

Pennsylvania Game Commission
Bureau of Wildlife Management

WILDLIFE DIVERSITY PROGRAM



2012

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Managing Pennsylvania's wild birds, wild mammals
and their habitats for current and future generations

2012

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COVER PHOTO

eastern spotted skunk

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COVER STORY: An exciting discovery occurred in fall 2012 – the documentation of a species not seen in Pennsylvania since the early 1950s. A wildlife consultant live-trapping for Allegheny woodrats in Fayette County as part of a monitoring project captured an eastern spotted skunk. Using trail cameras, PGC biologists were able to confirm the presence of that single spotted skunk. The location where it was found is outside of the range where they were known to exist half a century ago, but was located in a similar habitat type. Ongoing trail-cam searches in a variety of locations surrounding the original capture point had not turned up any other individuals prior to publication of this report. About half the size of its striped cousin, this little weasel is an avid mouser. Individual spotted skunks can be easily distinguished by their unique pattern of white dots and stripes.

Compilation and layout

Eileen Butchkoski

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2012

northern harrier
state threatened species



Every species has a story,
a complex set of circumstances unique to itself.

Jake Dingel/PGC

These stories are comprised of the species' history, habitat requirements and threats faced in the struggle for survival. We generally understand just bits and pieces of these stories; many chapters in the lives of wildlife populations have not been revealed. Our job is to unveil the secrets of these stories and, to the extent possible, guide the plots into positive territory.

In modern times, most wildlife populations are interwoven with our own story. The outcomes of many species are inextricably linked with the often unwitting activities of mankind. Populations rise and fall under the weight of human activity as they cross paths with our own narrative. Since no landscape in Pennsylvania has been unaffected by humans, the lives of wild creatures that call Pennsylvania home have been shaped by us. At one extreme, purple martins in the East no longer nest in natural cavities but are completely dependent on the boxes and gourds provided specifically for them. On the other hand, many forest birds thrive in Pennsylvania's second-growth forests for which the lumber era gave no thought. Either by intention or accident, we are the stewards.

A case in point involves our bat populations. After years of conservation actions that were showing fruit, the unintentional introduction, apparently by humans, of a fungus six years ago erased the recovery efforts for Indiana Bats and decimated other hibernating bat species in the eastern United States. Unseen except in dark winter caves and mines, this silent killer has rewritten the story of these nocturnal insectivores.

But, the majority of wildlife stories are not so gloomy. Species are adapting to the human-altered landscape and holding their own or even expanding. The bald eagle provides a dramatic example, but fisher and river otter also lead that list because of concerted conservation efforts on their behalf. The majority of the state's forest birds expanded their ranges over the 20-year period since the mid-1980s. As the following articles demonstrate, these and other successes bolster our hope and enliven our energies to work to conserve species that are not currently on the right road. Birds such as golden-winged warbler, American woodcock and young-forest specialists like them are in decline, but efforts on their behalf are having a broad effect. Only time will tell whether these efforts will turn around the trends and give them a happy ending. Our goal is that the collaborative efforts of so many may stem the losses enough to prevent them from becoming threatened.

Similar hopes may be held out for the Allegheny woodrat—an Appalachian specialist of rocky slopes. Employing cutting-edge science, as well as traditional husbandry approaches, this iconic denizen of remote talus slopes is being given a new lease on life. The "positive energy" generated through a greater understanding of the intricacies of its life-history will translate into higher survival, and eventually a road to recovery. That road may well be pot-holed and meandering, but the challenges faced sometimes bring breakthroughs in our understanding and open new chapters that may bring renewed hope.

This report highlights our efforts on behalf of the wildlife in our charge—the birds and mammals of Pennsylvania. Our focus is on the *species of greatest conservation need*, those species which have suffered in the past, but may benefit from our attention. We have provided highlights of our efforts to add to our knowledge and encourage the conservation of this rich heritage that entralls so many of us.

Dan Brauning

Wildlife Diversity Division Chief





Joe Kosack/PGC

BALD EAGLE RECOVERY state threatened species

It's hard to overstate the dramatic recovery that bald eagles have experienced in Pennsylvania and the region. Since the beginning of the reintroduction efforts 30 years ago, the breeding population has increased from three pairs in 1983 to over 237 nests in 2012, and is still growing. This growth rate has continued unabated at over 10% per year. Eagles have been expanding in all directions – spreading into new counties and filling in vacant territory along the corridors of the state's rivers and streams, tracing this prime habitat into ribbons across the state. The outline of the main stem and North Branch of the Susquehanna River is particularly visible now as a string of nests. In many areas of the state it is now not a surprise to see a wild bald eagle; it's still a thrill, but one that can be experienced on a daily basis.

How many eagle nests could Pennsylvania support in the future? It's hard to say, but we will keep counting them to find out. The density of nests along the lowest stretches of the Susquehanna River and in the glaciated sections of the state's northwestern corner may be approaching saturation, but vast stretches of rivers and streams, including in the southwestern corner and south-central counties, have yet to be colonized. These may be the areas of greatest potential expansion. The clear waters of central Pennsylvania also hold promise.

Dedicated volunteers are critical to our eagle monitoring efforts, observing nest sites for breeding activity and fledgling production. In addition, they helped survey 38 counties for wintering eagles. Eagle viewing areas were identified in 2012 to help promote the public's appreciation for our nation's symbol and understanding of the needs of wildlife in general. Increasing public appreciation of bald eagles by enhancing viewing opportunities is an important strategy in the management plan. Eagles are sensitive to disturbance, based on their relative experience and surroundings, so care should still be taken when observing these majestic birds. Learn more at pgc.state.pa.us; click the **Bald Eagle Watching** photo icon.

During the past breeding season, eagles nested in 53 counties and raised an average of over 1.3 young per nest. These, and the growing tally of nests statewide, provide parameters for measuring the success of this dramatic recovery. Only one population goal identified in the Bald Eagle Management Plan—successful nesting pairs in at least 40 counties for five consecutive years—remains unfulfilled before the species may be considered recovered and secure.

PEREGRINE FALCON state endangered species

Peregrine falcons continue to capture the public's attention. During 2012, over 165 volunteers and agency personnel monitored sites with established pairs and surveyed additional locations across the state for falcon activity. Thirty-two sites were occupied by territorial pairs, the same as 2011 and the highest number since the beginning of the peregrine falcon recovery program. Twenty-two nests were successful, producing 62 fledglings of which 42 were banded. The public was invited to attend peregrine falcon banding events at the Rachel Carson State Office Building in Harrisburg, the University of Pittsburgh's Cathedral of Learning and Philadelphia City Hall.

