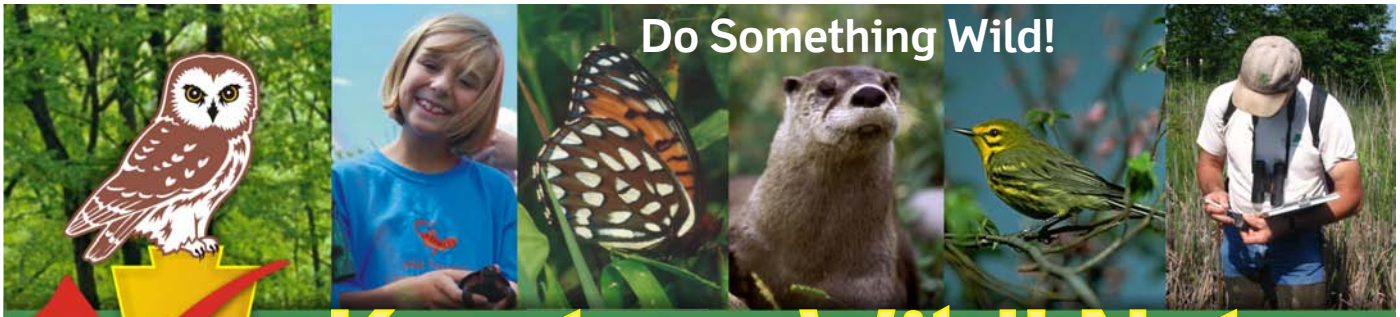

Keystone Wild! Notes

Spring/Summer 2014 Edition

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Snowy Owls Invade Pennsylvania

by Sarah Sargent, Important Bird Area Coordinator, Audubon Pennsylvania

Many Pennsylvanians will remember the winter of 2013-2014 as being especially cold, but bird watchers and ornithologists will remember it as the biggest winter for snowy owls in decades. The snowy owl (*Bubo scandiacus*) is the largest owl species in North America, and only ventures as far south as Pennsylvania in the winter, spending the breeding season in the very far north in open tundra. They are well known for their irregular pattern of occurrence, none being seen in most years, but then having an "irruption," with many showing up in some years. Irruptions occur about every four years on average, but are not entirely predictable. This year has been the biggest irruption in nearly 50 years, with snowy owls finding their way as far south as Florida and Arkansas.

Irruptions are linked to the owls' food supply during the previous breeding season. They feed on lemmings—a type of rodent—several species of which have notoriously cyclical populations. The summer of 2013 was a huge year for lemmings in the breeding range of snowy owls, and so the parent owls were able to lay more eggs, and raise more owlets. In lean years a female may lay only three to five eggs, or she may even skip a year, whereas in years with plentiful lemmings she can lay up to 11 eggs. The young grow up but then need to find a place to hunt for the winter, and so they move south. Typically the birds we see in Pennsylvania are the young ones hatched the previous summer, and often we see more males than females. Females weigh more than males (about 2.3 kilograms (kg) versus 1.8 kg, on average) and the larger bird wins if there is a dispute about hunting rights. Thus a male is more likely to be pushed farther south before he finds a place to spend the winter. Snowy owls consistently choose sites that resemble their home landscape: flat and treeless with short vegetation, like mowed areas and farm fields, where they can catch rodents. Airports turn out to be very attractive to these owls. They also like beaches and open marshes.

article continues on page 7

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Administered by the
PA Department of Conservation & Natural Resources
in cooperation with the PA Game Commission and
PA Fish & Boat Commission

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Do Something Wild!
Keystone Wild! Notes

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From the Editor's Desk

by Jessica Sprajcar, Editor of *Keystone Wild!Notes*

Jessica Sprajcar is a Land Conservation Specialist in DCNR's Bureau of Forestry, Rural and Community Forestry Section.

My ties to the Wild Resource Conservation Program began when I interviewed for my first position within DCNR back in the spring of 2004. Then director of the program, Ron Stanley, participated in my interview, along with two other DCNR employees. Honestly, at that point I had never heard of WRCP. I was familiar with the owl license plate, but didn't know what organization was responsible for it. I learned a lot from Ron, then Sara Nicholas, and now Greg Czarnecki. I have a much greater appreciation for all that goes into protecting the plants, non-game wildlife and habitats of Pennsylvania from the wisdom of these three leaders of WRCP. (I never met Frank Felbaum, WRCP's first director, but I've have heard from many people of the great legacy he started).

WRCP has always been an organization of few staff, so they don't mind volunteers helping out. Over the years I assisted with the festivals, occasionally wrote an article for *Wild!Notes* and helped design brochures and other documents. In 2008 I even became the host of the first set of Cosmo's World videos, which was an amazing and very fun experience. The following year was full of transitions for WRCP, particularly when it came to *Wild!Notes*. Due to budgetary issues we had to say goodbye to our paid editor, Linda Steiner. I stepped in to keep the publication going and take it into a new and exciting direction—an online e-zine! While not all our readers were happy with the move to digital, I found it exhilarating to link our content to web-based material and be able to showcase all photos in color, and to expand the page numbers too. *Keystone Wild!Notes* is a meatier publication today and I think many of those wary of change are finally coming around.

The winter 2010 issue was my first as editor. Over the last four years I've had a blast searching for good photos, writing articles on a variety of topics and trying to wrangle authors to meet their deadlines. So it makes me a little sad to say that this spring 2014 issue will be my last as editor. I've had a great run as editor but given a lot of new responsibilities at work, I think it's best for me to pass the baton. I am turning over the publication to a very capable woman who is excited to take on this role. I would like to introduce you to Rebecca Bowen, editor of *Keystone Wild!Notes* starting with the forthcoming fall issue. Rebecca is the Chief of the Ecological Services Section. You will learn more about her in the next issue, when she says hello officially. Please give her a warm welcome!

Although you won't see my face on the editor column in the future that doesn't mean I'm gone for good. I'll still be here at DCNR, working on private forestland issues, and contributing stories as an author from time to time. WRCP has a very special place in my heart and that won't change! Thank you so much for reading this publication. The emails and letters of support and praise have been a joy to read over the years. It's great to know that you find *Wild!Notes* such a useful and interesting publication. Keep reading!

Sincerely,

WRCPeople Ellen Shultzabarger

I grew up in south-central Pennsylvania, in the Carlisle area along the Conodoguinet Creek. My brother, sister and I spent most of our time in, on, or around the creek. Often, my brother fished while my sister and I picked wildflowers and flipped over rocks to see what new creatures we could find. If we weren't in the creek, we spent a lot of our time in the woods, often hiking to Pole Steeple or Flat Rock at Pine Grove and Colonel Denning state parks. We also had a small fruit farm, so during the growing season I was often helping pick fruit. However, I wasn't super helpful to my parents, as I ended up eating more strawberries than I actually saved to sell!

Currently, I am the Chief of the Conservation Science and Ecological Resources Division within the Bureau of Forestry in DCNR. This division houses the Wild Resource Conservation Program (WRCP), the Pennsylvania Natural Heritage Program (PNHP), Ecological Services for the bureau, and the Wild Plant Program. Most of my career has revolved around threatened and endangered species or resource conservation. I began my career at the National Wildlife Federation developing educational information on threatened and endangered species (This is where I got the bug to focus my work on these species and habitat conservation). I later moved to Massachusetts where I worked on sustainability programs at a university, on land protection at a conservancy, and at the Massachusetts Natural Heritage and Endangered Species Program. Since then I've been back in Pennsylvania, where I began by reviewing development projects for potential impacts to threatened and endangered species for PNHP, and now I manage programs focused on many aspects of species of special concern, forests and natural resources conservation.

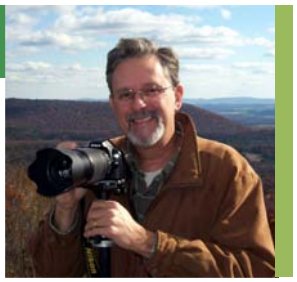
I began working with the WRCP while at work in DCNR's Wild Plant Program. The program often had funding needs in order to survey for rare plant populations across the state, to develop recovery plans for imperiled plant species, and to provide research on specific questions or issues facing plant species management or conservation. WRCP is an important component in Pennsylvania's conservation because it focuses on non-game animals and plants. Typical funding sources aren't always focused on these types of resources, so it is valuable to have these funds available from WRCP to provide connections for researchers, conservation managers and educators on plants and non-game animals in Pennsylvania.

