



Pennsylvania Natural Heritage Program

information for the conservation of biodiversity

Wild Heritage News

April—June 2013



Inside This Issue

Lehigh Valley Greenways	Pg 1
Species Highlight: Giant Swallowtail	Pg 5
Notes from the Field	Pg 7
Measures of Progress	Pg 13

Photo Banner:
David Yeany

Bee-balm (*Monarda didyma*) flowering along a tributary to Three Springs Run at State Game Lands 158 in Blair County

Planning for Conservation in the Lehigh Valley Greenways

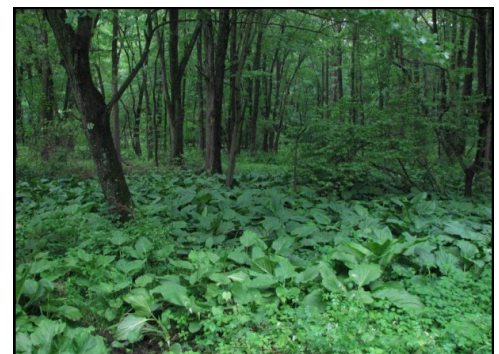
by

David Yeany

The Lehigh Valley, located in far eastern Pennsylvania, includes both Northampton and Lehigh counties and was recently the focus of a Natural Heritage Inventory update. As with all inventory updates conducted by PNHP, the goal was to hit the “Refresh” button on occurrences of species and natural communities of concern in the two-county area to determine which existing records were still present and hopefully discover new occurrences at other locations. The PNHP Conservation Planning staff used the updated species and natural community occurrence data to form Natural Heritage Areas that provide biodiversity priorities for conservation action in focal greenways established by the Lehigh Valley Planning Commission (LVPC).

After completing their county comprehensive plan in 2005 and outlining seven key goals for natural resource conservation, LVPC created the *Lehigh Valley Greenways Plan* in 2007 in which they designated thirty-one corridors in the two counties that would be the focus of open space, recreational, cultural, and

natural resources planning. These greenways were designated around waterways, forested ridgelines, and other scenic natural areas and were assigned different categories (Cultural/Recreational, Conservation, Multi-Use, and Scenic) by the LVPC based on what plans were intended for the preservation and use of the greenway. Ultimately, the plan set goals to protect and acquire “high priority natural, recreational, historical, and scenic lands” throughout the entire greenways network. LVPC selected nine corridors to serve as focal greenways which needed conservation implementation strategies in order to meet the goals of protecting these natural corridors.



Skunk Cabbage—Golden Saxifrage Seep

PNHP

Even though much of the impetus for conserving the focal greenways stemmed from natural resource planning – riparian buffers, intact forests, steep slopes, etc., PNHP wanted to provide not only a means of prioritizing parcels for natural resource conservation but specifically for biodiversity conservation – species and natural communities of concern. We determined that a good way to provide conservation priorities for the 5,824 parcels that comprised the Lehigh Valley focal greenways was to assess four important elements for each parcel using spatial tools in a Geographic Information System (GIS): Conservation Value, Protection Status, Current Management, and Development Pressure.

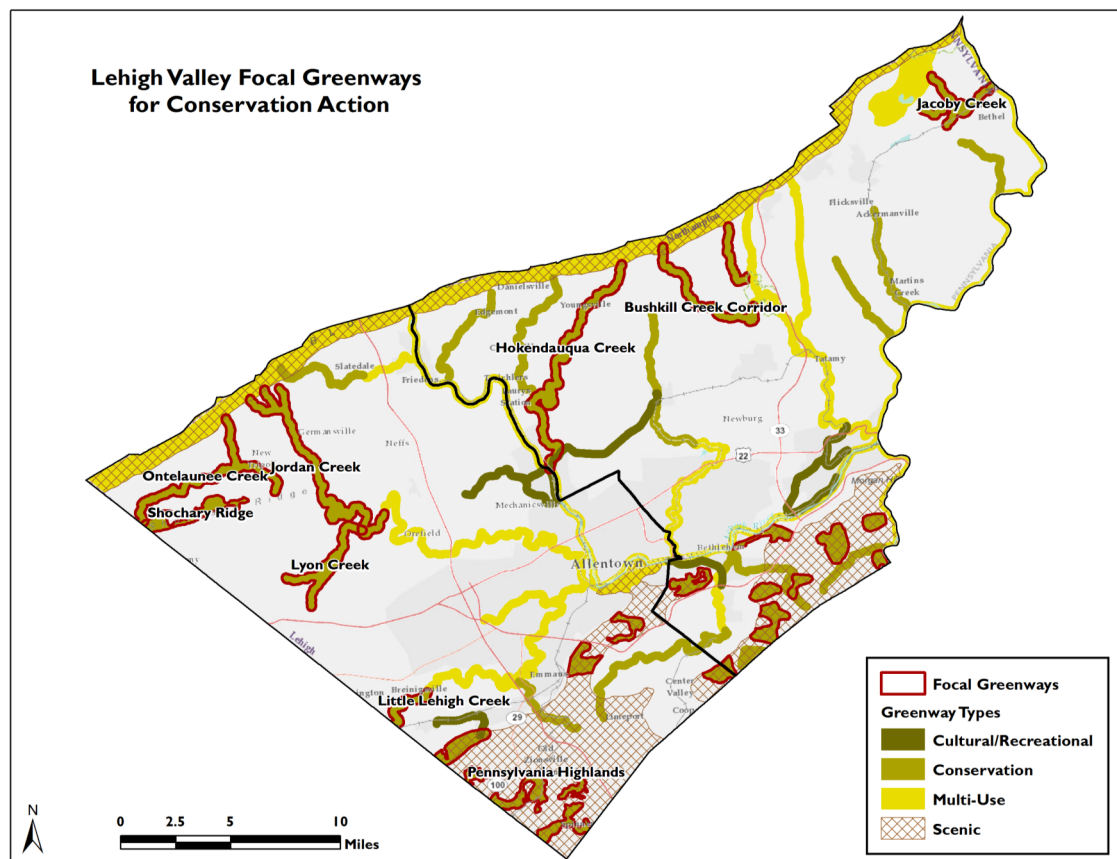
Conservation Value was assigned as categorical priorities (Very High, High, Medium, and Low) based on parcel scores for LVPC natural resources plan data and Natural Heritage Areas (NHAs) identified through the inventory update as critical habitat for species and communities of concern. Natural Heritage Area significance scores based on global and subnational rarity ranks and occurrence conditional ranks enabled PNHP to effectively prioritize parcels for biodiversity importance among the thousands contained by the focal

