



# Pennsylvania Natural Heritage Program

information for the conservation of biodiversity

Wild Heritage News

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A high quality vernal pool in Pike County, pg 1  
Photograph by Betsy Leppo

## Vernal Pools and Private Landowners

by  
Betsy Leppo

For some wildlife enthusiasts, spring arrives with the duck-like quacking of male wood frogs. Humorous to the human ear, this call beckons female frogs to rendezvous in the chilly waters of Pennsylvania's woodland pools. Around the same time, large, exotic-looking mole salamanders emerge from their underground tunnels in the forest. Most will return to the vernal pool where they were born years ago to find a mate and breed.

Vernal pools are depressions in the forest that fill with water from precipitation, snowmelt, and/or ground water, and then dry for a few months during the summer. Vernal pools provide critically important habitat for certain amphibians, insects, turtles, and crustaceans, many of which have special adaptations to live in temporary pools and do poorly in permanent waters. Several 'Species of Greatest Conservation Need' identified in the Pennsylvania Wildlife Action Plan (PA-WAP) depend upon or commonly utilize vernal pools including Jefferson salamanders (*Ambystoma jeffersonianum*),

marbled salamanders (*Ambystoma opacum*), spotted turtles (*Clemmys guttata*), and wood turtles (*Glyptemys insculpta*).

Vernal pool habitats were recognized as requiring Level I (highest priority) conservation actions in the PA-WAP (Chapter 17-5). They are threatened by filling, excavation, and forest fragmentation, as well as alteration of hydrology, water chemistry, substrate, vegetative cover, and conversion of natural habitat for human uses. Vernal pools are particularly vulnerable to destruction because they are easily overlooked during their dry phase.



Marbled salamander (*Ambystoma opacum*), a vernal pool indicator species

Jack Ray

The PA-WAP recognized that landowners play an important role in the protection of vernal pools. Management practices on private lands will impact the distribution and condition of seasonal wetland habitats throughout Pennsylvania. Therefore, direct outreach and technical assistance for landowners was identified as a way to encourage beneficial management practices for vernal pools on private lands.

Since 2009, the Pennsylvania Natural Heritage Program (PNHP) has worked to produce management plans and other educational materials for landowners.



Betsy Leppo

A landowner enrolled in the program shows us her beautiful vernal pool in Pike County

This work was funded by two grants awarded to the Western Pennsylvania Conservancy: 1) The Community Conservation Partnerships Program, Environmental Stewardship Fund, administered by the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation, and 2) the Landowner Incentive Program, administered by the Pennsylvania Fish and Boat Commission. This work was conducted in partnership with the funding agencies, the ClearWater Conservancy, and The Nature Conservancy.

Landowners who enrolled in this program prioritized goals for their property. PNHP biologists visited each property to assess the natural resources present in

and around existing wetlands, and wrote a plan recommending best management practices to protect the vernal pools and adjacent uplands with sensitivity to other land use goals. There were no fees or commitments associated with this program.



Betsy Leppo

Highbush blueberry is a lovely native flowering shrub often found in vernal pool wetlands

During the course of this project, PNHP staff and collaborators logged 50 outreach and education events, including a video clip for the Discovery Channel website. We visited the wetlands of 30 private landowners and developed customized management plans for each. We prepared educational mailings for an additional 60 landowners, educators, and land managers. PNHP collaborated with The Nature Conservancy to develop a 'Statewide Vernal Pool Identification Guide' in poster and booklet form which is available at <http://www.naturalheritage.state.pa.us/>.

The interest generated by this project indicates a receptive audience in Pennsylvania. We hope to find ways to continue developing management plans for vernal pool landowners and assist them with implementation of their plans.



Betsy Leppo

A high quality vernal pool in Pike County

## County Inventory Program's New Web Application

by  
Rocky Gleason

Where would you go to get descriptions and biological details of nearly 4000 ecologically significant places across Pennsylvania? Log onto the PNHP web site and you will see the results of over 20 years of work that PNHP has carried out as part of its County Natural Heritage Inventory (CHNI) Program. All of the county data has now been combined into a statewide layer, which can be viewed through a new interactive web application.