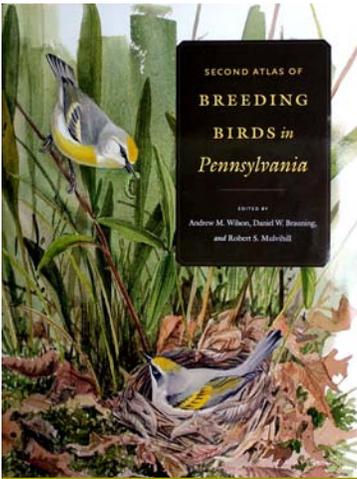
With only four nests on natural cliff sites, most peregrine nests are on human structures, which regularly brings nesting peregrines directly into conflicts with people. Construction and maintenance at 15 bridges and buildings were coordinated with project managers, ensuring protections for nesting falcons.

Many are enthralled by this grand species, but peregrine population recovery is slow. A management plan, on course for completion in 2013, establishes recovery objectives and management activities to promote the return of this majestic bird to its rightful place in Pennsylvania. The management plan is available at pgc.state.pa.us.



Joe Kosack/PGC

Peregrine program coordinator Art McMorris is assisted by a student during a banding at the Rachel Carson office building.



The **SECOND ATLAS** of **BREEDING BIRDS** in PENNSYLVANIA

A milestone was achieved with the publication in 2012 of the *Second Atlas of Breeding Birds in Pennsylvania* by Penn State University Press. It is a follow-up to the first atlas conducted in the 1980s, but with many improvements. The second atlas compiled more than 600,000 bird records contributed by volunteers from 2004 to 2009.

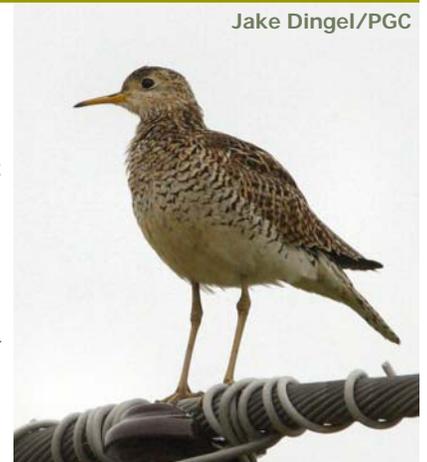
The new atlas and its data set give us a scorecard of species that have increased and others that have decreased, alerting us to species and habitats in need of further study and higher priority for conservation and management. More than a publication, the second atlas is a compelling statement about the power of volunteers and how a well-conceived and executed project not only gives great results but also provides new directions and challenges. You will find references to the atlas throughout this report.

UPLAND SANDPIPER state endangered species

The wild-sounding whistle of the upland sandpiper, a characteristic sound of the prairie and grasslands of North America, is now rarely heard in Pennsylvania and other north-eastern states. Once fairly common in the state, the upland sandpiper is one of the most critically threatened grassland birds in Pennsylvania. It has declined steadily since the early 20th Century and was made a state threatened species in 1985 because of its rarity and growing dependence on agricultural habitats rather than rapidly disappearing native grasslands. The *Second Atlas of Breeding Birds in Pennsylvania* further documented the upland sandpiper's decline. It was found in only 23 atlas blocks with breeding activity only confirmed in two blocks during data collection for the second atlas, a nearly 50% reduction from the first atlas. The Game Commission downgraded the upland sandpiper from threatened to endangered in 2012.

To better understand and manage this very rare species, the PGC supported surveys conducted in 2012 by Dr. Andrew Wilson of Gettysburg College. The survey team used recent data from the second atlas and Pennsylvania eBird reports to focus searches in areas with the best probability of finding upland sandpipers in breeding habitat. One study tested a targeted field protocol from May 14 to 25 when this species is most detectable, but late enough to avoid passing migrants. Audio playback surveys conducted at 126 locations detected upland sandpipers in 17 atlas blocks. Volunteers also surveyed nine locations where upland sandpipers had been found during the second atlas and found sandpipers at six of them. By combining results of the audio playback and volunteer surveys, the effort located 19 singing male upland sandpipers, which probably represents the number of active nesting territories. Most of these sandpipers were found on private lands but five pairs were found on state game lands. Almost all of these records are on reclaimed surface mine grasslands.

The rarity of the upland sandpiper notwithstanding, the survey approach in 2012 was very successful. Despite threats including housing development, early hay cutting and vegetative succession change, there are opportunities for managing some of these areas to sustain small populations of upland sandpiper.



Jake Dingel/PGC



Joe Kosack/PGC

NORTHERN HARRIER & LONG-EARED OWL

state threatened species

Based on information provided by the *Second Atlas of Breeding Birds in Pennsylvania* and a recommendation by the Ornithological Technical Committee, the Game Commission added northern harrier and long-eared owl to the list of threatened species in Pennsylvania.

Northern harrier, a grassland and wetland raptor, is fairly conspicuous in open country.

Despite some benefit from recent grassland initiatives, the harrier is still in decline, probably as a result of the decrease in appropriate grasslands and open wetland nesting habitat.

The long-eared owl is a very elusive and difficult to detect nocturnal bird that nests in conifer groves in mixed habitat or forest. By listing these species as threatened, the Game Commission has taken a leadership role in protecting their nesting locations and promoting their conservation to prevent their extirpation from the state.



OSPREY state threatened species

Osprey are listed as threatened in Pennsylvania, but increasing numbers may soon justify a conservation status reflecting improving security.

Their distribution across Pennsylvania and the number of nesting pairs are growing. Like peregrine falcons, osprey readily exploit human structures for nesting, so a good understanding of their needs and tolerance to human activity is paramount to maximize their success while minimizing disturbance to people.

It is likely that osprey will be the next threatened species success story.

COLONIAL WATERBIRDS

Great egret, black-crowned night-heron and yellow-crowned night-heron are endangered in Pennsylvania. These colonial wading birds are particularly vulnerable because their nests are clustered at a small number of locations, putting large parts of the nesting population at risk from natural and human disturbances. Most of the colonies in Pennsylvania are single-species colonies, but the two sites that support great egrets have other species nesting in close proximity.

During the 2012 breeding season, about 100 volunteers, PGC staff and staff of other agencies inventoried waterbird colonies, counting nests for great blue herons, black-crowned and yellow-crowned night-herons, great egrets and double-crested cormorants. The most widespread and common species, the great blue heron, tallied over 1,100 nests in 38 counties and 13 new colonies were found. Great egrets persisted at a second site with just eight nests. Yellow-crowned night-herons abandoned a site monitored since 2004 but only moved a short distance, remaining within the city of Harrisburg.