greenways. The Protection Status and type of land protection (state park, conservation easement) of each parcel was determined and Current Management of each parcel was evaluated as existing land use type (agricultural, residential, parks and recreation) as well as current land cover (deciduous forest, developed, cultivated crops). Finally, our analysis determined which parcels had existing subdivision development, based on LVPC subdivision information, and which had municipal zoning types that could lead to future development or future land preservation.



Scarlet Indian-paintbrush

Steve Grund



The conservation implementation plan for Lehigh Valley focused on nine conservation greenways, highlighted in red.



Bog turtle

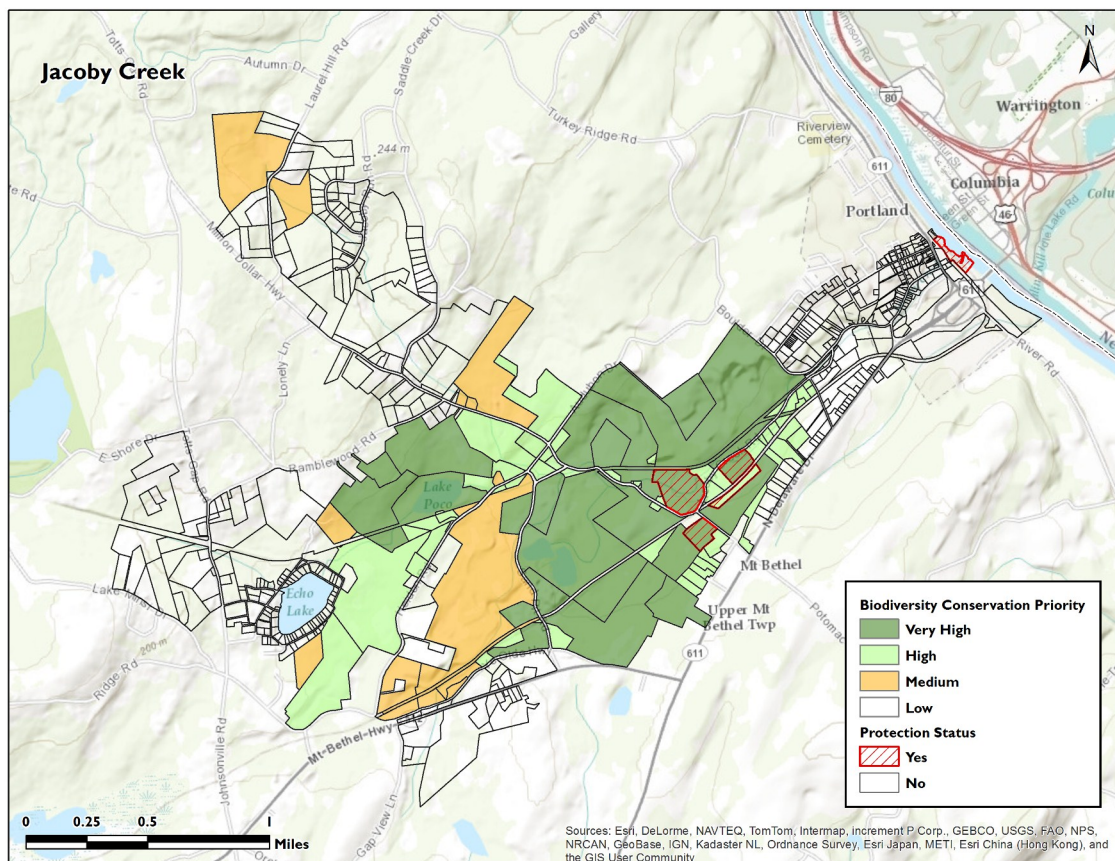
Charlie Eichelberger

After evaluating these four factors, a Conservation Implementation Matrix was created which highlighted the 322 highest priority parcels for biodiversity conservation, based on the NHA Core Habitat, across the focal greenways and provided recommendations for conservation actions (parcel

acquisition, conservation easement, zoning, transfer of development rights). All factors from the analysis were considered in making conservation implementation recommendations. Greenway parcels having the most

