



Pennsylvania Natural Heritage Program

information for the conservation of biodiversity

WILD HERITAGE NEWS

Summer 2016



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Photo Banner:

Carolina Tassel-Rue (*Trautvetteria caroliniensis*) is common in the Youghiogheny River Gorge at the northern limit of its range, but is found nowhere else in Pennsylvania.

Greg Funka

Our Work in State Parks

by

Ephraim Zimmerman

Much is made of the world-class recreational opportunities within Pennsylvania's state parks, and rightly-so! They serve millions of visitors each year – providing numerous ways to enjoy the outdoors. Pennsylvania's state parks also play a critical role in conserving the natural diversity of the commonwealth, including unique and globally significant ecosystems and rare plant and animal species. A key part of the Pennsylvania Bureau of State Parks' (BOSP) mission is management and protection of the natural resources found within the public properties under the agency's stewardship.

Many parks are recognized for their unique natural features and plant communities. The Slippery Rock Creek Gorge at McConnells Mill, the ancient dune and bluffs at Erie Bluffs, and the boulder field at Hickory Run are just some of the many important natural features protected because of state park designation. Presque Isle State Park is notable for the large number of state-listed plant and animal species and natural communities; the concentration of rare plants is found nowhere else in the state. Parks also

provide important habitat connections and corridors for wildlife movement within a greater network of protected lands.

The Pennsylvania State Park system includes some of the most ecologically important areas in the state. Park lands support approximately 1400 occurrences of rare plants, animals, and natural communities that are tracked by the Pennsylvania Natural Heritage Program and used in the Pennsylvania Conservation Explorer (6% of the tracked occurrences in the state). An additional 95 elements (species or natural communities) found in parks, which includes other important species and significant natural features that



Bluffs along Lake Erie shoreline

Pete Woods

are not included in environmental review, are in the PNHP Biotics database. The density of rare elements in state parks is particularly notable when compared to other protected lands in the commonwealth, which contain far fewer rare elements with respect to the total number of acres under protection. State parks contain 0.46 rare elements/acre, compared to the 0.13 rare elements/acre on state game lands, 0.076 rare elements/acre on state forest land, and 0.054 rare elements/acre within the Allegheny National Forest. Even though it makes up only one percent of the total land area of the state, the state park system in comparison to other protected lands is critical for the protection and maintenance of rare species in Pennsylvania. While it is far too simplistic just to compare numbers of rare species and natural communities on a per-acre basis, since rare species are not evenly distributed across the landscape, all acres are not equal, and management focus differs from one agency to the other, it does underscore the importance of park lands in the conservation of rare flora and fauna in the state.

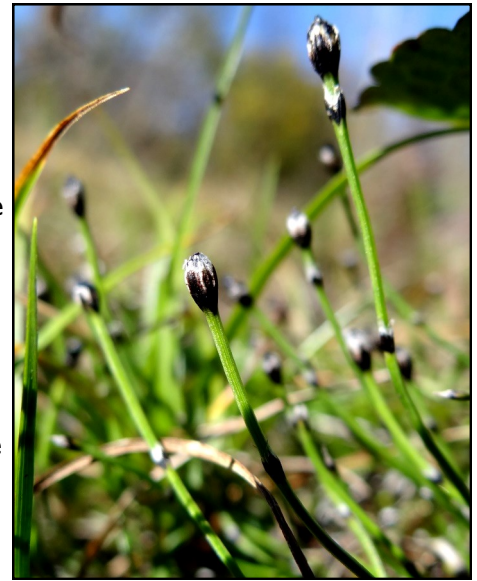


Betsy Leppo

Northern metalmark butterfly (*Calephelis borealis*) at Canoe Creek State Park.

Since its inception, PNHP has worked closely with the Bureau and partners to provide ecological data and management suggestions to guide stewardship of state park lands. State parks have been included in PNHP inventory efforts since the early 1980s as part of our mission to gather information about animal and plant species of special concern and the biodiversity of the commonwealth. Additionally, state parks have provided research sites for classification and assessment studies to define vegetation types and aquatic communities. PNHP data has been used by conservation organizations such as Western Pennsylvania Conservancy (WPC) and The Nature Conservancy to identify high quality, biologically rich properties for protection, often

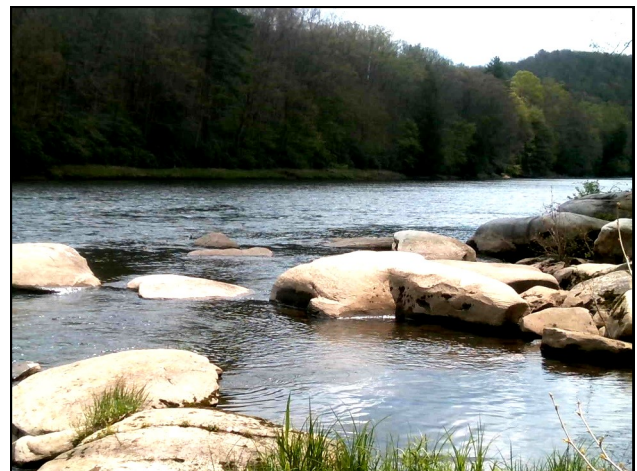
through conveyance to public agencies. Erie Bluffs State Park, on the shores of Lake Erie, for example, was targeted for protection by WPC and DCNR because of the many rare plants and natural features found on the property by PNHP's County Inventory efforts and partners like Jim Bissell of the Cleveland Museum of Natural History.



