Although often portrayed as dark, scary and suspicious characters, bats are just small animals trying to survive in an ever-changing world. As the world’s only true flying mammal, bats have extremely interesting lifestyles. They belong to the order *Chiroptera*, or “hand wing.” There are approximately 1,240 species of bats worldwide, with 47 species residing in the United States. Wisconsin was home to eight bat species at one time, but only seven 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, bats 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 but 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 bats are classified as either cave- or tree-dwelling; cave-dwelling bats hibernate over winter in Wisconsin while tree dwellers migrate south to warmer climates.

(see individual species descriptions inside)

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

The flap of skin connecting a bat’s legs is called the uropatagium. This structure can be used as an “insect net” while a bat is feeding in flight. It aids in aerodynamics and is furred in some species.
The following four Wisconsin species are permanent residents and do not migrate in the fall. They undergo annual cycles of hibernation (November-April), emergence, fat storage and reproduction (August-October). These bats give birth to one or two young (called pups) per year. Both big brown and little brown bats raise their pups in large maternal colonies containing hundreds to thousands of bats.

**Wisconsin Permanent Resident Bats**

**Northern long-eared bat (Myotis septentrionalis)**

The northern long-eared bat 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 colonies in trees in the summer and tend to hibernate alone in rock crevices or small cracks in walls. They forage for larger insects like beetles and moths in forests at dusk or dawn.

**Eastern pipistrelle (Perimyotis subflavus)**

The eastern pipistrelle 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. Pipistrelles roost in places like rock crevices, caves or trees. During winter they prefer to hibernate in caves and mines.

**Big brown bat (Eptesicus fuscus)**

Big brown bats are large-bodied, have dark muzzles, rounded ears, and broad tragi. Big brown bats roost in trees or cave-like dwellings during summer, and commonly hibernate in houses and other buildings. They are widely distributed in Wisconsin.

**Little brown bat (Myotis lucifugus)**

The little brown bat has glossy yellow-brown fur. The tragi are short and slightly gently bent, a useful identifying mark for this species. Little browns roost in clusters in trees, bat houses, buildings or caves and hibernate in caves, mines, and buildings.

**Indiana bat (Myotis sodalis): An endangered species**

The Indiana bat was found in Wisconsin until the early 1960s. The current population resides in the eastern United States, and now is less than half of what it was in 1967 when the U.S. Fish and Wildlife Service listed the species as endangered. Causes of endangerment include roost disturbance, summer habitat loss and degradation, pesticide use and environmental contamination. The Indiana bat has dark brown to black fur. Indiana bats hibernate during the winter in caves or mines in roosts of up to 50,000 bats. During the summer, they roost under the peeling bark of dead and dying trees.
The following three species dwell in trees during their summers in Wisconsin, migrate south for the winter, and return to Wisconsin beginning in April. These bats give birth to two or three pups each year. Unlike the cave-dwelling species, which rear their young in large colonies, these bats raise their pups on their own.

**WISCONSIN MIGRATORY BATS**

**Silver-haired bat** (*Lasionycteris noctivagans*): The silver-haired bat has 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.

**Eastern red bat** (*Lasiurus borealis*): Bright orange-red fur with white spots/striping on the shoulders makes the eastern red bat 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.

**Hoary bat** (*Lasiurus cinereus*): The hoary bat is Wisconsin’s largest bat. Due to its size, it is possible for people to hear the bat’s echolocation calls. The hoary bat’s body size also 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, and a furred uropatagium. They have bands of yellow fur around their faces. 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. It is unknown how common hoary bats are in Wisconsin.

**HABITS & HABITAT**

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

Bats that overwinter in Wisconsin often hibernate together in large colonies called hibernacula, which can house hundreds of thousands of bats. Most bats hibernating in Wisconsin will use caves or mines. 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 food resources are available, they may die of starvation or dehydration.

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

Bats mate in the fall. After mating, the female houses the sperm in her reproductive tract until the following spring, when fertilization and ovulation 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.
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 to 23 states and five Canadian provinces with alarming speed (see WNS sidebar).

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 colony.

