



# Mid-Atlantic Network



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## Vital signs have been selected!

The term vital sign is defined as “a subset of physical, chemical, and biological elements and processes of 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 National Park Service is using vital signs to identify priority resources for long-term monitoring

The Mid-Atlantic Network (MIDN) initially selected 43 vital signs, in consultation with park staff and the Science Advisory Committee, that represented high priority natural resources and ecological stressors. Supporting material was developed that provided a brief outline for each vital sign, including a justification for monitoring, information on related environmental issues, examples of monitoring questions and management applications, proposed metrics and their efficiency, and prospective methods for monitoring.

Next, a web based interface was developed where users could log-in and select vital signs for ranking. Ninety-seven subject matter experts participated, more than would have provided input through a single workshop. Participants included members

of the Science Advisory Committee, park staff, and a wide range of experts from other government and state agencies, universities, and NGOs.

This process resulted in the selection of 20 vital signs (see list on right). Of these, five will involve data compilation from other sources, nine will be developed as protocols for implementation at parks over the next three to five years, and six are considered high priority but will not be developed into protocols at this time. Since Shenandoah National Park already has a monitoring program in place, the results of the vital signs ranking process will be used to evaluate their current monitoring priorities and to identify potential gaps in the program.

The MIDN is currently working to develop four monitoring protocols that will target the high priority and high feasibility vital signs. These include Air Quality, Weather, Water Quality, and Forest Vegetation. Protocols identified for future development include Riparian/Wetlands, Land Cover/Land Use Change, Amphibians, and Breeding Birds. Over the next few months, MIDN staff will initiate pilot testing and implementation of the first monitoring protocol, Forest Vegetation.

### MIDN Vital Signs

#### Data Compilation

- Ozone
- Wet and dry deposition
- Visibility and particulate matter
- Air contaminants (mercury)
- Weather and climate

#### Implementation

- Stream/river channel characteristics
- Stream and river water dynamics
- Water chemistry
- Aquatic macroinvertebrates
- Invasive exotic plants
- Native forest pests
- Exotic diseases/pathogens- plants
- Forest plant communities
- White- tailed deer (herbivory)

#### Developed Later

- Soil structure and composition
- Wetland water dynamics
- Riparian/wetland communities
- Amphibian communities
- Breeding birds
- Land cover and land use dynamics

Download the MIDN Phase Two report at:  
[www.nature.nps.gov/im/units/midn/PhaseTwoReport.cfm](http://www.nature.nps.gov/im/units/midn/PhaseTwoReport.cfm)

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# Adding it up- Certified species in the MIDN parks

Just how many species are in the parks? The table below shows the number of species certified in NPSpecies for each park. The numbers include species documented through I&M inventories, previous park studies, and other sources.

NPSpecies certification is a quality control step to provide documentation that the organism lists and associated attributes for a park and taxon have been reviewed for completeness and accuracy. The certification process screens sensitive data and en-

ures the quality of data that will eventually be available to the public.

The MIDN continues inventories and compilation of existing park data to reach its goal of documenting 90% of all species.

	Fish	Reptile	Amphibian	Bird	Mammal	Vegetation
Appomattox Court House NHP (APCO)	30	14	19	93	26	Data will be certified in late 2007
Booker T. Washington NM (BOWA)	38	9	9	92	32	
Eisenhower NHS (EISE)	31	3	7	111	11	
Fredericksburg & Spotsylvania NMP (FRSP)	41	18	22	159	19	
Gettysburg NMP (GETT)	18	13	15	157	25	
Hopewell Furnace NHS (HOFU)	18	15	16	139	18	
Petersburg NB (PETE)	22	26	21	130	34	
Richmond NB (RICH)	30	24	23	137	22	
Shenandoah NP (SHEN)	34	27	24	192	54	
Valley Forge NHP (VAFO)	28	19	17	173	26	

## Catch and Release- An inventory of the MIDN fish

Fish inventories have been completed for the entire network and the species data has been certified within NPSpecies. This tremendous sampling effort was conducted by the Shenandoah National Park team headed by Jim Atkinson.

