NABat

Celebrating a decade of collaborative bat monitoring across North America

By Annika Hipple

A northern long-eared bat (*Myotis septentrionalis*) rests on a rock.
Photo: J. Scott Altenbach

The population of northern long-eared bats (*Myotis septentrionalis*) has declined up to 99% in some hibernation sites due to the devastating effects of white-nose syndrome (WNS), which is caused by the *Pseudogymnoascus destructans* (*Pd*) fungus. The species may have declined in silence if not for a game-changing collaborative data-sharing effort that began 10 years ago: the North American Bat Monitoring Program (NABat). Thanks to data collected through NABat, the species is now listed as Endangered, and conservation efforts are underway. Another species, the tri-colored bat (*Perimyotis subflavus*) has been proposed to be listed as Endangered thanks to data collected by NABat. "NABat is a continent-wide monitoring program established to determine the status and distribution of bats and track that across time so that we can determine which species may be in trouble and those species that are doing well," says Susan Loeb, Ph.D., a research ecologist with the United States Forest Service (USFS), who is one of the founders of NABat.

"NABat has direct implications for making regulatory decisions."

—WINIFRED FRICK, PH.D.

Photo: Rachel Harper

Turns

A team of scientists swab bats in caves in Texas Hill country to monitor the spread and impacts of white-nose syndrome on hibernating species.

Team members conduct field research to collect data that will be shared via NABat.

Photo: BCI

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In 2015, Bat Conservation International (BCI) joined a multinational coalition of government agencies, conservation organizations, academic institutions, and other stakeholders to launch NABat. The initiative grew out of the national response to white-nose syndrome, which bat conservationists were able to detect and address rapidly thanks to pre-existing monitoring programs for federally listed Endangered species in the region. Researchers realized that other bat populations face a variety of issues, such as wind energy development, that also require consistent monitoring, so they worked together to create NABat to gather and share this data.

"Ten years is a really big milestone because that also means we have 10 years of data and enough for some species to have really meaningful looks at what's going on," says Amanda Adams, Ph.D., BCI's Director of Research Coordination. "That's the whole point of it: to be able to understand what's going on with North America's bat species on this really large scale, essentially across their entire range."

Thanks to NABat, researchers and conservationists now have a forum for sharing and monitoring data, enabling them to gain a more complete picture of the status and distribution of bat populations across the continent. This information can then be used to design and implement more effective conservation measures, such as with the northern long-eared bat.

"NABat has direct implications for making regulatory decisions," says BCI Chief Scientist Winifred Frick, Ph.D. "It also impacts the ability to look at different scales, like looking at when conservation actions are benefiting species or when species might be in decline and need urgent conservation attention."

Working together to collect data
NABat utilizes four types of data collection methods to monitor bat distribution and abundance: Stationary

acoustic surveys in key locations, mobile acoustic surveys along roads, winter hibernaculum counts, and maternity colony counts.

To facilitate collaboration and consistency, eight official Bat Hubs provide support to a partner network in their data collection efforts. This support includes lending bat detectors, providing data collection training, answering questions, and connecting partners with resources. BCI runs two of these hubs: the PacWest Hub (California and Nevada) and the Southwest Hub (Arizona and New Mexico). While data collection is currently primarily in the United States and Canada, NABat organizers hope to eventually expand into Mexico and beyond.

At the heart of NABat is an extensive network of partners who contribute data and tools for monitoring. The NABat network includes more than 480 groups, including state agencies, federal land managers, Native American tribes, and nonprofit organizations. The U.S. Geological Survey (USGS) coordinates the program, and USFS remains one of the largest contributors of monitoring data after helping to establish NABat. BCI is also piloting a community science program through the PacWest and Southwest Hubs.

One of BCI's key roles involves processing much of the acoustic data submitted through NABat. Federal partners also worked with BCI and Conservation Metrics, Inc., to develop the National Data Processing Laboratory, which is a pipeline for processing acoustic data collected by the stationary and mobile acoustic surveys. And in Canada, NABat involves partners like federal and provincial governments, environmental organizations, and First Nations groups, as well as community scientists interested in doing acoustic monitoring. Some Canadian libraries even have bat detectors available for loan. "The beauty of NABat is that really anyone can do it," says Jordi Segers, NABat Coordinator for Canada. "I think to a large extent, NABat thrives because of community scientists."

Open data provides key to success
The power of NABat is that it is a clearing house for multiple types of data, which allows researchers and conservationists to see a more complete picture. Before, scientists would have to piece together data from individual projects published in a variety of locations. Now, a researcher can log into NABat

NABat by the Numbers

8 Regional NABat hubs

480+ Partner organizations in U.S. and Canada

47 North American bat species in database

170,000,000+ Bat-related data records

and find data from a variety of sources all in one place.

