BATS OF WISCONSIN

Wisconsin Department of Natural Resources
Bureau of Natural Heritage Conservation

Wisconsin Bat Program

http://wiatri.net/inventory/bats

Bats

Bats are some of the most fascinating and ecologically important animals in the world. However they are also one of the most misunderstood groups of animals in the world, which has led to many irrational fears and myths about bats.

Bats are mammals—they give live birth and nurse their young—however, they are not rodents as many people believe. They are members of the mammalian order *Chiroptera,* meaning hand-wing, and they are the only group of mammals to ever have evolved true flight. There are over 1,400 species of bats in the world, which make up about one-fifth of all known mammalian species.

The order *Chiroptera* is split into two groups: *Megachiroptera*, about 150 species of old world fruit eating bats, and *microchiroptera*. *Microchiroptera* are the rest of the 1000+ species of bats which are usually small, and have a wide variety of diets.

Many bat species are insectivorous, but several species eat nectar or fruit, and three species drink blood (though rarely from humans). Bats are known for their voracious appetites; a single bat can eat thousands of insects every night. With appetites like these, bats are an important form of natural pest control. It has been estimated that bats save farmers in the southwestern United States hundreds of millions of dollars in reduced pesticide use every year.

Insect-eating bats use echolocation to locate and capture prey. They emit ultrasonic clicks and buzzes above the range of human hearing which bounce off potential prey and back to the bats' sensitive ears. Researchers use ultrasound detectors to record the sounds bats make. From these recordings, experts can identify the species of the bat and create inventories of the area surveyed.

Bats are long-lived for their size, living up to ten and twenty years in many cases. Most bats give birth to only one baby a year, called a pup. though, some species have four mammary glands and birth up to 4 pups each year. Bats mate in the fall before and during migration and swarming, and delay fertilization until spring, after emerging from hibernation or migrating back to summer home range. The gestation period for bats is around 60 days. The mother bat nurses the young, and after about three weeks the young are able to fly by themselves.

Because of their life history, bats as a group have slow population growth rates and are susceptible to drastic drops in population.

DNR Bat Ecologist David Redell observes the fall swarm at Neda Mine. Dave passed away in 2012, but his legacy lives on in the conservation work of the Wisconsin Bat Program.

Wisconsin Bats

Wisconsin has recorded eight species of bats, all of which are insectivorous and members of the family Vespertilionidae, the evening bats.

Bat biologists use several characteristics to correctly identify bats: the tragus, the flap of skin that sticks up in the ear of the bat; the calcar, the skin that connects the legs and tail together; and color, relative size, and echolocation calls to determine species.

Bats are often split into two groups: "cave bats" and "tree bats". Cave bats are species that hibernate over winter in caves and mines. Tree bats are species that migrate south for the winter. In Wisconsin, the little brown, big brown, tricolored bat, and northern long-eared are all classified as cave bats. The silver-haired, eastern red, hoary, and evening bats are classified as tree bats.

Little Brown Bat: *Myotis lucifigus*

STATUS: State Threatened

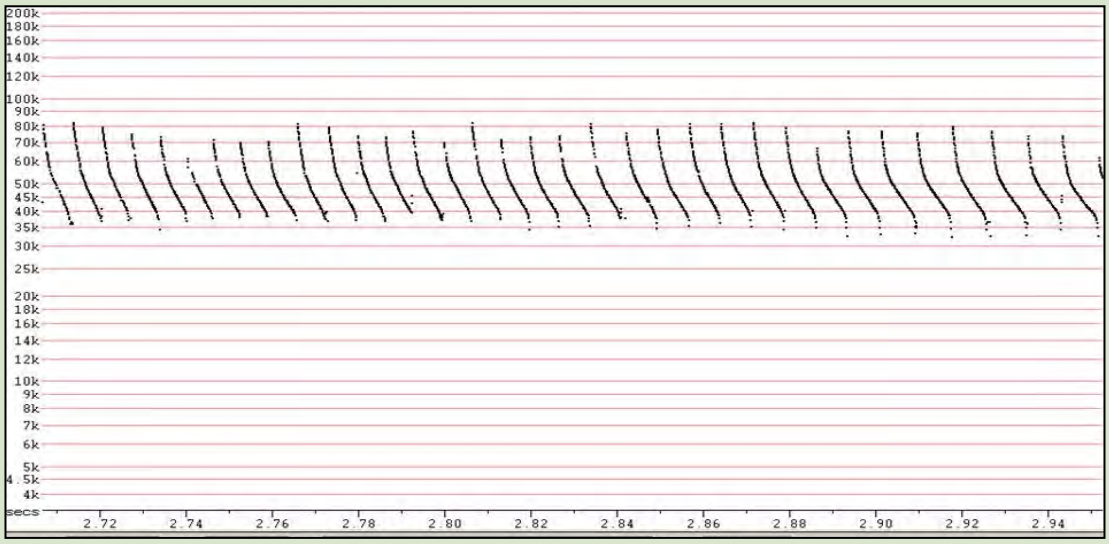
DESCRIPTION: The little brown bat is a medium-sized member of the genus *Myotis*. It has light to dark brown glossy fur and a lighter underbelly, as well as short ears and a blunt tragus. It has long hairs on its feet that extend beyond the tips of the toes.

