Pennsylvania Natural Heritage Program

information for the conservation of biodiversity

Wild Heritage News July-September 2012

Photo Banner:
Pete Woods

Fruiting bodies of an immature slime mold, Erie County

Inside This Issue

PNHP Covers the State

by

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One of the strengths of our statewide program is that we collect much of the information for the Pennsylvania Natural Heritage Program (PNHP) firsthand by visiting and documenting sites of known or potential ecological importance. But with a state as large as Pennsylvania, it can be a logistical challenge to provide coverage to all regions. Fortunately, we have two main offices, one in Pittsburgh and one in Harrisburg, along with several single person offices in central Pennsylvania, that give us reasonable access to much of the state. From year to year, our projects might concentrate on certain regions or they might be spread throughout the state. This year finds us with many projects in the far eastern and far western parts of Pennsylvania. To the east of the Appalachian Mountains, we are working on four County Natural Heritage Inventory updates in Lehigh, Northampton, Berks, and Chester counties as well as a submerged aquatic vegetation project in the upper Delaware River. To the west of the Appalachian and Allegheny mountains, we are working on two County Natural Heritage Inventory updates in Beaver and Erie counties, a piping plover habitat restoration project on Presque Isle State Park, Lake Erie conservation action planning, and an oak savanna restoration project at Erie Bluffs State Park.

County Natural Heritage Inventories

The County Natural Heritage Inventory (CNHI) projects are intended to provide a pre-planning guide to the locations of species of concern and high quality natural communities on a county by county basis. The completed CNHI projects, though originally conceived as stand-alone reports, have recently been combined into a web-based statewide map of biologic information http://www.naturalheritage.state.pa.us/cnhi/cnhi.htm.

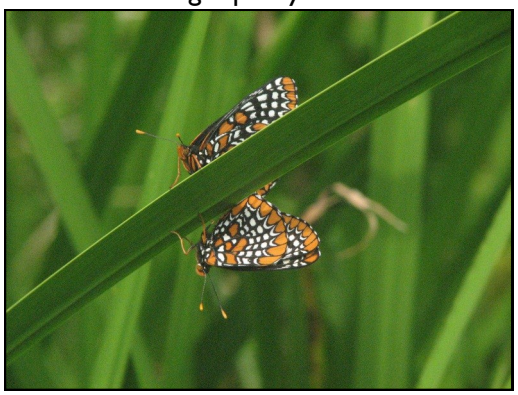
Rocky Gleason

Tony Davis making a community classification in Northampton County

With the recent completion of an initial survey of all the counties in the state, we've begun to focus our attention on those earliest completed counties that are due for an update of the information. The emphasis of these update projects is to return to previously identified areas hosting species of concern and document their current status. In addition, new survey areas are identified to fill gaps in the previous survey coverage.

Lehigh and Northampton CNHIs

The update of the Lehigh Valley CNHI project, which was originally completed in 1999, has just concluded its second and final season of field surveys. The two-county project (Lehigh and Northampton) began with a review of information on known species of concern. We identified areas of high priority for survey and contacted roughly 500 private property owners for permission to visit. We conducted approximately 175 field surveys in the Lehigh Valley over the two-season period, and 73 of these resulted in the documentation of species of concern and/or high quality natural communities.



Rocky Gleason

A pair of mating Baltimore checkerspots were documented in a small wet meadow.

The Lehigh Valley area has often been the subject of biological scrutiny with several high profile naturalists calling this home over the centuries including Rev. Thomas C. Porter, Professor of Botany at Lafayette College (1866-1896) who wrote the "Flora of Pennsylvania," which was published after his death in 1901. Harold Pretz published a "Flora of Lehigh County" in 1911, and Dr. Robert Schaeffer, Professor of Biology at Muhlenberg College (1954-1983) published "The Vascular Flora of Northampton County" in 1949. We are provided with a good glimpse of the past landscapes of the Lehigh Valley through the work of these early naturalists. This region is rich with limestone bedrock bordered to the north by the Kittatinny Ridge, known here as Blue Mountain. Thick deposits of Wisconsinan glacial till define the landscape of the northeastern corner of Northampton County resulting in a diversity of unusual habitats.

The Lehigh Valley floor has long been prized for cultivation, and had also been an industrial hub of the country with steel production and other manufacturing in Allentown and Bethlehem. The valley has seen dramatic development pressure in the past few decades, with suburban and rural development replacing farmland. In addition, changes in farming practices, natural succession, and the spread of exotic invasive species of plants have dramatically altered habitats throughout the region. Attempts to relocate formerly documented populations of species of concern have proven particularly frustrating. Springtime surveys for the plant spreading globe flower (*Trollius laxus*) where it had formerly been observed proved unsuccessful despite return visits. We tentatively attributed the loss of the species from these locations to natural succession, which over time replaced open habitats with closed canopy habitats that are unfavorable to this plant species.

