act (1929) under the supervision of the research station (Andrews and Cowlin 1940).

The following trend line graph is based on the above information (as reference for range of variability and historic amounts of older forest) plus more current information provided by the NWFP Interagency Monitoring Group. The two trend lines in the following graph are of older forests as defined by on "old growth structure index" (OGSI) developed by Spies and Franklin (1988):

1. OGSI 80 = old growth structure index threshold of ≥80 years average stand age.
2. OGSI 200 = old growth structure index threshold of ≥200 years average stand age.



For both definitions of older forest the trend since implementation of the NWFP in 1994 has been positive. While the broader definition (OGSI 80), which includes a wider range

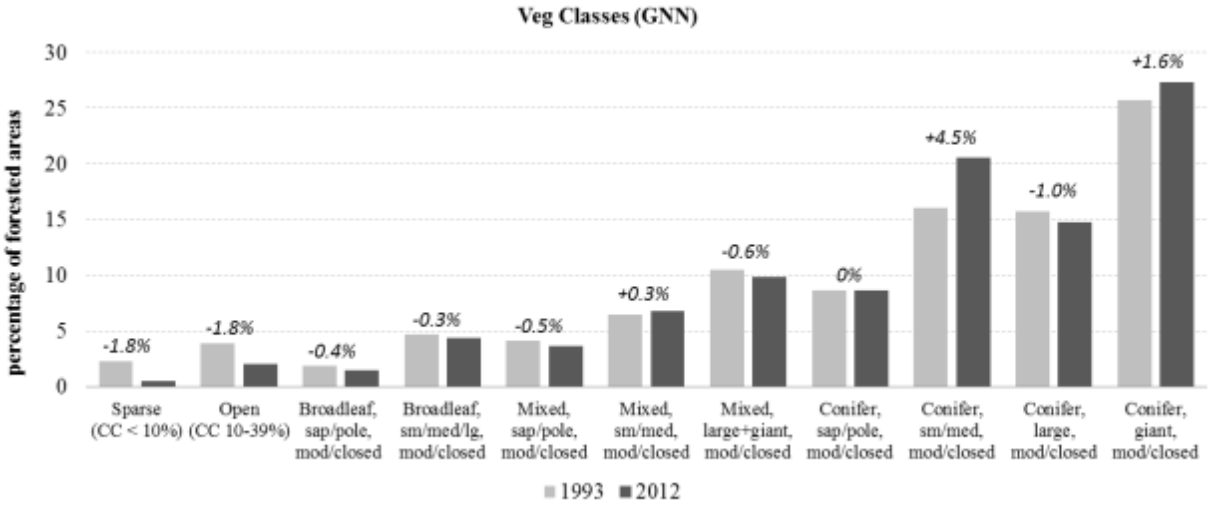
of age classes, is within the range of variability (40-65%), the older definition (OGSI 200) has increased more markedly, and is now just below this range. This data indicates successful restoration and maintenance of older forests on the Siuslaw National Forest.

To help achieve this outcome, the Forest has been actively managing conifer plantations through thinning, releasing and under-planting stands to accelerate their development towards late-successional habitat. Snags and down wood creation through Stewardship contracts or service contracts are also accomplished in conjunction with commercial thinning timber sales. We will likely see the results of this management first within the broader old forest definition (OGSI 80) as plantations continue to get older. However, not enough time has yet elapsed for us to see the results of these thinnings on the older defintion. Most of the gains in the older definition (OGSI 200) are likely due to natural succession of areas that were stand-replaced by large wildfires during the mid-1800s. In addition to positive trends in older forests, NWFP monitoring of spatial patterns indicates an increase in the amount of cohesive patches of older forest and a decrease in overall old forest fragmentation.

While older forests appear to be making a comeback, recent concerns over perceived declines in amount of early-seral forests have surfaced. For reference, the following table describes the broad seral conditions on the Forest as of the 1930s inventory.

Seral Stage	Percentage of Forest
Early	8
Mid	14
Late	61
Hardwoods	11
Nonforested	6

The following graph shows changes that have occurred over 20 years (between 1993–2012) on the Siuslaw National Forest. Net changes in vegetation classes (GNN) are shown in italics as percentages.



The data indicates a 3.6% decrease in open early-seral classes. Broadleaf types have declined slightly (0.7%). Mixed conifer/broadleaf forests have declined by about 0.8%, considering a slight increase in the small/medium size class. The largest change occurred within the small/medium conifer class, likely due to young conifer plantations getting older. There was a 1.6% increase in the giant conifer class, likely related to the natural succession from older wildfires as mentioned previously. To address concerns for losses in early-seral, the Siuslaw is creating small gaps during plantation thinning. Enhancement and maintenance of existing meadows that are being encroached upon by conifer and hardwood trees is another method being used.

References:

GNN (online) Data Dictionary - http://lemma.forestry.oregonstate.edu/data/structure-maps

Spies, T.A.; Franklin, J.F. 1988. Old growth and forest dynamics in the Douglas-fir region of western Oregon and Washington. Natural Areas Journal. 8: 190–201.

U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior, Bureau of Land Management [USDA and USDI]. 1994. Final supplemental environmental impact statement on management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl. Volumes I-II + Record of Decision.

Monitoring Question: Plantation Management

Are plantations being managed at prescribed density levels?

Plantations are being managed through non-commercial thinning and commercial thinning. 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.

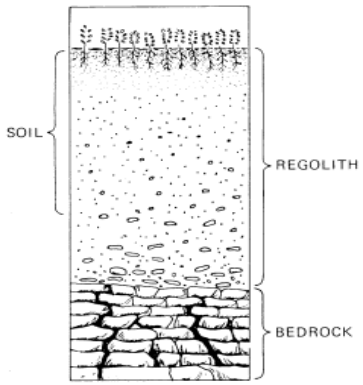
Monitoring Question: Special Forest Products

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?

Product	Quantity Sold	Number of Permits	Value
Alder puddle sticks	4000 pieces	4	$80.00
Beach Grass & Carex Transplants	60 plants	6	$120.00
Plants, Shrubs Transplants (Hebo)	380	6	$730.00
Boughs (CCRD)	10 Tons	4	$200.00
Boughs (Hebo)	none	none	$0.00
Cascara Bark (CCRD)	none	none	$0.00
Cascara Bark (Hebo)	6500 Lbs.	13	$325.00
Christmas Trees (CCRD)	133 Trees	18	$665.00
Christmas Trees (Hebo)	80 Trees	5	$400.00
Commercial “Other” Mushroom (CCRD)	15,565 Lbs	338	$15,565.00
Commercial “Other” Mushroom (Hebo)	1060 Lbs	26	$1060.00
Commercial Greenery (CCRD)	2367 Tons	294	$88,200.00
Commercial Greenery (Hebo)	300,000 Lbs	50	$15,000.00
Commercial Matsutake Mushroom (CCRD)		48	$38,332.00
Commercial Transplants (CCRD)	1,475 plants	8	$1,415.00
Misc. Cutting Foliage (Hebo)	800 lbs	2	$40.00
Misc. Cuttings (CCRD)	1,800 lbs	4	$90.00
Misc. Grass and/or Plant Seed	none	none	$0.00
Misc. Root Species	none	none	$0.00
Moss	none	none	$0.00
Commercial Firewood (CCRD)	1311 Cords	118	$17,100.00
Commercial Firewood (Hebo)	523 Cords	100	$32,691.00
Personal Use Firewood (CCRD)	484 Cords	148	$4,320.00
Personal Use Firewood (Hebo)	432Cords	389	$3,850.00
Poles, Posts & Split Rails	400 each	1	$20.00
Commercial Berries (CCRD)	2 gal.	1	$20.00
Grand Total		1583	$221,033.00