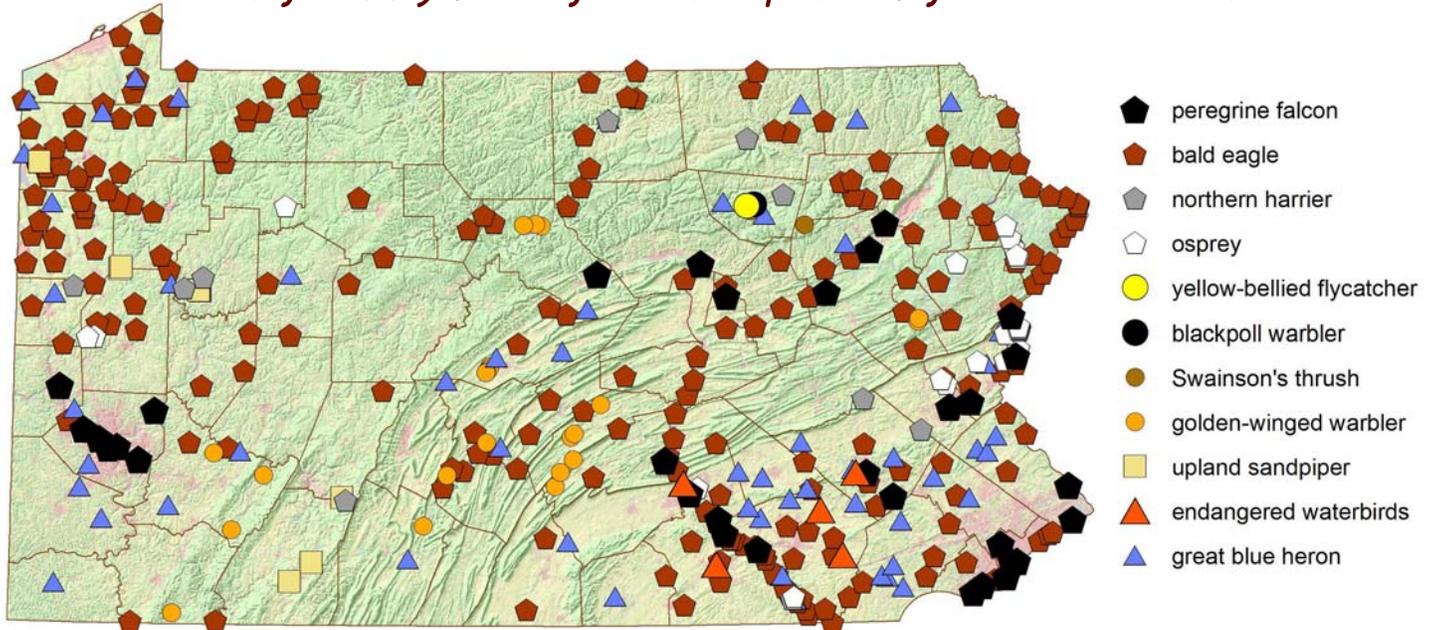
A large portion of known waterbird colonies were surveyed in 2012, but some were missed. The remaining colonies are scheduled for surveys during the 2013 breeding season to complete the comprehensive waterbird colony survey.



great blue heron

Jake Dingel/PGC

2012 breeding activity for targeted bird species of greatest conservation need



GOLDEN-WINGED WARBLER high-level concern

The golden-winged warbler is a species of high-level concern in the Pennsylvania Wildlife Action Plan and is under consideration for listing under the federal Endangered Species Act, with declines of 6.8% per year from 1966 to 2011 according to Breeding Bird Survey data. Additionally, golden-winged warblers were detected in 61% fewer blocks in the *Second Atlas of Breeding Birds in Pennsylvania* as compared to the first atlas.

The PGC Wildlife Diversity Division cooperates with the Cornell Laboratory of Ornithology's Golden-winged Warbler Conservation Monitoring project. In 2012, the PGC golden-winged warbler team expanded its survey coverage to include areas where we believed warblers were likely to occupy habitat. We conducted 165 point counts on which 28 golden-winged warblers were detected. In these same surveys, 29 blue-winged warblers and nine hybrids between the two species also were found.

One of the objectives of the agency's golden-winged warbler project is to determine areas with best potential for management wherever the agency has some influence. Pennsylvania has unique opportunities for managing golden-winged warblers because of its relatively large proportion of the population in the Appalachians and the potential for managing this species on public lands. Other species associated with golden-winged warbler habitats include ruffed grouse, eastern whip-poor-will, American woodcock, and Appalachian cottontail.

A large golden-winged warbler population was discovered in Sproul State Forest in an area affected by an arson fire. Birders have long known about the population in the Scotia barrens of State Game Land 176, where controlled burns assist scrub barrens management and maintain golden-winged warbler habitat. In northeastern counties, previous surveys identified populations on two game lands and a state forest in Pike County and on a game land in Luzerne County, all with potential for management.

Especially in the northeastern counties, golden-winged warblers occupy a variety of wooded wetlands. Golden-winged warblers use some wooded wetlands very successfully as nesting habitat. They can be found in red maple swamps, tamarack swamps, scrub wetlands and old beaver dam wet meadows, as well as the habitats typically used, such as timbered areas, reverting farmland and scrub barrens. Identifying these areas is an important step in targeting management.

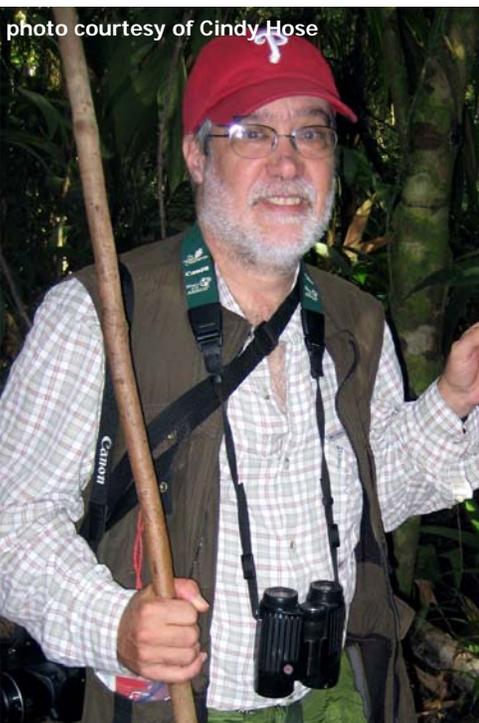


photo courtesy of Cindy Hose

Habitat management is being implemented on public lands with the assistance of a federal State Wildlife Grant to Indiana University of Pennsylvania. To date, over 2,200 acres across 11 state game lands and one Nature Conservancy property have been prepared for conversion to young forest habitat following guidelines in the publication *Golden-winged Warbler Habitat Best Management Practices for Forestlands in Maryland and Pennsylvania*. Additionally, the U.S. Department of Agriculture has provided funds for improvements on 3,485 privately owned acres in Pennsylvania through its Working Lands for Wildlife program.

With the acreage of young forest habitat created on public lands, combined with outreach and funding to promote the creation of young forests on private lands, the Game Commission and its partners are improving the outlook for golden-winged warblers and other young forest species.