When not working, often you can find me with my family outside. I am a big proponent and user of public lands—so we often enjoy local conservancy, county or state lands throughout Pennsylvania. We've got two young children and two young dogs, so for us, the outdoors (preferably wooded) are the best places to burn off our family's energy and then sit, relax and enjoy the view when we're done!

Conservation Today

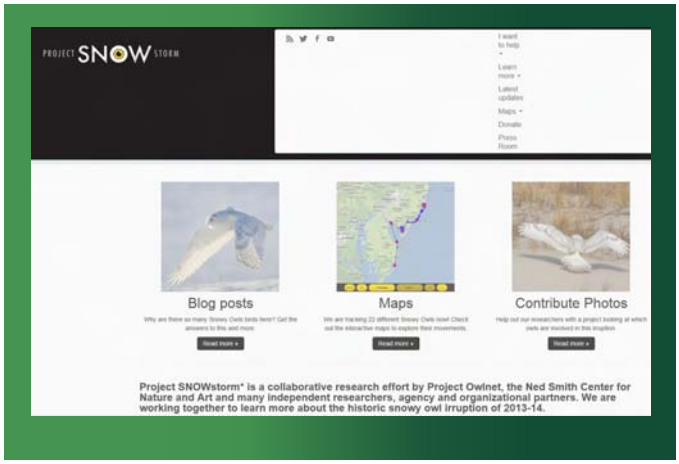
Conservation in the Age of Social Media

by Greg Czarnecki, WRCP Director



Like it or not, social media has changed the way we communicate and connected us to more people in more ways than at any other time in history. While sites like Facebook and Twitter are used mostly to socialize with family and friends, they're also playing an increasingly important role in conservation.

A great example of using social media to involve the public in conservation is Project SNOWStorm, which was formed in response to this past winter's massive southward migration of snowy owls. This irruption, as they're called, was the largest of its kind in decades. When the scope of this year's irruption became apparent, Scott Weidensaul and his associates at Project OwlNet saw a rare opportunity to track the bird's movements and behavior. They organized Project SNOWstorm, a collaboration between dozens of scientists and organizations, to study the irruption and share it with the world via their website and Facebook page.



They used a technology that had never been tried with owls—outfitting the birds with solar-powered GPS units that transmit information about the bird's movements through the network of cellular phone towers. Like most of today's cutting-edge technology, however, it wasn't cheap. The small transmitters, which the birds wear like a backpack, cost about $3,000 each, and there are the additional costs of collecting and managing the data they transmit. Raising funds on short notice was going to be a challenge, so Scott and crew decided to try crowdfunding, which raises money with small donations from a large number of people. The concept isn't new—it dates back to the 17th century—but the internet has given it a modern and very effective twist.

Crowdfunding was first used in the U.S. in the 1880s. Joseph Pulitzer, publisher of the *New York World*, appealed through his newspaper to everyday citizens for donations to fund the pedestal upon which the Statue of Liberty would be built. Within six months, more than 125,000 people donated, most less than a dollar, and Pulitzer raised more than enough for Lady Liberty's new home.

Project SnowStorm's goal was a bit more modest—$20,000 over two months—which would allow the team to outfit six owls. They exceeded that amount within two weeks, and by the time the online campaign had closed, they had received $36,000 in donations! When combined with larger donations and grants, such as the one from the Wild Resource Conservation Program, this allowed them to tag 22 owls in seven states, far surpassing what they had hoped for.

Why was it so successful? "I think we had the perfect alignment of factors—a big, enigmatic, charismatic species that birders already love, and which was all over the news nationally because of the historic irruption this winter," says Weidensaul. "Throw in the Harry Potter angle, and there's hardly a person that isn't intrigued by snowy owls. On top of that, this gave the public a way to get directly and immediately involved with a cutting-edge application of new technology, which provided immediate feedback in the form of amazingly detailed maps showing where the owls were traveling and what they were doing."

Conservation in the Age of Social Media continued...

Those maps are updated every few days on the Project SNOWstorm website, thereby allowing the "crowd" that donated to see their contribution in action. Becoming part of an important cause and contributing to its success is why this funding concept can be so successful for conservation and research projects.

Weidensaul also has a blog on the website that provides detailed updates on the bird's movements and activities. "It's been a phenomenal way to engage people. That helped with the fundraising, of course, but I think we all saw the biggest impact on education and conservation, as a way of bringing people directly into science. The conversations we've been able to have with people, through our blog and Facebook page, have added greatly to the whole project."

So what's next for Weidensaul and his team now that the owls are returning to the Arctic? "We're deciding where we go from here. Project SNOWstorm was conceived on the fly to take advantage of this historic irruption, but we're looking at how we can continue this work, perhaps not only with snowy owls but also with other Arctic-nesting raptors. But we're still catching our breath and trying to wrap our heads around what we experienced this winter."

Weidensaul says there's no question that social media is an invaluable tool for modern day conservation. "Any time you can bring people into the meat of a science or conservation project, make them feel the excitement and give them a way to contribute directly, you're going to get them fired up for conservation as a whole. This snowy owl phenomenon has been the best example of that I've ever been involved with."

WRCP Videos Available Online

The two most recent WRCP documentaries, **"Fungi: Pennsylvania's Hidden Treasures"** and **"Dangerous Invasions,"** can be viewed online at **www.pacast.com.**

Just click on the Productions tab to see these and other Commonwealth Media Services videos.

00:00 | 00:00

Snowy Owls Invade Pennsylvania continued…

Many aspects of the movements and behaviors of these owls are poorly known, especially when they venture south in irruption years. Once it became clear that this year was going to be an especially large irruption, a group of researchers teamed up to take advantage of the flood of owls to learn more about them. The collaboration named itself Project SNOWstorm and has an excellent website at http://www.projectsnowstorm.org/ where followers can learn more about their work. A major component of the work they undertook was capturing owls, taking various measurements and samples from them, and attaching transmitters to their backs that collect location information and send it in to the researchers via cell towers. The transmitters were designed especially for snowy owls and were made here in Pennsylvania. Transmitters were attached to 22 owls from Massachusetts to Minnesota, between December 17th and March 16th. Six of these owls were from Pennsylvania, named after their release sites: Philly, Erie, Millcreek, Amishtown, Womelsdorf and Wiconisco.

I was lucky to assist with two owls, Erie and Millcreek, which were both captured near the Erie International Airport and released at Presque Isle State Park. I say assist, but mostly I just observed the processing of the owls by Mike Lanzone, Trish Miller and Tom MacDonald.

Erie and Millcreek, each named for the city where they were first captured, are just two of the many snowy owls involved in Project SNOWstorm.

(Photos: Eugene Ware)

Project SNOWstorm is tracking the movements of 22 owls, including six that were captured in Pennsylvania.

During the processing of each owl, a number of standard measurements were taken, including weight, wing length, tail length and bill length. Each received a numbered band on its leg as a permanent identification marker. Then the transmitter harness was carefully made up and fitted just right for each owl. These birds will carry their transmitter for the rest of their lives, so the fit has to allow for normal movement and fat storage. Studies of other raptors have shown that transmitters like these do not interfere with normal activities of the birds, and give us a detailed view of their lives. The final processing step was collecting a blood sample and some small feather samples for later analysis in the lab. Later we let the owls go and each flew off strongly over the ice of Presque Isle Bay.

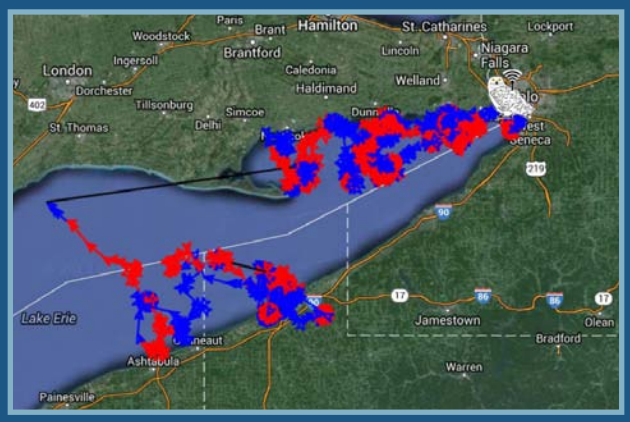
The solar-powered transmitters "call in" to the cell phone network every three days. If the owl makes a connection through a nearby cell tower, all the data that has been collected since the last download is transmitted. If no connection is made (i.e., the owl is in an area with no cell phone coverage), the transmitter waits another three days, then tries again. The transmitter can store data for years if it is unable to make a connection.