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, 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 and submit it to the Wisconsin State Laboratory of Hygiene or your county’s health department for rabies testing. Take care not to damage the head because the brain is needed for testing. The Centers for Disease Control

White-nose Syndrome (as of spring 2014)
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 as far west as Missouri. WNS is caused by a fungus (*Pseudogymnoascus destructans*), and over the past few years the disease has killed entire bat populations in some caves and mines. Bats with WNS wake from hibernation too soon and may emerge and fly about on winter days. This burns up their energy stores, leaving them weak and unable to survive the winter. Many bats starve or freeze to death and are found lying outside the entrance to their winter roosts.

WNS does not affect humans, but people can spread the disease from cave to cave by carrying the fungus on clothing, skin, or gear. So far, WNS has not been reported in Wisconsin, and various steps are being taken to protect bat populations from the spread of the disease into the state. Wisconsin's tourist caves and mines now have prevention plans in place to protect against the assisted transport of the fungus. These specific regulations should be reviewed before entering any cave or mine.

A bat with WNS looks as if its face has been dipped in a snow bank. The fungus may also spread to the wings and other areas of the body. If you see a bat(s) in Wisconsin that you suspect may have White-nose Syndrome, please contact the Wisconsin Department of Natural Resources (WDNR) by email (DNRBats@wi.gov) or phone (WDNR Bat Hotline: 608-266-5216).
Of the eight bat species found in Wisconsin, the three tree bats (silver-haired, eastern red, and hoary bats) are on the Wisconsin Department of Natural Resources (WDNR) list of special concern species; the four cave bats (big brown, little brown, northern long-eared and eastern pipistrelle bats) are listed as threatened. 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, public health concerns, building repairs, or similar incidental situations. Specifically, the provision allows five or fewer bats to be killed between June 1 and August 15 at a residence or place of work. If bats are lethally removed in this manner, a report must be sent to the WDNR within five days of removal. Questions about the incidental provision should be directed to the WDNR.

The Indiana bat is listed as federally endangered and is protected by the Endangered Species Act. This strictly prohibits the possession, capture, or killing of the Indiana bat without a federal permit.

Benefits of bats
Bats provide billions of dollars of 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.

Alternative roosting sites
Bat houses can provide great roosting habitat for bats. The Wisconsin Bat Monitoring Program or Bat Conservation International (batcon.org) encourages bat house construction and provides detailed information about building and installing your own bat house. Installing bat houses is a great idea for bat conservation, but should not be done with the intention of reducing bat presence in nearby buildings.

CDC) also recommends submitting any bat for testing that is discovered where people sleep. It is recommended that you contact a physician immediately regarding post-exposure vaccinations to prevent rabies, even if you are unsure whether you or someone in your care may have been bitten or scratched.

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.

Little brown bats roosting in a cave.
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 is from what is left behind, primarily guano and urine.

Bat guano looks like small brown cylinders (see image) and is similar in size and shape to mouse droppings. Bats defecate where they roost, leaving small clusters of guano below. The insects the bats eat give the guano a shiny appearance; it 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.

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. 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 assistance, check under “Pest Control” or “Wildlife” in the business listings of your local phone book.

If one or two bats are found flying around a room, they most likely entered through an open door or window and should be allowed to leave on their own (see above). If more bats are found or heard, or seen flying into the house (often into attics), the best course of action is to find and close the bats’ entry point after they have left the building. If bats continue to be found in the building there is likely a colony, and the safest option is to call a professional who has experience removing bats.

Exclusion

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 half-inch-wide 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. An exclusion 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). Do not attempt to exclude bats until all access points but one are located and sealed. Install the exclusion device over the opening. An exclusion device should be left in place for about a week to ensure all bats have left the building, and then the hole should 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. Also, bats must not be disturbed or awakened during hibernation because the extra activity will rapidly deplete their energy stores and they may freeze or starve.

**Repellents**

There are no effective, long-term bat repellents.

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**REFERENCES**


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

Internet Center For Wildlife Damage Management. *Bat guano & bat food Cleanup*: http://icwdm.org/wildlife/bat/batguano.asp


Wisconsin Department of Natural Resources. 2010. *Building a bat house*: http://wiatri.net/inventory/bats/Monitoring/Roosts/docs/BuildingBatHouses.pdf
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 which 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.

The authors thank Paul White, bat ecologist with the Wisconsin Department of Natural Resources, for his critical review of earlier drafts.

This publication is available in pdf format at: wildlifedamage.uwex.edu

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Bat Ecology and Damage Management  G3997-012  I-03-2014