At BOWA the bigeye jumprock (*Scartomyzon ariommus*), a globally rare Catostomid was documented within Gills Creek. Nearly one third of the fish community diversity within Gills Creek is comprised of Catostomids. A total of 10 species have been detected within the section that flows through or adjacent to BOWA.

Surveys at EISE detected a high diversity and density of fish in the red shale/sandstone/limestone streams within the park. A remarkable total of 16,851 fish representing 31 species were captured at EISE in less than two days of electrofishing within Marsh Creek and Willoughby Run.

At FRSP a population of mottled sculpin (*Cottus bairdi*) as encountered within Wilderness Run (central Piedmont). In Virgin-



Counting the bounty after a day of electrofishing at EISE. Photo by J. Comiskey

ia, these fish are more typical of coldwater streams in the Blue Ridge and Valley and Ridge provinces. Disjunct to distant mottled sculpin population isolates in Virginia only occur within the Rappahannock and James drainages. Additionally, a population

of silverjaw minnows (*Ericymba buccata*) was encountered in Hazel Run. This is the only known record of the species within the Rappahannock Drainage from the upper Coastal Plain. These fish more typically occur in the central to upper Piedmont regions of the drainage.

At VAFO the introduced flathead catfish (*Pylodictus olivaris*) was detected within the Schuylkill River and was associated with the absence of a sunfish population within the sample section. These catfish have been gradually introduced into a number of Atlantic slope drainages from the Mississippi basin since the mid 1960s and have become well established in some river systems.

While there are currently no listed endangered or threatened species within any of the parks sampled, several species appear on the Virginia Natural Heritage Vertebrate Watch List.

Download the fish reports at: [www.nature.nps.gov/im/units/midn/inv\\_fish.htm](http://www.nature.nps.gov/im/units/midn/inv_fish.htm)

# Bat inventories in the Pennsylvania parks

Jim Hart, Pennsylvania Natural Heritage Program, conducted the bat inventories in the Pennsylvania parks throughout 2005 and 2006. Bats were captured using mist nets strategically placed in areas where bats would likely be present, such as near stream corridors or barns. Captured bats were examined, measured, weighed, and then released.

The little brown (*Myotis lucifugus*) and big brown (*Eptesicus fuscus*) bats were the most commonly caught species within all four parks. The State Rare northern long-eared bat (*Myotis septentrionalis*) was also documented within all four parks.

At GETT and EISE the majority of the little brown and big brown bats were females, indicating that several maternity colonies may exist within the confines of the parks. Other species found at GETT and EISE include the red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), eastern pipistrelle



SCA intern at VAFO assists with the examination of a northern long-eared bat. Photo by M. Carfioli.

(*Pipistrellus subflavus*), and the northern long-eared bat.

At VAFO and HOFU four bat species were detected. These include the little brown, big brown, northern long-eared, and the red bat. The occurrence of the northern long-eared bat at HOFU and VAFO may

indicate that the habitat within the park supports a stable population of this species.

During the spring of 2005, two Federally Endangered Indiana bats (*Myotis sodalis*) were radio tracked by the Pennsylvania Game Commission (PGC) traveling through GETT on migration to summer sites in Maryland. Further inventories were conducted by Hart in 2006 to determine whether this species “stops over” in GETT during these migrations, but no Indiana bats were captured in the park. Additionally, in the spring of 2006, an Indiana bat was captured by the PGC approximately 30km north of HOFU. Although the Indiana bat has not been documented in the parks it is definitely in the area!

Download the bat reports at [www.nps.gov/nero/science/FINAL/revise\\_final\\_reps/mammals.htm](http://www.nps.gov/nero/science/FINAL/revise_final_reps/mammals.htm)

# Snakes, turtles, frogs...oh my! The MIDN herp inventories

In the Pennsylvania parks the herp surveys were conducted by Dr. Richard Yahner, Pennsylvania State University (GETT & EISE) and Harry Tiebout, West Chester University (VAFO & HOFU).

