

SNAPSHOTS

from 2019



DNR Indiana Department
of Natural Resources
WILDLIFE SCIENCE

A MESSAGE FROM THE ASSISTANT DIRECTOR

The North American Model of Wildlife Conservation is the model by which Indiana's wildlife resources are managed. Its seven core principles are 1) Wildlife belongs to the people and is managed as a public trust for all citizens; 2) Prohibit the deleterious markets for dead wildlife parts or products; 3) Regulate and determine the proper use of wildlife by law; 4) Wildlife can only be killed for legitimate purposes; 5) Wildlife is an international resource; 6) Science is the appropriate tool to develop wildlife policy; and 7) Protect the democratic allocation of citizen opportunity to harvest wildlife.

The first and sixth principles are the foundation of the DNR biologists'

research and management practices. Government agencies are entrusted to manage wildlife as a resource for all people of Indiana, and the use of science is the appropriate basis for wildlife policy. The DNR's primary mission for fish and wildlife research is to generate the science to manage Indiana's wildlife resources. That science may take the form of understanding how diseases affect wildlife populations in order to help determine the most appropriate management response. That science can be an evaluation of 30 years of wild turkey information to understand how that species' populations have grown and the next steps needed to better manage those populations. That science might be

understanding the needs, desires, and values of the public and their interactions with wildlife so that we can manage wildlife for the people of Indiana. Or that science can be understanding the needs of a rare species that has nearly disappeared from Indiana to aid its recovery.

Without science as the basis for wildlife management and policy, we would rely on uninformed opinions, guesswork, and random observations that are often laced with the bias of the observer. The work of DNR's biologists and scientists is critical for proper management of Indiana's wildlife resources. I am proud of the accomplishments of our scientists that are highlighted in this report.



Joe N. Caudell, Ph.D.
Assistant Director
Division of Fish and Wildlife
Office of Science and Research



TABLE OF CONTENTS



A Message from the Assistant Director 2

Revenue & Expenditures 4

New Faces 6

A Picture is Worth a Thousand Bats 7

Healthy Mussels 8

Can We Count You In 9

Eavesdropping on Endangered Frogs 10

Building a Better Pond 11

Tails of a Virus 12

Shrubs for Shrikes 13

Bringing Science to Social Media 14

No Wild Goose Chase 15

Between a Rock and a Hard Place 16

Citizens Help Monitor Wildlife Health 17

Green Treefrogs On the Move 18

Reflections on Wild Turkey Restoration 19

Silos Full of ... Mussels 20

REVENUE & EXPENDITURES

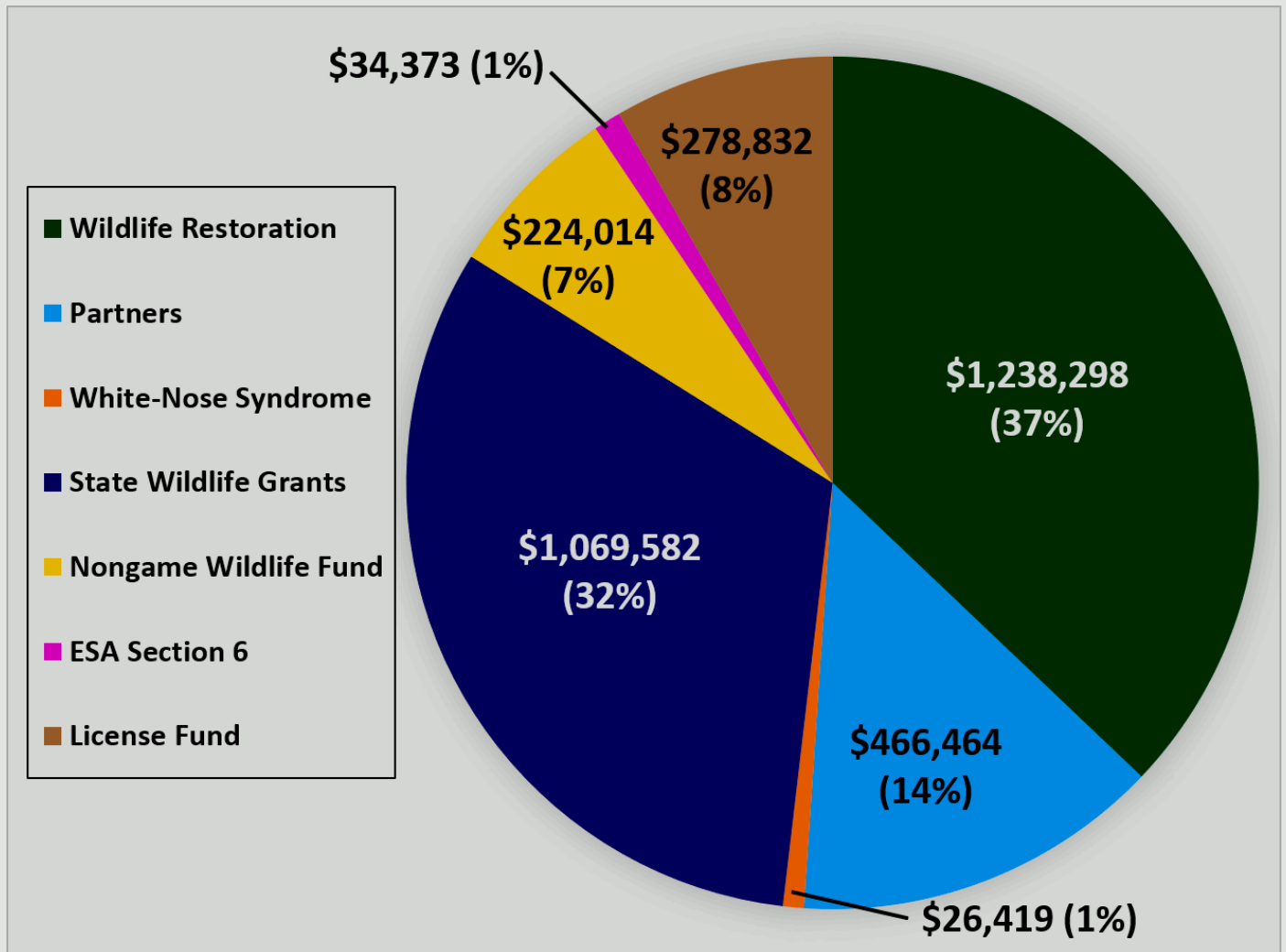
Wildlife Science programs are supported by both state and federal funds. The two sources of state funds are revenue from the sale of Indiana hunting and trapping licenses and donations to the Indiana Nongame Wildlife Fund. Federal dollars come to the DNR Division of Fish & Wildlife several ways, but the two primary means for wildlife conservation are the Wildlife Restoration Program and the State and Tribal Wildlife Grant (STWG) Program.

