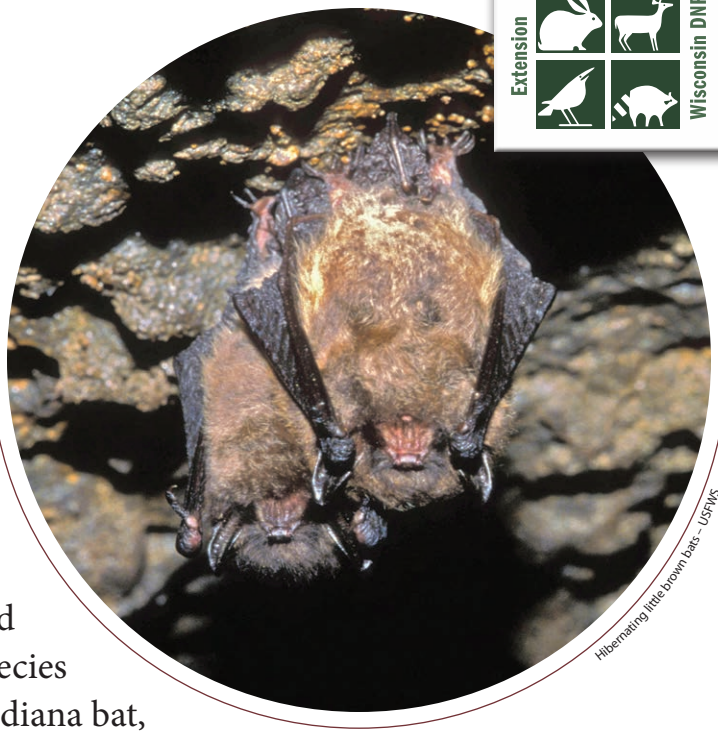
Bat

Ecology & Damage Management

USDA Wildlife Services
Extension
Wisconsin DNR



Hibernating little brown bats – USFWS

As the world's only true flying mammal, bats have extremely interesting lifestyles. They belong to the order *Chiroptera,* which means "hand wing." There are approximately 1,400 species of bats worldwide, with 47 species residing in the United States. Wisconsin was home to nine bat species at one time (there was one record of the Indiana bat, *Myotis sodalis,* in Wisconsin), but only eight species are currently found in the state. Our Wisconsin bats are a diverse group of animals that are integral to Wisconsin's well-being. They are vital contributors to the welfare of Wisconsin's economy, citizens, and ecosystems. Unfortunately, some bat species may also be in grave danger of extinction in the near future.

DESCRIPTION

All Wisconsin's bats have egg-shaped, furry bodies, large ears to aid in echolocation, fragile, leathery wings, and small, short legs and feet. Our bats are insectivores and are the primary predator of night-flying insects such as mosquitoes, beetles, moths, and June bugs.

Wisconsin's bats are classified as either cave- or tree-dwelling; cave-dwelling bats hibernate underground in caves and mines over winter in Wisconsin while tree-dwellers migrate south to warmer climates.

(see individual species descriptions inside)

"Wisconsin was home to nine bat species at one time, but only eight species are currently found in the state."

Paul Cryan, USGS; Eastern red bat inset photo: USDA Forest Service, SRS, Bugwood.org

Bats in flight at sunset.

WISCONSIN PERMANENT RESIDENT BATS

The following four Wisconsin species are permanent residents and do not migrate in the fall. They undergo annual cycles of hibernation (November–April), emergence and summer residency (May–July), and fat storage and reproduction (August–October). These bats give birth to one or two young (called pups) per year. Both little and big brown bats raise their pups in large maternal colonies containing hundreds to thousands of bats.

FIGURE 1

Big brown bat *(Eptesicus fuscus)*

State-threatened species

The big brown bat (Figure 1) is large-bodied, with a dark muzzle, rounded ears, and broad tragi. They roost in trees, bat houses, and buildings in summer and hibernate underground in caves, mines, and sometimes buildings. Big brown bats are widely distributed in Wisconsin.