As endangered and non-game bird section supervisor, Doug Gross oversees research and management activities for the state's endangered, threatened and special-concern bird species. That includes coordinating Pennsylvania's contribution to golden-winged warbler conservation monitoring coordinated by the Cornell Laboratory of Ornithology.

While on vacation, Doug travels to exotic locations where Pennsylvania's neo-tropical migratory birds, including the golden-winged warbler, spend the winter.



photo courtesy of Christian Artuso

WHITE NOSE SYNDROME in BATS

White Nose Syndrome (WNS) is a devastating disease that has caused the most precipitous decline of North American wildlife recorded in the past century – declines greater than 90% in infected populations. From its discovery in upstate New York in 2006 through the end of 2012, WNS had affected seven species of hibernating bats in 22 U.S. states and five Canadian provinces. By the end of the winter hibernation period on April 30, 2013, another three states were added. WNS has been detected in 33 of Pennsylvania's 67 counties. Nearly every hibernaculum in the state is believed to be contaminated. Insect-eating bats are critical to the normal function of terrestrial and aquatic ecosystems. Many feed on insects that are pests of forests, agriculture and garden crops or pose risks to human health.

For three years, the Wildlife Diversity Division led a multi-state WNS response project awarded \$940,000 in federal competitive grant funds in April 2009. As lead state, Pennsylvania played a key role – organizing and participating in research efforts to monitor the severity and spread of WNS, and to identify methods of reducing its impact. Field and laboratory research projects, including two treatment studies, were completed during 2012. Unfortunately, neither study produced a treatment that could be safely and effectively deployed. A final report is being prepared.

Pennsylvania's most significant contributions to WNS response:

- Greg Turner led a team that developed a protocol using non-invasive ultra-violet (UV) light to accurately diagnose WNS in the field. In May 2012, the National Wildlife Health Center incorporated the UV protocol into procedures for collection of laboratory samples, thus eliminating the need to euthanize and submit whole bats.
- Our ongoing summer bat count program, which originated in 1989, was the only source of historical summer data predating the onset of WNS. Post-onset summer surveys document declines in maternity colonies that corroborate declines observed in hibernating bat populations during winter.
- Researchers at Bucknell University used digital dataloggers on bats and in hibernation sites to confirm that WNS-affected bats awoke from hibernation much more frequently than healthy bats, thereby depleting their fat reserves, triggering early emergence and contributing to mortality.
- PGC and Bucknell University contributed to U.S. Geological Survey research that proved dehydration and a resulting electrolyte imbalance caused neurological symptoms in bats including tremors and collisions with stationary objects during flight.
- Cal Butchkoski originated and maintains a detailed map that tracks the spread of WNS in North America. The map is distributed to federal and state agencies in the U.S. and Canada, and to WNS researchers in North America and Europe.



Artificial bat roosts were well-represented in 2012 summer bat counts, with 71 bat box sites and 12 bat condos. They may be critical to conservation of Pennsylvania's bats. To head off further depletion of this valuable resource, boxes or condos should be installed where summer concentrations of bats are in jeopardy of losing roosting habitat.

The condo in this photo, built by a wood-shop class at Juniata Valley High School, Huntingdon County, is used by a summer colony of bats evicted from a space under the high school auditorium roof. In 2012, a total of 478 bats used the condo and adjacent boxes originally mounted on the auditorium wall. The condo is on a hillside overlooking a wooded river corridor and agricultural fields that provide food.

Collect data for the APPALACHIAN BAT COUNT

To learn how, go to pgc.state.pa.us
Click **WILDLIFE**, then **Wildlife**,
then **Pennsylvania Bats**

Measuring the effects of WNS on Pennsylvania's bats

Counts of hibernating bats in 26 mines and caves conducted January 26 to March 22, 2012 found a decline of 98.7% for all cave bat species combined when compared to pre-WNS counts.

Compared to pre-WNS counts, 2012 surveys at two summer bat colonies linked to known WNS-infected hibernacula declined by 98.9% and 96.5%

Results of the 2012 statewide Appalachian Bat Count found an overall decline for of 83.4% for 129 summer colonies with historical data.

Summer colonies of 100 or more little brown bats and 50 or more big brown bats are now considered *significant*. These new, low thresholds for *significant* are remarkable given that for 20 years before the onset of WNS the *average* count for summer colonies was 1,100 bats.



INDIANA BAT federal and state endangered species

The Indiana bat was listed as a federal endangered species in 1967. Following federal listing, Pennsylvania listed it as a state endangered species as well. The rarity, mobility, and nocturnal habits of the Indiana bat make it a challenging animal to study under ordinary conditions. Despite the difficulty, in the past PGC biologists conducted groundbreaking radio-telemetry to identify previously unknown summer sites and study Indiana bat foraging behavior and habitats.

In 2012, bat counts of all cave bat species were conducted from late January to mid-March within 26 hibernation sites. Eighteen Indiana bats were observed at Canoe Creek, the site that harbors the state's largest known hibernating population of that species. No Indiana bats were observed at seven other sites that had low numbers of Indiana bats in the past. During spring and fall, three Indiana bat hibernacula were surveyed by live-trapping at the entrances, resulting in capture of 13 Indiana bats and greatly reduced numbers of other bat species.

During fall 2012, Wildlife Diversity Division staff live-trapped the entrances of two Indiana bat hibernacula, a limestone mine at Canoe Creek, Blair County, and an abandoned coalmine in Luzerne County, at least once per week in an effort to determine whether WNS has affected the range of dates when most Indiana bats enter hibernation. In the past, both mines were dependable sources of Indiana bat captures during spring and fall. Since the onset of WNS it has been far more difficult to detect this species. Nine individual Indiana bats, eight males and one female, were captured in Blair County. Interestingly, one of the males was a recaptured bat banded there in October 2007, meaning it had withstood WNS, confirmed at the limestone mine in spring 2010. All un-banded Indiana bats captured in 2012 were banded for a long-term study. Only one Indiana bat was captured the Luzerne County coalmine, a male that had been banded in September 2010.

Too few Indiana bats were captured in 2012 to detect a change in the dates when they enter hibernation. But, like the recaptured bats from 2007 and 2010, we will persist despite WNS. We will continue to research, manage and protect Pennsylvania's Indiana bats and their habitats for current and future generations.

POSITIVE ENERGY for the INDIANA BAT

Thanks to **E.ON Climate and Renewables, North America, Inc.**, the state's second largest population of hibernating Indiana bats is now more secure.

E.ON provided funds for a bat-friendly gate designed by Sanders Environmental of State College and built by Gross Brothers Welding of Somerset.

The U.S. Fish and Wildlife Service Pennsylvania Field Office suggested the gate to protect the hibernaculum. It also increases public safety.

The incomplete railroad tunnel excavation is on Pennsylvania Turnpike Commission property.