CNHIs are systematic studies of the critical biological resources of Pennsylvania's counties. The primary focus of CHNI surveys has been on species of concern, those plants, animals, natural communities, and habitats most at risk of decline or loss. PNHP staff began conducting CNHIs in 1988 with Centre and Lancaster Counties and are nearing the completion of all counties within Pennsylvania. These studies were conceived as tools to assist in county and municipal planning to avoid the accidental destruction of habitats supporting species of concern. The information provided in CNHIs has been incorporated into comprehensive plans, regional greenway plans, watershed plans, and land acquisition prioritization by government and conservation organizations. CNHIs have also been a primary source for much of the current Pennsylvania Natural Diversity Inventory (PNDI) environmental review data. While the CNHIs do not replace the need to conduct environmental

permit reviews, they can streamline the process by highlighting the most sensitive natural features in the region as a first step in project planning.

Although CHNI projects were initially conceived as tools to help individual counties integrate biodiversity information into their planning efforts, more and more users began to request data for projects that went beyond county lines, such as regional greenway planning or watershed planning. At the time, one would have to sift through the various CHNI projects to get a broader view of the primary locations for species of concern and other sensitive natural features prior to submitting a project for environmental review. The goal of this project was to integrate all of the individual county reports together into a single statewide dataset. The new dataset provides a landscape level review of the most sensitive ecological features of the state.

Combining data collected over a 20 year span posed many challenges. New data have become available since the older reports were published, which had to be integrated into the statewide layer. Sites on county borders had to be edge-matched, and the corresponding information combined. Site descriptions were also reviewed to meet current PNHP standards for the release of sensitive species information, removing mention of those considered at high risk from intentional disturbances such as collecting or poaching.

Click the Core Habitats in the map to view site details. For more information hover the mouse over help icons ?

Map navigation: Topo Map, Terrain, Map, Satellite, Hybrid

Search by County or Watershed:

Select a County: [Dropdown] Go

Open CHNI Report

Select a Watershed: [Dropdown] Go

County Help: ? Watershed Help: ?

Search by Address

Map Help

Map Legend:

- Core Habitat ?
- Provisional species of concern site ?
- Supporting Landscape ?
- Landscape Conservation Area ?
- Important Bird Areas (IBA) ?
- Counties ?
- Municipalities ?
- HUC8 Watersheds ?

View the GIS Layers in ArcMap ?

View the GIS Layers in Google Earth ?

Map coordinates: 40.875000 -77.802778

Map data ©2011 Google, Copyright ©2011 National Geographic Society, DataScribe

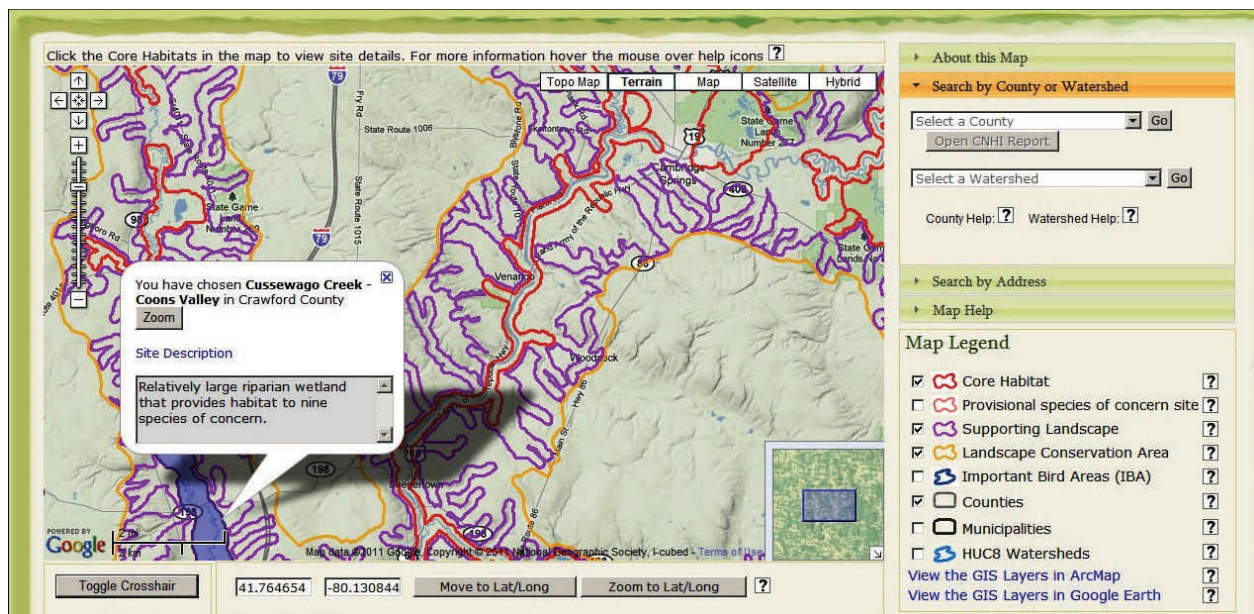
Currently, we use four levels of CNHI polygons to highlight the high priority ecological attributes of the landscape and map them according to their sensitivity to human activities. We did not develop all four types of polygons for every CNHI project, but a future goal is to provide this level of mapping statewide.

