

THE KLAMATH KALEIDOSCOPE

A Newsletter of the Klamath Network Inventory and Monitoring Program Spring 2006

Communicating Science in the Klamath Network

By Daniel Sarr, Klamath Network I&M Coordinator, and Mac Brock, Resource Chief of Crater Lake

The Klamath Network Inventory Program, funded from 2000-2004, sent scientists to the field and libraries in the Klamath Network to learn more about landbirds, small mammals, amphibians and reptiles, rare and invasive plants, freshwater and marine fish, wetlands and coastal habitats, and a host of management issues. There was no time to rest on our laurels, however, for monitoring called. Since 2004, Network and Park scientists endured blizzards of scoping meetings, long treks through the review and prioritization of vital signs, the chill winds of peer review, and the oppressive heat of yearly

reporting deadlines. Quietly, in the

Crater Lake National Park's Superintendent's residence, soon-to-be home of the Science and Learning Center at Crater Lake National Park.

newsletter, the Klamath Kaleidoscope, and writing the monthly Featured Creatures. In 2005, the I&M Program sought to provide more thematic offerings by entering into an outreach partnership with Southern Oregon University. The project aims to provide guidance and financial support for one graduate student to take on a critical topic for each of the next five years. Deborah Zierten, whose work appears in this issue of the Kaleidoscope, is the first such student selected. It has been great fun to work with Deborah and hear her describe the Klamath ecosystems and research with fresh eyes.

Exciting things are afoot in the parks too. This summer, the *Science and Learning Center at Crater Lake National Park* will open its doors for the first time. Since the days of William Gladstone Steel, people have marveled at the indigo blue of the Lake and the sublime scenery of ancient forests surrounding it. However, the Park has the potential to provide many opportunities besides world-class scenery, such as serving as a classroom for education, an outdoor laboratory for research, and a place for personal inspiration and artistic expression. For the past decade,

background, our knowledge base has been growing, though it is sometimes difficult to make such information available to ourselves, much less the parks and public!

Over the last several years, the Klamath Inventory & Monitoring (I&M) Program has instituted several tools for outreach and communication of our growing knowledge base, including community lectures, publication of our website, launching the biannual the Park has worked with a variety of public and private partners to nurture a vision and to bring science and education to the forefront of public awareness at Crater Lake National Park. Two renovated historic buildings will serve as a focal point for the center, from which the Park will encourage multidisciplinary investigations, educational development, and creative expression. The vision will become a reality on August 25, 2006, when the Park will celebrate with its partners and the public the opening of the new *Science and Learning Center*. It will be a great time to visit the Park.

It is encouraging that as our knowledge of park- and network-wide science has grown, so too has our skill and the diversity of ways in which we communicate it. We look forward to strengthening our collaborative outreach program in the years ahead as new discoveries come to light.

Please welcome Sean Mohren, the Klamath Network's new Data Manager!



Sean got his B.S. in Wildlife and Fish Biology Management and M.S. in Zoology and Physiology from the University of Wyoming. From 1994 – 2003, he worked in wildlife research for the University of Wyoming Cooperative Fish and Wildlife Research Unit. In 2003, he moved to Oregon to work as the Data Steward for the Bureau of Land Management. In his free time, Sean likes to seek out new hiking trails with his wife, hunt with his friends, and play ball with his Lab. The National Park Service

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THE KLAMATH NETWORK PARKS:

Crater Lake National Park www.nps.gov/crla/ (541) 594-3100

Lassen Volcanic National Park <u>www.nps.gov/lavo/</u> (530) 595-4444

Lava Beds National Monument <u>www.nps.gov/labe/</u> (530) 667-2282 Ex.232

Oregon Caves National Monument <u>www.nps.gov/orca/</u> (541) 592-2100

> Redwood National Park www.nps.gov/redw/ (707) 464-6101

Whiskeytown Natl. Recreation Area <u>www.nps.gov/whis/</u> (530) 246-1225

Tidepool Study of Black Rockfish at Redwood NP

By Sarah McCullough

Two student researchers from Humboldt State University are exploring the population dynamics of an important fishery off the coast of Redwood National and State Parks. The fish species of interest is the black rockfish (Sebastes melanops), a schooling fish found near rocky reefs in shallow water or in open water over deep banks. It feeds on other fish and on plankton, can grow to a length of 25 inches (although larger individuals are rarely caught in the fishery today), and can live up to 50 years. The study is providing new information about the habitat used by young-of-the-year juveniles

and may eventually contribute to California's efforts to establish a network of protected marine parks and reserves. Funding for this research was provided by the Klamath Network and Redwood National Park.



enced an emergency closure in 2004 when recreational fishing exceeded the statewide harvest limit. The State of California is currently in the process of establishing a network of protected marine areas under the Marine Life Protection Act. Redwood National

While young-of-theyear are thought to

mainly settle and feed in shallow kelp beds, researchers conducting a separate intertidal inventory found thousands of juvenile black rockfish in tidepools at two Park locations, False Klamath Cove and Endert's Beach. This discovery prompted a small pilot study that focused on rockfish in tidepools, conducted by Karah Cox and Cara McGary under the direction of Professors Tim Mulligan and Sean Craig. The initial findings are that juvenile rockfish used the tidepools for two to three months before moving into deeper waters, that they grew 60 percent larger (from 40 mm to 63 mm, on average) while in the tidepools, and that individual fish stayed in the same tidepool during that time.

Rockfish in a tidepool at Redwood National Park. Photo by Mark Lomeli and State Parks encompass high value

> nearshore coastal waters that could be protected as reserves under the Act. Evidence that Park sites act as a nursery for a commercial fish species could make an important contribution to that process.

Due to these findings, the project has been expanded to

describe the relative abundance, distribution, and sea-

sonality of juvenile black rockfish in rocky intertidal

areas. This work will be continued in Redwood Na-

tional and State Parks during 2006. The research team

is conducting similar work at sites ranging from Cali-

fornia to the Oregon-Washington border to produce a

Black rockfish are an excellent food fish; they are fished commercially and recreationally. In Northern

California, this species accounts for 15 to 30% of the

total recreational marine catch. While they are not con-

sidered to be an overfished species, the fishery experi-

more complete picture of regional rockfish distribution.

The False Klamath Cove and Endert's Beach sites, as nursery sites for juvenile black rockfish, represent a valuable refuge for a local resource, and serve as a reminder of the connection between the National Parks and their surrounding lands.

Sarah McCullough, a seasonal biotech at Lassen, worked at the Klamath Network this winter and edited this edition of the newsletter.

Grinnell Resurvey Project heads to Lassen Volcanic National Park By John Perrine

This summer, biologists with the Museum of Vertebrate Zoology (MVZ) at UC Berkeley will begin to inventory the terrestrial vertebrate species within the "Lassen Transect," a 3,000 square mile swath of northern California from the Sacramento River to the Nevada border that includes Lassen Volcanic National Park (LVNP). This survey is part of MVZ's Grinnell Resurvey Project, an ambitious effort to revisit the sites that were inventoried between 1910 and 1930 by Joseph Grinnell, the MVZ's founding director. By inventorying the same sites as Grinnell, the resurvey project

will document any changes in species distributions that have occurred in the intervening decades.