(left to right)

Greg Turner, PGC Endangered Mammal Specialist
 Duane Clapp, Site Supervisor, E.ON's Stony Creek Wind Farm
 Andy Lutz, Assistant Environmental Manager, Turnpike Commission and
 Brad Jones of E.ON inspect the completed gate.



Greene and Washington counties, in the state's southwestern corner, are home to several Indiana bat maternity sites. Since 2008, under an agreement with an energy company, wildlife consulting firm Environmental Solutions and Innovations (ESI) has conducted summer mist-netting and telemetry studies to monitor the welfare of Indiana bats in Greene County.

In 2012, ESI netted and tracked seven juvenile Indiana bats documenting 12 roost trees, and delineating and describing foraging areas. Thanks to this and other telemetry studies, we now know of ten Indiana bat roosts and several foraging areas on an adjacent state game land. In August 2012, a separate ESI team, conducting an unrelated study, captured and tracked a juvenile female Indiana bat, and discovered a new maternity area in Washington County. The new area is 14 miles south of Washington County roosts identified in 2010 by Diversity Division staff and less than four miles northwest of the Greene County maternity site.

NORTHERN FLYING SQUIRREL state endangered species

Monitoring of northern flying squirrel sites, particularly in northern tier counties, has continued for nearly a decade. Long-term monitoring and research has allowed us to document some key findings. Coexistence and competition for resources between northern and southern flying squirrels in close proximity appears to increase parasite transmission, increase competition for food and nesting resources, and even cause some level of hybridization. Studies have shown that the diversity of conifer species is an important factor in producing mycorrhizal fungi. Specifically, red spruce is shown to have the most types of this food source and expand the time period it is produced, promoting the northern species.

PGC has been collecting, growing and planting native red spruce in active northern flying squirrel locations. Sites with a limited conifer diversity were targeted first, with nearly 5,000 seedlings planted to date. These plantings aim not only to establish this red spruce in active squirrel sites, but to expand and connect optimal habitats. Removal of mast-producing trees that benefit the southern flying squirrel reduces competition. Benefits from managing for red spruce will extend to other species of concern as well. Species such as the blackpoll warbler, yellow-bellied flycatcher and snowshoe hare are all known to inhabit the same rare habitat.



Endangered bird specialist Patti Barber collects red spruce cones.

Greg Turner/PGC



Jamie Flickinger/PGC

Because the areas woodrats inhabit are so isolated, they usually show little fear of humans, in this case allowing close observation of a kit by veteran PGC wildlife biologist Cal Butchkoski.

POSITIVE ENERGY for the ALLEGHENY WOODRAT

Thanks to funds provided by **Pennsylvania General Energy Company, LLC**, woodrat management has been implemented in DCNR's Tiadaghton State Forest.

From January to November 2012, Wildlife Specialists, LLC completed habitat improvements at nine management compartments.

ALLEGHENY WOODRAT state threatened species

The Allegheny woodrat is a small rodent (but not a rat!) about the size of a gray squirrel. It inhabits talus slopes, boulder fields, caves and cliffs in hardwood forests along the Appalachian Mountains. In recent decades the woodrat has experienced a steep population decline attributed to loss of mast crops, forest fragmentation, increased predation and a parasite spread by raccoons.

Earlier, a series of three conservation-partner projects, funded by federal State Wildlife Grants, developed a management plan and a model for predicting population viability, and trained 90 resource managers to evaluate and enhance woodrat populations. PGC began implementing woodrat habitat management, primarily aimed at increasing forage, on selected state game lands in 2010. Diversity Division staff surveyed 26 Allegheny woodrat sites in 11 metapopulation areas in 2012. Of those 26 sites, 18 had active sign, five were inactive and three were potential sites with no woodrat sign. The area on a Dauphin County game land that received the earliest and most intensive management persists despite surrounding woodrat sites having little or no activity.

No metapopulation areas were reclassified from active to inactive as a result of 2012 surveys. That's good news considering eight metapopulation areas were reclassified from active to inactive between 2007 and 2010. In 2011, one metapopulation area became active, but much more work is needed to reverse the Allegheny woodrat population decline. Thanks to assistance from Indiana University of Pennsylvania, funded by a DCNR Wild Resource Conservation Program grant, PGC land managers are now implementing management on additional game lands.

ROAD to RECOVERY

In 2012, PGC selected two complementary projects for State Wildlife Grants Program funding. An Allegheny woodrat genetic catalog by Indiana University of Pennsylvania will guide near-term management as well as future releases of woodrats from the captive breeding program at Delaware Valley College.

The photograph on the left was taken at the captive breeding facility. Red lighting is used to minimize disturbance to the woodrats.



PRIVATE LANDOWNER ASSISTANCE PROGRAM

In 2004, the Game Commission established a network of regional wildlife diversity biologists (RWDBs) and initiated the Private Landowner Assistance Program (PLAP), which provides technical services for the management of wildlife habitat on private lands. There is no charge or public access requirement for PLAP. Since 2004, RWDBs have written over 1,100 PLAP plans for more than 168,900 acres. The program continues to grow through consultation with owners and managers of both private and public lands, demonstrating its potential to enhance management of species of greatest conservation need with the intention to forestall listing of additional species as endangered or threatened.

In 2012, RWDBs produced 123 written management plans for 18,615 acres, providing recommendations that integrate the wishes of the landowner with conservation of species of concern and their habitats. In conjunction with developing management plans, the biologists continued to successfully leverage outside funding sources to get tangible on-the-ground results. Thanks to technical assistance provided by RWDBs, at least 15 PLAP projects were approved for implementation with funds from Farm Bill programs administered by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service. Other funding and implementation partners include the Chesapeake Bay Financial Assistance Program, Audubon Important Bird Areas Program, The Nature Conservancy, the Western Pennsylvania Conservancy and other land trusts.

Another USDA program, the Voluntary Public Access and Habitat Incentive Program (VPA-HIP), encourages owners and operators of privately held farm, ranch and forest land to make that land available for access by the public for wildlife-dependent recreation, including hunting and fishing. In 2012, RWDBs proposed 22 projects under this program. Eighteen of these projects received funding for herbicide treatment, tree planting, native grass planting, pollinator habitat planting, aspen management, upland forest management and creation of early successional habitat.



Northeast region wildlife diversity biologist Rich Fritsky addresses participants during a workshop titled, "Wildlife Habitat Management: It's not just for the birds."

In 2012, regional diversity biologists gave 45 presentations to 1,867 people at speaking engagements state-wide. Topics included forest-dependent species of conservation concern, managing woodlands for wildlife, benefiting wildlife in grazing systems, ethics in wildlife biology, bird identification, farmland raptors, bat conservation, and invasive plants. Venues included woodland owners associations, watershed groups, natural history organizations, regional festivals, and local universities and schools.