Waiting for the transmitters to call in and report on the owls' movements was like waiting for Christmas morning. I eagerly checked the map updates to see what "my" owls have been doing, along with all of the others. After just a few months we have already learned a tremendous amount from these owls. Some of them very clearly stuck to a home area where they stayed for months. Others wandered long distances, especially some of the ones along the coast. Unfortunately, some

Snowy Owls Invade Pennsylvania continued...

of the owls have died, including Philly, who loved the Philadelphia International Airport so much that he returned there from Lancaster County, having been removed from the airport previously for his own safety. He found his way back very quickly, and before he could be recaptured again he was killed by a jet that was landing.

Erie turned out to be quite an adventurer, and spent a lot of time riding ice floes out in Lake Erie, where presumably he was hunting ducks. This was not something that we knew snowy owls did before this study.



Project SNOWstorm tracks the movement of the owls using cell phone towers. Here is Millcreek's flight path.

As spring arrives, the owls are heading north, back to their breeding grounds. They will be out of cell phone range for quite some time, and likely we will never hear from some of them again. However, if any of them do make it back into cell phone range in future winters, Project SWOWstorm will get a big download of stored data, and we will learn all about where they go and how they behave in the summer months. It will be like a fabulous, surprise gift when it comes.

Answers to Wild Words on page 25.

Answer Key:

1. Great horned owl
2. Northern saw-whet owl
3. Eastern screech owl
4. Snowy owl
5. Barred owl
6. Long-eared owl
7. Barn owl
8. Short-eared owl

Answers to Color Me Wild! on page 26.

Answer Key:

6 Barn owl
3 Barred owl
8 Eastern screech owl
4 Great horned owl
7 Long-eared owl
5 Northern saw-whet owl
2 Short-eared owl
1 Snowy owl

Up Close and Personal With Snowy Owls

by Greg Czarnecki, WRCP Director

The highlight of my winter was helping out, in a very small way, with Project SNOWstorm. I spent several cold nights with Scott Weidensaul and his team in Montour and Berks counties locating, trapping and banding snowy owls.

Here are a few photos of the birds, including Womelsdorf, the owl carrying the WRCP-funded transmitter, as well as images of the data collection process and transmitter fitting. One of the most remarkable things was how calm and completely accepting the owls were of all of the poking and prodding. They are beautiful creatures, and these photos don't do them justice.

All of the owls you see in these photos were caught in farm fields. That is ideal habitat for snowy owls because it's wide open, with plenty of rodents, just like their Arctic habitat.

Snowy owls are superbly adapted to cold conditions, as the thermal images in these two photos attest. In the photo on the left, Dr. Eugene Potapov of Bryn Athyn College is recording the heat signature from the owl's face and head, with only the eyes and bill emitting any significant amount of heat. When Dan Brauning, Wildlife Diversity Chief for the Pennsylvania Game Commission, opens up the wing, you can clearly see the heat generated by the bird's torso and the underside of its wing. When resting, these areas are kept covered, keeping heat loss to a minimum.

Up Close and Personal With Snowy Owls continued...

Word spread quickly through the farming community that we were banding the owls, and many of the local families came out in the sub-zero wind chill to see the birds. Here a young girl helps Scott Weidensaul take wing measurements.

Scott Weidensaul quickly weighs Womelsdorf as Clarissa and Carolyn Witmer and their grandfather, Mose Burkholder, look on. Mose's wife Edith helped us locate the owl, which she had been watching for weeks, and allowed us to conduct all of the measurements and banding in her basement, which was a cozy reprieve from the frigid outdoor temperatures.

Scott and his team take many physical measurements, including bill length, and detailed photographs of the wing patterns, which are unique to each bird.

Up Close and Personal With Snowy Owls continued...

As Steve Fererri of the Pennsylvania Game Commission holds Wolmelsdorf, Scott Weidensaul removes one of the owl's feathers. Skin cells at the base of the feather will be frozen for later DNA analysis, while the feathers themselves will be analyzed for stable chemical isotopes. The isotopic analysis can shed light on where in the Arctic the owl originated and also can provide insight into its diet.

Blood samples can tell a lot about a snowy owl. Womelsdorf's gender will be confirmed, his genetic makeup profiled by looking at the mitochondrial DNA, and the smear that Scott Weidensaul is preparing will tell us whether he has any blood parasites.

Up Close and Personal With Snowy Owls continued...

Both the transmitter and the harness that holds it in place were made in Pennsylvania. "The harness is made of tubular Teflon, which is manufactured in Berks County by Bally Ribbon, the only place in the world that makes the stuff—every raptor researcher on Earth knows them", says Scott Weidensaul. "It goes around the wings in a figure-eight without restricting the bird's movements, and keeps the transmitter high in the middle of the back at the bird's center of gravity. Since the birds are as big as they'll ever be when they leave the nest, there's no need to worry about them outgrowing the harness". The transmitter, which was made by Cellular Tracking Technologies of Somerset, will collect information on Womelsdorf's location, altitude and speed once every 30 minutes and can store six years of data, which will automatically download the next time he's within range of a cell tower.

Without a doubt the most striking feature of the snowy owl is its eyes. While these birds rarely weigh more than six pounds, their eyes weigh about the same as ours!

*** All photos were taken by Greg Czarnecki, WRCP**

"New" Firefly Found in Pennsylvania

by Bruce Parkhurst,
PA Firefly Festival Board Member

Did you know that the rare species *Photinus carolinus*, or synchronous firefly, was discovered in the upper Tionesta Creek area of Forest County, Pennsylvania? Once thought only to exist in Asia, a population of synchronous fireflies was first found in the Great Smoky Mountains of Tennessee, and has been the subject of much study and interest over the past decade. It was widely held that the Elkmont, Tennessee group of synchronous fireflies was the only population outside Asia. That is no longer the case.

A few years ago on a moonless night, an astute observer camping in the Allegheny National Forest noticed large groups of simultaneously flashing fireflies in the woods by Tionesta Creek. She got in touch with forest biologists from the Great Smoky Mountains National Park, who came up to the area in 2012 to make the verification official. Now that there is a recognized population of this species in our state, interested individuals are making it a priority to educate Pennsylvanians of all ages about this amazing insect.

Male synchronous fireflies hover in woodland areas where females await below, in the leaf debris. The males start flashing in unison to attract the attention of the females. Typically, there is a pulse-pulse-pulse-rest pattern to the flashing, and once the males get "synched up," the woods light up in a fantastic display.

While in the Tionesta Creek area, the researchers noted at least 15 other types of fireflies, including the slow-flashing "Chinese lanterns," which light up along the creek edges, hanging in the air like so many tiny lanterns, their reflections dancing on the water.

To celebrate the amazing diversity of fireflies, the importance of their special habitats, and to bring attention to the discovery of the synchronous firefly in Pennsylvania, residents in Forest County have organized an annual Pennsylvania Firefly Festival, timed to coordinate with the peak appearance of the synchronous firefly population. The 2nd annual event will take place on Saturday, June 28 from noon to midnight.

The festival site is located at 13558 Route 666 in Kellettville, near Little Minister Run, at the Black Caddis Ranch. This is a free event for families and eco-tourists, with activities for all ages, live local music, food, exhibits, educational sessions and night walks for firefly observation. Firefly viewing starts late, around 9 p.m. Families with very young children should plan accordingly.
For more information, including details about camping on-site, helping volunteer for the event, and more, visit http://pafireflyfestival.blogspot.com.

A population of synchronous fireflies was discovered in Allegheny National Forest by Tionesta Creek.

Photo: Radim Schreiber, www.fireflyexperience.org

Visitors to the Firefly Festival will get to take night walks to look for fireflies.

Photo: Radim Schreiber, www.fireflyexperience.org

Wild! Watch

Murder in the Woods

by Heidi Mullendore

Environmental Education Specialist at Canoe Creek State Park

Crows belong to the Corvid family of birds. A group of crows is called a "murder".