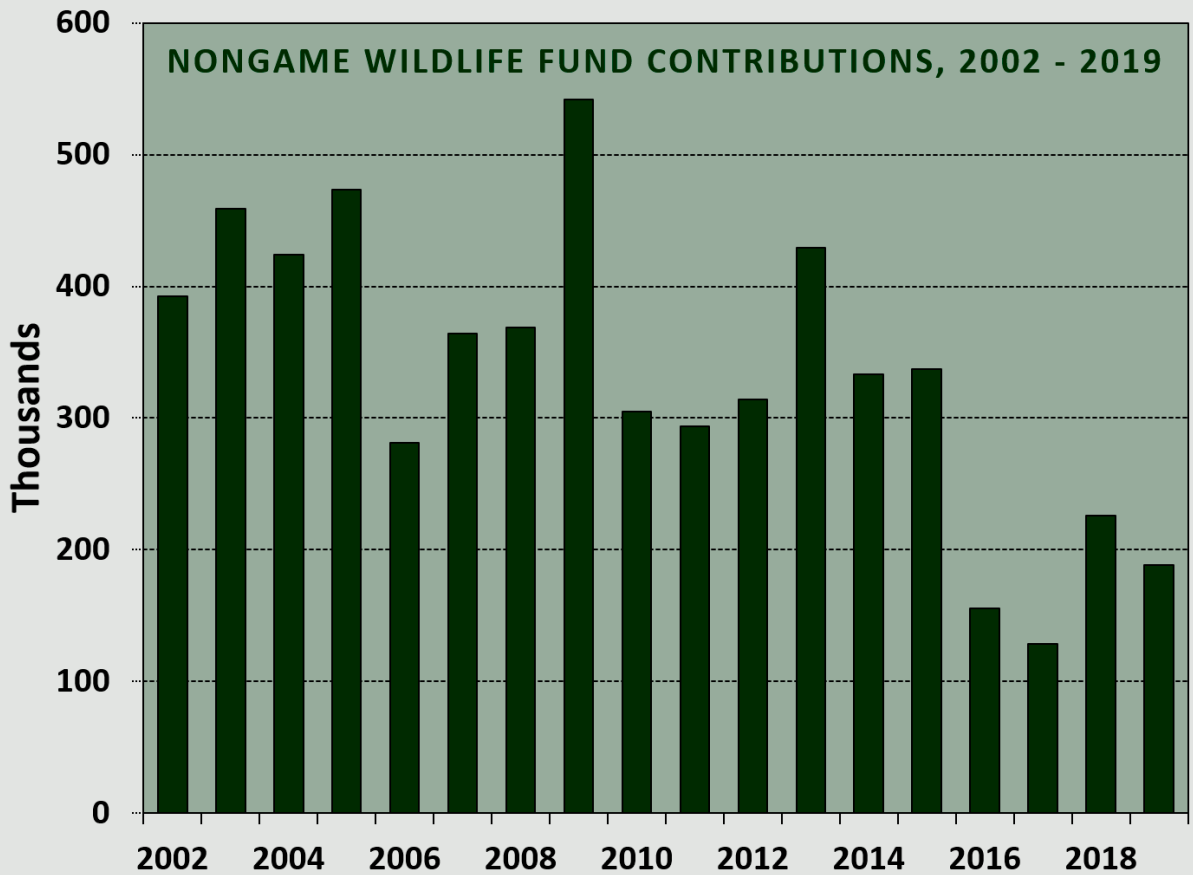
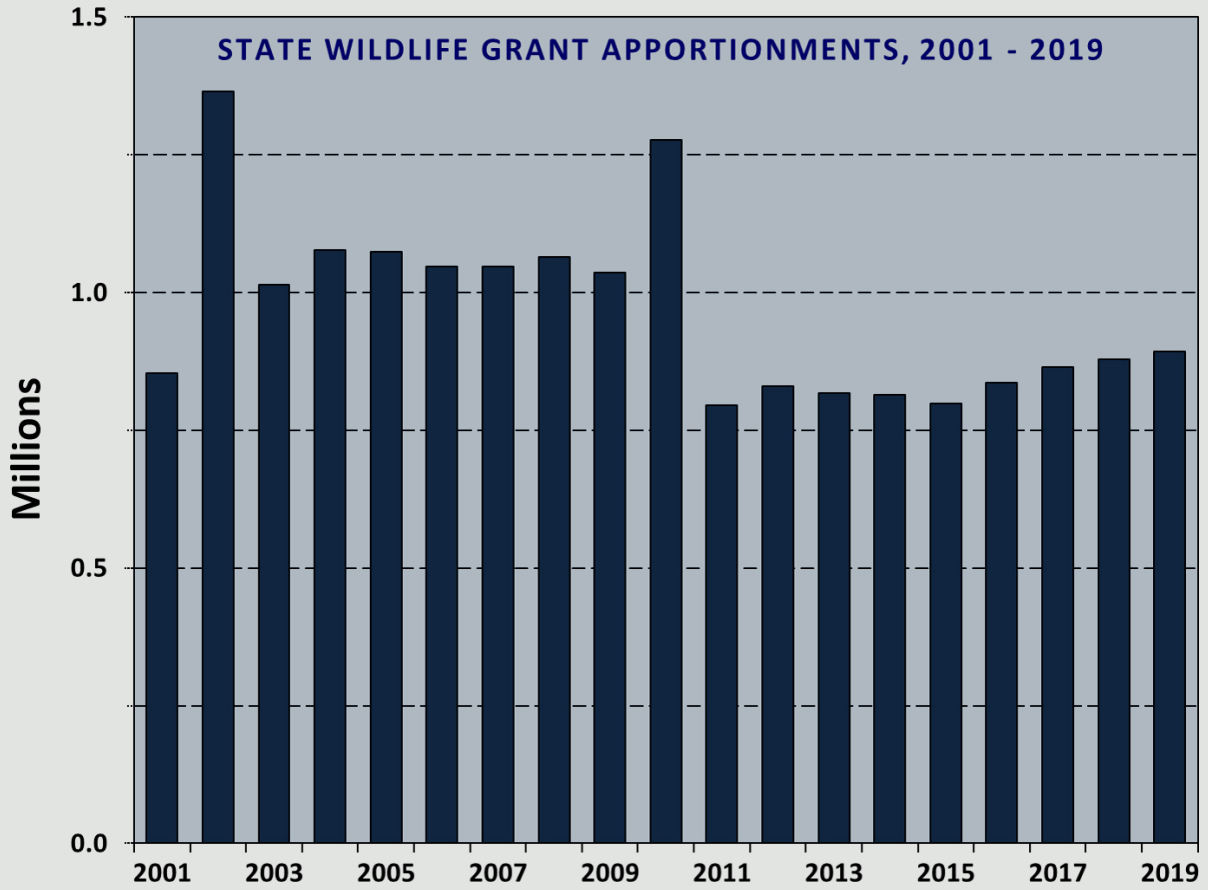
The Indiana Nongame Wildlife Fund is a dedicated fund that was created in 1982 to support nongame and endangered species conservation in Indiana. In 2019, donations totaled nearly \$188,300, a 17% drop from the previous year. Hoosiers have generously contributed nearly \$13 million to the Indiana Nongame Wildlife Fund during its 37 years.