FIGURE 2

Little brown bat *(Myotis lucifugus)*

State-threatened species

The little brown bat (Figure 2) has glossy yellow-brown fur. The tragi are short and slightly bent, a useful identifying mark for this species. Little browns roost in colonies in trees, bat houses, and buildings and hibernate in caves, mines, and other suitable hibernacula. In summer, this bat eats soft-bodied aquatic insects.

FIGURE 3

The arrow points to one of the northern long-eared bat's tragi. The tragus is a part of the ear often used to identify bats. The tragi of this species are known to be tall and pointed, while other species may have rounded and shorter versions.

Northern long-eared bat *(Myotis septentrionalis)*

Federally and state-threatened species

The northern long-eared bat (Figure 3) appears similar to the little brown bat in color but has pinkish facial skin and long ears with narrow, pointed tragi. These are forest bats. They roost alone or in small colonies in trees in the summer and tend to hibernate alone in rock crevices or small cracks in caves and mines. They forage for beetles and moths in forests at dusk or dawn.

FIGURE 4

Eastern pipistrelle *(Perimyotis subflavus)*

State-threatened species

The eastern pipistrelle, also known as the tricolored bat, (Figure 4) is Wisconsin's smallest bat. It is found mostly in the southwestern part of the state. This bat has tricolored fur, (a mixture of browns, blondes, and reds) and notably pinkish skin on its face, ears, and forearms. Eastern pipistrelles usually roost in live and dead leaf clusters in trees in summer. Females form small maternity colonies to raise their pups. During winter they prefer to hibernate singularly in caves and mines.

Photos: Big brown – David Redell, WDNR; Little brown – J. Paul White, WDNR; Northern long-eared – David Redell, WDNR; Eastern pipistrelle – Heather Kaarakka, WDNR

WISCONSIN MIGRATORY BATS

The following four species dwell in trees during Wisconsin summers, migrate south for the winter, and return to Wisconsin beginning in April. These bats give birth to one to three pups each year. Unlike the cave-dwelling species, which rear their young in large colonies, these bats usually raise their pups on their own.

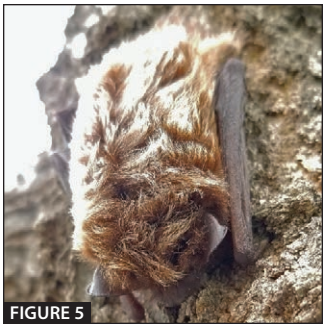


FIGURE 5

Silver-haired bat *(Lasionycteris noctivagans)*

The silver-haired bat (Figure 5) has dark brown or black fur frosted with white over its back. Because of this frosted appearance, it can be mistaken for the hoary bat. More than any of the other bat species found in Wisconsin, this species is associated with old-growth forests. Silver-haired bats typically roost alone in trees, although reproductive females may roost alone or in small groups.

FIGURE 6

Eastern red bat *(Lasiurus borealis)*

Bright orange-red fur with white spots/striping on the shoulders makes the eastern red bat (Figure 6) easy to identify. Its uropatagium, the flap of skin between the back legs, is furred. Red bats roost in trees, often in suburban areas in southern Wisconsin. They feed at forest edges and around streetlights, mainly on moths. This species is common in Wisconsin.

FIGURE 7

Hoary bat *(Lasiurus cinereus)*

The hoary bat (Figure 7) is Wisconsin's largest bat. The hoary bat's body size allows it to have the longest migration distance of Wisconsin's tree-dwelling bats, making it the last of the bats to return in spring. These bats have dark chocolate-brown fur with bands of white frosting on the back, bands of yellow fur around the face, and a furred uropatagium. They roost in coniferous trees and have been said to resemble hanging pinecones. Hoary bats emerge right after sunset to feed on large insects near forest edges.

FIGURE 8

Evening bat *(Nycticeius humeralis)*

The evening bat (Figure 8) is Wisconsin's newest bat species, having been discovered in our state in 2016. The evening bat is an overwhelmingly brown-colored bat with a black mask and a short, round tragus. It is visually similar to a big brown bat, although it is about half the size. These bats roost under bark and in cavities of trees as well as in buildings. A majority of their diet consists of a variety of beetle species.

