



# Crater Lake National Park Terrestrial Ecology Branch 2014 Project Summary

By

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Fisher at a hair snare station near Timber Crater (photo curtesy of NPS) and Anderson's lupine on Hillman Peak (photo by Jen Beck in 2014).



## Introduction

This year was another exciting year for the terrestrial team with a host of new projects that kept us scrambling throughout the diverse reaches of the Park. In case you did not know, the Terrestrial Branch is one of three branches (terrestrial, aquatic, GIS) of the Resource Preservation and Research Division at Crater Lake National Park. In 2014, the Terrestrial Branch consisted of a Terrestrial Ecologist, Botanist, and two seasonal wildlife technicians. In addition, project funding helped support five botanical technicians that contributed to the Rim Drive Rehabilitation Revegetation and Invasive Vegetation Management projects; and one additional wildlife technician who helped provided support on our mesocarnivore inventory.

We believe it is important to understand the work each division is undertaking so we can figure out better ways of working together to meet the Park's mission. This year we received assistance from all the divisions which helped contribute to such a great season and we want to thank all of you for that help. I know we are all very busy and at times it is hard to take some time to see what others are getting accomplished. Therefore, Jen and I have put together this short summary of many of our 2014 projects. Please take a look at a few of the projects that might interest you. For many of the projects, we are hoping to continue working on them again in 2015 so if you are interested in learning more about the projects or would like to assist us in 2015 just give Jen or myself a call.

Some of the more interesting achievements that occurred this year included: 1) the wildlife team placed 112 remote cameras throughout the Park and recorded over 30 species, including the rare fisher that is currently in the process of being listed; 2) we continued to receive many incidental observations from Park staff and the public, this year we had 132 reporting's which included 3 observations of the elusive Sierra Nevada red fox, 3) this marked the second year of seasonal closure of the Llao Rock Research Natural Area to protect rare and sensitive plant species and their habitat; 4) we continued with seed collection to revegetate areas that will be disturbed as part of the Rim Drive Rehabilitation project; and 5) thanks to some additional funding we were able to remove over 80,000 invasive plants from the Park including 5 new species that had not been previously documented in the Park.



Davidson's penstemon, one of the species targeted for seed collection and propagation for the Rim Drive Rehabilitation Revegetation project. Photos by Melody Frederic.



## Invasive Vegetation Management

### Background

Over the last twenty years, non-native, invasive plant species have been spreading throughout the Park. Some of the Park's most offensive invasive plant species include St. John's wort, bull thistle, Canada thistle, bulbous bluegrass, sheep sorrel, and smooth brome. Invasive species are found along Park roads and trails, around facilities, and also in the Park's backcountry – especially near the Park's boundaries and in wetland and riparian areas. The Park has been actively treating invasive plants since the late 1990s with annual efforts made since 2003.

### Why is this important?

Non-native, invasive species are considered one of the most critical threats to biodiversity. It is imperative that invasive plant populations are treated while still at small and manageable levels to protect the Park's native plant communities. Crater Lake possesses a relatively pristine flora, with some plant communities comprised entirely of native members. Protecting against non-native plant invasions through preventing new invasions, early detection of and rapid response to new invasions, and regular treatment/control of established invasive plant populations help maintain the diversity and integrity of native plant communities and the suite of species that depend upon them.



Controlling St. John's wort in a remote part of the Red Blanket Canyon. Photo by Jen Beck.

### 2014 Activities

Progress was made toward reducing the abundance and distribution of invasive plants throughout the Park. Botany staff received assistance from the Oregon Department of Agriculture Noxious Weed Control program, the Friends of Crater Lake, the Youth Conservation Corps, and special financial assistance from the Crater Lake Natural History Association and Crater Lake Fire Management. This year 80,603 plants were treated park-wide. In 2014, five new weedy plant species were recorded (and removed) in the Park

for the first time: rush skeletonweed, Jerusalem oak, scentless mayweed, pineapple weed, and field pepperweed. The 2014 annual report for this project can be downloaded by [Clicking Here](#).



A new Jerusalem oak infestation along Munson Valley Road. Photo by Christine McCullough.

### Project Summary/Future Work

Invasive vegetation management will be an ongoing project for the Terrestrial Ecology staff. Despite tremendous progress that has been made in controlling and treating invasive plants to date, new infestations emerge annually that require regular treatment. The Park has had some success in reducing invasive plants throughout the Park; for example, in the late 1990s thousands of spotted knapweed plants were removed from roadsides in the Park's Panhandle area. Over the last few years, only isolated plants have been found in this area. The Park is developing a new Invasive Vegetation Management Plan and Environmental Assessment to enhance and improve control options park-wide.



