



Natural Resource Monitoring at Black Canyon of the Gunnison National Park

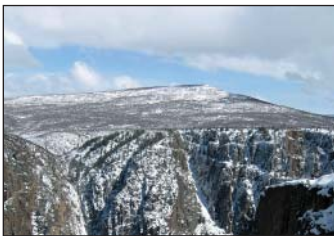


Winter storm (NPS/L. Lynch)

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 Black Canyon of the Gunnison National Park (BLCA).

Air Quality

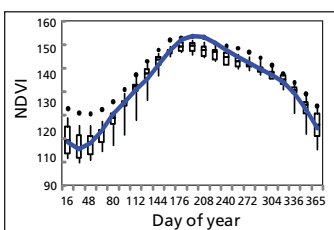


Black Canyon airshed (NPS)

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 Black Canyon of the Gunnison NP, the report focused on visibility monitoring. Under the Clean Air Act, Class I areas, like BLCA,

are subject to regulatory standards for particulates and visibility. Based on interpolated data from the nearby Weminuche Wilderness site in the San Juan National Forest, visibility was estimated to be in moderate condition at BLCA. Park visibility is often impaired by light-scattering pollutants (haze), but has been improving on clear days. The park is currently meeting its 2008 GPRA goal for visibility.

Land Condition



Normalized Difference Vegetation Index values for BLCA 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 Normalized Difference Vegetation Index (NDVI) is

a measure of vegetation greenness, or productivity, derived from satellite imagery. Although the timing of green-up was approximately the same time as the 9-year average, 2009 was one of the most productive of the last 10 years, based on peak seasonal greenness. During most of the growing season, the 2009 curve was generally at or above average condition. End of season brown-down occurred at the same rate and timing as in previous years.

Landbirds



Black-throated sparrow (©Greg Lavaty)

The NCPN is partnering with the Rocky Mountain Bird Observatory to assess breeding bird species trends in three habitats: riparian, pinyon-juniper, and sagebrush-shrubland. In 2009, the fifth year of monitoring was completed, including one plot each in sagebrush-shrubland and pinyon-juniper woodland at BLCA. We currently estimate that we will be able to detect a population change of at least 3% within 30 years for 55 species, representing

more than 90% of all individual birds observed thus far. To date, only one species is showing a consistent annual decline in NCPN parks: mourning dove, in low-elevation riparian areas. Three species have shown consistent annual increases: black phoebe and black-throated sparrow, both in low-elevation riparian habitat, and dusky flycatcher, in sage-shrubland. This trend information is preliminary.

Uplands



Uplands monitoring (NPS)

Aspen forest, sagebrush shrubland, oak woodland, and pinyon-juniper woodland vegetation types were selected for integrated upland monitoring at Black Canyon of the Gunnison NP and Curecanti NRA, grouped together due to their proximity, joint management, and overlapping vegetation types. For all types except aspen (which has a small spatial extent in both parks), a three-year pilot study to obtain estimates of variance for key parameters began in 2008. This information will be used to deter-

mine the number of plots necessary to detect trends for long-term monitoring. A total of 37 plots were established and monitored in 2008. These plots were revisited, and 15 new plots established, in 2009. Pilot sites were selected in a manner that ensures they will be included in the full-scale monitoring design. Network staff will return for the final season of pilot monitoring in 2010, to be followed by full-scale implementation.

Exotic Invasive Plants



Cheatgrass.

Cassandra Skinner@USDA-NRCS PLANTS Database

Invasive exotic plants 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 2010, the NCPN will be-

gin an invasive plant inventory and implement monitoring of invasives at BLCA and CURE. The three-pronged methodology will include (1) surveys of established monitoring routes by experienced field staff, (2) one-time inventories of areas of high concern to park managers, and (3) "monitoring lite," a method used by park staff or volunteers with less knowledge of invasive species.

Water Quality



Headgate (NPS)

The NCPN supports the existing long-term water quality monitoring program at BLCA. Data are used to determine compliance with Clean Water Act and state standards, and to assess trends over time. No water quality violations have been observed in the Gunnison River since 2006, but water quality in Red Rock Canyon frequently exceeded standards

for selenium and manganese, and occasionally exceeded standards for *E. coli*. Elevated *E. coli* concentrations have been observed in Red Rock Creek during summer low-flow periods. This Gunnison tributary is on the 303(d) list of impaired waters due to elevated selenium loads, but selenium and manganese may be naturally weathering from the watershed.

Additional Efforts

Protocols for monitoring riparian communities and land cover/land use are underway and planned for future implementation at Black Canyon of the Gunnison NP. Efforts are also

underway to complete both a vegetation map and Natural Resource Condition Assessment for the park. The park's list of natural resource inventory needs was updated in 2009.

For more information

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