Free Use Permits Issued

Product	Quantity Issued	Number of Permits	Estimated Value
Misc. Non-Conv. Forest Products (Hebo)	131 (each)	8	$131.00
Misc. Non-Conv. Forest Products (CCRD)	370 (plant)	26	$370.00
Firewood (limbs, chunks, and bark) (CCRD)	126(cord)	11	$245.00
Firewood (limbs, chunks, and bark) (Hebo)	22 (cord)	18	$225.00
Total		126	$971.00



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?

Sand Lake Research Natural Area restoration through invasive plant control native plant community recovery. European beach grass control with glysophate seems effective. Two years after the first test treatment, Poa, one of the native beach grasses the RNA was established to protect, seems to be responding aggressively. The more extensive treatment has been highly effective in killing the European beach grass. Hopefully, as the root systems continue to decay and allow more sand movement, we'll see more of the Poa move into the newly recovered habitat.

Northwest Youth Corp removed a lot of shore pine that had seeded into the interior. One unknown is how rapidly the vegetation (both vascular plants and mosses), that rapidly colonize areas protected by shore pine or Scots broom, will respond to having the trees, and brush removed.

This RNA is a great place to try some of the techniques that could be used on the Oregon Dunes National Recreation Area. Also, as a control, the area on the other side of the road is an example of bare post-Off Highway Vehicle sand that now just has the European beach grass, and the seed source for the natives is nearby, but in the wrong direction for wind-borne seed. So it could be used to test seeding or else as a control for not seeding.

Sand Lake invasives (shore pine, European beach grass): post treatment

Edge of dense tree invasion by road

ROW where shore pine stabilization had advanced: post cut/burn/spray

Area with denser European beach grass and shore pine invasion

Fresh sand movement evident where European beach grass herbicided

Ridges previously stabilized by European beach grass

Characteristic ridge habitat for Poa

Decay of European beach grass roots allows sand movement

Dead European beach grass in plot

Dead European beach grass in plot with native lupine and glehnia

Poa on fresh sand surface

Crowley Creek Monitoring. Vegetation Restoration. Year 1

In August of 2012, the remaining dikes at Crowley Creek on the Salmon River were removed to restore hydrology to the site. The disturbed, bare ground on the marsh from the dike removal was planted with Tufted Hairgrass (*Deschampsia cespitosa*) by Salmon-Drift Creek Watershed Council staff to ensure establishment of the dominant native marsh grass in the area and contribute to the suppression of invasive non-native plants, such as Reed Canary Grass (*Phalaris arundinacea*). The seeding of Tufted Hairgrass has shown effective in invasive plant suppression at Tamara Quays.

On September 30, 2013, I installed two vegetation monitoring transects at Crowley Creek on the Salmon River to monitor vegetation recovery on disturbed ground where dike removal work was conducted. One transect was located in the disturbed area near the mouth of Crowley Creek where the dike was removed and, for comparison, the other transect was located in the adjacent reference marsh (Figure 52). The reference marsh represents a tidal marsh plant community for the Salmon River area that the disturbed area should become. The interior area of the reference marsh does have some patches of Reed Canary Grass, which likely demarcates a drop in salinity. The upper end of the reference marsh transect was located to monitor the Reed Canary Grass patches in the event a changed hydrology encourages spread.

Sampling.

Transects were 50 meters in length, and the starting points were 30 meters from the shoreline of the Salmon River. Percent cover was estimated for plant species, standing water, bare soil, and downed wood in a 1 x 1 meter quadrate, located every other meter along the transect.

Summary.

Once the restoration ground work was performed to remove the dike from the tidal marsh area of Crowley Creek, it was a strip of bare soil; in one year, tufted hair-grass has become the dominant plant in this disturbed area (Table 10; Figure 53; Figure 54). The planting effort likely played a major role in this success, but seed brought in by the tide probably contributed as well. Other plants captured in the disturbed area have established solely from local seed sources brought in by the tide. Bare ground and standing water making up the highest cover in the removed dike area is expected after only one year of plant colonization (Figure 54). Many of the non-native plants in the removed dike area either maintain a low, non-threatening cover in the long-term (e.g. Spear Saltbush) or are common pioneer species (e.g. Toadrush) (Table 10). There was a tiny Reed Canary Grass plant in this transect, and it likely remains from the population that was on the dike (Table 10; Figure 55).

The reference marsh transect captured a general tidal marsh plant community for the area, which is mostly native dominated (Figure 55). It is expected that the disturbed area, where the dike was removed, will develop in the same direction. While the cover of the non-native Creeping Bentgrass was high in the removed dike area, it maintains a high cover in the reference marsh area as well (Table 10). Reference marsh data from other projects in the area suggests it has become a component of these tidal marshes, and the

native plants appear to co-exist. The Reed Canary Grass and Bull Thistle presence (Table 10; Figure 55) will have to be addressed and monitored.

Figure 52 Transect locations for vegetation monitoring at Crowley Creek.