While attempts to relocate species of concern occasionally met with disappointment, the opposite was also true. Populations of the wetland shrub swamp dog hobble (*Leucothoe racemosa*) are thriving at several previously documented locations for the species and several new populations were identified during the surveys. Similarly, populations of nodding trillium (*Trillium cernuum*) were documented at a number of new locations in the region. The region has many vernal pool and seep natural communities, especially along the toe slope of Blue Mountain. In all, 38 different species of concern and five types of high quality natural communities were documented during these surveys.

The results of the surveys are currently being processed and will be compiled into a report for the Lehigh Valley Planning Commission. This information will also be available online through the PNHP County Inventory interactive map. The Pennsylvania Department of Transportation matched funds from DCNR to make this project possible.

Rocky Gleason

Wild kidney bean, last documented at this location in 1939, was rediscovered along the Lehigh River.

Chester and Berks CNHIs

The current Chester and Berks CNHI is an update to the original surveys completed in 1991 in Berks County and 1994 in Chester County. As with Lehigh and Northampton counties to the north, these two counties are being updated together to create a more regional approach to our survey efforts.

Each county has had significant disturbance to the historical landscape. Both Chester and Berks counties have a mix of residential development and agriculture that make the small patches of remaining habitat especially important for conservation of both the rare and more common species.

Denise Watts

Maryland golden-aster (*Chrysopsis mariana*)

As the first field season for the Natural Heritage Inventory updates for Chester and Berks counties come to a close, we have had many successes while moving toward our first goal of updating records greater than 10 years old. Surveys this quarter reconfirmed 23 occurrences and found 4 new occurrences of species of concern. Six of these species are classified as endangered in the state – Bradley's spleenwort (*Asplenium bradleyi*), false hop sedge (*Carex lupuliformis*), Maryland golden-aster (*Chrysopsis mariana*), downy lobelia (*Lobelia puberula*), Virginia bunchflower (*Veratrum virginicum*), and tawny ironweed (*Vernonia glauca*).

During the next field season, we hope to visit all of the remaining sites, as well as identify some new areas for surveys. We will even be able to spend some time this winter away from our desks doing surveys for puttyroot (*Aplectrum hyemale*) and cranefly orchid (*Tipularia discolor*), which are more easily seen during the months when competing vegetation has died back. Other main priorities for the 2013 field season are plant and invertebrate surveys at several of the serpentine barrens in Chester County.

After the completion of the field surveys in 2013, the information we collect from these surveys and other sources of data will be compiled and made available to the public as well as county planners so they can make informed decisions about future development and other planning activities. This information is also available to the numerous land trusts in these counties and may provide guidance for land acquisition and assist landowners with conservation of species of concern. In addition to DCNR, the Wyomissing Foundation has provided funding for the Berks County portion of our work.

Erie CNHI

PNHP is working with the Erie County Planning Commission to update the Erie County Natural Heritage Inventory (CNHI). The original Erie CNHI was published in 1993. As many things have changed in the nearly 20 years since this first inventory, this update will provide additional information and enhanced mapping to help guide conservation decisions.

Surveys for the updated Erie CNHI began in the spring of 2008, and took place on both public and private lands (the latter always with landowner permission). The field work immediately resulted in some notable discoveries. One of the most exciting was the discovery of a population of dwarf scouring rush (*Equisetum scirpoides*), previously undocumented in Pennsylvania. We focused the majority of the work on updating older element occurrences and visiting new sites not previously surveyed through heritage surveys. Even visits to well documented sites, such as Wattsburg Fen, yielded new discoveries of tracked species, including several interesting invertebrate records.

Erie County has the highest numbers of rare, threatened, and endangered species of any county in

Pete Woods

Dwarf scouring rush (*Equisetum scirpoides*)

Pete Woods

Northern leopard frogs are rapidly disappearing across Pennsylvania.

Pennsylvania, with nearly 1300 distinct element occurrences present. Many of these are associated with unique habitats such as the Presque Isle sandspit and French Creek and are found nowhere else in the state. Overall, 113 Natural Heritage Areas (NHAs), representing these rare species habitats have been delineated. Final edits and additions are being made to the report, in preparation for publication and public distribution this fall. This updated Erie CNHI represents a substantial revision to the longstanding style and format of the CNHIs, and will serve as a model for future county-by-county updates.