REPRODUCTION: Little brown bats usually give birth to a single pup in early summer. They are long-lived animals living up to ten and fifteen years in many cases.

HABITAT & HABITS: In summer, reproductive female little brown bats form maternity colonies (up to hundreds of bats) in old barns, attics, and bat houses. Non-reproductive females and males will roost alone or with a few other bats in buildings, trees, and rock crevices.

In winter from late October to mid April, little brown bats hibernate in caves and abandoned mines where temperatures remain relatively constant. This species will often form large clusters during hibernation.

DIET: The little brown bat prefers to forage near water and along field and woodland edges. Little brown bats eat many species of wasps, moths, leafhoppers, and flies, including mosquitoes.



Echolocation call:

Big Brown Bat: *Eptesicus fuscus*

STATUS: State Threatened

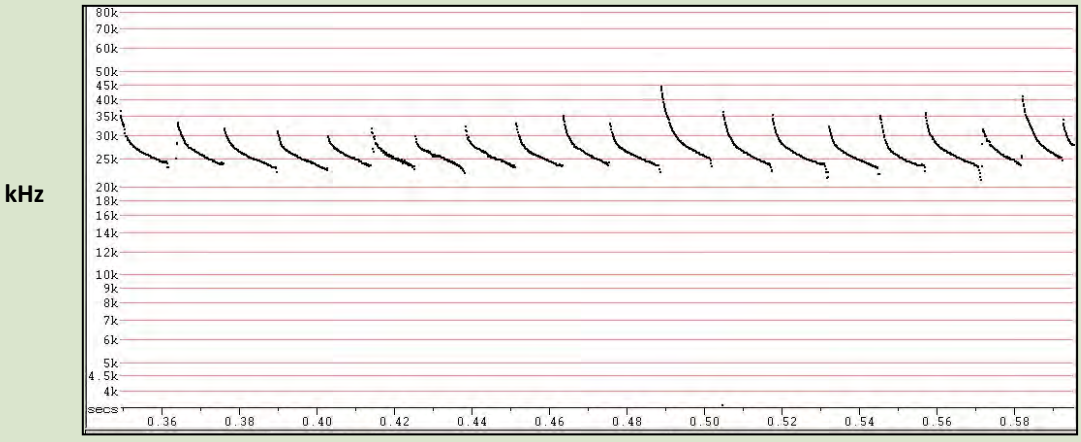
DESCRIPTION: The big brown bat has similar coloring to the little brown bat, but is about twice the size and has a wide black muzzle. Big brown bats may live over fifteen years in the wild.

REPRODUCTION: Females give birth to one or two young in early summer.

HABITAT & HABITS: In summer, reproductive females use buildings, bat houses, and rock crevices for roosts. Non-reproductive females and males roost solitarily in trees and rock crevices. Big brown bats prefer to forage over open fields, along field edges, and along shorelines.

In winter from November to late March, big brown bats hibernate in caves and abandoned mines. Unlike other species, they can tolerate and often prefer cooler temperatures when hibernating, and will often be located closer to cave and mine entrances than other bats. They are also the only species in Wisconsin found hibernating in buildings in the winter.

DIET: The big brown bat is known for eating large amounts of insect pest species, including moths, wasps, true bugs, and beetles.



Echolocation call:

Northern Long-Eared Bat: *Myotis septentrionalis*

STATUS: State Threatened; Federally Endangered

DESCRIPTION: This bat is similar in appearance to the little brown bat, and needs close inspection to tell the difference. It gets its name from the long ears it uses to locate prey within the forest interior. When folded alongside the head, the ears extend more than three mm past the tip of the nose. Its tragus is also more pointed and symmetrical than that of the Little brown bat.

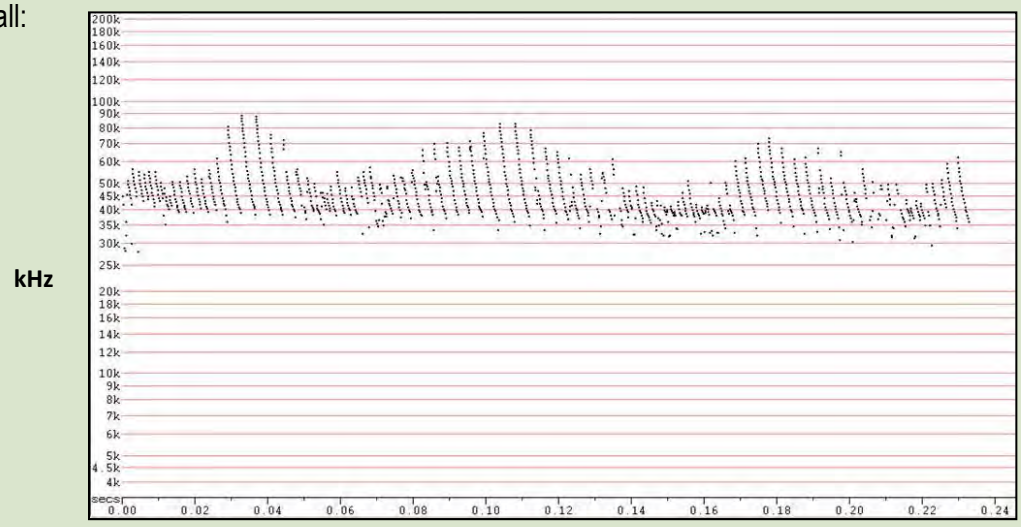
REPRODUCTION: Northern long-eared bats give birth to a single pup in early summer.