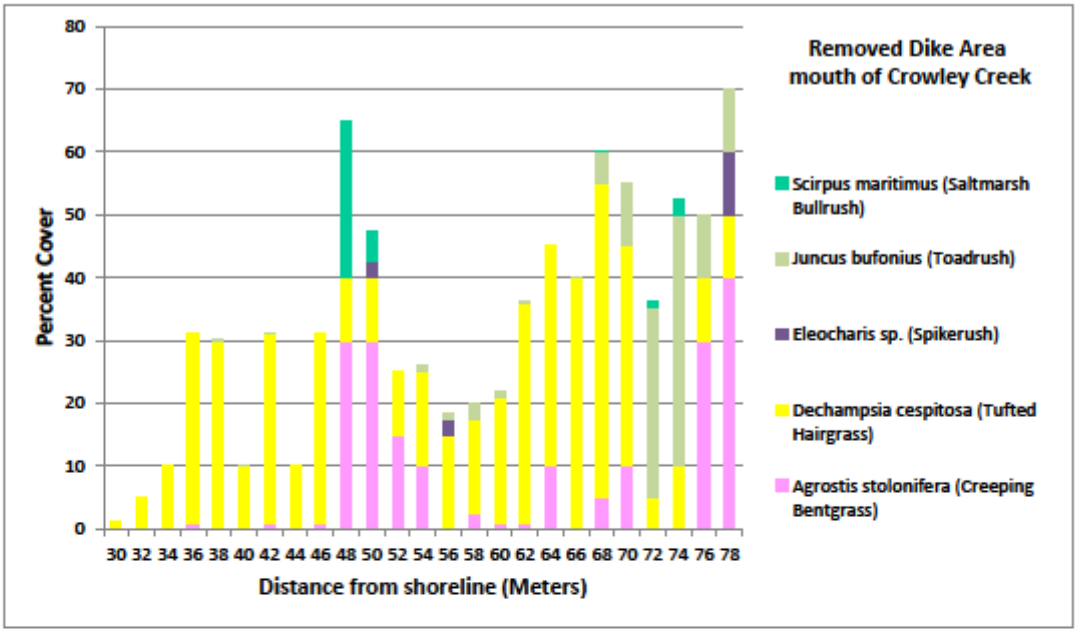
Figure 53 Dike in place August 2012

Figure 54 Dike removed September 2012

Figure 55 Dike Removal Area September 2013 and location of transect 1

		Average % Cover	
Species/Other	**Common Name**	**Removed Dike Area**	**Reference Marsh**
Native			
Deschampsia cespitosa	Tufted Hairgrass	19.2	60.2
Scirpus maritimus	Saltmarsh Bullrush	6.7	0.0
Eleocharis sp.	Spikerush	5.0	0.0
Juncus effusus	Soft Rush	2.6	17.4
Argentina pacifica	Pacific Silverweed	1.2	9.1
Juncus sp.	Rush	1.0	0.0
Typha latifolia	Cattail	1.0	0.0
Symphotrichus spicatus	Seaside Daisy	0.6	0.6
Glaux maritima	Sea Milkwort	0.1	0.0
Rumex aquaticus var. *fenustratus*	Western Dock	0.1	0.0
Angelica lucida	Seacoast Angelica	0.0	0.4
Distichlis spicata	Saltgrass	0.0	0.1
Grindelia integrifolia	Gumweed (Yellow Aster)	0.0	0.1
Salicornia depressa	Pickleweed	0.0	9.4
Vicia gigantea	Giant Vetch	0.0	0.1
Non-native (low concern)			
Ranunculus repens	Creeping Buttercup	0.1	0.0
Atriplex patula	Spear Saltbush	2.2	2.1
Trifolium repens	White Clover	3.9	0.0
Juncus bufonius	Toadrush	7.4	0.0
Agrostis stolonifera	Creeping Bentgrass	9.0	9.7
Non-native (Invasive)			
Phalaris arundinacea	Reed Canary Grass	1.0	0.8
Cirsium vulgaris	Bull Thistle	0.0	0.2
Other			
Bare ground	44.0	0.0	Bare ground
Standing Water	36.4	0.0	Standing Water
Log	0.0	0.8	Log

Table 10 Average percent cover in vegetation monitoring transects in the tidal marsh area of the Crowley Creek restoration site, one year after dike removal. Two 50 meter transects were established; one in the disturbed area where the dike was removed, and one in the adjacent established marsh (Reference Marsh). The Reference Marsh plant community represents a mostly native species composition for the area. Species are in order of percent cover in the removed dike area.



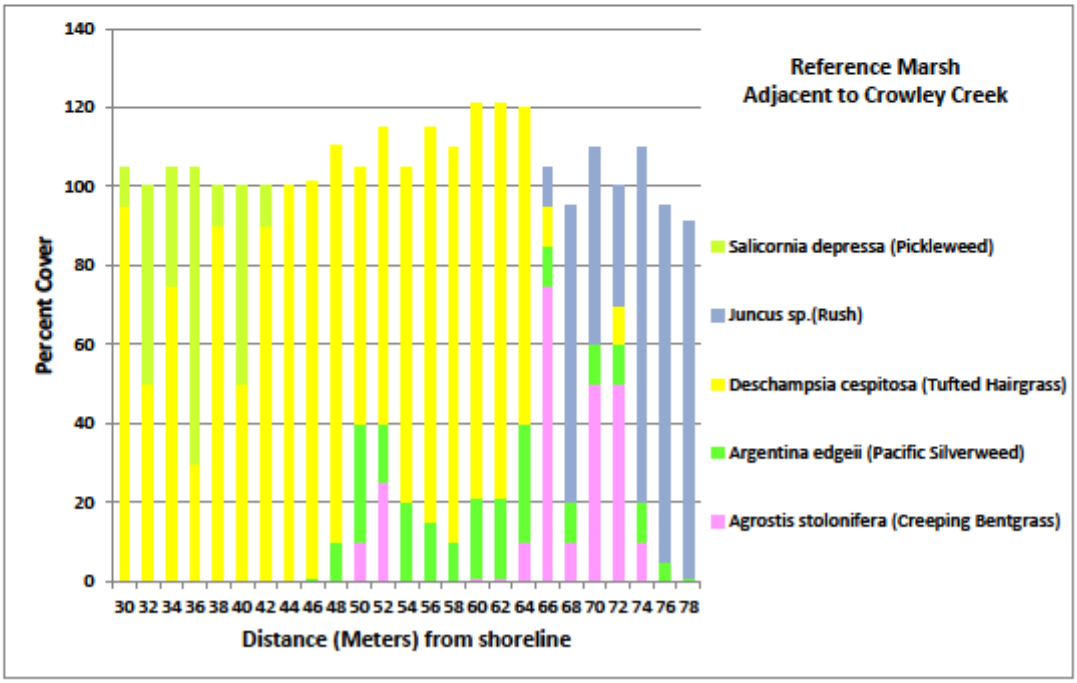
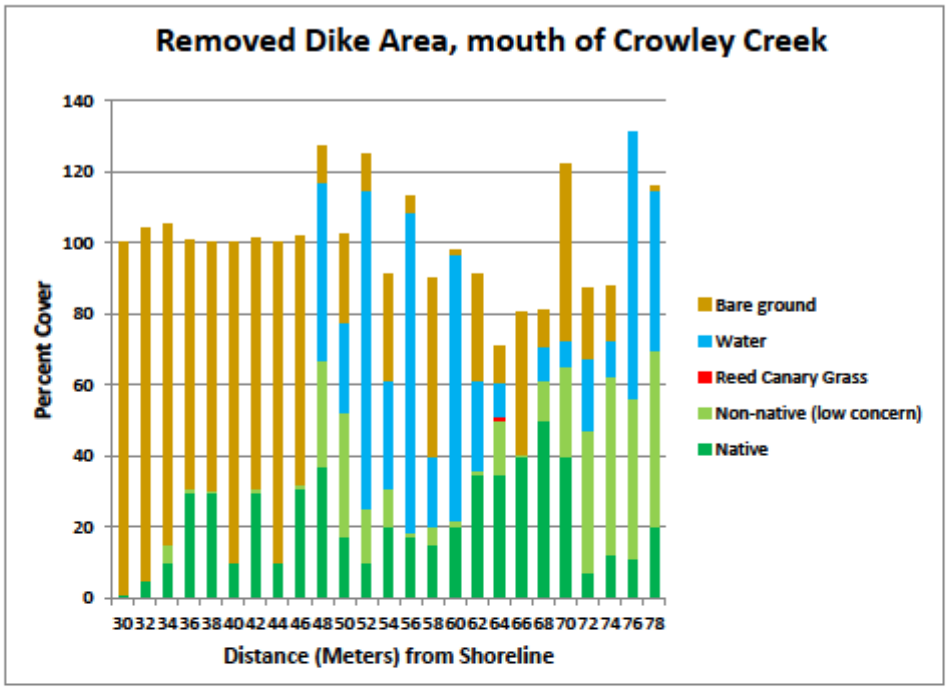