Photo: Dick Daniels, Wikimedia.com

Arthritic branches held paralyzed poses under a darkening sky. On an early spring day, the bare trees showed hints of green at the tips of branches, and burgeoning spots of green were unfolding among the rusty brown leaves of the forest floor, hinting at the upcoming lushness of spring foliage to come.

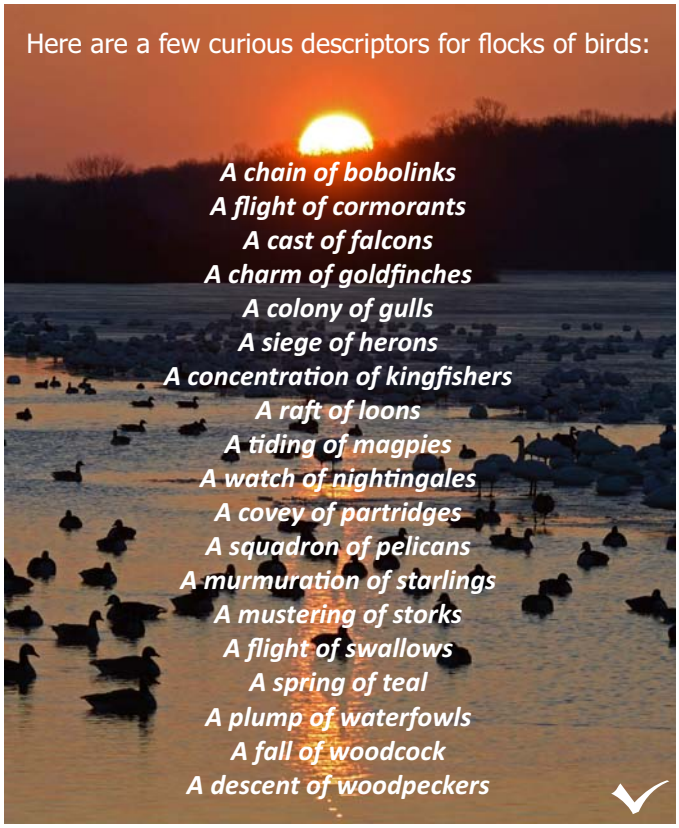
The storm clouds pushing into the area were turning the sky a dull steel gray. The woods were muffled and there was an air of waiting. The open woods, usually ringing with the drumming of woodpeckers and the call of early spring warblers among the white oaks were strangely quiet as the pressure changed.

As the sky darkened I stood still, straining to hear anything—but nothing was stirring. There was no breeze, nothing was moving. Suddenly, a cacophony of raucous, agonizing shrieks cracked the stillness. My heart thundered as I craned my neck around to find the cause of the uproar. Black shapes exploded over the ridge in pursuit of a lone owl trying to escape the barrage.

Many species of birds mob larger species, smaller birds harassing the larger birds, chasing off the bully. But crows exhibit a wild raucous joy as they scream thunderously in pursuit of owl or hawk. Corvids seem especially intent in their mad glee—murder on the wing—midnight arrows plunging again and again to harass the predator in its desperate escape. The phrase 'a murder of crows' is an accurate depiction of the black bedlam of the screaming crows, worthy of Hitchcock and Poe.

Many terms are used to describe species of birds, a few reflecting the true character of the bird. Among my favorites are: a piteousness of doves; a convocation of eagles, a trembling of finches and a wedge of geese. I've not found many sources to reveal the origins of these terms; they seem to have sprung from the pages of dusty ornithological references, some as dull as the faded prints themselves, others creatively hatched with the birds in mind.

Here are a few curious descriptors for flocks of birds:



A chain of bobolinks
A flight of cormorants
A cast of falcons
A charm of goldfinches
A colony of gulls
A siege of herons
A concentration of kingfishers
A raft of loons
A tiding of magpies
A watch of nightingales
A covey of partridges
A squadron of pelicans
A murmuration of starlings
A mustering of storks
A flight of swallows
A spring of teal
A plump of waterfowls
A fall of woodcock
A descent of woodpeckers

While Outdoors, Jot Your Observations Down in a Nature Journal

by Jessica Sprajcar, editor of Keystone Wild!Notes

Many environmental educators encourage the use of nature journals to document your thoughts, feelings, ideas and observations that take place while out in the natural world. What we see, hear or smell may be fleeting, but by capturing those experiences in a nature journal, the emotions are captured for posterity and later reflection.

John Muir, founder of the Sierra Club and protector of parks, was an avid journal writer. He liked to capture the beauty he saw in nature, both with words and with sketches. Through his journals, generations of nature-lovers can experience what he experienced and compare to their own travels in nature. What a lasting legacy!

Beginning a nature journal is easy. There are no rules; do whatever feels right to you. To help you get started, though, here are a few suggestions.

- Provide descriptive words and details for all the various living and non-living things you see, hear, smell, touch and maybe even taste. Think about how they interact with one another to create the ecosystem
- Think about the feelings that these items evoke in you and write them down
- No need to erase or think too much about what you want to put down on paper; let it flow
- Feeling especially creative? Why not add a poem to your narrative?
- Sketch what you see, or take a photo, insert a pressed leaf or flower… anything to complement your writing
- Find a book about nature journaling at your local library to get additional inspiration

And check out this beautiful page from Heidi Mullendore's nature journal. It is both inspiring and educational. Can you put together something that captures the emotions and experiences of nature? Give it a try!

Raising Allegheny Woodrats in Captivity to Aid Wild Populations

By Reg Hoyt, Assistant Professor/Co-Chair
Animal Biotechnology & Conservation
Delaware Valley College

(Photo by Joe Kosack, PGC)

As a child, "The Wonderful World of Disney" introduced me to many fascinating animals. Among them was an endearing rodent called the pack rat, which while gathering food for its winter pantry, or midden, had the unusual habit of collecting the trash and treasures of human society. In addition to the food that it required to get through times of scarcity, everything from bottle caps to jewelry might be carried back to the pack rat's nest. Probably in no small measure, shows like this led me to a career working with wildlife. My fascination with this particular group of rodents, which are also known as woodrats, persists.

Soon after coming to Pennsylvania, I learned that the Allegheny woodrat (*Neotoma magister*) is listed as a state threatened species and that its long-term survival is less than certain throughout much of its former distribution. The Allegheny woodrat is a habitat specialist that prefers the less than hospitable rocky talus slopes, cliffs and caves of the Appalachian Mountains and many river corridors. It once was found from Connecticut to northern Georgia and Alabama, but is now locally extinct in many places. While its diet includes a wide variety of foods from mushrooms to seeds and even insects throughout the spring and summer, winter food scarcities make the woodrat dependent upon the availability of fruits and nuts, or soft and hard mast, and the storage of these items in their middens, to survive until spring.

The Allegheny woodrat has a furry tail, distinguishing it from the more common and non-native Norway rat.
(Photo: Cal Butchkoski, PGC)

Where the woodrat persists it is an indicator of high quality habitat, as human changes to the landscape have resulted in their decline. Over the last 40 years the populations of Allegheny woodrats have declined by 35 percent. There is no single factor likely to be the cause of this decline. The loss of the American chestnut, due to the introduced chestnut blight, seems to have started the cascade of events that have brought about the decline. Nearly half the trees in Pennsylvania's forests were chestnuts prior to the introduction of the deadly chestnut blight. Each tree annually produced thousands of nutritious nuts that the woodrat, among many other species, depended upon for its winter diet. While oaks have replaced the chestnut as the dominate trees in Pennsylvania's forests, oaks are far less reliable in the amount and quality of hard mast (i.e. acorns) they produce. In addition, the recovery of deer, bear and turkey populations across the state has produced a number of competitors for this food source.

Although some species do not prosper in close proximity to increasing human populations, great horned owls and raccoons are two species that thrive in the face of civilization. Uncontrolled deer populations destroy ground cover vegetation, making the woodrat more vulnerable to predation by owls. Raccoons may have an internal parasite, the raccoon roundworm (*Baylisascaris procyonis*), that is fatal to the woodrat. The seeds passed within the dung of the raccoon are collected by the woodrat and stored in its midden for later consumption. The warm, moist conditions of the midden are ideal for the roundworms to thrive.

