SIERRA NEVADA NETWORK

National Park Service
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DEVILS POSTPILE • SEQUOIA & KINGS CANYON • YOSEMITE

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Sierra Nevada Monitor

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Jonny Nesmith records forest plot data while Jim Syvertsen stretches out a tape for a subplot.

Sandy Graban and Andi Heard measure and tag a lodgepole pine in a forest monitoring plot in Kings Canyon NP. Photos: Linda Mutch.

Staff Trip: Forest Monitoring and Testing of New Safety Procedures

Six Sierra Nevada Network (SIEN) staff members backpacked into the Monarch Divide/Granite Basin area of Kings Canyon National Park in late August to become familiar with forest monitoring methods and ground-truth potential plots.

Jim Syvertsen, a trailhead ranger in Kings Canyon, joined us. He was one of the forest monitoring field crew members from 2011 when the project was initially implemented, and he shared valuable information about the field methods.

We also met up with SIEN volunteer Bob Kenan, who traveled to 20 forest plots during the summer to document the presence of target species (whitebark pine or foxtail pine), evaluate the safety of routes to the sites, and document stand structure of the plot area through detailed notes and photography.

In addition to the benefit of long-term staff cross-training and learning methods of new projects, the trip also provided a chance to use safety procedures that were newly implemented this field season (e.g., revised communication check-in procedures and after action reviews to discuss how the field day went, what went well, what could have been improved).

Sierra Nevada parks are noted for their outstanding wilderness landscapes. Core staff who spend a majority of their time in the office must periodically journey into the wilderness to keep fresh in our minds the joys and challenges of wilderness travel. Hiking the parks' trails, carrying a backpack up a long climb, and participating in the actual monitoring on a variety of projects helps us more effectively train and communicate with field crews who are on the front line collecting data for us.

In This Issue

About the Sierra Nevada Network (SIEN) Inventory & Monitoring Program

As part of the National Park Service's effort to "improve park management through greater reliance on scientific knowledge," a primary role of the Inventory and Monitoring (I&M) Program is to collect, organize, and make available natural resource data and to contribute to the Service's institutional knowledge by facilitating the transformation of data into information through analysis, synthesis, and modeling.

Parks in the network are: Devils Postpile National Monument (DEPO), Sequoia & Kings Canyon National Parks (SEKI), and Yosemite National Park (YOSE).

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New Safety Plan Implemented

Sierra Nevada Network (SIEN) staff developed a comprehensive safety plan over the past year with the primary purpose of developing standards, procedures, and training for improving field safety. Our new plan also emphasizes more integration with park operations.

Better integration of Inventory & Monitoring (I&M) projects into park operations will ensure that field staff benefit from pooled resources, shared knowledge, and overall coordination between park and network programs. Greater integration with parks strengthens Sierra Nevada Network's ability to fully support field crews and comply with park safety policies. SIEN I&M staff are working closely with staff in our local parks to better integrate into local operations, and several of our actions are listed below. An added benefit of greater integration with park operations is that these activities also provide opportunities to share information and increase awareness of our program among park staff. Specifically, we have been:

- Requesting review of our network safety plan by park safety officers
- Attending interdivisional safety committee meetings and participating in Resources Management and Science monthly safety sessions
- Participating in Wilderness Operations meetings and working with the local wilderness rangers and maintenance staff to provide crews with gear and food caches and to lighten crews' backpack weights
- Using local wilderness communication check-in procedures with field crews
- Attending local safety trainings conducted at parks
- Cost-sharing Wilderness First Aid training with park staff

ARRIVALS AND DEPARTURES

Physical Scientists Pursue New Job, PhD Completion

Sierra Nevada Network Physical Scientists Andi Heard (left) and Jennie Skancke (right) near Grouse Lake in Kings Canyon National Park. Photo: Linda Mutch.

The Sierra Nevada Network recently said good-bye to Jennie Skancke, who joined us in the spring of 2010 to develop our climate reporting and river hydrology monitoring protocols. Jennie successfully completed these projects and has moved on to a hydrologist position with the Minnesota Department of Natural Resources Division of Ecological and Water Resources covering the Minneapolis and St. Paul metro area.

Her new job brings her closer to family and her roots in South Dakota.