Pete Woods

Variegated horsetail (*Equisetum variegatum*), a rare plant species at Erie Bluffs State Park

Beginning in 1999, the Bureau of State Parks began providing specific funding to the Natural Heritage Program to conduct ecological inventories focused on state parks, particularly the parks where resource management plans were being updated and/or had designated natural areas. From 1999 to 2007, PNHP completed inventory and assessment reports for state natural areas within Colton Point, Leonard Harrison, Ricketts Glen, Swatara, Caledonia, Codorus, Frances Slocum, Gifford Pinchot, Hills Creek, Kings Gap, Pine Grove Furnace, R.B. Winter, Salt Spring, Susquehannock, Worlds End, Pymatuning, Cook Forest, Canoe Creek, Black Moshannon, and Ohiopyle state



Ephraim Zimmerman

Floodplain Scour Community along the Clarion River at Cook Forest State Park

parks. The primary tasks of this work were to inventory rare plant and animal species and to map plant communities. PNHP provided the parks with data and ecological interpretation for helping to guide management activities.



Sarah Parker

Sampling aquatic vegetation at Raccoon Creek State Park

From 2007 - 2014, the Bureau and PNHP further refined the focus of the inventory and assessment reports to address specific management concerns held by park managers, so that management recommendations could be included in park management plan updates. No longer limited to just natural areas, PNHP staff surveyed sites throughout the parks and made suggestions for management of recreational trails, campgrounds, and control of invasive plant and animal species. Erie Bluffs, Sinnamahoning, Kettle Creek, Gifford Pinchot, Canoe Creek, Bald Eagle, Blue Knob, Raccoon Creek, Ohiopyle, Ricketts Glen, Caledonia, Pine Grove Furnace, and Mont Alto state parks and Kings Gap Environmental Education Center were among those parks covered during this period. Botanists from Morris Arboretum also contributed to this effort and completed inventory and management recommendations reports for a number of parks, including French Creek, Hickory Run, Lehigh Gorge, Ridley Creek, and Nockamixon state parks. PNHP and Morris Arboretum botanists also completed comprehensive surveys for native and invasive plants in lakes at Raccoon Creek, Canoe Creek, Promised Land, and Shawnee state parks and developed recommendations for treatment of aquatic invasive plant species.

In addition to our work with Cleveland Museum and Morris Arboretum, PNHP has collaborated with other researchers in inventory and assessment studies in the parks. Because of their accessibility to high quality

natural features, state parks are outstanding outdoor labs for ecological investigations. The BOSP has a strong environmental education program and PNHP has actively pursued opportunities to connect staff expertise to the educational efforts of park staff. PNHP has worked with BOSP to coordinate bioblitzes at two state parks. A bioblitz is a term used for an intensive biological survey of a given area over a short period of time, usually involving many different taxonomic experts and volunteers. The objective of each of the two bioblitzes was to document as many species in the park as possible within a 24-hour period. The Erie Bluffs Bioblitz was held shortly after the park was established in 2004 and the Kings Gap Blitz was held following the addition of the Ritter tract, which nearly doubled the area of the park in 2012. Bioblitzes serve to connect the public with professional field biologists and also to provide information on common species in the parks and data on many under-sampled taxonomic groups that otherwise may be ignored in ecological assessments. Bioblitzes provide opportunities to showcase the park's ecology and introduce the public to conservation and careers in conservation. In both cases, the results of the bioblitzes provided biological baselines for the new properties and a snapshot in time of a wide-spectrum of the parks' biological diversity.



Christopher Tracey

Participants at the Kings Gap bioblitz preparing to survey the park.