HABITAT & HABITS: After hibernation, reproductive female northern long-eared bats roost alone or with a few other females under tree bark and in tree crevices, and rarely in man-made structures. Males and non-reproductive females roost singly in tree crevices of hardwood trees.

In winter, the northern long-eared bat hibernates in caves and abandoned mines where temperatures remain constant. They tend to hibernate singly, unlike little brown bats which will hibernate in clusters.

DIET: These bats eat flies, beetles, and moths.

Echolocation call:



View northern long-eared bat species guidance online: http://dnr.wi.gov/topic/endangeredresources/animals.asp

Tricolored bat (formerly Eastern Pipistrelle): *Perimyotis subflavus*

STATUS: State Threatened

DESCRIPTION: The tricolored bat is Wisconsin's smallest bat. It is often described as having a tri-colored appearance because of the three colors found on the hair shaft. Tricolored bats are usually the first bats to enter the hibernacula in the fall, and the last to leave in the spring.

REPRODUCTION: They give birth to two pups in June or July.

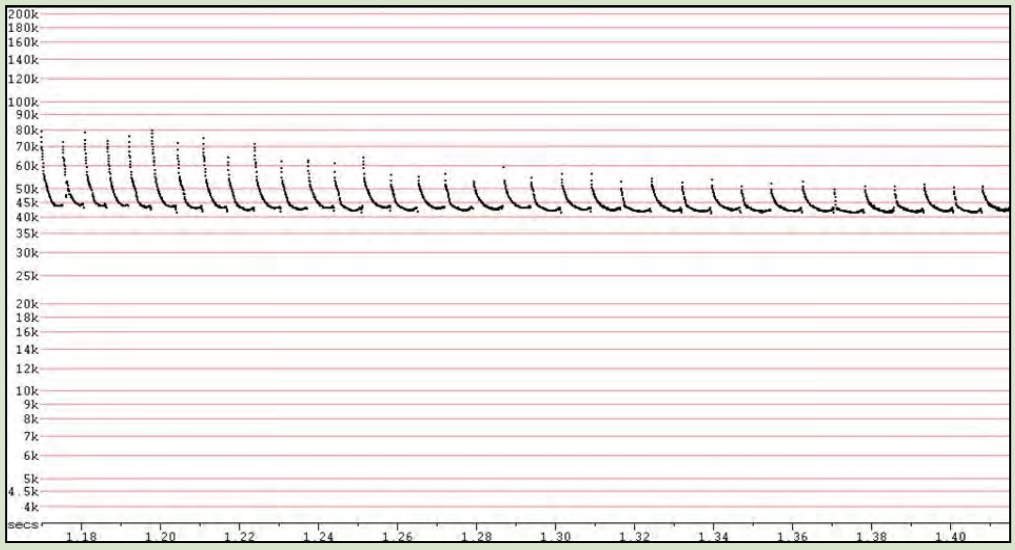
HABITAT & HABITS: In summer, reproductive females may band together in small groups of up to 20 bats in dead and live leaf clusters in oaks and hickories, and sometimes in building eaves. Males roost alone in trees. Both sexes forage over water and along field edges.

In winter, tricolored bats hibernate in caves and abandoned mines. They hang singly from the walls of the cave or mine and rarely cluster.

DIET: Tricolored bats eat true bugs, beetles, flies and moths.

This species is rare in Wisconsin, and its range is mostly in the western and southern portion of the state.

Echolocation call:



View tricolored bat species guidance online: http://dnr.wi.gov/topic/endangeredresources/animals.asp

Evening Bat: *Nycticeius humeralis*

STATUS: Species with information needs

DESCRIPTION: The Evening bat is similar in appearance to the little brown bat and big brown bat. Distinguishing characteristics are black and hairless wings, ears and forearms; and a short, blunt tragus that is curved forward. The dorsal fur is rich brown and ventral side is much paler.

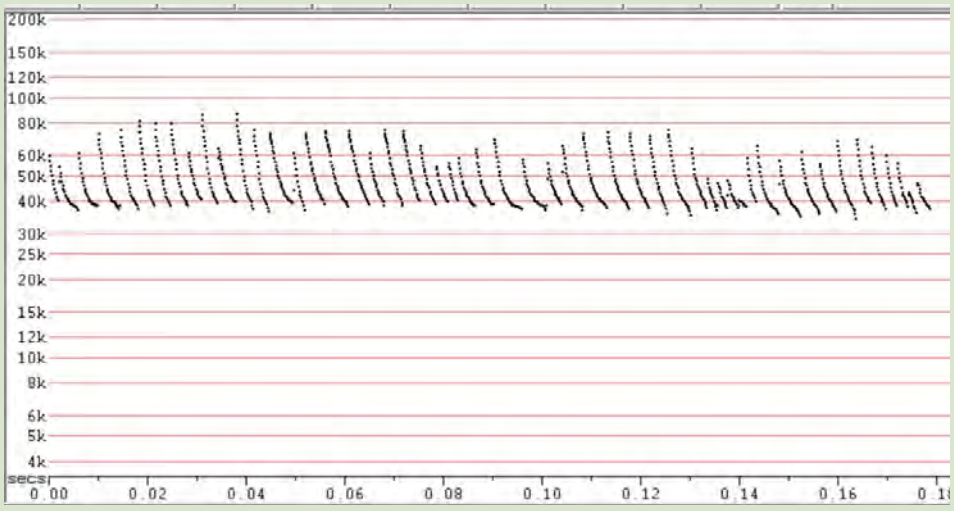
REPRODUCTION: Most female evening bats give birth to twins in June.

