



Natural Resource Monitoring at Colorado National Monument



Colorado National Monument/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 Colorado National Monument (COLM).

Invasive Exotic Plants



Russian olive
J.S. Peterson@USDA-NRCS PLANTS Database

The NCPN will implement a three-pronged approach to the early detection of invasive exotic plants. For the first two components, NCPN or park staff experienced in a wide range of exotic plants will survey established monitoring routes on a rotational basis to maximize both efficiency and ground coverage. They will also conduct one-time inventories of areas that are of high concern to park managers. In addition,

the NCPN staff has designed “monitoring lite,” a method by which park staff or volunteers with less knowledge of invasive species may collect data that can be used in NCPN databases and reporting. The network experimented with these methods at Fossil Butte NM and Golden Spike NHS in 2008, and plans to introduce them at COLM in 2009.

Air Quality



Colorado NM airshed/NPS

Understanding changes in air quality can aid in interpreting 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 COLM, the report will focus on the park’s portable ozone monitoring station. 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.

Flora Checklist



Plateau yellow cryptanth
G.A. Cooper@USDA-NRCS PLANTS Database

In 2008, NCPN cooperator Walter Fertig completed a revised checklist of the vascular flora of Colorado National Monument. This entailed a thorough review of existing literature, re-examination of specimens from the Colorado National Monument 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, 467 vascular plant taxa have been confirmed or reliably reported

as occurring in the monument. Another 46 species formerly considered part of the monument flora have now been shown to be falsely reported. Although no plant taxa are federally listed as threatened or endangered, at least 20 are considered species of concern by the state's natural heritage program. Introduced plants make up 14 % of the monument flora (66 species), of which 15 species are considered noxious weeds by the State of Colorado.

Landbirds



American kestrel
©Greg Lavaty

Birds are sensitive to habitat changes and play an important role in the flow of energy through ecosystems because they occupy various levels in the food web, 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 at COLM 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.

Climate



Weather station/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 Colorado NM. Over the past 59 years, COLM has shown an increase in average annual maximum temperatures and a decrease in snowfall. The average maximum high for 2007 was 69.3°, the

second-highest average ever recorded for this station. Precipitation for 2007 was 6.35 inches, the fourth-lowest amount recorded for this station. Other climate stations in NCPN parks also recorded above-average mean annual maximum and minimum temperatures and below-average snowfall in 2007. Colorado NM climate data for the years 1948–2007 are available in an interactive, graphical format on the NCPN webpage.

Future Projects

The NCPN will continue to expand ecological monitoring at Colorado NM. Protocols for monitoring land condition and land cover/

land use are underway and planned for future implementation.

For more information

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