"My favorite part about working for the network was supporting a mission that I felt passionate about," Jennie said of her time in the Sierra Nevada. "Of course, you can't beat the views and I loved being able to get out to see the resource and interact with partners like the USGS or SCE Hydrologists."

Andi Heard has been with the Sierra Nevada Network since 2004. She has been involved with all the phases of planning for SIEN's monitoring program, and has led development and implementation of the network's pioneer monitoring project - lakes, which focuses on monitoring changes in water chemistry and lake level , and also collects amphibian data that are provided to the parks' aquatic ecology programs. Andi has been pursuing a PhD from the University of California-Riverside since 2009 in Soil and Water Sciences.

Andi secured a fellowship and full-time funding and has gone on furlough until summer 2013, to focus on completing her dissertation. When her PhD is completed, Andi's position will be converted from its current Pathways student status to a permanent subject-to-furlough Physical Scientist.

Monitoring Project Updates

Climate Reporting

Jennie Skancke played the lead role in writing the climate reporting protocol, responding to peer reviews, and finalizing it for publication. This protocol does not involve field data collection, but compiles and reports annually on data from existing weather monitoring stations in SIEN parks. The 2012 reporting will be done by SIEN's Data Manager Les Chow. Periodic trend reports will be developed with the assistance of an outside climatologist, as funds allow. These future trend reports may build upon the temperature trend analysis being conducted by the Western Regional Climate Center for a subset of stations in and near SIEN parks. The WRCC project is being funded by SEKI.

Rivers

Network staff are in process of responding to peer reviews of the river monitoring protocol, developed by Jennie Skancke, Alice Chung-MacCoubrey and Les Chow. The revised protocol will be re-submitted by Spring 2013. This project focuses primarily on streamflow quantity and timing, but also includes water chemistry at two river monitoring stations. Reporting will also include monitoring data collected at river gaging stations by parks, USGS, and other state or private organizations in SIEN parks. In 2012, SIEN staff visited existing stations on the Merced and Tuolumne Rivers in Yosemite to evaluate technical requirements and feasibility for long-term monitoring.

Taking streamflow measurements at Devils Postpile NM. Photo: Alice Chung-MacCoubrey.

Birds

SIEN staff (Alice Chung-MacCoubrey is local lead) and The Institute for Bird Populations (IBP) completed a second successful season of bird monitoring at all SIEN parks. All 27 monitoring transects were completed at both Sequoia & Kings Canyon and Yosemite national parks, and all survey points were done at Devils Postpile. New safety training and check-in procedures were tested by the bird crew members. The annual report for the 2011 season was published and is available on SIEN's website (Holmgren et al. 2012).

Bird monitoring crew members (left to right) Ryan Carlton, Tyler Stuart, Ben Dudek, and Jade Ajani. Photo: Bob Wilkerson.

High-Elevation Forests

In 2012, the forest monitoring project was in a safety stand-down. To prepare for future seasons and test communication procedures, SIEN conducted a staff trip into Kings Canyon focused on forest monitoring methods in August (see article on page 1). The annual report on the 2011 field season was recently published and is available on SIEN's website (Stucki et al. 2012). Jonny Nesmith will hire a crew to conduct monitoring in Sequoia, Kings Canyon, and Yosemite in 2013. Jonny also co-authored a paper (Hilimire et al. in press) characterizing the initial effects of the severe Fall 2011 windstorm on the forests of Devils Postpile National Monument.

Lakes

Nathan Ernster paddling out for a mid-lake sample in Yosemite. Photo: Scott Cereghino.

Andi Heard successfully led a fifth season of lake monitoring in Sequoia & Kings Canyon and Yosemite. This project primarily focuses on monitoring water chemistry of SIEN lakes, but also conducts amphibian surveys. Crew members for 2012 were Dena Paolilli and Samantha Kannry at SEKI and Scott Cereghino and Nathan Ernster at YOSE. New safety training and check-in procedures were tested by the lake crew members. The report on 2008-2009 monitoring seasons was published (Heard 2012). There will be a limited lake monitoring effort in 2013 to allow time to implement the first year of river monitoring and to complete the first multi-year synthesis report for the lake monitoring project.

