



Natural Resource Monitoring at Natural Bridges National Monument



Owachomo Bridge/NPS

The Northern Colorado Plateau Network

The Northern Colorado Plateau Network (NCPN) covers a geologically and biologically diverse region comprising 16 national parks in four western states. These parks contain desert grasslands, shrublands, forests, caves, large rivers, perennial streams, seeps, springs, and striking geology. Invasive plants, trampling and grazing by livestock, and adjacent land-use activities are some of the most significant threats to NCPN parks. The NCPN is designing and implementing a long-term monitoring program to measure key indicators of ecological integrity, or “vital signs.” Multiple monitoring efforts will help inform managers of the health of park resources and provide early detection of potential problems. This brief describes recent NCPN activities at Natural Bridges National Monument.

Flora Checklist



Sego lily.

Sheri Hagwood@USDA-NRCS PLANTS Database

In 2008, a revised checklist of the vascular flora of Natural Bridges NM was completed. This entailed a thorough review of existing literature, re-examination of specimens from the Natural Bridges NM herbarium and other state and national museum collections, and additional field work to corroborate unverified species reports and locate new species. Based on this study, 428 vascular plant taxa have been confirmed or reliably reported as

occurring in the monument. Another 61 species formerly considered part of the monument flora have now been shown to be falsely reported. Although no plant species are listed as federally endangered or threatened, at least 20 are considered species of concern by state and/or federal agencies. Introduced plants make up 11% of the monument flora (46 species), of which only two species are considered noxious weeds by the State of Utah.

Water Quality



Owachomo Bridge Spring/NPS

At Natural Bridges NM, the NCPN is cooperating with park staff to collect water quality data used to assess condition and trends relative to the Clean Water Act, human health, and ecological function. Since 2006, available data have indicated occasional exceedances of alu-

minum and phosphorus standards for fish at a site near Sipapu Bridge in White Canyon. No other notable impacts were observed during routine site visits. Sampling at Natural Bridges NM will resume in mid-2009.

Landbirds



Juniper titmouse.
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Birds play an important role in the flow of energy through ecosystems because they occupy various levels in the food web. Birds are also sensitive to habitat changes, which make them good indicators of habitat quality. The NCPN is partnering with the Rocky Mountain Bird Observatory (RMBO) to assess breeding bird species trends in three habitats: riparian, pinyon-juniper, and sagebrush-shrubland. The NCPN has monitored two plots in low-elevation riparian habitat and one plot in

pinyon-juniper woodland at Natural Bridges NM since 2005. The NCPN and RMBO will produce the first trend estimates for individual bird species after the 2009 field season, the fifth year of NCPN landbird monitoring. The goal is to be able to detect a population change of at least 3% within 30 years. We currently estimate that we will be able to do this for 52 species, representing more than 90% of all individual birds observed during 2005–2007.

Springs and Seeps



Red-spotted toad near spring water/NPS

The primary goal for long-term monitoring of springs, seeps, and hanging gardens is to assess trends in key indicators of spring and seep ecosystem health. In 2008, the NCPN completed the first half of a two-year study investigating the effects of anthropogenic disturbance on aquatic macroinvertebrate communities and habitat quality across a range of impacted springs. The study is being conduct-

ed at more than 30 springs in 6 NCPN parks, including 3 springs at Natural Bridges NM. The information gathered will serve as the basis for selecting future core monitoring parameters and provide metrics for interpreting springs and seeps data. Protocols for monitoring rare plant populations at hanging gardens will be developed in FY 2009–2010.

Vegetation Mapping



Vegetation-mapping plot/NPS

The NCPN recently completed a multi-year, multi-partner effort to map the vegetation at Natural Bridges NM. This project has included gathering aerial photography, collecting initial vegetation-plot data, using the vegetation data to classify vegetation types and write vegetation descriptions, writing a dichotomous vegetation-type key, performing photo interpretation, conducting accuracy-assessment exercises, creating a geodatabase, and writing the final report. The team collected vegetation and environmental data from 80 vegetation

classification plots, 17 observation points, and 228 accuracy assessment points. A total of 1,232 map polygons representing 16 natural and semi-natural vegetation map classes were developed for the Natural Bridges NM mapping project. The project achieved an overall mapping accuracy of 87%. These maps will be a valuable resource for use in park management, natural resource monitoring, interpretive programs, park planning, prescribed fire, and as a baseline for designing ecological studies.

Riparian Systems



Upper White Canyon/NPS

Integrated riparian monitoring involves the collection of biological and physical measures, such as riparian vegetation, non-native species invasions, streamflow, alluvial groundwater dynamics, and changes in channel form. Developing credible, efficient monitoring approaches will help the NCPN to assess ripari-

an-system health and provide early warning of system degradation. Testing of riparian methods occurred at Zion NP in the fall of 2008; in 2009, the NCPN will work with Natural Bridges NM staff to select study sites and begin implementation.

Additional Efforts

A climate report, produced by the NCPN in 2008, is available on the network's web page. The NCPN is continuing to expand ecological monitoring at Natural Bridges NM. Protocols

for monitoring land condition and land cover/land use are underway and planned for future implementation.

For more information

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