PNHP work continued into this year with a focus on plant community mapping and descriptions. Community maps and descriptions of the community types were developed for Swatara, Yellow Creek, Cook Forest, Clear Creek, Laurel Hill, and Promised Land state parks, Boyd Big Tree Preserve and Ibberson conservation areas, and Jennings Environmental Education Center. The work included general descriptions of the composition and ecological quality of plant communities and development of GIS maps at



Virginia Pine—Mixed Hardwood Shale Woodland at Swatara State Park

Ephraim Zimmerman

the Pennsylvania plant community classification standard, which is the system used by the Bureau of Forestry and Pennsylvania Game Commission to map state forest and state game lands. While the work did not include the detailed species inventory or management recommendations of previous projects, the mapped and described plant communities will provide a foundation to support ecologically-based conservation and management, and ecologically sound development. Heritage ecologists did make note of interesting and important ecological features including a high quality occurrence of Oak – Mixed Hardwood Palustrine Forest, a Virginia Pine – Mixed Hardwoods Shale Woodland, and several rare plants at Swatara State Park as well as a Rich Hemlock – Mesic Hardwoods Forest and a newly documented population of Appalachian violet (*Viola appalachensis*) at Laurel Hill State Park. Work at Jennings Environmental Education Center resulted in a better description of the



Successional forest at Jennings Environmental Education Center

Adam Hnatkovich

successional oak-dominated woodland/forest surrounding Jennings prairie. This woodland, occurring at the same elevation and similar topography to the managed Jennings prairie, is most likely also a prairie remnant that has succeeded to woodland and forest. In this woodland patch, large swamp white oaks (*Quercus bicolor*) similar to those on the prairie are surrounded by smaller shagbark hickory (*Carya ovata*) and American ash (*Fraxinus americana*), suggesting that this area succeeded to woodland in the absence of relatively frequent disturbance. Over the past year, park staff noticed prairie plants emerging in this area following significant dieback of overstory ash trees killed by the emerald ash borer.



Emerald ash borer

Colorado State Forest Service

PNHP has had a strong interest in ecological conservation and stewardship of Pennsylvania's state parks and has worked with the Bureau and other conservation partners to contribute to sound management and stewardship practices. Our work in state parks, in which we provide data to inform management and stewardship, is a core activity of our program. Ecological inventory is a continuous process; living systems change over time, and the diversity of life is such that it often takes many decades to assemble baseline information for a given site. So our work, in a sense, is never done. The information collected by PNHP, however, will help the Bureau in its management efforts to preserve the natural biodiversity of our state parks. We encourage you to get out and enjoy the spectacular natural features of Pennsylvania's state parks and help in the stewardship of these ecological treasures!

Ohiopyle and the Youghiogheny River Gorge—A Botanical Paradise

by
Steve Grund



PNHP

The falls at Ohiopyle is the most well-known of the many scenic features at Ohiopyle

Ohiopyle State Park is truly a gem in western Pennsylvania. It is the most popular destination for whitewater recreation in North America, it is a highlight of the Allegheny Passage bicycle trail, and it is one of the most scenic places in Pennsylvania. It also hosts the most globally rare plant species of any site in

Pennsylvania. Six plant species of global conservation concern (Table 1) and an additional 25 plants of regional conservation concern have been documented in the park. Because of the high biodiversity significance, PNHP has conducted well over one hundred field surveys at Ohiopyle and in adjacent portions of the Youghiogheny River Gorge. Whether or not conducted as part of projects funded by the Bureau of State Parks (BOSP), these surveys have produced the core data used to ensure that management at the park is effective at protecting biodiversity.

Why are there so many rare plants at Ohiopyle? The distribution of plant species is driven largely by geography and geology. Chemically, the geology of the Youghiogheny River Gorge contains nothing unusual for Pennsylvania, but there is enough variation to provide a variety of soil types, including some with elevated alkalinity. This variability is in part responsible for the presence of habitats suitable for different plant species. As the river cuts through two mountains it scours the adjacent boulders and bedrock, creating unusual habitats that are at the core of what makes the gorge so interesting. In this part of the Youghiogheny River, we have two factors driving high plant diversity: a variety of soil types and unique habitats created by a high-energy river. But another factor also adds to the diversity of this area.



PNHP

These rocks at Railroad Rapids are scraped of soil and vegetation by raging flood waters which often carry sheets of ice.

Table 1. Plant Species of Global Conservation Concern at Ohiopyle State Park

Latin Name	Common Name	Global Conservation Status	Pennsylvania Legal Status
<i>Marshallia grandiflora</i>	Barbara's buttons	G2 (Imperiled)	Endangered
<i>Vitis rupestris</i>	Sand grape	G3 (Vulnerable)	Endangered
<i>Gymnocarpium appalachianum</i>	Appalachian oak fern	G3 (Vulnerable)	Proposed Endangered
<i>Scutellaria saxatilis</i>	Rock skullcap	G3 (Vulnerable)	Proposed Endangered
<i>Carex roanensis</i>	Roan mountain sedge	G2G3 (Imperiled)	Proposed Endangered
<i>Spiraea virginiana</i>	Virginia spiraea	G2 (Imperiled)	Extirpated

Most of the larger rivers in Pennsylvania flow generally from north to south. The Youghiogheny, as well as its major tributary, the Casselman, flow into Pennsylvania from the south carrying seeds and other plant propagules of species with more southern ranges, facilitating their establishment as far north as the climate will accommodate them. To the south lie the southern Appalachians, a region of global biodiversity significance. The high peaks in the southern Appalachians provided a refuge for plants of cold climates that had migrated southward during glacial episodes. Those plants in addition to the abundance of species that evolved without disruption from glaciation in the multitude of habitats in the valleys, ridges, exposed rock faces, and protected coves, created a hot spot for botanical diversity (as well as for other groups of organisms). Many of those southern to mid-Appalachian endemic species reach the northern limits of their ranges in the Youghiogheny River Gorge at Ohiopyle.