Beaver CNHI

PNHP is working with the Beaver County Planning Commission to update the Beaver County Natural Heritage Inventory (CNHI). The first Beaver CNHI was completed in 1993 and recognized 35 Natural Heritage Areas (NHAs). Of those NHAs, 11 were considered exceptionally significant, 15 were highly significant, and 9 were notably significant to maintaining the biological diversity of Beaver County. Many things have changed in the 20 years since the first Beaver CNHI. While activities such as mineral extraction, timber harvest, residential and commercial developments, and invasive species encroachment continue to be of issue for the conservation of these NHAs, natural gas extraction and related infrastructure represent a potential new land use challenge for the NHAs.

Pete Woods

Midland clubtails are found near riffle habitats in high quality streams.

Survey efforts for the Beaver CNHI update began in the spring this year. These surveys have been focused on state game lands, state parks, and Beaver County Conservation District properties. The 2012 field season for the Beaver County Natural Heritage Inventory update resulted in some interesting discoveries and habitats.

While there were few exciting plant discoveries this field season, new patches, though not new populations, of the hybrid of declined trillium and wakerobin (*Trillium flexipes x erectum*) were found. We also discovered several notable invertebrate county records during the plant surveys. These include the midland clubtail (*Gomphus fraternus*) and blue-tipped dancer (*Argia tibialis*) at North Fork Little Beaver Creek.

Scott Schuette

Queen snakes prefer clean freshwater habitats due to the fact that their diet consists exclusively of crayfish.

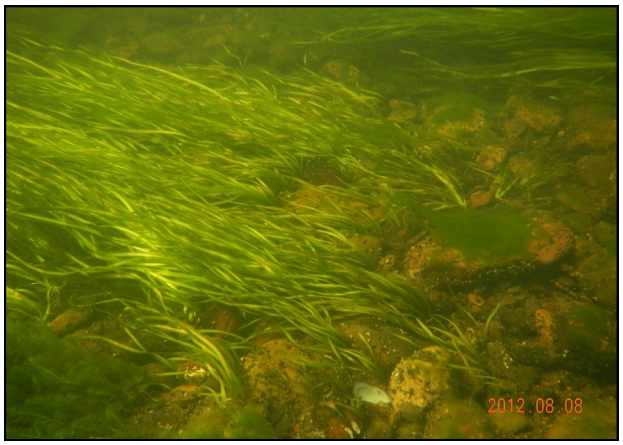
Shells of the Mapleleaf mussel (*Quadrula quadrula*) were found for the first time in Little Beaver Creek. The only other report of this species from Beaver County comes from Ortman's historical treatment of Pennsylvania mussels in which he documents the Mapleleaf at Cooks Ferry along the Ohio River. Another mussel new to Beaver County as a result of survey efforts this year is the pink heelsplitter (*Potamilus alatus*). We found a single complete shell of this species in Raccoon Creek while conducting surveys for queen snakes (*Regina septemvittata*). These and subsequent surveys for queen snakes in Brady's Run and North Fork of Little Beaver Creek reconfirmed the presence of the snake in Beaver County.

Late season surveys for historical plant records on Beaver County Conservation District properties served to identify potential habitats for marsh birds and rich woods plant communities where a small population of American ginseng was found growing on the steep wooded slope. Discoveries of these types of habitats increases potential for finding more species of interest

or concern on properties not covered in the initial CNHI. With the anticipated completion date for the Beaver CNHI update in 2014, this two year effort will swing into full force during the 2013 field season as we put together an advisory committee and contact landowners over the course of the coming winter months. This effort has been funded to date by DCNR and WPC.

Delaware River Submerged Aquatic Vegetation

Submerged aquatic vegetation (also known as SAV) is a group of plants that grow entirely underwater; although some may have additional floating leaves. These plants are found in most bodies of water from small ponds and streams to the world's oceans. SAV serves multiple important ecological roles in aquatic systems. Dense patches of submerged leaves and stems of aquatic plants provide protection for small juvenile fish and serve as an attachment surface for invertebrates like snails. Large patches of SAV or 'beds' help reduce turbidity by reducing the velocity of water flow which causes suspended sediments to settle out, while their roots and rhizomes help stabilize substrate. Decomposing SAV also provides food for bottom-dwelling organisms. Because of these important functions, the presence of SAV can serve as a barometer providing insight into the health of an aquatic system.



J. Krstolic, USGS

An example of an SAV bed.

