



Natural Resource Monitoring at Natural Bridges National Monument



Owachomo Bridges/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.

Landbirds



Gray vireo/RMBO

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. NCPN data will contribute to the RMBO's

broader, landscape-scale, breeding-bird monitoring program. The NCPN has monitored two plots in low-elevation riparian habitat and one plot in pinyon-juniper woodland at Natural Bridges NM since 2005, continuing the riparian bird monitoring conducted by park resource management staff from 1993 to 2004. The NCPN and RMBO will begin to look at trend data in 2009, after five years of data collection.

Exotic Invasive Plants



Tamarisk
(J.S. Peterson/USDA-NRCS PLANTS database)

Exotic invasive plants represent one of the most significant threats to natural resources in national parks. Exotic plants are a concern because they are able to reproduce prolifically, rapidly colonize new areas, displace native species, and alter ecosystem processes across

multiple scales. To minimize costs and maximize the potential for eradication, it is critical to detect new populations of invasive species early. At Natural Bridges NM, surveys will cover the places where exotic plants are most likely to occur: roads, trails, and riparian corridors.

Vegetation Mapping



Vegetation-mapping plot/NPS

The NCPN is nearing completion on a multi-year, multi-partner effort to map 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, collecting accuracy-assessment data, creating a geodatabase, and writing

the final report. 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. Potential uses could include assessing the number of acres of potential habitat for rare species, and fire management assessments. The map is currently planned for completion in winter 2007–2008.

Species Lists



Tree lizard/NPS

The NCPN has completed NPSpecies certification at Natural Bridges NM for six taxonomic categories—birds, mammals, reptiles, fish, amphibians, and vascular plants—and has posted the results on its website. An interactive application allows users to select a desired taxonomic category and an alphabetic sort function (i.e., by common name, scientific name, or family–scientific name). Additionally, users

can search by park, by status of the species in the park (e.g., present, historic, unconfirmed), and by individual species—allowing users to query, for example, does Natural Bridges NM have a verified report of a tree lizard? The resulting species list can be downloaded into an Excel spreadsheet for use by the public, park staff, or park cooperators.

Climate



Potholes with recent rainfall/NPS

Climate plays a crucial role in regulating biological and physical processes; rainfall and temperature are the primary factors that limit an ecosystem's structure and function. The NCPN compiles and analyzes climate data from an existing weather station in Natural Bridges NM. Over the past 34 years, Natural

Bridges NM has shown an increase in average annual minimum temperatures—including record highs for January and February 2005—and a decrease in snowfall. Natural Bridges NM climate data for the years 1965–2006 are available in an interactive, graphical format on the NCPN webpage.

Land Condition



White Canyon/NPS

Information on landscape-scale plant vigor and productivity (land condition) is key to understanding natural and human-caused ecosystem changes. Land-condition monitoring involves the use of the MODIS (MODerate Resolution Imaging Spectoradiometer) satellite imagery. A measure of vegetation productivity, Normalized Difference Vegetation Index (NDVI), is calculated over time to esti-

mate the start and end of the growing season, the time of peak production, and seasonal productivity. This coarse-scale assessment of land condition can reveal important trends in the overall health of a park and surrounding ecosystem. A draft protocol for land-condition monitoring is scheduled to be complete in spring 2008, with monitoring to follow.

Future Projects

The NCPN will continue to expand ecological monitoring at Natural Bridges NM. Protocols for monitoring integrated riparian ecosystems, aquatic macroinvertebrates, land

cover and land use, and human demographics are underway and planned for future implementation.

For more information

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