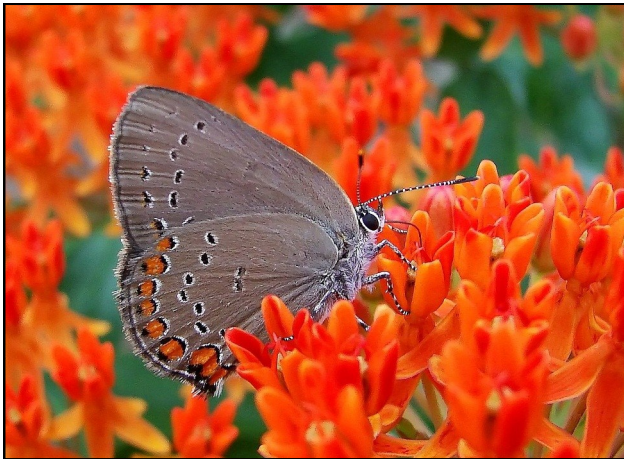
important ecological resources and highest biodiversity were recommended to receive the highest level of protection as acquisitions by a conservation organization capable of managing habitat for the target species, communities, or other natural resources. In addition to the above, suggested partners for carrying out the conservation actions and timeframe priorities were noted for each parcel. This Conservation Implementation Matrix should serve as a planning tool which will help guide land protection for biodiversity conservation within the focal greenways and can be used together with the plan narrative and spatial data in GIS that were provided to LVPC. Perhaps even more importantly, the LVPC now has a blueprint for updating its greenway conservation priorities as new ecological and threat-based information becomes available.

While all nine focal greenways had high priority parcels for natural resource conservation, biodiversity priorities were identified in seven of the nine. These priorities were represented by 28 Natural Heritage Areas which provide Core Habitat for 44 species and natural communities of concern. Based on our analysis, the



Jacoby Creek is a focal greenway in Northampton County that has a number of large parcels with a Conservation Value ranking of Very High that should be targeted for biodiversity conservation.

Pennsylvania Highlands (101 parcels, 2207 acres), Jacoby Creek (87 parcels, 972 acres), and Bushkill Creek Corridor (77 parcels, 731 acres) had the highest number of parcels and the most acreage prioritized as Very High or High for biodiversity conservation. Our analysis also showed that two of the greenways with the most Core Habitat to protect – Bushkill Creek Corridor and Jacoby Creek – also had the largest percentage of residential land use, at 23% and 20% respectively. Given the potential for adverse effects from residential development (degraded water quality, habitat fragmentation, invasive species), the amount of continued residential development in high priority parcels should be mitigated and further protection strategies should be enacted for these areas as recommended in our conservation implementation matrix.



Kathy Martin

Coral hairstreak

Through this conservation implementation plan, concerted protection efforts in just the top three Lehigh Valley greenways have the potential to protect over 2,700 acres of Natural Heritage Area Core Habitat or nearly 70% of all Core Habitat located in the focal greenways. Among the species and communities that stand to benefit if the plan is followed are butterflies like the coral hairstreak (*Satyrium titus*) and mulberry wing (*Poanes massasoit*), the globally vulnerable spreading globeflower (*Trollius laxus*) among other wetland plants like scarlet Indian-paintbrush (*Castilleja coccinea*) and capillary beaked-rush (*Rhynchospora capillacea*), a Skunk Cabbage - Golden Saxifrage Seep forest community, and even the federally threatened bog turtle (*Glyptemys muhlenbergii*).

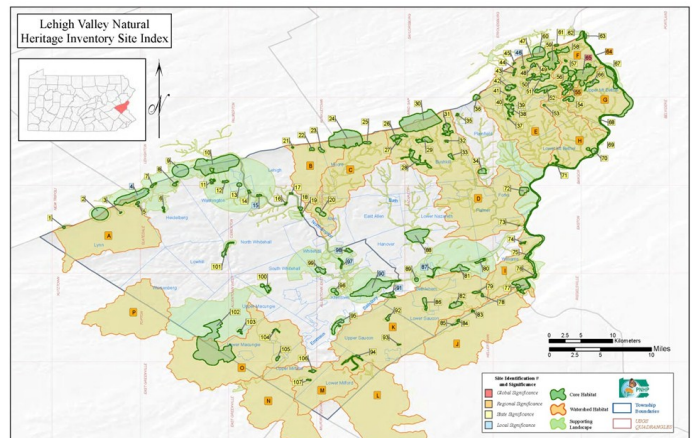
This exercise demonstrates that the protection of biodiversity can be accomplished in several different ways through smart municipal planning. With a combination of regulatory measures like zoning, transfer of development rights (TDR), and official maps,

conflicts between residential or commercial development and biodiversity can be avoided. While land acquisitions provide the best and most permanent protection for areas of high ecological value, they are not the only route to success. Applying varied conservation strategies in the Lehigh Valley and concentrating in areas of highest biodiversity priority will allow future generations to enjoy the ecological benefits of these greenways for years to come.