With funding from the National Park Service, PNHP conducted a study this summer that examined SAV beds in the Upper Delaware Scenic and Recreational River and Delaware Water Gap National Recreation Area. A similar project in the early 1990s mapped SAV beds and recorded species composition along the same stretch of the Delaware River. The purpose of the current project was to revisit a sample of the SAV beds identified in the previous inventory and document changes in SAV bed size, distribution, and plant composition. In total, we revisited 45 SAV beds over a three week period. The beds ranged in size from scattered strands of just a few plants to large, continuous beds that nearly carpeted the entire width of the river. We sampled over 600 plots to document the plant species found in each SAV bed.

Mary Ann Furedi

Stephanie Seymour examining a rock with riverweed.

Some of the common plant species found in these portions of the Delaware River include waterweed (*Elodea* spp.), pondweeds (*Potamogeton* spp.), water-celery (*Vallisneria americana*), water star-grass (*Heteranthera dubia*), and riverweed (*Podostemum ceratophyllum*). The common SAV found this summer were consistent with the species found in the 1990s survey with the exception of one species Eurasian water-milfoil (*Myriophyllum spicatum*). Although only a few of these plants were documented in this year's work, it is important to note this since Eurasian water-milfoil is one of the most abundant non-native invasive aquatic plants found in Pennsylvania. Many of the SAV beds appear to differ in size (some smaller, some larger) than previously described in the 1990s survey. However, it is difficult to say, without multiple years of comparative data, whether these changes are temporal (varying from year-to-year) or the result of alterations from multiple large flood events since the early 1990s. The establishment of long-term SAV monitoring plots would provide more insight into the dynamic nature of SAV beds in the Delaware River.

Lake Erie Conservation Action Planning

As part of the Great Lakes Restoration Initiative that has directed federal funds into projects that benefit the entire Great Lakes Basin, PNHP was contracted by The Nature Conservancy to serve on a steering committee for their Conservation Action Plan (CAP) for Lake Erie. Conservation Action Plans are designed to focus conservation on specific ecological targets, identify threats and stresses to those targets, and develop strategies to address the various stresses.

PNHP, along with the Heritage program from Michigan - the Michigan Natural Features Inventory - provided data and collaborated in the review of species and natural community records across the entire Lake Erie Watershed. This information enabled the planning or targets to focus on specific areas. Unlike many geographically smaller CAPs where the targets are often species or a distinct species population, the Lake Erie CAP ended up focusing on broad-level targets given the size and scale of the watershed and overall plan. The targets included Open Water Benthic and Pelagic Ecosystem, Nearshore Zone, Native Migratory Fish, Coastal Wetlands, Lake Erie Connecting Channels, Islands, Coastal Terrestrial Systems, and Aerial Migrants. The final Lake Erie CAP will be completed shortly and a link will appear on the PNHP web site.

Erie Bluffs State Park

PNHP has been involved in habitat management activities at Erie Bluffs State Park since its establishment in 2004. PNHP has long recognized the area as a site of high biological diversity value, as it contained one of the largest undeveloped blocks of forested habitat along the coast of Lake Erie in Pennsylvania. Inventories at Erie Bluffs, including results from a 2004 DCNR BioBlitz and work by PNHP botanists and colleagues like Jim Bissell of the Cleveland Museum of Natural History, have resulted in the documentation of nearly 500 species of plants at the park. This high number is due in part to the diversity of plant community types and landforms at the park.

In addition to seepage wetlands and shrublands on the 90 foot high bluffs rising from the Lake Erie shore, communities include the Elm – Ash – Maple Lakeplain Swamp Forest, Sugar Maple – Beech Escarpment

Ephraim Zimmerman

Great Lakes sand barren

Ephraim Zimmerman

Restored black oak savanna patch.

Forests, and the globally significant Black Oak Savanna and Great Lakes Sand Barren communities found on relict beach ridges and dunes, formed thousands of years ago when glaciers receded and lake levels were higher. Thought to have been much more prevalent prior to the development of the region by European settlers, these communities are now found only at a handful of sites in northwestern Pennsylvania and northeastern Ohio. The occurrence of these types at Erie Bluffs State Park along with others throughout its range are threatened by invasive species such as Asian bittersweet, bush honeysuckle, garlic mustard, multiflora rose, and black locust. Instead of the open canopied "savanna-like" character of these two natural communities with a high diversity of understory and groundcover species, the invaded black locust patches were dark and not diverse, due to the high density of overstory trees with few species in the understory and ground-layer. The shade of black locust drastically reduces the habitat quality for sun-loving savanna and barrens species.