Wetlands

SIEN Ecologist Jonny Nesmith is working with park and USGS staff from the local wetlands work group, and will revise the wetlands protocol in response to peer review comments and local recommendations. This protocol describes our approach for monitoring plant communities, water dynamics, and invertebrates in SIEN park wetlands. Jonny hopes to have a revised draft submitted for peer review by the summer of 2013. The largest changes to the protocol are the elimination of the index sites and the reduction in overall sample size.

GeoPro Messaging Device and Field Communication

Field crews working in Sierra Nevada Network (SIEN) parks travel to remote wilderness sites to monitor park resources such as birds, lakes, and high-elevation forests. One of the challenges of doing work in remote and often rugged terrain is maintaining consistent communication capability between field and office staff, for both basic operational needs as well as ensuring efficient response to emergency situations.

The SIEN Inventory & Monitoring (I&M) program has implemented use of Roadpost's GeoPro web application and associated satellite messaging devices (Shout Nanos) to improve our ability to communicate with field crews and track their locations. These devices also serve as back-up emergency communication devices, particularly in areas of the parks with unreliable radio signal coverage.

These devices can be programmed to transmit position coordinates at a particular interval so that we have more accurate information about crew locations and travel routes. They also allow two-way text messaging capabilities. This feature has allowed SIEN project leads and crews to share information with each other on a daily basis, ask questions about routes or schedules, and perform daily check-ins.

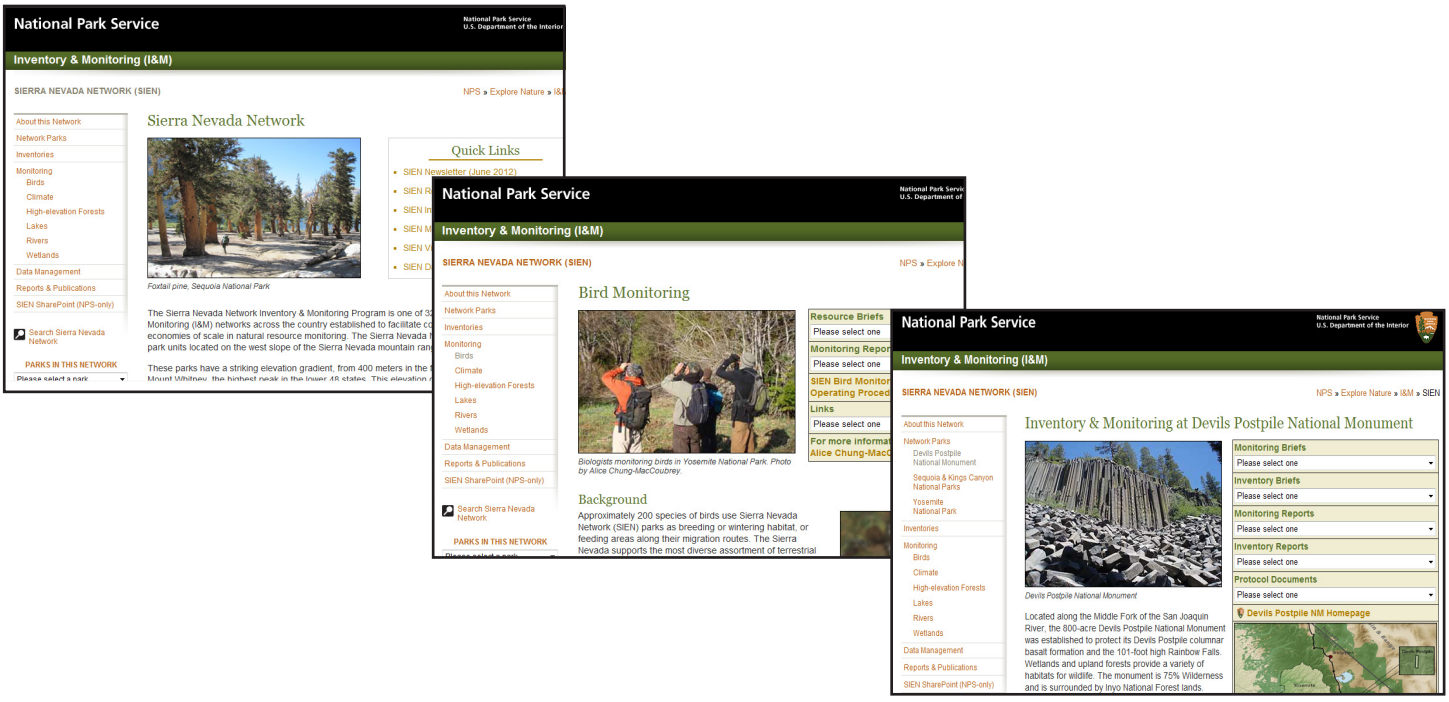
Shout Nano satellite messaging device made by Iridium.