HABITAT & HABITS: In summer, day-roosts of the evening bat include cavities and sloughing bark of hardwood and conifer trees, as well as buildings.
Evening bats are thought to be a migratory species, moving out of northern climate to warmer parts of the US.

DIET: Evening bats eat beetles and true bugs and several insects consumed by them are economically important including the spotted cucumber beetle, green stink bugs and emerald ash borers.

The Evening bat was first documented in Wisconsin in 2016 and capture records indicate its presence is known to occur in southern third of the state.

Echolocation call:



More information on the Evening bat can be found on Bat Conservation International's website:
Nycticeius humeralis - Bat Conservation International

Silver-Haired Bat: *Lasionycteris noctivagans*

STATUS: Species of Special Concern

DESCRIPTION: This is a medium-sized species of bat with dark fur with silver tips on the hairs which gives the bat its name. It may be confused with the hoary bat, however, it has only half of its tail covered with fur, and it is smaller and darker than the hoary bat. The silver-haired bat can live up to twelve years.

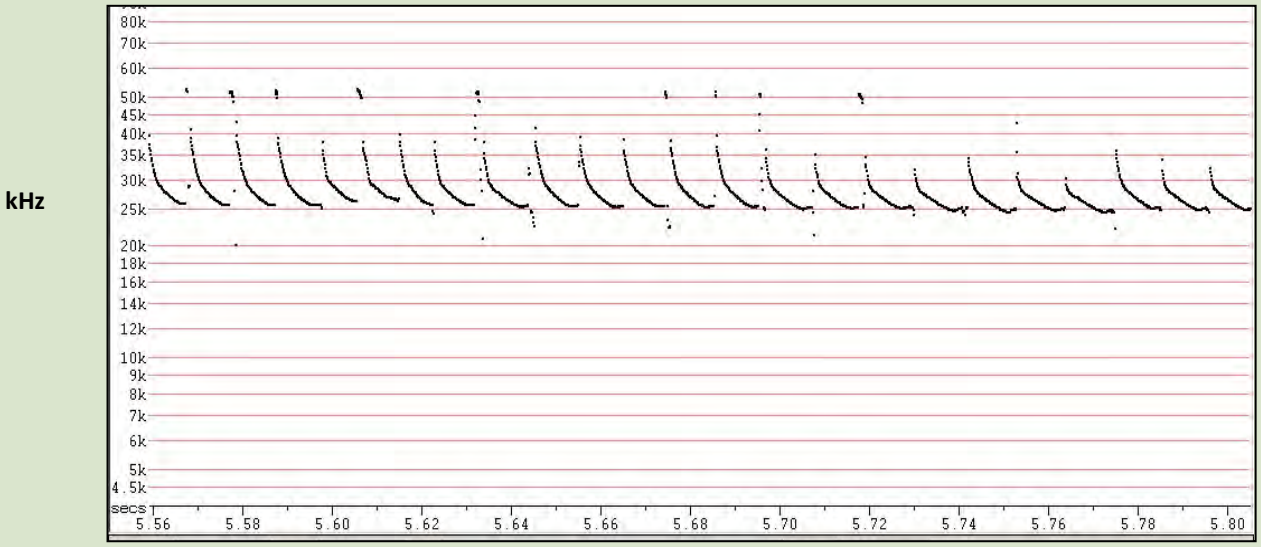
REPRODUCTION: Female Silver-haired bats usually give birth to two pups in June.

HABITAT & HABITS: In summer, this bat prefers to roost under bark and in tree hollows, and forage in wooded areas. It roosts one to five meters above the ground. Silver-haired bats of both sexes tend to roost alone, although reproductive females may form small maternity colonies of up to twelve bats.

In winter, the silver-haired bat migrates to the southern United States where it hibernates in crevices and tree hollows from October to April.

DIET: Silver-haired bats eat moths, flies, and beetles.

Echolocation call:



Eastern Red Bat: *Lasiurus borealis*

STATUS: Species of Special Concern

Photo: M. Fifield-Murray

DESCRIPTION: The Eastern red bat is a large, common species of bat in Wisconsin. It has brick-red to yellowish-red fur, often with white tips, giving the bat a frosted appearance. It is easily identifiable since no other bats in Wisconsin possess red fur. The Eastern red bat roosts and forages in deciduous forest, and can be easily overlooked because it can appear to be a dead leaf while roosting.