Grinnell and his colleagues Joseph Dixon and Jean Linsdale surveyed the Lassen Transect from 1924 through 1929. They visited more than 50 sites throughout the region, documenting the distributions of



MVZ, are still being used for scientific research. Lassen Volcanic National Park lies at the heart of the Lassen Transect. Grinnell was particularly fond of the Park, conducting much of his work there while on summer vacation with his family. Although the entire Park is within the Lassen Transect, Grinnell and his colleagues concentrated their efforts at nine sites in and adjacent to the Park, ranging from Manzanita Lake and Drakesbad to Lassen Peak itself. Over the next three years, MVZ biologists plan to revisit each of these sites. To maximize the comparison with the historic

> data, they will revisit the sites on approximately the same dates and will use similar methods as Grinnell and his colleagues. In six days per site, the MVZ team will inventory the birds, small mammals, and reptiles and amphibians using a suite of detection techniques. These surveys will also expand upon a recent small vertebrate inventory con-

the distributions of Lassen Peak from Kings Creek Meadow. Photo by B.F. Loomis, more than 350 species courtesy of MVZ.

of birds, mammals, reptiles and amphibians, and collecting more than 4,500 specimens. They summarized their results in the 1930 monograph entitled "Vertebrate Natural History of a Section of Northern California through the Lassen Peak Region." More than just a species checklist, this 600-page volume is rich with behavioral observations and historic photographs. For many areas in the transect, their survey remains the most comprehensive vertebrate inventory yet conducted. Their specimens, which are still at the ducted in the western half of the Park by LVNP biologists, which documented several small mammal species new to the Park.

The MVZ team has almost completed a similar resurvey of the Yosemite region. Comparison with the historical data has revealed some exciting and potentially troubling trends. The distributions of several species have expanded to higher elevations, and the ranges of some of the highest-elevation species have become sharply reduced. For example, the upper limit of piñon mouse (*Peromyscus truei*) has increased nearly 3,000 ft, and the lower ranges of pika (*Ochotona princeps*) and alpine chipmunk (*Tamias alpinus*) have retracted nearly 2,000 ft since Grinnell's surveys. These patterns are consistent with predictions from climatic warming models. By examining the Lassen Peak region and other mountainous areas throughout California, the MVZ biologists can determine whether such changes are widespread throughout the state. The resurveys will also set a new baseline for future monitoring efforts.



Joseph Grinnell in the field. Photo courtesy of MVZ.

More information on the Grinnell Resurvey Project, including photographs and annual reports from the Yosemite resurvey, is available on the MVZ website: http://mvz.berkeley.edu.

John Perrine is the coordinator for the Grinnell Resurvey Project in northern California. His email is perrine@nature.berkeley.edu.



Excerpts from Joseph Grinnell's field notes while in Lassen Volcanic National Park

<u>May 16, 1924</u>: 7:30 pm. Left our Mineral camp at 2 pm and came toward Lassen Peak up the road following Summit Creek and thence over a divide into a creek canyon between Black Mountain and Brokeoff Mountain, in fact right at the base of the latter. The road goes farther up yet, but is soft and we were stalled and had to give up getting the Ford clear of the road. Our camp is at about 7000 ft altitude. From 6 to 7:15 this evening I went up to the end of the road... where there is a surveying party established – purpose, to carry this road clear to the very base of the Lassen cone.

<u>May 17, 1924</u>: 11 am. Have been up to the base of the very cone of Lassen, near to where the last stunted hemlocks grow. Only rocks and slides in sight above, with the glaring sun of a clear day beating back from them – so I desisted from that last climb! Only birds: Mountain Chickadee ("Tee-tee, too-too" clearly in the distance) and the harsh "chaw chaw" of a Nutcracker. No mammals at all, save for winter sign of gophers wherever there is soil and a little vegetational remains.

June 27, 1928: At 8:00 o'clock we left for Cinder Cone, and made its top at 10:15 – hard going! The crater, with three rims, looks exceedingly fresh. But several little pines (yellows and lodgepoles) and a fir grow down the inner wall near the top, and two or three clumps of willow, strangely! It is interesting to see the recovery of the most recent deposit of cinders on the country around the cone by pines – small-sized yellows (or Jeffrey) mostly. The main lava flow, however, that dammed Snag Lake, is later than any cinder deposit. An area of dirt-covered snow on the north aspect of Lassen, in such wonderful view from the summit of Cinder Cone, shows a blow-out of "ashes" perhaps – though, possibly, simply dust and sand blown off the summit by the southwest wind in normal fashion.