Because we have an especially rich flora to the south and conditions that allow many of those species to reach northward into Pennsylvania in the Youghiogheny Gorge where there is a diversity of habitats due to varied soils and physical conditions, most notably the fast-moving river, there is a convergence that creates unique conditions. The sheer energy of the river cannot be underestimated as a primary shaping force. The Youghiogheny passes through gaps in both Laurel Ridge and Chestnut Ridge, dropping about 300 feet from the mouth of the Casselman River to the downstream limit of Ohiopyle State Park in the Chestnut Ridge Gorge. That drop represents a large amount of energy, especially when the river is carrying a lot of water.



Greg Funka

Blue monkshood (*Aconitum uncinatum*) is a southern Appalachian endemic that reaches its northern limit along the Youghiogheny River, not far downstream from the Youghiogheny River Gorge.

During spring melting events, not only is the river carrying a lot of water, but much of that water is in the form of ice. Picture yourself standing on the outside edge of a bend in a river with raging water carrying huge chunks of ice your way. Plants can't run away! These floods scour the shores, especially on the outside of bends and in places where the river is narrowed. In places where the river suddenly slows, debris that was removed by scouring is deposited. This produces scour zones and deposition zones. But it's not all or nothing and so we have severe scour zones as well as moderate and minimal scour zones.



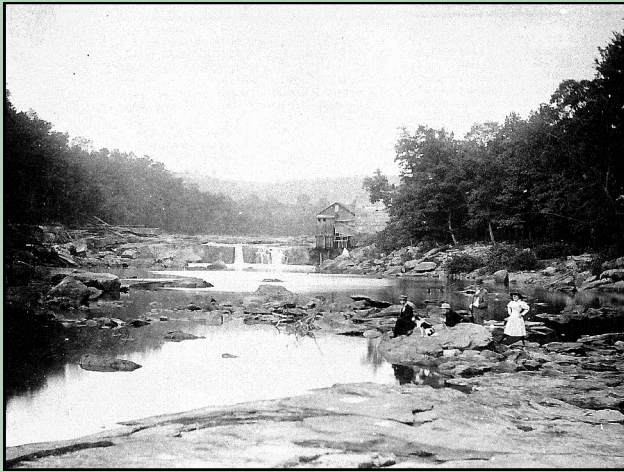
Christopher Tracey

Barbara's buttons (*Marshallia grandiflora*) is a scour specialist and a southern Appalachian endemic that is not known north of the Youghiogheny River Gorge. Because it is globally imperiled, the New York Botanical Garden has taken responsibility for preservation of living material as a safeguard.

All soil at the surface is removed in a severe scour event, and only a few plant species have adapted to survive such conditions. Plants that lose nearly everything above ground rely on roots or rhizomes to anchor them deeply into rock crevices. The large gnarled rootstock of a sand grape producing a vine less than a meter long testifies to a long-lived plant that is violently ripped to the base at least once a year. Because environmental conditions are so severe in this habitat, and these conditions do not commonly occur, many of the highly specialized species that grow in severe scour are of global conservation concern. At Ohiopyle, the globally rare species that can survive severe scour are sand grape (*Vitis rupestris*) and Barbara's buttons (*Marshallia grandiflora*).

More moderately scoured areas are also specialized habitats, but the conditions are less severe and less unusual. As a result, one finds a greater variety of species in these areas, with common species growing with globally and regionally rare species. The

History of Conservation at Ohiopyle



Youghiogheny River Falls in the mid 1880s, seen from scour habitat at the mouth of Meadow Run.

Ohiopyle experienced its first wave of tourism in the early twentieth century. Around the turn of the century, ten or twelve thousand people filled five hotels during the summer months. Botanists recognized the area for its botanical splendor, and it became a favorite destination for botanists from the Carnegie Museum and the Botanical Society of Western Pennsylvania. The Torrey Botanical Society of New York City held its second Botanical Symposium at Ohiopyle in 1905.

By 1951, all but one of the hotels were gone, and many of the houses were in a state of decay. Sewage flowed directly into the river, which was devoid of fish due to acid mine drainage originating mostly in the Casselman watershed. The area might have succumbed its natural character to extractive industries were it not for Lillian McCahan.