Raising Allegheny Woodrats continued...

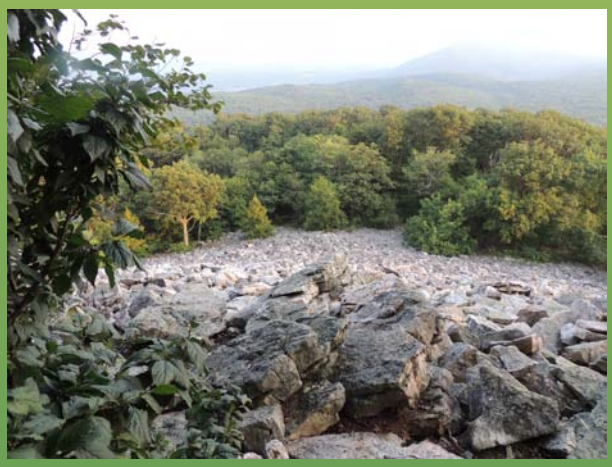
If these threats were not enough, the growing human population and the expansion of agriculture, housing, energy development and roads have isolated populations of woodrats. Without the ability to integrate new members into a population, the genetic variability within the population declines and the risk of inbreeding greatly increases. This may be the final straw in the downward spiral to extinction of local woodrat populations.

In 2011, the Pennsylvania Game Commission resurveyed 25 sites that were known to have Allegheny woodrats in the past; only 16 were found to still have signs of their presence. With so many threats, there is not one single solution. Habitat protection and restoration are clearly important. Local reductions in deer numbers may reduce competition and the negative habitat impacts of uncontrolled populations. Research has indicated that some success may be possible in reducing the impact of raccoon roundworm via the presentation of medicated bait, similar to the methods used to provide raccoon populations with rabies vaccine. Yet none of these methods can reverse the genetic loss that has occurred within isolated woodrat populations.

Delaware Valley College, in partnership with the Pennsylvania Game Commission and with funding from the State Wildlife Grant program, is embarking on an effort to provide captive-born woodrats for restocking and possibly reintroduction efforts in Pennsylvania. The addition of individuals that provide more genetic variability to the population may arrest the downward spiral to extinction when coupled with other conservation measures. The ultimate goal is to prevent the need for listing the Allegheny woodrat as a federally endangered species.

Delaware Valley College has acquired a colony of Allegheny woodrats that were the subject of several studies conducted by a post-doctoral candidate, Dr. Timothy Smyser, at Purdue University. Additional animals were acquired from the Pennsylvania Game Commission. It is hoped that offspring produced from this captive colony will be available for restocking efforts in 2015.

However, being solitary in the wild, woodrats provide some challenges to captive propagation. While more sociable species may be housed together, woodrats prefer to live alone until they are ready to reproduce.



Woodrats live in rocky, mountainous areas surrounded by mast trees like oak.
(Photo: Reg Hoyt)

Delaware Valley College, in conjunction with the Pa. Game Commission, is raising woodrats in set-ups like this.
(Photo: Reg Hoyt)

Raising Allegheny Woodrats continued...

Human care-givers must recognize when a female is ready to breed, which is often signaled by a harsh "raspy" call. If not closely supervised, encounters between males and females can be violent. Woodrats don't breed until their second year and seldom live to be much older than three to four years of age in the wild. Averaging only two pups per year, 60 percent of the young will not survive until the next spring. Therefore, the reproductive potential of this species is not comparable to other rodents we are familiar with.

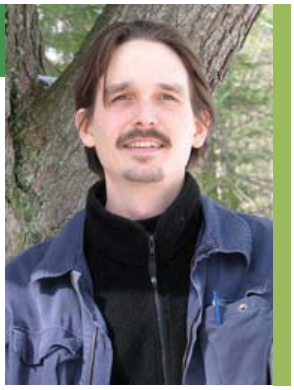
While no captive propagation program can provide large numbers of offspring given the biological constraints of the species, the head-start provided can better prepare youngsters for the harsh realities of the wild. By 60 days of age, a woodrat pup is ready to leave the protection of its mother's nest. Captive-born woodrats would then begin preparations for release. They would be given time to gain the strength and agility needed to navigate the rocky talus slopes in the wild. Food hidden within their enclosures would provide the juvenile with the opportunity to search for its next meal, a skill essential in the wild.

Upon being transported from the breeding facility to the wild, juveniles will be housed on-site for a period of time to acclimate to the local conditions. This is referred to as a "soft release" method, as it provides additional support at the release site. After release, supplemental feedings will continue in order to promote survival. To monitor the success of released individuals, radio-tracking may be used. While mortalities are expected to be high, the addition of new genetic lines into a population would increase the likelihood of survival of isolated woodrat populations. Improvements in available food resources and habitat would also create better connectivity between populations.

Captive propagation should never be considered a substitute for the management of the many threats that face the Allegheny woodrat. It is but one tool in the wildlife management arsenal. One third of the woodrat species found in the U.S. and Mexico are of conservation concern. Let's hope that we find solutions to the threats facing these fascinating, small mammals, and that the Allegheny woodrat survives to spark the imagination of generations to come.

Woodrats have an average of two pups per year, very low compared to other rodents. (Photo: Reg Hoyt)

American Ginseng: A Threatened Native Plant with Specialty Forest Crop Potential



by Dr. Eric Burkhart
Plant Science Program Director, Shaver's Creek Environmental Center
Professor, Ecosystem Science & Management Department, Penn State University

In July 1783, the Bavarian scholar Dr. Johann David Schöpf visited Pennsylvania and several other eastern states with an interest in America's medical botany. He began his trip at Philadelphia, later extending visits to Bethlehem, Nazareth, Reading, Lebanon, Carlisle and Pittsburgh. A published account of this journey, entitled Travels, provides a glimpse of early drug plant collection and trade. At Laurel Hill, Pennsylvania, he observed the following:

A man met us who was taking to Philadelphia some five hundred pounds of ginseng-roots (Panax quinquefolium L.) on two horses. He hoped to make a great profit because throughout the [Civil] war little of this article was gathered, and it was now demanded in quantity by certain Frenchmen. The hunters collect it incidentally in their wanderings; in these mountains the plant is still common, but in the lower parts it has pretty well disappeared…. Much is brought into Fort Pitt [in Pittsburgh]. Industrious people who went out for the purpose have gathered as much as sixty pounds in one day. Three pounds of the freshly gathered make only one pound of the well dried; which is sold by the gatherers for one, one and a half, to two shillings, Pensylv. Current, commonly about a shilling sterling. The physicians in America make no use of this root; and it is an article of trade only with China, where the price is not so high as it was, on account of the great adulteration.

American ginseng is a valuable non-timber forest resource in Pennsylvania.

(Photo: Eric Burkhart)

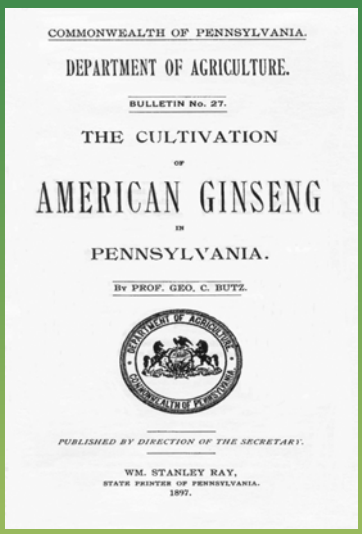
Although timber is typically considered the principal forest resource in Pennsylvania, the state's forestlands also harbor many other economically valuable resources whose encouragement (or cultivation) can provide landowners with additional income, as well as an interesting diversion. Pennsylvania has a rich assemblage of native, medicinal forest plants that have long been commercially exploited. In addition to American ginseng, other economically important species include goldenseal (*Hydrastis canadensis*), black cohosh (*Actaea racemosa*) and bloodroot (*Sanguinaria canadensis*). These species have been abundant throughout the state, but diverse pressures including over-collection and land development have placed many of them in peril. Cultivation or other forms of husbandry (planting, tending, encouraging) on forestlands is a way for Pennsylvanians to help wild plant resources survive and thrive.