Klamath Network Data Mining

By the Data Mining Team

What does "data mining" mean in the Klamath Network (KLMN)? Data mining means finding and recording key information. The purpose is to catalog information so it is preserved and available to researchers and park managers. This helps retain institutional memory and allows future studies to build upon past projects (Figure 1). It also carries out the Natural Resource Challenge and the guidelines for the Inventory and Monitoring Program (I&M), NPS-75.

What information is mined? The focus is on each park unit's "12 basic inventories," defined by I&M, which include: Species Occurrence and Distribution, Bibliographies, Water Quality and Classification, Geology, Soils, Air Quality and Related Values, Climate, Base Cartography, and Vegetation Maps. The main formats of information are: raw data, reports, journal articles, theses, books, and maps.

Where is the information stored? Data miners enter information into specialized National Park Service databases: *NatureBib*, an online bibliography database; *NPSpecies*, an online biodiversity database; and *Dataset Catalog*, a catalog of descriptive information concerning data, a.k.a. "metadata."



Figure 1. Institutional memory deterioration without data mining/sound information management.

Past Accomplishments

The KLMN Data Mining Team started in January 2004. After training, the crew began cataloging all references relevant to vertebrates and vascular plants and some water quality references at all six KLMN Park Units. Table 1 is a summary of their work.

A smaller crew concentrated solely on Redwood National and State Parks (RNSP), especially on the wildlife division, from September 2004 to April 2005. Beginning in June 2005, the crew switched over to focus on the vegetation division. After completing hardcopy references of vascular plants and vertebrates, the crew moved to digital documents and the remaining 12 basic inventories.

In total, from September 2004 to March 2006, the crews added 2,362 references to *NatureBib* and 1,326 references to *NPSpecies* for RNSP. Since June 2005, the crew processed over 5,100 documents.

Occasionally, the data miners help collect field data and assist in park operations. This helps them become more familiar with park data and also benefits park projects. An average of one to two times each month, they help with resource management, research, and protection projects. So far, they have assisted in programs including bat, beach carcass, elk, fish, and snowy plover surveys; fire management; second-growth vegetation studies; cave reconnaissance; and marine inventories.

Present

Now data mining is in a second phase, consisting of cataloging information in the remaining 12 basic inventories and developing metadata.

The team is developing protocols to standardize digital files' documentation and entry, as well as metadata creation, across the KLMN Park Units. These proto-



The KLMN Data Mining Team: Tim Shepherd, Bess Perry, and Laura Bridy

cols are currently under revision and, when complete, will be an asset to data miners, managers, and researchers.

As in the past, the data miners maintain an open dialog with the database developers. This ongoing dialog helps the crew better understand the programs, constructively comment on the databases, and keep the KLMN current on regional and national developments.

Notes of Interest

Data miners at Lava Beds National Monument "rediscovered" a vegetation survey map from 1936, delighting park staff who found it to be valuable, an example of a "data jewel."

At RNSP, data miners helped identify areas for future research. For example, they found that nearly 20 per-

To the moon!

There are more references in NatureBib than miles to the moon! A vast resource of more than 260,000 references is waiting at your fingertips.

Scientists estimate the Earth is home to over 4 million species. How many are on your list?

For a log-in to NatureBib or NPSpecies, contact Sean Mohren at sean_mohren@nps.gov.

cent of the 1,639 species in NPSpecies with park status do not yet have supporting references. This may indicate a need for researching more about these species that had no recorded evidence, or only a voucher specimen or observation in NPSpecies.

Future

The future of data mining will focus on completing Phase Two at all the KLMN Park Units. Part of the crew transferred to Lava Beds National Monument in April 2006. The team continues to use resources from the National I&M Program, including national discussion groups and I&M updates, to keep current on data mining issues and national progress. The data miners look forward to contributing to KLMN resources and progress on all levels: to individual researchers and park managers, parks and networks, and the national program.

