



Natural Resource Monitoring at Fossil Butte National Monument



Fossil Butte 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 Fossil Butte National Monument.

Flora Checklist



Sego lily.
Sheri Hagwood@USDA-NRCS PLANTS Database

In 2008, a revised checklist of the vascular flora of Fossil Butte NM was completed. This entailed a thorough review of existing literature, re-examination of specimens from the Fossil Butte 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, 546 vascular plant taxa have been confirmed or reliably reported as occurring in

the monument. Another 68 species formerly considered part of the monument flora have now been shown to be falsely reported. Although no plant taxa are listed as threatened or endangered, at least 8 are considered species of concern by the state’s natural heritage program. Introduced plants make up 13.2% of the monument flora (72 species), of which 10 species are considered noxious weeds by the State of Wyoming.

Exotic Invasive Plants



Burdock/NPS

The NCPN will implement a three-pronged approach to the early detection of exotic plants. First, NCPN or park staff experienced with a wide range of exotics will survey established monitoring routes on a rotational basis to maximize both efficiency and ground coverage. In addition, NCPN staff may dedicate approximately 25% of their time to one-time inventories of areas that are of high concern to park managers but might be missed on

the routine monitoring routes. Finally, the network has designed “monitoring lite,” a method by which park staff or volunteers with less knowledge of invasive species may collect data for use in NCPN databases and reporting. A report summarizing a pilot field season at Fossil Butte NM and Golden Spike NHS in 2008 will be completed in winter 2008–2009. The network plans to return to Fossil Butte NM in 2009.

Landbirds



Mountain bluebird.
USFWS/D. Menke

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 two plots in sagebrush

shrubland at Fossil Butte 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.

Climate

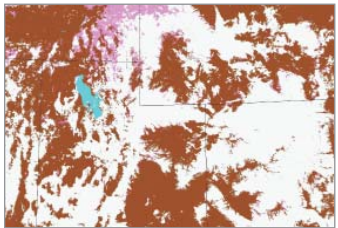


Early snowstorm/NPS

The overarching goal of NCPN climate monitoring is to compile and present climate data in a form that helps us to understand the reasons for trends seen in other network vital signs. The NCPN compiles and analyzes climate data from one weather station in Fossil Butte NM. The average maximum high for 2007 was 58.7°, the highest average ever recorded for the 17 years of this station. In 2007, maximum and minimum temperatures were generally above average, and snowfall below average, at cli-

mate stations across the network. Five NCPN parks have shown increases in average minimum and maximum annual temperatures over the past 43 years or more, and measurements from the weather station at Fossil Butte NM, established in 1990, align with that trend. Fossil Butte NM climate data for the years 1990–2007 are available in an interactive, graphical format on the NCPN web page. A climate report, produced by the NCPN in 2008, is also available on the network's web page.

Land Condition

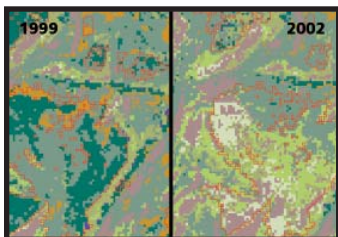


Southwest Wyoming snowpack, 2/2007.
MODIS image

Information on landscape-scale plant vigor and productivity (land condition) is key to understanding natural and human-caused ecosystem changes. Land condition monitoring involves the use of the MODIS (MODerate Resolution Imaging Spectoradiometer) satellite imagery. A measure of vegetation productivity, Normalized Difference Vegetation Index (NDVI), is calculated over time to estimate the start and end of the growing season,

the time of peak production, and seasonal productivity. This coarse-scale assessment of land condition can reveal important trends in the overall health of a park and surrounding ecosystem. Draft protocols for land condition monitoring will be implemented as pilot projects at Fossil Butte NM and Bryce Canyon NP in 2009. Pending these results, the NCPN will move forward with implementation at all 16 network parks in future years.

Land Cover and Land Use



Example fire-effects map.
USDA Forest Service

The composition, configuration, and connectivity of land-cover types determine habitat availability, energy and material flows, and the movement of organisms on a landscape. Changes in landscape structure due to natural and human-caused disturbances can be detected by evaluating imagery representing conditions across many years. Custom algorithms are being refined to unambiguously separate long-term change from seasonal and

annual phenological changes due to variations in weather. These data will provide park managers with a baseline against which to assess future changes in landscape structure and composition; the ability to detect large-scale disturbances in remote areas; and information on land-use activities along park boundaries. A pilot report is expected in May 2009, with protocols and standard operating procedures to follow.

For more information

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