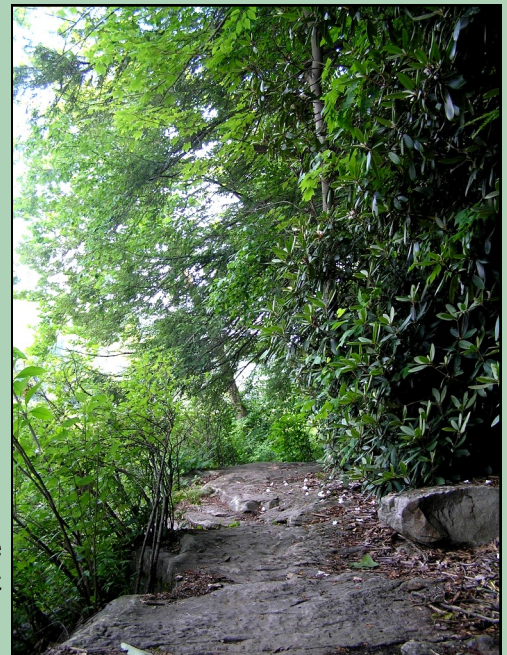
Lillian McCahan had grown up near Blackwater Falls in West Virginia, and had witnessed the clear-cutting and subsequent burning of the virgin timber in that area. She landed a job in Ohiopyle in 1932, and later, reflecting on that time wrote, "After I had seen Cucumber Falls and walked through Ferncliff I thought, well, someday those far hills will be cut, but I hope they always keep Ferncliff a park." McCahan wrote many times to the Western Pennsylvania Conservancy (WPC), starting in 1948, hoping to get some protection for Ferncliff Peninsula.

WPC approached the state, which deemed Ferncliff too small for a state park. WPC had little resources at the time, and was mostly working in Pittsburgh. McCahan persisted, and when the situation became critical, WPC decided to act. Ferncliff Peninsula was up for sale, and there was an offer by a developer who planned on building a commercial park. Other ideas for the conversion of the peninsula included an amusement park, factories, and shunting the river at the base of the peninsula and using the drop to generate electricity.

Edgar J. Kaufmann was a businessman from Pittsburgh who owned a house near Ohiopyle. It was a very nice house called Fallingwater (perhaps you have heard of it). WPC approached Kaufmann who quickly agreed to fund the purchase of the 750-acre Ferncliff Peninsula.

Once Ferncliff was secured, WPC stepped back and looked at the potential for a much larger project encompassing much of the Youghiogheny Gorge. Much planning and negotiating culminated in 1971 with the dedication of Ohiopyle State Park, which encompassed 18,719 acres. Additions over the years have expanded the park to just over 20,000 acres.

Note that while today, Ohiopyle is famous primarily for white-water recreation opportunities; such activities were essentially unknown when Ferncliff Peninsula was purchased for conservation in 1951. The first commercial white-water rafting in eastern North America was at Ohiopyle, but not until 1963. When Ohiopyle State Park was envisioned in 1951 it was to protect the unique natural elements of the Youghiogheny River Gorge, including its remarkable flora.



The trail to Ohiopyle Falls at Ferncliff



Steve Grund

Royal fern (*Osmunda regalis* var. *spectabilis*) just after a flood. Although the fronds are broken at the base, new leaves will restore the plant within a few weeks. The dense mass of fibrous roots and stems is very effective at anchoring the plants to the rocks during scour events.

combinations of species are sometimes surprising and include more typical riparian species as well as those found in more prairie-like habitats given that woody plants are prevented from gaining dominance. Prairie grasses and wildflowers, like big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), and tall tickseed (*Coreopsis tripteris*) are common examples. Not surprisingly, some of the typical species are those generally encountered along rivers, such as nine-bark (*Physocarpus opulifolius*) and cardinal flower (*Lobelia cardinalis*). Because soil does not accumulate from year to year in these habitats, they do not look like wetlands, but much of the scoured habitat is wet much of the year, and many of the characteristic plants are species commonly encountered in mucky wetlands, such as royal fern (*Osmunda regalis*), yellow star-grass (*Hypoxis hirsuta*), and boneset (*Eupatorium perfoliatum*). Flooding

during scour events brings water levels far above normal, submerging rocks that are as dry as any desert most of the year. Here we find plants of dry rocky or sandy habitats like stiff-leaved aster (*Ionactis linariifolius*) and dwarf dandelion (*Krigia biflora*).

As noted earlier, Ohiopyle boasts six globally rare plants and another 25 plants of regional conservation significance. There are other biological rarities in the park as well: one mammal of global concern (Allegheny woodrat), and one of regional concern. Also of regional concern are two herptiles, four insects, and one plant community. Ohiopyle is clearly very important for biodiversity conservation. When partnering with organizations that work nationally and globally, PNHP has made the case for recognition of the Youghiogheny River Gorge in large-scale conservation planning and has partnered extensively with Ohiopyle State Park staff to protect the biological resources of the park. In addition to the many field surveys to document and monitor rare plant and animal populations, PNHP has engaged in a number of important projects at Ohiopyle, including participating in the development of resource management plans, mapping the natural communities, and providing advice on minimizing impacts when updating park infrastructure. We work directly with park personnel to utilize the data we collect to help ensure the continued health of the plants, animals, and natural communities that make Ohiopyle such a special place.