- **Core Habitat** - denotes the area most closely associated with the species of concern habitat. This area can support little disturbance without adversely affecting the habitat of the species of concern. (3407 polygons in current statewide dataset)
- **Supporting Landscape** - identifies areas surrounding or adjacent to core habitats that are not the primary habitat of the species of concern or natural community, but represent the areas necessary to maintain vital ecological processes or secondary habitat that could be impacted by certain types of habitat-disturbing activities. (558 polygons)
- **Provisional species of concern site** - refers to areas where species have been found outside of existing core habitat areas after completion of a given CNHI project, for which no CNHI site polygon was developed. The statewide map denotes areas of importance to species of concern first mapped during active projects and in most cases does not reflect data obtained from subsequent surveys. These areas are being evaluated and redrawn based on species habitat requirements (2586 polygons)
- **Landscape Conservation Areas** - are large contiguous areas that are important because of their size, landscape context, open space, and/or inclusion of numerous core habitats. These areas are large scale, and while they typically include many land uses, they

provide the ecological framework of the landscape that links habitats and allows plants and animals to shift and move across sizable portions of the landscape. (140 polygons)

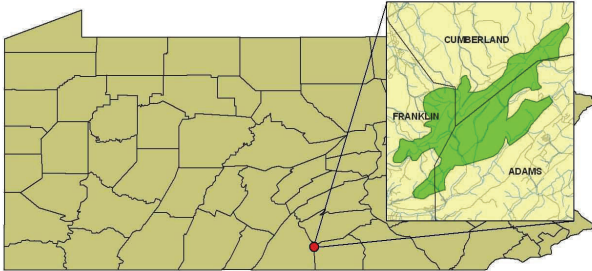
This new statewide approach to documenting biological diversity, combined with the web tool to display the information, enables PNHP to provide more current data to the public than was possible with static reports. As new information is documented, site boundaries and descriptions can be updated.

DCNR has developed and is hosting the interactive statewide CNHI map as part of the PNHP website (<http://www.naturalheritage.state.pa.us/cnhi/cnhi.htm>). This online map allows users to view the CNHI collected works at any scale including statewide, regional, county, municipal, watershed, and individual site. Tabs allow the user to view brief descriptions of each site, or click to view the entire site description as it appeared in the original report. Users can also directly download the GIS data to their application, or view the data in Google Earth to support their analyses with the most up to date information. This effort is already proving its worth. During the first six weeks that the map tool was available, users from 39 states and 9 countries accessed it over 1,700 times. The top states by number of users were Pennsylvania followed by New York, New Jersey, Maryland, and Texas. Utilizing this web-based mapping technology has helped further PNHP's mission of providing readily accessible information for the conservation of the Commonwealth's biodiversity.