Lehigh and Northampton CNHI Updates

As mentioned, the greenways work that we completed for the Lehigh Valley Regional Planning Commission was part of a larger project to update the County Natural Heritage Inventories for Lehigh and Northampton counties. With the original inventory completed in 1999, we had to reconfirm and gather additional information on many records of rare species and natural communities, as well as survey many new sites. Additionally, we remapped all of the existing sites to new mapping standards that are being applied to the more than 3500 Natural Heritage Areas (NHAs) throughout the state.

Our work within the combined 726 square miles of Lehigh and Northampton counties yielded 123 Natural Heritage Areas representing 325 individual occurrences of 111 species of concern and 8 types of high quality natural communities. As a way of providing relative importance and ranking, we assign one of four designations to NHAs. Out of the NHAs we designated for Lehigh and Northampton counties, one was considered globally significant, 18 regionally significant, 96 state significant, and 8 locally significant. Look for more in-depth information on the sites and species in the Lehigh Valley in a later PNHP newsletter.



Updated Natural Heritage Areas in Lehigh and Northampton counties showing Core Habitat (dark green), Supporting Landscape (light green), and Watershed Habitat (yellow).

Species Highlight: Giant Swallowtail

by
Betsy Leppo



Betsy Leppo

Giant swallowtail (*Papilio cresphontes*)

It is May 20, 2013, and while it is still spring, temperatures are pushing to highs we haven't experienced since last summer. I am baking in the sun in a parking lot in a state game lands in Centre County, talking to two local naturalists. Harry Henderson and Frank Fee are both retired but actively pursue a youthful fascination with the plants and animals of Penn's Woods. Decades earlier, Frank discovered several rare butterflies at this site, which is the reason we're here almost 30 years later. The Pennsylvania Natural Heritage Program is revisiting old records of species of concern found on Pennsylvania Game Commission lands. Landscapes change over time, and it is important to revisit populations of species of concern to see if they, and their required habitats, are still present.

Our main goal for today is to locate three kinds of plants: round-leaved ragwort (*Packera obovata*), wild columbine (*Aquilegia canadensis*), and prickly ash



Betsy Leppo

Northern metalmark

(*Zanthoxylum americanum*). These plants are consumed by the caterpillars of the northern metalmark (*Calephelis borealis*), the columbine

duskywing (*Erynnis lucilius*), and the giant swallowtail (*Papilio cresphontes*), respectively. We don't expect to find these butterflies unless the food plant they need for their young is present.



Pete Woods

The columbine duskywing looks virtually identical to the wild indigo duskywing pictured above. The columbine duskywing is an uncommon species whose caterpillars only feed on wild columbine.

We find relief from the hot sun by pushing into the woods, but the comfort is short lived as we begin to climb a steep hill. Huffing and sweating, we try to retrace Frank's steps of nearly 30 years ago to the place where he found the columbine duskywing. Frank notices that the woods have matured over the years.

We eventually find the rocky ledges where the columbine likes to grow, but it seems to be less abundant than it was in the past. Several kinds of non-native



Prickly ash

Betsy Leppo

invasive shrubs have filled the ledges and appear to be crowding out the smaller native plants. In open woodland areas we find nice patches of round-leaved ragwort, but the glades and small clearings the northern metalmark butterfly prefers have grown smaller as trees have matured in and around them. We are pleased to find that our third target food plant, the prickly ash, is doing very well. This small shrub is a member of the citrus family and has aromatic oils in its bark. Stands of the shrub are frequent in the understory of the woods and along trails. It is not a pleasant shrub to touch because it has sharp protective thorns. But it is attractive with glossy foliage and clusters of berries that start green and mature to a lovely red.



Pete Woods

A puddling gray comma

We don't find any of our target butterflies in the woods this particular day. But we have found the caterpillar food plants so we remain hopeful that the butterflies are still present. After thanking my guides for their help, they depart for home and a tall cold drink. I stay in the parking lot for a few minutes taking notes about the day. As I prepare to depart, I notice a large swallowtail hovering around a mud puddle in the gravel road. Sure enough, it is the giant swallowtail, one of our targets for the day. Male butterflies in particular are often found 'drinking' from damp soils and even less savory substrates such as dung and carrion, where they obtain nutrients such as salts and other minerals they need.



Jon Dombrowski

Giant swallowtail from above

The giant swallowtail is currently considered imperiled (S2) in Pennsylvania, as historically it has been very uncommon in the state. Its range in the northeastern United States appears to be limited by a cold temperature threshold which impacts the host plant

and survivorship of late season caterpillars. But in the past decade, the species has become more widespread in the state, and appears to be expanding its range along the northeastern edge. So be on the lookout for this beautiful creature in a garden near you. The adults are recognizable from above by their dark black wings marked with a bright yellow cross-bar. When their wings are closed, they appear mostly yellow.



Jon Dombrowski

Giant swallowtail caterpillar

The caterpillars are as bizarre as the adults are beautiful. They are dark with white blotches and look remarkably like bird droppings, a good camouflage to avoid being eaten. If gently prodded with a stick, they will suddenly extrude a bright reddish Y-shaped gland that produces a bad smelling chemical to ward off would-be predators.

Consider planting some prickly ash and nectar plants in your yard to encourage giant swallowtails and increase their numbers in our state.

