

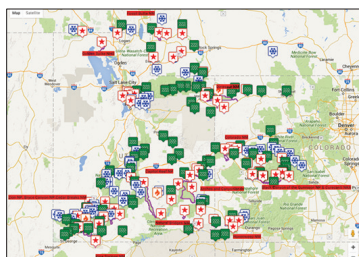


Natural Resource Monitoring at Arches National Park

The Northern Colorado Plateau Network

In 16 parks across four western states, the [Northern Colorado Plateau Network](#) (NCPN) is dedicated to providing National Park Service (NPS) managers with the information they need to make sound, science-based decisions. By conducting long-term monitoring of key indicators of ecological integrity, or “vital signs,” we help inform managers about the health of park resources and provide early detection of potential problems. In this way, we support the NPS mission of preserving the resources of America’s most special and treasured places for future generations. This brief describes recent NCPN activities at [Arches National Park](#).

Climate



NCPN weather stations.

The NCPN recently moved its [climate](#) monitoring toward interactive, user-defined data presentation. Network staff are working with developers of [The Climate Analyzer](#), an interactive website that allows users to create custom graphs and tables from historical and current weather-station data that update every 24 hours. Parameters include temperature and precipitation, snowfall and snowpack, and stream flow and water temperature. In July 2014, an NCPN version of [The Climate Analyzer](#) was launched, with data now available for each network park. In addition, “Climate

dashboards” for Dinosaur NM and the Southeast Utah Group parks (Arches NP, Canyonlands NP, Hovenweep NM, and Natural Bridges NM) present current conditions, forecasts, and recent data for numerous weather stations in one easy-to-access location. The dashboards also present the current condition of drought severity in the region through a link to the U.S. Drought Monitor. Additional NCPN dashboards are in development, and the page will continue to be refined as we receive feedback from users. More information can be found in our [2015 climate monitoring brief](#).

Wadeable Streams



Courthouse Wash.

To monitor [riparian systems](#), the NCPN collects data on vegetation, hydrology, and geomorphology in wadeable streams. Since wadeable streams monitoring began at Courthouse Wash in 2010, five monitoring reaches have been established, with shallow groundwater-monitoring wells installed at one reach. At all reaches, cross-sections of the channel and the location of the thalweg (deepest part of the channel) have been surveyed, and vegetation has been sampled for at least two years. Many geomorphic changes have occurred in Courthouse Wash since summer 2013. In late summer and fall of 2013 and 2014, floods reshaped

the channel and deposited sediment on the floodplain. By October 2014, a large channel had cut into parts of upper Courthouse Wash that were previously covered in dense vegetation. The height of the instream well was increased in 2014 to help deal with the dynamic channel reshaping and sediment deposition of the past couple years. We may need to adjust our riparian sampling design to better capture the dynamics of this system. In 2015, vegetation was sampled and geomorphology was surveyed at one reach in upper Courthouse Wash. Hydrologic monitoring continued at the one reach with shallow groundwater wells.

Springs and Seeps



Sevenmile Boundary Spring.

The primary goal of NCPN monitoring of [springs, seeps, and hanging gardens](#) is to assess trends in key indicators of spring and seep ecosystem health: water quantity, water quality, and spring-related vegetation. In 2015, spring-flow monitoring continued at three sites in Arches NP, and vegetation monitoring was initiated at two sites. Network and park staff also published a [report](#) compiling 14 years of springflow data at four sites in the park. The results show that springflows have decreased at two sites in Sevenmile Canyon, while remaining stable at one site in Courthouse Wash. More analysis will be needed to explain why; the trends

appear to include abrupt changes in flow, yet the springs and their estimated recharge areas are all protected under a water-rights agreement with the State of Utah. Park staff will continue to collect monitoring data on a monthly basis at three sites. Monitoring has been suspended at one geomorphically volatile site in Courthouse Wash until a stable monitoring location emerges. A joint effort with several other NPS monitoring networks is underway to develop a database for this protocol. The NCPN springs monitoring protocol was submitted for peer review in 2013.

Water Quality



Salt Wash.

In 2014, the NCPN published its third [water quality report](#), focusing on water years 2010–2012. These reports compare the data collected to state [water quality](#) standards. At Arches NP, 96.8% of evaluations met state water quality standards. We also continued our ongoing screening for contaminants of emerging concern in conjunction with the Environmental Protection Agency (EPA) Region 8. Surface waters at 16 locations in and near seven network parks were sampled two times in

2014. In Arches NP, Sleepy Hollow Spring, Upper Courthouse Wash Spring, and Lower Courthouse Wash showed surprisingly high numbers and concentrations of analytes relative to the other 15 NCPN sites sampled that year. Overall, however, detection frequencies and concentrations were low across the seven parks. Detections were more frequent in samples taken during spring (April and May) than in the fall (September and October; [read the CEC report or brief](#)).

Uplands



Blackbrush shrubland.

The NCPN has monitored grasslands and blackbrush shrublands at Arches NP since 2010 (although grasslands and some blackbrush communities were not sampled in 2013 due to budget cuts). This protocol measures soil stability, hydrologic function, biological soil crusts, and plant community characteristics. Its goal is to increase understanding of upland systems and provide

park managers with early warning of undesirable change. In 2015, network staff completed the sixth season of monitoring at Arches NP. Network staff are currently working on long-term trend reports for [uplands](#) at Canyonlands and Capitol Reef national parks. After those documents are complete, we will begin reporting for additional parks.

Land Surface Phenology



MODIS image of Earth, with an opening in cloud cover over the Colorado Plateau.

The NCPN is working with cooperators at Pennsylvania State University and Northern Arizona University to develop software that automates processing of MODIS (moderate resolution imaging spectrometer) satellite imagery. The greenness of Earth's surface, as measured by the MODIS satellite, provides a way to [track soil moisture and](#)

[vegetation condition](#) across large spatial scales in remote areas at 16-day intervals. These satellite data are being used to interpret climate effects on vegetation in NCPN parks. The data are being analyzed in conjunction with data from NCPN uplands monitoring to determine if observations from space match what we see on the ground.

Additional Efforts

In addition to the projects described in this brief, the NCPN also monitors [air quality](#), [landbirds](#),

and [landscape dynamics](#) at Arches National Park.

For more information

Northern Colorado Plateau Network
National Park Service
P.O. Box 848
Moab, UT 84532
435-719-2346

<http://science.nature.nps.gov/im/units/ncpn>