They also conducted 11 landowner workshops where expert biologists, foresters and land managers gave presentations on species of greatest conservation need and their habitats. More than 550 people attended the workshops, which included topics such as the Private Landowner Assistance Program, young forest habitat management, and management for migratory birds.

blue-winged warbler



Jake Dingel/PGC

BEYOND PRIVATE LANDOWNER ASSISTANCE

In 2012, regional wildlife diversity biologists (RWDBs) contributed to comprehensive planning for 35 state game lands comprising 207,681 acres. During that process they provided guidance on habitat management for species of greatest conservation need. RWDBs assisted by providing suggestions for forestry prescriptions, identifying opportunities for biological research linked to land management practices, and incorporating management guidance for sensitive areas and critical habitats. Species listed in Pennsylvania's Wildlife Action Plan that received attention thanks to RWDB involvement in game lands planning include golden-winged, cerulean, blue-winged and Canada warblers, scarlet tanager, Louisiana waterthrush, wood thrush, yellow-throated vireo, yellow-breasted chat, American woodcock, Allegheny woodrat, northern flying squirrel, and northern long-eared and Indiana bat.

RWDBs also assisted numerous Bureau of Wildlife Management research and management activities. These included golden-winged warbler and colonial waterbird surveys; bald eagle nest monitoring; peregrine falcon banding; bat telemetry, emergence counts and hibernacula surveys; woodrat surveys and northern flying squirrel assessment.

In 2012, RWDBs began assisting the Environmental Review Section of the Bureau of Wildlife Habitat Management with Pennsylvania Natural Diversity Inventory reviews for gas development. They conducted 97 reviews and 10 field surveys to assess potential impacts to endangered, threatened and other species of greatest conservation need.



BARN OWL CONSERVATION INITIATIVE

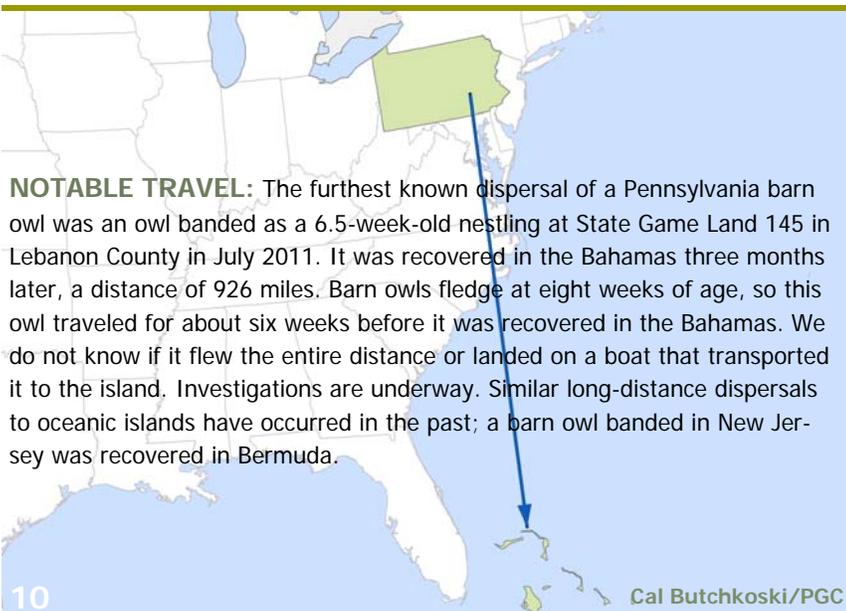
Comparisons between the first and second Pennsylvania breeding bird atlases suggest that barn owls declined by at least 50% since the mid-1980s. Regional wildlife diversity biologists (RWDBs) began the Barn Owl Conservation Initiative in spring 2005 with the goal of securing the species' future in the Commonwealth. RWDBs visit sites where barn owls are expected to occur to determine presence or absence, confirm breeding activity and band nestlings. Banding provides information on longevity, dispersal and causes of mortality.

Although barn owls have decreased in number, they do have high reproductive potential. An example documented in the PGC's Northcentral Region: an eight-month-old barn owl banded in August 2011 was discovered at her natal site in May 2012 – incubating eggs in the same nest box where she was banded. While barn owls are reproductively mature at one year of age, no published evidence indicates they could reproduce at eight months. Why this nestling did not disperse from her natal site, the fate of her mother, and the sire of the eggs she was incubating are unknown. DNA samples taken from her banded nestlings may answer the latter question.

In 2012 we also learned that actively nesting pairs can successfully raise clutches very close to one another. In April, the Northcentral diversity biologist observed a female incubating in a box installed inside a barn the previous year and a second female incubating in a second box in the silo attached to the barn. The boxes were only 20 yards apart. Both nests fledged six young during the summer. This suggests that barn owls may not be very territorial and can tolerate one another when an adequate supply of prey is available.

NOTABLE NUMBERS in 2012:

- 75 confirmed, active barn owl nests, the highest number of confirmed nests in a single year for this study
- 22 new nest sites, a record high (not including start-up year 2005)
- 285 barn nestlings banded at 57 sites (both numbers are new highs)
- 5 nestlings per clutch on average
- 7 nests produced a second clutch
- 1st active Montgomery County barn owl nest in 20 years
- 1st active Bucks County barn owl nest in 10 years
- 1st active barn owl nest in 6 years in Bedford county, the western edge of the barn owl's current Pennsylvania range



NOTABLE TRAVEL: The furthest known dispersal of a Pennsylvania barn owl was an owl banded as a 6.5-week-old nestling at State Game Land 145 in Lebanon County in July 2011. It was recovered in the Bahamas three months later, a distance of 926 miles. Barn owls fledge at eight weeks of age, so this owl traveled for about six weeks before it was recovered in the Bahamas. We do not know if it flew the entire distance or landed on a boat that transported it to the island. Investigations are underway. Similar long-distance dispersals to oceanic islands have occurred in the past; a barn owl banded in New Jersey was recovered in Bermuda.



In 2012, RWDBs delivered, and in most cases installed, 42 boxes to provide nesting sites safe from predators and hazardous ledges. Landowners and volunteers help to monitor box use and nesting success.

WILDLIFE CONSERVATION PLANNING

“Together, everyone accomplishes more” goes the old adage for teamwork. The myriad of challenges facing wildlife and their habitats today, and the pace at which our landscape is changing, requires teamwork among conservationists now more than ever. To bolster conservation partnerships and identify potential areas of mutual interest, the Game Commission hosted the first-ever Wildlife Diversity Forum in cooperation with the Wildlife For Everyone Endowment Foundation in June 2012. Specifically, the event aimed to raise awareness across the conservation community of the full breadth of the agency’s mission – conserving all birds and all mammals for all people for all time. The forum also was designed to inform participants about Pennsylvania’s Wildlife Action Plan and its upcoming revision, and motivate multiple stakeholders to better understand and advance wildlife conservation programs and projects.