The STWG Program, authorized by Congress in 2001, provides annual allotments to states and U.S. territories for rare, declining, and

at-risk species. Indiana's 2019 share was nearly \$894,000—the highest in nine years. During the 19-year lifespan of the STWG Program, Indiana has received \$18.6 million to support rare species conservation.

Wildlife Science programs spent more than \$3.3 million from seven different funding sources in 2019. Nearly 70% of this total was provided through the Pittman-Robertson Act and the State and Tribal Wildlife Grant Program.





NEW FACES

In 2019, Wildlife Science welcomed Casey Maynard, DNR Division of Fish & Wildlife's first Wildlife Health Assistant. Casey earned her B.S. in wildlife science with a minor in forestry from Virginia Tech in 2014. She held various lab and technician positions during and after college that included carnivore studies in Virginia and Michigan, work with detection dogs in Oregon, and a stint as a veterinary assistant at a local mobile hospital in Virginia. Since 2017, Casey has been working as a Wildlife Disease Technician for the Virginia Department of Game and Inland Fisheries with emphasis on monitoring programs for chronic wasting disease, epizootic hemorrhagic disease, and West Nile virus.

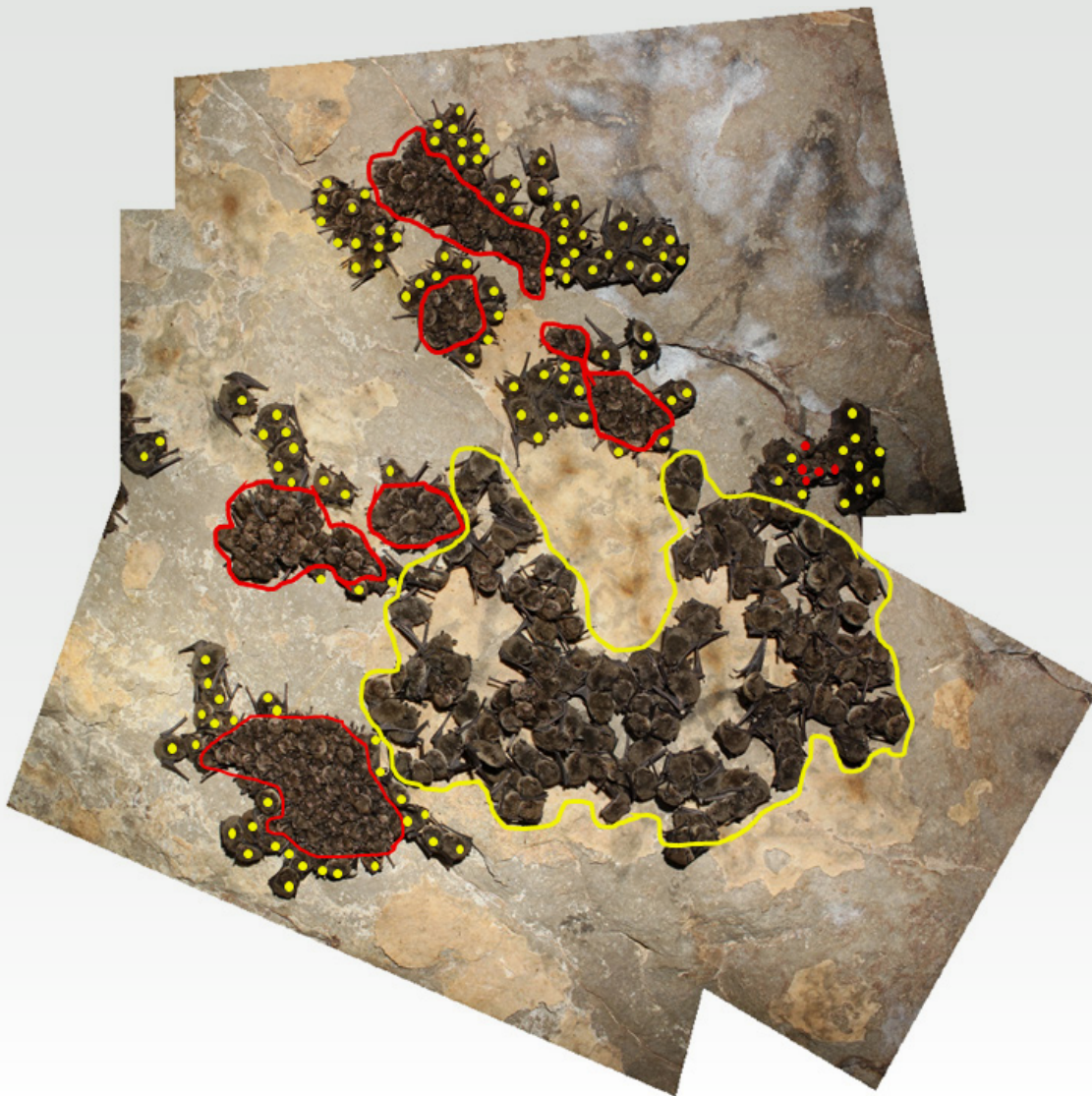


A PICTURE IS WORTH A THOUSAND BATS

The Hoosier state is known for its large number of endangered Indiana bats that hibernate in caves and mines. Each winter, biologists enter caves to count small groups of bats or take photos of larger clusters to be counted later. Photography increases the speed and accuracy of the survey and reduces disturbance to hibernating bats. Photographs also provide

opportunities for quality control, allowing biologists to zoom in on digital images to closely examine the features or coloration of the clusters. While inspecting images from 2019, an incredible find was made—over 3,800 endangered gray bats were discovered in Wyandotte Cave. Indiana is at that the northernmost edge of the gray bat's distribution. Only a handful are typically found each winter, so this was a significant discovery.

In this photo, Indiana bats are grouped in tight, compact clusters shown in a red outline and dots. The larger, more scattered individuals between the clusters are gray bats (yellow outline and dots). By carefully inspecting photographs from past surveys, biologists learned the number of gray bats that hibernate in Wyandotte Cave has been slowly increasing since 2015.



HEALTHY MUSSELS

Freshwater mussels are among North America's most imperiled species, and widespread die-offs are increasingly recognized as major population threats. Basic information on the health of mussels and the diseases that affect them is limited. In 2019, DNR began to gather baseline data on the health of mussels and develop methods to quickly collect samples for diagnostic tests in the event of a future die-off in Indiana's waterways.