Notes from the Field

Piping Plover Habitat Restoration

Presque Isle State Park is a historic nesting site for piping plovers in Pennsylvania. The last known reports of breeding activity were during the mid-1950s; however, migrating plovers have recently been observed in the sand plains and beaches within the Gull Point Natural Area at the easternmost end of Presque Isle State Park, an area that is part of a 6 km USFWS Designated Critical Habitat Unit for Great Lakes Piping Plover. The Pennsylvania Game Commission suggested that vegetation encroachment was a major impediment to piping plover colonization and recommended the park implement a control plan for invasive exotic and aggressive native shrub and tree species at the eastern tip of the Presque Isle Peninsula. From 2011 to 2012 PNHP, Audubon Pennsylvania, and Cleveland Museum of Natural History worked with Presque Isle State Park to remove invasive species and obtain a pre-treatment baseline for target species within an area identified as the Piping Plover Habitat Restoration Area. The project partners used a combination of mechanical and chemical means to remove phragmites, purple loosestrife, native willows, eastern cottonwood, and black locust from the area.



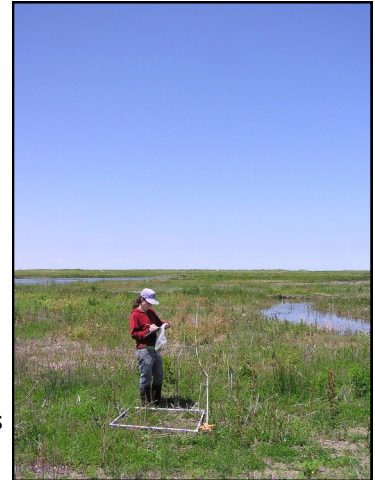
Ephraim Zimmerman

Dry and Palustrine Sand Plain Communities at Gull Point Natural Area, Presque Isle State Park following invasive shrub removal activities.

In 2013, PNHP conducted a post-treatment vegetation assessment and follow-up control activities for target species. Post-treatment vegetation assessment results indicated that the management activity successfully reduced the occurrence of phragmites, willows, and eastern cottonwood. The team was less successful at

controlling purple loosestrife and PNHP noted significant cover of sweet clover, Canada thistle, and spotted knapweed in the treatment area a year following treatment. Additionally, there were several patches of willow and cottonwood seedlings that had either germinated in 2013 or escaped the previous year's treatment. While the

initial treatment could be considered a success as it substantially reduced the frequency and coverage of invasive species, it was clear from the survey that an on-going maintenance-level treatment is important to ensure the sand plain communities at the tip of Presque Isle remain open and free of tall, dense vegetation. Presque Isle State Park Resource Management staff is well suited to continue this work with help from PNHP and volunteers from the Presque Isle Weed Warrior program and Lake Erie Region Cooperative Weed Management Area (CWMA). Continued adaptive management and assessment activities will be implemented as part of a 10 year vegetation management plan for the area.



Jeff Wagner

Ecologist Jessica McPherson conducting a vegetation survey within the Piping Plover Habitat Restoration Area at Gull Point, Presque Isle State Park.

Kings Gap Inventory and Monitoring

The Pennsylvania Natural Heritage Program completed a report detailing results of inventory activities conducted at four parks on South Mountain; Kings Gap Environmental Education Center, and Pine Grove Furnace, Caledonia, and Mont Alto state parks. South Mountain is recognized as a distinct physiographic province in Pennsylvania and provides a large forested refuge for wildlife in an otherwise predominantly agricultural landscape. PNHP scientists documented rare plants and animal species, assessed aquatic resources, mapped and described plant communities, and determined critical habitat areas in the parks. PNHP surveys were complemented by a BioBlitz, held

at Kings Gap Environmental Education Center on June 2 and 3, 2012, which provided an intensive baseline inventory of species in the park across a wide variety of plant and wildlife species.

Small seepage wetlands along streams and floodplains were found to contain numerous plant species of special concern. Small streams and ridgelines are critical habitats for several reptile species of concern. The wetlands, forests, and clearings at Kings Gap Environmental Education Center are also home to a number of rare moths. These data, along with suggested management options to conserve the rare species and their critical habitat resources are part of an on-going inventory project with the Pennsylvania DCNR Bureau of State Parks to provide managers with information to guide management and conservation planning activities.

Two Species Found - New to West Virginia

The Pennsylvania Natural Heritage Program works closely with Natural Heritage Programs in adjacent states to document the regional flora and fauna. In the October-December 2012 issue of Wild Heritage News, we reported on work we did with the West Virginia Heritage Program to document the status of *Eunonymus* scale damage to the globally-imperiled Canby's mountain lover (*Paxistima canbyi*). While documenting one of these populations, PNHP botanists John Kunsman and Steve Grund happened upon a population of bearberry manzanita (*Arctostaphylos uva-ursi*), previously unknown to West Virginia.

Bearberry manzanita is a small shrub with evergreen leaves in the heath family (Ericaceae). The berries are not favored by humans, but can be an important food source for some animals (including bear), especially in late winter, when tastier and more nutritious food has been depleted. The plant has medicinal uses in many cultures, and has been smoked, sometimes mixed with other plants, as a substitute for tobacco, hence another common name for the species, knickknack.



A close-up of bearberry manzanita showing its thick evergreen leaves.