Ninety-one participants representing over 50 Pennsylvania conservation organizations attended the two-day event. The first day began with brief presentations to ensure all participants received similar background information. They then divided into eight breakout groups to brainstorm and categorize conservation issues into seven categories (policy/funding, education/communication, scientific research, population monitoring, habitat management, land protection, and conservation planning and design). A poster session and banquet dinner that evening offered networking opportunities for agency personnel and conservation partners. The second day focused on prioritizing 340 conservation issues identified during the previous day’s breakout sessions and discussing actions that could be taken to address priority issues. Expert groups clarified language describing the top issues within their category, suggested conservation actions, and, if possible, identified organizations that could take those actions. The Wildlife Diversity Forum was only the start to a long conversation leading to updating the state’s Wildlife Action Plan jointly with the Pennsylvania Fish and Boat Commission by September 30, 2015. Collaboration between agencies and among the conservation community was a resounding theme from many of the discussion groups.

To advance coordination and collaboration, the PGC and PFBC have formed an advisory committee to assist with the state Wildlife Action Plan revision. This voluntary consultative board, representing twenty-three governmental and non-governmental land, water and wildlife management agencies, will offer multifaceted perspectives on conservation actions to proactively address species declines. In addition, the Pennsylvania Biological Survey and the Pennsylvania Chapter of The Wildlife Society hosted a joint conference in March 2013 to promote current research and actions related to species of greatest conservation need, as identified in the state Wildlife Action Plan and supported by federal State Wildlife Grants Program funds. Enhancing cooperative conservation strategies through partnerships and networking opportunities will continue to lead imperiled species down the road to recovery.

GRANTS ADMINISTRATION



piping plover photo courtesy of Jerry McWilliams

Lake Erie shoreline restoration is for the birds

The Great Lakes shoreline is home to globally important habitats that support distinct assemblages of plants and wildlife. In recent years, non-native and woody vegetation encroachment has degraded these habitats, making them unsuitable for many native endangered and rare species. For example, Presque Isle State Park’s Gull Point Natural Area along the Lake Erie shores regularly hosted up to 15 breeding pairs of federally endangered piping plovers until the late 1950s and a colony of over 100 pairs of state endangered common terns was active from the 1920s to 1940s.

Funding from a USFWS Great Lakes Restoration Initiative grant enabled project partners PGC, DCNR Bureau of State Parks, Western Pennsylvania Conservancy and Audubon Pennsylvania to remove non-native and invasive vegetation and restore more than 30 acres of critical shoreline habitat for these species from 2010 to 2012.

Excitingly, two nesting pairs of common terns were found in the treatment area in June 2012, although the eggs from both nests disappeared by mid-July. This was the first common tern nesting since 1995! Volunteer birders also observed two migrant piping plovers at Presque Isle in 2012, an adult in July (color-banded as a juvenile in Michigan) and a juvenile in August (hatched and color-banded in Michigan). Although we cannot be certain that our efforts contributed to the tern nesting and plover visits, we remain hopeful that continued habitat restoration in the Gull Point Natural Area will ultimately lead these imperiled species down the road to recovery in Pennsylvania.



common tern nest photo courtesy of Jerry McWilliams

STATE WILDLIFE GRANTS PROJECTS

State Wildlife Grants support the work of the Diversity Program's endangered bird and mammal specialists, regional wildlife diversity biologists, the Private Landowner Assistance Program and the Barn Owl Conservation Initiative. Equally important, the Game Commission works with conservation partners across the state to bring special expertise and local commitment to projects and maximize the impact of these federal dollars.

CONSERVATION PARTNER PROJECTS

Ongoing

Implementing Forestland Best Management Practices for Golden-winged Warbler Habitat on Public Lands in Pennsylvania, *Indiana University of Pennsylvania*—This project expedites implementation of breeding habitat management for one of the most imperiled birds in the eastern U.S. on thousands of acres of state game lands.

Marcellus Shale Exploration and Development, Quantifying Effects, *Pennsylvania State University*—Surveys of forest birds track whether their populations increase, decrease or stay the same in relation to differing levels of gas exploration and changes to habitat.

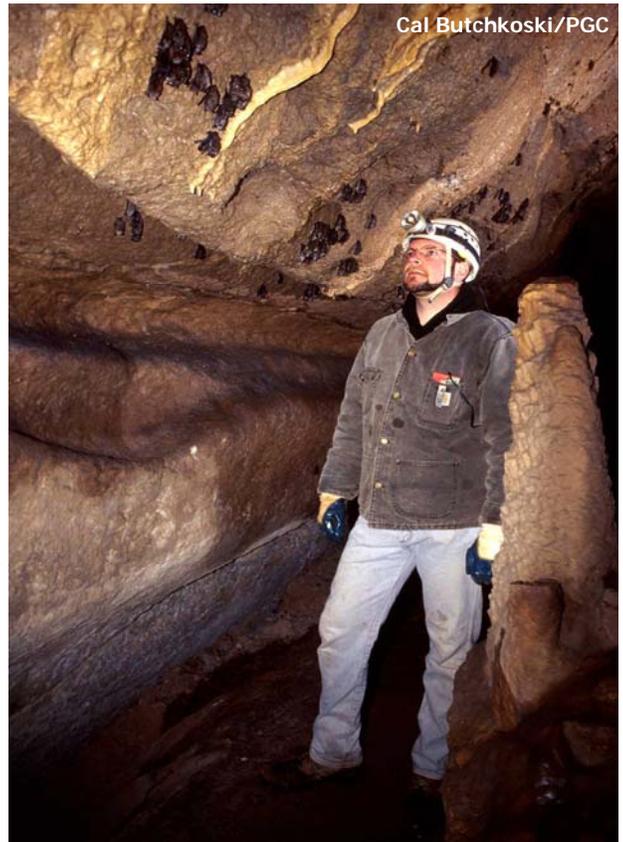
White Nose Syndrome: Development of a Multi-State Response, *Indiana University of Pennsylvania*—IUP coordinated the many research efforts and advancements by 11 states, and three non-state partners, in the effort to combat the expanding health threat to North America's bats. Field and laboratory studies were completed in 2012, but the extensive final report is still in production.

Northeast Regional Conservation Needs, *Wildlife Management Institute*—Through the RCN partnership, the northeastern states are able to utilize resources, techniques, expertise and funding to achieve a scale and scope of ecosystem conservation that would not be possible for any single state to deliver.

Selected in 2012

Genetic Catalog of Allegheny Woodrat Metapopulations in Pennsylvania, *Indiana University of Pennsylvania*—Management solutions have been identified for many Allegheny woodrat population pressures. However, loss of genetic diversity due to declines and isolation may inhibit woodrat recovery. An atlas of genetic diversity among woodrat populations will identify populations that require genetic restoration to achieve long-term recovery goals.

Allegheny Woodrat Captive Breeding Program, *Delaware Valley College*—The goal of this project is to maintain a breeding colony to supplement the genetic diversity of the state's isolated woodrat populations and allow reintroduction efforts in suitable habitat in the hope of averting federal listing of the Allegheny woodrat.



