



The Sierra Nevada Monitor

Newsletter of the Sierra Nevada Inventory & Monitoring Network

February 2012



Bird monitoring crew training at Hodgdon Meadow in Yosemite National Park, May 2011. Alice Chung-MacCoubrey.

Notes from the 2011 Field Season

Birds

During the first season of implementing the Sierra Nevada Network (SIEN) bird monitoring project, crews sampled 27 of 30 transects in Yosemite, 24 of 30 in Sequoia and Kings Canyon, and all of the Devils Postpile survey points. Bird surveys must occur between mid-May through late July to coincide with the breeding and nesting season for birds. Not all high-elevation sites could be sampled due to weather patterns resulting in snow lingering late on mountain passes and many streams flowing too high to be safely crossed.

Scientists at The Institute for Bird Populations who manage this project will complete the annual report by May 2012. Notable sightings include black-backed woodpeckers at four separate unburned forest locations and at one burned site in Yosemite. The black-backed woodpecker is an uncommon woodpecker of coniferous forests that prefers burned-over sites. These birds move from place to place, following outbreaks of wood-boring beetles in recently burned habitats.

Lakes

Physical Scientist Andi Heard and her two field crews completed the fourth season of lake monitoring in Sequoia and Kings Canyon and Yosemite. A total of 75 unique lake sites across the network have been sampled in the last four years.

Andi completed a report summarizing the water chemistry results from the 2008-2009 field seasons. The report is in peer-review and will be published later this spring.

One highlight from the report is that nitrate concentrations were lower in Yosemite compared to Sequoia and Kings Canyon. This difference is likely attributed to lower rates of atmospheric deposition in Yosemite. Sequoia and Kings Canyon, Sequoia in particular, have higher deposition rates due to air patterns that concentrate pollutants in the southern Central Valley.

See page 3 of this newsletter for articles on two seasonals who have worked with the lake project for multiple years.

High-elevation Forests

Ecologist Shawn McKinney implemented the first season of high-elevation forest monitoring with a 4-person field crew shared with the Upper Columbia Basin Network. The crew started their season at Craters of the Moon National Monument & Preserve monitoring limber pine. They established 11 whitebark pine monitoring plots in Yosemite, and seven foxtail pine plots in Sequoia. A serious accident in Kings Canyon resulted in a life-threatening injury for a crew member. See additional information on page 2 regarding actions to improve safety.

Whitebark pine is in decline throughout much of its range -- learn more about its status on page 4 of this newsletter.

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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. The Sierra Nevada Network includes Yosemite National Park, Sequoia and Kings Canyon National Parks, and Devils Postpile National Monument.

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Improving Safety

At the end of the 2011 field season, a Sierra Nevada Network (SIEN) forest monitoring crew member experienced a serious accident in the field in Kings Canyon National Park. Due to the life-threatening nature of the injury, the PWR Regional Director ordered a Serious Accident Investigation (SAI) to identify lessons to be learned from the incident.

An SAI Team interviewed a wide range of parties, reviewed supporting materials, prepared a Factual Report (which was released on 12/9/2011), and subsequently briefed Sequoia & Kings Canyon (SEKI) and SIEN staff on the nature and content of the report. Internal SIEN discussions and the SAI Factual Report revealed several areas in need of improvement to ensure that employee safety is central to program operations. Before the upcoming 2012 field season, SIEN staff will establish safety standards and procedures, develop a

training curriculum to improve employee safety, obtain Operational Leadership training, conduct project-specific risk analyses, and discuss and initiate approaches for developing a safety-oriented culture and maintaining a cycle of continuous self-improvement.

Much of this information will be articulated in a comprehensive document that addresses safety philosophy, guiding principles, training, and procedures. After the SAI Board of Review meets this winter, SIEN will also implement the resulting management recommendations. All SIEN staff will be engaged in applying what we learn from this accident to be more mindful of safety in our program.