Photos: Silver-haired – Heather Kaarakka, WDNR; Eastern red – David Redell, WDNR; Hoary – Heather Kaarakka, WDNR; Evening – Kentucky Department of Fish and Wildlife

HABITS and HABITAT

A bat roost is where bats sleep, hibernate, or rest. They spend a great deal of time at their roosts, resting, grooming, and washing themselves. Bats inhabit a variety of areas, but some places where bats commonly roost include trees, caves, mines, tunnels, abandoned buildings, rock crevices, and storm sewers. They are also often found roosting in attics, barns, and garages in summer.

Bats that overwinter in Wisconsin often hibernate together in large colonies in underground sites called hibernacula, which can house hundreds of thousands of bats. Most bats hibernating in Wisconsin will use caves or mines (Figure 9). Hibernating bats must gain enough fat during warm months to survive the winter. Hibernation allows the bats to survive winter without expending much energy. If the bats are roused before there are food resources available, they may die of starvation or dehydration. Consequently, people should remain out of caves and mines from October 1–May 15 to avoid disturbing hibernating bats.

Since bats are nocturnal mammals, they become active in summer shortly after the sun goes down and usually remain active throughout the night until sunup. Bats use echolocation to navigate and find food and places to roost. Echolocation is similar to radar and uses high-frequency sound waves to locate objects.

Heather Kaarakka - WDNR

FIGURE 9

Little brown bats roosting in a cave.

Bats mate in the fall. After mating, the female houses the sperm in her reproductive tract until the following spring, when ovulation and fertilization occur. The gestation period lasts 2–3 months, depending on the species. Young bats are called pups, and females rear up to three pups per year.

MANAGEMENT and CONSERVATION ISSUES

Threats to bats

All bats in Wisconsin face increasing conflicts with humans as their habitat is destroyed and altered. Currently, the greatest threat to our resident cave bat species is white-nose syndrome (WNS), a fungal disease that attacks bats during hibernation. The disease was first reported in New York State in 2006 but has now spread coast to coast (see sidebar on page 5).

Another danger to bats comes from the increased use of wind turbines across the landscape. Mortalities have been reported as a direct result of turbines in both the eastern and midwestern United States. Wind projects typically affect tree bats during migration but also can affect cave bats under specific circumstances, such as if the wind farm is located close to a cave bat hibernation site.

Disease and public health

The disease most often associated with bats is rabies. Even though less than one percent test positive for rabies, it is always wise to use caution around bats, especially if they are behaving abnormally. For example, a bat that is active on a bright, sunny day, found in an area where not normally present, or appears sick (lethargic, confused, downed, etc.), may be infected with rabies. Unhealthy bats will often be more approachable or tolerant of human activity.

However, a rabid bat can also appear completely normal. Rabies can only be confirmed by lab testing. If you are bitten or scratched by a bat, capture it alive and submit it to the Wisconsin State Laboratory of Hygiene (WSLH). Contact your county's health department for steps to submit a bat to WSLH for rabies testing. Take care not to damage the head because the brain is needed for testing. The Centers for Disease Control (CDC) also recommends submitting any bat for testing that is discovered in a room where people are sleeping. It is recommended that you contact a physician immediately regarding post-exposure vaccinations to prevent rabies,

White-nose Syndrome (as of spring 2020)

Found in a New York cave in 2006, white-nose syndrome (WNS), a devastating disease of hibernating bats, has been spreading steadily and is now found in Canada and across the continent into California and Washington. WNS is caused by a fungus *(Pseudogymnoascus destructans)*, and since its discovery, it has killed entire bat colonies in some caves and mines. A bat with WNS looks as if its face has been dipped in powdered sugar (Figure 10). The fungus may also spread to the wings and other areas of the body. WNS is spread primarily due to bat-to-bat contact but can be spread by humans carrying the fungus on clothing, skin, or gear as they move between bat hibernacula. Bats with WNS wake from hibernation too often and too soon and may emerge and fly about on winter days. This arousal causes bats to burn up their energy stores, leaving them weak and unable to survive the winter. Many bats starve, die of dehydration, or freeze to death and are found lying outside the entrance to their winter hibernacula. Little brown bats, northern long-eared bats and eastern pipistrelles are particularly hard-hit by WNS.