## Northern Spotted Owl Monitoring

### Background

The first recorded observation of a Northern Spotted Owl (NSO) in Crater Lake National Park was in 1934, and between 1934 and 1978 several other sightings were reported. The first formal survey for spotted owls was conducted in 1978 in cooperation with the Oregon Department of Fish and Wildlife and the United States Forest Service. In 1992, the first survey was conducted following an established protocol but was limited in scope. More intensive surveys following the protocol were completed between 1993 and 1997 whereby all potential habitat in Crater Lake National Park was surveyed. Survey efforts in 1998 to present focused on monitoring long-term trends in the population at known NSO activity centers and completing surveys in areas where Park management activities may have an effect on this species.



Northern Spotted Owl  
photographed by Jeff Murphy

### Why is this important?

After a status review by the US Fish and Wildlife Service the spotted owl was listed under the Endangered Species Act as “Threatened” in June of 1990. In 2008 the USFWS developed a spotted owl recovery plan that describes 4 basic steps to NSO recovery including: 1) Completion of a range wide habitat modeling tool; 2) Habitat conservation and active forest restoration; 3) Barred owl management; and 4) Research and Monitoring. As part of this monitoring plan the NPS is listed as one of the responsible parties for the following activities: 1) Monitor population trend; 2) Utilize habitat modeling to help with recovery measures; 3) Design and conduct experiments concerning habitat, prey, and spotted owl fitness; 4) Establish protocols to detect and manage barred owls; and 5) Ensure the monitoring protocol adequately detects spotted owls. In order to help with the recovery effort and to ensure Park management activities and high numbers of Park visitors have no negative effect on NSO recovery, the Terrestrial team monitors known sites, surveys for new sites, and surveys areas where management activities are planned using the standardized protocol developed by the USFWS.

### 2014 Activities and Results

This year we conducted 53 surveys between May 28<sup>th</sup> and August 7<sup>th</sup> at 12 of 15 known spotted owl activity centers and 6 sites where fuels reduction, trails/road maintenance, and habitat restoration projects were planned. Spotted owls were found at 2 locations and barred owls were found at 6 locations that were surveyed. None of the areas where management activities were planned had spotted owls, however two of the areas did have barred owls present. The 2014 annual report for this project can be downloaded by [Clicking Here – NPS ONLY](#).

### Project Summary/Future Work

Crater Lake National Park has been monitoring NSOs using a standardized monitoring protocol since 1992. Sampling efforts have varied over years due to funding constraints and limited staff time. Since 1992, an annual report has been developed that describes what was accomplished each year. In addition, region wide assessments of NSO recovery were completed in 2004, 2008, and 2014. The spotted and barred owl information gathered between 2009 and 2014 is currently being analyzed and results should be made available soon. In 2015, the wildlife team plans to continue monitoring NSOs at known sites and in planned project areas and will continue to use acoustic stations (see below) to contribute to this effort.



## Whitebark Pine Conservation

### Background

Whitebark pine is a keystone and foundation species that inhabits the Park's highest elevations. It has been declining for decades due to the non-native disease white pine blister rust, which was first documented in the Park in 1936. Over a decade of mountain pine beetle attack has further reduced mature whitebark pine throughout the Park, and the beetle has surpassed blister rust as whitebark pine's leading mortality agent. Whitebark pine is eligible for listing as threatened or endangered under the Endangered Species Act; however, this action is precluded by lack of funding and higher priority work for the USFWS and so whitebark pine remains a "Candidate" for listing. Whitebark pine has received management attention over the last 15 years with efforts made to monitor whitebark pine communities, identify trees with natural resistance to blister rust, and conduct restoration outplantings of seedlings from rust-resistant "Parent" trees.



Whitebark pine continues to be killed in the park by the mountain pine beetle. Photo by Jen Beck.

### Why is this important?

Whitebark pine is highly susceptible to the fatal blister rust pathogen; low levels of genetic resistance to blister rust have been reported for whitebark pine. Without management intervention, it is likely that whitebark pine will continue to decline park-wide. As both a foundation and keystone species, whitebark pine plays a key role in supporting the Park's high elevation biodiversity. Whitebark pine is considered a pioneer species that can grow on harsh, exposed sites. Once established, they can act as a nurse species that provide shelter for a variety of other species. In addition, their highly nutritious seeds help support a host of wildlife species that occur at high elevations, including the Clark's nutcracker.



Installing cages around whitebark pine cones to protect developing seeds. Photo by Jen Beck.

### 2014 Activities

Sixty-nine rust resistant and potentially rust resistant whitebark pines were protected with bark beetle repellent. Assistance was received from the USFS Forest Health Protection program that facilitated tree climbers from the Deschutes National Forest to cage and collect cones from 13 new whitebark pines. Cones from these 13 trees were sent to the USFS Dorena Genetic Resource Center (DGRC) where seeds were extracted, stratified, and germinated for entry into rust resistance trials.

### Project Summary/Future Work

The total number of whitebark pines that have had cones collected (2003-2014) and sent to the DGRC for rust resistance screening is 112.

