Our Bats Are Dying

by Debra Sanders

Like it or not, we need bats and they are in serious trouble. As Merlin Tuttle, Founder of Emeritus Bat Control says, "The world would be buried in insects if it weren't for the bats to keep them under control" (McGowan, David). A little brown bat can eat 1,000 insects and hour, reducing the risk of mosquito-borne diseases. Two of the most common diseases being combated in our area are West Nile Virus and Equine Encephalitis. "A colony of 150 big brown bats can protect crops from up to 33 million rootworms over a growing season……..Nationwide, the value of bats as pest controllers is estimated to be at least $3.7 billion and possibly much more. (This leaves out the value of two other very important services that bats provide: controlling insect-borne diseases and pollinating commercially valuable plants.)" (qtd. Medellin, Melnick, Pearl).

Although most people are afraid of bats because of old wives' tales and horror movies, the bats are not a threat to people, and are very important to our eco-system. This past summer my three and five year old grandsons had their first experience with bats. Late in the afternoon on a warm summer day, they could hear the scratching of the bats as they were starting to roust getting ready for dusk for them to come out and feed. I told my grandsons that bats will not hurt them and they are very fascinating to watch because they look like flying mice! As the bats came out one by one, we were "ooo"ing and "aaww"ing at how many there were, how big they were and how they flew. I went back into the house to fix supper satisfied thinking I had educated them on the bats and how really cool they are. Five minutes later I heard a blood-curdling scream and my husband barged through the door with the three-year old screaming!! A bat had landed

on the driveway and the little one went over to investigate…the bat flew up into his face! There go all my lessons on bats. I washed his little face and he was fine. After the fracas was over, I went to investigate. The tiny bat was so malnourished he didn't have strength to fly anymore. He was also absolutely covered in lice which I'm sure also led to his emaciated condition. I softly picked up the bat (with gloves) and put it into a hiding spot where it could recuperate. I found two more bats in the lawn and placed them in hiding also. The next day they were all gone, but I'm sure they never made it to their hibernation cave.

Many thousands of hibernating bats are dieing in caves and abandoned mines in the North East United States. The fungus "Pseudogymnoascus destructans" has been demonstrated to cause the White-Nose Syndrome which is associated with the alarmingly high rates of mortality in bats (U.S. Fish and Wildlife Service). Although for some people the bats conjure up visions of Vampires or the terror of getting tangled in their hair, I have found the bats fascinating. I have read about their habits and have tried to learn as much as I could about their behavior especially when I learned about White-Nose Syndrome (WNS). I became aware of the problem with bats a number of years ago, shortly after the disease was discovered, and have been following the progression of the White-Nose Syndrome and the fate of the bats. Through my readings about the bats and White-Nose Syndrome, I have learned that while in hibernation, the bats live and sleep huddled together in clusters of up to 300 individuals per square foot for warmth, so the fungus is easily transmitted from bat to bat as they hibernate (Department of Environmental Conservation). Bats feed on millions of insects during the summer months to help build up their fat reserves for winter hibernation. The fungus, White-Nose Syndrome, acts as an irritant and causes the bats to "wake" from their hibernation during the winter to forage for food. The bats fly around during the day looking for food, or cluster in the drafty openings of the

caves, thus using up their fat reserves and starving to death. White-nose Syndrome (WNS) is named for the white fungus that appears on the muzzle and causes lesions on the animals' wings and skin. "The fungus behind it is a member of the group Geomyces: fungi that live in soil, water and air, which are able to reproduce in cold temperatures like those found in bat hibernacula" (Kerwin, Herzog).

White-Nose Syndrome was first documented in 2006 in a cave near Albany in upstate New York and was thought to be Geomyces destructans up to 2012 when the fungi was finally identified as Pseudogymnoascus destructans. It is believed to have been carried from Europe to a bat cave on an explorer's hiking boot. In Europe, the bats seem to be immune to the fungus possibly through an evolutionary process. "Adding to the intrigue is a 1983 report that shows a picture of a German bat with powdery white substance around its muzzle. The report mentions occasional sightings of such bats during routine winter bat surveys, suggesting that the fungus may have been infecting European bats for at least 23 years, apparently without killing them, before showing up in North America" (Buchen).

Through my fascination with bats I have learned that bats fly hundreds of miles to their winter hibernating sites, with the vast majority of New York bats doing so in a small number of caves and mines (DEC). Buchen adds in her article, "This week, wildlife biologist Scott Darling and his small team will snowshoe up to the mouth of Vermont's remote Mount Aeolus cave, once the largest bat hibernation spots in New England. As recently as three years ago, the cave held in excess of 200,000 bats…'last year we estimate that we found between 10,000 and 20,000 dead bats on the cave floor,' says Darling, who works for Vermont's Fish and Wildlife Department in Rutland". It has been estimated the White-Nose Syndrome has killed nearly 7 million bats since it was first discovered, fearing that some species will go extinct. "Although

little can be done to control the spread of the disease through bat-to-bat transmission, the US Fish and Wildlife Service (FWS) has asked people to stay out of caves in and near the affected areas, and have closed some caves on agency-managed land"(Young).

