ECHOLOCATOR

WISCONSIN
BAT PROGRAM

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Greetings to Our Partners in Bat Conservation!

It's summer, and bats are back! And they're not just back for the season—numbers are rebounding at Wisconsin's largest little brown bat hibernation sites! Populations are still much lower than pre-White Nose Syndrome (WNS), but we now have multiple years of data suggesting that numbers are increasing significantly. Other hibernating species, like northern long-eared bats, remain nearly undetectable in Wisconsin, but little brown bat numbers are growing, according to summer roost counts and winter hibernacula counts.

We are so grateful to all our conservation and outreach partners across Wisconsin for your hard work protecting Wisconsin's eight bat species and their habitats and connecting others to bats!

Noteworthy accomplishments from Wisconsin's bat community in 2023:

- The Wisconsin Bat Program partnered with more than 36 organizations across the state to collect thousands of data points, publish findings and reach thousands of people as part of bat conservation, research and education projects.
- We made meaningful progress toward our bat conservation goals, from protecting, improving and building bat habitat to teaching the public and initiating a new train-the-trainer outreach workshop.
- Whether you counted bats emerging from a roost, listened in to bat chatter while driving your acoustic survey route or were a positive voice speaking up for bats, thank you for all you do for Wisconsin bats; long may they fly. We look forward to partnering with you again in 2024!

Echolocator is an annual publication of the Wisconsin Bat Program, part of the Wisconsin Department of Natural Resources Natural Heritage Conservation Bureau. DNR conservation biologists statewide monitor, research and inventory Wisconsin's eight bat species in collaboration with other state and federal agencies, universities, conservation groups, other non-governmental groups and hundreds of volunteers. Echolocator presents bat conservation work and research relevant to Wisconsin and welcomes ideas for future articles and featured groups.

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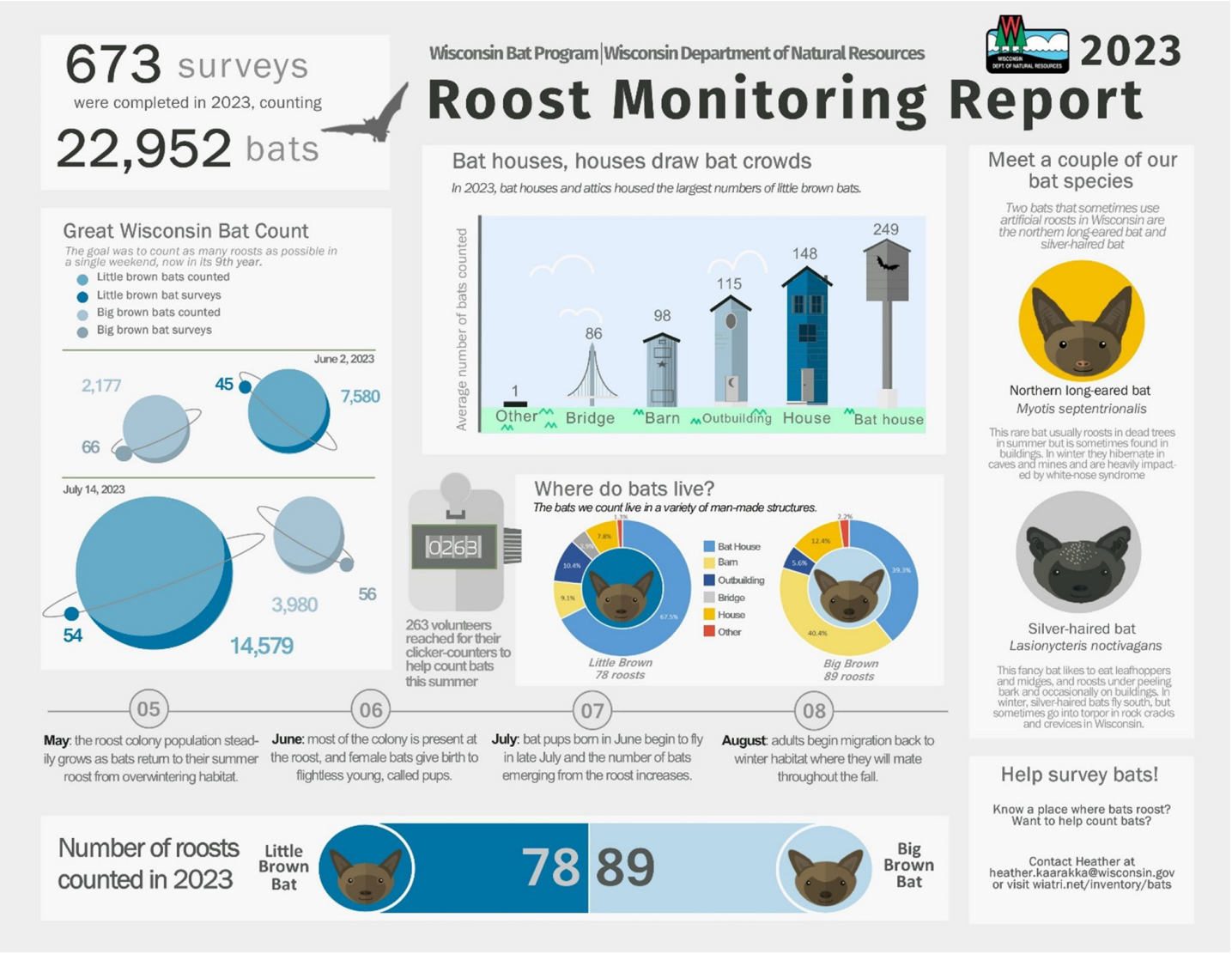
ON THE COVER: Throw-back thinking. The decade anniversary of WNS in Wisconsin has us thinking back over what information has been gathered about Wisconsin bats over the decades. The cover photo for this issue was originally published in the January 1950 issue of Popular Mechanics magazine. A summary of the original article and commentary by our program are provided at the end of this issue.
Photo: Tom McHugh, originally published in Popular Mechanics Magazine, Hearst Publishing, January 1950. Online source: Google Books