Sixty individuals of each of three common mollusk species—the native fatmucket and plain pocketbook, and the non-native Asian clam—were collected from three sites in the Wildcat Creek drainage. General characteristics for each mussel were documented, and hemolymph and tissue samples were collected for a wide range of diagnostic tests, including the determination of microbial populations (viral, bacterial,

parasitic, and fungal), the antibiotic resistance of cultured bacteria, and levels of glycogen, stable isotopes, and contaminants.

Ideally, the project will establish baseline health parameters of multiple mussel species in different waterways, which is critical to understanding results in the event of a die-off. Learn more about freshwater mussels: **wildlife.IN.gov/8684.htm**.



CAN WE COUNT YOU IN?

Annual summer production is critical to wild turkey populations. In 2019, Hoosiers joined a new citizen science project to report turkey broods (i.e., hens with young, called poults). The survival of young poults from hatching around Memorial Day to Independence Day is a dicey situation due to cold wet rains, few insects for food, and predation by a number of creatures. Because survival is so precarious and variable, accurate estimates of summer productivity require up to 3,000 observations each July and August. Around this time, larger

poults are easier to see and have a greater chance of surviving into fall.

Seeing that many broods requires a lot of eyes and a bit of luck—reporters need to be in the right spot at the right time. Social media promotion, a news release, mass emails to past participants and hunters, and a campaign poster “Can We Count You In?” increased exposure of the new web-based survey and attracted participants. An illustrative guide using real photos of turkey broods in typical observational situations was developed to improve reporting accuracy.

A total of 1,195 usable observations of 7,941 total turkeys representing 899 broods was received from nearly 1,600 participants in 2019. This represents a 47% increase in total observations and a stunning five-fold increase in registrants from 2018.

The substantial increase in participation and brood reports undoubtedly contributed to better estimates of wild turkey production. Considering the summer of 2019 was a poor one for turkey production, it is fortunate there were more eyes out there to count the fewer successful broods.

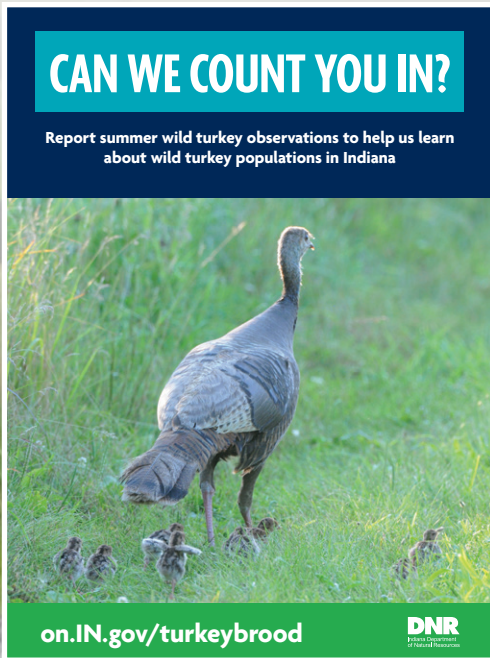
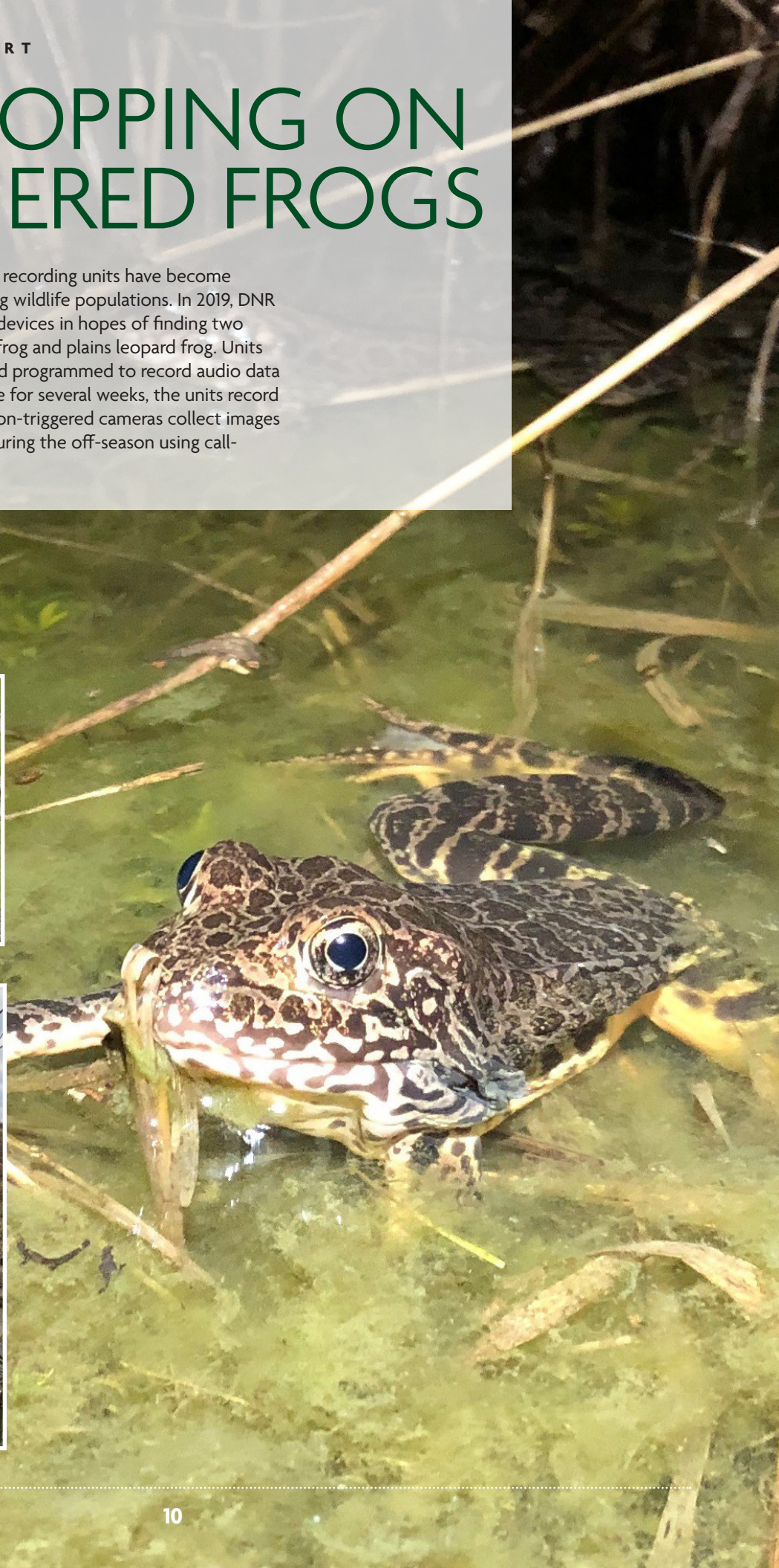


Photo by G. Johnston

EAVESDROPPING ON ENDANGERED FROGS

During the past decade, automated recording units have become increasingly popular for monitoring wildlife populations. In 2019, DNR herpetologists began using these devices in hopes of finding two endangered species: the crawfish frog and plains leopard frog. Units are attached to trees in suitable habitats and programmed to record audio data for several hours after sundown. Left on site for several weeks, the units record frog calls and other sounds, much like motion-triggered cameras collect images of wildlife. Audio recordings are analyzed during the off-season using call-recognition software.



