



Springs, Seeps, and Hanging Garden Community Monitoring

2010

Importance

Springs, seeps, and hanging gardens provide essential water, food resources, and wildlife habitat, and are important oases of biodiversity and productivity in desert landscapes. Because of their inherent fragility, spring and seep ecosystems are sensitive to a variety of human activities that have reduced the ecological integrity of these ecosystems through recreation, groundwater diversion, and livestock grazing. Monitoring spring and seep ecosystems will enable a more thorough understanding of the impacts of human activities and climate change on these ecosystems.

Long-term Monitoring

The primary goal for long-term monitoring of springs, seeps, and hanging gardens is to assess trends in key indicators of spring and seep ecosystem health. In 2010, the Northern Colorado Plateau Network (NCPN) completed a final report summarizing the results of a two-year study to investigate the effects of anthropogenic disturbance on aquatic-macroinvertebrate communities and habitat quality in springs. The study, conducted at more than 45 springs in six NCPN parks, across a range of spring types in varied geologic settings, benefited from partnerships with the National Aquatic Monitoring Center (Utah State University), U.S. Geological Survey, and Bureau of Land Management.

Also in 2010, the NCPN completed an inventory of rare-plant populations at hanging gardens in Arches NP and Natural Bridges NM. This project was supported by a small parks grant, and a final report will be submitted in FY 2011. Protocols for monitoring rare-plant populations at hanging gardens were developed and tested in FY 2010.

The information from these two studies and previous inventory work will serve as the basis for selecting future core monitoring parameters and provide metrics for interpreting springs and seeps data. Draft monitoring protocols were developed in FY 2010 by staff from five NPS arid-land monitoring networks. Pilot testing of vegetation monitoring protocols occurred in FY 2010, and site selection and monitoring implementation will begin in FY 2011. Given the fragile nature of all these areas, monitoring designs will attempt to minimize observer impacts.

Monitoring Objectives

Preliminary objectives for springs and seeps monitoring are to:

1. Determine long-term trends in discharge;



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Pilot testing vegetation monitoring methods at a hanging garden, Arches NP.

2. Determine long-term trends in core and site-specific water-chemistry parameters;
3. Determine long-term trends in habitat area;
4. Determine long-term trends in vegetation composition and structure, with particular emphasis on rare plants at hanging-garden sites; and
5. Determine long-term trends in diversity and abundance of aquatic invertebrates.

Management Applications

Information gathered from NCPN monitoring of springs, seeps, and hanging gardens will be used to:

- Identify ecologically impaired sites;
- Identify priority restoration needs;
- Establish regional abundance and diversity of vegetation and invertebrates in Colorado Plateau springs, seeps, and hanging gardens; and
- Improve understanding of these ecosystems in parks.

Contact: Rebecca Weissinger, rebecca_weissinger@nps.gov

Network park units where springs, seeps, and hanging gardens will be monitored:

Arches National Park
Canyonlands National Park
Hovenweep National Monument
Natural Bridges National Monument