Above: The Summer Roost Monitoring Project collects critical information about roosting bat colonies across Wisconsin. Every year, we continue to be joined by new bat counters and survey new sites. Thank you to everyone this summer who reported a roost, surveyed emerging bats or was an all-around bat friend. You can check out more details about summer roost monitoring in the [2023 Roost Monitoring Report](#).

Bottom: Female little brown bats gather in warm locations like attics to birth and rear their pups together. Photo: Wisconsin DNR Bat Program

Right: A silver-haired bat roosting on a brick building in Milwaukee in October. Photo: Wisconsin DNR Bat Program

Bat Outreach: Ambassadors Take Flight

The public can tour a small section of Horseshoe Bay Cave in Door County in summer when bats are not present. Ambassadors enjoyed an (optional!) cool crawl through the long puddle in the "Duck Under" passage. Photo: Wisconsin DNR Bat Program

Wisconsin Master Naturalists and bat fans from around Wisconsin gathered for two training workshops to learn about bats with plans to teach others about bats. In partnership with the Wisconsin Master Naturalist program, the long-term goal of the Bat Ambassador Program is to create a statewide network of bat outreach volunteers we could call on to help respond to the many requests for bat presentations we receive each year.

Our program developed and conducted two separate two-day workshops to develop the knowledge, skills, understanding and confidence of Wisconsin Master Naturalists and others interested in conducting bat education and outreach across the state. The Wisconsin Master Naturalist Program partnered in this effort by developing and handling registration, advertising and soliciting feedback. They also track data on volunteer hours, locations and audience reach. Both 2023 workshops were full, with 25 participants each and wait lists.

The 2023 trainings were held on opposite sides of the state using classroom facilities at Peninsula State Park and Blue Mound State Park. Sites were chosen based on the availability of significant bat roosts (Peninsula State Park and Governor

2023 At A Glance: Wisconsin Bat Ambassadors

- Wisconsin Bat Ambassadors trained in 2023: **50**
- Counties represented: **21**
- Volunteer outreach hours: **300+**
- Audience members reached by ambassadors in the second half of 2023: **3500+**

Noteworthy:

We attempted mist-netting for bats in the field at both trainings but were unable to capture bats at sites where historically we would have expected to capture several individuals and multiple species. Fortunately Ambassadors were able to watch and listen to bats emerging from their roosts at each training session.

Dodge State Park) and proximity to publicly accessible caves. Hosting partners included Door County Parks (Horseshoe Bay Cave) and Mississippi Valley Conservancy (Kickapoo Caverns). Attendees included both Master Naturalists receiving advanced training, members of the public interested in becoming volunteers and staff of host-partner groups (resource managers, ecologists and natural resources educators).

Each two-day training consisted of indoor classroom sessions in bat biology, natural history, ecology, conservation topics, human-bat issues, white-nose syndrome, habitat management, bat education methods, an overview of bat teaching resources and ideas and actionable ways the public can help bats. Experiential field sessions included activities from the national Project Edubat curriculum, bat emergence viewing, acoustic monitoring, mist-netting and cave/karst hibernaculum visits.

