



Natural Resource Monitoring at Capitol Reef National Park



Badlands, Capitol Reef National Park.

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 Capitol Reef National Park.

Aquatic Contaminants



Fremont River.

In 2010, as part of a special project in cooperation with the Environmental Protection Agency (EPA), the NCPN sampled the Fremont River and Sulphur Creek for contaminants of emerging concern (those that have not traditionally been tested for during water quality sampling and may not be adequately cleansed by current wastewater treatment methods). Samples were analyzed at an EPA lab for evidence of pesticides and wastewater indicators, including manufacturing byproducts and agricultural and human waste contaminants. Analytes were

detected at low levels at both sites. Bisphenol A (BPA, plastics) was detected in the Fremont River and Sulphur Creek, while the flame retardant tri(2-butoxyethyl) phosphate (TBEP) was detected in the Fremont River. Follow-up samples will determine if these analytes are persistent. The Fremont River will be re-sampled in 2012, and additionally tested for the presence of pharmaceuticals and personal care products. The network will publish final results from this work at a later date.

Uplands



Grassland.

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. 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 soil stability, hydrologic function, biological soil crusts, and plant commu-

nity characteristics. Monitoring began in 2007, the first of a three-year pilot study (2007–2009) to obtain an estimate of the variance in key parameters. The network implemented a full-scale monitoring design based on the results of the pilot study in 2010. In 2012, network staff completed the sixth year of monitoring at the park. [Annual reports](#) of upland monitoring are available at the network’s web site.

Invasive Exotic Plants



Oak Creek.

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 2011, Capitol Reef NP staff detected four IEP species on monitoring routes and transects along 7.3 kilometers of

Oak Creek. Of the invasive species considered priority species for the park, only tamarisk (*Tamarix chinensis*) and Russian olive (*Elaeagnus angustifolia*) were detected. Tamarisk was by far the most common (68 of 69 infestations) IEP detected along monitoring routes. While infestations were widespread, actual IEP percent cover was low in Oak Creek. Both tamarisk and Russian olive were present in numbers similar to those recorded during surveys in 2003. A [full report](#) is available at the NCPN web site.

Riparian Systems



Riparian habitat.

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 proposed monitoring plan for Capitol Reef NP includes monitoring 10 reaches throughout the stream, with special focus on an abandoned meander that is planned for reconnection to the river system. The three established reaches were visited again in 2010 and 2011 to gather baseline data above, within, and below the abandoned meander. An additional reach was established in 2012.

Flora Update

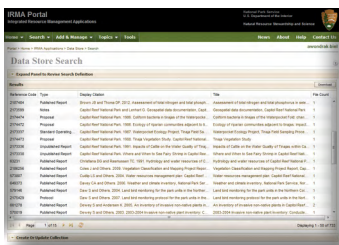


Apricot, one of many cultivated plants found in the park.

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. Capitol Reef NP has seen an increase of 22 new plant taxa since 2007, an increase of 2.5% that brings the known and reported park flora to 909 taxa. Two new native species for the park are local endemics of the San Rafael Swell: Bolander's camissonia (*Camissonia bolanderi*) and Johnston's cryptanth (*Cryptantha johnstonii*). Only two of the new species are exotics.

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, [104 were linked to Capitol Reef NP](#). These documents covered topics including hanging garden communities, water quality, and macro-invertebrates.

Additional Efforts

In addition to the projects described in this brief, the NCPN also monitors landbirds, climate, landscape dynamics, water quality, and

land surface phenology at Capitol Reef National Park.

For more information

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