



Bat Monitoring Along the St. Croix Riverway, 2016–2018

Bats nationwide are struggling to survive against threats posed by climate change, habitat loss, wind turbines, and a devastating fungal disease called *white-nose syndrome (WNS)*.

Four of the eight bat species found along the riverway are only here in the summer; they spend their winters in the southwestern U.S., Mexico, and even Central America (Table 1). The other four species, rather than migrating, hibernate here over the winter, roosting in caves or buildings. Three of these hibernating species—the little brown, northern long-eared, and tricolored bats—are highly susceptible to **WNS**. The big brown bat is also a hibernating species but has exhibited resistance to the disease.

Prior to 2016, seven bat species were documented at St. Croix National Scenic Riverway (SACN). In 2009–2010, a graduate student captured little brown bats at maternity colonies in Saint Croix State Park and William O'Brien State Park, both on the Minnesota side of the river. A monitoring program coordinated by the Wisconsin DNR included acoustic survey driving routes in or adjacent to SACN in 2010, 2013, and 2019. Their results included detections of seven species: big brown bat, eastern red bat, hoary bat, silver-haired bat, little brown bat, northern long-eared bat, and tricolored bat.



The evening bat is found primarily in far southern Wisconsin, but they appear to be moving north. U.S. ARMY PHOTO.

Evening bats were first documented as a resident species in Wisconsin in 2016, when a maternity colony was discovered in far southern Wisconsin. That same year, an evening bat was captured near the Twin Cities in Minnesota. Previous surveys have not documented evening bats at SACN, but this species may be expanding its range northward and could be present here.

Breaking the Ultrasonic Barrier

Bats give different calls while in flight to help them navigate and to locate things like food. Like bird songs, we can identify bat species by their calls, but the calls are ultrasonic—beyond the range of human hearing—so special microphones and software are used to record and identify them. But, also like birds, some bat species have similar calls, and there can be variation in the calls of any one species. As a result, the software we use to analyze and identify the recordings is not 100% accurate. In these cases, a proportion of call files are reviewed “manually” using a spectrogram to verify the identifications.

Seven, Plus One!

The seven bat species previously known to be in the park were reconfirmed and one additional species—the evening bat—was also documented. Although the park is north of the evening bat's range, the 2016

Table 1. Bat species documented at St. Croix National Scenic Riverway before the start of a formal monitoring program in 2016 and after three years of acoustic monitoring (2018). Asterisk (*) indicates winter hibernating species.

Common Name	Scientific Name	Pre-2016	2018
Big Brown Bat *	<i>Eptesicus fuscus</i>	Y	Y
Eastern Red Bat	<i>Lasiurus borealis</i>	Y	Y
Evening Bat	<i>Nycticeius humeralis</i>	N	Y
Hoary Bat	<i>Lasiurus cinereus</i>	Y	Y
Little Brown Bat *	<i>Myotis lucifugus</i>	Y	Y
Northern Long-eared Bat *	<i>Myotis septentrionalis</i>	Y	Y
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	Y	Y
Tricolored Bat *	<i>Perimyotis subflavus</i>	Y	Y

observations in Wisconsin and Minnesota, prompted us to begin looking for it. We obtained a total of 26 manually verified evening bat recordings, suggesting that this species is at least occasionally present in the park.

All eight species were recorded in all three years, and five species (big brown, eastern red, hoary, little brown, and silver-haired bats) were recorded at every single survey site each year. Two sites were particularly busy places. In two of the three years, a site northwest of Sunrise Landing Campground was host to the greatest number of call files for big brown, eastern red, hoary, and silver-haired bats. Another site on Twin Springs Road yielded a greater number of “call files per recording night than any other site in any other year” for little brown, northern long-eared, and tricolored bats. The Twin Springs Road site is a quiet wetland/backwater area that provides good bat foraging habitat.

Activity levels for big brown, eastern red, hoary, silver-haired, tricolored, and evening bats appear to be stable or slightly increasing, while those for little brown and northern long-eared bats appear to be declining.

The Future of Bat Monitoring

We are working with the NABat Midwest Bat Hub (<https://midwestbathub.nres.illinois.edu/>) to create statistical models of bat occupancy, particularly those most affected by WNS. *Occupancy* measures the probability that a species is using an area, while taking into account the fact that we cannot always perfectly detect the species.

When this project began, the Great Lakes region was at the leading edge of the WNS spread. This monitoring program helped parks to document baseline data on their bat populations and to assess changes over time. However, the Great Lakes Network handed all aspects of bat monitoring over to the parks in 2022, so any further monitoring at St. Croix will be conducted by park biologists.



Bats of the St. Croix Riverway (top): Big brown bat, northern long-eared bat (WISCONSIN DNR/D. REDELL), silver-haired bat (WISCONSIN DNR PHOTO), hoary bat (USGS/P. CRYAN); (bottom) eastern red bat, tricolored bat, little brown bat, and evening bat (U.S. ARMY PHOTO). NPS PHOTOS UNLESS CREDITED OTHERWISE.