## Big Pine Flats: A Collaborative Approach to Resource Management

by  
Brad Eichelberger



Brad Eichelberger

Big Pine Flats is a richly diverse and unique area within Michaux State Forest (Cumberland, Adams, and Franklin Counties) that supports rare plant and animal species as well as recreational uses such as fishing, hunting, camping, horseback riding, and hiking. A section of the Appalachian Trail runs through the forest and connects to Caledonia State Park. In 2008 the Pennsylvania Natural Heritage Program was funded by the Pennsylvania Department of Conservation and Natural Resources' (DCNR) Office of Conservation Science to complete species surveys and develop a plan to integrate management of ecological resources with current forestry practices and public uses. With an assortment of species and resource interests within this unique area, this project has involved a collaboration of agencies and conservation groups including the DCNR Office of Conservation Science, DCNR Bureau of Forestry, DCNR Bureau of State Parks, Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission, The Nature Conservancy, and Appalachian Trail Conservancy. Through this collaborative approach, recommendations will be made to minimize impacts to rare species and habitat while maintaining the recreational uses that make Michaux State Forest a popular public attraction.

Big Pine Flats contains many unique habitats within its boundaries that support approximately 40 known occurrences of rare species. Towards the northern end of the area lies extensive dry ridgetop forest that contain pockets of open barren habitat consisting of heath shrubs (*Vaccinium* spp.) intermixed with scrub oak (*Quercus ilicifolia*) and pitch pine (*Pinus rigida*). The dry open barren habitat supports host plants for several rare moth species and potential breeding grounds for warbler species. PNHP staff will survey

the barrens for breeding birds this upcoming field season and have been collecting moth samples using blacklight traps. To date, seven moth species of concern have been collected within the barrens such as gray spring zale (*Zale submediana*), pine woods underwing (*Catocala* sp.), blueberry sawfly (*Apharetra dentata*), southern variable dart (*Xestia elimata*), southern pine looper moth (*Caripeta aretaria*), a noctuid moth (*Platyperigea meralis*), and footpath sawfly moth (*Metaxaglaea semitaria*). Several of the rare moth species appear to be at the northern limit of their range in Big Pine Flats. Historical evidence suggests that frequent, low intensity natural fires that prevent succession of open areas to forests typically maintain ridgetop barren complexes such as this. As a result, PNHP is currently working with the DCNR



Betsy Leppo

Blacklight trap in an open ridgetop barren

Bureau of Forestry to integrate small-scale fire management and/or potential clearing of small patches as a method of preserving this unique habitat system and the sensitive species that occupy it.

Several large vernal pool complexes, with a total of 37 known individual pools, are also located within Big Pine Flats. These ephemeral pools fill with rainwater during the winter and spring and serve as important breeding habitat for herpetofauna such as mole salamanders (*Ambystoma* spp.), spotted turtles (*Clemmys guttata*), and frog species, as well as habitat for the federally endangered northeastern bulrush (*Scirpus ancistrochaetus*). While the locations of numerous pools have been known for some time, efforts have been made to identify previously unknown

vernal pools with several new occurrences being documented during this project. Shippensburg University has tracked spotted turtle activity in several vernal pools for many years and PNHP staff will survey turtle presence in the newly found pools during this upcoming field season. Management recommendations for the pools will include extending the forestry management buffer around the complexes to limit habitat fragmentation and provide habitat cover for species as well as to minimize sedimentation and runoff into the pools.

Another area of interest known as Sand Spring Seep is a rather unusual habitat for the southern portion of Pennsylvania. Groundwater seepage from the underlying acidic bedrock has created a swamp system that contains numerous species that otherwise occur in wetlands of the Pocono region of Pennsylvania, approximately one hundred miles north of Michaux State Forest. Several state endangered and threatened species found within this site include dragon's mouth (*Arethusa bulbosa*), rough-leaved aster (*Eurybia radula*), and several orchid species. Due to the unique assortment of plants that occupy this area, DCNR recently designated Sand Spring Seep as a Wild Plant Sanctuary and the area will receive additional protection aside from current forestry management. Staff have documented rare plant locations, invasive species, and areas requiring light shrub thinning in



John Kunsman

Dragon's mouth (*Arethusa bulbosa*)

order to provide adequate light for these sensitive species. The resulting recommendations from this project and the Wild Plant Sanctuary management plan will be dove-tailed to ensure effective management of this unique habitat.