Figure 56 Crowley Creek Restoration Area. Dominant Plant Species. September 30, 2013



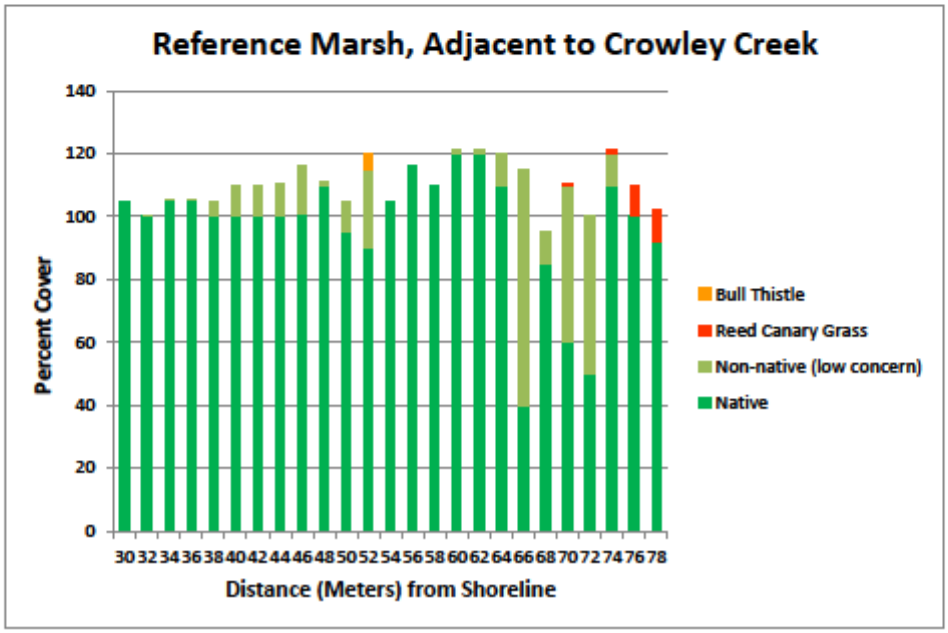
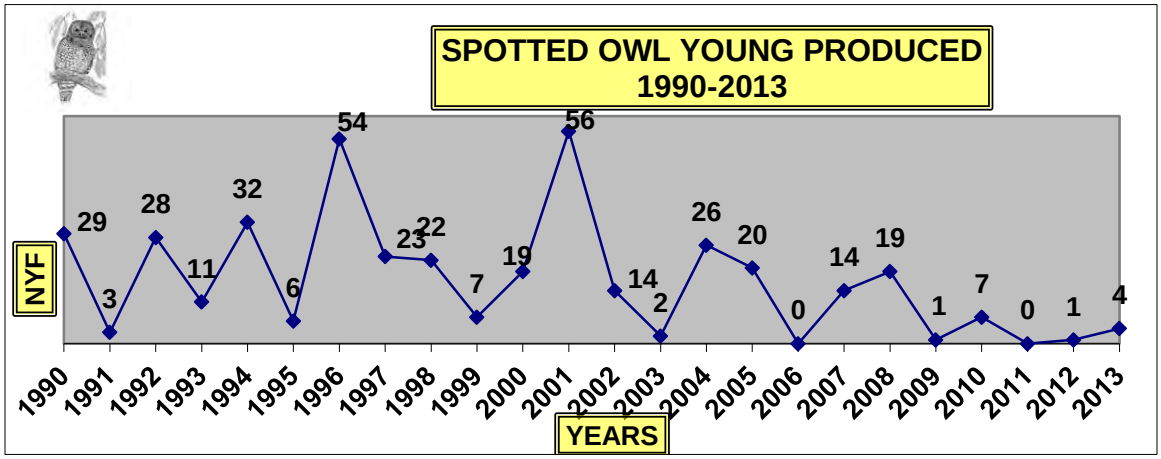


Figure 57 Crowley Creek Restoration Area. Ground Cover vs. Invasive Plants. September 30, 2013

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 fourteen 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.



The proportion of sites where at least one barred owl was detected within 1.6 km of the year-specific spotted owl activity center has increased steadily throughout the duration of the study, suggesting a steady increase in the barred owl population. PNW survey methods probably underestimated the number of sites with barred owls because they did not specifically target barred owls during surveys of spotted owls. The continued increase in the proportion of territories where barred owls were detected is likely due to an increase in barred owl numbers, as well as increased nighttime survey effort at sites where spotted owls have disappeared.

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

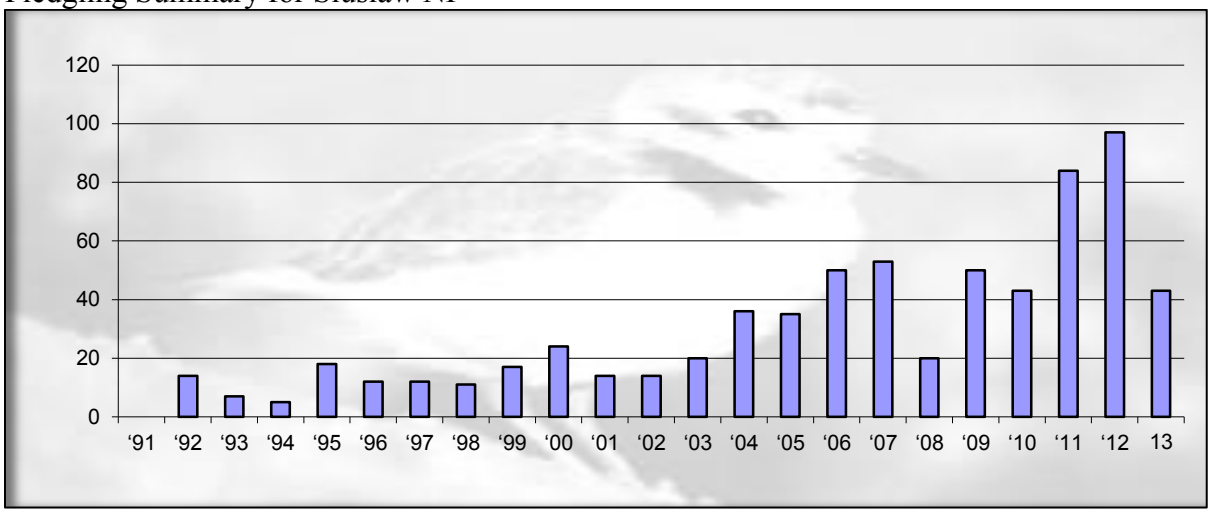
What are the trends in western snowy plover breeding and winter in populations on the Forest?

