



Natural Resource Monitoring at Dinosaur National Monument



Green River (NPS/D. Thoma)

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 Dinosaur National Monument.

Flora Checklist



Sego lily.
Sheri Hagwood@USDA-NRCS PLANTS Database

In 2008, a revised checklist of the vascular flora of Dinosaur NM was completed. This entailed a thorough review of existing literature, re-examination of specimens from the Dinosaur 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, 756 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. One plant, Ute ladies' tresses (*Spiranthes diluvialis*), is federally listed as a threatened species, and at least 79 are considered species of concern by state and/or federal agencies. Introduced plants make up 10% of the monument flora (78 species), of which 22 species are considered noxious weeds by the states of Utah and Colorado.

Water Quality



Yampa River/NPS

In cooperation with the State of Utah and the U.S. Geological Survey, the NCPN is conducting long-term water quality monitoring on the Yampa and Green rivers in Dinosaur NM. Data are used to determine compliance with the Clean Water Act and to monitor trends

in water quality that may impact visitors and ecological function of aquatic systems. Data for 2008 indicated high levels of total recoverable iron, consistent with high values observed between 2005 and 2007. Both the Yampa and Green rivers will be monitored in 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 five plots in sagebrush-shrubland, four in pinyon-juniper woodland,

and three in low-elevation riparian areas at Dinosaur 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.

Uplands



Uplands/NPS

Sagebrush, pinyon-juniper woodlands, and grasslands were selected for integrated uplands monitoring at Dinosaur NM. This protocol measures soil and site stability, hydrologic function, biotic integrity, and vegetation

composition and structure. NCPN staff conducted ecosite delineation and site reconnaissance at Dinosaur NM in 2008, in preparation for the start of plot establishment and monitoring in 2009.

Vegetation Mapping



Vegetation-mapping plot/NPS

The NCPN recently completed a multi-year, multi-partner effort to map the vegetation at Dinosaur 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 727 vegetation

classification plots, 217 observation points, and 1,543 accuracy assessment points. A total of 28,915 map polygons representing 37 natural and semi-natural vegetation map classes were developed for the Dinosaur NM mapping project. The project achieved an overall mapping accuracy of 81%. 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.

Air Quality



Dinosaur NM airshed/NPS

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. For Dinosaur NM, the report will focus on the park's portable ozone

monitoring station (POMS). 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. The Dinosaur NM POMS also collects data on dry deposition, which can have a variety of effects on ecosystems, including acidification, fertilization or eutrophication, and accumulation of toxins.

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 Dinosaur NM. Protocols for

monitoring land condition, land cover/land use, and integrated 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/>

