

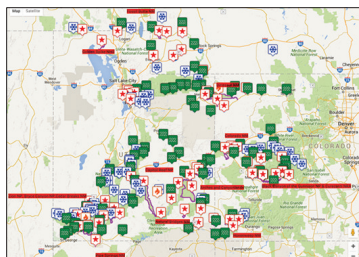


Natural Resource Monitoring at Zion National Park

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 [Zion 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](#).

Water Quality



Sampling for contaminants.

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 Zion NP, 95.5% of evaluations met state water quality standards. We also continued our ongoing screening for contaminants of emerging concern (CECs) in conjunction with the Environmental Protection Agency (EPA)

Region 8. Surface waters at 16 locations in and near seven network parks (including Zion) were sampled two times in 2014. Overall, detection frequencies and concentrations were low across the seven parks. Detections were more frequent in samples taken during spring (April and May) than in fall (September and October; [read the CEC report or brief](#)).

Wadeable Streams

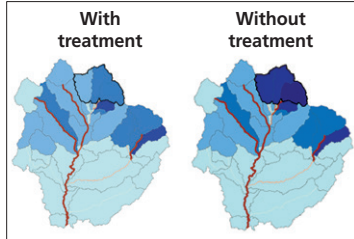


East Fork Virgin River.

To monitor [riparian systems](#), the NCPN collects data on vegetation, hydrology, and geomorphology in wadeable streams. Since monitoring of the East Fork Virgin River began in 2008, three monitoring reaches have been sampled for vegetation. Those reaches have also been surveyed along the thalweg (deepest part of the channel) and cross-sections of the channel at least twice. Shallow groundwater-monitoring wells were installed at one of these

reaches. In 2015, vegetation and geomorphology were not sampled for a third year, due to both budget cuts and accessibility issues related to a new private landowner. Despite these issues, annual hydrologic monitoring has continued. In 2015, we published NCPN's first wadeable streams report, focusing on changes after a large flood in Zion NP in 2010 ([download the report or brief](#)).

Fire Effects Modeling



Gabriel Schwan

Modeled effects of pre-fire treatment on post-fire erosion.

Post-fire precipitation events can dramatically increase hydrologic runoff and sedimentation—but in some cases, park managers can lessen the impact of these effects with pre-fire fuel treatments. A recent publication in the *International Journal of Wildland Fire* used case studies at Zion and Bryce Canyon national parks to evaluate a computer model that quantifies the benefits of pre-fire fuel-reduction treatments on post-fire runoff

and erosion. The study was led by hydrologists at the University of Arizona and Agricultural Research Service and co-authored by NCPN staff. The model was improved based on the results of this research, and is currently being used to assess post-fire runoff and erosion scenarios following wildfires in the western U.S. The model is [freely available online](#) and has been downloaded over 100,000 times by users worldwide.

Land Surface Phenology



NASA

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.

Pika and Climate



NPS/Peaco

Pika.

NCPN and park staff recently contributed to a U.S. Geological Survey study describing trends in pika occurrence across the western U.S. Using data generated from NCPN's phenology monitoring (see above), this research examined relation-

ships between pika occupancy, climate, and water balance. The results of the study, which include significant findings for Zion NP and Cedar Breaks NM, have been accepted for publication in an upcoming issue of the *Journal of Mammalogy*.

Additional Efforts

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

[otic plants](#), [landbirds](#), [landscape dynamics](#), and [uplands](#) at Zion National Park.

For more information

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