Snowy Plover Monitoring Efforts: The western snowy plover nesting populations is co-operatively monitored each year. The areas monitored include ocean shores administered by the Forest Service, Oregon Parks and Recreation Department and the Bureau of Land management. One of the recovery criteria for the Oregon-Washington recovery unit is 250 breeding adults. For the entire Oregon Coast monitoring area there was an estimated 304 adult Snowy Plovers with a minimum of 190-191 individuals known to have nested. The adult plover population was the highest estimate recorded since monitoring began in 1990. Overall apparent nest success was 24%. Exclosed nests (n = 18) had an 83% apparent nest success rate, and unexclosed nests (n = 362) had a 21% apparent nest success rate. Nest failures were attributed to unknown depredation, unknown cause, avian depredation, corvid depredation, one-egg nests, wind/weather, abandonment, mammalian depredation, overwashed, infertility, and adult plover depredation. We monitored 101 broods, including eight from unknown nests, and documented a minimum of 103 fledglings. Overall brood success was 71%, fledging success was 39%, and 1.04 fledglings per male were produced. Siuslaw specific information is listed below.

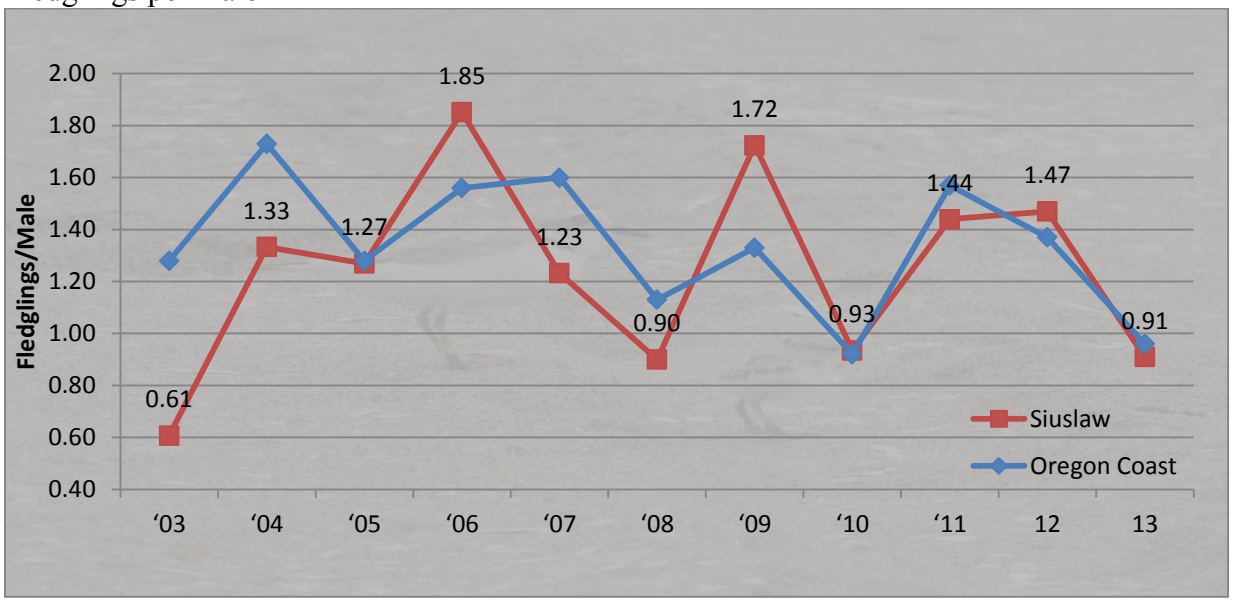
References:

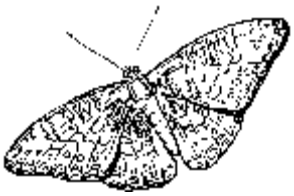
The Oregon Department of Fish and Wildlife, Oregon Natural Heritage Information Center, Central Coast Ranger District-Oregon Dunes NRA, U.S. Fish and Wildlife Service, Bureau of Land Management.

Fledgling Summary for Siuslaw NF



Fledglings per male





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, and Mt. Hebo.

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. Figure 58 displays the Oregon Silverspot Index of Abundance counts between 1990 and 2013 for sites on the Siuslaw NF. Mt. Hebo is considered to be relatively stable. Table 11 displays the counts for Brays Point and Rock Creek along with augmentation numbers. The last four years show an increase, some of which is associated with the augmentation efforts at Rock Creek and Brays Point.

Past vegetation management efforts were designed to promote the development and maintenance of early blue violet populations. The non-native grasses that now dominate the critical breeding sites; have not been responsive to traditional mechanical treatment methods. Non-mechanical methods including the use of landscape fabric have had limited success on very small areas. Consequently, the US Fish and Wildlife Service has concluded that without the use of herbicides, followed by planting native plants or seed, the grassland habitat at the Rock Creek site west of Highway 101 will be lost as suitable habitat for the species. Since this part of the designated critical habitat for the species, recovery efforts would be hampered.

