

Welcome everyone, thank you for coming. My name is _____. I'm with *Speaking for Wildlife*, a wildlife volunteer program run by the University of New Hampshire Cooperative Extension. *Speaking for Wildlife* is a program that brings wildlife presentations and nature walks to New Hampshire communities.

Today I'll be talking about bats in NH and a disease in bats called white-nose syndrome, which is killing millions of bats. This program was developed by two biologists working to conserve bats in New Hampshire: Emily Preston of NH Fish and Game, and Susi von Oettingen [*pronounced "von-ott-in-jen"*] of the US Fish and Wildlife Service – so we thank them for their efforts.

I'll talk for about 40 minutes, and then we'll have some time for questions at the end. But if you have questions about the slides I'm showing, feel free to raise your hand during the presentation.

- What's So Interesting About Bats?
- Eight Species of Bats in NH
- White Nose Syndrome
- How You Can Help!

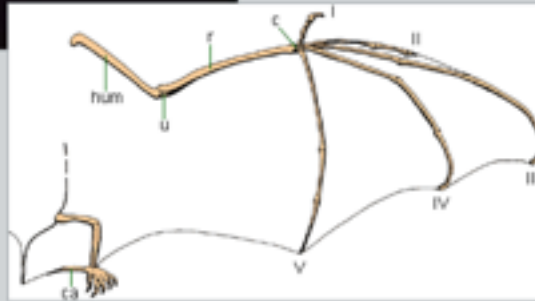


Why am I here to speak about bats, or perhaps why did you come to listen? Because bats are really interesting! They are mysterious to us because they fly at night, so we get just brief glimpses of them. They are mammals, not birds, but they've adapted to flight in many of the same ways. We've been told scary stories about bats, and sometimes we believe them.

- Today I'll explain some of the special ways bats have adapted to life in the air.
- Then I'll go over the 8 kinds of bats we have in New Hampshire. All of these bats are considered "species of greatest conservation need" in the NH Wildlife Action Plan.
- After that, I'll tell you about a disease that is affecting bats called white-nose syndrome.
- And finally I'll describe some ways you can get involved to help bats here in New Hampshire.

So, let's get started.

What's So Interesting About Bats?



Who here likes bats?

Bats are a very important part of the world's ecosystems. As far as mammals go, they are incredibly numerous, representing 20% of all of the world's mammals. Bats in the tropics are important pollinators of flowering plants. Bats in northern places like New Hampshire eat tons of insects.

Bats are the only mammals that are true fliers, like birds. Bat wings are strong and flexible, so they can move incredibly quickly to grab insects flying through the air. Their bones are similar to your arms and hands, if we had very long fingers. They use the thumb, which sticks up, for hanging and crawling. Their feet are great for clinging upside down, but their legs are too weak for them to jump off the ground and fly so they have to crawl up a tree trunk or wall and fall off to start their flight.

Note: Try spreading your hand to resemble a bat's when you talk about the bat's skeleton. It helps people visualize the bat's wing.



Bats are the greatest predator of night-flying insects in many places, including New Hampshire.

They have high energy needs, so they eat a lot of insects -- often half their body weight every night! And they eat more if they are a female with pups.

Each bat species has preferences in the types of insects they eat and how they catch them – for example larger bats prefer larger insects. Some bats snag insects out of the air, while others, like long-eared bats, can grab insects and spiders off leaves and twigs.

Bats are also important to us because they eat some agricultural pests, forest pests, and, best of all....mosquitoes!

Bat Facts - Echolocation

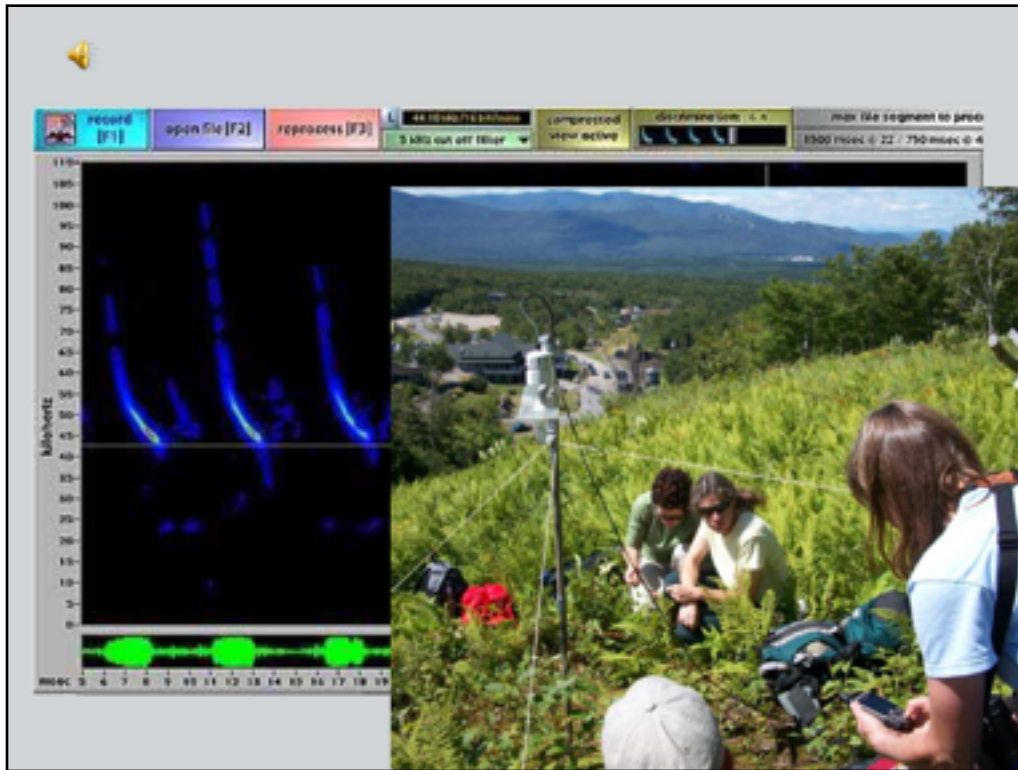


Bats have a special ability called **echolocation** to find their way through the woods and find the flying insects they depend on for food.