The Park's 4 whitebark pine restoration plantings experienced survival rates between 77 - 90%. Results from the Park's long-term monitoring plots indicated that total blister rust infection within plot areas (determined by active & inactive cankers) in trees at least 1.4 m tall has changed from 11.5% in 2003 to 23.9% in 2014; mature whitebark pines (> 15 cm DBH) have been reduced within plot areas by 23.5% since 2003. Twenty-two percent of the Park's known rust resistant whitebark pines are now dead; all have been killed by the mountain pine beetle. The Terrestrial Ecology staff will continue with whitebark pine monitoring efforts and application of bark beetle repellent to high-value trees in 2015. Additionally, the next whitebark pine restoration outplanting (scheduled for 2016) is in the planning stages.



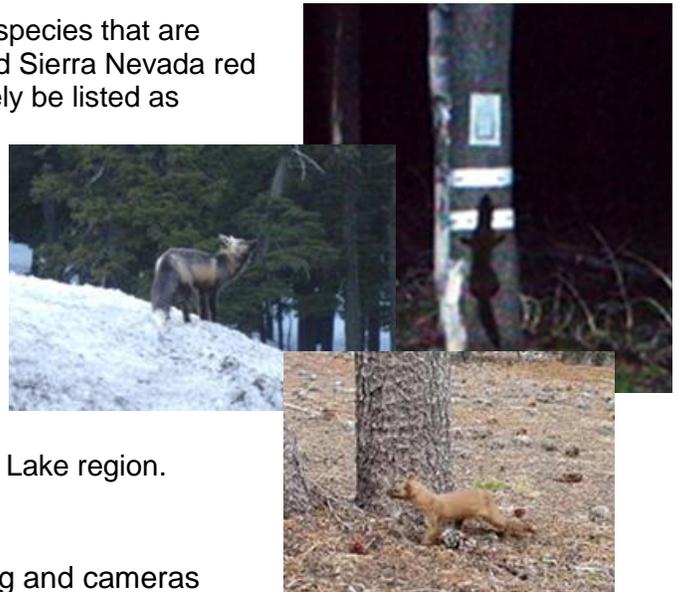
## Remote Camera Species Distribution Project

### Background

Mesocarnivores are generally thought of as small to midsized mammals whose diet consists mostly of meat. Unlike large carnivore species (bear, cougar, wolves, etc.), mesocarnivores tend to be more numerous in species richness (number of different types of species), have more diverse behavior patterns, use a greater diversity of habitats, and are generally more abundant than large carnivores yet we know very little about their influence on the ecosystem at Crater Lake National Park. What we do know is mesocarnivore species play a key role in controlling prey populations (have you see the pine marten hunting mice near your house) and can even play a role in determining the vegetation species in an area. Since many species in the Park rely on one or two plant species to persist, it becomes critical to ensure mesocarnivores are accounted for as major contributors to the Crater Lake Ecosystem.

### Why is this important?

Crater Lake National Park is home to three mesocarnivore species that are currently in jeopardy, these are the Fisher, Pine Marten, and Sierra Nevada red fox. The Fisher is a Federal Candidate species and will likely be listed as threatened in 2015 by the USFWS. The Sierra Nevada red fox is a rare subspecies of fox that was thought to only occur in 2 locations in California when it was petitioned to be listed in 2011. More recent surveys have documented a few individuals in Oregon including Crater Lake National Park. The species is currently being reviewed for listing by the USFWS. The Pine marten (also called American marten or Pacific marten), is an Oregon state sensitive species. This species is struggling in many parts of Oregon such as the Blue Mountains and Coast Range, however it is abundant throughout the Crater Lake region.



Fisher, Sierra Nevada red fox, and Pine Marten at Crater Lake National Park. Photos by Sean Mohren.

### 2014 Activities

This project would not have been possible without funding and cameras donated by the National Park Foundation, Disney Nature, and Subaru. The wildlife team was able to utilize remote cameras to sample 112 locations scattered around the Park. In total, 42,905 photographs were taken, with 8,603 (20%) containing images of wildlife documented 30 unique species including some of the rarer species such as the striped skunk and fisher. We also collected 7 genetic samples to try and determine areas being used by the rare Sierra Nevada red fox. The 2014 annual report for this project can be downloaded by [Clicking Here](#).

### Project Summary/Future Work

The future of this project is currently unfunded but we have submitted several proposals in an effort to obtain funding to continue to examine the distribution of mesocarnivore (and other species) in and around Crater Lake National Park. Our hope is to continue to learn more about the ecology of these species and other species captured by the remote cameras (see full report) so we can ensure their longevity and better understand potential impacts from management activities.



## Pumice Grapefern Monitoring



The pumice grapefern (left - photo by Jen Beck). Pumice grapefern sampling frame with tagged individuals (right - photo by Kathryn Williams).