Participants committed to providing one bat outreach/educational event in the following year—either in response to a request from our DNR Bat Program or by initiating an event in their community. Trained Ambassadors can check out Echometer Touch bat detectors from a small lending library for use with groups (bat talks, bat walks, etc.).

In the second half of 2023 alone, Wisconsin Bat Ambassadors provided bat talks and walks for state parks, libraries, birding clubs, home school, and scouting groups.

In the second half of 2023 alone, Wisconsin Bat Ambassadors provided bat talks and walks for state parks, libraries, birding clubs, homeschool and scouting groups. Ambassadors who are also Wisconsin Master Naturalists reported their hours through the Wisconsin Master Naturalist portal. Together, Ambassadors logged over 300 hours providing public outreach in all corners of the state and reached an audience of more than 3,500 people. They've returned to their local communities to lead bat house-building initiatives at libraries and parks, and they even worked to convert a former root cellar to a bat hibernaculum in a city park!

Two more Wisconsin Bat Ambassador trainings took place in April 2024 and ambassadors have a wide-variety of bat outreach events planned across Wisconsin this year. If you missed the 2024 trainings but would like to become an ambassador, check the Wisconsin Master Naturalist website in early 2025 for training announcements.

Special thank you to the Wisconsin Master Naturalist Program for training coordination and to workshop partners who hosted—Peninsula State Park, Door County Parks, Blue Mound State Park, Governor Dodge State Park and Mississippi Valley Conservancy's Kickapoo Caverns.

Left: Ambassadors who attended the Door County training at Peninsula State Park. Photo: Wisconsin DNR Bat Program Top: Ambassador trainings include a field component, like this one at Governor Dodge State Park. Photo: Wisconsin DNR Bat Program

Underground Update

Top: This large underground room in a Wisconsin mine is home to several thousand hibernating little brown bats each winter. Photo: Wisconsin DNR Bat Program

There is a feeling of immense relief when you realize that animals you watched disappear rapidly in only a few years are growing in number again. Moments like these have been few in North American bat conservation since white-nose syndrome (WNS) arrived on our continent. However, as our program concluded hibernation surveys at our largest sites in the early spring of 2023, we were surprised at how rapidly numbers were rising for two winters in a row. The good news leaves us inspired and renewed in our efforts to monitor, protect and conserve Wisconsin's remaining bat population.

The Wisconsin Bat Program continued to revisit many hibernacula not surveyed since before WNS began to affect bats in Wisconsin. In addition to these less-visited hibernacula, we went to our regular subset of approximately 25 sites with our research partners at Virginia Tech. This includes all the largest and most diverse hibernacula in Wisconsin. Despite the good news from the largest hibernation sites, things were not looking as good across Wisconsin's underground bat landscape.

- Only nine sites visited last winter held 10 or more little brown bats, including Wisconsin's three largest hibernation sites.
- Only eight additional sites visited last winter held any little brown bats.
- Only 17 sites held tricolored bats, and just two of those held 10 or more bats.
- One northern long-eared bat was found underground in Wisconsin in the 2023 hibernation season.

We continued to provide logistical support to two research projects with Virginia Tech and the United States Geological Survey (USGS). One continues to investigate a possible vaccine for bats with WNS. We responded to more break-ins, vandalism and theft associated with multiple hibernation sites, some of which occurred during the hibernation period. The Wisconsin Bat Program provided fencing and bat-friendly cave gates at two sites in 2023 and began planning for entrance stabilization and security at one of the state's most important hibernation sites. New "Help Protect Bats at Rest" informational/awareness signs were developed and produced to provide bat protection

guidance at hibernation and roost sites located in places accessed by the public. We also helped develop and fund several bat and hibernacula interpretive signs at Kickapoo Caverns and Mayville Museum's Neda Mine exhibit.

Volunteers helped to clear invasive plants and remove overgrowth to keep flyways accessible around entrances to Neda Mine. The cage-like cupola-style bat-friendly gate covers a 30-foot shaft. Photo: Alison Reinhoffer

Left: Winter work in hibernation sites includes supporting various research projects related to WNS survival and host ecology. Here J. Paul White gently swabs the muzzle of a tricolored bat. Photo: Wisconsin DNR Bat Program

2023 At A Glance: Winter Hibernacula Surveys

- Sites visited: 50
- Bats counted: 62,160
- Bats banded/tagged: 1,000+
- Species encountered: 4
- Counties with hibernacula: 35
- Years since WNS arrived in Wisconsin: 10

Noteworthy:
Numbers are up! Little brown bat numbers have increased significantly at all three of Wisconsin's largest hibernation sites for the second year in a row. Two of these sites hold populations numbering in the tens of thousands. Both sites experienced their eighth year of WNS infection in winter 2022-2023 and had initially dropped to around 20% of their original population. The past two winters saw a rebound in numbers by thousands of individuals.
Despite this positive update, most of Wisconsin's 200 hibernation sites are still not showing signs of growth. Many of the sites surveyed last winter continued to have no bats or just one or two individuals. A few previously occupied sites also dropped to zero. This information is disheartening but expected.