We can help the little bats because we need them for insect control and pollination. Some of the easiest ways to help is to keep barns and sheds open to bat populations during the summer, and to build bat houses and place them in the specific areas that are most preferred by the bats. Bats will also roost in trees, dead or alive, so it is beneficial to the bats to leave as many trees as possible on the host property. Jenna Kerwin and Carl Herzog also address this in their article "Bats On the Brink" and say that bat boxes may help if properly built and placed where bats will use them, but not all bats roost in boxes. The boxes can help some species of bats survive the winter by getting them off to a better start in the spring. If a person doesn't like the bats, they can always build or buy a bat house and give it to the neighbor. That way, the neighbor is happy because he/she got a gift and the bats are happy because they got a new home.

As for scientists, there are studies of the bats natural bacteria and skin for biological treatments or non-chemical agents to combat the infection. Scientists are also investigating whether or not they could change the temperature and humidity in the hibernation caves to slow the fungus, plus using molecular and genetic tools to reduce the ability of the fungus to cause disease. It was suggested at one point to disinfect each cave where the fungi are known to exist, but disinfecting the caves may put other species of animals, fungi, and bacteria that live in the caves at risk." 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" (Kerwin, Herzog). "Biologists in New York and Vermont have found up to 50 percent of marked little brown bats at test sites surviving from one winter to the next in recent years, giving hope that this species might one day be able to recover"(U.S. Fish and Wildlife Service). In spite of all the research and strategies, the little brown bat is still only at 10 percent of its original population before 2006.

I have learned that there are actually six species of bats that hibernate in New York State that have been affected by the White-Nose Syndrome: northern, little brown bat, big brown bat, tri-colored bat, Indiana bat and Eastern small-footed bat (Kerwin, Herzog). The Eastern small-footed bats and the Indiana bat were already on the government's endangered species list and now may be near extinction. "Northern bats seem to be the hardest hit in New York, with losses of about 98 percent from pre-disease level….Little browns have declined by 90 percent, and so comprise the greatest number of bats that have died"(Kerwin, Herzog). As of August 2014, bats with WNS were confirmed in twenty-five states and in five Canadian provinces. Although their numbers are slowly rising, we still have a long way to go. According to an article by Keri Collins Lewis from Mississippi State University, the White-Nose Syndrome has been found in Alabama but not in Mississippi yet. The Delta farmers are ready to face the prospect of compensating for the loss of the bats as pollinator and as insect control.

On September 24, 2012, the New York Times published an article out of Clarksville Tennessee stating that Cory Holliday, the Nature Conservancy's cave specialist in Tennessee, is actually building a cave with the help of the Nature Conservancy, for the bats to hibernate in. Mr. Holliday (a distant relative of the original Doc Holliday) found WNS in a cave near his home so he knew it was time to act. In Tennessee there are 10,000 caves and 16 species of bats. Bellamy

Tennessee is winter home to 270,00 gray bats that are endangered. The entire species hibernates in nine caves, three of them being in Tennessee (Gorman). Holliday and the Nature Conservancy built a concrete cave 80 feet long and 16 feet wide with 11-foot ceilings. It is buried under four feet of earth and is close to the original Bellamy cave where the bats hibernated. This cave is equipped with cameras, a temperature monitor and most importantly, can be scoured and disinfected after the bats leave in the spring. As of the publishing, scientists and Mr. Holliday are not sure if the bats will even come to the cave. Recorded calls of bats will be used to attract the bats then the cave will be closed to humans until spring when it will be cleaned. This venture seems extreme, but if it works it may be something that should be copied in other areas.

We don't think about the bats as being beneficial and the news hasn't spoken much about it like they have the loss of the bees, or GMO's, but as stated earlier, we need the bats. I'm sure that most of us have watched the bats swarm out of an old barn or even out of someone's attic, but have we ever really thought about what the bats actually do? I myself hadn't realized how much we depend on the bats for pollination. Not so much in this area, but in certain parts of the US and southern countries the orchard owners depend on bats to pollinate fruit crops as most bats in the world eat fruit and insects.