### Background

The pumice grapefern is a rare plant found in the southern and central Cascade Range that is listed as threatened by the state of Oregon. It is also on the Oregon Biodiversity Information Center’s “List 1” which includes species that are “endangered or threatened throughout their range or presumed extinct.” Crater Lake contains one of the world’s largest pumice grapefern populations, which is also the type locality for the species. A type locality is the physical location where a species is first collected and described; therefore, it defines and serves as a genetic reservoir for the species. The Park has been monitoring populations of pumice grapefern since 2010 to determine dormancy rates in this species.

### Why is this important?

The pumice grapefern has a prolonged subterranean dormant phase in which it is completely dependent upon its mycorrhizal associates for photosynthate (its food source). It is currently unknown what percentage of the pumice grapefern population is dormant annually and how this varies over time. Long-term demographical monitoring provides critical information for managing this species, and dormancy rates are essential to determine total population size and fluctuations in population size over time.

### 2014 Activities

2014 marked the fifth year of pumice grapefern monitoring at three locations park-wide. Sampling assistance was received by Susie and Eric Roe-Andersen. The shortest dormancy period recorded by plot data is one year; the longest period so far is four years (and counting). This year’s sampling effort marked the highest dormancy rate (15.3%) recorded to date.

### Project Summary/Future Work

It is difficult to determine if “new” plants encountered each year are ones breaking dormancy or new recruits to the population; several additional years of monitoring will be required to determine true dormancy rates.

Year	% Population Emerged	% Population Dormant	% Population New
2011	76.0	6.5	17.5
2012	90.5	7.7	1.9
2013	89.3	10.1	0.6
2014	83.5	15.3	1.2



## Acoustic Inventory and Monitoring Project

### Background

Beginning in 1992 the wildlife team at Crater Lake National Park began implementing the USFWS Northern Spotted Owl Monitoring protocol to determine distribution, abundance, and reproductive success of spotted owls in Crater Lake National Park. As the years have progressed, reductions in budgets and increased awareness of safety have reduced our ability to implement this monitoring protocol in its entirety at the Park. In general, the wildlife staff is capable of implementing 1-3 surveys at each known spotted owl activity center in any given year versus the 6 surveys recommended in the USFWS monitoring protocol. In an effort to help improve our ability to determine the occupancy of an area by spotted or barred owls the wildlife team began exploring the use of acoustic station to help supplement our spotted owl monitoring efforts.



Acoustic monitoring station at Sun Creek during the 2014 sampling season. Photograph by Sean Mohren.

### Why is this important?

After a status review by the US Fish and Wildlife Service the spotted owl was listed under the Endangered Species Act as “Threatened” in June of 1990. In 2008 the USFWS developed a spotted owl recovery plan that describes 4 basic steps to NSO recovery including: 1) Completion of a range wide habitat modeling tool; 2) Habitat conservation and active forest restoration; 3) Barred owl management; and 4) Research and Monitoring. As part of this monitoring plan the NPS is listed as one of the responsible parties for the following activities: 1) Monitor population trend; 2) Utilize habitat modeling to help with recovery measures; 3) Design and conduct experiments concerning habitat, prey, and spotted owl fitness; 4) Establish protocols to detect and manage barred owls; and 5) Ensure the monitoring protocol adequately detects spotted owls. In order to meet the NPS responsibilities of the recovery plan we need to ensure we have an adequate understanding of spotted owls and barred owls in the Park.

### 2014 Activities

A total of fourteen sound stations were deployed at 7 sites between May 21, 2014 and August 15, 2014. In that time, 5,863 hours of data were recorded. Each station was deployed for an average of 17.45 days. Spotted owls were recorded at one station in a known spotted owl activity center. Barred owls were documented at 86% of the sites and included a pair that was recorded at the one new area of the Park that was surveyed. The barred owl pair documented in this new area is the highest elevation we have documented barred owls in the Park. If we compare the diversity of owls observed at each site when using acoustic station versus just implementing the limited traditional field crew survey methods we can see the benefits of the acoustic stations. Acoustic stations documented the same species that were observed by the field crew. However, acoustic stations also documented barred owls at 5 sites where field crews did not observe this species. In addition, field crews did not document any great horned owls; however we did record this species at 3 locations using the acoustic stations. The 2014 annual report for this project can be downloaded by [Clicking Here](#).

### Project Summary/Future Work

The wildlife team plans on implementing acoustic station during the summer of 2015. We will attempt to strike a balance between sampling known spotted owl activity centers, new areas that have not been sampled since 1992, and compliance areas where traditional 6 visit sampling following the USFWS spotted owl monitoring protocol will be conducted.



# Pika Occupancy Research Project

## Background

The American pika, a small mammal related to rabbits and hares, occurs in rocky environments and is largely restricted to boulder-strewn talus fields and slopes where abundant crevices and cavities provide sufficient cover. Beginning in 2010, Crater Lake National Park was one of 8 National Park units in the western United States that began working on the “Pikas in Peril” project (see link below) which was being spearheaded by the NPS Upper Columbia Basin Inventory & Monitoring Network. As part of this project, a standardized protocol was developed for surveying pika populations. Each of the Park units implemented this protocol so results could be compared across the region. In addition, genetic samples were collected to measure gene flow and model the connectivity of pika populations at five of the eight Park units that are participating in this project. This year marked the fifth and final season of sampling pika populations.



