

Petersburg National Battlefield

National Park Service
U.S. Department of the Interior

Northeast Region



Bat Population Monitoring and White-nose Syndrome



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Why is Petersburg National Battlefield interested in bats?

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

By learning what types of bats live in the park, and what habitats they use, park managers hope to develop plans to help bats withstand this devastating disease.

White-nose syndrome...what's that?

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 Virginia, the disease has reduced some bat populations by more than 90%.

Which bat species get white-nose syndrome? How are they infected?

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

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. 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 causes the bats to wake up more 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.

Highlights

- Recent monitoring detected 11 species of bats, including two federally threatened or endangered species.
- White-nose syndrome has negatively affected several species of bats in the park.
- Overall, bat activity was highest in the Eastern Front, but Five Forks also had relatively high activity of several rare species.
- Little brown bats, a state endangered species, may be reproducing in the park.

Why are bats important in ecosystems?

Bats are major nocturnal predators of insects and 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 riparian habitat for foraging. Both 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.



After a bat is captured, biologists can check the wings for damage from white-nose syndrome. They can also determine if the bat is an adult or a juvenile by visually examining the wing bones. See page 2 to learn what biologists have learned about bats in the park. NPS photo.

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

Biologists have creative ways of studying these animals. Bats use echolocation to navigate and catch insect prey during the dark of night. People can't hear these bat calls, so biologists use special microphones, called acoustic detectors, to record the sounds. Specific bat species can then be identified by analyzing the bat calls.

From 2016-2017, scientists used acoustic detectors to document 11 species of bats in the park (see photo and graph below). Generally, the most bat activity was observed in the Eastern Front. The lowest activity occurred at Five Forks.



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.

The most commonly detected bat species overall was the big brown bat (*Eptesicus fuscus*)—this species is less susceptible to white-nose syndrome than many other species. Interestingly, the little brown bat (*Myotis lucifugus*), a state endangered species which is extremely susceptible to the disease, was also relatively common. Despite generally low bat activity at Five Forks, an exception occurred at one site that had very high levels of little brown bat activity. This suggests that little brown bats may be reproducing there.

Researchers are also capturing bats and using tiny radio-tracking devices to follow bats to important habitats. Park managers can then better protect these areas. For example, some bats return to the same breeding locations every year, including

specific hollow trees, buildings, or snags. Limiting disturbance to these areas is essential to maintaining bat habitat.

What about other rare bat species?

During the summer, there are four rare bat species that can be found in the park. In addition to the little brown bat, the tri-colored bat (*Perimyotis subflavus*), the Indiana bat (*Myotis sodalis*), and the northern long-eared bat (*Myotis septentrionalis*) are also present. The latter two are protected by the Endangered Species Act and all three were rarely recorded by the acoustic detectors. This indicates that they are not common. All of these rare species are sensitive to white-nose syndrome.

These rare bats spend their summer days roosting in tree cavities and snags, under tree bark, or in buildings. At night, they emerge to feed across the park's landscape. During the fall, these species of bats usually travel to caves or mines, where they hibernate for the winter.

In these caves and mines, they can contract white-nose syndrome and die.



A hibernating tri-colored bat showing symptoms of white-nose syndrome. NPS Photo.

What is the park doing to help bats?

The data being collected on bats will help park managers conserve bats and their habitat. Protecting hollow trees and snags where bats raise their young and preserving mature hardwood forests will help reduce the impacts of the disease. White-nose syndrome remains an extraordinarily dangerous threat to bat populations—sadly, some species may ultimately disappear from the region.

To learn more about bats, visit www.nps.gov/subjects/bats or www.whitenosesyndrome.org.

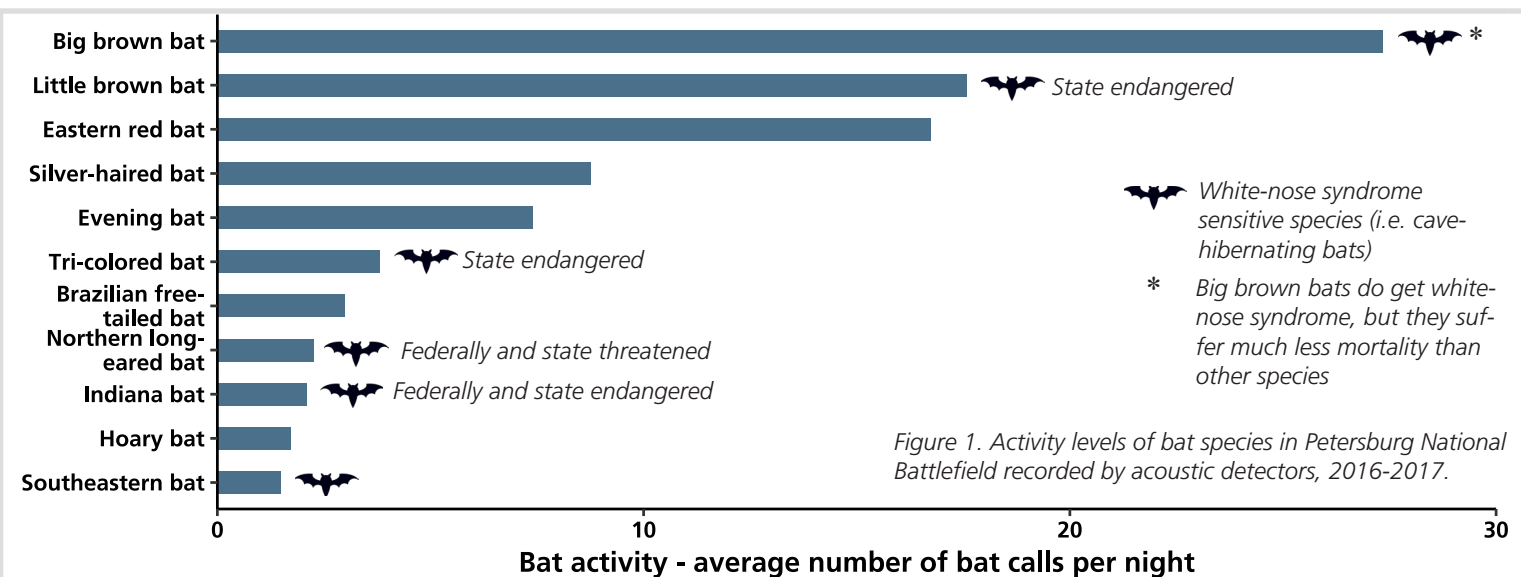


Figure 1. Activity levels of bat species in Petersburg National Battlefield recorded by acoustic detectors, 2016-2017.