The SIEN I&M Program staff are grateful to the SEKI staff members who did the wilderness rescue operation and who provided support to us after the accident.

Monitoring Project Status

Monitoring Project	Project Status
Birds	Protocol approved April 2010. First field season completed summer 2011. Annual report done by May 2012.
High-elevation Forests	Protocol in revision, re-submitted to peer review Jan 2012. First field season completed summer 2011. Annual report finalized by March 2012.
Lakes	Protocol approved October 2011. Fourth field season completed in 2011. Report for 2008-2009 completed in 2011. Status and trend report will be completed by Fall 2012.
Wetlands	Protocol went through peer review in 2009. Revisions initiated; to be finalized by new SIEN Ecologist. Paper published by Holmquist et al. on pilot invertebrate data December 2011.
Climate Reporting	Protocol submitted to peer review July 2011. 2010/2011 report to be completed by Fall 2012.
Rivers	Protocol under development. Submit to peer review January 2012. First year of monitoring 2012.

Two Seasonals Who Keep Coming Back...

Josh Baccei and Dena Paolilli have worked for the SIEN lake monitoring project for four and three years, respectively – our longest term seasonals so far. Why do they keep returning, and what do they do when not monitoring Sierra Nevada lakes?

Josh Baccei worked on the Yosemite lake monitoring crew all four of his seasons, but occasionally has traveled to Sequoia and Kings Canyon to assist with a few of the SEKI lake monitoring trips.

“I really enjoyed this project because I got to see a lot of the backcountry. The trips were always nicely prepared ahead of time, and it’s all well-organized,” Josh explained.



Josh monitoring a lake in Yosemite NP. Scott Cerreghino.

Josh has also worked on hydroclimate projects in Yosemite that are done in collaboration with USGS and university scientists. These projects include monitoring water chemistry, streamflow, temperature, humidity, and occasionally coring lakes to collect lake sediments for studies about climate history and pesticide deposition. Josh started working for the Physical Sciences Branch of Resources Management & Science (RMS) in Yosemite in 2006, and prior to that he worked on trail crew for several seasons.

Josh got a B.S. in Environmental Sciences from Humboldt State University in 2005, with an emphasis on watershed management. He would like to go on to graduate school and continue working in Yosemite. When not working, Josh enjoys climbing and traveling. He travels to Utah, Joshua Tree, and Red Rocks for climbs outside of Yosemite.

A highlight for last year was Josh’s marriage to Joy Fischer, who works with the Vegetation and Restoration Branch of RMS in Yosemite. They traveled together to Argentina and Patagonia.

Josh’s favorite places in the Sierra Nevada include Kaweah Basin in Sequoia National Park, and a lake he visited this year in northwestern Yosemite, Flora Lake.



Josh at Flora Lake, Yosemite NP. Scott Cerreghino.

Dena Paolilli worked on the Sequoia and Kings Canyon lake monitoring crew for the past three seasons. Favorite wilderness places of Dena’s include the off-trail lake the crew sampled this year in the Mineral King area near Needham Mountain, and Bighorn Plateau in the upper Kern River drainage, both in Sequoia.

“I like to go to new places in the parks each year,” Dena said. “I like working for all of you in I&M – you take good care of crews. I enjoy having some input on trip planning and logistics, and I love getting paid to go backpacking and camping at the lakes we monitor!”



Dena enroute to a SEKI lake. Scott Roberts.

Prior to her summers with SIEN, Dena worked for the SEKI amphibian restoration project and for a research project in the Trinity Alps of northern California comparing lake ecosystems that have long had introduced fish to those without fish and those that have had fish removed. She has a B.S. degree from the University of California at Davis, in environmental biology.

In the winters, Dena likes to farm and travel. She has worked with a community-supported agriculture farm near Sacramento in past years, and loves to travel in other countries by bicycle.