Volunteers At Neda Mine State Natural Area Keep Flyways Open For Bats

Volunteers from as far away as Muscoda and Browntown assembled to clear brush and burdock from the secured adits of UW Milwaukee's Neda Mine SNA, an abandoned iron ore mine in Dodge County. Neda Mine is one of the largest hibernacula for little brown bats in the Upper Midwest. Individual bats may migrate from as far as 290 miles away to overwinter in the site.

The workday was a joint effort between the Prairie Enthusiasts (TPE) and the DNR's State Natural Areas volunteer program, and was led by the Prairie Enthusiasts' Glacial Prairie Chapter. They offered beds and meals to participants the night before, serving up dinner and breakfast before a hard day's work.

The event's focus was on removing vegetation around entrances to the mine where predators like raccoons, hawks, cats and owls take cover and might easily grab bats as they come and go from their roost. Bats are known to avoid sites with dense tree cover, and camera traps show cats and raccoons waiting to hunt bats at the site. Volunteers used saws and gloves to remove shrubs and brush.

The site is protected from human disturbance and for safety reasons, by bat-friendly steel gates, which allow bats the ability to fly freely between bars across the entrances.

Another focus was to reduce burdock populations around the entrances. Burdock is an invasive weed that produces dry fruits, or burs, that are spiky and stick to a bat's fur. The bats can become entangled in the burs and may eventually die. Volunteers wielded brush saws and "Parsnip Predators," a modified shovel used by the Prairie Enthusiasts, to cut the burdock before it produced burs.

Steward Tunnel Repair Plans Recieve Funding Approval

Sections of loose and falling rocks from the ceiling and side walls inside the historic Stewart Tunnel on the Badger State Trail caused the DNR to close the tunnel in 2019 for safety concerns. The tunnel remains closed today while Tunnel Road provides a temporary detour for users to go around the tunnel. The site is also an important bat hibernaculum. $6.6 million is included in the Governor's 2023-25 Biennial Budget for repairing and re-opening the Stewart Tunnel. The DNR initiated the project in the fall of 2023 for Department of Administration (DOA) approval and management (all capital development projects over $50,000 are managed by DOA).

The tunnel project will proceed with repairs consistent with the scope of work described as Alternative 4 – Corrugated Metal Pipe Lining in the Stewart Tunnel Alternatives Analysis Report. This repair allows humans to access the ground level of the tunnel space while overwintering bats remain separate and undisturbed on the ceiling, all while buffering the freeze-thaw cycles that degrade the rock of the tunnel. The plan is similar to the Poe Paddy Tunnel project in Pennsylvania, which saw an increase in both bat numbers and species diversity after the project was completed.

The cave entrance building at Kickapoo Caverns has undergone extensive repairs and cleaning on its journey from a gift shop to a classroom and visitor vestibule. New posters highlight the cave's geology, history and ecology while display cases now contain memorabilia and artifacts from the cave's former use as a place for commercial tours. The cave is open for public tours at least once each summer. Visit Mississippi Valley Conservancy's website for details. Photos: Sarah Bratnober

What You Can Do

When we focus our efforts, we act directly on threats that affect bats. We can all help bats recover their populations and continue to be a beneficial element in our lives.

- Keep hollow trees and old trees with dead branches. These trees are crucial as bat refuges.
- Put up a bat house.
- Create bat-friendly gardens with native plants that are pesticide-free.
- Prevent pet cats from leaving the house because they're excellent predators, impacting both bats and birds.
- Become a voice for bats: speak of how wonderful and necessary bats are for our daily lives.

Did you know that approximately 60% of Wisconsin's 200 bat hibernacula are located on private land? This means that working with private landowners is vital to protecting and caring for our bats and their winter homes. This percentage is mirrored in summer, with around 60% of roost sites (maternity colonies) found on private lands.

Next Page: As of 2023 WNS has affected cave bat populations in Wisconsin for ten hibernation seasons. The WNS fungus is now considered endemic, present in all underground sites throughout the state. Here's a look at some notable moments since WNS was first documented in North America.