In addition to the important areas outlined above, PNHP has been conducting general rare plant, herpetofaunal, and small mammal surveys throughout



Charlie Eichelberger

Northern long-eared bat (*Myotis septentrionalis*)

Big Pine Flats. Various rare plants are found along seeps such as variable sedge (*Carex polymorpha*) and dwarf iris (*Iris verna*), both of which require semi-open forest canopies for growth. Small scale canopy thinning for areas supporting these species will be recommended to provide adequate light availability. Rocky talus slopes found throughout the area are being surveyed for coal skinks and timber rattlesnake hibernacula. These species require a portion of open habitat for basking, and we are identifying rocky, talus slopes that may require removal of some canopy trees. Management recommendations will include selective cutting of trees while leaving the cut debris on the slope for habitat cover. Another area of interest is the Long Pine Reservoir and the associated streams that feed it. Staff have mist netted for bat species that forage along these ravines. Initial surveys yielded 21 bat captures in one night, including 15 little brown bats (*Myotis lucifugus*), 3 northern red bats (*Lasiurus borealis*), 2 big brown bats (*Eptesicus fuscus*), and a northern long-eared bat (*Myotis septentrionalis*). Such bat species may be impacted by the emerging white-nose syndrome epidemic in Pennsylvania and surveys will continue this field season to document bat use along these ravines.

Many efforts are underway to meet the multiple management goals of the Big Pine Flats section of Michaux State Forest. Inventories will provide a summary of the rare species that occur within the area and outline the processes needed to support them. The collaboration of various groups has helped integrate management of taxa with forestry practices and public uses within the forestland. The Commonwealth of Pennsylvania will benefit greatly through the coordinated management of both recreational activities and protection of the species and natural features that help create the aesthetic beauty and ecological diversity of Michaux State Forest.

## Notes from the Field

### County Inventory

The County Inventory projects during the first quarter of the year have focused on report writing and compilation. The process includes creating conservation sites (polygons) for species of concern, developing introductory materials, preparing maps and species fact sheets, and writing site descriptions and conservation recommendations. Currently, six CNHI reports are scheduled for delivery by the end of June 2011 - Butler, Cameron, Delaware, Indiana, Jefferson, and Pike - with Erie due by the end of December 2011.

The Lehigh Valley Planning Commission accepted a project proposal to conduct an update to their CNHI. This 2½ year project will focus on transportation and greenways planning as well as a survey of the high priority habitats and species of concern of the two-county area.

### Conservation Information Management

As part of our annual data exchange with NatureServe, we have completed our data upload from NatureServe's Central Database. This process updates taxonomy and Global Rarity Ranks for the species lists in our Biotics database.

In January, Conservation Information welcomed back Jenni Mumper, former Conservation Information Manager for the PNHP Eastern Office. Jenni has returned as a part-time Conservation Information Assistant, and her primary project has been working with Ecology staff to update and refine database records for natural communities.

Conservation Information staff continue to process and update data and respond to internal and external data requests. We have been working with PNHP partners to streamline the data request process.

### Conservation Planning

We completed two case studies and provided additional information for the NatureServe led project entitled "*Development of Model Guidelines for Assisting Local Planning Boards with Conservation of Species of Greatest Conservation Need and their Key Habitats through Local Land Use Planning.*" Through this project, PNHP conducted a survey of county planning

departments on their use of conservation information in their planning efforts; results from the survey were used to inform improvements to Natural Heritage Inventories. Project results will be made available through *Landscape Pennsylvania*. Funding for this project was provided through NatureServe via the Northeast Association of Fish and Wildlife Agencies (NEAFWA) Regional Conservation Needs program.