In 2009, PNHP began a project to remove black locust and manage other invasive native and non-native species on a 14 acre site at Erie Bluffs supporting Black Oak Savanna and Great Lakes Sand Barren community patches. Over the past three years, we have monitored results of the restoration activity and re-establishment of sand barren species through a series of permanent plots located within the treatment area. Following removal and herbicide applications, we have seen a number of species characteristic of dry sandy open habitats in the Great Lakes region return to areas previously dominated by black locust and non-native invaders. In addition to the black oak, other species such as blue curls (*Trichostema dichotomum*), dewberry (*Rubus flaggellaris*), purple lovegrass (*Eragrostis*

spectabilis), sanddune sandbur (*Cenchrus tribuloides*), flatsedge (*Cyperus lupulinus*), fall witchgrass (*Digitaria cognata*), and several panic grasses (*Dichanthelium* spp.) are common. In 2011, we recorded a small population of wild lupine (*Lupinus perennis*) within the restoration area. This species had not previously been known from the park. Invasive plants continue to be a management concern within the restoration area and PNHP is developing a 10 year adaptive management plan to guide management activities for this area as well as other dry sandy sites at Erie Bluffs State Park.

Presque Isle State Park Gull Point Restoration

The piping plover (*Charadrius melodus*), a shorebird species endemic to the Great Lakes, is globally rare and considered an umbrella species for coastal ecosystems. Presque Isle State Park is a historic nesting site for piping plovers in Pennsylvania. However, there has been no breeding activity observed since the mid-1950s. Because migrating plovers are seen annually within the Gull Point Natural Area, situated at the tip of the Presque Isle peninsula, biologists with the Pennsylvania Game Commission (PGC) believe that this area may support plover nesting. In a report to the Pennsylvania Game Commission in 2007, Cathy Haffner, currently the Conservation Planning Coordinator with the PGC, suggested that removing non-native invasive plants and woody species, primarily eastern cottonwood and willows would improve the nesting habitat for plovers and other shorebirds that rely on Gull Point as an important migratory stopover.

Through a grant from the U.S. Fish and Wildlife Service, PNHP and partners from Pennsylvania Audubon, Cleveland Museum of Natural History, and Presque Isle State Park have been working to control invasive plants in in areas of critical shorebird habitat within Gull Point Natural Area as suggested in Haffner's report. PNHP has been focusing on giant reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), narrow-leaf cattail (*Typha angustifolia*), black alder (*Alnus glutinosa*), and black locust (*Robinia pseudoacacia*), along with native willows (*Salix eriocephala, S. exigua*) and cottonwood (*Populus deltoides*).

Ephraim Zimmerman

Great Lakes palustrine sand plain invaded by *Phragmites*

Ephraim Zimmerman

Woody plant control in progress

Control treatments began in 2011 with mowing of the woody plants in the Great Lake's sand plain and beach dunes communities in a 35 acre area within the Gull Point Natural Area at the eastern-most tip of the Presque Isle peninsula. PNHP applied several rounds of chemical treatment using a wetland-approved herbicide. Prior to the herbicide treatment in 2012, PNHP and Audubon established 16 transects at 50 meter intervals through the treatment area to map and record plant composition of the plant community patches and to provide a baseline for monitoring. These transects will be resampled in 2013 to assess the effectiveness of the control measures and be used to assess change in community composition and dynamics over time.

As part of this project, PNHP is developing a 10-year adaptive management plan to ensure the habitat is not further compromised by invasive species re-growth in subsequent years. The plan will include methods for continued invasive species control, specific inventory and management actions to prevent recolonization of the area by *Phragmites* and other species treated during restoration activities, and a schedule for monitoring and treatment.

Notes from the Field

Botany/Ecology
Botany and ecology staff worked on several projects and activities that included restoration implementation, field inventory, and monitoring and assessment of plant species and communities throughout Pennsylvania. These third quarter activities yielded some interesting discoveries in Pennsylvania and neighboring West Virginia.

PNHP staff documented a healthy population of three-birds orchid (*Triphora trianthophora*) after following up on a report from an astute naturalist in central Pennsylvania. To our knowledge, this was only the fourth time it has been sighted in Pennsylvania during the past 100 years. The most recent previous sighting of this elusive orchid was in 1987, but unfortunately the habitat where it was seen has since been destroyed by incompatible land use. It is good that we once again know of a viable population of this species in Pennsylvania.


Three-birds orchid (*Triphora trianthophora*)

A two-year cooperative botanical project with the West Virginia Natural Heritage Program to help document rare, threatened, and endangered plant species is wrapping up this year. This collaborative effort involving our senior botanists Steve Grund and John Kunsman led to the discovery of bearberry (*Arctostaphylos uvi-ursi*), a new species for West Virginia.

