



2008 Mountain Lakes and Ponds Pilot Project

Why Monitor Lakes and Ponds?

Water quality and aquatic communities were identified as high-priority vital signs. Lakes and ponds can be useful indicators of impacts or changes due to a variety of environmental perturbations across the landscape. These include both near-field impacts such as visitor use or invasive species, and far-field impacts such as atmospheric deposition or climate change.

Objectives of the Pilot Project

In sum, the objectives were to field test the feasibility of draft protocols developed by the USGS Forest and Rangeland Ecosystem Science Center. A two person crew was trained in the methodology, and trial collections occurred from 10th September to 16th October 2008.

Results from Lassen Volcanic National Park

We were able to sample 21 out of 25 sites visited in the pilot project. Some highlights:

- Protocols were successfully trialed, and showed that lakes/ponds could be sampled in a single visit of 2 to 6 hours (Figure 1).
- Fish occurred in only 2 of the 21 sampled sites; Summit Lake had Brook Trout and Reflection Lake had Golden Shiner. Both are introduced, invasive fish.
- Zooplankton collections resulted in the identification of 68 total taxa, from over 16,000 individuals.
- Macroinvertebrate collections in the near-shore zone resulted in the identification of 104 total taxa from over 12,000 individuals.
- A total of four species of amphibians were observed during sampling: Long-toed Salamanders, Western Toads, Pacific Tree Frogs, and a single specimen of a Rough Skin Newt.
- Long-toed Salamanders at Cliff Lake were found to be infected with a Ranavirus, and metamorphs (the stage where juveniles transform into adult stages) were the hardest hit and many individuals were moribund, sluggish, or dead. The USGS National Wildlife Health Center confirmed Ranavirus and identified the viral strain as capable of infecting other amphibians (Figure 2).



Figure 1. Field crew members sampling at Lassen Volcanic National Park.



Figure 2. A dead salamander at Lassen Volcanic National Park that was infected with Ranavirus. *Note: always wear gloves when handling any wildlife!*

Continued on next page...



2008 Mountain Lakes and Ponds Pilot Project (continued)

Reconnaissance in Crater Lake National Park

A three day visit occurred at the end of the pilot project (28th to 30th October 2008) to Crater Lake National Park to determine if the methodology at Lassen Volcanic National Park would be applicable to the habitats of Crater Lake National Park. Visits to 23 of the 38 identified potential sites revealed that most lakes/ponds outside of the caldera are ephemeral (dry up during the year; Figure 3). Only four of the 23 visited sites appeared to be permanent water bodies, suggesting that Network monitoring efforts should be capable of monitoring all perennial sites (estimated to be around 10 total). Protocols are not suitable to assessing status and trends in waters that are not permanent.



Figure 3. An ephemeral lake at Crater Lake National Park.

Resulting Protocol

The lessons of the pilot project were incorporated into a final draft protocol, and submitted for peer review in January 2010. We expect to have an approved, final protocol for implementation by winter 2010. The draft protocol is available from the Klamath Network web site at:

http://science.nature.nps.gov/im/units/klmn/Monitoring/vs/Lakes/VS_Lakes.cfm

Future Work

The Mountain Lakes and Ponds draft protocol is currently under peer review. We expect comments back from academic, state monitoring specialists, and NPS Water Resource Division personnel. With the revision and approval of this protocol in winter 2010, the first field season for implementation will be 2013 (2011 and 2012 will be Wadeable Streams monitoring).

Until the protocol is finalized, we are working to develop an important management tool, called an Index of Ecological Integrity. This index collates multiple, independent measurements from biological communities, into a single score from 0 – 100. Condition assessment (e.g., very poor, poor, fair, good, very good) can then be rapidly made to inform managers about ecosystem quality, and the proportion of their habitats in the different condition groups.

More Information

Contact Dr. Eric Dinger, Klamath Network Aquatic Ecologist, at Eric_Dinger@nps.gov (541) 552-8574