

LIVING

What is killing the bats?

Death toll soars past one million – mystery fungus could be cause or symptom

As hard as it is to believe, there is every possibility that some of our most common bat species could completely disappear from northeastern North America within 10 years. These are the bats that you might typically encounter at the cottage or in an old house or church. This dire projection is being made by Dr. Brock Fenton of the University of Western Ontario, one of the top bat researchers in the world. By all accounts, it would seem that we are witnessing one of the most drastic wildlife declines ever seen in North America.



Drew Monkman
OUR CHANGING SEASONS

The freefall in bat numbers appears to be linked to a fungus that is killing the animals as they attempt to hibernate during the winter in caves and abandoned mines. (The site where a bat hibernates is called a hibernaculum.) Known as white nose syndrome (WNS), biologists are still trying to understand basic questions about the epidemic. However, parallels are already being drawn to the fungus that is being blamed for the world-wide decline of frogs throughout the tropics.

According to Don Sutherland of Natural Heritage Information Centre at the Ontario Ministry of Natural Resources, our knowledge of the bats of the Kawarthas is somewhat limited, at least relative to other small mammals. We do know that of Ontario's eight bat species, six occur here – little brown bat, northern long-eared bat, big brown bat, hoary bat, eastern red bat, and silver-haired bat.

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The latter three species are migrants, wintering in the central and southern U.S. They occur in Ontario only in summer. All three are forest bats and tend to roost solitarily; only the silver-haired has been documented forming maternity colonies. The little brown, long-eared and big brown bats overwinter in Ontario, mainly in mixed species hibernacula in abandoned mines and solution caves – those dissolved out of solid rock by acidic waters. Big brown bats regularly overwinter in human habitations. Two other less common species, eastern small-footed bat and the eastern pipistrelle, could quite possibly occur in Peterborough but their presence has not yet been confirmed.

It is interesting to note that the little brown bat is quite long-lived for such a small mammal. Individual, banded little brown bats have been recovered in the same cave or mine as much as 31 years later!

The little brown bat is also the species most at risk of developing white nose. However, the less common northern long-eared bat, eastern small-footed bat, and eastern pipistrelle are also vulnerable. All of these species typically hibernate in dense clusters that, theoretically at least, would make for easy



Photo courtesy of New York Department of Environmental Conservation



Photo courtesy of U.S. Fish and Wildlife Service

spread of disease. Big brown bats, which often hibernate in buildings, appear to be less susceptible to WNS, at least for the time being. Perhaps avoiding the damp, crowded, underground sites favored by other bat species provides some protective benefit to them.

The most obvious symptom of WNS is the presence of a white fungus growing most often around the nose area. The fungus itself is a never-before-seen species known as *Geomyces destructans*. Surprisingly, it grows only in the cold. Though the fungal growth is most apparent on the bats' muzzles, it can actually grow anywhere on the body, including the tail and the fragile wings. It is not known if it is the fungus itself that kills the bats, or if the presence of the fungus is just a symptom that appears when the animal's immune system has become compromised for some unknown reason. The fungus is similar to one known to infect bats in Europe where, curiously, the bats seem able to survive its effects. Whether North American bats will eventually adapt to the fungus and their populations stabilize is not known.

The fungus was first identified in a

cave http://en.wikipedia.org/wiki/Cave_near_Albany,_N.Y., in February 2006. It has since spread to many caves and mines throughout the northeastern U.S. Although there is no proof that it has reached Ontario or any other Canadian province, Dr. Fenton is almost certain it has. The disease is fatal to about 95% of the bats affected and has already killed more than a million of the animals.

Researchers are starting to get a clearer picture of how the bats are dying. Hibernating bats will usually awaken from their torpor a few times each winter and even fly off in search of water, especially during mild weather. However, bats with white nose syndrome are being observed to wake up far too often and to stay awake too long. Being overly active during winter depletes their stored fat reserves prematurely, since the animals require a lot of energy to stay warm in cold weather. To further complicate matters, there are no insects for bats to eat in winter. So, bats with WNS exhaust their fat reserves and end up starving to death. Witnesses in WNS areas of the U.S. report seeing dehydrated and emaciated bats floundering about during

A cluster of little brown bats (top) in a cave in New York State exhibiting the symptoms of white-nose syndrome. At left is a close-up of a single bat showing the tell-tale white fungus on its nose.

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daylight in mid-winter during a range of temperature conditions. Some end up dying on the landscape while others die inside the cave or mine. In affected hibernacula, the bats seem to be concentrated near the cave or mine entrance – often near the zone of light penetration – which is also abnormal.

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Surveys of four New York State caves last winter found a 90% reduction in the number of bats as compared to two years earlier. One colony went from 200,000 bats in 2007 to 3,000 bats a year later. Probably as a result of the winter die-offs, biologists are now finding that the sites where the bats give birth in summer have also been depopulated.

WNS has now been confirmed in Watertown, N.Y., just 30 kilometres from the Ontario border. So, people here in Ontario are essentially just waiting for

WNS to show up. Ministry of Natural Resources staff is monitoring bat hibernation sites for any signs of the syndrome in the province. In late November, Dr. Fenton joined biologists from MNR and the University of Guelph to visit a bat hibernaculum in an abandoned mine near Bobcaygeon. However, no sign of the disease was found.

There are a lot more questions than answers when it comes to WNS. One of the biggest questions is whether white nose syndrome spreads only in caves contaminated with the fungus spores, or does it spread readily from bat to bat in the summer birthing and roosting colonies? This means that biologists don't know for sure how far or fast the epidemic will travel. This kind of research has been hampered by what Fenton and others say is a desperate lack of funding, especially in Ontario.

What the demise of bats will mean to the environment is not clear. Bats are the primary predator of night-flying insects like moths and mosquitoes and can eat half their body weight in insects every night. The disappearance of most bats from northeastern North America could theoretically lead to large increases in insect numbers such as the mosquitoes that carry West Nile virus. At the same time, however, it's probably a stretch to say that bats actually “control” the mosquito population – especially in a place like Ontario.

More than anything, people need to show bats a little sympathy and appreciate them as a fascinating part of our planet's biological diversity and a stunning achievement of evolution. Their value lies in the simple fact that they exist and are here among us. As you can well imagine, WNS has left much of the bat research community in North America demoralized. Scientists are facing cave floors littered with the animals they've spent decades studying. Unfortunately, this sort of precipitous decline in wildlife species is expected to become more commonplace as climate change takes hold.

MNR encourages the public to report any unusual bat deaths to the Canadian Cooperative Wildlife Health Centre at 1-866-673-4781 or to the local MNR office. In the Peterborough area, call (705) 755-2001. Bats are very vulnerable to disturbance. No one should enter a hibernaculum between September and April or a bat nursery site during the breeding season in mid-July. There is also some evidence that human activity in caves is contributing to the spread of the fungus. For example, spelunkers could be moving fungal spores between caves on their gear. Therefore, the public is also urged to refrain from entering caves and abandoned mines where overwintering bats may be present. Small numbers of bats do overwinter in caves in the Kawarthas, especially in the Warsaw area.

As mentioned above, bats do occasionally rouse in winter and leave their overwintering site to drink and eliminate wastes. Sometimes active bats end up inside buildings, too. If you come across one, either leave it alone or catch it using a towel. It can then be released outside. Be sure to wear gloves since, in rare cases, bats sometimes carry rabies.

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