Vital Signs Monitoring in the National Capital Region Network

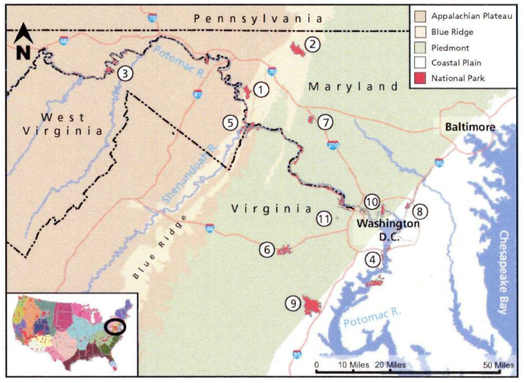
National Park Service
U.S. Department of the Interior

National Capital Region Network

Assembling the Puzzle

Monitoring the status and trends of the nation's parks

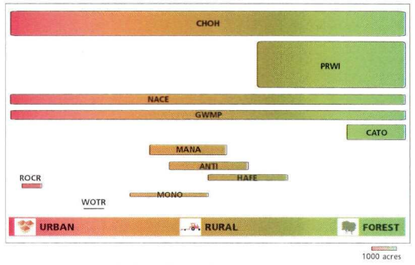
Knowing the condition of natural resources in national parks is fundamental to the National Park Service's mission to maintain park resources "unimpaired for the enjoyment of future generations." Most parks are open systems vulnerable to threats such as air and water pollution and invasive species, which originate outside of the park's boundaries. Understanding the dynamic nature of park ecosystems and the consequences of human activities is essential for management decision-making aimed to maintain, enhance, or restore the ecological integrity of park ecosystems.



Under the Inventory & Monitoring program, approximately 270 National Park Service units have been organized into 32 networks (inset U.S. map) to conduct long-term resource monitoring. The regional map shows the 11 National Capital Region Network park locations.

1. **ANTI** Antietam National Battlefield
2. **CATO** Catoctin Mountain Park
3. **CHOH** Chesapeake and Ohio Canal National Historical Park
4. **GWMP** George Washington Memorial Parkway
5. **HAFE** Harpers Ferry National Historical Park
6. **MANA** Manassas National Battlefield Park
7. **MONO** Monocacy National Battlefield
8. **NACE** National Capital Parks - East
9. **PRWI** Prince William Forest Park
10. **ROCR** Rock Creek Park
11. **WOTR** Wolf Trap National Park for the Performing Arts

Land Use Adjacent to and the Relative Sizes of the National Capital Region Network Parks



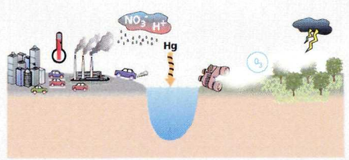
Although they comprise only a small fraction of its total area, the National Capital Region Network parks are among the most visited in the National Park system. The high numbers of visitors are due in part to the urban context in which many of the parks are found.

Monitoring Vital Signs

A suite of quantitative indicators inform park management

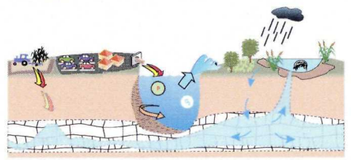
Vital signs monitoring is meant to provide early warning of abnormal conditions and impairment of selected resources and data to better understand the dynamic nature and condition of park ecosystems. The Inventory & Monitoring program will ultimately help managers make better-informed decisions and work more effectively with stakeholders who benefit from proper park stewardship. Each network links parks that share similar geographic and natural resource characteristics to improve efficiency and reduce costs. Priority vital signs for the National Capital Region Network fall into four categories of indicators:

Air Quality and Climate Indicators



- ozone concentration
- wet deposition
- visibility/particulate matter
- mercury deposition
- ambient temperature/precipitation

Water Quality and Hydrology Indicators

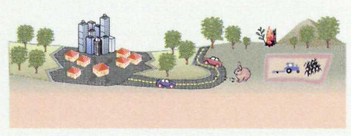


- surface water flow/discharge
- water chemistry
- nutrient dynamics
- aquatic macroinvertebrates
- shoreline features/change
- stream habitat/adjacent vegetation

Biodiversity Indicators

- invasive/exotic plants
- forest insect pests
- forest vegetation diversity/age/size
- biotic diversity/range/abundance
- rare/threatened/endangered species and communities

Ecosystem Pattern and Processes Indicators

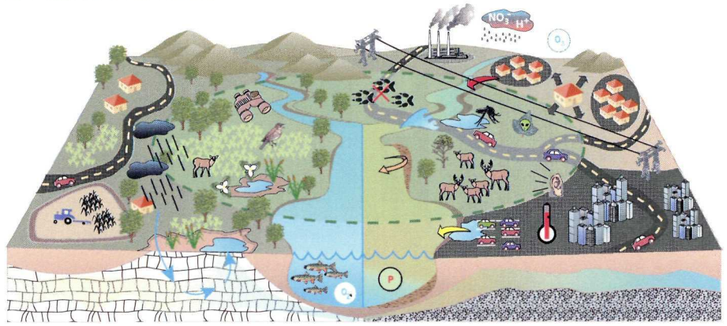


- land cover/land use
- landscape condition

National Capital Region Network Issues

Development pressures result in shared issues for National Capital Region Network management

The National Capital Region Network parks protect nationally and regionally important water, forest and grassland, wildlife, historic, and recreational resources:



- rivers, streams, wetlands, ponds, and seeps located in the parks, most of which lie in the Potomac River watershed, contribute substantially to the overall water quality of the Chesapeake Bay;
- park forests help to filter nutrients and sediment, stabilize soils, and moderate flooding of these streams and rivers;
- park forests also contribute to regional air quality by removing pollutants, fixing carbon, and buffering traffic and other noise pollution; and
- forest regeneration can be observed in many of the parks, while others maintain large expanses of grassland habitat, which serve as valuable habitat for the region's imperiled grassland bird populations.

However, major challenges face National Capital Region Network park management:

- adjacent development can have a significant impact by promoting exotic species invasions and the overabundance of native and pest species;
- regional changes in land use intensity can influence spatial-temporal patterns in temperature, disease outbreaks, and air pollution;
- regional changes in urban development or agriculture can alter water quality and quantity through the addition of impervious surfaces, the loss of forest and grassland areas, and the release of chemical and biological pollutants; and
- major transportation and utility corridors bisect many of the parks and can interrupt the natural flow of water, air, and biota.

National Capital Region Inventory & Monitoring Program
National Park Service
www.nps.gov/cue

Integration & Application Network (IAN)
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