Prior to the introduction of white-nose disease, hibernating clusters of the federally endangered Indiana bat (like the one pictured here) were becoming more common in New York.

Alan Hicks

Bats on the Brink

White nose disease takes a toll on New York's bats

By Jenna Kerwin and Carl Herzog

It is a calm, July night and you're sitting on your porch, watching twilight set. The sky is full of stars and every now and then, something small and dark flashes across your line of vision. There's one! It dips and darts in another direction. Now there's another, and another! The night is simply riddled with the small, shadowy aerial acrobats.

To some, bats are those creepy, noisy inhabitants of Grandma's attic. To others, they're a Halloween mascot, invoking images of Dracula. But despite what you might think, they are pretty amazing creatures. And, they're pretty neat to watch flying around at night. In fact, night is actually their feeding time. Bats can consume 50-75 percent of their own body weight in flying insects on a summer night! Pretty cool, huh?

But over the past few years, you might have noticed the summer skies are a little emptier. New York's bats are in trouble, and have been since 2006, when biologists with the Department of Environmental Conservation (DEC) first documented a curious white fungus on the noses and mouths of bats in Hailes Cave in Albany County. The unusual ailment (then-dubbed "white nose syndrome") was present on dead and dying bats, and the death toll of several species rose quickly.

New research indicates the fungus is actually the cause of death and not just a symptom of something greater, as previously thought. Therefore, the ailment is more like a disease, instead. Since its original discovery, it has spread to at least seventeen states, from Maine to Tennessee, and into four Canadian provinces. The white fungus behind it is a member of the group Geomyces: fungi that live in soil, water and air, and which are able to reproduce in cold temperatures like those found in bat hibernacula.

Biologists first noticed something was wrong when bats prematurely left their caves during winter hibernation. Generally, hibernating bats have enough stored fat reserves to carry them through the winter when their body temperatures and metabolisms are low. However, when awake, bats' body temperatures are similar to ours and so they burn through their fat reserves at a high rate. Research suggests the white nose disease causes hibernating bats to wake more frequently and perhaps for longer periods of time when there is no readily available source of food—insects aren't plentiful until the following spring. The bats then either starve to death or fly out of the site, presumably in a desperate attempt to find food. This leads to predation or succumbing to the winter elements.

James Clayton

The tell-tale sign that a bat has white nose disease is the easily recognizable white fungus on the animal's nose and mouth.

It seems bats are the primary vector for spreading the disease, as it has appeared in previously unknown caves or in many areas where no person has been since before 2006. Since bats often hibernate close together, bat-to-bat transmission is easy. However, humans may also contribute to spreading the fungus. In fact, it is believed humans first transported the fungus from a cave in Europe or Asia. The same fungal disease has been identified there, but it does not affect native bats. It's assumed those bats have learned to adapt. It's also been suggested that a live, infected bat was unintentionally transported across the Atlantic, but it's very unlikely it made the trip itself, so human transport seems the likeliest possibility.

Six species of bats that hibernate in New York have been affected by the white nose disease: northern, little browns, big browns, tri-colored, Indiana, and eastern small-footed bats. Northern bats seem to be the hardest hit in New York, with losses of about 98 percent from pre-disease levels! Little browns were the most common species in the state; they were one of two species commonly found roosting in houses and barns. (The other is the big brown.) Little browns have declined by 90 percent, and so comprise the greatest number of bats that have died.

James Clayton

White nose has decimated many of New York's bat populations—some by 90 percent!

James Clayton

Research shows bats with the disease tend to wake from hibernation sooner, and thus leave their caves in a desperate attempt to find food. Most succumb to starvation or the elements. Here, retired DEC bat biologist Al Hicks studies one such bat who left its cave too early.

James Clayton

Due to white nose disease, biologists often find only a few bats in areas previously inhabited by large congregations.

Big browns are the least affected of New York's bats, as they spend most of the winter in buildings. This makes them hard to count, but seems to offer a sort of protection. This species is still abundant in summer and is now the most common species in the state. So far there isn't a reason to think that the population has drastically declined, if at all.

The tri-colored bat was uncommon even before white nose hit, and has since declined by 90 percent. The federally endangered Indiana bat has declined by 70 percent. The eastern small-footed bat was so rare before white nose that it was a candidate for federal endangered species protection. It has been impacted to some extent by the disease, but because of its rarity, it's hard to know to what degree.

Alan Hicks

The easiest ways to help stop the spread of this deadly disease are to follow decontamination procedures and simply to not venture into cave sites closed to the public.

It's difficult to judge what the future brings in terms of white nose disease. It does not appear to be stopping, but there are many factors that may work in our bats' favor. For instance, some bat species naturally forage during the winter, which allows them to replenish any extinguished fat reserves if they were to be affected by white nose. Also, tree bats migrate south for the winter. The silver hair bat, a type of tree bat, may stay over in caves, but the chances of them picking up the disease are less likely.

Though wide-scale solutions have been offered, such as disinfecting caves and treating each bat individually, perhaps the best thing we can do to help is to take precautionary measures. Disinfecting an entire site, for instance, puts other species (sometimes endangered) at risk; treating individual bats isn't a very practical or reliable way to help. What we can do is follow strict decontamination procedures set in place for those visiting caves so the disease isn't accidentally spread to other sites. Not venturing into cave sites closed to prevent the spread of disease is also an important rule to follow.

Many people also wonder if bat boxes can help. Though it's hard to say (as not all species of bats use boxes), properly constructed and placed boxes could perhaps help some bats that manage to survive the winter get off to a better start in the spring breeding season. Bat boxes provide an alternative location to trees or in buildings for bats to have young. (Search for the "How to Build a Bat Box" brochure on DEC's website at **www.dec.ny.gov**, and check out the February 2008 *Conservationist* for more information, as well.)

Also, though it does happen, it's unusual for a wildlife disease to cause species extinction. Recently, some evidence even suggests the decline of little brown bats in affected hibernation sties may have stopped! It's a tiny, but positive sign. In the meantime, numerous New England states, including New York, are looking to add many bat species to state endangered species lists. The federal government is looking into the possibility, as well.

Our best hope is that bats will develop immunity to the disease. Even now, some evidence suggests that some bats may be relatively unaffected, either because of an inherent protective benefit from their own immune system or a tendency to engage in more solitary behaviors, or a combination of both. Whatever the case, scientists hope that those bats will pass down the traits to their offspring; then the decline may halt and populations might be able to recover.

So for now we must hope that bats will be able to pull through on their own. Until then, researchers and biologists will continue to study the disease, and look for answers. Perhaps the rest of us will keep looking in the summer sky, waiting for the nighttime acrobats.

Jenna Kerwin is the staff writer for *Conservationist*. **Carl Herzog** is a biologist with DEC's Wildlife Diversity Unit.