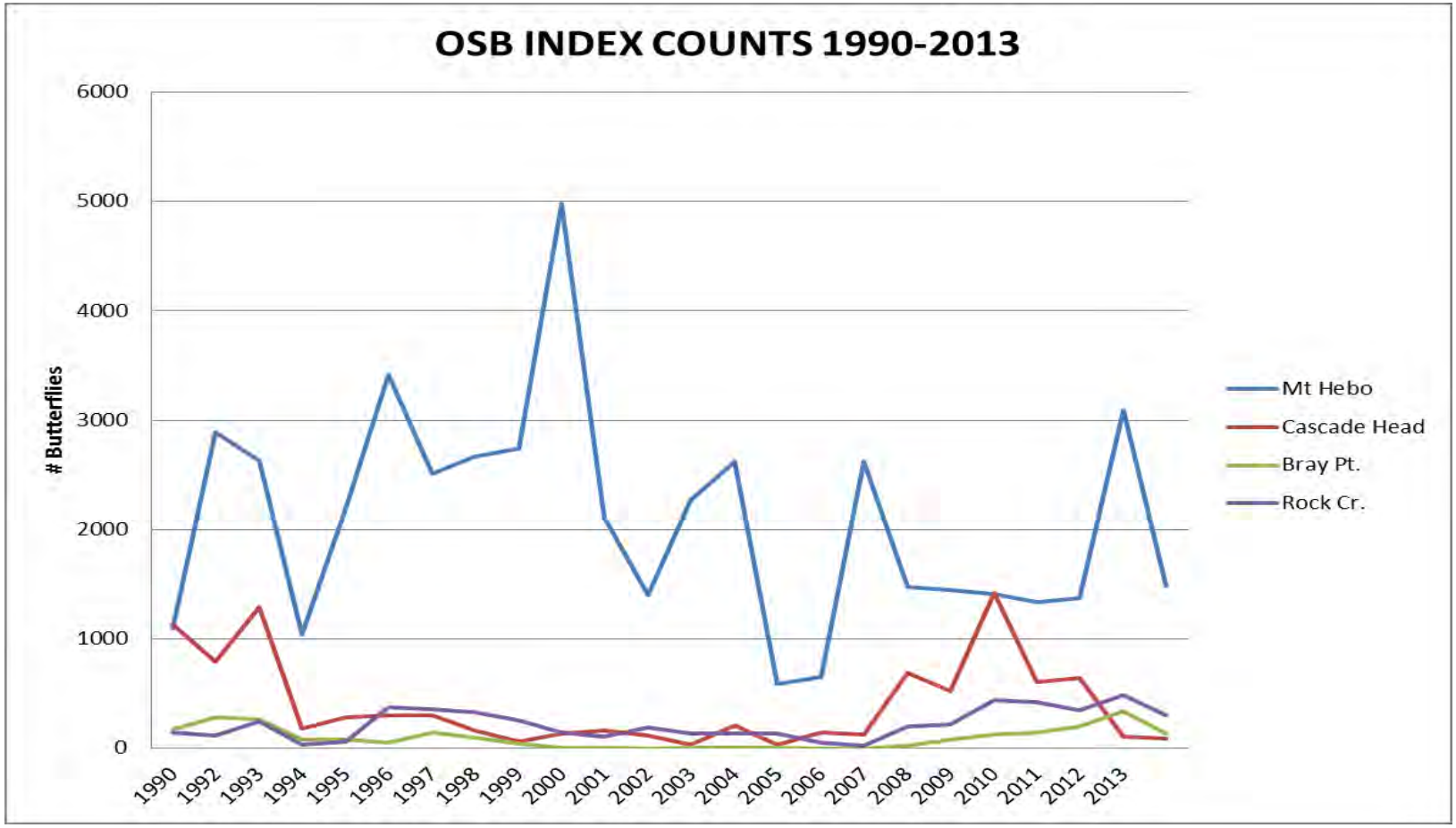


Figure 58 Oregon Silverspot Butterfly Index of Abundance, 1990-2013

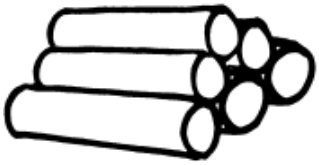
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Rock Cr.-Big Cr. Index Count	108	192	139	136	131	55	25	202	219	423	426	352	251	302
Butterflies released					47	0	0	183	199	834	0	0	734	582
Caterpillars released										830	655	0	259	0
Release totals										1664	655	0	993	582

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Bray Pt. Index Count	9	0	2	3	2	0	0	21	82	124	140	204	56	3
Butterflies released					5	0	0	134	300	1213	1356	560	0	0
Caterpillars released										7	11	4	0	0

Table 11 Brays Point and Rock Creek Populations and Augmentation Numbers

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 FY10 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 Northwest Forest Plan specified a probable sale quantity (PSQ) of 23 mmbf for the Forest. This was calculated for Option 9 of the Draft Northwest Forest Plan, and was based on acres in the matrix only. The matrix was defined as all forested land outside of riparian and late-successional reserves, and on land specified as suitable for commercial timber management in the Siuslaw Forest Plan. The riparian reserves for Option 9 in the Draft were defined as one-half site-potential tree length for either side of intermittent streams and 2 site-potential tree lengths for either side of perennial streams; or about 125 and 500 feet respectively. The reserve width for intermittent streams was increased to a full site-potential tree length (250 feet) for the Final Northwest Forest Plan (NWFP). This significantly reduced the matrix acres, but PSQ was not recalculated between draft and final. In the, *Federal Lands in and Adjacent to Oregon Coast Province Assessment Report*, 1995 adjusted the PSQ, taking the Riparian Reserves in account, to 2.6 mmbf.

A Total Sale Quantity was estimated, also. This included the PSQ plus an estimate of commercial thinning to promote late-successional characteristics in Reserves (Riparian and Late-Successional). This estimate was 25.6 mmbf.

Following completion of the Late-Successional Reserve Assessments and results from the Siuslaw Thinning and Understory Development Study, thinning prescriptions increased the TSQ. The Forest current TSQ, from restorative thinning, is 40 mmbf.

The Forest offered and sold 44.7 MMBF of timber in 2013. Volume harvested in 2013 was 51 MMBF.

Special Forest Product sales include 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 1583 permits for a total of $221,033 in 2013.

Monitoring Question: Cultural Resources

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

Archaeological survey was conducted for the major restoration/landscape management projects on the forest, including the South Nestucca, Millwright-Beaver, and Schooner Creek projects. Cultural resources identified as significant were recorded and protected.

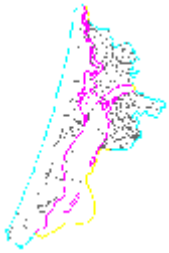
Archaeological survey and monitoring also occurred on smaller projects across the forest insuring that cultural resources were not impacted. One example of this is the joint monitoring effort with the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians on the North Spit of the Umpqua River. Tribal and FS archaeologists monitored cultural resources of significance significant to the forest and Tribe, including the site of Fort Umpqua.

The Forest's sites identified as Heritage priority assets were visited during the year. Ocean erosion continues to reshape the coastline, with some loss of shoreline noted at cultural sites along the northern portion of the Central Coast Ranger District (e.g., Big Creek and Cape Perpetua Scenic Area).

In addition to archaeological survey and monitoring a structural assessment of the historic CCC constructed Hebo Lake Community Kitchen. These documents will help guide future restoration work associated with these historic properties and structures.

The Forest's listed National Register sites remained open to the public, providing various recreational opportunities, such as hiking, public education, camping and B&B accommodations. Such sites include those located in the Cape Perpetua Scenic Area, Tahkenitch Campground, and Heceta Head Lightstation. Daily summer interpretive programs and guided walks at the Cape Perpetua Visitor Center and Heceta House provided visitors an opportunity to visit and learn about significant historic properties at these areas. The Keepers of Heceta House continue to offer exceptional overnight accommodations at the historic lightstation, and provide seasonal events for the local community.

