



# Natural Resource Monitoring at Dinosaur National Monument



Harding Hole, Yampa River/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 Dinosaur 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 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 begin to look at trend data in 2009, after five years of data collection.

## Vegetation Mapping



Vegetation-mapping plot/NPS

The NCPN is nearing completion on 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, 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. The vegetation map is scheduled to be complete in fiscal year 2008.

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## Uplands



Re-growth after recent fire/NPS

Sagebrush, pinyon-juniper woodlands, and grasslands are being considered for integrated upland monitoring, which includes measuring soil and site stability, hydrologic function, biotic integrity, and vegetation composition and structure. In cooperation with park staff, discussions to determine which combinations of vegetation types to include in the monitoring effort took place in 2007. A three-year

pilot study designed to obtain an estimate of the variance in key parameters will begin in 2008. The information gathered will be used to determine the number of plots necessary for long-term monitoring. Pilot sites will be selected in a manner that ensures they will be incorporated into data analysis in the future, full-scale monitoring program.

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## Water Quality



Yampa River/NPS

The NCPN is conducting long-term water quality monitoring on the Yampa and Green rivers in Dinosaur NM. These sites, chosen to represent the condition of water flowing into the monument, will be compared to data from sites further downstream to determine cumulative effects of natural and human-caused changes in water quality. Data are used to determine compliance with the Clean Water Act

and for monitoring trends in water quality that may impact visitors and ecological function of aquatic systems. Monitoring conducted between January 2005 and January 2007 indicated that 2 of 8 sites sampled did not meet state standards for total recoverable iron for all stages of aquatic life. Continued monitoring will determine if this is a persistent problem.

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## Species Lists



Great Basin spadefoot toad/NPS

The NCPN has completed NPSpecies certification at Dinosaur 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 Dinosaur NM have a verified report of a Great Basin spadefoot toad? The resulting species list can be downloaded into an Excel spreadsheet for use by the public, park staff, or park cooperators.

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## Climate



Gates of Lodore, Green River/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 three existing weather stations in Dinosaur NM. Over the past 34 years, Dinosaur

NM has shown an increase in average annual minimum temperatures and a decrease in snowfall. This included record-high temperatures for January and February 2005. Dinosaur NM climate data is available for the years 1915–2006 in an interactive, graphical format on the NCPN webpage.

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## Future Projects

The NCPN is continuing to expand ecological monitoring at Dinosaur NM. Protocols for monitoring aquatic macroinvertebrates; land condition; land cover and land use; integrated riparian communities; springs, seeps, and

hanging gardens; invasive exotic plants; and human demographics and development are underway and planned for future implementation.

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## For more information

Northern Colorado Plateau Inventory & Monitoring Program  
National Park Service  
P.O. Box 848  
Moab, UT 84532  
435-719-2346  
<http://www1.nature.nps.gov/im/units/ncpn/index.cfm>