The GeoPro web application allows project leads to view maps of crew locations, see and send messages to/from crews, and manage device settings, user permissions, and emergency response communications. GeoPro devices can send text messages to the web application, email addresses, cell phones, and other GeoPro devices in the field.

SIEN I&M Program is working directly with Roadpost to test and troubleshoot use of these devices in I&M field operations. Park Dispatch and the Law Enforcement Division at Sequoia and Kings Canyon National Parks worked with SIEN staff during the 2012 field season to begin to implement GeoPro devices in park operations.

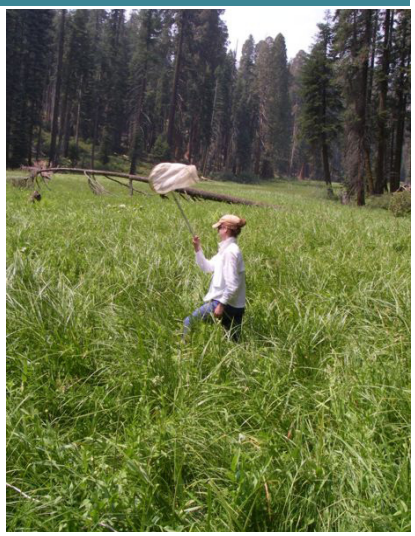
New and Improved Web Pages

The SIEN Inventory & Monitoring Program, with support from the NPS Inventory & Monitoring Division Web and Publication Specialist Fagan Johnson, has migrated its web pages to new templates and updated and improved much of the content. There are now pages dedicated to each park with links to park-specific I&M reports, briefs, highlights, and more via convenient pull-down menus. The pages are available at: http://science.nature.nps.gov/im/units/sien/. Please contact Linda Mutch with any suggestions.



Wetlands: Gems of the Sierra

John Muir called Crescent Meadow in Sequoia National Park the "gem of the Sierra". This description could apply to many of the wetlands in Sierra Nevada Network parks. You may have enjoyed wetlands for their aesthetic and recreational value. If you have backpacked into the Sierra Nevada wilderness or dayhiked amongst the giant sequoia groves, you have likely appreciated the wildflowers, vibrant vegetation, wildlife viewing, and open vistas that wetlands provide.



Left image: Shorty's Meadow in Kings Canyon NP - example of a "wet meadow"(photo: Erik Frenzel)**. Right image: Collecting insects with a sweep net in Log Meadow, Sequoia National Park, testing the SIEN wetlands monitoring protocol** (photo: Linda Mutch)**.**

Why so valuable?

While wetlands (often called "meadows") occupy a small area compared to forests, they contribute tremendous value to the landscapes where they occur.

An aquatic insect (backswimmer) from a Yosemite wetland. Photo: Jeff Holmquist.

Wetlands are biologically diverse ecosystems, and in the Sierra Nevada they support a large number of species relative to the small portion (<10%) of the landscape they occupy.

Wetlands provide critical habitat for wildlife, play an important role in the life cycle of many invertebrate and amphibian species, and provide numerous ecosystem services such as flood control and sediment storage.

Wetland Types

A wetland is an area of land that is saturated with water either permanently or seasonally and has hydrophytic or 'water-loving' plants.

The major wetland types in the Sierra Nevada include:

Fens - occur in basins, on slopes, or in association with distinct springs. They are perpetually saturated or flooded from groundwater sources. A major identifying trait of fens is they accumulate peat (decayed vegetation), enabling them to sequester carbon.

Wet Meadows - often found in stream valleys and have fine textured soils with high organic content but little peat. They are usually dependent on water from snowmelt and sometimes dry out by late summer or fall.

Riparian - occur along edges of rivers or streams. Characterized by the presence of unidirectional moving water, which has the potential to erode and transport sediment.