GETT & EISE- The Northern leopard frog (*Rana pipiens*) was documented as a new record for Adams County.



A bullfrog (*Rana catesbeiana*) found during inventories at APCO. Photo by J. Mitchell

HOFU- Several amphibian species of special concern were found including the four-toed salamander (*Hemidactylum scutatum*), spotted salamander (*Ambystoma maculatum*), and wood turtle (*Glyptemys insculpta*).

VAFO- Wetlands and lowland forests along the northern floodplain of the Schuylkill River supported more than 2/3 of the herp species found. Some park species appear to be rare or limited to a restricted geographic range, making them vulnerable to local extinction. The surveys also documented the presence of the exotic red-eared slider (*Trachemys scripta elegans*).

Through a cooperative agreement with Dr. Joseph Mitchell, University of Richmond, herp inventories in the Virginia Parks of APCO, BOWA, FRSP, PETE and

RICH began in October 2002 and were completed in July 2005. (cont'd on p.4)



An eastern box turtle (*Terrapene carolina*) in the forest of GETT. Photo by C. Davis.

# Learning from the SHEN Prototype

Forests constitute an important component of the ecosystems of Shenandoah National Park. Since 1989, the park has conducted long-term forest monitoring to document the status of the forest and detect large-scale changes resulting from human-caused or natural environmental factors. The variety of vegetation communities throughout the park presents a challenge to the monitoring program, and in 1999 a program evaluation and review process was initiated. This process served to 1) better define program objectives, 2) evaluate the usefulness of existing data to answer ecological questions, and 3) refine the sampling design. The review identified a field protocol that was too labor intensive and collection of data that did not yield sufficient statistical power to detect forest changes of interest.

In 2000, state, federal and university scientists joined forces to help the park revise the monitoring program. Changes included a streamlined protocol, a revised plot sampling scheme, and the addition of sampling plots. Since 2003, SHEN staff have initiated implementation of the new forest monitoring protocol which has included installation of 93 new plots and modification of 67 existing plots. The plots are distributed proportionately across 16 strata



Park staff monitoring vegetation in plot. NPS Photo.

defined by unique combinations of three bedrock geology types, two continuous aspect classes, and three continuous elevation classes. Preliminary trends indicate the monitoring program has greater precision than the historic data.

The forest monitoring experience at SHEN has been invaluable to other networks, including MIDN, that are developing forest monitoring programs. Over the past two years, SHEN staff have contributed to the design and standardization of forest monitoring protocols for eight I&M networks with eastern forests. The stage is now set for regional comparisons in forest monitoring trends.

For more information contact Wendy Cass (SHEN Botanist) at [wendy\\_cass@nps.gov](mailto:wendy_cass@nps.gov)

## Herp inventories (cont'd from p. 3)

APCO- A salamander of special interest in VA, the elusive mole salamander (*Ambystoma talpoideum*), was documented.

BOWA- The combination of unique habitat types (mixed hardwood forests, impoundment pond, and floodplain pools) at BOWA provide habitat for various reptiles and amphibians.

FRSP- A frog of special interest in VA, the carpenter frog (*Rana virgatipes*), was found at the Stonewall Jackson Shrine.

PETE- One species of frog and two species of salamanders have been newly documented for the Piedmont Physiographic Province and Dinwiddie County.

RICH- Two species of frogs new to Henrico County were documented in the Fort Harrison Unit.

Download the herp reports at:

[www.nature.nps.gov/im/units/midn/inv\\_herps.htm](http://www.nature.nps.gov/im/units/midn/inv_herps.htm)

### Mid-Atlantic Network:

[www.nature.nps.gov/im/units/midn](http://www.nature.nps.gov/im/units/midn)

### National Inventory & Monitoring Program:

[science.nature.nps.gov/im](http://science.nature.nps.gov/im)

### National Park Service:

[www.nps.gov](http://www.nps.gov)

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