

Professor seeks to increase awareness, monitoring of declining bat populations in Maine

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Credit: Maine Audubon

Erik Blomberg, assistant professor in the Department of Wildlife, Fisheries, and Conservation Biology at the University of Maine, wanted to bring the massive declines in bat populations to the public's attention and to educate residents about the extensive services that the animals

provide to humans.

He also wanted to improve monitoring methods used by researchers to evaluate Maine's [bat populations](#) in order to increase efforts to conserve them.

And he wanted to do so by involving citizens.

After attending a conference in Portland, Maine, Blomberg created a pilot citizen science-based bat-monitoring project, named BatME. The goal was to test the feasibility of using handheld detectors to monitor bat populations in Maine.

He proposed the project to officials at the Maine Department of Inland Fisheries and Wildlife, who immediately showed interest. Blomberg then teamed up with Maine Audubon, an organization that works to conserve the state's wildlife habitat by engaging people of all ages through education, conservation and action, who already had volunteers working on a variety of projects.

During two months in summer 2015, 20 volunteers collected more than 4,000 detections of bats with hand-held bat detecting units produced by Wildlife Acoustics.

"The project provides an interface that gives volunteers a uniquely interactive experience with bats while collecting data," said Blomberg.

The new equipment—purchased with funding from the Maine Outdoor Heritage Fund—included an acoustic microphone that attaches to an iPad and simultaneously records bat echolocation calls and identifies the species of bat. The application quickly translates the call into sounds the human ear can interpret (bats use ultrasonic sound to navigate.)

"It struck me that with a lot of other wildlife, like birds in particular, we can enlist the help of nonscientists for monitoring because they (birds) are very visible and you can hear them. There is this interactive component that people get excited about, whereas with bats, which fly at night, we might not be able to hear or see them unless you are really skilled at that," says Blomberg.

"So bats really lacked in that interactive mechanism for people to get excited about. Now we have a piece of equipment that would make that possible. When I saw the hand-held monitoring devices I thought, 'This could be a great tool for a citizen-scientist project.'"

On Oct. 25, Blomberg gave a presentation titled, "Monitoring Bat Populations in Maine: New Strategies for Citizen-Science Data Collection," which discussed the innovative project aimed at identifying bats in Maine to increase understanding of the mammals that's populations are plummeting rapidly. The discussion was collaboratively sponsored by the Friends of Dr. Edith Marion Patch and the Orono Bog Boardwalk.

Maine is home to eight species of bats, three of which are proposed for state listing as threatened or endangered. The eastern small-footed bat is listed in Maine as threatened, the little brown bat and the northern long-eared bat are listed as endangered in Maine and threatened under the U.S. Endangered Species Act.

The declines in [bat species](#) have been attributed to white-nose syndrome, a disease caused by the cold-loving fungal pathogen *Geomyces destructans*, which awakens cave-dwelling bats from hibernation.

The fungus accumulates on the bats' muzzles and weakens the delicate membranes of their already paper-thin wings. Researchers believe the fungus irritates the animal, causing it to come out of hibernation.

Waking in the middle of hibernation leaves the bat extremely vulnerable—resulting in wasted precious metabolic energy and body fat, both which are vital during the coldest months of winter. The bats are unable to raise their body temperatures high enough, resulting in death.

The disease was first documented in upstate New York in 2006, when residents began to notice bats flying far from their caves, in the dead of winter, during the day—all extremely uncharacteristic behaviors.

When biologists found thousands of dead bats in a cave near Albany covered in a fuzzy-looking, white dust, their concerns deepened.

The disease rapidly spread throughout the Northeast, leaving in its wake millions of dead bats. It has resulted in unprecedented wide-range declines in populations of cave-hibernating bats across the country, with some species experiencing a 90-percent population decline the last five years.

It wasn't long before the fungus knocked on Maine's door, with the first outbreak identified in Oxford County in 2011.

Next year, Blomberg hopes to allow volunteers to check out equipment from UMaine or the Maine Audubon—based out of Falmouth—to expand the range of monitoring and data collection.

He also plans to further standardize the sampling by asking volunteers to return to the same locations multiple nights in a row, which would help to detect bats that were missed the first night of sampling. This is important for species of greater concern, such as the little brown or the northern long-eared bat, says Blomberg.

"There are not that many of them out there anymore, so the chances that a volunteer would go out on a night and detect one is very slim," said

Blomberg. "Sampling multiple nights increases the probability."

Blomberg pointed the volunteers toward areas that were common "bat-y" places—open areas, wetlands and places where there are lots of insects. Then volunteers wandered around until they heard the exciting beep of the bat detector.

"We had volunteers go all over. Some took the detectors in their boats to the middle of lakes. Some were just walking around in residential neighborhoods. Some went to quarries or wetlands. They really surveyed a variety of places."

"Every person that used the detector, loved it," he says. "I mean, it's fun to walk around in the dark and all of the sudden all these lights start flashing and it tells you what species of bat you have detected."

The utility of this method, says Blomberg, is that it allows researchers to collect data in places they wouldn't if they were using traditional methods for bat monitoring.

The only true flying mammal, bats are nocturnal and stalk their prey at night, swooping and diving after moths, beetles, mosquitoes and flies. Bats locate prey by refracting sound off their surroundings, a system called echolocation. Dolphins also use this strategy.

A lot of the bugs that bats eat are insects we don't necessarily want around, says Blomberg, such as common crop pests and disease-spreading mosquitoes.

In a study published in spring 2011 in *Science*, researchers estimated that bats annually provide more than \$3.7 billion in pest-control services to the agricultural system in the United States. Some bat species also aid in seed dispersal and the pollination of flowers.

"Even in Maine, that study is estimating that by a county-to-county basis, bats are providing millions of dollars of services to us in a given year," says Blomberg. "So when you think about declines in bat populations, this means fewer bats and fewer insects being eaten by the [bats](#)."

Provided by University of Maine

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