Of all of the plants collected for the medicinal trade, American ginseng has undoubtedly figured most prominently. As a result of strong international demand and often astonishing profitability, ginseng collection and husbandry have occurred statewide for at least two centuries. In western Pennsylvania, there are early accounts of ginseng serving as an early form of "currency" on the early frontier, used for bartering, along with whiskey.

American Ginseng: A Threatened Native Plant continued...

In the past, ginseng was almost certainly much more widespread in the wilds of Pennsylvania. Inevitably, this must have led to naive and careless collection by some, resulting in an overall decline in species occurrence and abundance. Observations of such trends are found in state agricultural bulletins from 100 years ago, which encouraged husbandry and cultivation on private lands in order to alleviate pressure on existing wild populations. Professor George Butz was an early agricultural researcher who conducted experiments in ginseng cultivation from 1897 to 1902 at the Pennsylvania State College Experiment Station in State College (later re-named the Pennsylvania State University). In an 1897 publication on ginseng cultivation that he wrote for the Pennsylvania Department of Agriculture he observed:

It is probable that every county in Pennsylvania has been hunted over for ginseng and that now there are from two to twenty more or less active ginseng collectors in each county of this state. The practice of collecting the roots during the summer months before the crop seed has ripened, and of taking every root in sight, however small, has very naturally resulted in greatly diminishing the quantity of wild root available for exportation.


COMMONWEALTH OF PENNSYLVANIA.

DEPARTMENT OF AGRICULTURE.

BULLETIN No. 27.

THE CULTIVATION

OF

AMERICAN GINSENG

IN

PENNSYLVANIA.

BY PROF. GEO. C. BUTZ.

PUBLISHED BY DIRECTION OF THE SECRETARY.

WM. STANLEY RAY,
STATE PRINTER OF PENNSYLVANIA.
1897.

George Butz, a professor at what is now Penn State, studied wild ginseng in the late 1800s.

On the basis of appearances alone, one would be hard pressed to point out anything especially remarkable about American ginseng. Indeed, the plant has a rather unassuming form, since it lacks any dramatic flower or foliage. The most striking characteristic is the plant's appearance in the fall of the year. At this time, the foliage turns golden yellow and, under certain conditions, plants may also bear a cluster of bright red fruit. It is this appearance that beckons the collector from a distance, a lure on some distant hollow. Appearances aside, there has nevertheless been a high value associated with wild ginseng root that originates from the forests of Pennsylvania. Most wild ginseng root is exported to eastern Asia, where it is valued for its tonifying properties, strengthening the body against stress and disease. Though it may be difficult for Americans to fully appreciate, there are characteristics attributed to wild ginseng that are not easily duplicated using typical field-based cultivation methods. These differences are analogous to the differences between regional wines, which many of us can appreciate but may find difficult to characterize precisely.

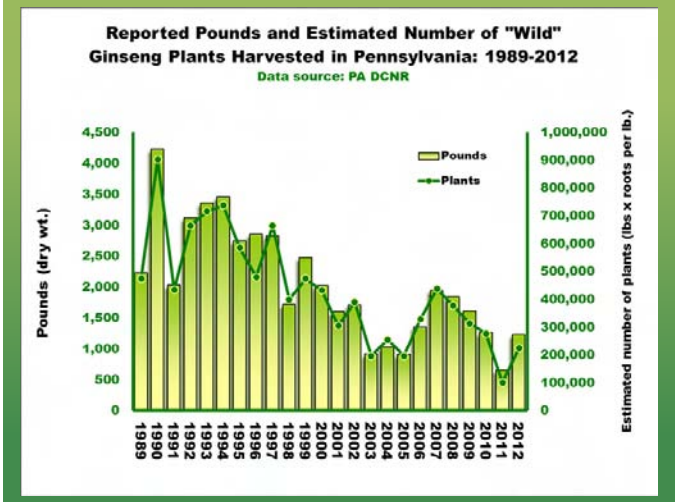
In the fall, ginseng may exhibit bright red fruits, but it is the roots that harvesters are interested in. (Photos: Eric Burkhart)

American Ginseng: A Threatened Native Plant continued...

In 1975, wild American ginseng was included under the international trade agreement known as CITES (Convention on International Trade in Endangered Species), and since this time, management of this native forest resource has become increasingly important throughout its range. The species is presently listed as "vulnerable" in Pennsylvania. The annual quantities of wild ginseng collected in Pennsylvania are compiled by the Department of Conservation and Natural Resources, and records extend as far back as 1989. These data are obtained with cooperation from licensed dealers and are used to discern trends in trade activities. The interpretation of available harvest data is complicated, however, by the fact that very little is actually known about existing wild populations and the individuals collecting or cultivating the species on private forestlands. In large part, this secrecy exists because the price commanded for forest-grown root has continued to increase, despite the fact that the plant is grown under artificial shade on thousands of acres around the world. Today, it is not uncommon for wild ginseng roots to sell for $500 to $600 per dry pound, while cultivated root may only fetch $20 to $60 per pound. It takes around 200 fresh roots to make a single dry pound of wild ginseng. Using this figure, it is estimated that over 10 million plants have been harvested from Pennsylvania forestlands since 1989, with an overall decline in recorded harvests since this program began. Clearly, these data suggest conservation concerns are warranted.

With funding from the Wild Resource Conservation Program (WRCP), my research continues to examine questions surrounding the trade of wild ginseng in Pennsylvania, and how to encourage a sustainable industry driven by forest-based cultivation on private forestlands. The practice of growing ginseng in a forest cropping system, referred to as agroforestry or forest farming, can have multiple economic and ecological benefits such as providing income, protecting forestlands, and enhancing landowner interest in our rich biological heritage. Besides medicinal plants such as American ginseng, other forest-farmed products from Pennsylvania include maple syrup, craft materials (grasses, ferns, mosses, branches, pine cones, etc.), mushrooms, fruits and nuts, and vegetable plants such as wild leek or ramps (*Allium tricoccum*).

I have been studying ginseng in Pennsylvania for the past 12 years, initially as part of my PhD studies at Penn State. My 2011 dissertation, entitled "Conservation through Cultivation: Economic, Socio-political and Ecological Considerations Regarding the Adoption of Ginseng Forest Farming in Pennsylvania", was in part supported by the WRCP. My current research seeks to build on questions and needs raised in this dissertation, and provide the DCNR Wild Plant Management Program with insights and recommendations for conserving wild ginseng populations while also supporting the growing niche industry of ginseng forest farming in the state. For example, I have been working closely with the DCNR Wild Plant Program since 2004 on the use of surveys to gather information about the ginseng supply chain from Pennsylvania. Survey results to date suggest that much of the current supply of wild ginseng being exported from Pennsylvania is from planted stock, and is being grown to resemble "wild" product so it can be sold as such. With funding from my current WRCP grant, I have worked with industry and DCNR to develop a short survey that is being used by the agency to gather information about the source of ginseng supplies. This survey is mailed annually to individuals from buyer transaction logs that sold ginseng in Pennsylvania during the previous commerce season, and allows the DCNR to better understand how much of the "wild" ginseng being sold in Pennsylvania is being cultivated using forest farming methods.



Studies show a sharp decline in the amount of wild ginseng harvested in the state over the past two decades.

American Ginseng: A Threatened Native Plant continued...

Another component of my current WRCP project is to develop population and habitat information regarding the distribution and occurrence of American ginseng on state forestlands in Pennsylvania. At each study site, field sampling is used to carefully document populations, soil characteristics, physiographic features, floristic associates, and potential threats to each population. The resulting information can be used to further develop predictive habitat modeling in Pennsylvania for conservation purposes and to help guide forest-based cultivation on private lands in the state. To date, fifty-five ginseng populations in thirty-nine counties have been included in this work, and I recently published a scientific paper, "American ginseng (*Panax quinquefolius* L.) floristic associations in Pennsylvania: guidance for identifying calcium-rich forest farming sites" in the journal *Agroforestry Systems* (2013, 87 (5): 1157-1172) that can be used to help landowners and managers identify populations or potential forest farming locations on forestlands.

American ginseng has been harvested for at least two centuries in Pennsylvania, and people continue to seek wild plants for sale and personal use. Forest farming is one approach to ginseng stewardship and conservation. Although it is not a "get-rich-quick" or risk-free crop to grow, its income-generating potential provides an opportunity for Pennsylvania's forestland owners. Ginseng husbandry is an activity that can help conserve a native plant resource while giving forestland owners a chance to become better acquainted with Pennsylvania's rich biological heritage.