Basically, bats send out a high-pitched sound and listen for the echo. Their hearing is so precise that they can pinpoint where the insect is and hone in on it while both animals are flying through the air.

Bat's incredible sense of sound and hearing also makes them hard to catch, as they can sense nets and avoid them. When biologists are able to catch them in mist nets stretched across trails or streams, the bats are probably concentrating on prey and thus ignoring the net.

Fun Fact: Some moths have evolved ways to sense echolocation calls to avoid being eaten.



The sounds that bats make are done in distinctive patterns that can be picked up on a special microphone and recorded.” Some species can be identified by their sounds alone. This allows researchers to count and identify bats without catching them, and these microphones can be set up to run several nights in a row.

Click for sound.

Here is what the bat echolocation calls sound like when they are slowed down so our ears can hear it. These sounds are emitted by the bat 10-50 times every second as it is flying, and speeds up as it gets near its intended prey.

The photo shows Forest Service biologists setting up a bat detector on Mt. Washington.

Bats can see!



Bat's eyes are small but they can see. Some species can see as well as or better than we can.

Lifespan

The common little brown bat of North America is the world's longest lived mammal for its size, with a normal life-span of 20-25 years!



Bats live a long time. Little brown bats, one of our most common, house-dwelling bats, lives for 20-25 years. There are records of them living to over 32 years!

Like most long-lived animals, they have few babies at a time, often just one per year. This makes it hard for them to recover after a serious population decline.

Note for speakers:

Little brown bats have 1 pup/year

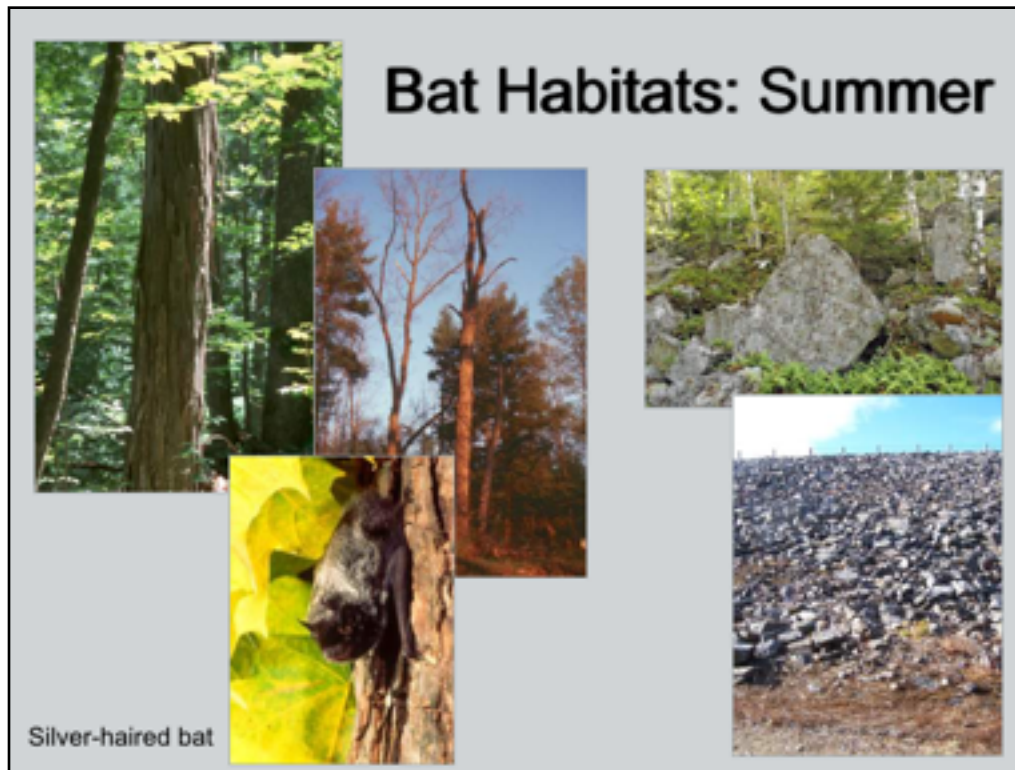


So let's take a look at a year in the life of a bat. They live very interesting lives!

- Bats hibernate in the winter, either in cool, damp caves or mines in the northeast, or down south for those that migrate there. Bats have likely adapted to hibernation since they depend on flying insects for food that are only available during the warmer months. They lower their body temperature to match the surrounding air, slow their breathing and heart rate, and basically just stay alive all winter. They don't eat. The fat they store in the fall can get them through 5 months of winter. **[CLICK]**
- In the spring, bats fly to their summer roosts in trees or buildings. A roost is any place that bats stop and hang upside down. Some bats stay in the same roost all summer and some move around from tree to tree. They start to feed as soon as they can. The females become pregnant using sperm they stored after mating in the fall. Bats may arrive in your neighborhood as early as mid-April. **[CLICK]**
- Some species form maternity colonies and some roost singly in trees. Males roost separately from females. Pups are usually born in June. The pups grow quickly on their mother's rich milk. Some species carry their young while flying, some rarely do. All bats feed every night in the forest, navigating among clearings such as paths, logging roads, streams, and wetlands. **[CLICK]**
- In mid-August the bats and flying pups start to return to where they hibernate (I'll talk about the kinds of habitats they require in a moment). Bats form swarms on fall nights while feeding and while mating, and by the end of October they are ready to hibernate again. **[CLICK] to complete the cycle**