Steve Grund



John Kunsman

John Kunsman spotted the bearberry manzanita midway up an outcrop growing on a sandstone shelf. The task of climbing up to collect a specimen fell to Steve Grund.

Bearberry manzanita grows at northern latitudes around the globe, and extends southward along the coast in eastern North America to New Jersey. South of New Jersey it is now known from three disjunct sites in Maryland, West Virginia, and Virginia. The species was recently rediscovered in Pennsylvania by Jamie Morgan, an ecologist with Kleinfelder East; the species had not been seen in Pennsylvania since 1941.

The previous year, 2011, John Kunsman discovered a colony of screw-stem (*Bartonia paniculata*) also unknown at the time in West Virginia (ecologists from the West Virginia Natural Heritage Program independently found the same species very close by a few weeks later). Screw-stem is an inconspicuous wetland species in the gentian family (Gentianaceae). The few leaves are little more than scales, and the flowers are tiny. It grows in acidic wetlands, usually with peat moss (*Sphagnum* spp.).

These finds are featured in the June issue of *Castanea*, the journal of the Southern Appalachian Botanical Society.

NatureServe Conference

With this year's NatureServe "Biodiversity without Boundaries" conference held so near (in Baltimore, Maryland), our program was able to send over 20 staff. We were strong participants, presenting and organizing workshops throughout the three and a half day conference. Kierstin Carlson, Tyson Johnston, Susan Klugman, and Erika Schoen presented "Reaching for the Sky: Building and Using a Cloud-Based Field Data Collection System." During the one hour presentation we shared our experience in the design, implementation, and use of the Field Information Networked Database

(FIND) with our NatureServe network partners. The session was well attended both in-person and via simultaneous web-broadcast. We had an active question and answer session from both audiences which extended beyond our one hour session allocation. In the time since the conference, we have been contacted by other state Heritage programs including Wisconsin and North Carolina for more information about our unique field data collection system.



Adam Hnatkovich discussing rare species management planning on state game lands at the NatureServe Conference.

Christopher Tracey

Other PNHP staff presenting at the conference included Jessica McPherson, "Conservation Assessment of Calcareous Habitats and their Flora in Pennsylvania" and Adam Hnatkovich, "Rare Species Management Planning on Pennsylvania State Game Lands." Two network-wide workshops were led by Ephraim Zimmerman, "Eastern Heritage Community Classification Workshop" and Christopher Tracey, "Development and Consolidation of Standards for the Identification of Sites of Biodiversity Significance."

Adam Hnatkovich, Christopher Tracey, and Ephraim Zimmerman participated in the NatureServe Leadership Training course during the four-day conference. Leadership Training consisted of informative talks from NatureServe staff, but more importantly, guided discussions regarding various leadership techniques. Leadership skills and techniques were broadly applicable to any professional field, but the training focused on Heritage program models of operation. Topics included a discussion of general leadership qualities, maintaining positive staff morale, and finding new sources of Heritage program funding.

NatureServe hosts the annual Biodiversity without Boundaries conference at various locations across its

membership territory. The 2014 Biodiversity without Boundaries conference will be held April 6-10, 2014 in New Orleans.

iMap Invasives

Heritage staff continue to spread the word about how to track invasive species through the iMapInvasives project, an online GIS-based data management tool for monitoring and management of invasive species. Twelve presentations and trainings were given from March through June showing participants the basics of iMapInvasives, how to enter observation data, and how to navigate the iMapInvasives website. In March, the iMapInvasives website went live; allowing public access to the website and its database. As more people, organizations, and agencies learn about the many benefits of iMapInvasives, we feel confident that invasive species tracking efforts will become more comprehensive, integrated, and useful to those who are managing these species across the state. The iMapInvasives database currently has over 1,200 observation records with many more waiting to be entered.

In the course of their search for rare native species, Heritage biologists often encounter and record exotic invasive species observations. As iMapInvasives develops, information from past and current surveys will be incorporated into the iMapInvasives database. One of the species we have recently documented in iMap is the highly invasive European frog-bit (*Hydrocharis morsus-ranae*). This species was apparently first introduced to North America in 1932 at Ottawa, Ontario. It has gradually spread along canals and rivers to the St. Lawrence River and both sides of Lake Ontario, and by 2008 had become established at the western end of Lake Erie. Our recent discovery of the species at Akeley Swamp in Warren County (SGL 282) is the first record beyond the St. Lawrence and Hudson River



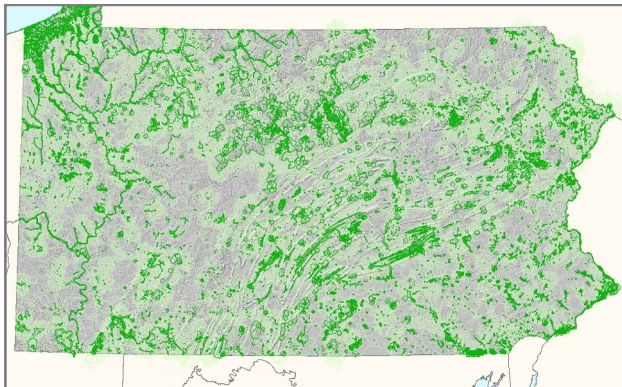
European frog-bit

Chuck Pierce, 2010

watersheds. It has already become the dominant species in some of the ponds and in the wetter parts of the swamps at Akeley Swamp. The leaves of this floating plant suggest a small water-lily, but the flowers are three-petaled and look much like arrowhead (*Sagittaria* spp.) flowers. It spreads rapidly, forming dense floating mats that crowd out native species and clog waterways, and the large amount of biomass leads to a reduction of oxygen levels as dead plants decompose.