Analysis work, public meetings, and document development continued on the Department of Community and Economic Development (DCED) and DCNR funded project to develop implementation plans for conservation greenways in Bedford and Fulton Counties. This project is expected to be complete by June 2011.

### Zoology

On the afternoon of March 29, Zoologist Ryan Miller participated in the annual prescribed fire at Jennings Environmental Education Center where fire has been used for over 30 years in the management of the unique prairie ecosystem. Fire plays an important role in management of woody vegetation encroachment and nutrient removal. To begin the process, DCNR staff provided two days of wild land fire fighting and fire behavior training. The trained crew of 12 then watched the fire lines as approximately 8 acres were burned. The prairie wildflowers should respond to the fire and bloom beautifully this coming season (and the eastern massasauga rattlesnakes should be happy too).



Ryan Miller watching a fire line at Jennings Environmental Education Center

In 2010, PNHP staff conducted mussel surveys of Conewango Creek. This Allegheny River tributary has a large mussel population with a unique community composition that includes the federally listed northern riffleshell and the plain pocketbook shown below displaying its reproductive lure. The final report for this State Wildlife Grant project was completed and submitted in the first quarter of 2011.



A displaying plain pocketbook (*Lampsilis cardium*) found in Conewango Creek

Any project that involves field work includes preparation during the off-season. To prepare for just a few of our projects in 2011, we have been busy planning mussel surveys for the West Branch and Lower Susquehanna River basins; timber rattlesnake, mountain chorus frog, green salamander, and water shrew surveys for the DCNR; and invertebrate surveys for some unique barrens ecosystems. Expect great news from these surveys (and others) as the season progresses!

### Ecology/Botany

It is likely that the predicted effects of global climate change may alter the distribution of plant and animal species in North America. Identifying which species are most vulnerable to climate change is an important first step in developing adaptive management strategies for the conservation of rare and threatened species. PNHP staff are developing a list of priority species in Pennsylvania that may be vulnerable to climate change, and examining the vulnerability of these species using a climate change vulnerability index (CCVI) developed by NatureServe. A new and improved version of the CCVI (v2.0) was released towards the end of 2010. During the first quarter of 2011, PNHP staff reanalyzed many of the species that were completed with the original CCVI. We found

that some of the vulnerability ranks differed based on these improvements to the index. This work will continue into the second quarter of 2011. We began work on the draft final report which will be completed and submitted to the Wild Resource Conservation Program (WRCP) by June 30, 2011. In addition, we attended several meetings to discuss the CCVI work and climate change efforts in Pennsylvania.

Wet thickets serve as habitat for priority bird species included in Pennsylvania's State Wildlife Action Plan (WAP), however, little is known about the composition and distribution of this habitat type. PNHP staff are identifying what bird species use wet thicket habitats (with a focus on WAP species), and examining the plant composition of these habitat types across Pennsylvania. During the first quarter of 2011, we submitted the final report for the State Wildlife Grant to the Pennsylvania Game Commission for review. In addition, we analyzed vegetation data for new plant community types and began writing the final report for the Wild Resource Conservation Program grant, which will be completed by June 30, 2011. Based on analysis of vegetation data, two additional palustrine shrubland community types were identified. Descriptions for these types were written and presented to the Pennsylvania Biological Survey (PABS) committee for expert review and discussion. It was agreed that these new types would be added to the already existing palustrine shrubland types identified in the *Terrestrial and Palustrine Plant Communities of Pennsylvania* (Fike 1999).



Sally Ray soil sampling at State Game Lands 111 in Somerset County

Mary Ann Furedi

Mary Ann Furedi





Sally Ray

Mary Ann Furedi vegetation sampling in Great Marsh in Chester County

PNHP is involved in providing comprehensive inventory and monitoring expertise and development of management actions for several of Pennsylvania's state parks. The overall goal is to provide inventory information and management guidance to the Bureau of State Parks. We provided the DCNR Bureau of State Parks with draft reports for Ricketts Glen, Ohioyle, and Blue Knob State Parks. The reports detailed the work completed in the three parks over the 2009/2010 field seasons and provided recommendations for management of rare plants and animals as well as management actions to address specific conservation concerns. The Bureau is reviewing the reports and will provide comments in April 2011. Final reports will be completed in May. In addition, the information in the reports is being used to update State Park Resource Management Plan documents. WPC staff updated species lists, habitat and management unit descriptions, and management activities based on information collected in the on-the-ground inventory work.