Pika photographed by Sara Hansen

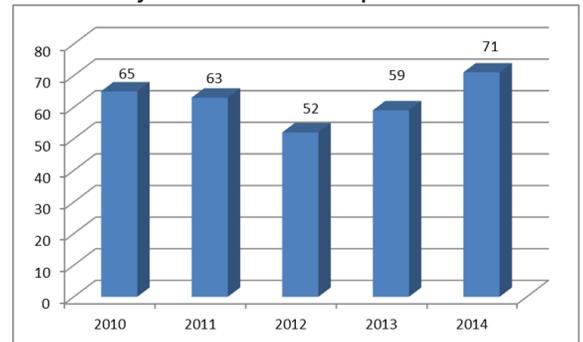
## Why is this important?

Initially, the National Park Service Climate Change Response Program funded this project to address questions regarding the vulnerability of the American pika to future climate change scenarios projected for the western United States. Pikas are extremely sensitive to heat stress and are generally restricted to higher elevations. Recently, localized extirpations of the species have been documented in isolated mountain ranges of the Great Basin. It is thought that the cause of the extirpations is increased warming resulting from accelerated climate change, and given the current predictions of climate change over the next century, the risk of extinction is now considerable. If you have spent any time around the caldera of Crater Lake you have probably

observed one of these species. Pika are currently abundant along the talus slopes of the Park and are a major food source for a diversity of species that live in the Park such as coyote, pine marten, weasels, birds of prey, bobcats, and fox. If temperatures rise as predicted by climate change scenarios this could mean a decrease in the pika population in the Park which could then result in a decrease of many of these other species.

## 2014 Activities

The wildlife team sampled 100 locations covering the majority of talus habitat in the Park in 2014. Most locations were visited one time; however 30% of these locations were visited twice to help determine our accuracy in detecting pika. Based on 2014 data, we estimate the occupancy rate to be 71%. This means that within the area sampled, if you were to randomly pick a site you would have a 71% chance of finding a pika. Results for all five years of sampling are provided in the figure to the right.



Occupancy rates for pika at Crater Lake National Park.

## Project Summary/Future Work

2014 marks the final year of this occupancy study and we will now be working with the Upper Columbia Basin Network and other contributing parks to develop a publication that discusses our findings. Five to 10 years from now, a repeat of this study will provided us with much needed information on how the pika at Crater Lake National Park are doing over the long term but for now the population seems very stable. More information about the Pikas in Peril project can be found at:

[http://science.nature.nps.gov/im/units/ucbn/monitor/pikas\\_in\\_peril.cfm](http://science.nature.nps.gov/im/units/ucbn/monitor/pikas_in_peril.cfm).



## Rim Drive Rehabilitation Revegetation Project



Rare plants to be salvaged along West Rim Drive (left – photo by Melody Frederic); plant salvage operations (middle – photo by Kathryn Williams); checking for ripeness of Newberry's knotweed seeds (photo by Melody Frederic).

### Background

The Rim Drive Rehabilitation project will reconstruct and/or repave West and portions of East Rim Drives starting in 2015. This project will cause ground disturbance along many sections of road by obliterating unofficial pullouts and realigning segments of road that are falling into the caldera. Rare plant species will be impacted by this project, including one of the largest known populations of the Crater Lake rockcress.

### Why is this important?

Rim Drive is a popular Park road, providing access to the caldera rim during the summer months. The condition of the road is poor in many places, which jeopardizes the safety of road users. Without correcting these deficiencies, the road will further deteriorate and fall into disrepair.

### 2014 Activities

Revegetation prescriptions were refined for each of the areas to be disturbed. Salvage of rare plant species (Crater Lake rockcress, pumice grapefern, and Mt. Shasta arnica) was performed after it was determined that impacts to these species were unavoidable. Rare plants were salvaged from two areas, maintained in a hold-over facility, and monitored on a regular basis. Seeds were collected to support revegetation efforts – including ones from the Crater Lake rockcress populations that will be impacted. The project area was surveyed for invasive plants, with all invasive plants encountered removed (a total of 18,237 individuals).

### Project Summary/Future Work

This was the second year of a multi-year effort to mitigate impacts to rim vegetation and soils from the Rim Drive Rehabilitation project. Efforts in 2015 will continue with collecting seed for customized seed mixes used to revegetate specific areas and for plant propagation. In fall of 2015, areas disturbed by the project will be seeded and planted with site-specific native materials and revegetated areas will be watered and monitored for revegetation success and invasive plant establishment. This will continue into 2016 and 2017. Transplant of rare and sensitive plant species will occur as feasible, and monitoring of transplanted individuals will be conducted. Revegetation efforts will continue to be monitored for their success and any follow-up planting and/or seeding will occur in 2017 and 2018 to help ensure the recovery of impacted areas. Invasive plants will be controlled within the project area during and two years after the project completion date.