Mosquito fern (*Azolla caroliniana*) is an unusual plant that floats on the surface of ponds and slow moving streams. We discovered this species in Conneaut Outlet during surveys for the Pennsylvania Game Lands Management Tool Project. It is unknown if this represents a recent natural dispersal event into northwestern Pennsylvania for this species. Prior to this finding mosquito fern was known only from Erie and Allegheny counties in Pennsylvania. This species is considered threatened in Indiana and exploitably vulnerable in New York. While the question remains if we should treat this species as native or non-native in our area, it is clear that this discovery warrants further study of this plant's distribution in Pennsylvania.

The Pennsylvania Game Lands Management Tool (PGLMT) – a project designed to furnish site-specific management information to assist PGC in their many activities on game lands - continued to progress during late summer/early fall of 2012. Inventory staff completed field work for the 2012 season, accomplishing nearly all inventory goals that were set for this year. Field botanists conducted surveys at SGL 127, SGL 66, SGL 13, SGL 51, SGL 176, and SGL 57. Species located (and protection status) include Labrador-tea (*Ledum groenlandicum)* (PR), *bog sedge (Carex paupercula*) (PR), creeping snowberry (*Gaultheria hispidula)* (PR), screwstem (*Bartonia paniculata)* (proposed PR), thread rush (*Juncus filiformis)* (PR), and Tuckerman's pondweed (*Potamogeton confervoides)* (PT). PNHP zoology staff conducted insect surveys on SGL 75 and were able to confirm the presence of the Atlantis fritillary (*Speyeria atlantis*), one of three butterfly targets of the survey. Updated occurrence data are already flowing into other components of the Game Lands Management Tool. Most recently, we began working on Best Management Practices (BMPs) for plant species of concern, and hope to complete a first draft of all BMPs by the end of 2012. The most significant achievement of the PGLMT for the third quarter was the completion of a template for site-specific management plans. The first management plan


Betsy Leppo

Atlantis fritillary (*Speyeria atlantis*)

for the PGLMT was completed for SGL 176 (Scotia Barrens, Centre County), which PGC hopes to integrate into their comprehensive management plans by the end of 2012.

Ecologists are wrapping up work for the High Elevation Wetland project and staff members are collecting additional data and photos, as well as providing new tags and stakes (where bears and other critters have been vandalizing them). Draft report documents and maps are well underway.

Charlie Eichelberger

Northern long-eared bat (*Myotis septentrionalis)*

Work for the Bureau of State Parks has focused on activities at Kings Gap Environmental Education Center on South Mountain in Franklin and Cumberland counties. The majority of fieldwork has now been completed, with some limited additional fieldwork remaining for the fall and next spring. Preparation for report writing has also begun. The report will summarize the results of the natural resources inventory and provide ecological management recommendations for each park. Highlights include documenting a new occurrence of the Pennsylvania endangered slender goldenrod (*Solidago erecta*) at Pine Grove Furnace State Park. We also updated the known occurrences of the Pennsylvania rare screwstem (*Bartonia paniculata*) and Pennsylvania threatened rough-leaved aster (*Eurybia radula*), yellow-fringed orchid (*Platanthera ciliaris*), and showy goldenrod (*Solidgao speciosa*). In July, staff completed surveys for dragonflies along Irishtown Run in Kings Gap State Park. We also sampled moth species at Caledonia, Pine Grove Furnace, and three locations at Kings Gap in September. We found three moth species of concern at Kings Gap State Park in 1998, and the September moth surveys may provide additional information about these populations. In July and August, PNHP staff continued bat mist netting. One night of mist netting at Mont Alto State Park yielded 33 bats. Most were big brown bats (*Eptesicus fuscus*) or red bats (*Lasiurus borealis*), but one male northern long-eared bat (*Myotis septentrionalis*) was caught. We also mist netted Tom's Run at Pine Grove Furnace State Park for one night. Four big brown bats (*Eptesicus fuscus*) and one red bat (*Lasiurus borealis*) were collected. We attempted mist netting on the Ritter Tract of Kings Gap State Park, but we were not able to set up the netting system due to power lines that run through the length of the corridor. Staff herpetologists also conducted surveys for queen snakes (*Regina septemvittata*) and preliminary surveys for wood turtles (*Glyptemys insculpta*). A population of queen snakes was found at Pine Grove Furnace State Park. Queen snakes had not officially been documented at the park since 1953.

In addition to monitoring Pennsylvania's peatlands in our High Elevation Wetlands project, PNHP obtained baseline data for occurrences of the federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) as part of a range-wide monitoring project. We finalized a monitoring protocol for low-intensity monitoring and distributed it to PNHP staff and DCNR-BOF Ecological Services staff involved with management of this species on state lands. In August and September, PNHP staff visited 13 known bulrush sites and implemented the low-intensity monitoring protocol. In addition, staff ecologists and botanists inventoried several vernal pools and seeps through the bulrush range and discovered one new site in Northampton County.