Dr. Eric Burkhart holds degrees in Economic Botany (B.A, Idaho State University), Horticulture (M.S., Penn State University), and Forest Resources (Ph.D., Penn State University). He can be contacted by email at epb6@psu.edu. *His educational publications on ginseng collection and cultivation are available on the DCNR ginseng web-site at:* http://www.dcnr.state.pa.us/forestry/plants/vulnerableplants/ginseng/index.htm.

2014 WRCP Calendar is Now Online!

Looking for a beautiful way to track the days? Look no further than the 2014 WRCP calendar. This year's theme is Pennsylvania old growth forests on state forestlands. Each month you'll see a photo of a scenic old growth forest and learn what makes them so special and unique. From Heart's Content Scenic Area to Anders Run Natural Area, each old growth forest in Pennsylvania is worth visiting. Download and print out this free 12-month calendar on our **website**.

TV Show Glorifies Ginseng Poaching

by Jessica Sprajcar, Land Conservation Specialist
DCNR Bureau of Forestry

One of the History Channel's newest shows, Appalachian Outlaws, is making more people aware of the value and importance of ginseng, but not necessarily in a good way. The "reality" TV show features a variety of people who illegally poach ginseng on public and private lands, fueled by the desire to make a quick buck. The show does little to nothing to promote the common practice of sustainably-harvesting the plant, as many ginseng gatherers have done for decades. Deb Fisler, the woman at DCNR charged with handing out permits to sell ginseng, sees the impact of the TV show firsthand.

Fisler says she has definitely seen an increase in interest in ginseng since the show aired last fall. She sent out approximately 30 packets of information over the year (a 10 percent increase over average), which include an application to sell ginseng, although she has only received a few applications back. She says that, "The biggest misconception that I found from everyone that called was that they thought they needed a permit to pick ginseng, and they don't. (The permit is required to legally sell ginseng.) Most were thinking about picking ginseng as extra money, some had land that they thought they would try and grow ginseng on, and a couple of people called and said they were out of work and thought this would be a possible source of income." The calls have slowed to only one in the past few weeks, but Fisler thinks that if more episodes are aired, she'll get more of the same inquiries.

Chris Firestone, botanist for DCNR and one of the lead authors on the recently revised ginseng regulations, says that "We don't know yet what impacts this TV show will have on harvesting since the show just started last fall after the harvest season. Besides the increase in questions by email and phone call there have been calls and inquiries to ginseng dealers. I had a conversation with a dealer who said that people call and demand the prices for ginseng that are being quoted on the show and call him a thief because he won't pay that amount. This show is not reality, even though it may be called reality TV. It's not."

Firestone is working with forest district ginseng coordinators and the Game Commission to be on the look-out for a potential increase in illegal ginseng harvesting on state lands. She has also had discussions with Eric Burkhart from Penn State (see his article on page 19) and the United Plant Savers organization, which sent a letter directly to The History Channel, challenging the show's inaccuracies. Numerous individuals and organizations with an interest in preserving populations of this special plant are working to bring reality back to this "reality TV show."

Firestone, Fisler and others worry that the hype generated from the show will lead to diminished populations of wild ginseng. This plant species, already struggling, could go from bad to worse if collectors act irresponsibly. If the TV show continues next season, hopefully they will portray a more balanced reality, focusing on the importance of conserving the species and harvesting it ethically, rather than worry solely about ratings. As Firestone said, "Time will tell what the actual impact on harvesting will be [from the TV show]."

Recent Changes to Legal Harvest of American Ginseng in Pennsylvania

by Chris Firestone, Botanist for the PA Bureau of Forestry

American ginseng (*Panax quinquefolius*) is listed in Title 17 Chapter 45, Conservation of Pennsylvania Native Wild Plants as Pennsylvania Vulnerable, due to its vulnerability from harvesting. These regulations specify the harvest season, necessary steps to take when harvesting, and requirements for selling and buying American ginseng outside of Pennsylvania. In July 2013, parts of the regulation changed and will affect anyone harvesting ginseng in the state. The start of the harvest season was changed to September 1, meaning that ginseng roots cannot be dug and sold as green prior to that date. The end of the American ginseng harvest season remains November 30.

The other change made to the regulation is a minor clarification, changing the word "seed" to "berries". American ginseng plants produce berries that are red at maturity. Within the red berries are the mature seeds that need to be planted in the vicinity of the plant when harvested.

In order to see the full text of the regulations pertaining to American ginseng, please visit: http://www.pacode.com/secure/data/017/chapter45/subchapEtoc.html

Scientist Profile— Arianne Proctor

Senior Geologic Scientist

I grew up with lots of brothers and sisters on a Thoroughbred horse farm just east of Harrisburg, in West Hanover Township. The farm life provided so many unique opportunities and experiences. From breeding mares and birthing foals to breaking yearlings and training two-year olds for race day, we had our hands in every aspect of the industry. There wasn't much down time on the farm and routine activities ranged from mucking stalls, fixing fence, mowing the fields, and grooming and feeding the herd. However, there was always time to play in the garden. In addition to being my personal Wonder Woman, my mom was an avid gardener and imparted her passion and knowledge upon me. It was these childhood experiences that molded my love for the outdoors, nature and earth science.

I went on to major in geology at Florida Atlantic University in Boca Raton, Florida. I completed both my undergraduate and graduate studies there with an emphasis in hydrogeology and numerical groundwater modeling. After I earned my master's degree, I returned to the Harrisburg area and worked for an environmental consulting firm on assignments including modeling groundwater flow in area landfills, environmental cleanup projects stemming from leaking underground storage tanks, and designing aquifer tests for public water supply groundwater wells. I began my employment with the Commonwealth in 2003 at the Department of Environmental Protection. I was fortunate to have the opportunity to design groundwater and surface water protection plans for public water supplies, as well as research the occurrence of pharmaceuticals, hormones and organic wastewater compounds in Pennsylvania waters.

I happily joined the DCNR family in 2010 and have been firing on all cylinders ever since. As it turns out, being part of the oil and gas program in the Bureau of Forestry is a lot like being back on the farm, as there is not much down time here either. But I must admit, these are truly exciting times as we are witnessing the dawn of an energy revolution. In 2005, the United States imported 60 percent of its oil needs, but through technological breakthroughs in shale gas and tight oil development, petroleum imports have fallen to 35 percent today. Natural gas production from state forest lands is certainly contributing to Pennsylvania's energy independence.

My position has afforded me the great opportunity to work together with many of the Bureau's divisions and Forest Districts across the state. While I appreciate the tremendous revenue natural gas development has afforded Pennsylvania, I also acknowledge that the costs to our public lands will be even greater if the development is not executed in an environmentally-sound manner. Collectively, we have a shared responsibility to the long-term conservation of the forest's natural resources. Together we work tirelessly to avoid, minimize, mitigate and monitor impacts from gas development so that we may maintain a state forest system rich in natural resources that our grandchildren will enjoy.

From the scenic vistas of the Pine Creek Valley to the dark skies of Cherry Springs State Park and the serene waterfalls of Ricketts Glen, I embrace all the DCNR has to offer and look forward to discovering additional treasures through my travels.

"Like" us on Facebook

WRCP has a Facebook page and we hope that you "like" it. When you click on the "like" button, you will become a member of our online presence and be the first to know about upcoming events, publication debuts and important news in the world of WRCP and conservation. So please find us on Facebook by searching for **"PA Wild Resource Conservation Program"** and join our group.