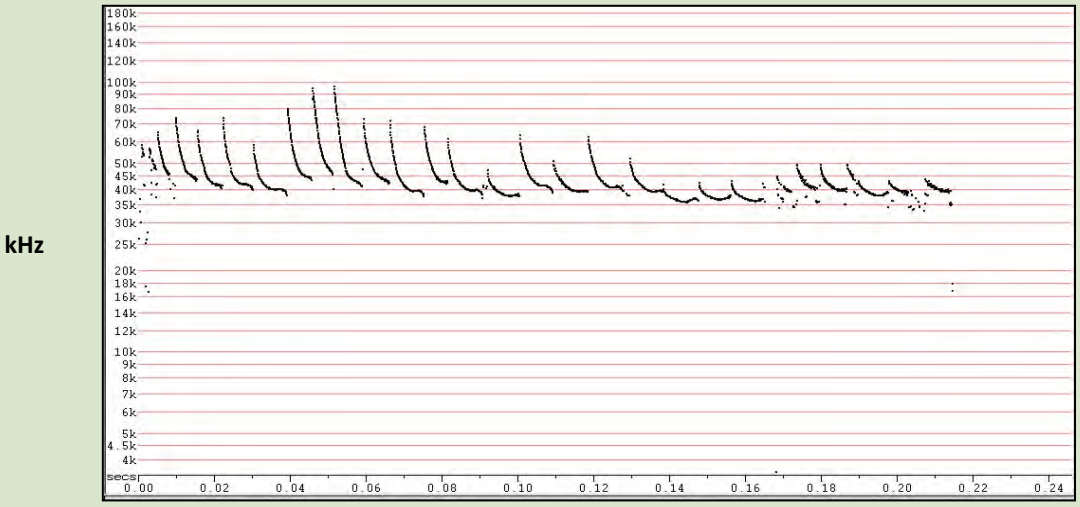
REPRODUCTION: Females usually birth two to three pups in June, although litters up to five have been recorded. (Eastern red bats are different than most Wisconsin bats as they have four mammary glands as opposed to two.)

HABITAT & HABITS: Both males and females prefer to roost alone one to six meters above the ground in trees such as elms and maples.

In September and October the Eastern red bat migrates south where it breeds and hibernates in tree crevices, and sometimes under leaf litter, until it returns to summer foraging grounds in April and May.

DIET: Eastern red bats eat primarily moths, but also true bugs and beetles.

Echolocation call:



Hoary Bat: *Lasiurus cinereus*

STATUS: Species of Special Concern

DESCRIPTION: The hoary bat has brown, tan, or yellowish fur, often tipped with white. The tail membrane is completely covered in fur, and the wings are partially fur-covered. The ears are light brown and rimmed with black.

REPRODUCTION: Females usually birth two pups, even though hoary bats possess four mammary glands like the Eastern red bat.

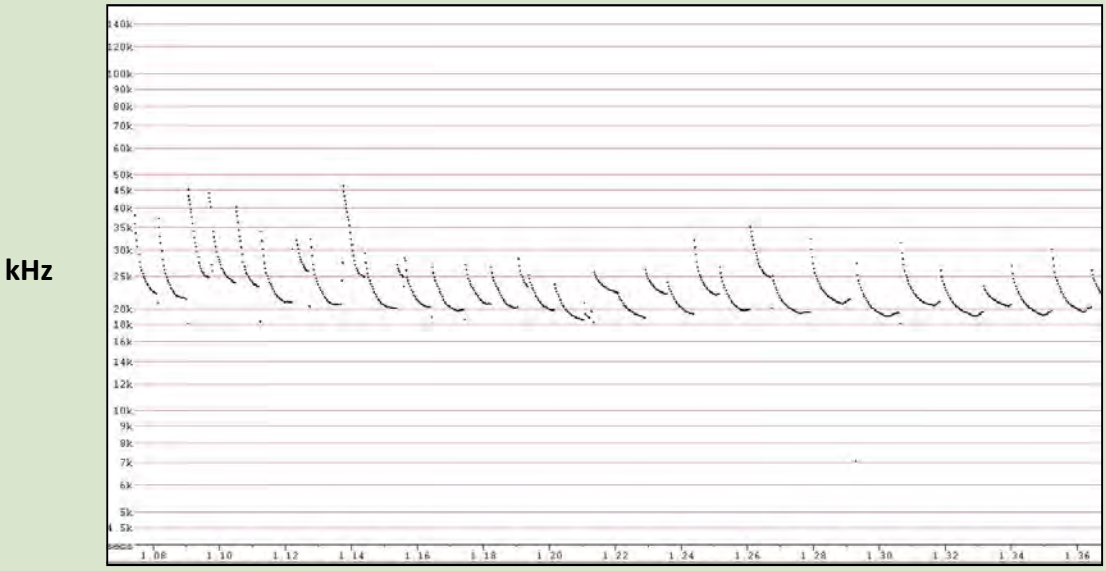
HABITAT & HABITS: In summer, the hoary bat roosts and forages in deciduous and evergreen forests. Both sexes roost solitarily two to six meters above the ground in maples, elms, cherries, and spruce.

In winter, the hoary bat migrates vast distances, often even to Mexico, to escape the cold.

DIET: Hoary bats prefer moths, and their echolocation calls are low frequency (below 20 kHz)—so low that occasionally humans can hear them echolocate.

The hoary bat is Wisconsin's largest bat, and is the most widespread species of bat in North America.

Echolocation call:



Threats to Bats

For hundreds of years, bats have been unfairly and inaccurately viewed as dirty and diseased animals that are out to get humans. Because of this, bats have often seen the brunt of human fear and anger. In many cases, common practice has been to kill any bats found in homes or buildings.