Staff continued water shrew sampling in Forest and Fayette counties at both state and privately owned sites. This resulted in the identification of two new water shrew populations. We also assessed the natural communities and riparian habitat at each site.

In the third quarter, the Ecology staff collected 643 one square meter plots along the full length of both the Upper Delaware Scenic and Recreational River and the Delaware Water Gap National Recreational Area to document patterns in submerged aquatic vegetation and associated environmental features.

PNHP staff have been working closely with the Bureau of Forestry to service inventory and EO update needs to equip the Bureau with the most accurate and up-to-date information regarding populations of species of concern. In this quarter, surveys were conducted in

Bald Eagle, Forbes, Gallitzin, Loyalsock, Michaux, Moshannon, Sproul, Tioga, and Weiser state forests. Our survey targets included mammals (including bats), reptiles, invertebrates, plants, and natural communities. A total of 144 sites were visited, confirming EOs at 45 of those sites. Of note was the capture of the threatened southern water shrew (*Sorex palustris punctulatus*) by zoologists Joe Wisgo and Ryan Miller nearly 7 miles north of the northern-most occurrence of this species. During an insect survey at Mill Creek Swamp in Tiadaghton State Forest invertebrate zoologist Betsy Leppo confirmed the presence of silver-bordered fritillaries (*Boloria selene*). Botanist John Kunsman had several significant finds on state forest land, including a new population of Pennsylvania threatened white twisted stalk (*Streptopus amplexifolius*), and a population of mountain bugbane (*Actea podocarpa*) over 90 miles northeast of the northernmost known occurrence!

Pete Woods

Mountain bugbane *(Actea podocarpa)*

J. McWilliams

Silver-bordered fritillary (*Boloria selene*)

Information Management

The Field Information Networked Database (FIND) is being used in the field and office for data entry and data processing. A FIND "refresher" course was held for WPC Heritage staff on September 17. Development of FIND 2.0 is ongoing. Staff held several meetings to review the database structure and update the lists of fields and attribute values for the new version. FIND 2.0 is being designed for ArcGIS 10.1, which will be rolled out initially to current FIND users in early 2013.

We are continuing development of the Pennsylvania node of the iMapInvasives website for aquatic invasive species in the Lake Erie and adjacent watersheds with funding from the Great Lakes Restoration Initiative (GLRI) provided through the Pennsylvania Fish and Boat Commission. The database will track the location, assessment and treatment of the invasives, and what new threats are emerging.

During the third quarter, a proposal was submitted for the third round of GLRI funding, and the issue with the website only working correctly with certain browsers was addressed. It is likely that all state agencies will be able to use the website in the future without investment in website retrofits or having to use a different browser specifically for iMAP. PNHP staff will continue to search out data sources, coordinate with data providers, and to prepare datasets for upload into the database in the next quarter.

Conservation Planning Polygon (CPP) development is ongoing. This effort is statewide and will provide important tools for Environmental Review as well as project planning prior to submission of projects via the PNDI web tool. Meetings were held with PNHP partners to discuss implementation of CPPs for the Pennsylvania Game Lands Management Tool. Meetings were held with WPC zoologists to review specifications and polygons for lepidoptera, and with Pennsylvania Fish and Boat Commission staff to review specifications for amphibians and reptiles. Sample polygons are also being developed for birds and mammals, to test the current specifications and prepare lists of questions for review with Pennsylvania Game Commission biologists.

Zoology

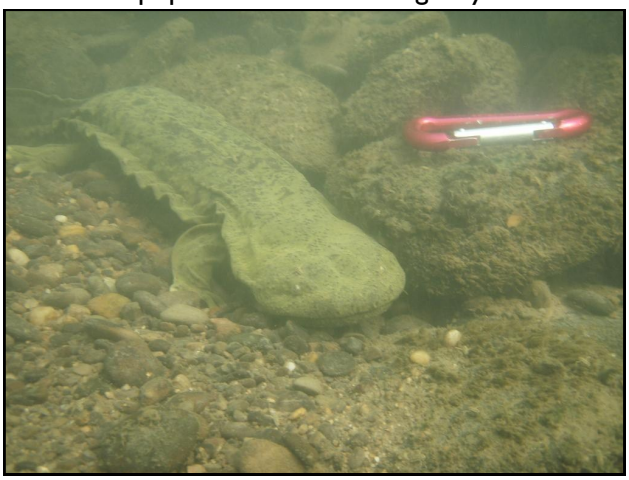
The Zoology staff was busy this quarter working on myriad projects, and our staff could be found from the depths of the Allegheny River to the highest peak in Pennsylvania. We assisted the PGC with a pilot project using trail cameras to survey for eastern spotted skunks (*Spilogale putorius*), a species which has not officially been documented in the state since 1950. Unfortunately, no spotted skunks were documented, but plans are being made to survey other locations within the historic range of this elusive species. Several surveys were conducted for queen snakes (*Regina septemvittata*) with populations documented in Beaver and Cumberland counties.