	NatureBib			NPSpecies		
			Total En-			Total En-
Park Unit	Initial	End	tered	Initial	End	tered
Crater Lake	1200	1606	406	<10	241	>231
Lassen	1440	1844	404	25	95	70
Lava Beds	770	1214	444	0	209	209
Oregon						
Caves	249	778	529	4	55	51
Redwood	2512	3232	720	26	430	404
Whiskeytown	603	794	191	1	103	102

Table 1. Numbers of references linked to each park unit at the start and end of FY04 data.

Exploring Biodiversity in the Klamath Region By Deborah Zierten

According to Dominick DellaSala from the World Wildlife Fund, "Despite ... international recognition and a growing interest in the [Klamath] region's biological significance, the global importance of this ecoregion is underappreciated by the public, resource managers, and decision makers." I decided to use Dominick's words as a challenge and to create something that would inspire people in this region to explore, understand, and love biodiversity.

As a graduate student in the Environmental Education program at Southern Oregon, I am working with the National Park Service, Klamath Network, on interpretive material for use by the parks on the theme of Biodiversity. The thought behind the project was to bring the attention of the people of the region to the rich biodiversity in the area, and to link the Inventory and Monitoring Program with the interpretive programs at

Region.

educator, I decided to create a website highlighting the biodiversity of the Klamath Region, focusing on what role National Parks play in conserving this biodiversity. My thought was to emphasize the region as a whole and establish a "sense of place" for the people of the area.

One of the biggest challenges I faced was telling the story of biodiversity in a simple but exciting way so that non-biologists would understand and become captivated by the region. I decided to address the basic biodiversity questions; what is biodiversity, why is it important to conserve, and what is threatening it? I also focused on what makes the biodiversity of the Klamath Region so extraordinary. Lastly, I talked about how the National Parks are conserving biodiversity through the Klamath Network Inventory and Monitoring Program. I decided to address these questions, not by just giving

the parks. Before I started this project, I understood little of the biodiversity of the Klamath Region. Lately, I have been discovering all the hidden treasures this region has through books, websites, and research articles.

With the rapid advancement of technology these days, websites are where it is at. In the hope to reach as many people as possible, as well as build my skills as an environmental



people the answers but by showing them. My hope is that park staff will use these pages to develop interpretive material for their parks based on biodiversity. Parks can use the species profiled on the webpage to tell a part of the biodiversity story. The webpage is rich in information about geology and soils, landscapes, caves, marine systems, and rare species. Each topic is explained through examples found within the region. For example, the geology of the region is told

The website will be accessible through a link on the Klamath Network Home Page as of June 1, 2006.

through the story of the California Pitcher-plant. General information about the plant is given, as well as information about serpentine soils, why they are important, how they were formed, and how they add to the biodiversity of the region. The page will be linked to the Klamath Network home page and will be accessible to all who wish to use it to tell the biodiversity story.

I hope that my website will give people the desire and motivation to get outdoors and explore the remarkable Klamath Region. Also, I hope that some concepts from my website stay with the reader, so the next time they see a California Pitcher-plant, or a Port-Orford Cedar, they will think about serpentine soils and endemic species. With personal experience comes understanding, with understanding comes appreciation, and with appreciation comes conservation.

Deborah Zierten is a second-year graduate student at Southern Oregon University, where she is working towards her master's degree in Environmental Education.



Boulder Creek at Whiskeytown

Watershed Condition Assessments to Begin in Oregon Caves, Redwood, and Whiskeytown By Daniel Sarr

Congress, in its FY 2003 Appropriations Act, instructed and funded the National Park Service (NPS) to assess NPS-managed watershed resources. This is the pilot year of the Watershed Condition Assessment Program, which is intended to serve all parks in the country over the next three to five years. This summer, the National Park Service Water Resources Division will fund watershed condition assessments in Oregon Caves National Monument, Redwood National and State Parks, and Whiskeytown National Recreation Area. A Principal Investigator will be selected by early summer to lead the project, which will be completed by Winter 2008. Jeff Albright of the NPS Washington Office is the national lead on this important project.

