



# Natural Resource Monitoring at Bryce Canyon National Park



Bryce Canyon National Park/©A.W. Biel

## 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 Bryce Canyon National Park.

## Landbirds



Gray vireo/RMBO

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. NCPN

data will contribute to the RMBO’s broader, landscape-scale, breeding-bird monitoring program. The NCPN has monitored two plots in pinyon-juniper woodland and one plot in sagebrush-shrubland at Bryce Canyon NP since 2005. The NCPN and RMBO will begin to look at trend data in 2009, after five years of data collection.

## Vegetation Mapping



Vegetation-mapping plot/NPS

The NCPN is continuing work on a multi-year, multi-partner effort to map vegetation at Bryce Canyon NP. This project has included gathering aerial photography, collecting initial vegetation-plot data, using the vegetation data to classify vegetation types and write vegetation descriptions, writing a dichotomous vegetation-type key, performing photo interpre-

tation, collecting accuracy-assessment data, creating a geodatabase, and writing the final report. 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.

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## Exotic Invasive Plants



Spotted knapweed  
(Elaine Haug/USDA-NRCS PLANTS database)

Exotic invasive plants represent one of the most significant threats to natural resources in national parks. Exotic plants are a concern because they are able to reproduce prolifically, rapidly colonize new areas, displace native species, and alter ecosystem processes across

multiple scales. To minimize costs and maximize the potential for eradication, it is critical to detect new populations of invasive species early. At Bryce Canyon NP, surveys will cover the places where exotic invasives are most likely to occur: roads, trails, and riparian corridors.

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## Water Quality



Yellow Creek/NPS

The NCPN is conducting long-term water quality monitoring at selected sites in Bryce Canyon NP, chosen through consultation with park resource management staff. Data are used to determine compliance with the Clean Water Act and monitor trends in water quality that may impact visitors as well as the ecological function of aquatic systems. Monthly monitoring visits indicate that water quality standards for bacteria are occasionally

exceeded at these sites, due largely to the presence of cattle that trespass into the park where fences are in disrepair along riparian corridors. For example, high bacteria levels were found in Yellow Creek after a recent flood of record destroyed the nearby boundary fence. Also, after the boundary fence on Sheep Creek was repaired, bacteria levels there ceased to be an issue.

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## Species Lists



Northern leopard frog/NPS

The NCPN has completed NPSpecies certification at Bryce Canyon NP for five taxonomic categories—birds, mammals, reptiles, amphibians, and vascular plants—and has posted the results on its website. An interactive application allows users to select a desired taxonomic category and an alphabetic sort function (i.e., by common name, scientific name, or family–scientific name). Additionally, users

can search by park, by status of the species in the park (e.g., present, historic, unconfirmed), and by individual species—allowing users to query, for example, does Bryce Canyon NP have a verified report of a northern leopard frog? The resulting species list can be downloaded into an Excel spreadsheet for use by the public, park staff, or park cooperators.

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## Climate



Fairyland area/NPS

Climate plays a crucial role in regulating biological and physical processes; rainfall and temperature are the primary factors that limit an ecosystem's structure and function. The NCPN compiles and analyzes climate data from five existing weather stations in Bryce Canyon NP. In 2006, precipitation and snow-

fall were close to long-term averages. Over the past 47 years, Bryce Canyon NP has shown an increase in average annual minimum temperatures. Bryce Canyon NP climate data for the years 1959–2006 are available in an interactive, graphical format on the NCPN webpage.

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## Future Projects

The NCPN will continue to expand ecological monitoring at Bryce Canyon NP. Protocols for monitoring land cover and land use, air

quality, human demographics, and land condition are underway and planned for future implementation.

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## For more information

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