WPC staff

Youghiogheny Gorge

In the 30 years that the Pennsylvania Natural Heritage Program has been in existence, over 750 high quality natural plant community occurrences have been added to the PNDI



Ryan Evans

Roundleaf sundew (*Drosera rotundifolia*)

databases. These community occurrences represent old growth forest, glacial bogs with sundews and pitcher plants, fire-dependent scrub oak barrens, freshwater tidal marshes on the Delaware River, and marshes and beach systems along Lake Erie. In the past, mapping communities and other element occurrences was not very accurate. During the first quarter of 2011,



Jessica McPherson

Titus bog, Erie County. Sphagnum mat with cottongrass

PNHP ecologists reviewed all of the plant communities for correct nomenclature as well as accuracy of map location and the extent of the community. We revised names in many instances and remapped many communities using high quality, recent digital true-color aerial imagery of Pennsylvania. The work is not yet complete, but we have gone a long way towards updating our community element occurrences to provide more accurate information to the users of the PNDI database. We hope to complete the revisions before the end of 2011.

## Measures of Progress

The following Measures of Progress have been expanded and defined more precisely for 2011. We believe that these measures represent a significant cross-section of results of the work that we do as a program. These measures will be reviewed and updated, as needed, to best reflect the activities and goals of PNHP. Progress for these measures reflects seasonality of program activity.

Measure of Progress	Annual Goal (2011)	1st Quarter 2011
Biotics Records Updated	200	140
New EOs Documented and Entered into Biotics	800	157
New Records Entered into HGIS	300	116
Percent of HGIS Records > 10 Years Old	50	53
Field Surveys Performed	400	0
New CPPs Developed	1000	41
Site Polygons Created and Attributed	400	0
Management Plans/Guidelines Developed	30	
State Parks		0
PA Game Commission		0
Other		1

PNHP performs many functions and provides many services as part of its mission. The measures of progress that are detailed here are meant to capture a number of important program activities and provide a picture of our progress in achieving our essential goals. The program goals and the measures provided for those goals will change over time as we complete certain aspects of our work and as new program responsibilities arise.

**Biotics Records Updated** indicates the amount of activity expended in improving and updating the more than 20,000 records in the PNDI database.

**New EOs Documented and Entered into Biotics** is a way to measure the success of our inventory effort in finding new occurrences of plants, animals, and exemplary natural communities. All new records entered into the database are counted.

**New Records Entered into HGIS** indicates our level of activity in reviewing, quality controlling, and entering records into the environmental review data layers. The timely and consistent refreshment of these data are critical to providing protection to the state's species of greatest concern.

**Percent of HGIS Records > 10 Years Old** is an indicator of the currency of data critical to the environmental review process. Keeping records as current as possible helps reduce the time needed to make decisions and determine a course of action for a given project under review.

**Field Surveys Performed** is a strong indicator of the effort expended on one of the basic functions of the program – inventory of the state's flora and fauna. Every field visit results in the entering of a field survey, regardless of the outcome of the survey.

**New Conservation Planning Polygons (CPPs) Developed** is a measure of our progress in creating ecological based mapping for the species and natural communities that we track as part of the PNDI database. Our goal is to have CPPs for all species and communities that we track.

**Site Polygons Created and Attributed** is a measure of our effort in developing, mapping, and describing sites that are important to conservation of Pennsylvania's biodiversity. This process began with County Natural Heritage Inventory projects and will now continue at a statewide level with the updating of existing sites and the creation of new sites. Site polygons will be based upon and consistent with CPPs.

**Management Plans/Guidelines Developed** is a direct indicator of our activity in utilizing our data and expertise to write management plans for a variety of clients and projects. We are increasingly called upon to provide this service and it will likely represent a substantial programmatic effort.