SIERRA NEVADA NETWORK

National Park Service
U.S. Department of the Interior

DEVILS POSTPILE • SEQUOIA & KINGS CANYON • YOSEMITE

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The Sierra Nevada Monitor

Newsletter of the Sierra Nevada Inventory & Monitoring Network

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Devils Postpile bird monitoring.

Lazuli Bunting. ***Gary Lindquist.***

Inside This Issue

Going to the Birds...

Imagine starting your job at sunrise each day, serenaded by the birds you are hired to monitor. You walk a mile-long transect that stretches away from a trail, and stop every 250 meters to record the birds you hear and see within a 7-minute period. Ash-throated Flycatcher – 1, Acorn Woodpecker -2, Western Scrub Jay – 1, Oak Titmouse – 2... And you continue, until your transect is done, and hike on to the next one.

Bird monitoring crew members Samantha Barnett, Ryan Carlton, Zeka Kuspa, and David Wolfson will have many early mornings like this as they initiate the Sierra Nevada Network (SIEN) bird monitoring project in Yosemite, Sequoia and Kings Canyon, and Devils Postpile this summer.

Scientists Rodney Siegel and Bob Wilkerson from The Institute for Bird Populations are SIEN's partners overseeing the monitoring of bird abundance and distribution in SIEN parks. May through July is the primary breeding season for Sierra Nevada birds, and the time when they are singing to define their territories. Crew members will start at lower elevations in May and work their way to higher sites later as the snow melts.

Sites to be sampled this year range in elevation from around 2300 feet in the foothills to over 11,000 feet on the Sierra crest. Even though snow may be late to melt out of the high country, birds time their migration based on day length and will show up to nest even if their habitat is covered with snow.

Bird-banding monitoring projects in SIEN parks have demonstrated that in previous late snowmelt years (like 2003), adult populations can decline 10-20% and numbers of young by 70%, compared to more average years when snowmelt occurs earlier in the season.

In addition to population rises or declines in response to year-to-year weather variation, birds also can show shifts in their distributions. Analysis of Christmas Bird Count data across the U.S. has shown that 58% of the 305 species analyzed have shifted their centers of distribution northward, associated with warming temperatures.

Long-term monitoring of birds will help us understand how birds respond to changing environmental conditions. *For more information, contact Alice Chung-MacCoubrey, 559-565-3788.*

About the Sierra Nevada Inventory & Monitoring Network

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.

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MEET OUR STAFF

Staff Profile: Shawn McKinney

Shawn McKinney started working as the Sierra Nevada Network (SIEN) Ecologist in March 2009. He joined SIEN from Missoula, Montana where he was working as a Postdoctoral Research Associate at the University of Montana, studying spatial use and foraging strategies in birds. Shawn received a Ph.D. in Forest Ecology from the University of Montana, a M.S. in Biology from the University of Colorado-Denver, and a B.A. in Ecology and Evolutionary Biology, Environmental Science, and History from the University of Colorado-Boulder.

His research focus has been to understand how modern perturbations in natural systems affect interactions between species and how altered species relationships ultimately influence the trajectory of community dynamics. Other interests include developing quantitative models to predict outcomes and inform resource restoration and conservation actions; and understanding ecological-evolutionary dynamics.

Shawn McKinney

Shawn is the lead Ecologist for SIEN's high-elevation forest and wetlands ecological integrity monitoring projects.

When asked why he was attracted to join the SIEN I&M Program, he said , "I found the scientific rigor of the I&M program impressive. I also knew, based on my own experiences as a scientist, that monitoring is and will continue to be an extremely valuable asset in understanding and responding to changes to natural systems."

Staff Profile: Jennie Skancke

Jennie Skancke joined SIEN in June 2010 as a term Physical Scientist. She is developing SIEN's rivers and weather/climate monitoring protocols, as well as providing some support to the lake monitoring project. Jennie moved to Three Rivers from Point Reyes National Seashore, where she worked as the Water Quality Specialist from 2007-2010 for the San Francisco Area Inventory & Monitoring Network.

Jennie has a M.S. in Water Resources (University of New Mexico) and a B.S. in Biology (University of Minnesota). Additional prior work includes being a Peace Corps volunteer in Mali, West Africa and working for the U.S. Forest Service and U.S. Geological Survey as technician in spotted owl research, hydrology, and wetland studies.

Jennie became interested in hydrology as a career while living in West Africa – "I began to realize that a degree in Hydrology might allow me to do work that could benefit people in developing areas. I didn't end up doing the work I hoped to, but love working for the NPS."

Jennie Skancke

She was attracted to work for the SIEN I&M Program because of the interesting hydrologic challenges it offered. "The fact that I could do work that revolved around some of the most incredible rivers in the world and in an area that is undergoing some interesting hydrologic shifts made me want to be involved," Jennie said.

Lake Monitoring

This summer will be the fourth season for our lake monitoring project in Sequoia, Kings Canyon, and Yosemite National Parks. If you go into the high-country this summer, you could encounter Dena Paolilli and Scott Roberts in SEKI or Josh Baccei and Scott Cereghino in YOSE filtering water samples on the shore of a lake, paddling out in a raft to collect mid-lake samples, or walking the shores to count amphibians.