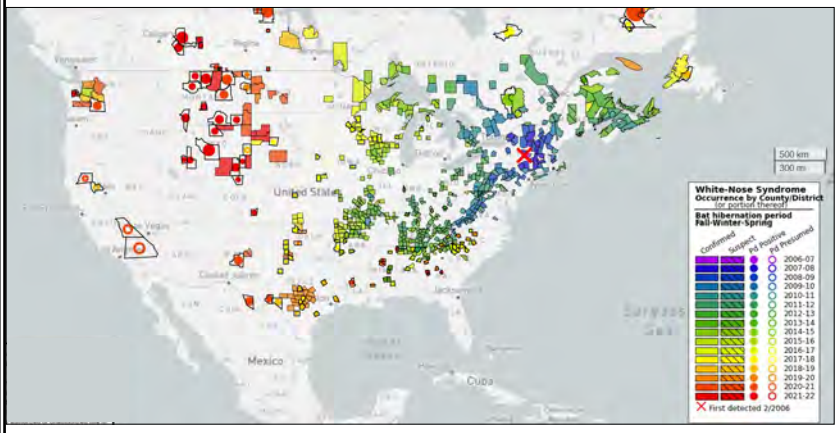
Today, bats face threats from habitat loss and degradation, hibernacula disturbance, and a disease called White-Nose Syndrome.

The invention of **pesticides** brought about an increase in rates of disappearance of bats. Bats are not only exposed to pesticides intentionally in attempts to evict them from homes, they are exposed to pesticides through the prey they eat. Because their predatory role places them near the top of the food web, the pesticides sprayed on insects can collect in the fat deposits of the bats causing problems such as birth defects and death.

Bats that hibernate in caves and mines are susceptible to **hibernacula disturbance** in winter. In order to successfully hibernate through the winter, bats must put on large amounts of fat. After bats have entered torpor, waking and returning to sleep uses fat reserves needed to make it through the winter. Entering hibernacula and disturbing the bats while they are hibernating can cause the bats to starve to death. Avoid any activities in winter that may disturb bats while they are hibernating.

The white powder seen on the bat's wings and nose in the photograph is the fungus *Pd.* www.whitenosesyndrome.org for more information on WNS.

Cave bats of all species are facing a new and unprecedented threat known as **White-nose syndrome** (WNS). In 2006, a fungus was discovered growing on a bat in a hibernaculum in New York state. It appeared as a white, powdery substance growing on the bat's nose, hence giving the disease its name: White-nose syndrome. It was later named by scientists as *Pseudogymnoascus destructans* (Pd), and it grows best in the cool, wet conditions of hibernacula. In five years, WNS has spread to 38 states and Canada. Every hibernaculum it contaminates continues to see 75 -100% mortality. White-nose syndrome was first discovered in Wisconsin in spring of 2014.



2023 distribution map for white-nose syndrome

Scientists are not yet certain of how exactly the fungus kills the bats, but it is clear that it affects the bats while they hibernate in winter. The Northeast has seen a dramatic decline in numbers of bats from WNS, and with the spread of the disease to hibernacula with endangered species, the United States could see the extinction of several species of bat in less than ten years.

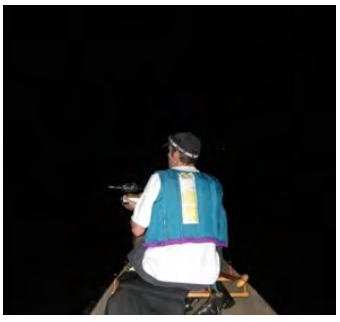
Another problem affecting bats in Wisconsin and all over North America is **wind turbines**. Turbines have caused mortality of all species of bats in Wisconsin, although they seem to affect tree bats more often than cave bats because of the migrations tree bats make in the spring and fall. Bats are not only hit by the turning blades of the turbines, they are also affected by the pressure differential caused by the turning blades. Directly behind the blades is a pocket of air of different pressure which causes the bats' lungs to fill with fluid similar to "the bends" in humans. It is not completely clear why bats are being affected by wind turbines, but research showing bats are more likely to be affected in the fall migration, during mating, indicates the bats may think the turbines are large trees. It may also be possible that the best places for wind farms are also the best migratory routes for bats.

What You can do to Help

Bats face many current and future threats. There are several things you can do to help bat conservation.

- ***Educate your friends and family***: Most hatred and fear of bats comes from misunderstanding. A large beneficial step can be taken by simply educating people about bats and how they benefit the ecosystem. Let your friends and family know how cool bats are, and how a single bat can eat up to 600 of those pesky mosquitoes in just one hour.
- ***Build and put up a bat house in your area***: A major threat to bats in Wisconsin is habitat loss. Most people do not want bats in their home, so they evict them. Provide evicted bats with an alternative summer roost by putting up a bat house on your property.

- ***Get involved in citizen-based bat monitoring in Wisconsin***: Before White-Nose Syndrome occurs in Wisconsin, WDNR researchers would like to create baseline inventories of species occurrences and numbers around the state. Two of the best ways to do this are to monitor summer roosting sites and perform acoustic surveys. Contact the Wisconsin Bat Monitoring Program for more information on monitoring in Wisconsin.



