

# Volunteers help track endangered, enigmatic bonneted bat

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The mysterious Florida bonneted bat, a creature so elusive that biologists know of only one roost in the wild, is actually a chatterbox, far easier to hear than see.

And for that information we can thank citizen scientists. Over the past year, they recorded thousands of calls, erected bat boxes and scoured the county to paint a new picture of the under-appreciated bats and lift the veil on one of the state's most critically endangered species.

Props also go to chance, for putting the bats within earshot of a cutting-edge bat researcher having a glass of wine in her backyard.

"Who would have thought?" said volunteer Alfonso Perez, an attorney helping create a nonprofit to support more research. "If we just sit back and smell the roses, there's a lot of things going on."

All the attention has generated some star treatment for the bats: their own Facebook page, parties and a corporate sponsor. Much of that can be credited to biologist Kirsten Bohn, an expert in bat songs, who began organizing outings - part party and part expedition - to collect data on the enigmatic bat, which has dwindled to a South Florida population numbering in the hundreds.

With their iPads and smart phones programmed to pick up high-frequency chirps, volunteers trained by Bohn located the first roost ever documented in Southeast Florida near the Gables Granada Golf Course

in September. Her team also recorded more than 20,000 calls, providing a trove of new data that shows the pug-nosed bats feed and sing like no other bat in the United States, in a range much larger than previously suspected.

On a recent Wednesday night, Zoo Miami wildlife veterinarian Frank Ridgely released the first bat raised from infancy. If all goes well, a tracker attached to the bat could let Ridgely observe its behavior in the wild.

All this new research could ultimately help federal wildlife managers now considering conservation plans for the bat. The U.S. Fish and Wildlife Service, which added the bat to the endangered species list in 2013 - the first bat in 25 years - is expected to propose a critical habitat by the end of the year and ask for input from the public and experts.

Habitat protocols could help avoid potential problems like the scene now playing out at the Granada course, where Coral Gables launched extensive restoration work last month that includes trimming trees and removing grass without contacting federal officials. The city's chief of landscaping, Brook Dannemiller, said the project manager checked with state officials, who signed off on the project, leading the city to believe the work would cause no harm.

But Bohn, who alerted federal agents, worries that bats with pups could roost in the trees. Stripping the grass could also affect the bugs they eat. Service spokesman Ken Warren said the agency is looking into the matter.

If the bats are to survive, Ridgely said more aggressive steps must be taken to protect them, including surveying parks throughout the county that could take the place of lost habitat.

"The forest is never coming back in most of Miami-Dade County," he said.

Conservation of bats has become more urgent in recent years with the spread of White Nose Syndrome, a fatal fungus, and a rise in wind turbines. Up to 2 million bats die each year, threatening a critical link in America's food production. Some bats pollinate plants - imagine a world without mangoes, avocados and guava. Others, including the bonneted bat, consume massive amounts of insects that farmers, and mosquito control districts, would otherwise battle.

Florida's bonneted bats, which are not known to contract White Nose and risk little injury from turbines, face bigger risks from pesticides and habitat loss. Because they are large and fly high, the bats need plenty of room to maneuver. Their perilously low numbers could indicate just how little open space remains in South Florida.

"Bonneted bats are like a bullet or a jet airplane," Ridgely said. "They are built for speed and go in a straight line."

That behavior also makes them hard to study. Try spotting a bullet 30 to 40 feet high in the air. In the dark.

Bohn knew little about Florida's bonneted bats, officially *Eumops floridanus*, when she arrived in Florida after studying in Texas and traveling largely in South America to record free-tailed bats for her research on communication. In 2014, she helped author a pioneering study that used mathematical equations to first document bat singing.

In the study, scientists used the calls of several species, including free-tailed bats, Carolina chickadees, orangutans and pilot whales. For a human sample, they recorded a reading of "Hamlet." It turns out the clicks and chirps that can sound like change jingling in your pocket are

more like a chorus of songbirds.

Bats, the study found, don't just chirp to get their bearings or find food, they also sing to flirt, fend off other males and call to their young. They sing from their nests and they sing when they fly. Like humans, they may have a language.

To hear most bats, calls need to be amplified using a microphone. But the bigger, lower frequency bonneted bat can usually be heard by most people, though not all. "Too many Motley Crue concerts," said Ridgely, who can't hear the calls without a microphone.

To study the bonneted bats, Bohn, who recently left Florida International University for Johns Hopkins University, first erected recorders on the Granada golf course. Amazed at the volume of calls, she began installing song meters around the county in large open areas where bats might forage - at Fairchild Tropical Botanic Garden, the Deering Estate and along the Ludlam Trail. The bats historically lived in pine rockland, where the sparse pine canopy let them cruise unimpeded. But with most rockland now gone - less than 2 percent of the historic range outside Everglades National Park remains - the bats adapted to become urban bats foraging in whatever open space they could find, like the parking lot around Zoo Miami.

Among Florida researchers, the Granada Golf Course was a well-known feeding ground. For Bohn, a move to the neighborhood in 2012 was serendipitous.

Within weeks, Bohn heard their songs, began recording them and recruited grad student Giselle Hosein. When neighbors read about their work in the Miami Herald, they contacted Bohn, who formed the Bat Squad to help collect data. At their first bat night at the golf course, Bacardi - the brand's logo includes a bat - provided free rum as hundreds

wandered around the darkened course or sat in lawn chairs gazing into the night sky.

"This is so up my alley," said Ken Willis, who attended another bat night in May. "We know so little about them and they're here. The bats. The foxes. They were here before us and they're here amongst us."

In the past year, Bohn and volunteer grad students analyzed about 25,000 calls and logged the comings and goings of bats from the roost - first reported in the 1980s but not confirmed until Bohn and Ridgely studied it - in the eaves of a house a block away.

The data helped paint a new picture of the urban bats. Bohn found the bats call at a much lower frequency and over bigger distances than Brazilian free-tailed bats, another species plentiful in South Florida. That discovery alone, Bohn wrote in a memo to federal officials, could make a critical difference in how bats are surveyed, because it makes them far easier to identify if microphones are set at the right frequency and correctly placed.

"Basically using acoustic monitoring is the best way to go," Bohn said. "You can have a Eumops flying by and I'll pick that bugger up."

Bohn picked up their calls "all over (southern) Miami-Dade County, but in very low numbers," she said, suggesting the long-lived bats travel farther to forage than previously suspected.

Bohn also found the bats roosting and feeding in Coral Gables were sensitive to temperature, emerging from their roosts only on warm nights. Surveying during colder months, she said, could give inaccurate information.

Without funding, Bohn was unable to complete more thorough research.

"I could write a 20-page paper, but I'm doing this on a volunteer basis," she said.

In an email from Honduras Saturday, she was optimistic that volunteers would carry on, organizing bat watches and installing boxes to provide more data so she could continue her research.

So far, Bohn's acoustic findings could help define hot spots like the Granada Golf Course, said U.S. Fish and Wildlife Service biologist Paula Halupa. But Halupa said findings on roosting patterns would need more research.

"If we can focus on areas where we know they're at and the surrounding areas, we can minimize the risks to the species," she said. "So it's all good stuff."

Halupa said she was not surprised by the extent of the bat's range: "A lot of times people don't find [bats](#) because they don't take the time to look. It's not easy work."

The intense public interest came as a pleasant surprise.

"It's awesome that people in their own backyards ... can see this and have enough interest to collect data," she said. "Our agencies are too small and too overwhelmed with day-to-day crises and we need to rely more on citizen scientists."

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