Greg Funka

Stiff-leaved aster (*Ionactis linariifolius*)

Notes from the Field

New Confirmation of Allegheny Woodrat

With its large ears, white undersides, and robust appearance, the Allegheny woodrat (*Neotoma magister*) is more reminiscent of a woodland creature found in a Disney movie than the images that one conjures when the word 'rat' is muttered. It is an inhabitant of rocky features and unlike the introduced Norway rat (*Rattus norvegicus*) which thrives in developed areas, the Allegheny woodrat is an obligate of forested habitats rich in native food sources. They are nocturnal and spend their nights gathering food which is transported to caches where it can be dried and stored for a later meal. These caches can contain vegetation from a plethora of different plant species as well as soft and hard mast, fungus, mosses, and lichens. They also tend to defecate repeatedly in the same place which is referred to as a latrine. Fresh scat in a latrine or fresh vegetation in a food cache is a telltale sign of recent woodrat activity. Unfortunately, the Allegheny woodrat has either been extirpated or is in decline throughout its range in the eastern United States due to several factors which include parasites, habitat fragmentation, and loss of food sources. It is considered a threatened species within Pennsylvania.



Allegheny woodrat within one of its food caches. Notice the freshly placed vegetation.

In 2015 a cooperative agreement was formed between the Pennsylvania Game Commission (PGC) and Heritage staff at the Western Pennsylvania Conservancy (WPC) to conduct mammal surveys as a pilot effort within the Central Mountains Region of Pennsylvania in support of the PGC's Pennsylvania Mammal Atlas. As part of this effort, Heritage zoologists conducted 45

visual surveys at potential and historic woodrat sites, and maintained baited trail cameras at four historic sites. These surveys spanned three of PGC's Woodrat Conservation Management Areas

(CMA): 1) Allegheny Front West CMA (two surveys), 2) Blacklog Mountain CMA (seven surveys), and 3) Central Mountains CMA (36 surveys). Despite our intense survey effort, we were only able to detect the active presence of woodrats at a single site that was within the Allegheny Front West CMA.

While we were only able to confirm the presence of woodrats at a single location, the find was significant as it was a previously unknown site and was located over two miles away from the nearest known active site. This was also a fortunate find for the zoologists present during the survey because while most sites are confirmed active by the fresh sign found in latrines or food caches, we were able to observe a wood rat function within its natural surroundings. Surprisingly, this individual was receptive to our presence allowing us to get close enough to photograph and observe it going about its daily routine. For approximately 30 minutes, we watched the woodrat move about, consume food within its food cache, and groom. As we continue our work in this region, we are also conducting surveys in the Southcentral Region of the state as part of the Bedford County Natural Heritage Inventory.



Rocky outcrops with many shelves and deep crevices provide excellent habitat for the Allegheny woodrat

Joe Wisgo

Charlie Eichelberger

Bedford County Zoology Fieldwork

Heritage zoologists discovered a new population of upland chorus frog (*Pseudacris feriarum*) in the Town Creek watershed in southern Bedford County. Although fairly common in the southern Mid-Atlantic States, the southern Pennsylvania border is the northern fringe of the range for this species in North America. The frogs prefer a wet meadow habitat that has not been impacted by agriculture. These frogs are small (3 cm) and difficult to observe, but are easily identified by their call which has been likened to the sound of a finger running down the teeth of a comb. This is the second record for this species in Bedford County and the fourth record for all of Pennsylvania. Survey effort for this species in the spring covered much of the Bedford County/Maryland Border.



Jack Ray

Upland chorus frog (*Pseudacris feriarum*)

We also surveyed for vernal pools in April and May, visiting over 60 potential pools that were delineated from aerial imagery and LIDAR topographical GIS data. Many of the pools were noted to have lower than average water levels for this time of year. The early warm and dry weather this past spring likely had an effect on the viability of the pools' obligate species (spotted, marbled, and Jefferson salamanders, wood frogs, and fairy shrimp). Some of the pools visited had dried significantly and we observed dead wood frog tadpoles. On a normal year, the pools remain wet until the frog and salamander larvae (tadpoles) can metamorphose. Vernal pools typically dry up by late spring (June), and it usually takes around 50 days for wood frogs to hatch and grow into adults that can leave the pool. Some of the pools that were visited contained multiple obligate species and were of fairly high quality.

