



Natural Resource Monitoring at Cedar Breaks National Monument



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Cedar Breaks Amphitheater

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 species, 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 Cedar Breaks National Monument.

Modeling Climate Change



NPS/Jim Peaco

Pika.

Changes in climate will affect some species more than others; what is not known is which ones, how much, and where. To better understand these questions, the NCPN cooperated with Dr. Henry Shovic, of Montana State University, to examine species distribution models, local spatial data, historical climate data from local weather stations, and climate projections in order to determine the location and quality of present and future potential habitat for two species of concern at Cedar Breaks NM. Results

show that American pika populations at Cedar Breaks NM may remain stable for the time being, but approach ecological limits by 2100. There appears to be sufficient future habitat for bristlecone pine within the monument in areas with appropriate physical characteristics that are presently unoccupied by other species. This spatially explicit, local information can help with park management decisions and development of a local adaptation framework for mitigating impacts to species as changes unfold.

Uplands



NPS

Subalpine meadow (foreground).

NCPN uplands monitoring is intended to strike a balance between increasing fundamental understanding of these systems and providing managers with early warning of undesirable change. This protocol measures plant community characteristics, including vegetation and surface cover, density of woody species, canopy closure, and fuels. Through discussions with park staff, the dominant vegetation types

that occur above the rim (subalpine meadows, spruce-fir forests, and aspen forests) were selected for integrated uplands monitoring at Cedar Breaks NM. The NCPN implemented monitoring in 2009, and network staff returned for a third season of monitoring in 2012. [Annual reports](#) of upland monitoring are available at the network’s web site.

Flora Update



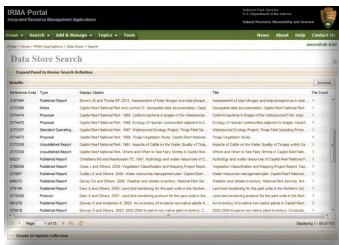
Moonwort.

Walt Fertig

In 2008–2009, the NCPN published an annotated checklist of vascular plant species for each network park. Since that time, nearly 700 changes have been necessary to keep up with new research, due to the discovery of new species and changes to park status and existing nomenclature. For instance, 432 new vascular plant species have been added to the park floras and the status of another 102 species has been changed. An [addendum to the original checklists](#), compiled by contractor Walt Fertig and published in 2012, details these changes. Cedar Breaks NM has seen an increase of 41 new

plant taxa since 2007, an increase of 11.6% that brings the known and reported park flora to 385 taxa. Among the noteworthy additions are the first reports of rosy cliff jamesia (*Jamesia americana* var. *rosea*) for Utah, and three new families: Ephedraceae, Loasaceae, and Ophioglossaceae. One new local endemic, Tushar penstemon (*Penstemon caespitosus* var. *suffruticosus*), is now known from the bottom of Ashdown Canyon within the monument. Two new non-native species have also been documented from the canyon bottom: bull thistle (*Cirsium vulgare*) and prickly lettuce (*Lactuca serriola*).

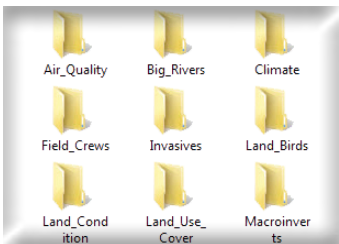
IRMA Data Store



Looking for something? The Integrated Resource Management Applications (IRMA) portal is your web-based “one-stop shop” for documents, data sets, and other types of NPS natural and cultural resource information. In 2011, the NCPN received funding from the national I&M Program to upload digital files to the [IRMA Data Store](#). Overall, a total of 370

digital files were uploaded. About half of those documents were already in digital form; the other half had to be scanned from hard-copy documents. Of the 370 documents uploaded, [49 were linked to Cedar Breaks NM](#). These documents covered topics including water quality, springs, and mammals.

Data Management Review



Data management is one of the NCPN’s most pivotal tasks. In 2011, the network completed a review of its data management practices as part of a program-wide assessment facilitated by the national I&M Program. The goal of the review was to evaluate current practices and identify areas for improvement. In collaboration with network staff, the NCPN data manager completed a comprehensive self-assessment consisting of more than 200 questions spanning 12 categories. The review identified several areas

of strength for the NCPN, including databases, data distribution, quality assurance/quality control, and data management roles/responsibilities. The network will share its expertise in these areas with other networks as needed to help them make improvements. Two main areas needing improvement were also identified: data documentation and water quality data management. The NCPN will work with the national I&M Program and other networks to make improvements in these areas.

Climate



Temperature sensor.

NPS

The overarching goal of NCPN climate monitoring is to compile and present climate data in a form that helps explain the trends seen in other network vital signs. The NCPN compiles and analyzes climate data from one weather station near Cedar Breaks NM. In 2011, mean annual maximum and minimum temperatures were above average at the station near Cedar Breaks NM, although temperatures tended to be below average throughout much of the NCPN region. Regional snowfall was gener-

ally below average, but there were no clear regional patterns in precipitation. Most NCPN stations with long observation periods show a general increase in average annual minimum temperature over the past 30–50 years. There is evidence for a declining trend in snowfall from the 1980s to the mid-2000s; however, snowfall during many of the last few years was higher than the long-term average. A climate report will be produced by the NCPN and posted on the network’s web site in 2012.

For more information

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