

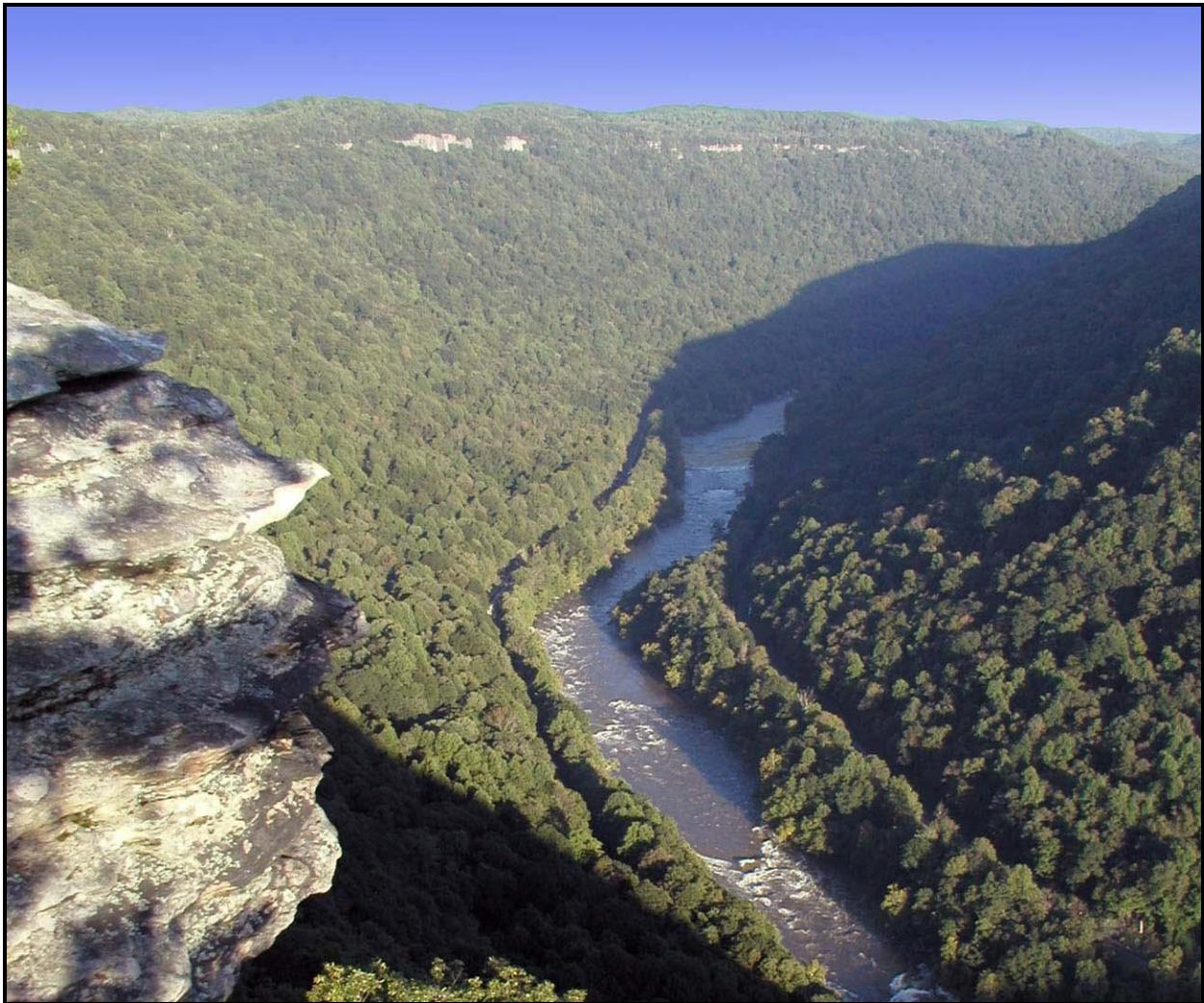
National Park Service
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Natural Resource Program Center

Eastern Rivers and Mountains Network Ecological Monitoring Plan

Natural Resource Report NPS/ERMN/NRR—2007/017



ON THE COVER

View of New River Gorge National River
Photograph courtesy of The National Park Service

Executive Summary

"To protect your rivers, protect your mountains"

- Emperor Yu, China, 1600 BC

Knowing the condition of natural resources in national parks is fundamental to the National Park Service's (NPS) ability to manage park resources "unimpaired for the enjoyment of future generations." Beginning in 1992, with additional support by the 1999 Natural Resource Challenge, the NPS implemented a strategy to institutionalize natural resource inventory and monitoring. The effort was undertaken to ensure that the more than 270 park units with significant natural resources possess the information needed for effective, science-based resource management decision-making. The national strategy consists of a framework having three major components: 1) completion of basic resource inventories upon which monitoring efforts can be based; 2) creation of experimental prototype monitoring programs to evaluate alternative monitoring designs and strategies; and 3) implementation of ecological monitoring in all parks with significant natural resources.

Parks with significant natural resources were grouped into 32 monitoring networks linked by geography and shared natural resource characteristics. The network organization was created to facilitate collaboration, information sharing, and economies of scale in natural resource monitoring. Parks within each of the 32 networks work together and share funding and professional staff to plan, design, and implement an integrated long-term monitoring program. The primary role of the networks is to collect, analyze, and share new data. The Eastern Rivers and Mountains Network (ERMN) is composed of nine park units within the states of Pennsylvania, New York, New Jersey, and West Virginia. The network parks are Upper Delaware Scenic and Recreational River (UPDE), Delaware Water Gap National Recreation Area (DEWA), Allegheny Portage Railroad National Historic Site (ALPO), Johnstown Flood National Memorial (JOFL), Fort Necessity National Battlefield (FONE), Friendship Hill National Historic Site (FRHI), Gauley River National Recreation Area (GARI), New River Gorge National River (NERI), and Bluestone National Scenic River (BLUE).