BUILDING A BETTER POND

Two requests often received from the public are how to manage private ponds and how to deal with wildlife conflicts. In 2019, DNR created the document “Providing Structure for Fish in Private Ponds” to address both questions. Structure refers to surface area for algae and macroinvertebrates to grow on and places for fish to hide, eat, or spawn. A large portion of Indiana’s

waters are in private ownership—this information helps landowners improve pond health and recreational opportunities while reducing conflicts with wildlife like river otters.

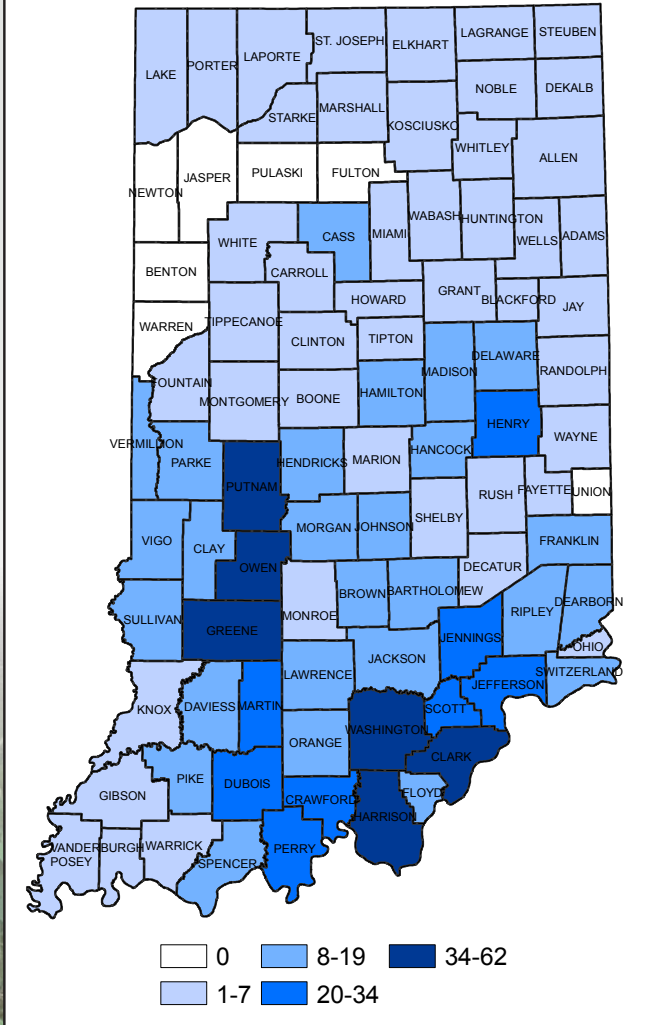
The new document and website offer resources and recommendations for pond owners to consider when managing their pond. It also describes 12 different habitat structure options, from

natural choices like felled shoreline trees and aquatic vegetation to ready-made structures like a Pennsylvania porcupine crib and turtle basking platform. The document also led to an extensive update of DNR’s private pond and lake management webpage to include more relevant content and links to additional information. Visit wildlife.IN.gov/3614.htm to learn more.



TAILS OF A VIRUS

EHD Reports by County



White-tailed deer are susceptible to a virus called epizootic hemorrhagic disease (EHD) that is spread by biting midges. The disease occurs naturally in the wild and is always present; however, hot and dry summers with little rain provide conditions for a major outbreak. Such was the case in 2007, 2012, and most recently in 2019 when EHD spread throughout southern Indiana, affecting thousands of deer.

Indiana DNR relied on public reports of sick and dead deer to monitor the spread of EHD across the state. An online reporting system provided daily maps on the website to keep the public informed on the disease's spread. Biologists collected tissue samples from dead deer to confirm the presence of the virus.

Signs of EHD typically appear about seven days after a deer has been infected and may include not eating, weakness, loss of fear of humans, and circling. EHD is often fatal, but some deer will survive and develop immunity. This is good news for Indiana's deer herd. Immunity and resiliency will allow the local deer population to rebound over the next few years.



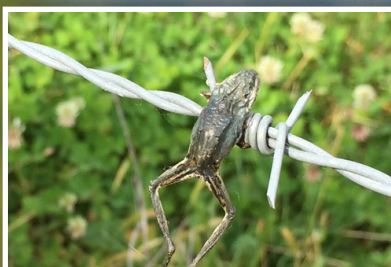
SHRUBS FOR SHRIKES

“Shrubs for Shrikes” is a new program by Indiana DNR, U.S. Fish and Wildlife Service’s Partners for Fish and Wildlife (PFW), and the Indiana Audubon Society that helps provide nesting habitat for loggerhead shrikes.

This robin-sized songbird is also known as the “butcher bird” due to its habit of impaling prey on thorns or barbed wire. Loggerhead shrikes are endangered in Indiana. More than 100 nesting pairs were found in the late 1980s; fewer than 10 pairs remain today, concentrated in pockets in southwest Indiana.

“Shrubs for Shrikes” help private landowners plant and preserve eastern red cedar shrubs in shrike nesting territories. Cedars are commonly used for nesting, but are often perceived as weedy by landowners and removed, thereby reducing safe nesting sites for shrikes. Funds raised by the Indiana Audubon Society’s newly-created “Adopt-A-Shrike” program incentivize participating landowners to preserve the cedars for at least 10 years. Donations to the Indiana Nongame Wildlife Fund will pay for the bushes and fencing to protect them from livestock. Planting costs are covered by PFW. This innovative partnership resulted in the planting of more than 40 cedar bushes in 2020.

Hoosiers can help plant more cedar bushes for shrikes by adopting a shrike (<https://indianaudubon.org/adopt-a-shrike/>) or donating to the Indiana Nongame Wildlife Fund (on.IN.gov/nongamewildlifefund).



