



## Bat Population Monitoring and White-nose Syndrome

### Why is Cape Cod National Seashore interested in bats?

Bats are an important part of ecosystems and food webs. They consume huge numbers of insects every night, filling a unique ecosystem role as nocturnal insect predators. Unfortunately, a new disease called white-nose syndrome is affecting bats across the United States. To better protect bats, the national seashore is working to understand how local bat populations are changing.

### How do bats contribute to ecosystems?

Due in part to their massive appetites, bats are a valued component of biodiversity. Bats can eat more than half their body weight every night—that's hundreds to thousands of bugs! Some of these insects, such as mosquitoes, can transmit human diseases. Others can be agricultural or forest pests. Scientists estimate that bats save U.S. farmers almost \$3.7 billion per year by eating crop-destroying insects.

### What habitats do bats need?

During the summer, bats use a variety of forests, fields, and wetland habitat for foraging. Buildings and live and dead trees are needed by many species for roosting and raising their young. Bats that hibernate need secure caves, mines, buildings, or rock outcrops during winter seasons.

### What's white-nose syndrome?

White-nose syndrome is a bat disease caused by the fungus *Pseudogymnoascus destructans*. The disease is named for the white fungal growth that occurs on bats' faces and wings. The fungus was first observed in 2006 in a New York cave and is believed to have originated in Europe. In the Northeast, the disease has reduced some bat populations by more than 90%.

### Which bat species get the disease?

Many species of bats spend the winter hibernating in caves, mines, buildings, or rock outcrops. These hibernating bats are more likely to get white-nose syndrome. Other bat species migrate south to warmer climates for the winter. These bats, in general, are not susceptible to the disease.

### Highlights

- Eight species of bats have been documented at the seashore. These include one federally threatened (and state endangered) species and three additional state endangered bats.
- White-nose syndrome has decimated the populations of some bat species.
- Big brown bats are likely the most common bat at the seashore.

### How are bats infected? What happens?

Once introduced, the white-nose fungus can persist in the cold, humid environment of caves and mines, infecting bats when they return to hibernate. The fungus can also spread from bat to bat when they touch, and bats that hibernate in large groups are most susceptible. Humans don't get the disease, but people can spread it from cave to cave on contaminated clothing or equipment.

Ongoing studies suggest that the fungus irritates and damages the skin of infected bats. The infection then causes the bat to wake up frequently during winter hibernation. When bats wake up, they use precious energy to stay warm. If they wake up too frequently, they can die of starvation or dehydration before spring arrives.



A biologist holds an eastern red bat (*Lasiurus borealis*). Eastern red bats are relatively common at the seashore. This species migrates south in the winter, does not hibernate in caves, and has never been observed with symptoms of white-nose syndrome. Photo courtesy of Sarah-Jayne Collins.

## How do biologists study bats? What have they learned about bats in the seashore?

Biologists use a variety of techniques to study bats. Bats use echolocation to navigate and catch insect prey during the night. People can't hear these bat calls, but biologists can use special microphones, called acoustic detectors, to record the sounds. By analyzing the bat calls, biologists can identify which species are present in an area.

Scientists have other creative ways of studying these fascinating animals. Special nets are used to catch bats at specific sites at the seashore. After capturing a bat, biologists can identify the species, determine the sex of the animal, evaluate its age, and examine the wings for damage from the white-nose fungus. Scientists can also attach tiny radio-tracking devices to bats and follow the bats to learn the location of important habitats.



Acoustic detectors, like this one, record bat calls over a period of weeks or months. Biologists then use special computer programs to analyze the calls. Since different species use unique calls, biologists can identify which species are present based on sounds alone. NPS photo.

With its diverse habitats, from dunes to interior forest, the seashore supports eight species of bats (see figure below). During recent surveys, the most frequently detected bat was the big brown bat (*Eptesicus fuscus*). Big brown bats are less sensitive to white-nose syndrome, possibly because of their body size or due to differences in the cave environments where this species prefers to hibernate.