Conservation Planning Polygons

This quarter, the CPP Team added 1581 new or replacement polygons to the CPP geodatabase. This puts us on track to meet our annual goal of 4,000 polygons since our total-to-date this year is 2,475. We also received several new specifications from the Pennsylvania Fish and Boat Commission (PFBC), including 4 amphibians, 4 reptiles, and 43 mussel specifications. For the total project, specifications are 75% complete and polygons are 86% complete.



Statewide core habitat (dark green) and supporting landscape (light green) conservation planning polygons

Assessing Energy Development Impacts

As part of a large Richard King Mellon Foundation funded project to assess impacts of shale gas development on high quality ecological areas, Heritage biologists are documenting water quality and biological communities of aquatic ecosystems, and mammal, bird, and plant species of terrestrial ecosystems at several locations in Pennsylvania where the development potential is high. This work will document baseline conditions within 80 high ecological value sites across the state. We will detail the approach to defining areas of high ecological value and other aspects of the project in a later issue of the newsletter. For now, here are some highlights of the work so far.

We began in April with early season water quality and riparian habitat assessments. At each site, staff analyzed

water samples in the field, assessed the aquatic macroinvertebrates, and collected water samples and sent them to a certified lab for analysis of standard elements associated with pollution from shale gas extraction. At select sites near water quality assessment locations, we established transects for permanent monitoring of plant species within zones of the floodplain.



Big Mill Creek, Allegheny National Forest

David Yeany

We selected 25 sites representing large blocks of interior forest to assess avian communities and monitor changes over time. Habitat quality parameters such as size, landscape context, forest fragmentation characteristics are being assessed to determine current condition. Between May and July, Heritage ornithologists conducted surveys at each of the 25 priority interior forest sites. As expected the ratio of forest interior bird specialists to edge species varied between sites, often depending on the presence of roads and other fragmenting features. Data for these surveys will be compiled but one interesting observation we made was a flock of 19 red crossbills in a shelterwood stand at a monitoring location near Lick Run, Clearfield County.



The Canada warbler nests in low densities in northern hardwoods and coniferous forests, preferring sites with dense forest understory cover often associated with mountain laurel or rhododendron thickets. Habitat fragmentation and loss have resulted in steady population declines since the 1960s.

David Yeany

In addition to the 25 terrestrial sites, 23 forested riparian areas were surveyed for American water shrew (*Sorex palustris*) which, while not exceedingly rare, is considered an indicator of high quality riparian ecosystems. Sites were primarily situated along headwater streams of the Allegheny Mountains, from the Northern Tier counties to Fayette County. This effort resulted in a total of nine new occurrences of American water shrew in Pennsylvania.



WPC Heritage and Watershed Conservation staff studying vegetation along Yellow Creek in Yellow Creek State Park, Indiana County.

Ephraim Zimmerman

Other interesting animal species of conservation documented by WPC staff through this project included Monongahela blue crayfish (*Cambarus monongalensis*), found along tributaries to Buffalo Creek, within SGL 95 in Butler County; mountain chorus frog (*Pseudacris brachyphona*) along Dunbar Creek, SGL 51, Fayette County; leopard frog (*Rana pipiens*) at SGL 12, Sullivan County; and gray petaltail (*Tachopteryx thoreyi*) on Porcupine Creek, a tributary of the Allegheny River in Venango County.

Delaware River Mussels



Eastern pearlshell

Mary Walsh

Aquatic ecologists Mary Walsh and Elizabeth Meyer and other WPC staff began mussel surveys in the Delaware River Basin. Over the next two years we will be targeting two endangered species

in the basin: the state endangered eastern pearlshell (*Margaritifera margaritifera*) and the federally and state endangered dwarf wedgemussel (*Alasmidonta heterodon*).

Eastern pearlshell is in a different family than all other freshwater mussels found in Pennsylvania, and is the only mussel in the state that uses trout as a host. Pennsylvania is at the southern edge of its range in North America. Dwarf wedgemussel is a very small

species that rarely exceeds 45 mm in length. Populations are declining throughout its range and its state conservation status is possibly extirpated or critically imperiled throughout its range. Funding for these projects is provided by the Pennsylvania Fish and Boat Commission through the State Wildlife Grant Program and Section 6 funding, as well as the DCNR Wild Resources Conservation Program.

Whip-poor-will

While conducting a survey for rare animals on Chestnut Ridge in Fayette County, Charlie Eichelberger, Joe Wisgo, and Ryan Miller stumbled upon a mother whip-poor-will with two recently hatched chicks. The nest was in a dense patch of mountain laurel and greenbrier. The mother tried to draw the zoologists away from the chicks by feigning an injury. The chicks were well camouflaged and looked like tan cottonballs lying on the forest floor. Although this was not a tracked species encounter, it was quite unique and exciting.