Doing acoustic surveys on a river

http://wiatri.net/inventory/bats

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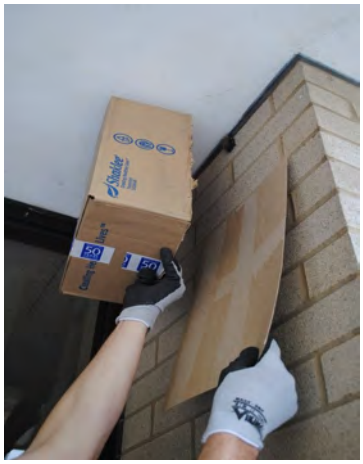
- ***Avoid disturbance of hibernacula and summer roost sites***: A common threat to bats is disturbance of roosting and hibernating habitat. If you find a bat roosting, leave it alone, and don't disturb bats in bat houses. Do not enter caves or mines in winter while bats are hibernating. Also, report any hibernacula or roosts you may find to the Wisconsin Bat Monitoring Program.
- ***Safely evict bats from your home***: The Wisconsin Bat Program has information on safely evicting bats from your home. One way doors should be put up in the winter after bats have left, and before they return in the spring. Never evict bats in the late spring and summer when there is the possibility of pups being in the roost, and never use pesticides or poisons to evict bats.
- ***Support the Wisconsin Bat Program***: If you still want to help out bats, but don't have the time or interest in monitoring, you can make a tax-deductible donation to the Wisconsin Bat Conservation Fund. This fund is an endowment of the Natural Resources Foundation and helps fund bat conservation and bat research projects. Select "endowment" and put "bat fund" in fund destination.

www.wisconservation.org

How to Safely Remove a Bat from Your Home

Occasionally bats, usually youngsters, will find their way into your living space. Do not panic. Bats are rarely aggressive, but they may bite if handled. Never handle a bat unless absolutely necessary, and always wear thick gloves if you need to handle a bat.

Bats are interested in getting out and away from you, and simply closing off the room and leaving a window or door open is enough to get them to leave. If the bat does not leave on its own, follow the instructions illustrated in the pictures below.



Step 1. Wait until the bat lands, and use a cardboard box or shoebox to trap the bat. Then slip a piece of cardboard under the box.

Step 2. Wait until the bat is off the wall and in the box.

Step 3. Take the box outside and leave the box open against a tree hollow, rock crevice or wood pile; preferably at breast-height or higher.

Sometimes the bat may not be able to fly from the ground. Leave the box tipped on its side on a table, or hold the box aloft so the bat can take flight. Do not attempt to throw the bat in the air to encourage it to take flight.

How to Exclude Bats from Your Home

While many bats still prefer to roost in natural roosts such as trees, bats are rapidly losing roosting habitat, and a few species will roost in homes or other buildings. It is beneficial to keep bats around because of their pest control qualities, but bats may be prevented from entering places where people live.

There are several places where bats may roost or enter a building. The best way to exclude bats is to prevent them from getting into the building in the first place. Keeping a well-sealed house is generally enough to keep bats out. Watch for any openings leading to the attic or other warm places, and seal them up before bats get settled (see figure on the next page for likely entrances).

However, bats are excellent at finding openings into which to enter the building, so proper exclusion methods can be used to evict the bats from homes. One-way exits are often used so that the bats may leave but not return into the building. Never use any sort of pesticides to evict bats because it is illegal. See Wisconsin Bat Program's exclusion instructions for more in-depth information about exclusion.

When attempting to evict bats from your home, several things should be kept in mind:

- Little brown bats and big brown bats which are the most likely to roost in homes are also the most likely to form maternity colonies in buildings.
- Do not evict bats during maternity season– June 1 through August 15. Using a one-way exit during this time period will not allow mother bats to return to the pups, which will die.
- It is most effective to install one-way doors after August 15th, because you can easily identify openings that the bats are using.

**Note: the big brown bat may overwinter in buildings, so before you start sealing your house, make sure there are no bats in it.*

- It is illegal to use pesticides or poisons to evict bats from houses.