NPS units, including Oregon Caves, Redwood, and Whiskeytown, are faced with a similar suite of threats, such as loss of native species, altered disturbance regimes, invasive species, pollution, and habitat fragmentation. They typically have inadequate scientific data close at hand to make informed management decisions to deal with these threats. Consequently, NPS needs to better understand and evaluate the existing data that are available concerning the state of knowledge and condition of natural resources in each park.

The Watershed Condition Assessment Program will provide an important synthesis of information for a variety of scientific uses and for meeting land health goals for the parks, as prescribed by the Government Performance and Results Act of 1993. Current land health goals include attainment of desired conditions for wetland, riparian, upland, marine, and mined areas within the parks.

Field Trip Notes: California Lichen Society visits Whiskeytown NRA

By Janet Doell

The California Lichen Society (CALS) is a non-profit organization, founded in 1994 with the purpose of promoting the appreciation, conservation, and study of the lichens of California. This includes an ongoing effort to record the lichen flora of the state as we collect and identify the species we find on our field trips.

In October of 2003, six CALS members gathered for the weekend at the Whiskeytown National Recreation Area. We had been invited by the Park to do a preliminary survey of the lichen flora there. Two of the participants, my husband Richard and I, had an added interest in the area because we had just started working on a small guide book to the lichens of Northern California

Arriving on a Friday evening, we met with Jennifer Gibson, the Park ecologist who helped us plan our trip. Our first stop on Saturday morning was at a mineral springs near where Crystal Creek and Willow Creek converge. On the greenstone there, we found mostly crustose lichens, which cling closely to the rock or bark they are growing on, like a crust. The yellow and black *Rhizocarpon geographicum* and the white and black *Lecidea tessellata* are good examples of this group.

The oaks growing nearby were well festooned with larger lichens. The small, upright, and bushy *Evernia prunastri* is a good example of a fruticose lichen, This lichen is used as a pollution monitor because, as with many lichens, it is sensitive to atmospheric pollution and is found in many geographic areas. Also on the oaks were some leafy-looking foliose lichen species, such as a green *Flavopunctelia*, a small white *Physcia*, and a brown *Melanelia*.

It is no wonder that this one spot kept us busy all morning! Around noon, we went down Crystal Creek Road, stopping occasionally to collect and photograph and eventually arriving at Coggins Park. Along the way we collected a grey *Leptogium lichenoides*, which is a member of the five percent of lichens in which the photosynthesizing is done by cyanobacteria rather than by algae. Cyanolichens play an important part in the environment because they can fix nitrogen; that is, they make atmospheric nitrogen available to other plants and animals when they die or are eaten. Pale green, stringy *Usneas* were present there as well, easily recognized by the tough cord of fungal threads running down the center of the branches.

On Sunday, we investigated the southeastern section of the Whiskeytown NRA, examining lichens in the parking lots of the Environmental School and the NEED camp. The group broke up around noon on Sunday and headed home. It would take a larger group and considerably more time to do a definitive report on the lichens of Whiskeytown, given the variety of elevations, substrates, plant communities and microclimates found there.



Photo courtesy of Robert and Janet Doell

Klamath Network Recent Highlights and Upcoming Events

February 2006 Water Quality and Aquatic Communities Protocol Meeting

May 2006 Bird Monitoring Protocol Meeting

December 2006 Klamath Network submits draft Phase III Vital Signs Monitoring Report

December 2006 Klamath Network Board of Directors Meeting

Featured Creatures Online!

We post all previous Newsletters and Featured Creatures on our website at http://ww1.nature.nps.gov/im/units/klmn/AboutUs/ Newsletter.htm