Mary Walsh

Sorting mussels from Allegheny River surveys.

PNHP divers strapped on scuba tanks to survey freshwater mussels in previously under-surveyed sections of the Allegheny River. On the river bottom, divers braced against the swift currents to collect bivalves nestled in the rocks and sand. The Allegheny River, valued as a regional gem of rich aquatic life, receives waste water from sewage and industrial sources. The study documented the occurrence of twenty mussel species, including rare and common species, in this section of the Allegheny River along a gradient of water quality. Results of the study will be used to manage mussel resources in the river.

During the Allegheny River mussel surveys, we observed two adult hellbenders. They were not under the cover of large rocks but appeared to be on the move in search of females. This discovery extends our knowledge of hellbender populations on the Allegheny River.



Patricia Morrison, USFWS

Eastern hellbender

Field work continued on the mussel community assessment in the Lower Susquehanna River project. PNHP staff conducted qualitative and quantitative surveys of freshwater mussels at one site on the Susquehanna River and in two tributaries in the Lower Susquehanna River basin. During these surveys we conducted habitat assessments and collected water chemistry data. We are now in the process of compiling data for species distribution modeling and continue to evaluate our analysis tools.

PNHP staff at the Pennsylvania Fish and Boat Commission continued searching for Blanding's turtles in Pennsylvania in cooperation with a regional wildlife grant that includes six states in the northeast. Traps were set and monitored for two weeks in August and two weeks in September, and one Blanding's turtle was captured for long term monitoring. Additional efforts will continue in 2013 with the intention of gathering samples for genetic analysis of the populations across the region, radio tracking individuals to determine habitat use, as well as designing habitat improvement and protection measures.

A study to assess the feasibility of removing one or more dams on the Lehigh River in Pennsylvania is currently being conducted by Pennsylvania Fish and Boat Commission personnel. Part of this study includes the potential impact that dam removal could have on the upstream movement of exotic crayfish. Given that exotic crayfish are rapidly spreading throughout Pennsylvania and can have substantial negative effects on aquatic systems, assessments such as this are extremely important, although few, if any, have ever been conducted. PNHP invertebrate zoologist Dave Lieb conducted three surveys for crayfishes on the Lehigh River in Pennsylvania. The specific objective of these surveys was to determine if exotic crayfish occur below the Easton and Chain dams such that the removal of those dams would afford exotic crayfish access to upstream areas. Because the only species of crayfish collected during the surveys (the spinycheek crayfish) is native to the Delaware River basin, removal of the Easton and Chain dams would not, at the present time, allow exotic crayfish access to upstream areas.

Dave was also reaching out to the community by staffing an invertebrate display at Penn State University's Ag Progress Days. These efforts resulted in a collaboration with a Williamsport Sun-Gazette writer to draft a newspaper article entitled "Crayfish invasion: exotic crustacean species wreaking havoc on natives" that appeared in a Sunday edition of the paper.

Measures of Progress

The following Measures of Progress 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 (2012)	1st Quarter	2nd Quarter	3rd Quarter	Cumulative Total	Percent of Annual Goal
Biotics Records Updated	200	127	127	96	350	100% +
New EOs Documented	800	169	198	88	455	57%
New Records Entered into HGIS	300	96	169	88	353	100%+
Field Surveys Reported	500	32	130	135	297	59%
New CPPs Developed	3000	1037	3792	821	5650	100%+
NHAs Updated	120	29	52	113	194	100%+
Outreach to Local Government	20	2	1	1	4	20%

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 is a way to measure the success of our inventory effort in finding new occurrences of elements of ecological concern (plants, animals, and exemplary natural communities). Biotics records are created for each new Element Occurrence documented.

New Records Entered into HGIS indicates our level of activity in reviewing, quality controlling, and entering biotics 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.

Field Surveys Reported 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.

NHAs Updated is a measure of our effort in developing, mapping, and describing sites (Natural Heritage Areas - NHAs) 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.

Outreach to Local Government is a measure of our initiative to increase interaction with local government and reflects our commitment to seeing our information used and refined to meet the needs of planning efforts within the counties and municipalities of the commonwealth.