



Natural Resource Monitoring at Dinosaur National Monument



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Dinosaur National Monument.

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.

Riparian Systems



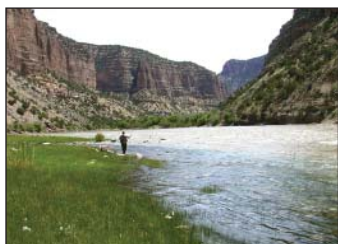
NPS/Williams

Laddie Park, June 10, 2011.

The winter of 2010–2011 brought near-record snowpack to the Green, Yampa, and Little Snake river basins. Subsequent spring snowmelt produced the largest flood events in recent history at Dinosaur NM. At Deerlodge Park, the unregulated Yampa River saw the second-highest flow and flood stage ever recorded. Similarly, the Green River at Jensen, while partially controlled by Flaming Gorge Dam upstream of the park, recorded the fourth-highest peak flow in more than 100 years. Although the actual runoff amount is still to be determined, magnitudes were also large. The rarity of these

events provides the NCPN a unique opportunity to document the effects of such flows on park water-related resources and natural processes. Along with staff from both the park and the NPS Water Resources Division, the NCPN helped obtain funding for and will participate in studies that include pre- and post-effect studies of riparian vegetation, geomorphology, and entomology, and LiDAR and multispectral imaging for the entire park through agreements with Utah State University and the U.S. Geological Survey (Fort Collins field office and Grand Canyon Monitoring and Research Center).

Water Quality



Green River.

NCPN water-quality monitoring is made possible through partnerships between the I&M Program, individual park units, the U.S. Geological Survey, and the State of Utah’s Division of Water Quality. In 2010, the network published its second biennial report on water quality in NCPN parks, covering the period from January 1, 2006 to December 31, 2009. Of 2,258

comparisons of results against beneficial use standards conducted at eight sites in or near Dinosaur NM, only 30 (1.3%) exceeded water quality standards or indications of impairment. Standards were exceeded for four constituent categories—most commonly, nutrients, metals, and dissolved oxygen. Overall water quality in Dinosaur NM is good.

Exotic Invasive Plants



Canada thistle.

Steve Dewey, Utah State University, Bugwood.org

Invasive exotic plants (IEPs) represent one of the most significant threats to natural resources in national parks. Exotic plants are able to reproduce prolifically, rapidly colonize new areas, displace native species, and alter ecosystem processes across multiple scales. However, if these invaders are discovered in their early stages, control efforts are likely to cost less and achieve higher success rates than after a species has become more widespread. In 2010, NCPN

staff detected 13 Priority 1 IEP species and 5 additional IEP species on monitoring routes and quadrats along 234 kilometers of the Green and Yampa rivers. Tamarisk, broadleaf pepperwort, and yellow sweetclover were widespread, and localized infestations of Canada thistle and Russian olive were present. NCPN crews will return in 2011 to complete monitoring of the entire river corridor.

Uplands

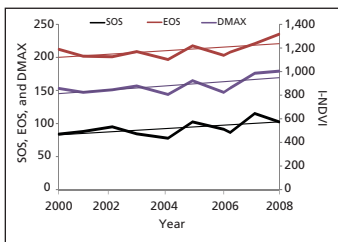


Uplands monitoring plot.

Sagebrush, grasslands, and, to a lesser extent, pinyon-juniper woodlands were selected for integrated uplands monitoring at Dinosaur NM. This protocol measures soil stability, hydrologic function, and plant community characteristics. A three-year pilot study to obtain estimates of variance for key parameters began in 2009, when a total of 35 plots were established

and monitored. These plots were revisited, and 5 new plots established, in 2010. The NCPN returned for a third season of pilot monitoring in 2011. This information will be used to determine the number of plots necessary to detect trends for long-term monitoring. Pilot sites were selected in a manner that ensures they will be included in the full-scale monitoring design.

Land Condition



Annual spring phenology metrics with trends, Dinosaur NM, 2000–2009.

The NCPN and U.S. Geological Survey have developed remote-sensing methods to improve understanding of how broad-scale vegetation condition responds to short-term weather events, long-term climate trends, land use, and geographic position. The satellite-derived Normalized Difference Vegetation Index (NDVI) and snow-cover imagery, available bi-weekly, are used to measure vegetation greenness and snow-covered area through time. In 2011, the NCPN published its first status and trends re-

port on remote sensing of vegetation phenology and snow-cover extent in NCPN parks, covering the years 2000–2009. For those years, the analysis showed three patterns for Dinosaur NM, where the start of season (SOS), end of senescence (EOS), and day of peak greenness (DMAX) for the spring growing season were all occurring later in the year. These patterns should be considered with caution because they are based on a short (10-year) record. The full report is posted on the network's web site.

Yellow-billed Cuckoo



Yellow-billed cuckoo.

In summer 2009, the Rocky Mountain Bird Observatory (RMBO) conducted surveys for western yellow-billed cuckoos (*Coccyzus americanus occidentalis*) and other bird species of interest in the park and on privately held lands in northwestern Colorado. At least one visit was made to 134 survey points, where surveys were accomplished by broadcasting cuckoo calls. Although western yellow-billed cuckoos were not detected during these surveys, they were detected on private land in northwestern Colorado as recently as July 2008, and suitable habi-

tat is found within Dinosaur NM. Therefore, it is feasible that these birds were present in the park but not detected during surveys. RMBO did record willow flycatchers (*Empidonax traillii*), least flycatchers (*Empidonax minimus*), and yellow-breasted chats (*Icteria virens*), chosen as species of interest due to their status as habitat indicators. Three new species were detected for the park: sora (*Porzana carolina*), Eurasian collared-dove (*Streptopelia decaocto*), and Cordilleran flycatcher (*Empidonax occidentalis*).

Additional Efforts

The NCPN is continuing to expand ecological monitoring at Dinosaur NM NP, where ad-

ditional efforts include monitoring of climate, land cover/land use, and air quality.

For more information

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