In-house and public lectures provided training about the Forest's history and cultural resources to a variety of audiences, ranging from the Field Rangers program at the Oregon Dunes NRA and Cape Perpetua to the Anthropology Department at Oregon State University. In addition, the Siuslaw NF Digital Collection - http://oregondigital.org/digcol/siuslaw/ - was made available to the public through Oregon State University Libraries & Press. The collection includes nearly 5,000 photos documenting the history of the forest, and will be updated with a variety of other historic information in future years.



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.

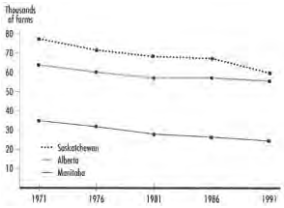
The Forest initiated strategy development in 2013, through a facilitated forum with Non-Governmental Organization partners, primarily land trusts, who have partnered with the Forest to acquire lands of high conservation value for potential public ownership. Forum members agreed to work together to establish acquisition priorities which will compete well for national funds and will garner necessary political support to move forwad.

The Forest has completed its effort to consolidate and reduce administrative sites. The Mapleton Compound (16 acres) was sold in 2013. It is the final property to be conveyed.

The Forest is working with potential partners to utilize and enhance the Alsea Guard Station, an important historic structure with ties to the local community of Alsea. In lieu of conveyance, an adaptive use which preserves the structure, and provides opportunities for the public to enjoy it, will be selected. The structure is expected to be open to public use in 2014.

Current Forest land adjustment priorities and objectives are being met, although as would be expected due to the age of the original Landownership Adjustment Plan, they are different than what the forest initially envisioned. The Forest continues to work with partners to acquire high priority stream and/or riparian restoration parcels for acquisition via Land and Water Conservation Fund Act funds. The Elk Creek Parcel, 60 acres in the Alsea Watershed, has favorable support for acquisition both regionally and nationally under the Pacific Northwest Streams initiative, and could be acquired using LWCF funds as early as 2015. This parcel will directly protect 1.0 mile of perennial stream shoreline which holds resident Oregon coast steelhead and cutthroat trout.

In 2013, Lowell Patton donated approximately 169 acres of private land located within the Siuslaw National Forest. The donation helps to consolidate ownership within the National Forest boundaries.



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 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.

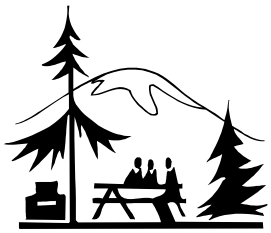
These committees are to be balanced and diverse with equal representation from industry, environmental groups, elected officials and local people. The composition of each RAC is to be balanced according to the following three interest categories identified in Public Law 106-393

There are four Stewardship Groups on the Forest, the Siuslaw Basin, Alsea, Marys Peak and Hebo. 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?

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.

Some areas of the Forest have been restored to have a less managed condition and appearance as the result of on-going restoration efforts aimed primarily at improving fish habitat along creeks and creek valleys. This has increased, and continues to increase, the land in semi-primitive condition on the Forest.

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 un-vegetated sand dune 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 (Management Area 10C) is allocated to motorized/OHV use only on designated routes to minimize impacts to vegetation and habitats. To date only a few routes have been designated in these areas and navigating on the ground can be difficult. 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. A Final Environmental Impact Statement and Record of Decision designating routes in the 10C area are expected to be completed in fall of 2014. Once the 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. At that time all non-designated routes in Management Area 10C will become closed and be rehabilitated or allowed to revert to a more natural condition.

The Forest offers three OHV riding areas at the Oregon Dunes NRA and one at Sand Lake. The riding areas are extremely popular and heavily used, especially during the summer. The Forest monitors use relative to capacity in these areas. NRA riding areas are approaching, but have not yet exceeded planned capacity (average of 2 riders/acre). Crowding and congestion primarily occurs on access routes to and from staging areas, but is not occurring on open sand.

The Forest will be conducting an economic impact and capacity analysis of the Oregon Dunes NRA and Sand Lake Recreation Area, in partnership with a local university. This analysis will consider all uses of the ODNRA, including non-motorized, and recreation contributions to local economies of Tillamook, Lane, Coos, and Douglas counties.

A moratorium remains in place on permitting new commercial motorized outfitter and guide services on the Oregon Dunes NRA. The Forest will begin a needs assessment to determine whether there are underserved visitors who could be better accommodated should additional commercial services be authorized.

Within designated riding areas regulations such as alcohol prohibition, sand camping restrictions, and closure areas (e.g. noise buffers, tree islands, snowy plover habitat, 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. Engine noise standard monitoring in 2013 indicates that compliance is still about 60% to the 95db level, and about 24% of riders tested are operating above the 99db level. Increased education and law enforcement efforts are planned to raise compliance in this area.

Overall, across the Forest, off-highway vehicle use taking place as intended in the Forest Plan.

Monitoring Question: Accessibility

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

Recreation Sites

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

Trails

Trail records for the Forest continued to be reviewed and updated in 2013. This is part of an ongoing effort to keep good records and provide good information about Forest trails on the Siuslaw and other National Forests. Data kept includes records of trail features, condition, and maintenance.

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 description of trail slope, tread, and condition, and will help people know how accessible or usable they will be to them, and helps the Forest Service plan for improvements to accessibility. Very good quality maps of the Forest trails were completed by geographic information and web site specialists in 2013, working with recreation staff, and this will also help people to better know the trail grades and locations.

National Scenic Area Standards

Cascade Head Scenic-Research Area

Cascade Head Scenic-Research Area was established by Act of Congress for the purposes of providing, *"present and future generations with the use and enjoyment of certain ocean headlands, rivers, streams, estuaries, and forest areas, to insure protection and encourage the study of significant areas for research and scientific purposes, and to promote a more sensitive relationship between man and his adjacent environment."*

Within Cascade Head Scenic-Research Area, the "Secretary's Final Guidelines "are followed. These criteria were set out in accordance with Public Law 93-535, December 22, 1974 that established the National Scenic Area. Projects proposed within Cascade Head that could affect scenic and environmental condition, as outlined in the "Secretary's Final Guidelines," were reviewed by the Siuslaw National Forest for consistency with the Secretary's "Environmental Design Criteria," and to insure that the purpose of use and manner of use of land of "characteristic subareas" of Cascade Head is substantially the same as it was on June 1, 1974.

The Forest completed six reviews at Cascade Head in 2013. A tide gauge placement and three proposed vegetation changes were reviewed on site, and all were found consistent with Environmental Design Criteria and scenic quality standards for Cascade Head. Two restoration projects at Cascade Head were proposed by the Forest Service, 1) Mink Creek of a former boat basin site and 2) east of Highway 101, a meadow enhancement project; and were reviewed for consistency with Cascade Head standards and design criteria included as part of environmental assessment review. A native plant list for use on private property for Cascade Head was also reviewed and revised by the Forest Botanist and Forest Ecologist.