Likely Entrances into Homes

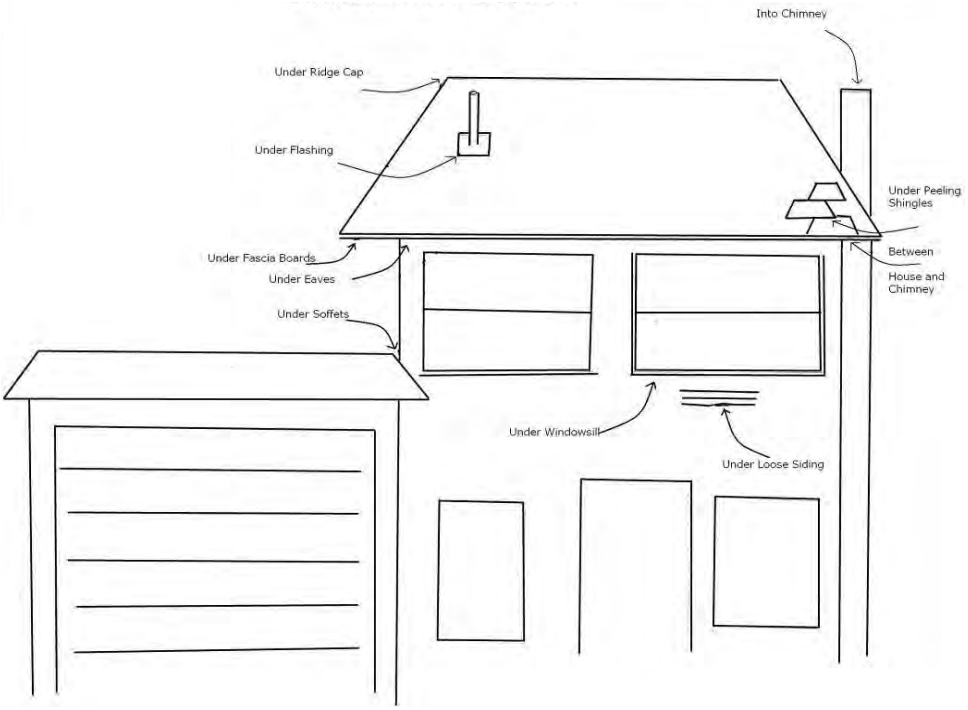


Figure 1. Where bats may enter your home

- If you don't feel like evicting the bats yourself, there are many professional pest control operators in the state.

One-way Doors for Bat Eviction

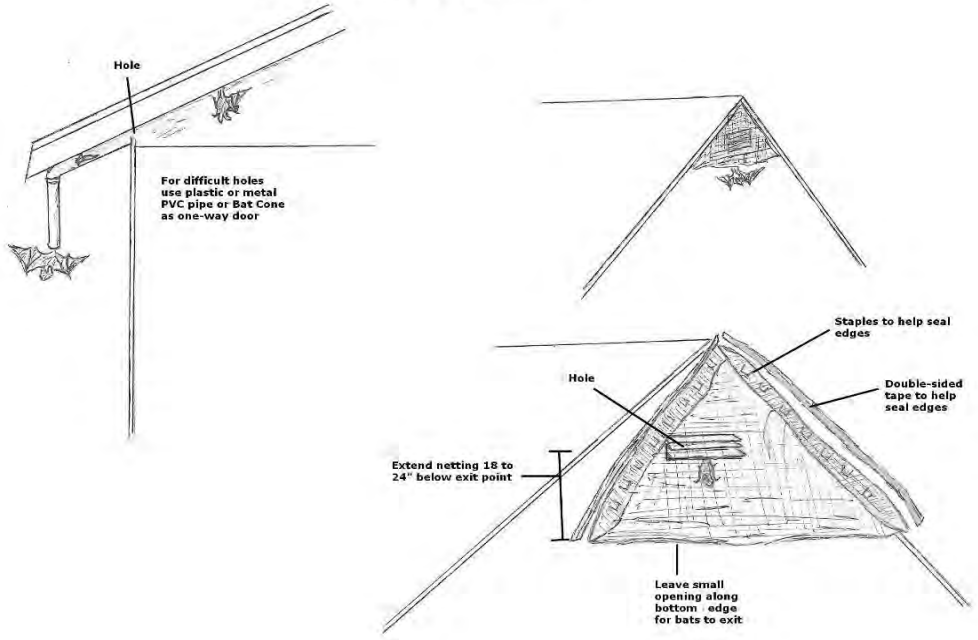


Figure 2. Two types of one-way doors often used to evict bats

Bat Houses

Whether you are looking to encourage bats, or are giving them a home after they are excluded, bat houses are a great way to provide roosting habitat for bats.

Bat house at Governor Dodge State Park

Bats can be a beneficial addition to your garden and yard because they eat millions of tons of insects every year, including mosquitoes and various garden pests. In addition to putting up bat houses, night blooming plants such as salvia, phlox, and spearmint, can be added to your garden to attract insects, and thus attract the bats that feed on them.

Included in the Build a Bat House Guide from the Wisconsin Bat Monitoring Program are useful instructions on how to build your bat house, where to mount it, and plans for several types of bat houses.

Once you put up your bat house, we encourage you to monitor it for the Wisconsin Bat Roost monitoring program.

Bats and Disease

There are two diseases that are most commonly associated with bats: rabies and histoplasmosis.

Rabies is a virus that is fatal unless immediate action is taken. Less than 1% of bats in the wild carry rabies. If you never touch a bat that you find on the ground, or behaving oddly, you greatly reduce your risk of exposure. If you think you have been bitten or if you see a bat flying in a room with a sleeping child, intoxicated or elderly person, safely capture it and work with your county health department to get the bat tested at the State Lab of Hygiene. Contact your health care provider immediately. If you find a bat flying in your home and you don't suspect it has been in contact with a person, safely attempt to escort the bat out of the building. (See page 13) For more information on rabies, see http://www.cdc.gov/rabies/

Histoplasmosis is caused by a fungus that can grow on large quantities of bird and bat droppings and manifests as a respiratory infection in humans. The fungus grows best in hot, humid enclosed spaces. Take the necessary precautions (masks and gloves) when cleaning enclosed spaces with large amounts of guano.

Bats are fascinating creatures that are threatened and lack basic information. The Wisconsin Bat Program encourages anyone who is interested in bats to do more research and get involved with bat monitoring in Wisconsin.

Additional Information

Useful Websites:

Wisconsin Bat Program Website: http://wiatri.net/inventory/bats

Bat Conservation International: www.batcon.org

USFWS White-nose Syndrome: www.whitenosesyndrome.org

Contacts for Wisconsin Bat Program:

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