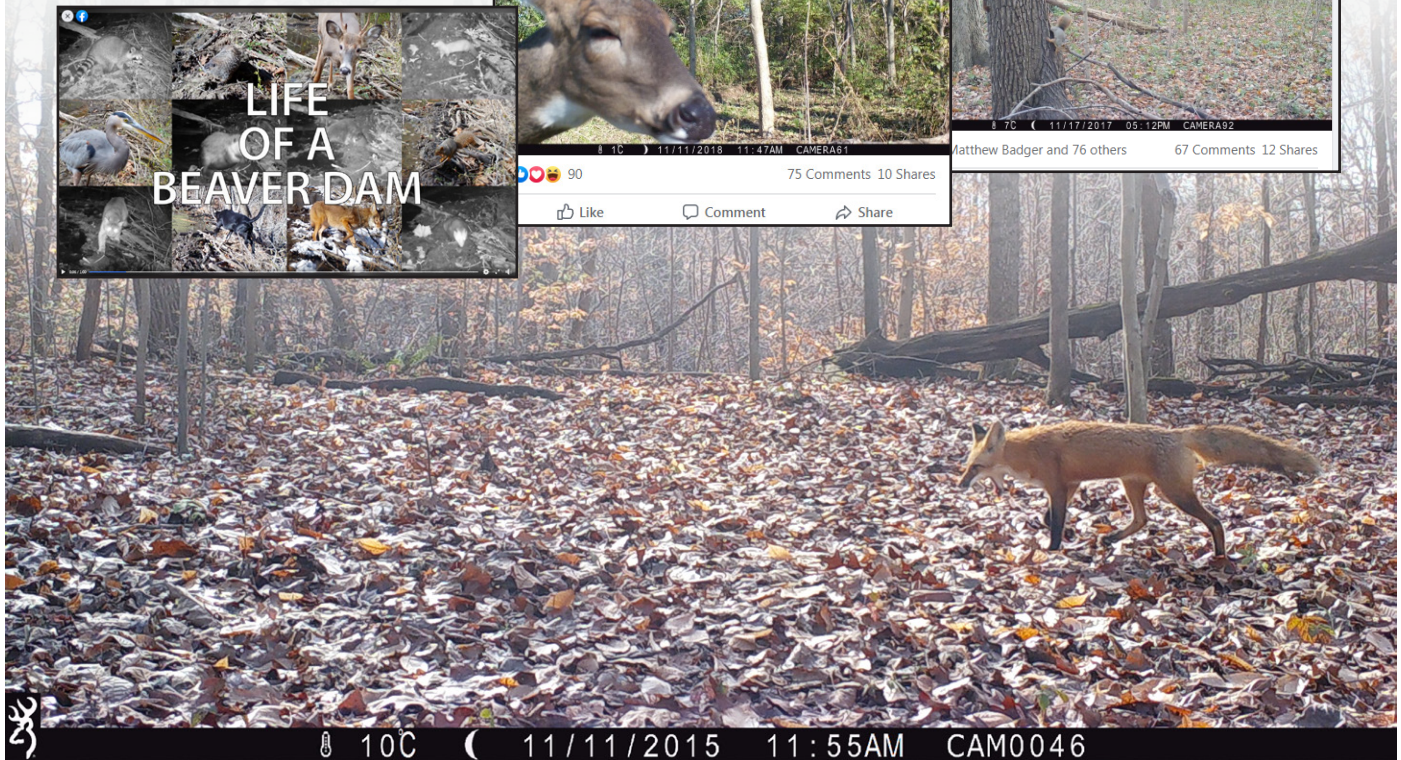
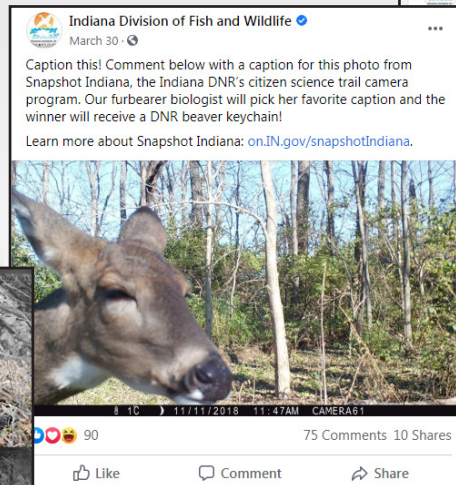
BRINGING SCIENCE TO SOCIAL MEDIA

Many states rely on volunteers to assist with monitoring wildlife, and Indiana is no exception. In 2015, DNR biologists started a volunteer-based trail camera project, Snapshot Indiana, that has since produced hundreds of thousands of photos across the state. In 2019, the DNR Division of Fish & Wildlife began tapping into the photos, not just for the information they provide, but to engage with people on Facebook.

Snapshot photos have been used in Facebook posts to advertise volunteer opportunities, teach users how to identify species, and generate contests, such as “Name that Animal” and “Caption This!”. One of the most popular posts featured several photos captured on a beaver dam, which is a natural travel route for wildlife, pieced together in a fun video: <https://bit.ly/2EMdEEW>. Set to music, the video revealed the variety of wildlife that crossed the dam, ranging from coyotes and mink to

great blue herons and the beaver that created it.

Repurposing photos used to monitor wildlife populations for outreach and engagement has been popular. These photos have garnered more than 1,100 likes, more than 550 comments, and around 360 shares from just 14 posts. You can find and like us on Facebook to see future posts using photos from Snapshot Indiana @INFishandwildlife. Learn more about Snapshot Indiana: on.IN.gov/snapshotindiana.



NO WILD GOOSE CHASE

Canada geese are an important gamebird in the upper Midwest and across the continent. The Indiana DNR monitors goose populations several ways, the most useful of which is banding. Banding is a process where a biologist attaches a uniquely numbered aluminum band to one of the goose's legs. If a hunter later harvests the bird and reports the band, biologists know when and where the goose was banded, along with its age and sex. This allows DNR to ensure that geese are not over- or under-harvested.

Catching a goose (or any bird) might seem difficult. All birds replace their feathers, just as people replace their hair—feathers fall out and new ones grow back. Most birds only lose (molt) one or a few wing feathers at a time, so they can continue to fly. However, waterfowl like geese molt all their flight feathers at once, usually in the latter half of June into early July. At this time, geese cannot fly and can be herded into pens to be banded.

In 2019, a total of 3,900 geese were banded in Indiana, the largest number in nearly a decade. This success was due, in large part, to a cooperative research project with Ball State University and Franklin College that targeted geese in the greater Indianapolis area for banding. Their efforts allowed DNR crews to band in other areas of the state.

Geese travel more than most people realize. Bands originating from Indiana have been reported in over 40 different states and Canadian provinces. If you harvest a banded bird, report it at reportband.gov.





BETWEEN A ROCK AND A HARD PLACE

Allegheny woodrats are limited by available rocky habitats—limestone cliffs, caves, and rocky slopes. In Indiana, they are found in only a few counties along the Ohio River. Accessing these areas to monitor woodrat populations can be difficult and dangerous.

From their vantage point along a narrow cliff edge, DNR biologists examine each newly captured woodrat. In addition to a quick health

assessment, woodrats receive unique identifying tags and a small tissue sample is collected from them for genetic analysis. Shortly after release, woodrats nimbly dart away, racing along the cliff face to seek shelter in their midden, or nest.