Extra Information for Speakers:

- *Bats wake up on a regular but infrequent basis during hibernation. They may move to a different part of the cave, drink water, mate or groom.*
- *Bats truly hibernate, dropping their body temperature to match the air in the cave or mine, about 40-45 degrees and also slowing their breathing and heart rates. In addition, most other metabolic functions shut down, including the immune and digestive systems. The high humidity of 80% or higher is critical for the bats' survival. Bats will huddle in small or large clusters, or hang singly for the cave walls and ceiling. During the course of the winter they periodically warm themselves up and may move to a different location in the cave or drink water. This takes a lot of their stored energy, so additional arousing due to human disturbance can take a toll. Staying out of caves and mines is critical for bats survival.*

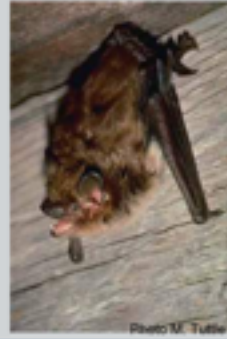


In summer, different kinds of bats that use trees for roosting use different parts of the tree, and have preferences in the level of decay of the tree. Some use live trees, sleeping in the foliage, and some use dead or dying trees, roosting under flaking bark or in holes.

The state-endangered eastern small-footed bat likes crevices in rocky hillsides and cliffs. They will even use the artificial rocky slopes on dams like you see in the picture at lower right.

Bat Habitats: Summer

Little and Big Brown Bats



Little and big brown bats are often called house bats because they like to live in large colonies in the summer, in hot areas such as the rafters of barns or in attics. Females form maternity colonies, which can number in the thousands. With all those bodies and the heat from the sun warming the space under the roof, the babies keep warm without using up precious food energy. They can put all their mother's milk into growth instead, and thus grow faster and better than individuals in very small colonies.

Bat houses are substitute buildings for these two species of bat. They work best when they are large, hung at least 12 feet up on the south or southeast side of a building, and are painted dark so they heat up quickly.

Bats in your House

- Open windows so they can fly outside.
- In attics, exclude bats in spring before mid-May and after August so as not to trap babies inside.
- Bat houses can help bats that you exclude – put them up before the exclusion.



Exclusion device

Two species of bats, big brown bats and little brown bats, like to use houses as roosts. They want to be in the hot, dark, quiet attic, not your living room. If they accidentally get into the living spaces of your house, just close the interior doors and open exterior doors and windows in whatever room the bat is in. It will soon find its way out, especially if you leave the room so as not to confuse the bat.

There is much concern about rabies in bats, and rabies does occur in bats, even though they don't show it. This is why you should never touch a bat with bare hands. If you have to handle one, use leather gloves. If you suspect you or someone else has been bitten by a bat, call your doctor right away. Rabies is transmitted through saliva so you CAN NOT get it from just having a bat in the same room. If a bat is found in a room with a person who is asleep, young, mentally unstable or intoxicated, contact your health care provider.

If you have bats in your attic, and don't want them, you can hire a licensed wildlife control operator to do an exclusion (or you can do it yourself). They will put up a 1-way device over the holes where bats enter your house, so the next time they fly out they cannot get back in. After the bats are all gone, you can seal up the holes. However, from mid-May through mid-August the bats have babies that cannot fly. To avoid baby bats starving in your attic, don't hire someone to do this exclusion during that time. Most won't do it anyway.

More Information for Presenters

Exclusion device: The bats crawl out and down the inside of the screen. When they come back, they can't get in as they hone in on the airflow from the attic and don't know to find the edge of the screen and crawl up to the hole from under the screen. The device is then removed and the hole sealed up.



To get ready for the winter, NH bats either fly to caves or mines to hibernate or migrate south to warmer climates.

Many species migrate long distances between summer and winter habitats - some up to 800 miles!

Most NH bats fly out-of-state for the winter. NH does not have enough "hibernacula," (caves and mines where bats can hibernate), to accommodate all our bats. Bats require a steady 40-50 degree temperature and very high humidity to survive hibernation. Over 80% is required but nearer 100% is better. All the cave-hibernating bats may gather together in one hibernacula. All the hibernacula identified in NH by NH Fish and Game are in mine shafts, but there may be a natural cave somewhere on Mt. Washington that houses a large population. More about that later.

[CLICK]

Migration is hazardous for bats, made worse by wind turbines on the ridges they follow as they fly. This is one of the reasons there is so much discussion on the placement of turbines in the northeast, as the ridges which are great for wind are also great for migrating birds and bats.

MORE INFORMATION FOR PRESENTERS

Cave and mine hibernators (includes 5 species) *Big and little brown bats, northern long-eared bats, tricolored bats, eastern small-footed bats* **Migratory:** *red, hoary and silver-haired bats. Big brown bats will also hibernate in buildings.*



New Hampshire has eight species of bat, and all of them are declining. That's one of the reasons volunteers like me are going out and doing these talks – we want to let people know that bats are in trouble. Since we don't often see them, it's hard to realize!

Bats are hard to tell apart. For some you need to be very close – looking at their faces or in their ears.

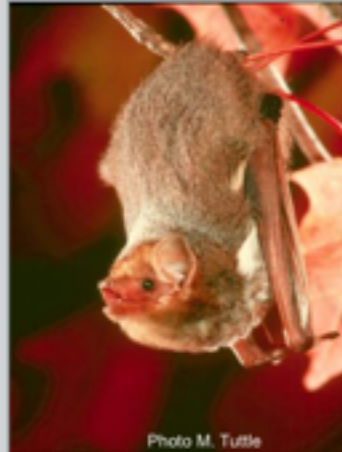
In this picture, the bats outlined in white are declining because of habitat loss and threats such as wind turbines. These include silver-haired bat, hoary bat, and eastern red bat.