The complex task of developing ecological monitoring requires a front-end investment in planning and design to ensure that monitoring will meet the most critical information needs and produce ecologically relevant and scientifically credible data that are accessible to managers in a timely manner. The ERMN "vital signs" monitoring program was developed over four years with specific objectives and reporting requirements for each of three planning phases. This document is the final monitoring plan. This plan: 1) outlines ERMN monitoring goals and the planning process used to develop the monitoring program; 2) summarizes existing information concerning park natural resources and resource management issues across the network; 3) provides a conceptual model framework for ERMN park ecosystems; 4) documents the effort to select and prioritize vital signs; 5) presents a sampling framework for aquatic and terrestrial ecosystems in parks; 6) summarizes monitoring protocols; 7) describes the network's approach to data management; and, 8) provides information on program administration, funding, and operations.

“Vital signs,” as used by this program, are a subset of physical, chemical, and biological elements and processes of park ecosystems that are selected to represent the overall health or condition of park resources, known or hypothesized effects of stressors, or elements that have important human values. The elements and processes that are monitored include water, air, geological resources, plants and animals, and the various ecological, biological, and physical processes that act on those resources. Vital signs may occur at any level of organization, including landscape, community, population, or genetic level, and may be compositional (referring to the variety of elements in the system), structural (referring to the organization or pattern of the system), or functional (referring to ecological processes).

The diversity of ecosystems in ERMN parks, the geographic distribution of the parks, and differences in resource management priorities among parks are perhaps the greatest challenges facing the network. However, the vital signs selection process found that parks share a number of similar resource management issues and monitoring needs. The ERMN vital signs monitoring plan identifies a suite of common vital signs for monitoring. The network will prepare and implement monitoring protocols for the following 13 priority vital signs over the next 1–3 years (this information is presented in a national 3-level framework adopted by all networks as a way to consistently display and organize vital signs):

Level 1 Category	Level 2 Category	Level 3 Category	ERMN “Vital Sign” Name
Air and Climate	Air Quality	Wet Deposition	Air Quality
	Weather and Climate	Weather and Climate	Weather and Climate
Geology and Soils	Soil Quality	Soil Function and Dynamics	Soil Function and Dynamics
Water	Hydrology	Surface Water Dynamics	Surface Water Hydrology
	Water Quality	Water Chemistry - Core	Water Chemistry - Core
		Water Chemistry - Expanded	Water Chemistry - Expanded
Biological Integrity	Invasive Species	Invasive/Exotic Plants and Animals	Invasive/Exotic Plants, Animals and Diseases - Status and Trends
		Invasive/Exotic Plants and Animals	Invasive/Exotic Plants, Animals and Diseases - Early Detection
	Focal Species or Communities	Shrubland Forest and Woodland Communities	Forest, woodland, shrubland, and riparian plant communities
		Riparian Communities	Rare, riparian plant communities
		Birds - Riparian Communities	Louisiana waterthrush
Landscapes (Ecosystem Pattern and Processes)	Landscape Dynamics	Land Cover and Use	Landscape Dynamics
		Landscape Pattern	

Network parks and I&M staff and their cooperators will make thousands of observations each year about weather and climate, plant populations, aquatic macroinvertebrates, riparian birds, physical and chemical characteristics of water, and other attributes of our priority vital signs. The key to maintaining an accurate and complete record of those observations in perpetuity is in data management. The ERMN Data Management Plan identifies key data resources and processes to manage inventory and monitoring data. Assuring and maintaining data integrity is fundamental to the ERMN mission and requires a conscious and consistent effort to be successful. Data management procedures follow five key steps: acquisition, verification, validation, analysis, and dissemination. In addition, storage, maintenance, and security issues apply to all stages of the data flow.

Reporting is how park managers get information from the underlying data collection, analysis, and interpretation for use in decision-making. Network reporting will include: 1) annual summaries of progress and achievements in monitoring that include graphed results and summary statistics for vital signs; 2) multi-year status and trend reports that include correlation and trend analysis; and 3) concise resource “briefs” that contribute up-to-date summaries, data analysis, and interpretation for issues of concern. Routine reports will be automated as much as possible.

Administrative oversight for the program is by ERMN park superintendents and the Northeast Region Chief Scientist in a charter-driven Board of Directors (BOD). Technical oversight is by the Science Advisory Committee (SAC), comprised of natural resource managers and other expert NPS and government scientists who serve as the first level of scientific peer review for the vital signs program. In the organizational structure for the network, the Northeast Region I&M Coordinator supervises the ERMN Coordinator and the ERMN Coordinator supervises network professional staff: a data manager, a plant ecologist, a hydrologist/aquatic ecologist, term employees, and field crews. The network office is located on the campus of The Pennsylvania State University - the geographic center of ERMN parks. The Board of Directors selected this location by majority vote.

ERMN will be subject to periodic reviews to ensure high program quality and accountability. In 2010 and every fifth year thereafter, a comprehensive review of program operations will be conducted. Peer review of monitoring protocols, upon their completion and prior to full implementation, will be coordinated by the NER I&M Coordinator.