Crews will visit a total of 25 randomly selected lakes in August and September. Samples are collected at outlets for all lakes, and for a subset of lakes, crews also collect mid-lake samples using a raft. The monitoring objectives emphasize current status and long-term trends of water chemistry parameters. These include the core parameters monitored by all networks (pH, specific conductance, temperature, and dissolved oxygen) as well as acid neutralizing capacity, major ions, nutrients (multiple forms of nitrogen and phosphorus), and particulate carbon.

Prior research has shown that elevated nitrogen and phosphorous in some SIEN lakes are changing nutrient cycles and phytoplankton communities. Project lead Andi Heard is conducting research at UC Riverside for her Ph.D., to inform identification of nitrogen thresholds for SIEN lakes. This information will help us determine when lakes are exceeding acceptable levels of nitrogen.

For more information, contact Andi Heard at 559-565-3786.

Emerald Lake, Sequoia NP.

Whitebark pine, Evolution Basin, Kings Canyon NP. *Peggy Moore.*

Monitoring High-elevation Pines: Idaho to California

From the limber pine of Idaho's Craters of the Moon National Monument and Preserve to the whitebark and foxtail pines of the SIEN parks, the four-person forest monitoring crew will experience a wide range of pine stands and park landscapes.

Dan Esposito, Matthew Otero, Devin Stucki, and James Syvertsen will be members of a crew shared between the Sierra Nevada and Upper Columbia Basin Networks (UCBN). SIEN Ecologist Shawn McKinney led the development of a multi-network high-elevation pine monitoring protocol this past year in collaboration with UCBN and the Klamath Network. SIEN and UCBN staff determined that there would be efficiencies in sharing a crew due to the common methods and time frames for monitoring in the various parks.

In the Sierra Nevada, these pines occupy high-elevation treeline and subalpine areas. They often occur in stands where they are nearly the only tree species present, and thus they can have a large influence on ecosystem processes and community dynamics, such as regulating snowmelt and streamflow and providing habitat and food for birds and mammals.

While the Sierra Nevada populations of these pines are still relatively healthy, elsewhere whitebark pine forests have had severe declines. The non-native pathogen, *Cronartium ribicola,* that causes the disease white pine blister rust, has been a factor in these declines. This pathogen often is associated with sugar pines of the Sierra Nevada, but is not yet prevalent in the higher elevation forests. Other threats include outbreaks of the native mountain pine beetle and climate warming.

To monitor these pines, the forest crews will collect data to determine the current condition and long-term trends in forest structure, species composition, death and birth rates, cone production, and incidence and severity of white pine blister rust, mountain pine beetle, and dwarf mistletoe infection.

Monitoring of white pine populations will increase the likelihood of detecting changes of concern in these forests and will assist land managers and scientists to better understand and protect these species across their range.

For more information, contact Shawn McKinney at 209-379-3291.

Marble Fork, Kaweah River, Sequoia NP. *Kevin Skeen.*

NATURE FEATURE

Watching the River Flow

Sierra Nevada parks contain the headwaters or large portions of seven major watersheds. The parks' waters provide important habitat and recreational opportunities, and water availability affects plant and animal distributions. Sierra Nevada watersheds also provide most of the water for communities and agricultural areas of California.

The quantity of water available through the dry season is closely tied to the winter snowpack. As much as 75 percent of western water supplies come from mountain snowmelt. This year the snowpack on April 1 was greater than 150 percent of average in most areas surveyed in the parks.

Water resources in the Sierra Nevada are vulnerable to changes in climate. Temperatures have increased over the past three decades in the Sierra Nevada. Under warming trends, a larger portion of precipitation falls as rain, and snowmelt occurs earlier in the season, yielding larger winter and spring runoffs, and less runoff during the dry summer season.

Tracking the changes in weather and climate and resulting effects on timing and quantity of streamflow helps us understand current relationships between climate and water dynamics, and better model and predict future changes.

Under Development

Rivers Protocol

The objectives of the Rivers Protocol include detection of long-term trends in timing and volume of streamflow, as well as water temperature and conductivity, using fixed, continuous, water stage and water quality recording stations at multiple elevations in selected major watersheds of the SIEN. The SIEN will use existing streamgages that would otherwise be abandoned by their current operators. As an integrator of climatic processes, streamflow data allows managers to examine changes in the type, quantity and timing of precipitation accumulation and melt. The final draft of the Rivers protocol is expected to be submitted for peer review in the fall of 2011.

Climate Protocol

The goals directing the climate monitoring protocol are (1) to characterize and understand variations and changes in key climate variables and (2) to compile and present climate data and products useful for understanding trends in other vital signs. The final version of the SIEN Climate Protocol is expected by summer 2011.

Wetlands Protocol

The wetlands ecological integrity protocol targets monitoring of wetlands (or meadow) plant communities, aquatic and terrestrial invertebrates, and groundwater levels. The protocol is under revision in response to peer reviews. A revised protocol will be re-submitted by fall 2011.

Where Are We?

Monitoring currently scheduled during the remainder of the fiscal year includes:

	May	June	July	August	September
Bird Monitoring	YOSE	SEKI, YOSE	DEPO, SEKI, YOSE		
Lake Monitoring			YOSE	SEKI, YOSE	SEKI, YOSE
Forest Monitoring (DEPO- as time permits)			YOSE	SEKI, YOSE	SEKI