USFWS

FIGURE 10

Little brown bat with white-nose syndrome.

WNS was first detected in Wisconsin in spring 2014 in a cave system in Grant County. Since then, WNS has spread across Wisconsin. Bat ecologists with the Wisconsin Department of Natural Resources (WDNR) visited 59 hibernacula during the 2018–19 winter and found all sites were infected with the disease, and bat populations in these hibernacula decreased 72%–100% relative to pre-WNS populations. In addition, all bat species susceptible to WNS are protected species at the state and/or federal level.

If you see a bat in Wisconsin that you suspect may have white-nose syndrome, please contact the WDNR (DNRBats@wi.gov).

even if you are unsure whether you or someone in your care may have been bitten or scratched. Contact your physician if you believe there may have been an exposure or your veterinarian if you have concerns about interactions between pets and bats.

Another disease associated with bats is histoplasmosis. Histoplasmosis is an airborne disease caused by a fungus that may be found in bat feces (guano). Because the symptoms of the disease are flu-like, it can be mistaken for influenza. Histoplasmosis is more common in the southern United States, but caution should still be used when working around guano. When cleaning up areas where bats have roosted, droppings should be vacuumed and not swept or shoveled. Gloves and a properly fitted respirator or mask should also be worn to further minimize the risk of exposure.

Benefits of bats

Bats provide billions of dollars in ecosystem services annually through their efficient removal of insects and pollination of plants. A single little brown bat can eat 1,000 mosquito-sized insects in an hour.

Bats are especially important to farmers, as they remove tons of insects that would otherwise destroy crops or require costly insecticides to control.

LEGAL STATUS

Of the eight bat species found in Wisconsin, three tree bats (silver-haired, eastern red, and hoary bats) are on the WDNR list of special concern species or species with information needs, and all four cave bats (big brown, little brown, northern long-eared and eastern pipistrelle bats) are listed as state-threatened. The northern long-eared bat is also threatened at the federal level. These bats are protected through the Wisconsin Endangered Species Law (s. 29.604, Wis. Stats.). This act prohibits the capture, killing, or possession of bats without an authorized WDNR permit. However, there is a Broad Incidental Take Authorization given by WDNR. This provision allows the killing of cave bats that may occur as the result of bat removals from buildings, public health concerns, building repairs, or similar incidental situations. For more information, please see the WDNR's webpage about incidental take: **dnr.wi.gov/topic/ERReview/ItBats.html.** Questions about the incidental provision should be directed to the WDNR.

The northern long-eared bat is federally threatened and protected by the Endangered Species Act. However, there are exceptions allowed despite the northern long-eared bat being listed as threatened. To better understand these exceptions, please visit the U.S. Fish and Wildlife Service's webpage: **www.fws.gov/midwest/Endangered/mammals/nleb.**

IDENTIFYING BAT DAMAGE

Bats do not cause structural damage to buildings. Unlike rodents, they will not gnaw on structures to increase the size of an entrance hole. Most issues with bats in buildings are associated with noise, odor, and droppings. The damage done is usually caused by what is left behind, primarily guano and urine. Bat guano looks like small, brown rice grains (Figure 11) and is similar in size and shape to mouse droppings.

Bats defecate where they roost, leaving small piles of guano below. The insect parts that the bats eat give the guano a shiny appearance and will crumble like dust when disturbed. In contrast, mouse droppings tend to harden over time. Remember to be careful when cleaning up after bats: wear gloves and a mask, especially in enclosed spaces with little or no ventilation.

WDNR

FIGURE 11

Bat guano.

