



Natural Resource Monitoring at Capitol Reef National Park



Formations below The Castle (NPS/L. Rademaker)

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 Capitol Reef National Park.

Air Quality



Waterpocket Fold (NPS)

Understanding changes in air quality can aid in interpreting changes in other monitored vital signs and support evaluation of compliance with legislative and reporting requirements. The NCPN acquires and analyzes air quality data from existing stations in NCPN parks. The network’s first air quality report was produced in 2009. For Capitol Reef NP, the report focused on visibility monitoring. Under the Clean Air Act, Class I areas, like Capitol Reef NP, are

subject to regulatory standards for particulates and visibility. The park is equipped with a visibility monitor, but its data set is currently too limited to allow trend identification. Based on interpolated data from the Canyonlands NP site, visibility on the clearest days has improved and has shown no trends on the haziest days at Capitol Reef NP. Visibility was estimated to be in moderate condition at the park, which is currently meeting its 2008 GPRA goal for visibility.

Water Quality

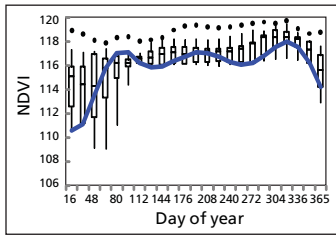


Pleasant Creek (NPS)

At Capitol Reef NP, the NCPN is cooperating with the State of Utah to collect water quality data used to assess condition and trends relative to the Clean Water Act, human health, and ecological function. Indications of impairment for phosphorus occurred on the Fremont River upstream and downstream from the park in 2009. However, since 2000, efforts to mitigate non-point sources of pollution in the Fremont

watershed upstream from Capitol Reef NP have been ongoing. These efforts may be improving water quality, as shown by a decrease in frequency of high total phosphorus samples in recent years compared with years prior to 2000. New monitoring sites were added at Pleasant Creek and Upper and Lower Sulphur Creek in 2009, and will continue to be monitored through 2010.

Land Condition



Normalized Difference Vegetation Index values for Capitol Reef NP in 2009, plotted with historical ranges.

The NCPN and U.S. Geological Survey have developed remote-sensing methods to study how broad-scale vegetation condition responds to short-term weather patterns, long-term climate trends, land use, and geographic position. Understanding vegetation response enhances knowledge of the biological ecosystems and physical processes affected by vegetation productivity and distribution. The Nor-

malized Difference Vegetation Index (NDVI) is a measure of vegetation greenness, or productivity, derived from satellite imagery. The timing of green-up in 2009 was approximately the same as the 9-year average, but was slightly more productive in the early growing season and average mid-season, then below average for the remainder of the season, with an earlier brown-down than in previous years.

Uplands



Uplands plot/NPS

Uplands represent the vast majority of land area at Capitol Reef NP, where grasslands have been selected as the ecosystem targeted for integrated upland monitoring. This protocol measures soil and site stability, hydrologic function, biotic integrity, vegetation composition and structure, and biological soil crusts.

Monitoring began in 2007, the first of a three-year pilot study (2007–2009) to obtain an estimate of the variance in key parameters. All 61 study plots were revisited in 2009. In 2010, the network will return to the park to implement a full-scale monitoring design based on the results of the pilot study.

Vegetation Mapping



Vegetation-mapping plot/NPS

The NCPN recently completed a multi-year, multi-partner effort to map vegetation at Capitol Reef NP. This project included gathering aerial photography, collecting vegetation-plot data, using the vegetation data to classify vegetation types and write vegetation descriptions, writing a dichotomous vegetation-type key, performing photo interpretation, conducting accuracy assessment, creating a geodatabase, and writing the final report. The team collected vegetation and environmental data from 243

vegetation classification plots, 17 observation points, and 1,313 accuracy assessment points. A total of 18,633 map polygons representing 70 natural and semi-natural vegetation map classes were developed for the project, which achieved an overall mapping accuracy of 77%. 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.

Riparian Systems



Fremont River/NPS

Integrated riparian monitoring involves the collection of biological and physical measures, such as riparian vegetation, non-native species invasions, streamflow, alluvial groundwater dynamics, and changes in channel form. Credible, efficient monitoring will help the NCPN to assess riparian-system health and provide early warning of system degradation. In 2009, three reaches were established on the Fremont River

and sampled for vegetation and geomorphology. Shallow groundwater-monitoring wells were installed at one reach. The final monitoring plan for Capitol Reef NP was completed in 2009, with 10 reaches proposed for monitoring throughout the stream, with special focus on an abandoned meander that is scheduled to be reconnected to the river system. Monitoring implementation will continue in 2010.

Additional Efforts

The NCPN is continuing to expand ecological monitoring at Capitol Reef NP. Invasive plant monitoring began in 2009. A protocol for monitoring land cover/land use is underway

and planned for future implementation. The network also reports on climate monitoring for the park. The park's list of natural resource inventory needs was updated in 2009.

For more information

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