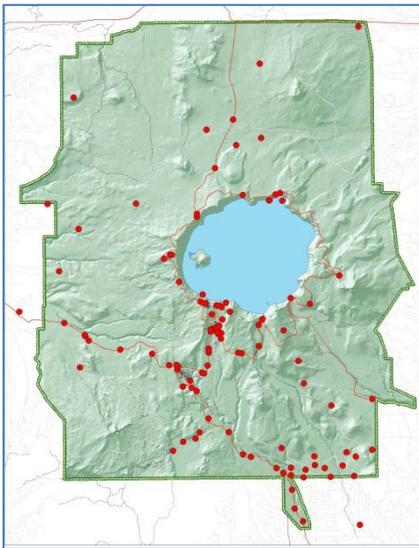
## Incidental Wildlife Observations

### Background

In general, the Terrestrial Branch base funding supports the Terrestrial Ecologist and one seasonal technician that are dedicated to the wildlife program. In 2014, we were able to have 3 seasonal wildlife technicians because we received project funds that helped support our botanical and wildlife programs. Wildlife staff is dedicated to completing many of the projects described in this document so very little time can be committed to general species inventories. Taking advantage of the fact that NPS employees from other divisions spend much of their time in the outdoors, and the Park has ~500,000 visitors traveling through the Park each year, this gives us the opportunity to record wildlife observations in areas that our core staff may not have time to inventory.

### Why is this important?

Incidental observations of wildlife are an extremely valuable piece of information that can be used to help inform many of the tasks the wildlife team takes responsibility for as part of our program. Incidental observations, especially when accompanied with pictures, can be used to help update Park species lists, inform the sampling design of species specific projects, and can draw concern about species that may be disappearing from the Park.



2014 Incidental Wildlife Observations

### 2014 Activities

In 2014, we received 132 incidental observations of 47 species from NPS staff (87%) and the public (13%). Species observed included:

**Birds:** American Dipper, Bald Eagle, Black-backed Woodpeckers, California Quail, Cedar Waxwing, Clark's Nutcracker, Coopers Hawk, Dark-Eyed Junco, Evening Grosbeak, Gray-crowned Rosy Finch, Great Gray Owl, Great Horned Owl, Hairy Woodpecker, Lazuli Bunting, Lewis Woodpecker, Merlin, Mountain Chickadee, Northern Goshawk, Northern Pygmy Owl, Northern Saw-Whet Owl, Pileated Woodpecker, Red Crossbill, Red Shouldered Hawk, Ring-necked Pheasant, Scrub Jay, Sharp Shinned Hawk, Sooty Grouse, Tennessee Warbler, Three-toed Woodpecker, Turkey Vulture, and White-headed Woodpecker

**Mammals:** Badgers, Black Bear, Black-tailed Deer, Coyote, Elk, Long-tailed Weasel, Mountain Lion, Mule Deer, Pacific Marten, Pika, Porcupine, Red Fox, Snowshoe Hair, White-tailed deer, and Yellow-bellied Marmot.

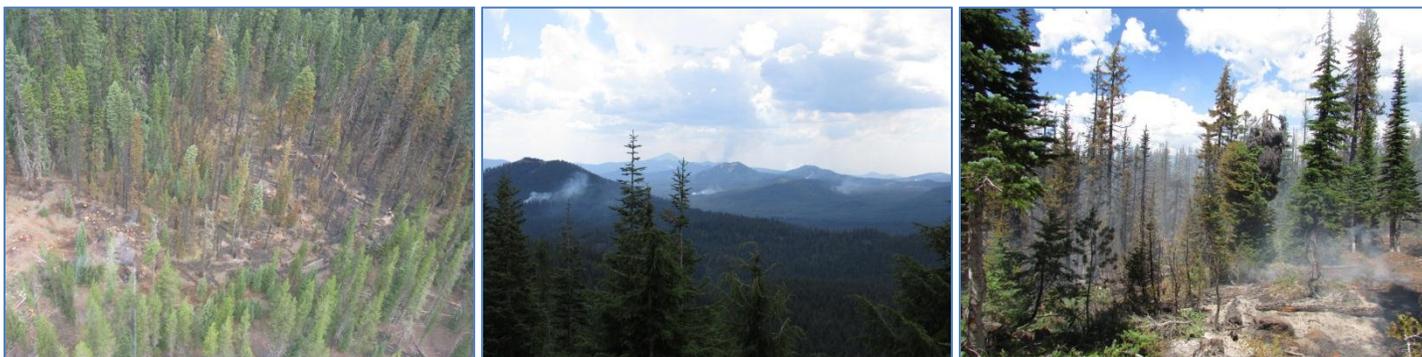
**Insects:** Common Buckeye Butterfly, Hoary Comma Butterfly.