The seashore also provides important habitat for a number of regionally rare bat species. These include the federally threatened northern long-eared bat (*Myotis septentrionalis*). Research in the park indicates that freshwater sources, like kettle ponds, are important for northern long-eared bats. Mixed forest types are also critical for this threatened species.



After capturing a bat, biologists can examine the wing for damage from white-nose syndrome. NPS photo.

The rarest bat at the seashore may be the little brown bat (*Myotis lucifugus*). This species was once the most common bat in Massachusetts. Due to white-nose syndrome, it is now endangered in the state. Unfortunately, little brown bats are also rare at the seashore—during many months of sampling, only three little brown bat calls were recorded.

## What is the seashore doing to help bats?

Biologists continue to learn about bats and use this information to conserve bats and their habitats. Kettle ponds and forests with a variety of vegetation types are important and should be preserved. Radio-tracking of bats is helping to identify critical breeding areas. There is still much to learn and research efforts are ongoing.

White-nose syndrome is an extraordinarily dangerous threat to bats—sadly, some species may ultimately disappear from the region. To learn more, visit [www.nps.gov/subjects/bats](http://www.nps.gov/subjects/bats) or [www.whitenosesyndrome.org](http://www.whitenosesyndrome.org).

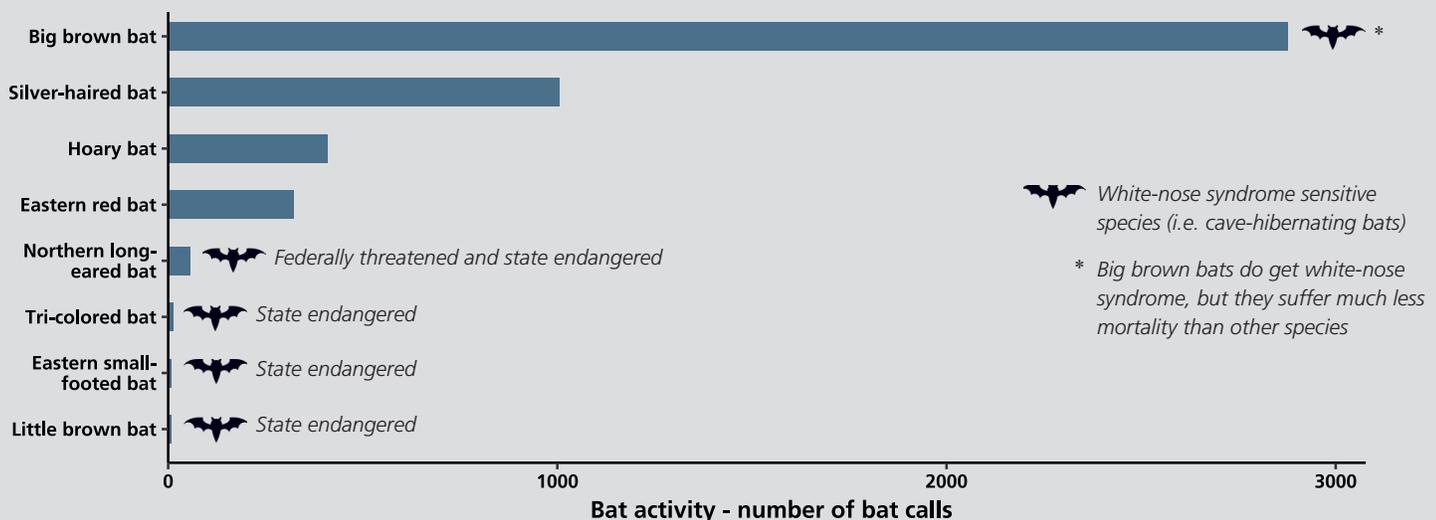


Figure 1. Activity levels of bat species as recorded by acoustic detectors at Cape Cod National Seashore, May-July, 2015-2016. Data provided by Dr. Shannon Farrell, State University of New York.