Marshes - non-peat accumulating wetlands frequently or continually inundated with water. Characterized by emergent soft-stemmed vegetation adapted to saturated soil conditions (such as cattails). Can occur along rivers, lake and pond margins, or as entities of their own.

A moss sample collected for identification from a fen in the Evolution area of Kings Canyon NP. Photo: Erik Frenzel.

Monitoring Wetlands

The Sierra Nevada Network is finalizing a protocol to monitor fens and wet meadows in Sequoia, Kings Canyon, and Yosemite and one wetland site in Devils Postpile. The project will monitor changes in hydrology, plant communities, and macroinvertebrates.

Wetlands are vulnerable to various stressors, including localized impacts such as roads, trails, water diversions, and livestock grazing. Additional larger scale stressors include atmospheric deposition of pollutants, non-native species invasions, and warming or drying climate regimes.

Monitoring data will provide key information to inform management, interpretation, and research and will increase understanding of how wetlands function.

New Publications

Graham, J. 2012. Yosemite National Park: Geologic resources inventory report. Natural Resource Report NPS/NRSS/GRD/NRR—2012/560. National Park Service, Fort Collins, Colorado.

Heard, A.M., L.A. H. Starcevich, J.O. Sickman, M. Goldin Rose, and D.W. Schweizer. 2012. Sierra Nevada Network lake monitoring protocol. Natural Resource Report NPS/SIEN/NRR—2012/551. National Park Service, Fort Collins, Colorado.

Heard, A. M. 2012. Sierra Nevada Network lake monitoring 2008 and 2009 summary report. Natural Resource Data Series. NPS/SIEN/NRDS—2012/357. National Park Service. Fort Collins, Colorado.

Holmgren, A. L., R. L. Wilkerson, and R. B. Siegel. 2012. Sierra Nevada Network bird monitoring: 2011 annual report. Natural Resource Data Series NPS/SIEN/NRDS—2012/362. National Park Service, Fort Collins, Colorado.

Keeler-Wolf, T., P. E. Moore, E. T. Reyes, J. M. Menke, D. N. Johnson and D. L. Karavidas. 2012. Yosemite National Park vegetation classification and mapping project report. Natural Resource Technical Report NPS/YOSE/NRTR—2012/598. National Park Service, Fort Collins, Colorado.

McKinney, S. T., T. Rodhouse, L. Chow, A. Chung-MacCoubrey, G. Dicus, L. Garrett, K. Irvine, S. Mohren, D. Odion, D. Sarr, and L. A. Starcevich. 2012. Monitoring white pine (*Pinus albicaulis, P. balfouriana, P. flexilis*) community dynamics in the Pacific West Region: Klamath, Sierra Nevada, and Upper Columbia Basin Networks. Narrative version 1.0. Natural Resource Report NPS/PWR/NRR—2012/532. National Park Service, Fort Collins, Colorado

Skancke, J. R., A. L. Chung-MacCoubrey, L. S. Chow, and J. D. Balmat. 2012. Sierra Nevada Network climate reporting protocol: Version 1.0. Natural Resource Report NPS/SIEN/NRR—2012/543. National Park Service, Fort Collins, Colorado.

Starcevich, L. A. H. 2012. Lake chemistry power analysis for the Sierra Nevada Network, National Park Service. Natural Resource Technical Report NPS/SIEN/NRTR—2012/621. National Park Service, Fort Collins, Colorado.

Stucki, D. S., S. T. McKinney, and J. C. B. Nesmith. 2012. Sierra Nevada Network white pine community dynamics 2011 annual monitoring report: Sequoia and Kings Canyon National Parks (SEKI) and Yosemite National Park (YOSE). Natural Resource Data Series. NPS/SIEN/NRDS—2012/405. National Park Service. Fort Collins. Colorado.

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The Sierra Nevada Monitor is published twice a year for Sierra Nevada Network park staff, our partners, and others interested in resources management and science in Sierra Nevada national parks.

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You can find resource briefs, reports, and more at:
http://science.nature.nps.gov/im/units/sien/

Jonny Nesmith and Jim Syvertsen examining wetland mosses near Shorty's Meadow, Kings Canyon National Park. Photo: Alice Chung-MacCoubrey.