The bats outlined in red are those that are affected by white-nose syndrome, which I'll talk about in a minute. These include the tri-colored bat, eastern small-footed bat, little brown bat, big brown bat and northern long-eared bat.

Now I'll tell you a bit more about each of the eight different bats that breed in New Hampshire.

Red Bat

(*Lasiurus borealis*)



Wingspan: 11-13 inches

The first three bat species I'll introduce all migrate south for the winter and don't hibernate in New Hampshire.

Red bats roost in the foliage of evergreen trees in summer. They are solitary, and spend their nights hunting around forest edges in clearings. You might see them feeding on insects that gather around streetlights.

Red bats are unusual in that they can have 2-3 young, instead of the single pup most bat species have.

In the fall they migrate south to the southeastern US where they forage in the forest, but crawl under leaf litter on cold nights. They have an 11-13 inch wingspan and can be identified by their bright fur.

Hoary Bat

(*Lasiurus cinereus*)



Wingspan: 13-16 inches

Hoary bats roost in trees year round – here in summer and down south in winter. They like forests with dense foliage above, and a relatively open understory below for hunting. They are rare and seldom seen.

Note for Presenters:

They also have 2-3 young and are very large, with a 13-16 inch wingspan.

Silver-haired Bat

(*Lasionycteris noctivagans*)



Wingspan: 11-13 inches

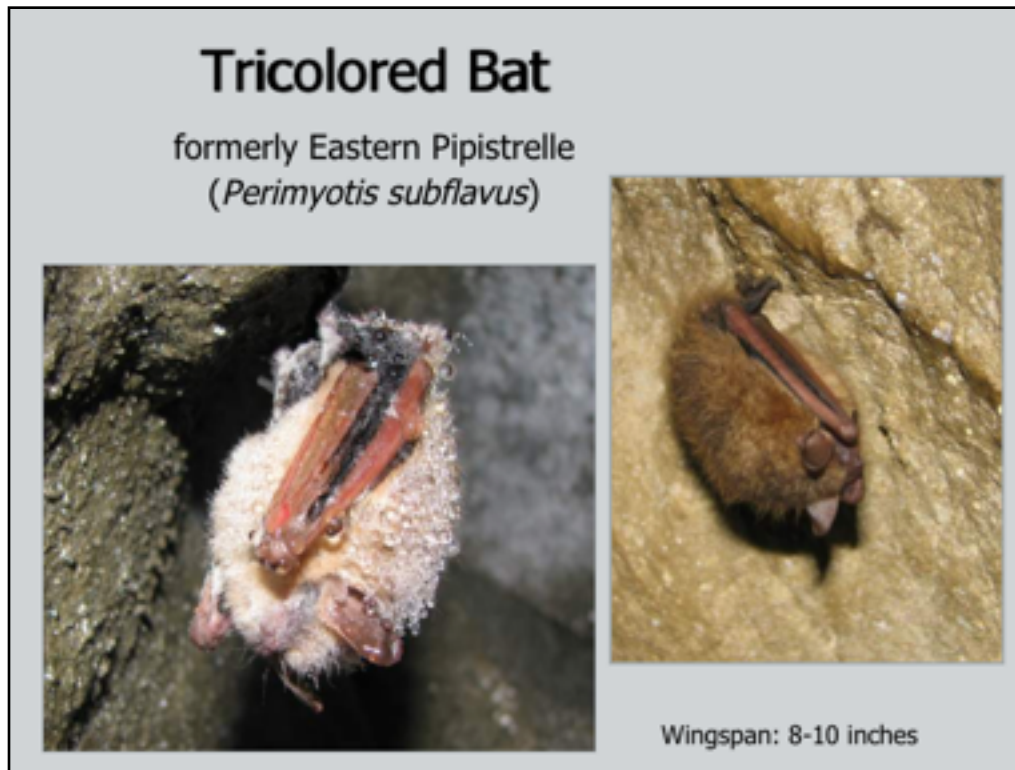


Silver-haired bats are the third of the migratory bats. These dark bats can be recognized by their slow flight. They roost in summer under the bark of dead and dying trees, or in old woodpecker holes or other crevices in trees. They roost low to the ground, sometimes as low as 3 feet up a tree. In the winter they head south where they roost in trees or rock crevices.



The next five species of bats all hibernate in caves and mines in the winter, so we often call them “cave bats.” They may travel far to find the right hibernacula. Some bats tagged by scientists in Peterborough, NH have been found hibernating in mines near Albany NY. All cave bats are affected by white-nose syndrome, which I'll talk about later.

Long-eared bats roost in trees in summer, and hibernate in caves and mines. They prefer to roost under bark, so they like large, dead trees. In the winter they crawl deep into cracks in the rock and so can be hard to find and count during winter surveys. Their population has declined dramatically due to white-nose syndrome, and they were listed as threatened in 2015.



Tricolored bats are small bats, with only an 8-10 inch wingspan. In summer they roost in trees, with females bearing twins and living apart from other bats.

During hibernation they hang singly from ceilings and are often frosted by condensation since they prefer areas with very high humidity. Ninety-five percent (95%) is ideal.

Their name comes from their colorful look - notice the reddish wings.



Eastern small-footed bats are endangered in New Hampshire, as well as in several other states.

In the summer, they roost in crevices in rocky slopes, cliffs and even the loose rocky slopes on dams. A Fish and Game biologist who was looking for black racer snakes under rocks found one colony of these bats in the crevices on a rocky hillside. The photo on the left is one of the bats he found. In the winter, eastern small-footed bats also hibernate in caves, but may use deep cracks in the rock and are probably using all sorts of very small caves that humans cannot get into.