Woodrat populations along the scenic cliffs at O'Bannon Woods State Park and Harrison-Crawford State Forest have remained relatively

stable in recent years; however, long-term studies suggest that Indiana's Allegheny woodrat population as a whole is at risk. DNA analyses have clearly shown that populations are spatially and genetically isolated from one another, separated by barriers that limit woodrat dispersal. Future conservation strategies may require moving individuals among occupied sites to maintain genetic diversity.

CITIZENS HELP MONITOR WILDLIFE HEALTH

In 2019, DNR biologists launched another citizen science project, “Report Sick or Dead Wildlife” (on.IN.gov/sickwildlife). This new online tool is designed to collect information about Indiana wildlife that appears sick or that died without an apparent cause. Reports are added to a growing database that tracks wildlife health trends over time. The DNR Wildlife Health Team is especially interested in the following:

- Incidents involving the death of five or more animals.
- Recurring deaths of animals in the same general location over a period of time.
- Deer exhibiting abnormal behaviors suggestive of chronic wasting disease (emaciation, staggering or standing with poor posture, salivating excessively, or carrying their head and ears lower than normal).
- Deer exhibiting signs suggestive of epizootic hemorrhagic disease (death in or near water, loss of appetite and wariness, swelling around the head and neck, increased respiration rate, excessive salivation, rosy or bluish color of mouth and tongue).
- Incidents involving endangered species, regardless of the cause of death or the number of animals involved.

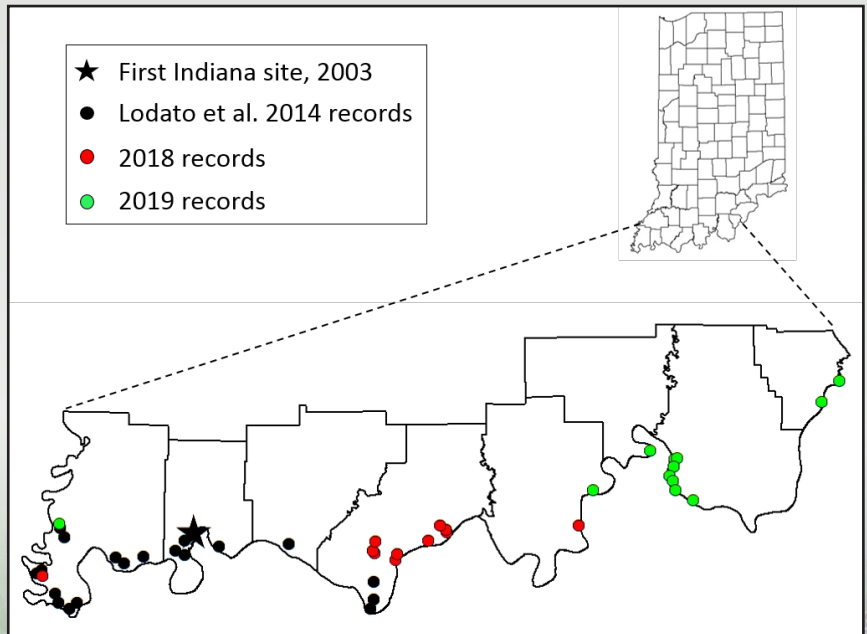
Reports of incidents involving common species and single animals are also useful for understanding baseline levels of wildlife health. This essential information can help lead to early detection of emerging disease outbreaks, targeted sampling of suspect animals, and greater understanding of widespread wildlife diseases in Indiana.



GREEN TREEFROGS ON THE MOVE

Green treefrogs have been expanding their range in the Ohio and lower Wabash River valleys since the species was first found in Indiana nearly 20 years ago. Surveys in 2019 revealed several new localities, especially along the Ohio River. Twelve new occupied sites were identified, including one in Floyd County that is more than 80 river miles upstream from where they were found the previous year.

The green treefrog's expansive and rapid colonization of the Ohio River valley has been remarkable and stands in sharp contrast to amphibian declines occurring globally. Why the frogs are now expanding and how they arrived at sites so far upstream is unclear, but climate change, flooding, and, perhaps, frogs being artificially moved through human activities may be contributing factors.



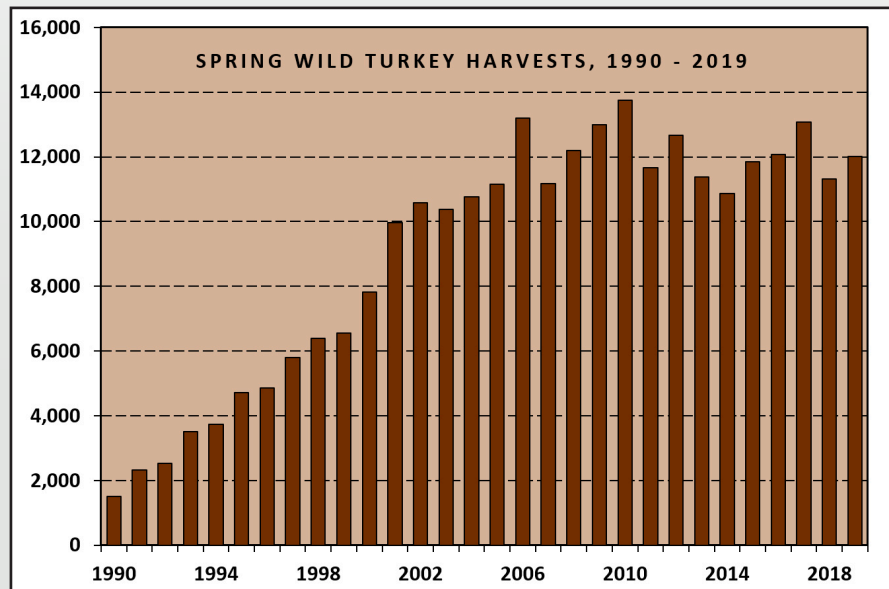
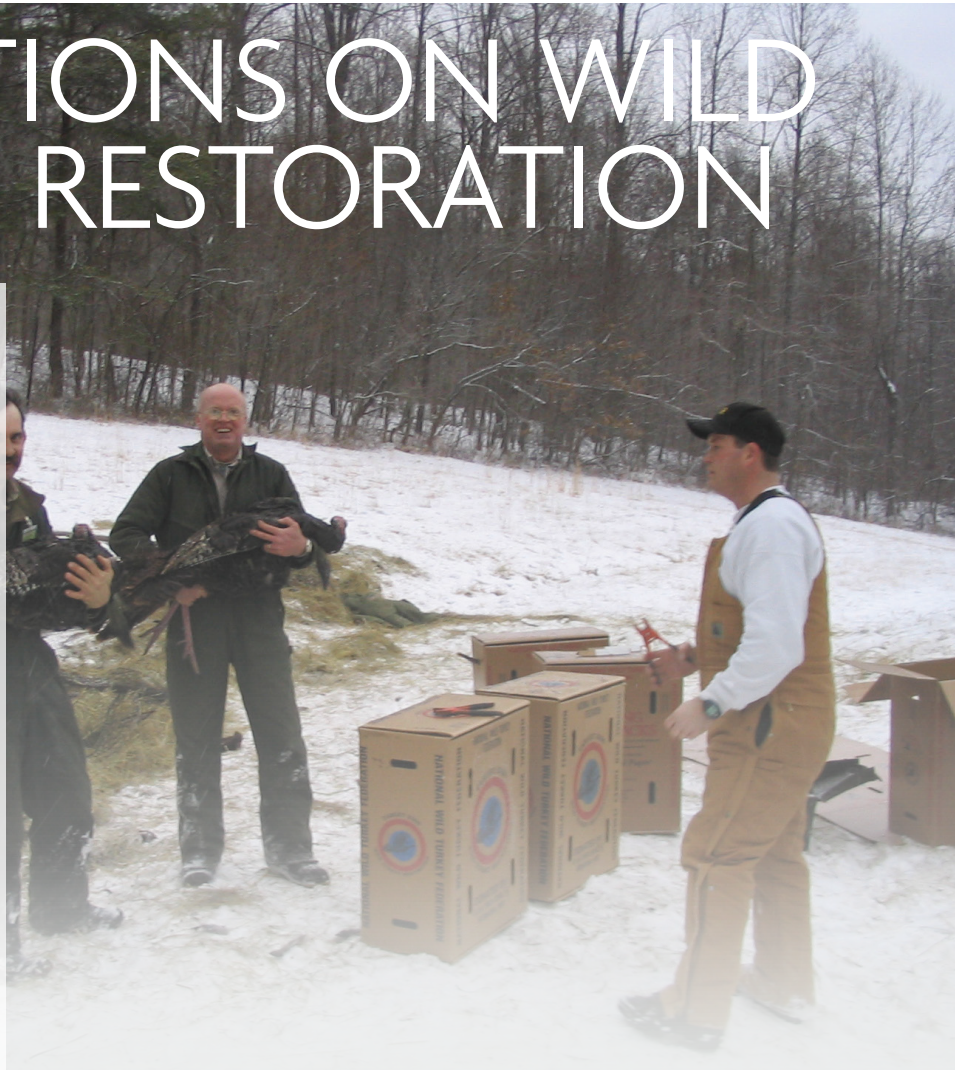
REFLECTIONS ON WILD TURKEY RESTORATION

