



Mid-Atlantic Network

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Protocol Development and Testing

In 2006, the Mid-Atlantic Network (MIDN) identified fifteen high priority vital signs for implementation as long-term monitoring programs in the parks. During the course of 2007, the network has initiated development of five protocols: air quality, weather and climate, water quality and quantity, aquatic macroinvertebrates, and forest vegetation.

Air Quality: The NPS Air Resources Division is developing the air quality protocol for all Inventory and Monitoring (I&M) networks. The protocol will include an annual scorecard and report which will synthesize existing data and provide a summary on trends for the four relevant MIDN vital signs.

Weather and Climate: In collaboration with the Eastern Rivers and Mountains Network (ERMN), Paul Knight (PA State Climatologist) is conducting an inventory of weather stations relevant to the network parks and developing a protocol for long-term monitoring and reporting. The data will be available through a web interface.

Water Quality and Quantity: Frank Deviney and Rick Webb at the University of Virginia are developing the protocol for

water quality and quantity. They will be conducting synoptic surveys and pilot testing at selected parks in the spring.

Aquatic Macroinvertebrates: Craig Snyder and John Smith, USGS Leetown Science Center, were awarded a NPS/USGS grant, “Ecological Thresholds and Structured Decision Analysis Using Aquatic Macroinvertebrate as Indicators of Stream Health in the Mid-Atlantic and Eastern Rivers and Mountains Vital Signs Networks”. The results of this project will feed directly into the development of an aquatic macroinvertebrate protocol for the network.

Forest Vegetation: A collaborative effort between several I&M networks and prototype parks has resulted in forest vegetation monitoring protocols that are closely based on the U.S. Forest Service Forest Inventory and Analysis program protocols. The MIDN has spent the summer pilot testing a protocol in all the network parks (see page 3).

Lastly, the network is currently working to complete the first draft monitoring plan which will be sent out for external peer-review in the winter, with the final plan due in September 2008.

Protocol	Related Vital Sign
Air quality	Ozone
	Wet and dry deposition
	Visibility and particulate matter
	Air contaminants (mercury)
Weather and climate	Weather and climate
Water quality and quantity	Stream / river channel characteristics
	Stream and river water dynamics
	Water chemistry
Aquatic macroinvertebrates	Aquatic macroinvertebrates
Forest Vegetation	Forest plant communities
	Invasive exotic plants
	Native forest pests
	Exotic Diseases / Pathogens – plants
	White tailed Deer (herbivory)
	Soil structure and composition



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Furry Friends of Forest and Field - MIDN Mammal Inventories

The mammal inventories for the MIDN parks are complete! The Pennsylvania parks were surveyed back in 1997 by the Pennsylvania State University (PSU). Through pitfall trapping, live trapping, scent stations, drift fences and road surveys the researchers were able to develop a baseline inventory of mammals within GETT, EISE, VAFO, and HOFU. These inventories also documented several new species for each of the parks.



Young Virginia opossum (*Didelphis virginiana*) at PETE. Photo by A. Roder & A. Chupp

Supplemental inventories were conducted by PSU at VAFO in 2004 which detected new park species including the coyote (*Canis latrans*) and feral cat. And more recent inventories conducted by the Pennsylvania Natural Heritage Program at GETT and EISE in 2004-2005 documented the presence of the state endangered least shrew (*Cryptotis parva*) at EISE.

The Virginia Commonwealth University conducted the mammal inventories for PETE, BOWA, and APCO. At PETE two large mammals, the bobcat (*Felis rufus*) and the coyote (*Canis latrans*), were documented through night camera photography at the Five Forks Unit. At APCO and BOWA findings indicate a relatively rich mammal fauna and ranging from the tiny pygmy shrew (*Sorex hoyi*) to the sizeable black bear (*Ursus americanus*).

Frostburg State University (FSU) conducted the mammal surveys of FRSP and RICH.



Live traps used at BOWA documented the presence of the grey fox.