East Meets West: 10 Years Later

For more than 20 years, the Pennsylvania Natural Heritage Program (PNHP) had a bit of an identity problem. First of all, we were often known as the Pennsylvania Natural Diversity Inventory (PNDI) which is and has always been the database and database information function of the program. However, we did not adopt and rebrand the program as PNHP until later. Also, at that time, PNHP was a three partner program between The Nature Conservancy (TNC), Western Pennsylvania Conservancy, and Department of Conservation and Natural Resources and staff identified as being PNDI-E, PNDI-W, or PNDI-Central. Other states and even agencies and constituents within the state were justifiably confused.

Even though we made some progress in describing and promoting ourselves as the Pennsylvania Natural Heritage Program, it wasn't until late 2005 that we undertook a full scale strategic planning effort. At that point, TNC decided to leave the program and the partnership as they had done in nearly all states where they had begun Natural Heritage Programs. Our then close cooperators, the Pennsylvania Game Commission (PGC) and the Pennsylvania Fish and Boat Commission (PFBC), were positioned to become full partners and WPC agreed to employ all the TNC staff. On July 1, 2006, all TNC staff became WPC staff, the program had four partners, and a plan was in place for the next five years.

Ten years later, we continue with the same partnership and strive to do all the things that we set out to do in our strategic plan. We've accomplished much including the completion of all initial County Natural Heritage Inventories and updates for numerous counties, the



Kings Gap Environmental Education Center

Natural Heritage Program Partnership staff circa 2005

publication of the Aquatic Community Classification and User Guide, the development of a classification of floodplains for the Susquehanna, Ohio, and Delaware watersheds, an update to the state-wide community classification we first published in 1991, the creation of a vernal pools registry, the expansion of our taxonomic expertise, the hosting and administration of the Rare Plant Forum, the development of a brand new online planning and environmental review tool (Pennsylvania Conservation Explorer - PACE), and the addition of over 8,300 new rare plant and animal records to the PNDI database. But maybe the most important thing that we've done is learn to work together more effectively as a partnership and make it clear, finally, that PNHP is one program.

Science Camp for High School Students

In June, Heritage biologists partnered with staff at Jennings Environmental Education Center (JEEC) to host the second edition of EYE Con (Experiencing Your Environment through Conservation); a summer science camp for high school students. Staff at JEEC presented students with management challenges that are specific to the park. Students worked closely with Heritage biologists to design experiments that focused on forest change, the theme for this year's program that was relevant to JEEC's management challenges.



Will Taylor

2016 EYE Con students and staff

For 2016, we expanded the camp to include a fourth day, providing extra time for recreation. Students went kayaking at Moraine State Park, participated in an orienteering experience, and took part in a number of other team-building activities. Another new addition to this year's camp was a question and answer session with biologists from academia and private industry. Students met with Dr. Nicole Dafoe, a biology faculty member from Slippery Rock University, and Chris Fry, a

consulting biologist from Beran Environmental Services, and discussed academic and career opportunities in the natural sciences.

Projects that were designed and implemented through EYE Con provided

students with an opportunity for experiential learning in field-science, and data from student projects are invaluable. Working in groups, students focused on two large projects. One group assessed the viability of habitat for the queen snake (*Regina septemvittata*) in a successional meadow community that was once forested, but has been recently impacted by beaver. The other group examined the suitability of three different forest communities for prairie expansion. Because JEEC manages habitat for the eastern massasauga rattlesnake, students compared forested communities to existing managed prairie habitat in order to recommend specific park areas that could be converted to prairie. Student performance was exemplary. EYE Con will return to Jennings Environmental Education Center in June 2017, with a new group of students and a new theme to promote conservation in our state park system.



JoAnn Albert

Students surveyed the crayfish population, which is the primary food source for queen snakes.



Adam Hnatkovich

Students utilize a transect to survey a successional forest community.

Peatland Birds

In the winter 2015-16 edition of Wild Heritage News, we described the details of a multi-year project focused on assessing peatland wetlands. This spring and summer we began one component of this study by conducting bird community surveys across peatlands at both long-term monitoring sites and validation sites. Drawing upon the strength of the PNHP partnership, we collaborated with Doug Gross, Endangered and Non-game Bird Section Supervisor at the Pennsylvania Game Commission, who has long-studied and monitored Pennsylvania Endangered yellow-bellied flycatchers (*Empidonax flaviventris*) and blackpoll warblers (*Setophaga striata*), as well as other birds specializing in boreal habitats. This statewide effort represents the first systematic survey focused on peatland bird communities, which are often difficult systems to access and navigate through.



Red-headed woodpecker (*Melanerpes erythrocephalus*)

Together, we implemented off-road point count surveys and rapid plant community assessments across 30 peatland sites during this first year of the project. In total we visited 195 point locations, sampling a range of wetland community types from graminoid dominated Bluejoint – Reed Canary-grass Marsh to ericaceous shrub-dominated Leatherleaf – Bog-rosemary Bog to closed canopy conifer-dominated Red Spruce Palustrine Forest. Our survey results will enable us to characterize breeding bird assemblages in these peatland communities and quantify densities for a number of conservation priority species, like Nashville warbler (*Leiothlypis ruficapilla*) and Canada warbler (*Cardellina canadensis*). This information will enable better monitoring of potential climate change impacts to these species and habitats and will make for more informed management decisions concerning these rare ecosystems.