Charlie Eichelberger

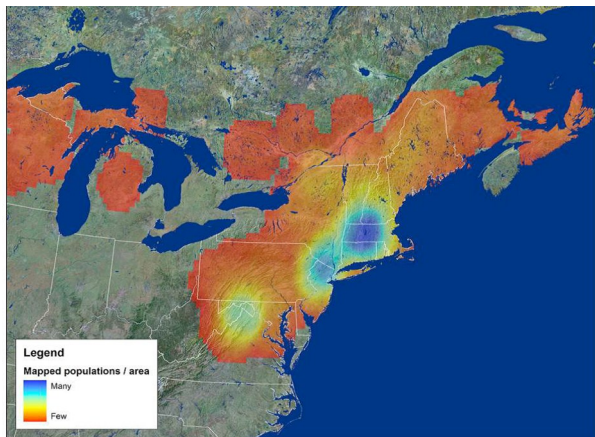
This whip-poor-will chick will practically disappear from view on the forest floor due to its tan feathers. Can you spot the chicks in the photo below?



Charlie Eichelberger

Wood Turtle Monitoring

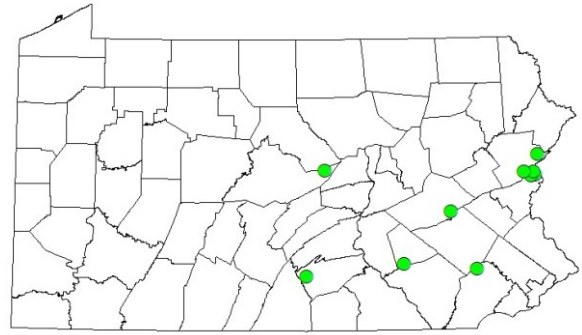
The Pennsylvania Fish and Boat Commission is leading the state's participation in a coordinated monitoring strategy for wood turtles (*Glyptemys insculpta*) in the northeastern United States, overseen by the Massachusetts Cooperative Fish and Wildlife Research Unit and the Northeast Wood Turtle Working Group. The purpose of the project is to use field monitoring to inform a regional status assessment and conservation plan for the species. The sampling strategy developed by the Massachusetts Cooperative Unit is designed to evaluate survey and detection protocols, evaluate current population status, and quantify population trends of wood turtles across its distribution in the northeastern United States. Coordination and project management, but not fieldwork, have been funded by the Northeast Association of Fish and Wildlife Agencies (NEAFWA) through state-level contributions from the State Wildlife Grants (SWG) program, in which twelve northeastern states, from Virginia to Maine, are cooperating to develop a regional status assessment. Fieldwork is being conducted primarily by volunteers or through individual states and researchers working throughout the region.



The approximate range of the wood turtle shown as a density surface based on available data (Mass. Coop.). Wood turtle was only recently added to the list of tracked species in the PNHP database; thus populations in Pennsylvania have poor representation on this map despite their prevalence in the state.

The basic sampling framework incorporates two tiers of survey intensity. The regional network of study sites will encompass a network of ≥ 20 long-term (LT) and ≥ 50 rapid assessment (RA) research sites. The LT sites are not randomly selected, but rather tend to encompass long-term study sites and regional conservation priorities. The RA sites are selected through both random and non-random techniques.

Pennsylvania's portion of the assessment includes two LT sites and eight RA sites, sampled by volunteers.



Wood turtle survey sites in Pennsylvania in 2012 and 2013.

Kathy Gipe, PNHP herpetologist, led fall and spring surveys at a Centre County LT sampling site in 2012 and 2013. This 3 km stretch of stream was specifically chosen for monitoring, because it was the site of some of the foremost research on wood turtle habitat use and movement patterns by Dr. John Kaufmann in the 1980s. The monitoring strategy entails visiting the stream three times in the fall and three times in the spring, seasons when wood turtles are most commonly found in or along the stream, and noting any wood turtles found within 10 m of the stream. During the summer months wood turtles have a wider upland habitat range and are more difficult to locate.

Over the course of these six surveys in Centre County, Gipe and her assistants documented 16 individual wood turtles (4 juveniles, 6 females, and 6 males). Two of these animals had markings that identified them as having been study subjects of Kaufmann's nearly 25 years prior. It is encouraging to see the persistence of these individuals, as well as evidence of successful reproduction, in the population here. Other study sites in Pennsylvania were chosen by volunteers interested in the program, and data is not yet fully available from their efforts.

Another beneficial outcome of this effort in the commonwealth is a focus on improving the dataset for this species in the Natural Heritage database, a species only recently added to the list of tracked species. A new herpetological atlas for the state will also contribute records to better understand the distribution of the wood turtle in Pennsylvania.



Kathy Gipe

This male wood turtle is at least 40 years old, based on evidence of his use in a radio telemetry study in the mid-1980s and his recent recapture in 2013 in Pennsylvania.

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 (2013)	1st Quarter	2nd Quarter	Cumulative Total	Percent of Annual Goal
Biotics Records Updated	200	60	105	165	83%
New EOs Documented	800	147	295	442	55%
New Records Entered into HGIS	300	71	129	200	67%
Field Surveys Reported	500	0	122	122	24%
New CPPs Developed	4000	894	1581	2475	62%
NHAs Updated	120	0	107	107	89%
Outreach to Local Government	20	0	2	2	10%

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 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.

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.