At RICH the inventories resulted in 13 new species for the park. At FRSP a marsh oryzomys or rice rat (*Oryzomys palustris*) was captured in wetland habitat, especially significant because FRSP is close to the northern extreme of the geographic distribution of this species.

Download the mammal reports at:
www.nature.nps.gov/im/units/midn/InventoriesBio.cfm

Managing Cultural Parks to Support Grassland Birds

The status of grassland birds has become an increasingly important conservation issue as these species exhibit the most consistent population declines of any group of North American birds during the past 40 years. In 2005 the I&M program partnered with USGS Patuxent Wildlife Research Center scientist Dr. Bruce Peterjohn to explore the potential of cultural parks to support breeding communities of grassland birds.

This project involved four parks in the Northeast and National Capital regions with extensive grasslands: Gettysburg NMP, Fort Necessity NB, Antietam NB, Monocacy NB, and Manassas NBP. The project detected several interesting patterns during these grassland bird surveys. In GETT, where mowing is delayed until July, grassland birds were largely restricted to NPS-managed fields that support more diverse grassland communities. Leased hayfields were composed of dense monocultures and supported few grassland birds. In

the other parks where mowing began in late May, grassland birds generally abandoned fields after they were mowed. Successful reproduction was evident only in fields that



The bobolink (*Dolichonyx oryzivorus*) is a World Conservation Union threatened species found at GETT. Drawing by R. Keane

These results indicate that grassland management practices can be adapted to benefit breeding bird communities in these habi-

remained unmowed through June. As expected, breeding grassland birds preferred the largest contiguous habitats in all parks, avoiding smaller fields less than 24 acres (10 ha) in size.

tats. Delaying mowing and haying activities until after July 15 will allow for improved reproductive success and population increases. Replacing homogenous areas with mixed-grasses will increase the amount of suitable habitat. In addition, proactive grassland management through prescribed burns, regular mowing, and/or periodic disking to create young and mature, mixed-species grasslands will support a more diverse grassland-bird community. Increasing the size of contiguous grassland habitats would also benefit breeding grassland birds.

With proper management of native grasses, cultural parks in the Northeast can cultivate historic landscapes, while providing habitat with the potential to support source populations for most grassland birds. The results of this study can be applied to other parks in the MIDN that manage grasslands.

Download grassland bird reports at:
www.nature.nps.gov/im/units/midn/Reports.cfm

Networks & Parks Collaborate on Eastern Forest Protocols

The I&M networks and parks in the East are collaborating to ensure that protocols for tracking forest vegetation in the eastern forests are compatible with each other and with the USDA Forest Service's For-



Tim Blumenschine measures tree diameter during surveys at PETE.

est Inventory Analysis and Forest Health Monitoring programs. Participants in this collaborative effort cross four NPS regions and include eight I&M networks and three prototype parks for a total sixty-one national parks (23% of the parks in the I&M Program).

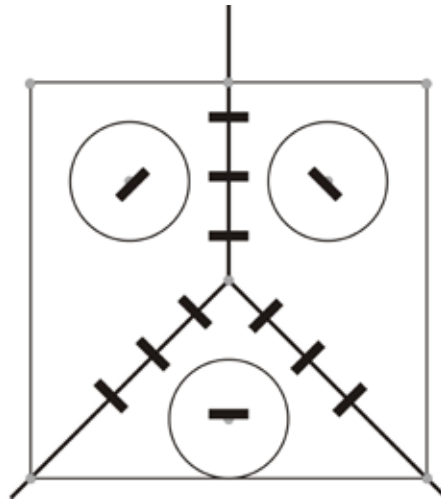
Networks include: Appalachian Highlands, Cumberland Piedmont, Eastern Rivers and Mountains, Great Lakes, Mid-Atlantic, National Capital Region, Northeast Coastal



Kristina Callahan, Data Manager using the digital range finder to establish plot boundaries.

and Barrier, and Northeast Temperate. Prototype Parks include: Cape Cod National Seashore (Massachusetts), Great Smoky Mountains National Park (Tennessee and North Carolina), and Shenandoah National Park (Virginia).