The year 2019 marked the 50th anniversary of the return of wild turkey hunting to Indiana, making it the time for reflecting on one of the most iconic wildlife conservation success stories in North America.

The loss of forested habitats and unregulated hunting drove Indiana's native turkey populations to extinction by the early 1900s. Restoration began in 1956, when five wild-trapped birds from Arkansas were released at Crane Naval Depot in Martin County. In the 48 years that followed, nearly 2,800 birds trapped in six states were released at 185 locations distributed across the entire state; nearly 95% of the releases took place in the 1980s and 1990s.

Population growth continued for 10 to 15 years after restoration, and wild turkeys now occupy all 92 counties. The largest populations are found in southeast and south-central Indiana, where forest cover is most abundant. Regulated spring hunting resumed in 1970, and since 2002, annual harvests have exceeded 10,000 birds, with nearly 60,000 hunters participating each year. In the last decade, harvests have stabilized at 5% lower levels due to maturing populations that are in balance with their available habitat.

The success of Indiana's program occurred because wildlife biologists integrated knowledge of turkey ecology with restoration strategies. Going forward, the populations' long-term sustainability will depend on future land-use changes and potential impacts of prolonged precipitation events during the summer brood rearing period.



SILOS FULL OF ... MUSSELS!

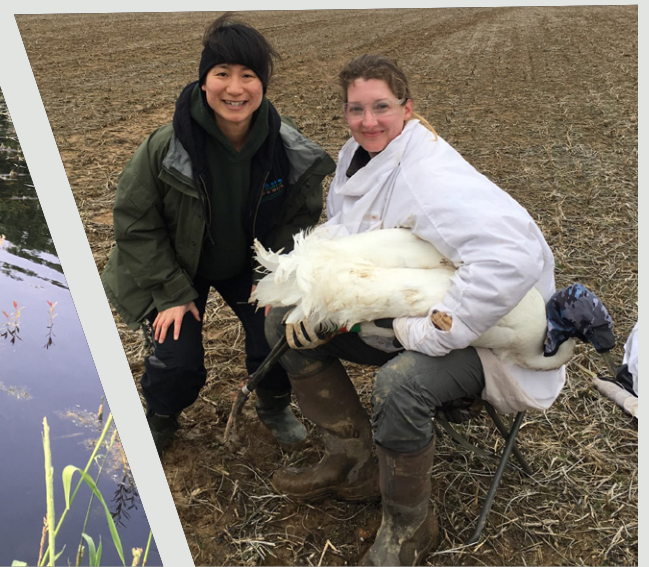
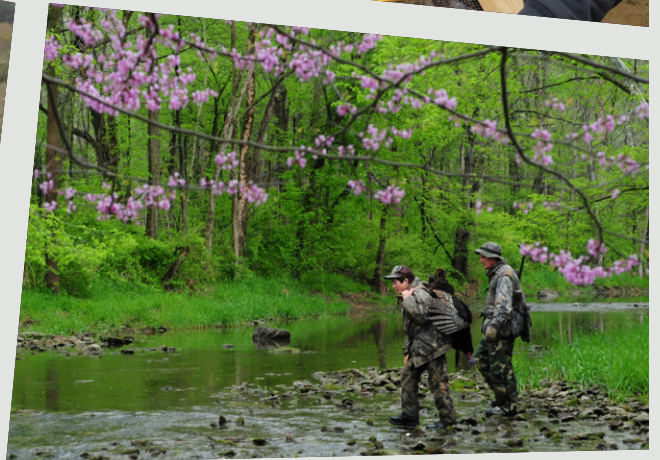
Not all Indiana silos are holding what you think. If you look closely at the bottom of some Indiana streams, you might notice a few (about the size of a soccer ball) concrete, hemispheres nestled among the rocks. These mussel 'silos'—with a piece of PVC pipe secured in the hollowed out center—provide a unique shelter to house juvenile mussels. Placing small, fragile mussels in the silos allows biologists to monitor their survival and growth. This helps evaluate a stream's ability to support freshwater mussels.

In late fall 2018, silos with juvenile plain pocketbook mussels were placed at several locations in the Wildcat Creek drainage in west-central Indiana in partnership with The Nature Conservancy. Mussels were recovered in July 2019. Results from this work will help guide freshwater mussel conservation efforts in the drainage. Plans are underway to expand mussel silo work to other areas of the state.



THESE SNAPSHOTS

were made possible by the sale of Indiana hunting and trapping licenses and donations to the Indiana Nongame Wildlife Fund.



on.IN.gov/INHuntFish

on.IN.gov/nongamewildlifefund