



# Inventory and Monitoring Program

## Background

To effectively manage, protect, and interpret park natural resources, National Park Service (NPS) managers must have access to reliable information about the current status and long-term trends in resource condition. 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 information.

To address information gaps and facilitate proactive resource management, the NPS established a servicewide Inventory and Monitoring Program, composed of 32 "networks" of parks grouped by proximity and ecological similarity.

The Sierra Nevada Network (SIEN) includes Devils Postpile National Monument, Sequoia and Kings Canyon National Parks, and Yosemite National Park. SIEN I&M Program staff are stationed at Sequoia and Yosemite national parks and work closely with staff in all network parks to plan and implement inventory and monitoring projects.

## Resource Inventories

Resource inventories are extensive, point-in-time surveys of plants, animals, or abiotic resources such as water, soils, and geology. Resource inventories offer the opportunity to discover new species for parks and enhance the existing information about park natural resources.



Yosemite bog-orchid.  
Photo: Alison E.L. Colwell.

The Sierra Nevada Network conducted biological inventories to help parks fill in information gaps on special status species (rare or non-native) and other plants and animals for which there was limited recent information available. Inventories targeted rare plants, bats, non-native plants in riparian and burned areas, birds, and small mammals.

Here are a few highlights:

- An orchid new to science, *Platanthera yosemitensis*, was discovered by USGS botanists conducting rare plant surveys in Yosemite National Park (see image to left).
- Plant inventories at Devils Postpile National Monument increased the



University of California-Berkeley Museum of Vertebrate Zoology employees doing early morning checks of vertebrate live traps in the Crane Flat area of Yosemite National Park. Photo: Les Chow.

number of documented plant taxa by 125%, from 169 to 380 species.

- In Yosemite, historic vertebrate transects were re-surveyed by the Museum of Vertebrate Zoology at UC-Berkeley, and significant changes in distribution were documented for numerous birds and small mammals. Some of these changes may be related to climatic warming.

- Information about bat diversity and distribution increased substantially. A total of ten species (all new records) of bats was documented for Devils Postpile, and sixteen species for each Sequoia (two new records) & Kings Canyon National Parks (six new records).



*Myotis lucifugus* (Little Brown Bat) is found in all SIEN parks. Photo: William E. Rainey.

The SIEN inventories described above provided data to update park species lists and better document species occurrence and distribution. Other offices of the NPS I&M Program support and develop an additional 10 basic inventories (e.g., Geologic Resources Inventory, Baseline Water Quality Data, and Vegetation Inventory). These inventories serve as a baseline for long-term ecological monitoring and provide fundamental resource information for park managers.

## Long-term Monitoring

Monitoring data (or measurements of condition repeated over time) provide managers with information on trends in resource condition. Trend information may provide early warning of decline and assist managers in planning management actions, preparing education and outreach information, or identifying further research needs.

Each I&M network conducts “vital signs monitoring” in collaboration with network parks and other cooperators. Vital signs are a subset of physical, chemical, and biological elements and processes of park ecosystems that are selected to represent the condition or health of park resources. In the SIEN, vital signs were selected through local workshops that involved I&M and park staff members and subject-matter experts from universities and other outside agencies. Vital signs were evaluated based on their ecological significance, sensitivity to change, and management importance.

The following table shows the vital signs that were selected and where they are monitored. These monitoring projects will provide park managers with scientifically sound information about the current status and long-term trends in a variety of park resources.

| Project/Parks<br>Where Monitored    | Vital Signs  |
|-------------------------------------|--|
| Birds - All parks                   | bird populations   |
| Climate reporting- All parks        | weather & climate, snowpack                                      |
| High-elevation forests -SEKI, YOSE* | whitebark pine, foxtail pine populations                         |
| Lakes - SEKI, YOSE*                 | water chemistry, lake level                                      |
| Rivers- All parks                   | streamflow   |
| Wetlands - All parks                | plant communities, macro-invertebrates, and groundwater dynamics |

\*SEKI = Sequoia and Kings Canyon National Parks  
YOSE= Yosemite National Park



SIEN Biological Technician takes water measurements at an outlet stream as part of the network's lake monitoring project. Photo: Alice Chung-MacCoubrey.



Explaining wetlands soil layers to Devils Postpile National Monument Superintendent. Photo: Linda Mutch.

The I&M Program protects the long-term value of monitoring data through its leadership in development of a comprehensive data management system that uses approaches such as well-designed databases, data backup and archiving, and systematic data collection procedures to protect and enhance the long-term value of monitoring data.

Information from inventory and monitoring projects is used in park resource condition assessments and planning documents, and is provided to managers, planners, interpreters, scientists, and the general public through numerous communication approaches. These include websites, technical reports, resource briefs, newsletters, journal publications, participation in local park staff meetings or trainings, and oral presentations.

## More Information

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