A Brief History of White-nose Syndrome and Bats in Wisconsin

2007 — First incidence of white-nose syndrome in New York State

2008

2009 — Wisconsin lists four cave bat species as state-threatened, providing greater protections

2010 — The Wisconsin Bat Program starts bat surveys to gather baseline data about bat populations in WI

2011 — US Fish and Wildlife Service starts a National WNS Response Plan

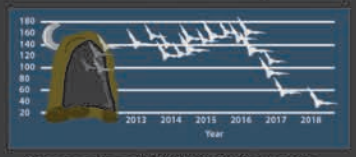
2012 — DNR Bat Program begins long-term partnership with WNS researchers from Virginia Tech Institute and UC Santa Cruz

2013 — White-nose syndrome first found in Wisconsin

2014 — First declines in WI hibernating bat populations observed; 14 caves and mines infected

2015 — Northern long-eared bat listed as federally threatened

2016 — First white-nose syndrome treatment trials in Wisconsin



Cave where WNS first found in Wisconsin houses 9 bats from a historic population of 1,000

First declines observed in some summer bat populations

2017

2018 — White-nose syndrome considered endemic in Wisconsin

Little brown bats rarely found outside of Wisconsin's three largest hibernacula. The only other cave bats found regularly in winter are tricolored and big brown bats.

2019 — Understanding survivorship, immigration and site fidelity becomes increasingly important; WDNR partners with USGS and Virginia Tech to mark 1,000+ bats to begin investigating survival and movement.

2020 — Observed increases in little brown bats at some summer roosts. Marked bats return to summer sites yearly suggesting some bats are surviving white-nose syndrome infection.

2021 — Measurable increases in little brown bat population at Wisconsin's largest hibernation site

2022 — Northern long-eared bat uplisted to federally endangered by US Fish and Wildlife Service

2023 — Tricolored bat proposed for listing as federally endangered by US Fish and Wildlife Service

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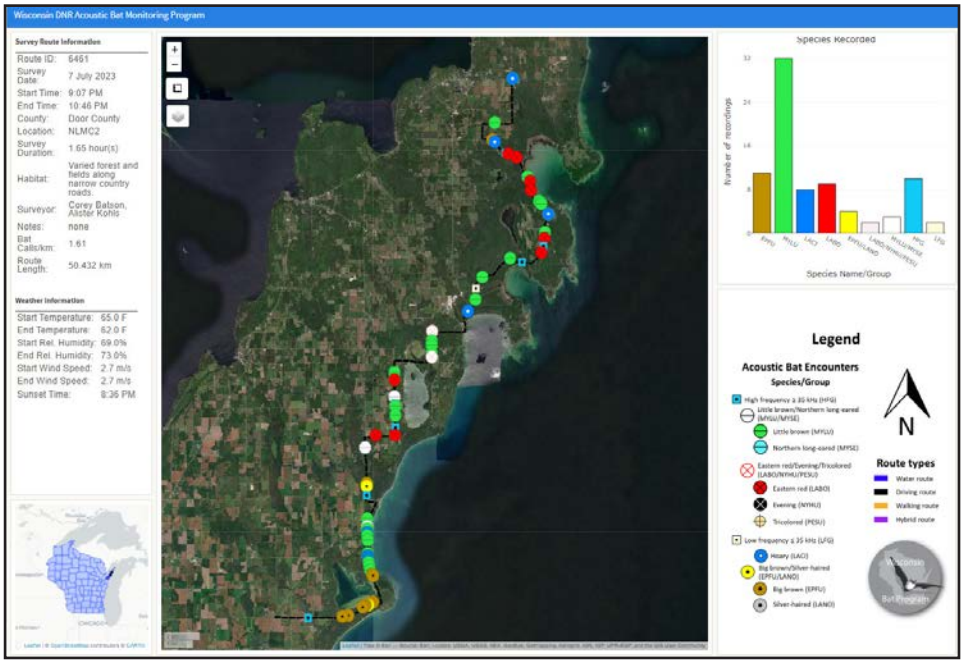
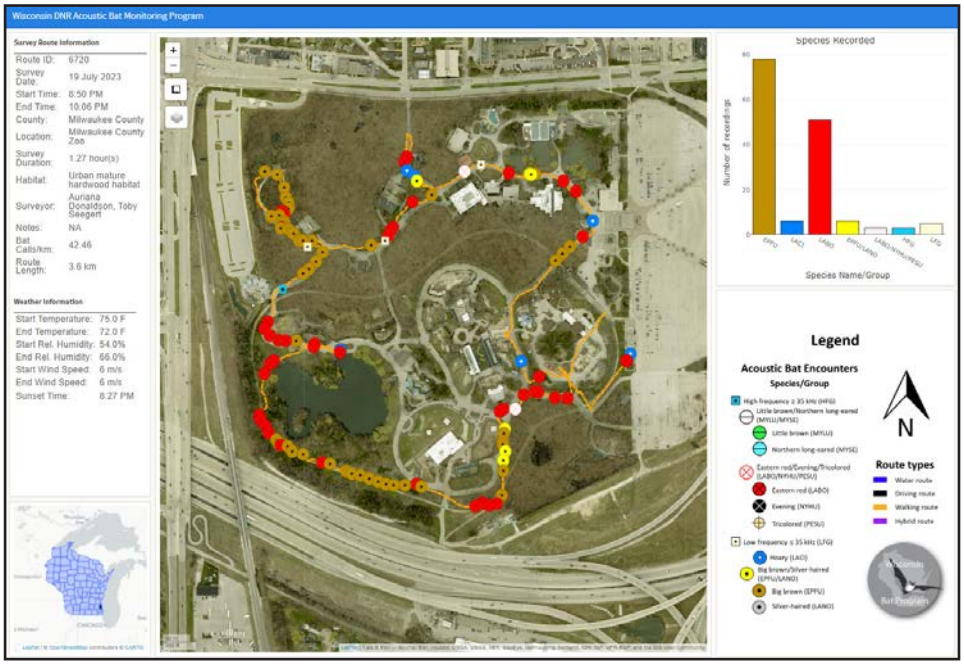
Acoustic Monitoring Update

