



Monitoring Natural Resources in the National Capital Region

What is NCRN I&M?

NCRN I&M (National Capital Region Network, Inventory & Monitoring) is part of a larger National Park Service strategy to improve park management through greater reliance on scientific information. NCRN monitors the status and trends of natural resources in parks of the greater Washington, D.C. region.

NCRN serves 11 national parks in Virginia, West Virginia, Maryland, and the District of Columbia that share common natural resources.

National Capital Region Network Parks	Abbrev.	State
Antietam National Battlefield	ANTI	MD
Catoctin Mountain Park	CATO	MD
Chesapeake & Ohio Canal National Historical Park	CHOH	DC, MD
George Washington Memorial Parkway	GWMP	DC, MD, VA
Harpers Ferry National Historical Park	HAFE	MD, VA, WV
Manassas National Battlefield Park	MANA	VA
Monocacy National Battlefield	MONO	MD
National Capital Parks - East	NACE	DC, MD
Prince William Forest Park	PRWI	VA
Rock Creek Park	ROCR	DC
Wolf Trap National Park for the Performing Arts	WOTR	VA

Inventories

Before embarking on long-term monitoring, NCRN conducted a range of inventories on species occurrence and distribution within the region. Nine targeted inventories determined the occurrence of vertebrates and vascular plants in network parks where these data did not already exist (see reverse).

The national I&M program also undertook 11 core natural resource inventories including air quality, geologic resources, base cartography, and water quality inventories.

Monitoring

NCRN monitors “vital signs” that are physical, chemical, or biological elements and processes of park ecosystems. Many NCRN vital signs are forest-related since forests make up ~74% of landcover in NCRN parks.

The NCRN monitors forest vegetation and pests in more than 400 plots across the region. In all plots, the trees, shrubs, vines, and herbs are identified to group or species, measured, and labelled. Plants are also checked for diseases, pests, and evidence of deer browse. Special note is made of both rare and invasive species. Forest birds are monitored in spring and summer each year at many of the same forest vegetation plots.



Photo: NPS/Brollis

The NCRN also monitors water quality on a quarterly basis in 37 streams. We measure the pH, dissolved oxygen, water temperature, acid neutralizing capacity, salinity/specific conductance, nitrate, and total phosphorus of the water. We also measure stream width, depth, flow, and discharge. Continuous water loggers in a subset of streams also measure conductivity, dissolved oxygen, temperature, and water level.

Amphibians in streams and vernal pools are monitored yearly and NCRN also monitors aquatic macroinvertebrates, fish, and stream physical habitat. For a full list of NCRN monitoring efforts and which parks they occur in, see reverse.

Data

NCRN I&M efforts are providing fundamental data on ecosystem health and creating an indispensable baseline for the status of natural resources in the region’s parks. Our monitoring data supports management decision making, park planning, research, education, and promotes public understanding of park resources.

NCRN I&M information is available to park staff and to the public in digital and print formats. Data on water quality and other vital signs is available online through interactive “visualizer” websites. These visualizers, accessible through the NCRN website, allow users to generate graphs or tables of their choosing.

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Photo: NPS/Pieper, Dupre, Nortrup

MONITORING VITAL SIGNS

Category	Vital Sign Name	Vital Sign Measures	Parks
Air & Climate	Ozone	Atmospheric ozone concentration affecting plants (W126, SUM60) and humans (ppb)	All parks
	Wet Deposition	Concentrations of NO ₃ and SO ₄ in precipitation	All parks
	Visibility & Particulate Matter	Seasonal trends in visibility (deciviews), particulates of 2.5 microns	All parks
	Mercury	Mercury concentration in precipitation	All parks
	Weather	Temperature, precipitation	All parks
Geology & Soils	Stream Physical Habitat Index (PHI)	Includes measures of stream habitat available for macroinvertebrates, bank stability, stream shading, and distance from developed areas.	All parks
Water	Surface Water Dynamics	Flow, discharge, water depth, and wetted width of stream	All parks except CHOH
	Water Chemistry	pH, dissolved oxygen, specific conductance, temperature, acid neutralizing capacity, salinity	All parks except CHOH
	Nutrient Dynamics	Total nitrate, total phosphorous	All parks except CHOH
	Aquatic Macroinvertebrates	Number and taxa of macroinvertebrates measured as Index of Biological Integrity (IBI)	All parks
Biological Integrity	Forest Vegetation	Abundance and distribution of species of trees, shrubs, and vines; presence of select herbs; tree size and canopy class; deer browse; and woody debris.	All parks
	Forest Pests	Presence of select insect pests and pathogens	All parks
	Invasive/Exotic Plants	Abundance and distribution of select non-native species	All parks
	Fish	Fish species composition measured as Index of Biological Integrity (IBI)	All parks
	Amphibians	Species occupancy and richness for salamanders, frogs, and toads in streams and vernal pools	CHOH, MANA, PRWI, ROCR
	Forest Birds	Species composition and abundance	All parks
Landscapes (Ecosystem Pattern and Processes)	Landcover/Landuse	Area of dominant land cover types, impervious surface, forest connectivity, road density, population, and housing	All parks

Above: NCRN I&M park monitoring from left to right: stream water quality, forest vegetation, and forest birds.

Below: harbinger of spring (*Erigenia bulbosa*).



Photo: NPS/Nortrup

INVENTORIES

(completed)

NCRN Inventories of Species Occurrence & Distribution:	Parks	I&M National Inventories	
			Parks
Bat Inventory	All parks except PRWI	Air Quality Data	All
Bird Inventory	ANTI, CATO, HAFE, MANA, PRWI, WOTR	Air Quality Related Values	All
Fish Inventory	ANTI, CHOH, GWMP, HAFE, MONO, WOTR	Base Cartography Data	All
Graminoid Inventory	CATO, CHOH, GWMP, HAFE, MANA, NACE, ROCR	Baseline Water Quality Data	All
Herpetological Inventory	CATO, CHOH, GWMP, HAFE, MANA, MONO, ROCR, WOTR	Climate Inventory	All
Macrofungal Inventory	ANTI, CATO, CHOH, PRWI	Geologic Resources Inventory	All
Paleontological Inventory	All parks	Natural Resource Bibliography	All
Small Mammal Inventory	ANTI, CATO, CHOH, GWMP, HAFE, NACE, ROCR	Soil Resources Inventory	All
Vascular Plant Inventory	ANTI, MONO, ROCR, WOTR	Species Lists	All
		Water Body Location & Classification	All
		Vegetation Inventory	All