The monitoring programs range from the three prototype parks that have been collecting forest data for years to the networks that began establishing monitoring plots in 2006 and 2007. Though plot sizes and shapes may vary, metrics and field procedures have been largely standardized to facilitate data sharing.



Forest vegetation monitoring plot design showing quadrats, microplots, and transects.

The MIDN has adopted the draft monitoring protocols developed by the National Capital Region Network (NCRN). Pilot testing was conducted from May through September by MIDN staff who visited nine parks. The tenth MIDN park, Shenandoah, is a prototype park and has an existing forest vegetation monitoring program in place. A total of 75 permanent vegetation plots were established in the nine parks, and the data is currently being analyzed to evaluate whether the protocols will meet the monitoring objectives.

For the MIDN, the forest monitoring plot is composed of a 20 x 20-m plot, three 3-m



James Comiskey, Network Coordinator, measuring tree DBH at BOWA.

radius microplots, twelve 2 x 0.5-m quadrats, and three 15-m transects. In the plot, all trees and shrubs with a diameter at breast height (dbh) ≥ 10 cm are identified, measured, marked, mapped and tagged. In the microplots, trees and shrubs with a dbh ≥ 1 cm are identified, measured, marked and tagged. In the quadrats, tree seedlings 15 cm or taller are identified and measured. Cover is estimated for all tree and shrub seedlings, exotic species, and a select list of native species in the quadrats. Along the transects, coarse woody debris ≥ 7.5 cm is measured. In the future, soil samples will be collected from outside the plot to evaluate the effects of acid deposition.



Gabe Sidman, GETT intern, marks the corner of a plot dominated by the exotic Japanese stiltgrass.

A Quarter Century of Watershed Research & Monitoring at SHEN

The Shenandoah Watershed Study (SWAS) program is the longest continuously conducted watershed research and monitoring program in the National Park System. The SWAS program was begun in 1979 as a cooperative undertaking of Shenandoah National Park and the Department of Environmental Sciences at the University of Virginia. The initial focus of SWAS was the harmful effects of acidic deposition from the atmosphere on the park's sensitive streams, most of which support reproducing populations of the native brook trout (*Salvelinus fontinalis*). Over time the SWAS program has evolved to address additional issues that challenge watershed ecosystems in the park, including the legacy of past land use, the impact of forest defoliation by the gypsy moth, and the depletion of nutrients in watershed soils.

SWAS data collection within Shenandoah National Park is coordinated with the Virginia Trout Stream Sensitivity Study



A waterfall within SHEN. NPS Photo.

(VTSSS), which extends watershed research and monitoring to native brook trout streams throughout the mountains of western Virginia. Regional-scale analysis has allowed identification of biologically important trends that are obscured on less extensive scales by variation due to lithology, forest disturbance, and other local factors. The integrated SWAS-VTSSS data collection framework represents (1) spatial variation through a site selection strategy based on differences in landscape proper-

ties, and (2) temporal variation by collecting data at different frequencies.

Current SWAS data collection in Shenandoah National Park includes a combination of quarterly, weekly, and higher-frequency water quality sampling on 14 streams, continuous discharge measurement on 5 streams, and determination of precipitation amount and composition at 2 locations. Current VTSSS data collection includes quarterly water quality sampling on an additional 51 streams located mostly in the George Washington and Jefferson National Forests

Staff from the Department of Environmental Sciences at UVA have joined forces with the MIDN to help develop the water quality and quantity monitoring protocols. Initial synoptic surveys and pilot testing will occur in network parks in 2008.

For more information visit:
<http://swas.evsc.virginia.edu>

Mid-Atlantic Network:
www.nature.nps.gov/im/units/midn

National Inventory & Monitoring Program:
science.nature.nps.gov/im

National Park Service:
www.nps.gov

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