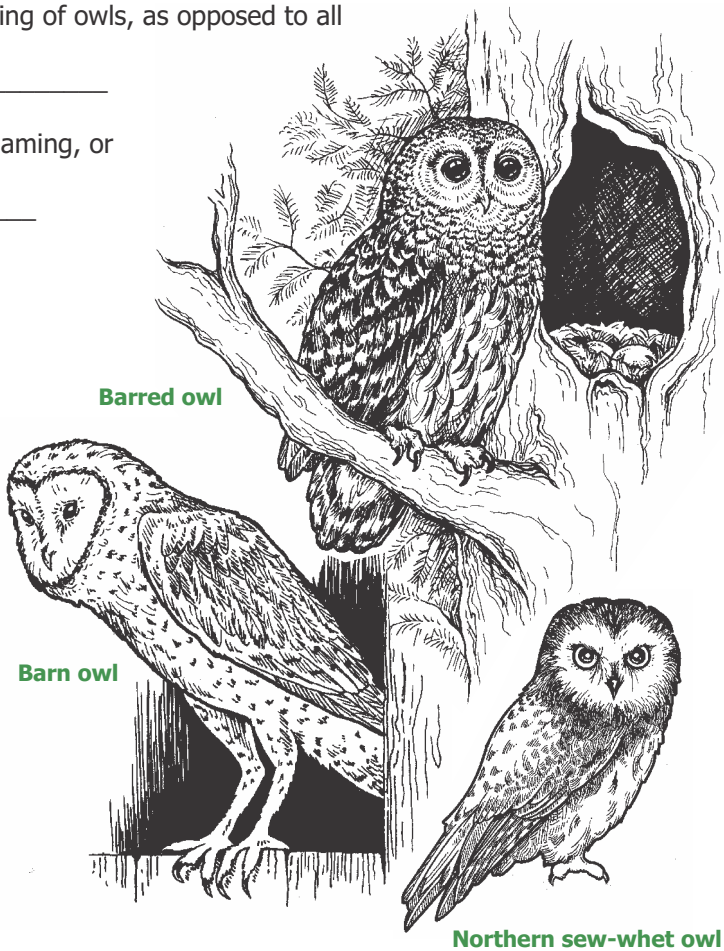
Wild! Words

How well do you know your owls? Can you match the owl species to the correct description? See how wise you truly are. **Answers are on page 8.**

1. This is the largest owl in Pennsylvania - _____
2. This is the smallest owl in the state - _____
3. This owl comes in two color phases, rufous and grey - _____
4. This owl spends much of its time in the Artic - _____
5. This owl's call sounds like "who cooks for you, who cooks for you all" - _____
6. This owl prefers to nest in conifer trees using old stick nests of other birds - _____
7. This owl belongs to its own smaller grouping of owls, as opposed to all other Pennsylvania owls - _____
8. This grassland owl's Latin name means "flaming, or the color of fire" - _____

Species:

Barn owl (*Tyto alba*)
Barred owl (*Strix varia*)
Eastern screech owl (*Magascops asio*)
Great horned owl (*Bubo virginianus*)
Long-eared owl (*Asio otus*)
Northern saw-whet owl (*Aegolius acadicus*)
Short-eared owl (*Asio flammeus*)
Snowy owl (*Bubo scandiascus*)

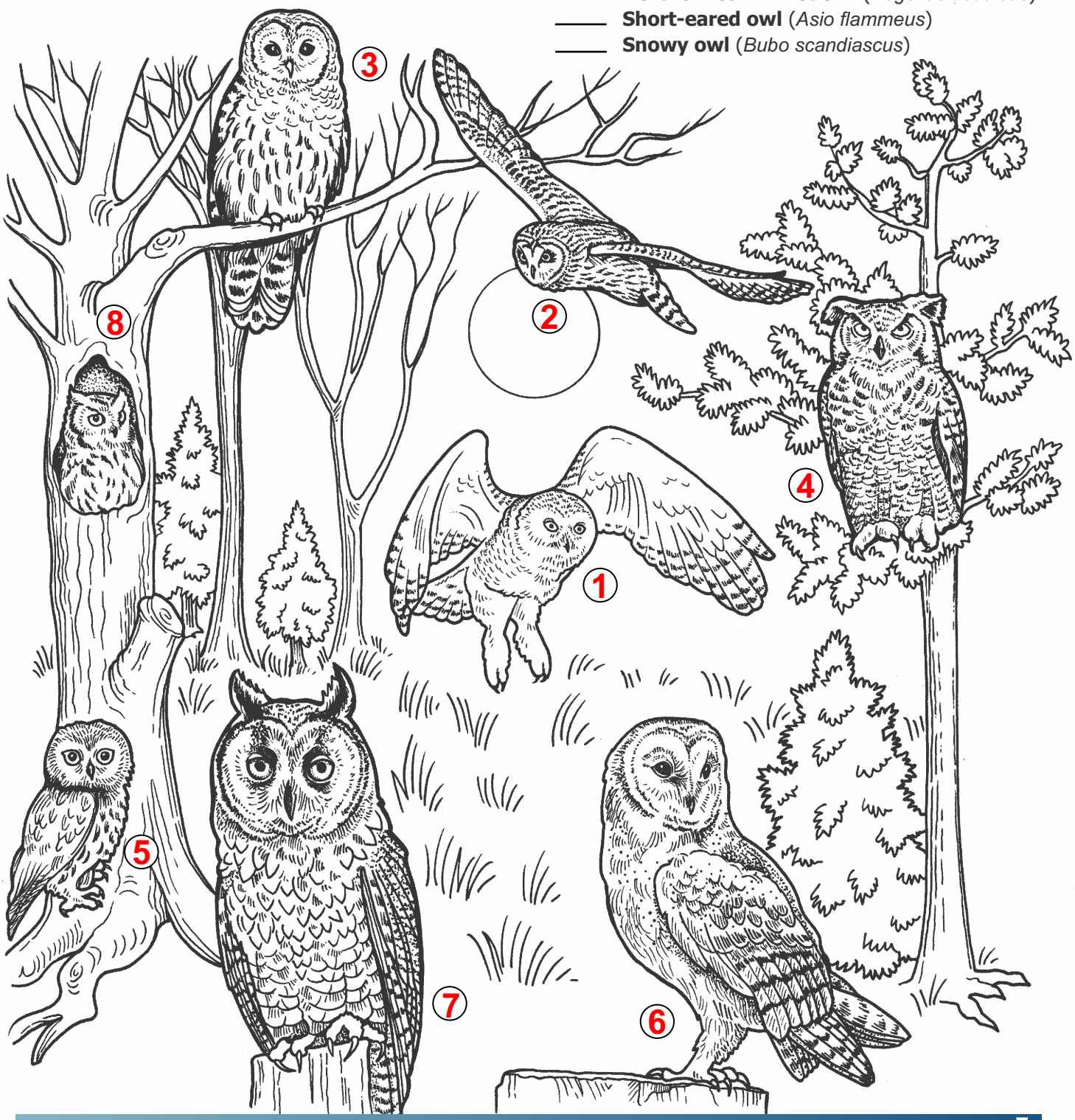


Color Me Wild!

Answers are found on page 8.

Match the number with the correct species

____ **Barn owl** (*Tyto alba*)
____ **Barred owl** (*Strix varia*)
____ **Eastern screech owl** (*Magascops asio*)
____ **Great horned owl** (*Bubo virginianus*)
____ **Long-eared owl** (*Asio otus*)
____ **Northern saw-whet owl** (*Aegolius acadicus*)
____ **Short-eared owl** (*Asio flammeus*)
____ **Snowy owl** (*Bubo scandiascus*)



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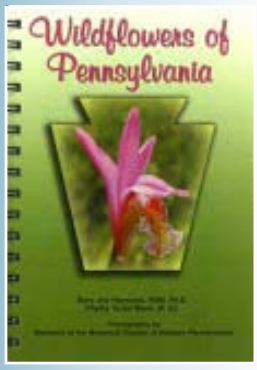

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This book is for all who enjoy nature and would like to become more acquainted with wildflowers. It will help the observer to identify the plants seen on a spring, summer or fall hike in a natural area. The book uses photographs of the plants, as photos reveal much more detail than can be found in drawings.
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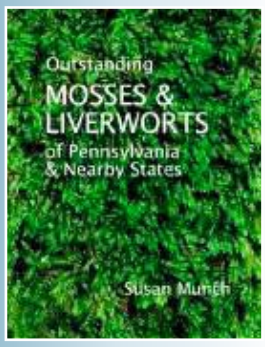
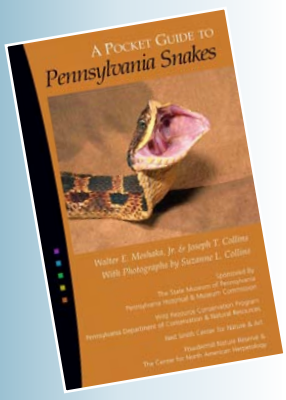
Price: $20 (+ $1.20 tax)





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