“A couple years ago I bicycled with a friend in Vietnam, Cambodia, Laos, and Thailand,” Dena said. “I like learning about different cultures, trying new foods, and seeing how people in other parts of the world interact.”

What would Dena like to do long-term? – Be a farmer and a wilderness ranger!



If only I had one more hand, this would be easier. Lyndsay Belt.

Whitebark Pine: In Decline across the West

If you have ever hiked at the upper limits of where trees grow in Yosemite, Kings Canyon, or northern Sequoia national parks, you have likely encountered whitebark pine, a typical tree line conifer in most of the Sierra Nevada. These trees are relatively short (10-15 meters tall), and often have gnarled or twisted branches. In more exposed areas, whitebark pine forms stunted, multi-stemmed trees and on the high wind-swept slopes and ridges at tree line, they form mats not more than one meter high, appearing more like shrubs than trees.

Whitebark pine (*Pinus albicaulis*) is an important high-elevation tree species that occurs across a broad geographic range in western North America. Its range extends from the northern Rocky Mountains in Canada south through Montana and Idaho and into western Wyoming; and the Cascade and Coastal Ranges of central British Columbia south through the Cascades and Sierra Nevada, where the species reaches its southern limit near the Mt. Whitney vicinity.

Although it is widely distributed, whitebark pine is declining throughout much of its range, and in July 2011, the US Fish and Wildlife Service declared that the species warranted protection under the Endangered Species Act (ESA). Whitebark pine is now on the list of candidate species eligible for ESA protection, and its status will be reviewed annually.

Why is whitebark pine in decline? Disease (white pine blister rust) caused by a non-native fungal pathogen, outbreaks of the native mountain pine beetle, and effects on survival and reproduction from fire suppression or unusually severe fire have contributed to the observed declines in the northern Rocky Mountains and Pacific Northwest. Climate warming exacerbates some of these problems, and also poses a threat to the species. For example, warming temperatures enable mountain pine beetles to expand their ranges into higher elevations, where they can cause substantial mortality in whitebark pine stands.



Whitebark pine in Goddard Canyon, Kings Canyon NP. Peggy Moore.



Krummholz (shrub-like) growth form of whitebark pine, Kings Canyon NP. Les Chow.



Large areas of whitebark pine mortality from mountain pine beetle outbreak in Yellowstone National Park (2007). Photo courtesy of Diana Tomback.

So far, the Sierra Nevada whitebark pine population is in good condition relative to those in other parts of the country. In the Intermountain and Northern Rocky Mountain region, 75-100% of whitebark pine trees are infected with white pine blister rust, and mountain pine beetle has recently contributed to high mortality in some areas. While white pine blister rust has been in the Sierra Nevada since at least 1968, it has more severely affected lower elevation five-needle pines –sugar pine and western white pine.

It is currently unknown why blister rust has not spread and intensified in the Sierra Nevada high-elevation pines, but recent discoveries of rust infection on whitebark pine in Yosemite might indicate that this is changing. Mountain pine beetle outbreaks are occurring in whitebark pine forests in northeastern California. The recent spread of these two stressors in or near Sierra Nevada Network (SIEN) parks may portend future whitebark declines in the region.

Whitebark pine play important roles in the high-elevation forest communities where they occur. They regulate runoff and reduce soil erosion. Their presence slows snow melt, reducing spring flooding at lower elevations and resulting in higher stream flows later in the summer. The large and nutritious whitebark pine seeds are an important food source for Clark's nutcracker, and other seed-eating birds and mammals. These trees are often early recolonizers of burned or otherwise disturbed areas, facilitating the growth of other vegetation.

The SIEN Inventory & Monitoring program started monitoring whitebark pine (and foxtail pine) in 2011. These data will provide information about the status and long-term trends of disease, insects, tree condition, population changes, and growth rates in whitebark and foxtail pine stands across the parks. This information is vital to park managers because it will allow them to respond to increases in mortality prior to severe population declines.