



2009

Natural Resource Monitoring at Hovenweep National Monument



Square Tower/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 Hovenweep National Monument.

Flora Checklist



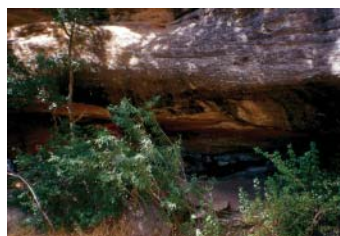
Sego lily.

Sheri Hagwood@USDA-NRCS PLANTS Database

In 2008, a revised checklist of the vascular flora of Hovenweep NM was completed. This entailed a thorough review of existing literature, re-examination of specimens from the Hovenweep 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, 340 vascular plant taxa have been confirmed or reliably reported as occurring in

the monument. Another 123 species formerly considered part of the monument flora have now been shown to be falsely reported. At least 16 of these species are tracked as species of concern by state natural heritage programs, but none is federally listed as threatened, endangered, or sensitive. Introduced plants make up 17% of the monument flora (57 species), of which 12 species are considered noxious weeds by the states of Utah and Colorado.

Springs and Seeps



Square Tower Spring/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 Hovenweep NM. Information from these studies 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.

Water Quality



Hackberry Spring pool/NPS

At Hovenweep NM, the NCPN is cooperating with the State of Utah and park staff to collect water quality monitoring data to assess condition and trends in water resources relative to the Clean Water Act, human health, and ecological function. Since 2006, water quality standards for aquatic life have been exceeded for aluminum occasionally at Cajon Spring, and for dissolved oxygen and phosphorus at both Square Tower Spring and Cajon Spring. Low levels of dissolved oxygen are not

unexpected in slow-moving water and springs. Square Tower Spring has high specific conductance and sulfate levels that are associated with local geology. The Cajon Spring site is a rain catchment pool, with minor water contributions from seeps in the alcove wall above the pool. Because this pool radically changes in size and dries up regularly, its chemistry can vary dramatically. Sampling at these sites will begin again in mid-2009.

Climate



Clouds over the Cajon Group/NPS

The overarching goal of NCPN climate monitoring is to compile and present climate data in a form that helps us to understand the reasons for trends seen in other network vital signs. The NCPN compiles and analyzes climate data from one weather station in Hovenweep NM, which is one of five NCPN parks that have shown increases in average minimum and maximum annual temperatures, as well as a decrease in snowfall, over the past 43 years or

more. In 2007, temperatures and precipitation at HOVE were close to long-term averages, whereas maximum and minimum temperatures were generally above average, and snowfall below average, at climate stations across the network. Hovenweep NM climate data for the years 1957–2007 are available in an interactive, graphical format on the NCPN web page. A climate report, produced by the NCPN in 2008, is also available on the network's web page.

Vegetation Mapping

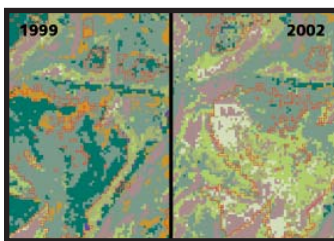


Vegetation mapping plot/NPS

The NCPN recently completed a multi-year, multi-partner effort to map the vegetation at Hovenweep 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, creating a geodatabase, and writing the final report. The team collected vegetation

and environmental data from 27 vegetation classification plots and 32 observation points. A total of 338 map polygons representing 29 natural and semi-natural vegetation map classes were developed for the Hovenweep NM mapping project. 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.

Land Cover and Land Use



Example fire-effects map.
USDA Forest Service

The composition, configuration, and connectivity of land-cover types determine habitat availability, energy and material flows, and the movement of organisms on a landscape. Changes in landscape structure due to natural and human-caused disturbances can be detected by evaluating imagery representing conditions across many years. Custom algorithms are being refined to unambiguously separate long-term change from seasonal and

annual phenological changes due to variations in weather. These data will provide park managers with a baseline against which to assess future changes in landscape structure and composition; the ability to detect large-scale disturbances in remote areas, and information on land-use activities along park boundaries. A pilot report is expected in May 2009, with protocols and standard operating procedures to follow.

Additional Efforts

The NCPN is continuing to expand ecological monitoring at Hovenweep NM. A proto-

col for monitoring land condition is underway and planned for future implementation.

For more information

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