



Southern Colorado Plateau Inventory and Monitoring Network



DAVID MIKESIC / NAVAJO NATURAL HERITAGE PROGRAM

Protecting National Park Resources for Future Generations

The National Park system was created to preserve the nation's natural and cultural heritage for this and future generations. Critical to this endeavor is knowing the condition of natural resources in the national parks.

To provide the parks with the information they need to improve natural resource management, the National Park Service created the Inventory and Monitoring Program by organizing 270 parks into 32 ecoregional networks. Each network is locally managed to address shared natural resource needs and issues of the constituent parks. Primary goals of the networks are (1) to

inventory the baseline condition of the natural resources in the parks and (2) monitor these natural resources over the long-term to detect changes in the ecological health of the parks. The networks then share the resulting information with park managers, the scientific community, and the general public. Park managers can use the information for planning, management, and decision making.

Over time, the scientific information provided by each network will help national parks meet the challenges of maintaining the ecological health of parks in the face of complex natural resource issues.



Vital Signs Monitoring

Vital signs monitoring is systems-based monitoring that provides scientifically sound information on park natural resources. It addresses physical resources and processes (e.g., air, water, climate, soils, fire, erosion), biological attributes (e.g., species, communities), and ecological processes (e.g., disturbance, productivity) that represent the overall health or condition of a park. Vital signs can also be park attributes that are highly valued by the public but not necessarily indicative of general park health.

I&M Networks have developed monitoring programs tailored to the highest needs of parks, working col-

laboratively with them to define goals and objectives, identify and prioritize potential vital signs, and to select a subset of these vital signs for long-term monitoring. The scientific information obtained through long-term ecological monitoring will have multiple applications for management decision-making, research, education, and promoting public understanding of park resources.

For more information about network vital signs monitoring, please see the Southern Colorado Plateau Network (SCPN) monitoring plan: http://science.nature.nps.gov/im/units/scpn/Documents/SCPN_MonitoringPlanFinal.pdf.



Upland Vegetation and Soils

Vegetation and soils are the foundation upon which all terrestrial ecosystems are built. Soils provide the medium for the storage and delivery of water and nutrients to plants, which in turn provide animal populations with both habitat and food. SCPN monitors vegetation and soils in selected vegetation types within network parks. The legacy of past livestock grazing, altered fire regimes, adjacent land-use activities, and climate change are major issues impacting the condition of upland ecosystems within these parks.



Riparian Systems

Vegetation is an important component of riparian ecosystems. Near-stream vegetation stabilizes stream-banks and provides habitat, organic matter, and nutrients essential to terrestrial and aquatic organisms. Riparian plant communities are sensitive to hydrologic change and vary depending on local geomorphology. Human activities, including water diversions, livestock grazing and recreational use, and natural disturbances, such as flooding, fire, and droughts, can alter the condition of riparian ecosystems. Integrated monitoring of vegetation, hydrology, and geomorphology can detect impacts to these systems.



Bird Communities

Because of their high body temperature, rapid metabolism, and high ecological position in most food webs, birds are a good indicator of the effects of local and regional changes in ecosystems. Bird monitoring within the SCPN focuses on habitats where upland vegetation or riparian monitoring is also occurring. In this way, information on the status and trends of bird communities contributes to our understanding of overall ecosystem condition.



Aquatic Macroinvertebrates

Aquatic macroinvertebrates, such as insect larvae, crayfish, snails, and worms, play a vital role in stream ecosystems, both as a food source and as consumers of algae and other organic matter. They are also sensitive to environmental change, so monitoring them enables us to detect chemical, physical, and biological impacts on aquatic ecosystems. Since Colorado, Utah, New Mexico and Arizona all utilize macroinvertebrates in their water quality monitoring programs, monitoring aquatic macroinvertebrates in SCPN parks will contribute to a broader regional understanding of aquatic conditions.



Water Quality

Perennial streams are rare on the Colorado Plateau—most are intermittent or ephemeral—and many are difficult to access, so water quality data on streams is sparse. SCPN monitors water quality to satisfy state and federal regulations and to learn about watershed condition and ecosystem health. Park managers need information on status and trends in order to develop plans and take actions to maintain or restore surface water quality and to work cooperatively with other agencies to protect aquatic habitats in the region.



Springs

Springs are important water sources in arid landscapes, supporting unique plant associations and sustaining high levels of biotic diversity. They also provide habitat for rare and endemic species. Because springs rely on groundwater, they can serve as important indicators of changes in local and regional aquifers. Throughout the Southwest, more than 90% of springs have been converted for human or livestock use in historic times. Springs on National Park Service lands can provide reference condition data for degraded springs in other areas.



Land Surface Phenology

Climate change may have complex ecological consequences on vegetation communities as it lengthens the growing season and alters annual precipitation patterns. SCPN monitors the productivity and phenology (timing of life-cycle events) for vegetation using Moderate Resolution Spectroradiometer (MODIS) satellite data. The trend information collected will enable parks to assess how climate change may be affecting the vegetation. The recent combined effects of drought, increased fire frequency, and associated insect outbreaks have made the need to monitor these patterns more urgent.





Mixed-conifer forest - Grand Canyon National Park



Ponderosa pine forest - El Malpais National Monument



Pinyon-juniper woodland - El Morro National Monument



Riparian woodland - Canyon de Chelly National Monument



Blackbrush shrubland - Glen Canyon National Recreation Area



Semi-arid grassland - Wupatki National Monument

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Southern Colorado Plateau Network Parks

The Colorado Plateau is a diverse region that extends from low desert communities in rugged canyons to alpine tundra atop the region’s highest peaks. Centered in the Four Corners area of Arizona, New Mexico, Colorado and Utah, it has one of the highest concentrations of national parks in the U.S. These parks are divided up between the Northern and Southern Colorado Plateau Networks.

The Southern Colorado Plateau Network (SCPN) covers nearly 3 million acres and encompasses 19 National Park Service units. Many of these parks were established to protect the cliff dwellings, great houses, and other archeological resources of ancestral Puebloan people that inhabited these lands in the past. Several parks preserve the history of early contact between American Indians and Europeans.

Other parks preserve significant geologic resources, ranging from Late Triassic paleontological resources found in Petrified Forest National Park to the volcanic features and landscapes of Sunset Crater and El Malpais National Monuments. The network also includes the spectacular 277-mile stretch of the Colorado River and thousands of miles of tributary side-canyons in Grand Canyon National Park.

The ecosystems found within SCPN parks mirror the diversity of the Colorado Plateau and include montane forests, pinyon-juniper woodlands and savannas, semi-desert grasslands, and shrub-steppe communities. The parks also include rivers, streams, and springs, which are scarce resources in the arid Southwest.

For more information about SCPN, please visit the website at <http://science.nature.nps.gov/im/units/scpn>.

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