Northern waterthrush (*Parkesia noveboracensis*)

With the potential to find a high diversity of breeding bird species of special concern that occur in peatland communities, the value of this collaborative project has already been borne out through the highlights from our first season. Through our peatland bird surveys, we detected 13 bird species of special concern, in addition to 15 other focal species as well as many additional forest interior birds. Among the birds of special concern we observed were golden-winged warbler (*Vermivora chrysoptera*), red-headed woodpecker (*Melanerpes erythrocephalus*), sora (*Porzana carolina*), American bittern (*Botaurus lentiginosus*), eastern whip-poor-will (*Caprimulgus vociferous*), common nighthawk (*Chordeiles minor*), osprey (*Pandion haliaetus*), northern goshawk (*Accipiter gentilis*) – with a nest found near a recent occurrence, and northern waterthrush (*Parkesia noveboracensis*), which was found at 15 sites.



Pitch Pine–Leatherleaf Palustrine Woodland

Several focal bird species of concern which specialize in boreal peatland habitats were also detected. Blackpoll warbler was observed at three sites, including one new location. Yellow-bellied flycatchers were found at two

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sites. Although they were absent from three known locations included in the project, multiple singing males were detected at one other regular site and the flycatcher was detected at one new location. Likely the surprise of the summer was the discovery of an olive-sided flycatcher (*Contopus cooperi*) giving its advertising song “quick, three-beers!” on June 21 in a Pitch Pine-Leatherleaf Palustrine Woodland (listen to its song here: https://drive.google.com/open?id=0BwDSYGXqd_YXWkJzNFFMQ2xGUFE). Olive-sided flycatchers have not been confirmed breeding in Pennsylvania since the 1930s and there have been few breeding season encounters indicating a breeding behavior code of “Possible” or “Probable” since the first Breeding Bird Atlas was initiated in 1983. While follow-up visits to the olive-sided flycatcher site did not confirm additional breeding activity, it was still a significant finding that, together with our other early results, further demonstrates the importance of our Pennsylvania peatlands and the need for continued monitoring of these boreal habitats.

iMapInvasives Website

Staff from the Pennsylvania Natural Heritage Program (PNHP) currently participate in a program which tracks invasive species locations and population distributions. This program is made to benefit citizen scientists and natural resource professionals working to protect our native species and habitats from the threat of exotic invasive species. This program, known to many in Pennsylvania, is called iMapInvasives and consists of an overarching network of ten participating states and provinces that all see the need to track and record invasive species locations as well as related control and eradication efforts.



This spring, the iMapInvasives network received greater online recognition when a new website was launched which benefits administrators and users alike. Available at www.iMapInvasives.org, the new website highlights various aspects of the benefits of using iMapInvasives as well as resources and success stories from members of the network. Some highlights from the website are listed below:

- **Why iMapInvasives?** – This portion of the website explains the tools and functionality available through iMapInvasives, providing aid to new and existing users who wish to understand how to capture and share their invasive species findings.
- **Broad Network** – Pennsylvania is just one of ten participating programs (nine states and one Canadian province) currently in the iMapInvasives network. Each of these programs has at least one person who acts as the administrator of their unique iMapInvasives database and has the goal of building and maintaining the invasive species data received for their state/province. View the full listing of network administrators on the iMapInvasives Network page.
- **Success stories** – With a multitude of registered users actively using iMapInvasives, there are always interesting stories to tell about how iMapInvasives is being used. These stories are highlighted on a page called “iMapInvasives in Action!”
- **Community Toolbox** – This portion of the website features a sampling of resources which helps registered users and the general public alike better understand how iMapInvasives is being used to connect citizen scientists, researchers, and land managers for the collaborative purpose of tracking and managing invasive species.

To see more of the new iMapInvasives network website for yourself, go check it out by visiting www.iMapInvasives.org!

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 (2016)	1st Quarter	2nd Quarter	Cumulative Total	Percent of Annual Goal
Biotics Records Updated	300	66	84	150	50%
New EOs Documented	800	189	407	596	75%
New Records Entered into PACE	350	0	0	0	0%
Field Surveys Reported	300	159	49	208	69%
New CPPs Developed	400	0	0	0	0%
NHAs Updated	150	15	0	15	10%
Sites Actively Monitored	35	0	28	0	80%

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 PACE 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.

Sites Actively Monitored indicates how many established geo-referenced plots that we visited and sampled. These sites allow us to collect data on structure, species composition, and physical context (soils, hydrology, etc.) in a systematic way and by following the same protocols to directly compare future data to previous data.