### Project Summary/Future Work

The wildlife team will continue to urge the Park staff and visitors to submit wildlife observations throughout the summer and winter. A special thank you goes out this year to: 1) Krista Johnson and Jordan Neumann for the plethora of observations you submitted this year, 2) Roger Van Curler, Jaime Summers, and Alan Tomaszewski for the only observations of our rare Sierra Nevada red fox, 3) Steve Thomas for collecting and submitting the numerous observations by the maintenance team, and 4) David Grimes for including the article in the Park newspaper on how to submit observations and for ensuring observations sent in by the public were forwarded to me for inclusion into our database. Thanks to all of you and everyone who submitted observations this year, it was very much appreciated.



## Resource Advisor Program



The Deer fire (left – photo by Todd Erdody); several lightning-ignited fires burning in the park (middle – photo by Jen Beck); the Pumice Flat fire (right - photo by Jen Beck).

### Background

Crater Lake receives an average of 13 lightning-ignited fires every year. While a select few are allowed to grow in size as fires managed for multiple objectives including restoring fire as an ecosystem process, the vast majority of fires are suppressed. It is typical to bring in outside resources (e.g., fire crews, engines, water tenders, helicopters) to assist with managing Park fires. These outside resources may have little knowledge of Park ecosystems, sensitive resources, and light-on-the-land tactics. The Resource Advisor (READ) program provides a direct link between fire and resource managers to incorporate resource management concerns into fire management activities.

### Why is this important?

The Park contains many threatened, endangered, or otherwise rare species and their habitat along with sensitive cultural resources, wetlands, and meadow habitats. Fire is a necessary and vital force shaping Park landscapes and restoring and maintaining ecosystem health. Providing fire managers with current and relevant site-specific information is essential to mitigate impacts of fire suppression/control activities and allow management to occur in an informed fashion.

### 2014 Activities

The Park experienced 42 lightning-ignited fires in 2014. The Pumice Complex, consisting of 25 fires, was the largest incident in the Park this year with hundreds of firefighting personnel brought in to help manage the complex. The Park received approval to manage the Founder's Day Fire, which was ignited by lightning on August 25, to achieve resource management objectives. This fire attained 266 acres in size. Terrestrial Ecology staff directed the READ effort and received assistance from several off-park READs to assist with on-the-ground concerns. Thanks to considerate and receptive fire personnel, impacts from fire control operations were minimized while still achieving fire management objectives.

### Project Summary/Future Work

READs assist with fire management activities by delivering briefings to outside resources; creating maps of sensitive resources in relation to fire locations; assisting with planning and objective-setting for wildland fire management; communicating resource concerns to fireline leadership; ensuring rehabilitation of firelines and fire suppression activities; and, most importantly, providing support to fire staff in managing wildland fire, which is one of the most important and powerful management tools available for restoring and maintaining ecosystem health.



# West Panhandle Forest Restoration Project

## Background

In 1932 the area of Crater Lake National Park known as the “Panhandle” was incorporated into the Park in part to protect the old-growth mixed conifer forest that occurs in this area. Over time this area has become dominated by shade-tolerant conifer species and is no longer functioning in a similar ecological capacity as it was when first added to the Park. We are currently proposing to implement a silviculture-based restoration effort using mechanical tree removal and appropriate fuels treatment to restore and protect the forest structure and vital ecosystem components in the Panhandle area of Crater Lake National Park. If successful, treatment of this area will increase resilience and resistance of old-growth mixed conifer forest in the Panhandle area and will facilitate a more successful reintroduction of fire into this area.

## Why is this important?

Since the incorporation of the Panhandle area into Crater Lake National Park, similar forest types surrounding this area have dramatically declined thereby increasing the ecological significance of the forest in this area.

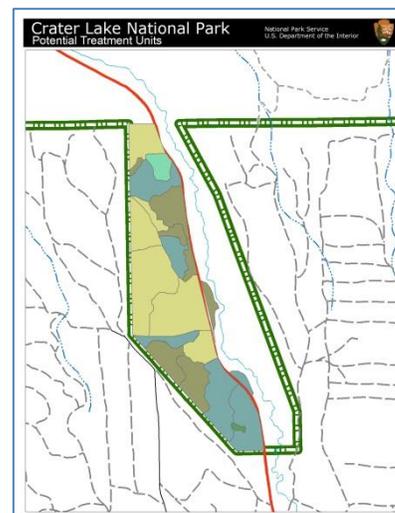
Over time, mainly because of historic fire management practices (fire suppression policies), the Panhandle area has become densely stocked with shade-tolerant (e.g., white fir) conifer species and is no longer functioning in its original capacity as an open forest dominated by old-growth ponderosa pine. Efforts to restore forest structure and composition with prescribed burning following a century of fire exclusion have been largely unsuccessful, and have resulted in high mortality of old ponderosa pines (contrary to resource objectives). If successful, this effort will improve the probability of survival of old, shade-intolerant trees, reduce the probability of high severity fire, increase landscape-scale heterogeneity, promote regeneration of ponderosa pine, and will have an overall positive effect on a diversity of species (understory vegetation, small mammals, landbirds, ungulates, etc.).