Only one mine in NH is known to have hibernating small-footed bats.

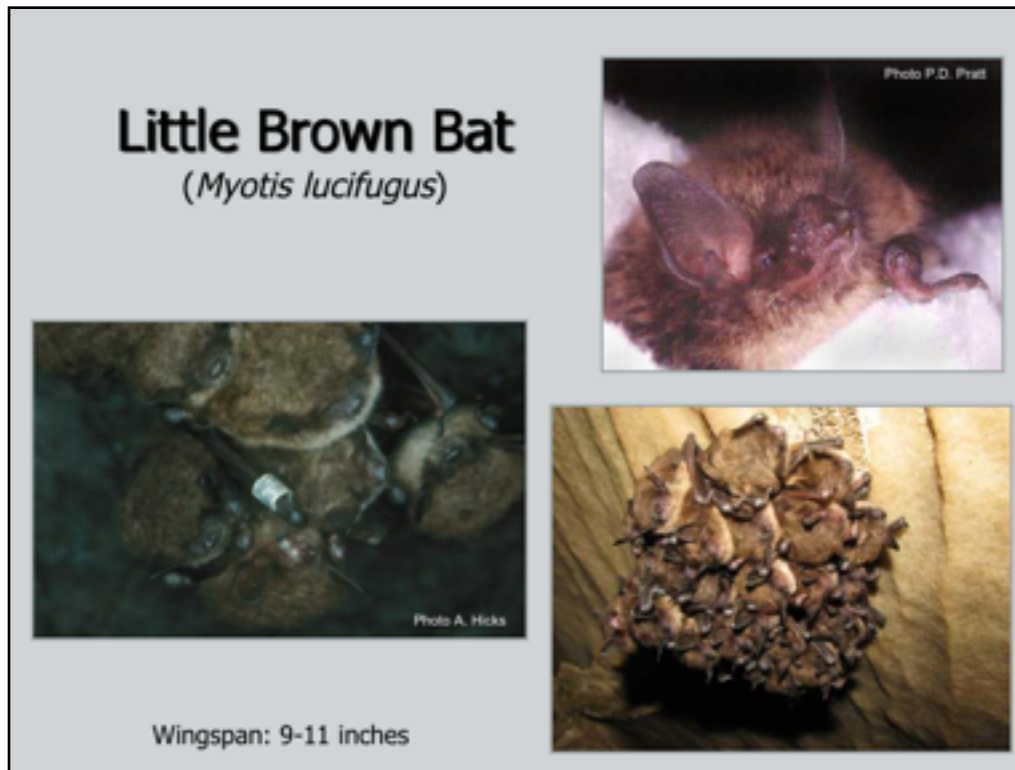


Big brown bats are one of the two species humans encounter the most, because they roost in buildings in summer and in winter.

In the winter, they appear to tolerate the drier conditions and somewhat variable temperatures found in buildings, as opposed to the consistent temperatures and high humidity found in caves, so while they will hibernate in caves and mines, they can also use buildings for hibernation.

In summer they are the most common attic bat and will also use barns and other buildings. At night, after feeding on insects for awhile, they will rest in garages or on porches.

They often have 2 babies, unlike most of the other cave bats.



Little brown bats also live in houses and barns in the summer, preferring buildings close to open water so they can forage on mosquitoes and other aquatic insects. They hold their single pup between their wings during the day, and prefer to gather in very large colonies, with hundreds if not thousands of other bats around them.

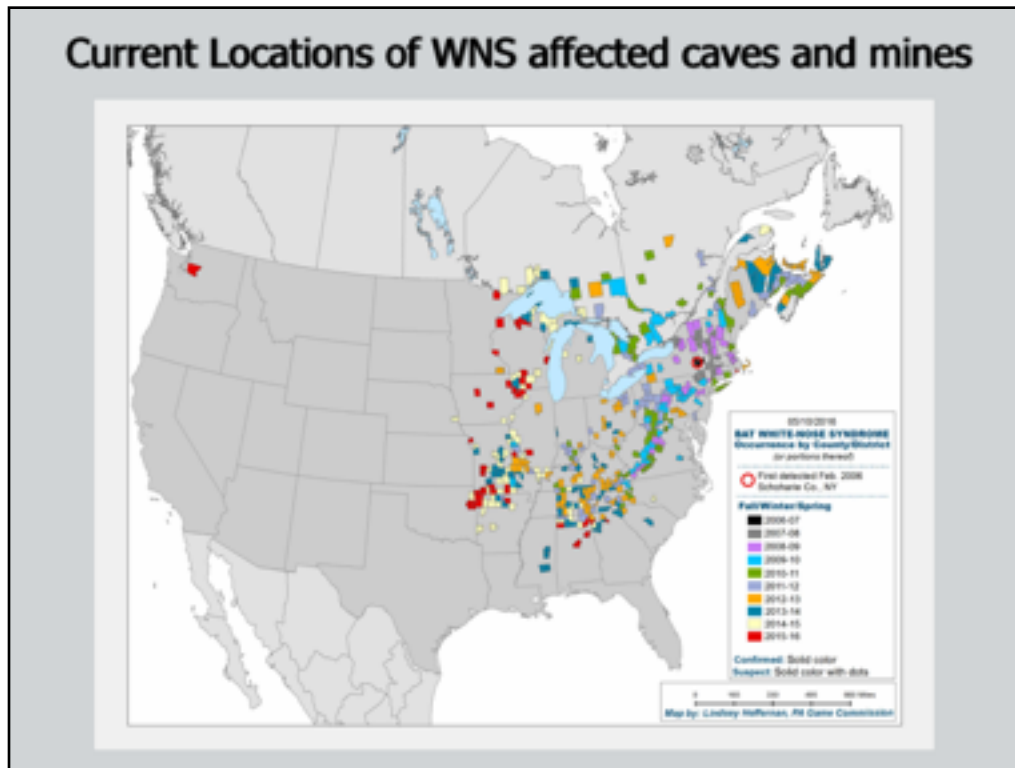
In the winter, they all go to caves and mines. They are the most susceptible to the new, devastating disease, **white-nose syndrome**.