Completed in 2012

Genetic Approaches to Understanding the Population Structure of Little Brown Bats in Pennsylvania, *Pennsylvania State University, Beaver Campus*

White Nose Syndrome (WNS) is thought to be spread primarily by bat to bat contact, so understanding connectivity and movements of bats can help in understanding the spread of the disease. Genetic studies of bats are one way to examine how bats in various regions are linked. The Game Commission and Penn State Beaver collaborated in 2011 and 2012 on a State Wildlife Grant-funded project to study the population genetic structure of little brown bats. Little brown bats were the most common species in Pennsylvania before WNS, but have since experienced declines of over 95%.

Researchers examined genetic markers from hibernating little brown bats throughout the state. No differences were found in nuclear DNA, indicating that bats from different areas of the state likely mix and mate at fall swarming sites. However, the researchers found maternally-inherited genetic differences between hibernacula in western Pennsylvania and those in the rest of the state. These differences suggest that females may hibernate in the same area year after year. WNS did not appear in these western hibernacula until one to two years after the disease appeared in the rest of the state. The results suggest that western Pennsylvania hibernacula are partially genetically isolated from central and eastern hibernacula, and may call for separate management units for WNS recovery efforts.

IN THE PUBLIC'S INTEREST

The Pennsylvania Game Commission's mission is to manage Pennsylvania's wild birds, wild mammals and their habitats for current and future generations.

ENGAGING THE PUBLIC'S INTEREST

In 2012 numbers of Pennsylvanians engaged in wildlife conservation through Wildlife Diversity Program citizen science, outreach and education continued to grow. Following are highlights:

- 3,200 citizens attended 67 presentations by Wildlife Diversity Program biologists statewide.
- 570 volunteers assisted statewide surveys of bald eagles, peregrine falcons, colonial waterbirds and other bird species.
- 59 highly skilled birders completed 99 U.S. Geological Survey Breeding Bird Survey routes in 2012. At least 20 of these individuals have surveyed their routes for more than 20 years and, in total, these volunteers have 750 person-years with this program.
- 82 of 156 Appalachian Bat Count summer colony reports were submitted by volunteers, reflecting continuing public concern about the effects of White Nose Syndrome on bat populations.
- 63,489 field trip reports were entered on Pennsylvania eBird, the first state portal for this free, real-time, web-based bird checklist.
- 68,652 downloads of Wildlife Diversity web pages included both educational materials and annual job reports on PGC research projects.

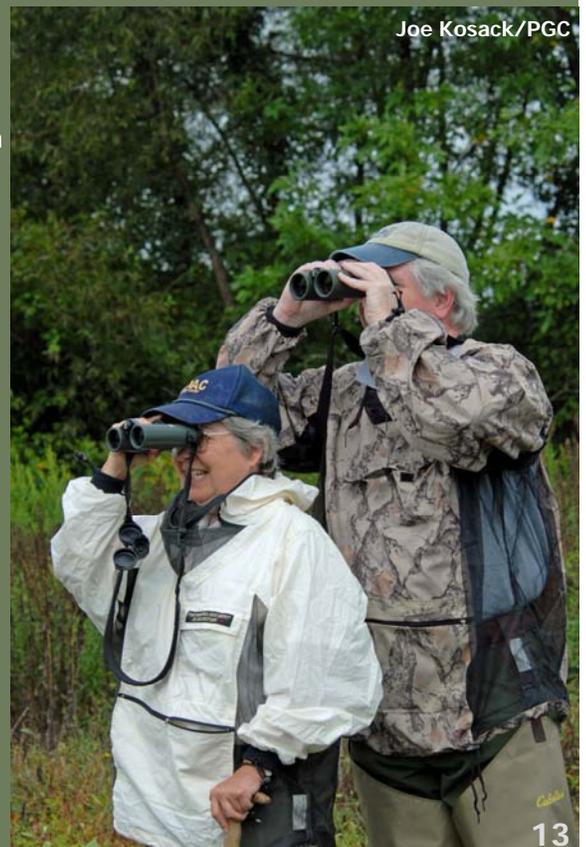
A MESSAGE to the VOLUNTEERS who contributed so much.

A longstanding strength of wildlife conservation in this state is citizen involvement in the monitoring, conservation and protection of Pennsylvania's many wildlife species, a heritage for all citizens.

The largest contribution by volunteers comes with birds because of their broad appeal. Hundreds of Pennsylvania residents monitor bald eagle, peregrine falcon, osprey and barn owl nests, as well as colonial waterbird colonies statewide. U.S.G.S. Breeding Bird Surveys routes are completed annually; some of these dedicated volunteers have 20-year histories. Others observe the restored habitat on the Lake Erie shoreline for rare appearances of common terns and piping plovers. Thousands contribute to Pennsylvania eBird, with a remarkable total of over 63,000 field trip reports entered in 2012 alone. The 600-page, six-and-a-half pound *Second Atlas of Breeding Birds in Pennsylvania*, copyright 2012, is a tangible testament to the power of volunteers.

For mammals, citizen involvement is more challenging because so many mammal species of greatest conservation need are reclusive and nocturnal. Still, the summer Appalachian Bat Count continues to grow and we recently celebrated our first 20-year participant milestone. The bat count is an example of a bittersweet aspect of citizen science. Because bat numbers have suffered huge losses due to White Nose Syndrome, it is now far more important that we gather data to monitor trends in summer maternity colonies. Pennsylvanians can play a huge role in helping to understand what is happening to bat populations.

Thanks to your dedication and expertise as citizen scientists, we all gain insight into the lives of our species of greatest conservation need.



PENNSYLVANIA'S
ENDANGERED and THREATENED
BIRDS and MAMMALS

ENDANGERED BIRDS

American bittern⁵
black-crowned night-heron⁴
blackpoll warbler^{4,5}
black tern⁵
common tern^{4,5}
dickcissel⁴
great egret⁴
king rail⁴
least bittern^{4,5}
loggerhead shrike^{4,5}
peregrine falcon⁴
sedge wren^{4,5}
short-eared owl^{4,5}
upland sandpiper^{4,5}
yellow-bellied flycatcher^{4,5}
yellow-crowned night-heron⁴

ENDANGERED MAMMALS

Delmarva fox squirrel¹
Indiana bat¹
least shrew
northern flying squirrel

THREATENED BIRDS

bald eagle³
long-eared owl^{4,5}
northern harrier^{4,5}
osprey⁴

THREATENED MAMMALS

Allegheny woodrat
small-footed bat
West Virginia water shrew

EXTIRPATED

piping plover²

¹federally endangered

²Great Lakes population federally endangered

³protected under federal Bald and Golden Eagle Protection Act

⁴protected under federal Migratory Bird Treaty Act

⁵USFWS Migratory Bird of Conservation Concern