## 2014 Activities

In an effort to ensure this project does not have a negative effect on rare species that are known to occur in this area and to make certain we are not contributing to the spread of invasive species the Terrestrial team began implementing field work associated with this project in 2014. Spotted owl surveys were conducted following the USFWS protocol and no spotted owls were observed. Remote cameras were used to determine if this area was being utilized by fisher, Sierra Nevada red fox, or wolves; none were documented. The area was surveyed by the botanical crew to determine the location of any rare plants, none were found. Lastly, the team searched for areas of weed infestation and treated several areas where invasive plants were found.

## Project Summary/Future Work

During the winter of 2014/2015 a team consisting of NPS staff will continue to work on putting together an environmental assessment (EA) that proposes the work we would like to get accomplished in this area. If the EA finds no significant impacts, the restoration efforts will begin in the Summer/Fall of 2016 and 2017. The Terrestrial team will continue to implement botanical and wildlife surveys and invasive vegetation control during this time. In addition, follow up surveys and control work will be conducted once the restoration and rehabilitation efforts have been completed to determine the success of the project.



Potential treatment units for the Panhandle Forest Restoration project. Map by Sean Mohren.



## Other Activities

In addition to the projects listed in this report the Terrestrial Branch worked on a variety of additional tasks and projects. Below is a list of those items and if you are interested in learning more about any of the project listed here or above please contact the Park Botanist, Jen Beck at 541-594-3072 or our Terrestrial Ecologist, Sean Mohren at 541-594-3074.

- Contributing to Park outreach efforts by participating in casual conversations, assisting with educating interpretive staff about wildlife species and botanical issues, helping develop materials for the Interpretation Division's educational programs, and sending out "Wildlife of the Week" photographs.
- Conducting a comprehensive survey of the Crater Lake Rockcress within the Llao Rock Research Natural Area (RNA) thanks to special funding from the Crater Lake Natural History Association. Additionally, social trails within the Llao Rock RNA were obliterated and disturbed areas rehabilitated to their natural condition.
- Monitoring Peregrine Falcon and Bald Eagle historic nesting locations within the caldera.
- Assisted the Klamath Inventory and Monitoring Network with a variety of projects that were implemented in the Park in 2014 including: Vegetation Mapping and Whitebark Pine Monitoring.
- Surveying for rare and invasive plant and wildlife species ahead of project implementation for several Maintenance and concessionaire projects.
- Presenting a poster on the Park's whitebark pines and their levels of rust resistance at the "Challenges and Opportunities in (1) Genetics of Five-Needle Pines and (2) Rusts of Forest Trees Research: Conservation, Evolution and Sustainable Management in a Changing Climate" conference.
- Conducting a presentation to the Audubon Society on black bear distribution at Crater Lake National Park.
- The Park's Invasive Vegetation Management program was featured in the Park's summer newsletter.
- The Park's Whitebark Pine Conservation Program and approaches to wilderness restoration were discussed in an Oregon Public Broadcasting's Earthfix feature: <http://earthfix.opb.org/flora-and-fauna/article/wilderness-creates-challenges-for-iconic-northwest/>



## The Terrestrial Branch 2014 Natural Resource Team



**From left to right. Front:** Alan Thomaszewski, Kathryn Williams, Jen Beck, Corinne Ross, and Dorsey Burger. **Back:** Christine McCullough, Sean Mohren, Elena Thomas, Melody Frederic, and Ian Whited. Photograph taken by Dave Hering.

The 2014 field season was another productive and fun year for Jen and myself and we would like to personally thank the seasonal employees for making this year such a success. This report only highlights our major projects and does not come close to describing everything you have done for us this year. Your hard work, dedication, and passion for the protection and understanding of natural resources at Crater Lake National Park are very much appreciated.

We would also like to thank many of the staff members from other divisions who have been a great help to us this year. We are thankful to Maintenance, Interpretation, Administration, and Visitor & Resource Protection divisions for working with us when natural resource-related issues occurred, reporting wildlife and invasive plant sightings, volunteering to assist with our projects, educating the public about the natural resources of this Park, and helping us protect our natural resources through many of your actions (e.g., educating Park visitors about natural resource issues; fencing the sewage ponds; reporting vehicle/animal accidents; enforcing Park regulations; avoiding nesting birds, sensitive plants, and invasive plants during maintenance activities; using light-on-the-land tactics to reduce disturbance to vegetation and soils while implementing Park projects; and many more).