White-nose syndrome is a relatively new disease in bats that is causing mass mortalities at hibernacula from New Hampshire to Oklahoma, and is spreading fast.

Cave-hibernating bats in New Hampshire have been decimated by WNS; winter surveys of bat hibernacula have documented major population declines – nearly 99% for two species and large declines of three other species. WNS has killed millions of beneficial, insect-eating bats. One study predicted that little brown bats, the most common bat prior to WNS, might be gone from the Northeast by 2026.

Bat hibernacula surveys in NH in 2011 truly brought home the devastation caused by white-nose syndrome. In four of the largest mines, there were only 16 bats. One mine was completely empty. In 2009 those same four mines housed 3230 bats. By 2015 only 31 bats were counted in all surveyed hibernacula.



White-nose syndrome was first found in Albany County NY in the winter of 2007, shown in black on the map. The next winter it spread to Connecticut, Massachusetts and Vermont, shown in grey. In the winter of 2009, shown in purple, it arrived in New Hampshire, but there was no mortality found that year. It also got as far south as Virginia and West Virginia. In 2010 the disease spread rapidly northward and westward, reaching far into Ontario and all the way to Kentucky, as these blue areas show. By this point, two species of bats in New Hampshire had declined by 50%. In 2011, shown in green, it has moved further east into Maine, New Brunswick and Nova Scotia and also into several southern and Midwestern states. (North Carolina, Kentucky, Tennessee, Ohio and Indiana).

In 2016, a White-nose Syndrome infected bat was found in Washington State (shown in red) - a leap of over 1300 miles. Research has found that the fungus detected in Washington is genetically similar to strains found in the eastern United States and did not likely originate in Eurasia. While it is unclear how the fungus reached Washington the finding reminds us of the importance of taking precautions to reduce the risk of spread by humans—I will talk about this more later.

WNS has spread rapidly and by 2016 white-nose syndrome has been confirmed in bat hibernation sites in 29 states and 5 Canadian provinces. All states are now worried about this devastating disease and are working to prevent its spread.

MORE INFORMATION FOR PRESENTERS: NOTE: This map is updated frequently. Download the talk and/or shortly before presenting it to make sure you have the most up-to-date version. Those areas shown as suspect did not have all the lab tests appear as positive, but the fungus was seen and some of the lab tests showed positive (i.e. the fungus was present but there was no proof it actually was infecting the bat). The standard for confirming WNS is to see tissue damage.



White-nose syndrome affects bats primarily in the winter when they are hibernating in caves and mines. The first sign is a white fungus on the nose, ears, wings or tails, but not all affected animals show this sign. (*Point to nose, ears and wings on photo at left*)

This fungus, new to science and appropriately called “*Pseudogymnoascus destructans*,” [*pronounced “Sue-doh-gym-no-az-cus Destruct-ans”*] grows in the damp 40 degree cave environment. It dies back in warmer temperatures.

The bats will groom off the fungus before they fly. In the spring it may be seen as a scaly residue on arms but it is not visible on most bats. By summertime, there are no visible signs of the fungus on any bats.

Affected bats show some abnormal behaviors. Some move to colder places in the hibernacula. Others fly out, apparently in a desperate attempt to find food and warmth. They can be found dead in front of the hibernacula or on nearby structures, but most are quickly eaten by waiting predators such as foxes and ravens.

What is the Cause of Mortality?



What causes bats to die? This photo is of dead bats on the floor of Aeolus Cave in Vermont.

Bats are starving to death – they are very underweight and by the time they leave the hibernacula in desperation, their organs have already started to fail. Although bats have a regular pattern of waking up and returning to hibernation all winter long, with white-nose syndrome they wake up more frequently and stay awake longer, burning up precious stored fat.

The fungus actually grows into the skin of the bat's wing, damaging the skin, muscles, and blood vessels. Bats depend on their large thin wings for water and air exchange. The damage could cause the bats to become dehydrated and wake up from hibernation more often to find water.

There is no treatment yet for the fungus. However, in the last few years researchers have made progress towards a treatment. For example, in 2015 a collaborative group of university, state and federal partners released bats that had been successfully treated for WNS. A lot more research is needed to determine the efficacy (it is VERY hard to treat thousands of flying animals), as well as the environmental safety of this and other treatments.

How Might WNS be Spread?



How do bats get white-nose syndrome?

Bats can transmit the fungus to one another when they touch each other in the hibernacula or in their summer colonies. The fungus remains in caves and mines even when bats are not there, so they pick it up when they return.

Even though the fungus is not active in the summer, it is likely the bats are carrying the spores with them as they travel back and forth between summer and winter roosts.

MORE INFORMATION FOR PRESENTERS:

The spores are called conidia.



Bats disperse from their hibernacula in all directions to join bats from other hibernacula in summer colonies. This way the populations are constantly mixing together, making the spread of white-nose syndrome happen quickly.

This illustration is from one study of bats that hibernate in Aeolus Cave in Vermont. This was one of the largest hibernacula in New England, and tens of thousands of bats have died there already. You can see that some of these bats went to maternity colonies near the caves in New York where white-nose syndrome first appeared.

How Might WNS be Spread?