The Wisconsin Bat Program's "electronic ears" were listening for bats in a big way in 2023. The acoustic bat monitoring project had one of its most productive years of surveying with over 400 acoustic bat surveys completed in 49 counties by 235 participants. Courtesy of the great volunteers and coordinators from North Lakeland Discovery Center and the Vilas County Land and Water Conservation Department, Vilas County had the most surveys completed, with 93! Statewide there were 158 driving surveys, 143 water surveys and 100 walking surveys. We welcomed new coordinators in Milwaukee and in the west-central part of the state in Vernon County. One big change in 2023 for the acoustic bat monitoring project was how we create maps of survey results. So that key personnel could focus on other priorities, we needed to find a way to create these results with limited resources. We partnered with computer scientists from the Midwest Bat Hub (MBH) at the University of Illinois Urbana-Champaign to create an application to help streamline the map-making process. Perhaps the biggest change, aside from being able to make a map within minutes of data processing, is the new bar graph in the upper right (see acoustic map graphics), indicating the number of species encounters or species groups recorded during the survey. We are very grateful to those who waited patiently for your results this past year and to our partners at MBH for creating this game-changing mapping app!



Above: Results from a July acoustic bat driving survey in the Door County Peninsula; produced by the new mapping app.
Below: One of many walking acoustic bat surveys held at the Milwaukee County Zoo in 2023. Three bat species were detected on this late July survey – big brown bat, hoary bat and eastern red bat.



In total, acoustic bat surveys recorded 19,143 bat calls during 34,256 minutes (571 hours) of survey time. Surveyors spent, on average, 85.4 minutes (1.4 hours) per survey, and when we adjust by removing DNR staff and Federal employees, the amount of volunteer hours is just under 700 hours! When that number is multiplied by the National Volunteer Rate of $31.80 (University of Maryland's Do Good Institute), the calculation projects the 2023 costs of volunteers for the acoustic bat project at $22,241.50. This monetary calculation doesn't even consider

the value of the bat data that were collected on our rivers, roads and trails.

The most detected bat species by survey are: hoary bat (80.0%), big brown bat (73.8%), little brown bat (61.8%), eastern red bat (61.6%), silver-haired bat (42.9%), evening bat (2.2%), tricolored bat (1.5%) and northern long-eared bat (0.5%). The average species diversity was 3.2 bat species per survey.

While it's discouraging - albeit expected due to white-nose syndrome - to observe low rates of detection for the tricolored and northern long-eared bats, we are encouraged by the detections of little brown bats. The high detection rate of little brown bats can be attributed, in part, to where surveys are taking place. For example, 85% of water surveys had at least one little brown bat detection with an average of 13.8 detections per survey. Compare this to other survey methods, where walking surveys found little brown bats on 23% of surveys (average 1.8/ little brown bats/survey) and driving surveys found little brown bats on 65% of surveys with an average of 2.4 little brown bats/survey.

