



Natural Resource Monitoring at Canyonlands National Park



Mesa Arch/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 Canyonlands National Park.

Flora Checklist



Sego lily.

Sheri Hagwood@USDA-NRCS PLANTS Database

In 2008, a revised checklist of the vascular flora of Canyonlands NP was completed. This entailed a thorough review of existing literature, re-examination of specimens from the Canyonlands NP 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, 594 vascular plant taxa have been confirmed or reliably reported as occurring in the

park. Another 100 species formerly considered part of the park flora have now been shown to be falsely reported. Although no plant taxa are listed as threatened or endangered, at least 45 are considered species of concern by state and/or federal agencies. Introduced plants make up 11.4% of the park flora (68 species), of which only 7 species are considered noxious weeds by the State of Utah.

Water Quality



Salt Creek near Peekaboo Spring/NPS

At Canyonlands NP, the NCPN is cooperating with the State of Utah and park staff to collect water quality data used to assess condition and trends relative to the Clean Water Act, human health, and ecological function. The Salt Creek site near Crescent Arch, monitored since 1997, began to dry in fall 2008, likely due to dynamic and shifting flood sediments, groundwater levels, and vegetation changes. Salt Creek and two other Needles sites indicated high but short-lived bacteria counts. All five Needles

sites and three sites in the Maze District are being monitored monthly from mid-2008 to mid-2009. As in previous years, extremely low readings of dissolved oxygen at the Horseshoe Canyon site in the Maze were attributed to flood events and warm summer temperatures. Water quality data collected for the park's big rivers in 2008 is not yet available, but will be evaluated specifically for phosphorus, a parameter that has often exceeded water quality standards in the past.

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 pinyon-juniper woodland and three in low-elevation riparian areas at Canyonlands NP since 2005,

continuing the riparian bird monitoring conducted by park staff during 1993–2004. 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.

Uplands



Uplands plot/NPS

This protocol measures soil and site stability, hydrologic function, biotic integrity, and vegetation composition and structure. Grassland and shrubland types were selected for integrated upland monitoring in Canyonlands NP. Monitoring began in 2006, and has been expanded each year since. In 2008, 40 plots were re-visited in the final year of a three-year pilot study to obtain an estimate of the variance

in key parameters. The information gathered will be used to determine the number of plots necessary for long-term monitoring. Pilot sites were selected in a manner that ensures they will be incorporated into data analysis in the future, full-scale monitoring program. Analysis of the first three years of data collected at Canyonlands NP will begin in winter 2008–2009.

Springs and Seeps



Little 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 10 springs at Canyonlands NP. 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.

Air Quality



Canyonlands NP airshed.
IMPROVE

Understanding changes in air quality can help us to interpret changes in other monitored vital signs. The NCPN will acquire and analyze air quality data from existing stations in NCPN parks. The network's air quality monitoring protocol was undergoing final review in late 2008; its first air quality report will be produced in 2009. Air quality monitoring at Canyonlands NP will include a complete complement of wet and dry deposition, ozone, and visibility monitoring. Deposition monitoring

measures levels of air pollutants. Ground-level ozone is the major constituent in smog; it can be toxic to humans, and some plant species are particularly sensitive to ozone damage. Visibility-obscuring particulate matter consists of dust, soot, and other fine solid materials that become suspended in the air. Under the Clean Air Act, Class I areas, like Canyonlands NP, are subject to regulatory standards for particulates and visibility.

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 Canyonlands NP. Protocols for

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

For more information

Northern Colorado Plateau Inventory & Monitoring Program
National Park Service
P.O. Box 848
Moab, UT 84532
435-719-2346
<http://science.nature.nps.gov/im/units/ncpn/>