Most bat species in North America have large ranges, which span many political jurisdictions. Additionally, migratory species cross state, provincial, and sometimes national borders when making their seasonal long-distance movements. Even at a nightly scale, some species will forage over large geographic areas. With such extensive movements across the landscape, a broad and coordinated monitoring effort is imperative for understanding species' populations and making informed management decisions to implement effective conservation actions.

"To really understand what is going on at the local scale, we have to understand what's going on at the regional and continental scale," Loeb says, pointing out that the monitoring can help scientists piece together data in different locations to observe broader trends. "Several scientific papers have come out using NABat data that have shown that some species are really declining. We are able to show a continent- or partial continent-wide strong decline of these species."

Data from NABat is also helping to inform decisions on energy development such as wind turbines. "A focus on migratory bats in NABat data is starting to help us understand their population trends," Segers says. "How badly are they affected? Where are they affected? What are the variables that can help us predict whether and where these migratory bats are going to be most affected by wind energy so that it can ultimately inform government management decisions?"

Sharing data is a vital part of this effort, and NABat is helping researchers access a wide body of data, which can even help solve ecological mysteries.

"We're constantly striving for open data sharing and creating community around getting information into people's hands," says Brian Reichert, NABat Program Coordinator at USGS. "We have status and trends for 14 different species currently, and we're working on some new modeling approaches that will allow us to be able to estimate status and trends for the vast majority of the species that occur in the U.S. We're also very close to finalizing some status and trends work for migratory tree bats, which has been an ongoing conversation for 20 years now."

Migratory tree bats are a challenge to study, but NABat is a key element in gathering enough data to help researchers put all the puzzle pieces together.

"There's been a lot of figurative head banging around how we get status and trends for migratory tree bats," says Bethany Straw, NABat Assistant Program Coordinator and a USGS Biologist. "They present particular challenges because of their ecology and life history. We are now delivering on what has felt impossible for a decade or two."

Celebrating a decade and looking ahead

Over the 10 years that NABat has been in existence, large-scale investment has built a strong foundation of data collection and analysis that can be used to

State of the Bats Report

NABat collaboration led to an in-depth assessment

Thanks to NABat collaborations, more than 100 scientists in Canada, Mexico, and the United States joined together to create the *State of the Bats Report*, which was published in 2023. The report analyzed the conservation status and threats to North American bats and determined that 52% of North American bat species are at risk of severe population declines within the next 15 years and require conservation action.

make informed conservation and management decisions. The challenge now, Frick says, is "to be able to ensure that we can capitalize on that investment and sustain the program and make sure that it continues to have both government and partnership support."

The value of programs like NABat is the consistency they bring to data collection, processing, and analysis—all elements whose continuation will be vital for understanding what is happening with bat populations in the coming years.

"We're actually seeing an increase in one of our Endangered species, the gray bat (*Myotis grisescens*)," says Adams. "We can see that because of data from NABat. If we're ever able to delist a bat species—which would be amazing—it's going to be because we have the data."

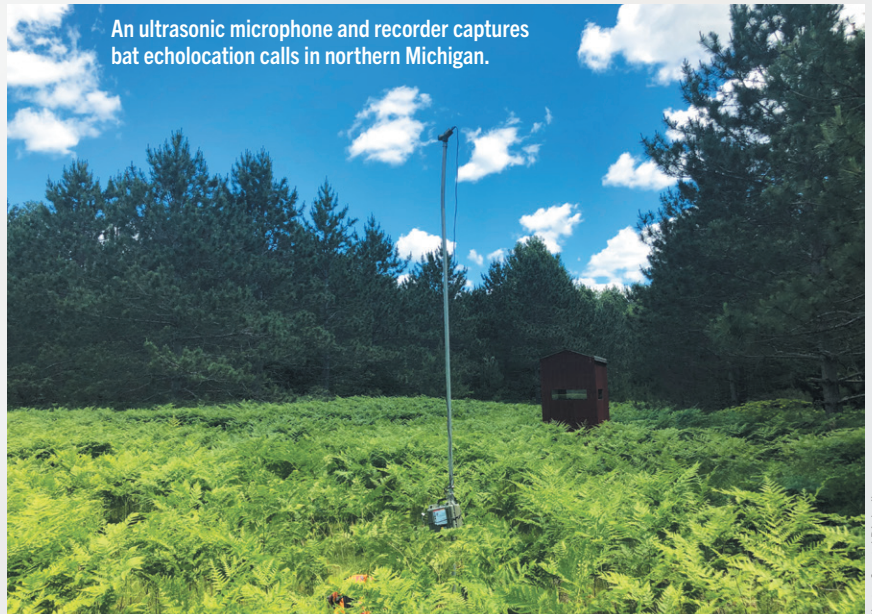An ultrasonic microphone and recorder captures bat echolocation calls in northern Michigan.

Photo: Crystal Birdsall