Wildlife biologists use acoustic bat surveys to assess bat activity, and it's one of the preferred methods of sampling as it's a low-cost/non-invasive tool for collecting data on occupancy and abundance. Acoustic bat surveys have been used to describe bat activity at solar energy projects, wind energy facilities, apple orchards, cranberry marshes and even near prairie dog colonies. The application of this technology seems endless. All Wisconsin-collected bat data are entered into the North American Bat Monitoring Program database where they can be used to understand where, when and how bat populations change over time. Most recently, data from the acoustic bat monitoring project were used to assess each bat species' rarity to inform Wisconsin's Wildlife Action Plan, which focuses on the conservation of rare and declining species and their habitats.

2023 At A Glance: Summer Acoustic Surveys

Surveys conducted: **401**
Volunteers: **235**
Volunteer hours: **700**
Bat calls recorded: **19,143**
Most detected bat species: **Hoary bat**

Thanks to the great many people who volunteer for the acoustic bat monitoring project, we now have a better understanding of Wisconsin's bat population. These dedicated volunteers capture the silent pursuits of the hoary bat, the feeding buzzes of the little brown bat and the social calls of the big brown bat. All these voices are unheard, untallied and understudied without the commitment of those who survey bats.

Lakes State Forest Management Bat Habitat Conservation Plan

In early 2023, the Wisconsin DNR, in partnership with the Minnesota DNR and Michigan DNR, finalized the Lakes State Forest Management Bat Habitat Conservation Plan (Bat HCP). The Bat HCP accompanies an incidental take permit issued by the U.S. Fish and Wildlife Service to the Wisconsin DNR to cover accidental take (harm, harass, kill) of forest bats that may happen during timber harvest and other forest management activities. Some bats in Wisconsin (little brown, tricolored and northern long-eared bats) are severely affected by white-nose syndrome and rely on forests for roosting and foraging in summer. Destruction and removal of required summer habitat can be an added stressor to already suppressed populations of forest bats.

The Bat HCP details conservation actions and efforts that the DNR will take to reduce the negative impacts that forest management activities, such as timber harvest, could have on bats. The plan protects forests in locations where bats are known to congregate, such as winter hibernation sites and summer roosting areas. It generally retains a percentage of the forest cover during timber harvests, ensuring habitat continues to be available to bats.

Through the Bat HCP Landowner Enrollment Program, the Wisconsin DNR can partner with county, private and other non-state landowners to provide incidental take coverage of bats during timber harvest in exchange for implementing conservation actions intended to protect bat habitat. To date, several County Forests and private landowners have enrolled and started the planning process for protecting bats and bat habitat in their forestlands. Information on eligibility and enrollment in the Bat HCP Landowner Enrollment Program can be found on the Bat HCP website. We look forward to working with more landowners to help protect bats and their habitat across the state.

Wisconsin Bat Conservation Flashback

Banding efforts continue to this day but most bands are now accompanied by PIT tags injected underneath the bat's skin. The tags are read by scanning antenna that logs the arrival and departure of bats without the need for biologists to lay eyes on the individual at certain hibernation or roost sites. Photo: Wisconsin DNR Bat Program

A Wisconsin bat research story, *On the Trail of the Bat*, was originally published in *Popular Mechanics Magazine* in January 1950. To provide some context, it was featured in the magazine along with an article about bringing colorized television to homes and a sneak peek at new movable plastic ice cube trays that could be taken in and out of the freezer. Read the original article on Google Books here: https://tinyurl.com/yttt8sr8

On the Trail of the Bat highlights the work of Fred Greeley and Dr. James Beer of the University of Wisconsin in trying to locate hibernation sites for the estimated one million bats they and others observe in Wisconsin each summer. Greeley and Beer search caves in Wisconsin for the 6500 bats they've banded, taking the article's author with them. Greeley and Beer find mostly male bats in caves in winter, and relatively few bats compared to the many female bats observed in maternity colonies on the summer landscape. They attempt to locate the "missing" bats in underground sites in Wisconsin and neighboring states. Much of the article describes common bat ecology and adaptations and photos included with the article show Greeley and Beer removing bats from cave ceilings in preparation for applying aluminum wing bands.

Commentary by J. Paul White, Mammal Ecologist and Bat Program Lead

In 1950 very little was known about Wisconsin bats. This is why University of Wisconsin-Madison Zoology graduate students James Robert Beer and Frederick Greeley began with a primary objective – connect the winter habitat where bats hibernate to the summer habitat where female bats birth their pups. They noticed the difference in the estimated number of bats observed at maternity colonies in summer compared with the relatively few bats known to hibernate in the state. Given the tools at their disposal, it proved unbelievably challenging to try to

make these habitat connections.

In the age before social media and crowdsourcing, and under their advisor, Aldo Leopold, Greeley and Beer began requesting locations of batsbat locations from the public to help answer this question. Between 1947 and 1948 articles were published in the Milwaukee Journal, the Waukesha Daily Freeman and even Popular Mechanics describing their research and encouraging the public to contact them with information about bats.