Cavers, those people who love to explore caves, and bat researchers could be moving the problem between sites on their gear. Most affected sites first found during 2008 had been visited by people that had been in the original four sites during 2007, based on surveys of cavers. The sites in Virginia and West Virginia were too far for bats to have carried it during normal movements. It is also likely that a human brought the fungus from a cave in Europe, where the fungus is common and does not appear to harm the bats. In addition, the new discovery of WNS in Washington state may have been brought there on clothing or gear.

Decontamination protocols have been developed and refined to prevent this type of spread, but they only work if people use them. This has been difficult, as the culture of caving is such that you weren't a "real" caver unless your caving suit was so dirty it stood up by itself. But cavers love bats, so they have been willing to wash and disinfect their suits and other gear, or borrow gear when they travel to prevent the spread.

Disinfection procedures can be found at whitenosesyndrome.org

What do we know now??

- The fungus is new to science and is named *Pseudogymnoascus destructans*. Its genome has been mapped.
- It grows into the skin, especially on the wings, destroying the tissue.
- Bats, caves/mines, and human gear can transmit the fungus.
- Bats appear to die from disruption of their metabolism.



So what do we know now about white-nose syndrome?

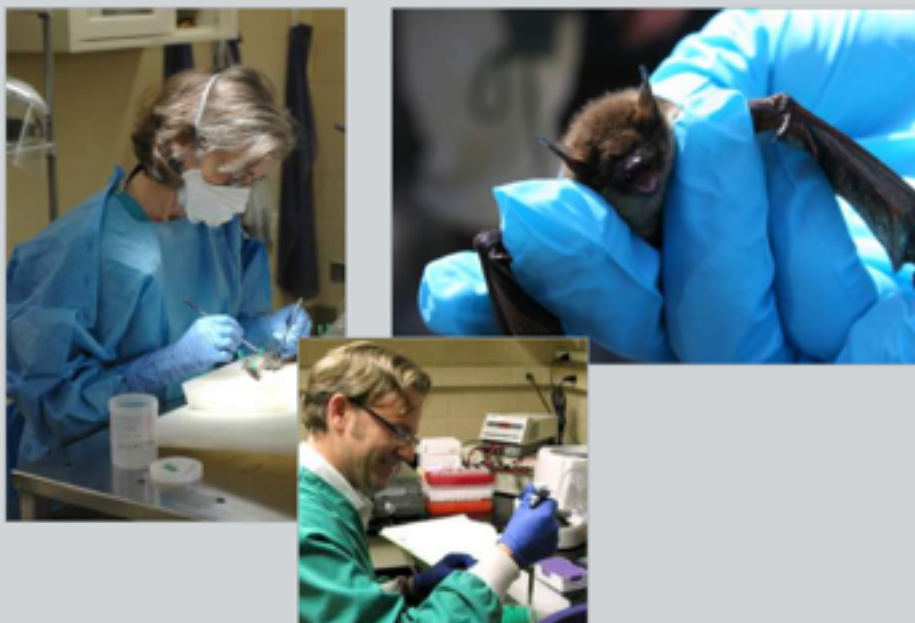
A huge team of state and federal agency biologists, universities and conservation and caving organizations are working together to stop the spread, find a cure and recover the devastated bat populations. Studies have already been done to determine what the fungus is (first bullet), what it does to the bats (second bullet), how it is transmitted (third bullet) and how the bats die (fourth bullet).

But there is still a lot we don't understand, so research is ongoing.

MORE INFORMATION

The White Nose Syndrome fungus has been identified as a new fungus, a relative of a common soil fungus but that requires cold and very humid conditions on which to grow, like the 40 degree, 80% or higher humidity of bat hibernacula. This fungus appears to originate from Europe, where it grows on bats but does not harm them. So the genetic work being done on the fungus might help us see if our strain is somehow different from that one. We know what the fungus does, growing right into the skin and destroying the tissues there, but not precisely how it kills the bats, just that they become emaciated and die.

New Research



There are many kinds of research projects going on to save the bats.

- This includes finding treatments, preventing transmission, learning more about the immune response of the bats, and genetic work on the fungus and the bats.
- Treatment is especially difficult. Most medical fungicides are put on the skin, but how do you do that for thousands if not millions of bats? Bats won't fly through a mister, as they sense it with that keen echolocation and perceive it as a barrier. And treating just the deadly fungus without harming natural fungi in the caves is critical.
- To keep track of all that is happening, and provide a forum to share new ideas and cooperate on projects, state and federal agency biologists and researchers meet by phone biweekly to keep communication flowing.

As I mentioned earlier, researchers continue to make progress towards a safe and effective treatment and are testing a variety of treatment options for WNS. Some of the potential treatments are moving to limited field testing.

MORE INFORMATION FOR PRESENTERS:

Finding treatments that kill the fungus but do not harm the bats is difficult. And then making it possible to actually treat the bats in the caves is even harder. There have been some possibilities, but so far no positive results. This is a critical area, and several researchers are working on it. There needs more done on what the fungus does in the summer – it appears to be affecting reproduction but we are not sure how widespread this is. Finding out how the bats are fighting or not fighting the fungus is critical. And the genetic work will tell us much more about the fungus and the bats that are resistant so that we might be able to find a cure. There are new studies being started all the time, as researchers answer some questions only to find a large number of additional questions that need to be answered as well.

Work in New Hampshire

- Surveys of hibernacula
- Participation in national studies
- Counts of maternity colonies



Luckily, Fish and Game has been surveying nine hibernacula in NH for several years. This is done by bat researchers, Dr. Jacques Veilleux and Dr. Scott Reynolds, assisted by NH Fish and Game biologists. Fish and Game was able to track the population growth in NH for several years before it crashed in the winter of 2009-2010. In that year, the population in all but one hibernacula dropped 50-98%. In 2011, the populations dropped even further – most sites being reduced 98-100% from pre-white-nose syndrome populations.