CONTROLLING BAT DAMAGE

Removal

If a lone bat is found in your house, it can be easily and safely removed. If the bat is flying around a room, close all doors and open a window to the outside. Remove any pets from the room and leave. You may want to seal underneath the door by placing a towel along the floor. The bat should fly out in a short period of time. If the bat lands on a wall, it is most likely exhausted and can be caught and taken outside. When capturing a bat, wear thick work gloves. Carefully lower a container or box over the bat and then slide a rigid cardboard square between the wall and the container to trap the animal inside. Take the container outside and release the bat near a tree. If you need help, seek professional assistance by searching "bat removal near me" online.

Controlling Bat Damage (continued)

Exclusion

Bats often take advantage of the warm and safe conditions found in building attics and walls to roost and raise their pups. The only long-term solution to keeping bats out is to bat-proof a building. This can be complicated, especially in older buildings that have an abundance of holes and gaps. A quarter-sized hole or crack is all a bat needs to gain entrance. All exterior holes should be sealed using materials such as sheet metal, siding, wood, screen, or caulking compound.

One-way exclusion devices allow bats to leave the building but not re-enter. Such a device can be purchased commercially or built from basic materials. Detailed plans and information on building your own bat exclusion device can be found on the Bat Conservation International website (**batcon.org**) or on the WDNR website: **dnr.wi.gov/topic/EndangeredResources/batfaqs.html.**

Do not attempt to exclude bats until all primary access points are located. Install the exclusion device over the main opening after sealing all other access points. An exclusion device should be left in place for at least a week of warm weather to ensure all bats have left the building, and then the hole can be sealed.

Excluding bats from buildings is permitted between August 16 and May 31. However, bats may not be excluded between June 1 and August 15, the breeding season, because if a mother becomes separated from her pups, they will die. If the landowner feels the bats pose a health risk, they may exclude bats June 1–August 15 provided they submit a health exemption form: **dnr.wi.gov/topic/ERReview/ItBats.html.**

Also, bats should not be disturbed or awakened during hibernation. The extra activity will rapidly deplete their energy stores, and they may freeze or starve. Avoid entering caves and mines from October 1 through May 15 where bats may be hibernating.

Repellents

There are no effective, long-term bat repellents.

Alternative roosting sites

Bat houses can provide great roosting habitat for bats and are effective when installed as alternate roost habitat during an exclusion. The Wisconsin Bat Monitoring Program (**wiatri.net/Inventory/Bats/Resources**) or Bat Conservation International (**batcon.org**) encourages bat house construction and provides detailed information about building and installing your own bat house.

REFERENCES

Bat Conservation International. *Acceptable management practices for bat control activities in structures.* Online at https://www.dfw.state.or.us/wildlife/rehabilitation/docs/Bat_Control_Practices.pdf

U.S. Fish & Wildlife Service Ecological Services. *Indiana bat (Myotis sodalis).* Online at http://www.fws.gov/midwest/endangered/mammals/inba

U.S. Fish & Wildlife Service Ecological Services. *Northern long-eared bat (Myotis septentrionalis).* Online at https://www.fws.gov/midwest/Endangered/mammals/nleb

White-nose Syndrome Response Team. Online at https://www.whitenosesyndrome.org

Wisconsin Department of Natural Resources. *Saving Wisconsin's bats.* Online at http://dnr.wi.gov/topic/WildlifeHabitat/bats.html

Wisconsin Department of Natural Resources. 2010. *Building a bat house.* Online at http://wiatri.net/Inventory/Bats/Resources/BuildingBatHouses.pdf

Bat Ecology & Damage Management

This fact sheet is part of a series designed to help you successfully manage wildlife damage problems on your property. The series includes additional publications that focus on controlling damage from specific animals, plus an introduction to wildlife damage management.

Species information courtesy of the late David Redell, WDNR bat ecologist, presented during Forest and Wildlife Ecology 306 (Terrestrial Vertebrates), at the University of Wisconsin–Madison, spring 2012.

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