An information stop along the highway for Cascade Head Scenic-Research Area was planned in the Cascade Head Management Plan, 1974, and assessing of possible sites for the stop continued in 2013, with review of sites for consistency with Cascade Head standards and with review of the final proposed site and proposed project. The proposed project is also assessed through the environmental analysis process, 2013, and expected to be final in 2014.

Monitoring Question: Access and Travel Management

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

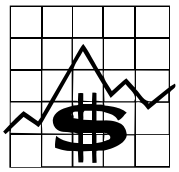
Total number of National Forest system (NFS) road miles in fiscal year 2013 is less than reported in previous fiscal years. Reduction in miles comes from decommissioning roads which remove them from the Forest Transportation atlas. Also, as road jurisdiction discrepancies between other local governments, agencies and private landowners are discovered and eventually resolved, Forest Service system road miles change.

The downward trend of total system road miles and upward trend of stored roads and decommissioned roads is reflected in the table below. The data provided in 1990 and 2003 is from the 2003 Forest Roads Analysis. The Forest's emphasis to attain a minimum road system has resulted in more decommissioning and road closures (storage). Stored roads have occurred as timber sales are completed and subsequent roads are closed and also from recent appropriated funding (CMLG - Legacy) to store or decommission roads.

Year	System Road Miles	Miles Open	Miles Stored (Closed)	Miles of Road Decommissioned
1990	2530	Not available	Not available	Not available
1994	2500	Not available	Not available	30
2003	2280	Not available	Not available	Not available
2009	2200	1924	276	288
2010	2166	1811	355	318
2011	2149	1722	427	333
2012	2139	1692	448	343
2013	2128	1624	504	354

Other Group

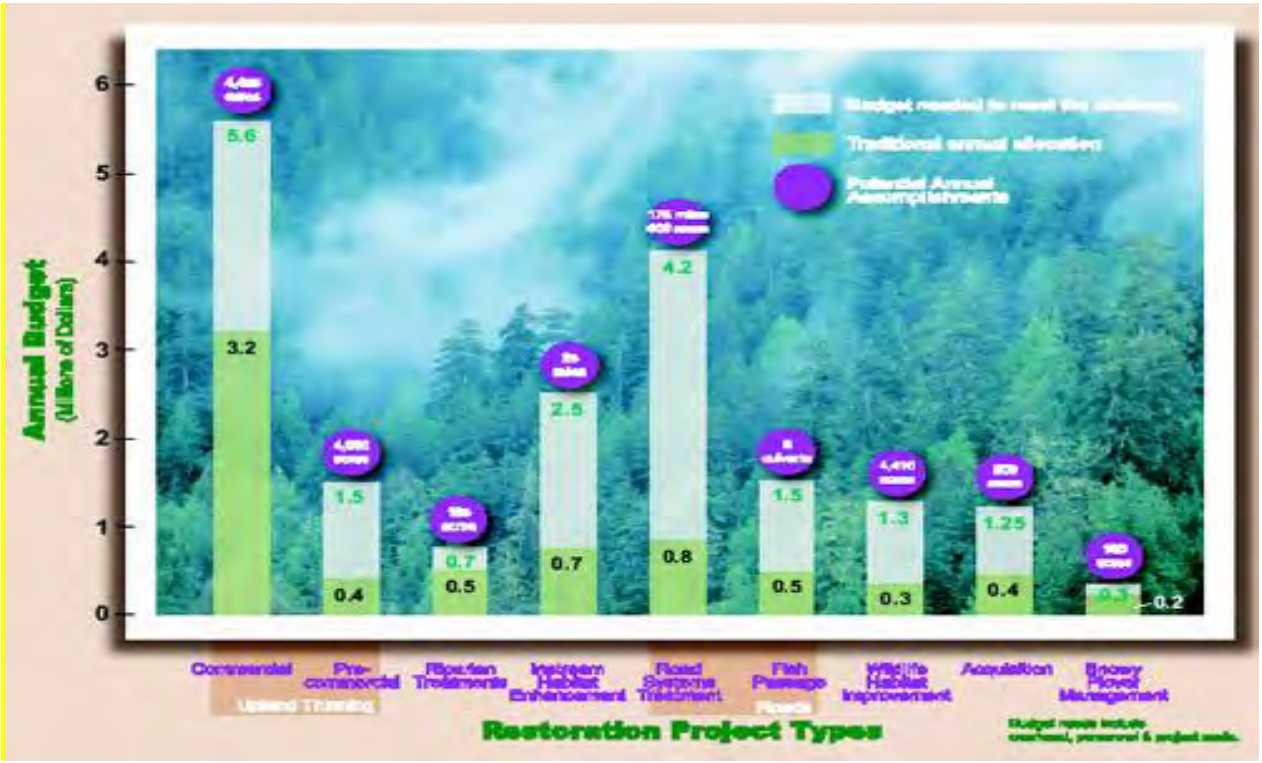
The Forest Standards and Guidelines provide direction to enable the Forest to meet the goals of finding and implementing new ways of meeting Forest goals. Below is a summary of FY08 monitoring questions designed to assist the Forest Supervisor in determining the effectiveness of the Forest Plan Standards 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	FY13Year End
Description Program Name	FY13 Expenditures
Brush Disposal	$68,068.91
Facilities Capital Improve & Deferred Mtnce	$545,443.38
Forest Products	$4,708,268.96
Inventory and Monitoring	$267,288.51
Land Management Planning	$70,384.23
Landownership Mgmt	$81,977.75
Minerals & Geology Mgmt	$18,054.94
Payments to Counties (Title II)	$508,810.73
Program Administration	$2,246,055.50
Rec Fee Demo	$1,140,912.73
Rec/Heritage/Wilderness	$975,236.13
Reforestation Trust Fund	$1,951.00
Roads Capital Improve & Mtnce	$2,055,456.17
Trails Capital Improve & Mtnce	$118,220.39
Vegetation & Watershed Mgmt	$635,027.33
WCFE	$794,411.11
Wildland Fire, Preparedness	$852,110.88
Wildlife & Fisheries Habitat Mgmt	$1,146,636.48
Grand Total	$16,336,516.84

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 National 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.

October 2005. Pacific Northwest Region Invasive Plant program. Preventing and Managing Invasive Plants. Adds invasive plant management direction including invasive plant prevention and treatment/restoration standards intended to help achieve stated desired future conditions, goals and objectives.

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."

List of Contributors

The principal contributors to the 2010 Monitoring and Evaluation Report are listed below. Please contact one of us if you have questions or want further information about the reported results.

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Acknowledgments

Monitoring activity on the Forest involves many people, far too numerous to list here. A few of these contributors or their organizations are acknowledged throughout the document as their related work is presented. In addition, many volunteers contributed their time and expertise, as did Ranger District employees across the Forest.