Researchers in NH, and throughout New England, have found evidence of persistence in Little Brown bat populations. Over a four year time period from 2009-2013, over 100 marked bats had survived at least one winter – and up to six winters – since the arrival of white-nose syndrome. The researchers also observed over 50 bats showing signs of successful reproduction. Unfortunately, while survivors have been documented for little brown bats, similar observations have not been reported for other affected species.

In 2015 a national monitoring plan (the North American Bat Monitoring Program - *NABat*) was created that includes protocols for acoustic monitoring and colony counts with the goal of producing reliable data that can be used in conservation and planning. NH Fish and Game participates in national survey efforts that use these protocols and recruits volunteers to help. Check out their website if you are interested.

Photo caption: Dr. Scott Reynolds getting ready to enter a hibernacula for a winter survey, wearing the protective gear required by the decontamination protocols to prevent the spread of white-nose syndrome by humans.



So, what can you do?

Preventing both the spread of WNS and allowing the bats to hibernate undisturbed are things anyone can do to help bats.

Many caves and mines have been closed to humans year-round. Some have bat gates, like this NH mine, where the bats can easily get in and out but humans cannot, except through a small locked gate. Other caves just have a sign. Please pay attention and do not enter a closed cave or mine.

In the winter, stay out of any caves or mines. Not all places that bats hibernate have been discovered yet or have signs to stay out, so it is best to just stay out of them so as not to disturb any bats.

If you enjoy caving, there are decontamination procedures you should take to prevent carrying the fungus from one cave or mine to another. Closures for caves on federal lands and decontamination procedures are found on the US Fish and Wildlife website.

If you like the sport of geocaching, please do not put your cache in a cave or mine, and help us spread the word.

Note: this photo was taken before WNS, so the researchers are not wearing protective gear.

What You Can Do: Protect Maternity Colonies



- Offer homeowner solutions!
- No exclusions mid-May through August
- Offer bat houses as replacements (bigger is better!)

Have any of you ever had bats living in your house or barn? Finding solutions to the problems bats can cause **without removing them from where they live** is an important thing you can do for bats.

- Bats in attics are a problem that usually can only be remedied by excluding bats from the house. However, in barns and outbuildings, tarps or other types of ceilings can be put up to catch the bat droppings, and be easily removed for cleaning. Thus the owner gets to use the barn for equipment and the bats get to use it too.
- Allowing bats to be successful in raising pups is critical, so even in attics, if there is no immediate human health issue, let the bats remain there until the pups fly, then exclude all the bats. For the homeowner, excluding bats when pups are there runs the risk of dead bats remaining in the attic.
- Building bat houses can help too. Be sure they are large and put up properly. Bats look for good roosting places in buildings, so a bat house should be on a building, near the roof, and on the south side so it can get hot.

What you can do: Report Bats

- Report sightings of bats outdoors, either flying or dead, in the winter months.
- Use our web-based reporting form linked from the NHFG website www.wildNH.com
Or call 271-2461 or email **wildlife@wildlife.nh.gov**
- Report information about your maternity colonies.

To track the progress of WNS, or even to find new hibernacula, NH Fish and Game depends on citizens to report flying or dead bats in winter.

In March of 2010, back country skiers on Mt. Washington reported seeing bats flying over their trail. Word got around on the backcountry blogs, and more sightings were reported to NHFG. This showed that there was a hibernacula somewhere nearby, one that no one had known about. The precise location is still unknown, but the White Mountain National Forest biologists are working with NH Fish and Game to find it in the rough terrain.

Tracking bats in summer is also important, and Fish and Game biologists want you to tell them about any maternity colonies you have in your houses, barns or other buildings. Instructions for doing a simple count and reporting this are on the bat pages of the NH Fish and Game website at **www.wildNH.com**.

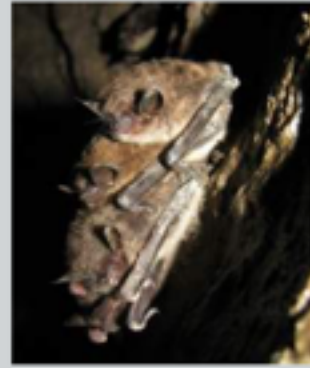
NH Fish and Game biologists cannot reply to every report, as they get many each week, but they will investigate all new locations with multiple sightings. They **do** use this valuable data, so please send it in!

More Information for presenters:

*The database for bat sightings is shared with Vermont, so the link will go to their website.
http://www.vtfishandwildlife.com/Sick_Acting_Bat_Citizen_Reporting_Form.cfm*

For More Information

- US Fish and Wildlife Service
WhiteNoseSyndrome.org
- NH Fish and Game
wildlife.state.nh.us/nongame/bats-nh.html
- US Geological Survey
nwhc.usgs.gov/disease_information/white-nose_syndrome
- Bat Conservation International batcon.org



There are constant updates about the conservation issues related to bats on the US Fish and Wildlife Service website. You can find all these websites linked to the NH Fish and Game website at **www.wildNH.com**

MORE INFO

*Direct address for NHFG bat pages is
<http://wildlife.state.nh.us/Wildlife/Nongame/bats.html>.*

Point people to the fact sheets and handouts, and to the poster showing all the bat species.



That's the end of my presentation. Before I take questions, I'd like to thank the organizations who sponsored this program:

- The **New Hampshire Charitable Foundation** and the **Davis Conservation Foundation** for grants that support Speaking for Wildlife,
- UNH Cooperative Extension** for supporting our volunteer programs, and
- The **New Hampshire Fish and Game Department** for helping put this presentation together

Thank you for listening! Questions or comments?