

Northern Colorado Plateau Network

Monitoring Brief

National Park Service
U.S. Department of the Interior

Intermountain Region
Inventory & Monitoring Program



2009

Land Cover Monitoring

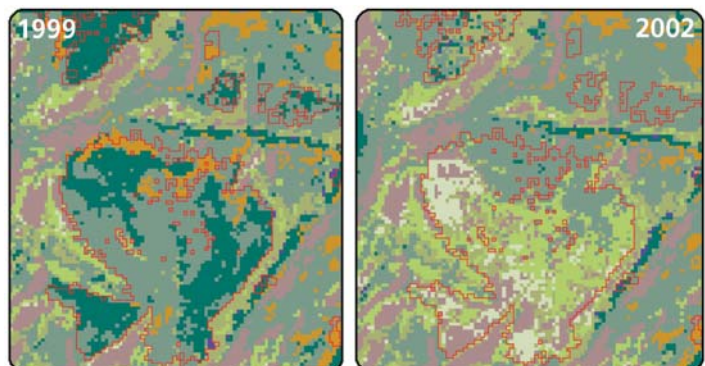
Importance

Landscape structure supports the natural diversity of ecosystems and species. The composition, configuration, and connectivity of land-cover types determine habitat availability, energy and material flows, and the movement of organisms on a landscape. Large changes in landscape structure occur in response to natural and human-caused disturbances. Natural disturbances are largely driven by climate; human-induced changes, such as agricultural production and housing development on lands adjacent to parks, can impact energy and material flows across park ecosystems. Given the relatively high perimeter-to-area ratios of Northern Colorado Plateau Network (NCPN) park units, monitoring changes in landscape structure along park boundaries is a high priority for park managers.

Long-term Monitoring

Follow-up studies based on recently completed pilot work indicate that satellite-based mapping of landscape structure and composition is feasible in NCPN parks. The process involves preprocessing and correcting raw imagery, extracting information on landscape change from that imagery, dividing the results into time periods of consistent change, and identifying points when trends in vegetation first begin to trend upward or downward. The next step involves linking the change maps to existing vegetation maps for interpretation.

The results will provide information on the start year, duration, and magnitude of change, as well as on starting values and relative change. That information will allow us to determine unambiguous trends related to climate change, disease, and encroachment over long time intervals (see below). The imagery



Maps showing effects of fire on land cover.

also clearly demonstrates abrupt changes like those caused by fire (see above), as well as the range of seasonal and annual phenological change driven by short-term variations in weather.

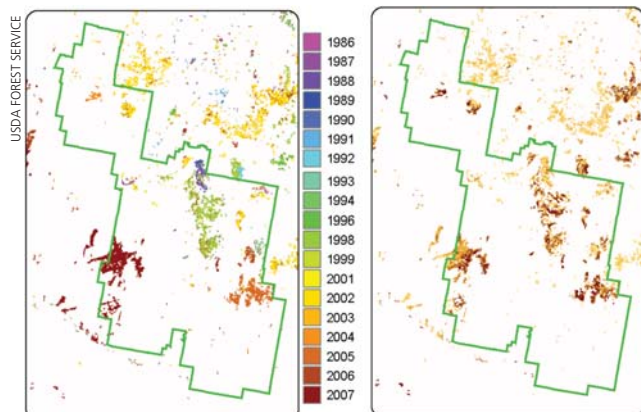
The objectives of this protocol are to determine (1) status and trends in the composition and configuration of land-cover types on park and adjacent lands; (2) status and trends in the connectivity of land-cover types within parks, and for park and adjacent lands combined; (3) status and trends in cross-boundary contrasts in land-cover types; (4) long-term changes in wildfire frequency and extent; and (5) long-term changes in the frequency and extent of insect and disease outbreaks.

Management Applications

Information from this monitoring effort will provide park managers with a baseline against which to assess future changes in landscape structure and composition, and the ability to detect large-scale disturbances in backcountry areas. Managers will also gain information on land-use activities along park boundaries and their potential impacts to park resources, which will aid in formulating mitigation strategies.

Contact

David Thoma, dave_thoma@nps.gov



Increase in vegetative cover over a 20+ year period in Zion NP, suggesting a slow infilling of shrub vegetation.

Network park units where land cover will be monitored

Arches NP	Dinosaur NM
Black Canyon of the Gunnison NP	Fossil Butte NM
Bryce Canyon NP	Golden Spike NHS
Canyonlands NP	Hovenweep NM
Capitol Reef NP	Natural Bridges NM
Cedar Breaks NM	Pipe Spring NM
Colorado NM	Timpanogos Cave NM
Curecanti NRA	Zion NP

NP = National Park; NM = National Monument;
NRA = National Recreation Area; NHS = National Historic Site

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

Intranet: <http://www1.nrintra.nps.gov/im/units/ncpn/>