In 1947, the zoologists had begun marking bats with a U.S. Bureau of Biological Survey-issued small, aluminum band in large numbers in many winter hibernacula throughout Wisconsin. The effort was part of the Bat Banding Program which was administrated, coordinated and maintained by the U.S. Bureau of Biological Survey in the Department of Agriculture and its successor, the U.S. Fish and Wildlife Service in the Department of the Interior from 1932 to 1972. Many active banding projects included state agencies, scientists and their students in the United States and other countries where the Program issued more than 2 million bat bands, of which 1.5 million bands were applied to 36 species of bats. Throughout the life of the Bat Banding Program, more than 6,000 bands were applied to Wisconsin bats, most by Greeley and Beer.

Despite that high level of effort, connecting summer to winter habitats remained nearly impossible. Greeley and Beer did, however, learn that a small percentage returned the following year to the same wintering site and, with the help of homeowners, they found two summer sites - one at 41 miles and another at 69 miles straight-line distance from where they banded in the winter. The sex ratio discrepancy cited in the article, which they hoped to answer, remained a mystery. The few linkages they made from winter to summer banding records were a disappointing sample size.

Fast-forward to today and the newspaper headlines could again refer to a "Scotland Yard" mystery regarding bats. Even given all that we've learned about bats and all the technology and ways to track and keep tabs on wildlife, that connection of overwintering and summer roost sites remains difficult to elucidate. However, with so many partners and state natural resource agencies involved in bat research these days, including UW-Madison, the answers continue to slowly trickle in, almost 75 years later. Although one could argue the mystery today is more about what bats (and how many) will survive the deadly fungal disease white-nose syndrome (WNS) rather than how the landscape is connected.

Although one could argue the mystery today is more about what bats (and how many) will survive the deadly fungal disease white-nose syndrome (WNS) rather than how the landscape is connected.

Nevertheless, how bats use Wisconsin's landscape and the connections between the winter and summer sites are critical to the reproduction and survival of bats. In addition to banding, useful modern-day bat tracking tools include radio-telemetry tags, GPS tags and Passive Integrated Transponder (PIT) tags. Bands are still used in combination with the other marking methods and the DNR and partners have marked over 10,000 bats since 2010. Through this endeavor, we are starting to make those connections that Greeley and Beer tried to make so long ago. With the help of PIT tags and automated readers, we have recorded ten separate "summer to winter" movements since the readers were first activated in 2020. We get information on the timing of departure and arrival and can even calculate the speed bats traveled. These pieces of natural history are incredibly important to the management and protection of bats decimated by a fungal disease.

With a cryptic, fast-flying, nocturnal animal the answers do not come easy. Greeley and Beer learned that, and our program understands the challenges faced when studying these mammals. Despite new technology and learning from past projects and experiences, the task remains the same. First, locate and protect winter habitat, of which there are only a finite number in Wisconsin that have specific conditions conducive to hibernation in a sub-zero landscape. Second, identify summer habitat because suitable foraging and roosting sites are needed to raise pups within a few short summer months. Finally, bridge the gaps between the two habitats to uncover stopover areas, migration timing and corridors to learn what areas need protecting for WNS survivors and juveniles taking flight to their first hibernation season.

At present, the Wisconsin Bat Program stands on the shoulders of giants with Wisconsin ties who paved the way for bat research and conservation, whether it was Aldo Leopold, Merlin Tuttle, James Beer, Charles Long, Kent Borcherding, David Redell or a great many volunteers who have collected data and helped us learn about bats. We are extremely grateful for their contributions and will continue to work in their honor to promote knowledge, appreciation and stewardship of bats in Wisconsin for present and future generations.

DONATE

To The Endangered Resources Fund

Photo: Wisconsin DNR Bat Program

Conservation works better together.

We're so grateful for your generosity with your time and expertise. In addition to our volunteers and partners, our work is supported through the Endangered Resources Fund. Each donation is matched dollar for dollar by the state, and there are three ways to give:

- Tax Check-off Donations: When filing your state income taxes, look for "Endangered resources" on line 23a in the "Donations" section of the tax form.
- Endangered Resources License Plates: A $25 annual donation through your vehicle registration gives you the choice of a wolf or eagle license plate. During 2024 all new plates get a $25 rebate on their donation.
- Donate Online, Select "**bats**": We accept VISA, Master Card, American Express, Discover and eCheck.

Learn more on the DNR's Endangered Resource Fund webpage: https://dnr.wisconsin.gov/topic/EndangeredResources/endangeredresourcesfund