Another good use for bats, or bat by-products is guano…bat poop. The cave floors are deep in guano and it smells really bad, but it is a useful nutrient for the garden. Of course, it will have to be mixed and incorporated into the compost before it goes to the garden. There are gardening supply sources that market guano as a fertilizer and additive for the garden. It can be no worse that cow manure and is just as beneficial. I personally don't know what elements or nutrient it holds but it apparently is good guano. All vegetables from the garden before they are eaten anyway.

As a kid, some friends, my sister and I were together in the evening hours and noticed the bats flying around. (Back then they were still the size of a Boeing 747…just kidding.) We tried to swat them with tennis rackets to no avail. We didn't realize how fast bats were and of course, with their echo-location, they knew where we were at any given moment. After several hours of chasing, and futile attempts at sending them sailing like a birdie in a badminton game, the boys decided to get out their b-b guns. We were quite a ways from the nearest house so we thought we were alright as far as range of the bb. As pre-teens, we lacked fair judgment of a number of things up to and including distance and how far a bb would travel when shot from a gun. The next day, my parents received a phone call from the family friend we had visited the night before. It seems they got a phone call also…from their neighbor…who had bb holes in several of his windows. Oops! Several months of house work, doing barn chores, mowing lawns, raking leaves or anything else our parents could think of, we had the cost of the window repairs paid off. Suffice to say we didn't try that trick again. I probably shouldn't be telling tales from the schoolyard especially about the bats that have been dealt a perilous fate, but when we go to family gatherings and reminisce, it sure is funny now.

We, as a general public, don't usually think about the bats and what they do, but there are small steps we can take to protect them. Even if we don't particularly care for them, they are important. Imagine how many more mosquitoes, lake flies, mayflies (and the list goes on), we would have to fend off at the next summer outing if it weren't for the bats. I was working at Chautauqua Institution during the middle 1980's when there was an eradication attempt in the Chautauqua Institution (much to the chagrin of the wild-life advocates) because the bat population was very large and they were living in the houses in the Institute. The summer after the "bat eviction", the home-owners and visitors to the Institution found they couldn't stay

outside for their concerts and evening dinners on the lake, because the lake fly and mosquito population were so bad that it drove the people inside. (A big "told you so" from the advocates.) The associations then realized that they needed the bats to control the lake fly and mosquito populations. They then had to contact Conservation groups and have bats brought back in. They built huge bat houses for the bats and they were place all over the grounds near where bats would normally roost. Some of the bats were fitted with small LED light sensors so their movements could be monitored. It was fun during that time to go outside and see all the little lights flying around at night!

While following the WNS and researching more about the disease, I found a press release from the US Fish and Wildlife Service stating "The U.S. Fish and Wildlife Service today announced grant awards totaling $1,276,088 to 30 states for white-nose syndrome (WNS) projects. State natural resource agencies will use the funds to support research, monitor bat populations and detect and respond to white-nose syndrome, a disease that afflicts bats." New York State is not on the list of recipients, but other states are now waging a full-fledged war on White-Nose Syndrome. According to the report, the disease has spread to 25 states and five Canadian Provinces to date. The Fish and Wildlife Service now have a website with information on White-Nose Syndrome, www.whitenosesyndrome.org, so people can follow the progress of the disease and find out how to help.

All living things have a place in our eco-system, and though we may not understand it, they are still important in some way. If we lose the bat population, or even a majority of the population, that will increase the use of insecticides to epic proportions. The public and farmers will be forced to use more pesticides to control the insect population. This not only puts more pollutants into our food chain, but adds additional costs to farmers. This is where the domino

effect comes to play in ecology. When one species is compromised or becomes extinct, it has an effect on the species that depended upon that species. And so it goes down the line. Native Americans have a saying, "We do not own the Earth, we borrow it from our children." What kind of life are our children going to have if we keep destroying what we have? I know this was an innocent mistake made, but how many innocent mistakes can we make until we destroy the nature we all need?

Annotated Bibliography

Buchen, Lizzie. "Disease Epidemic Killing Only US Bats: Fungal Infection Linked With High Mortality In The United States, Whereas Infected European Bats Seem Fine." *Nature* 463.7278 (2010): 144+ *Green Gale*. Web. 6 November. 2014.

I chose this article because the author, Lizzie Buchen starts right out with reporting that researchers are going into a cave that once held 200,00 hibernating bats, but now may hold none. It also tells of going into Mount Aeolus Cave in New England and finding between 10,000 and 20,000 dead bats on the cave floor. This brings into perspective the decimation to the bat population and what will be a costly ecological loss.

Department of Environmental Conservation. "White-nose Syndrome" Web. 29 September, 2014

This is a good article because it describes the symptoms of White-nose Syndrome and also the actions of the bats. It also names the types of bats that have been affected.

Gorman, James. "Building a Bat Cave to Battle a Killer." *The New York Times* Online 24, September 2012 Web. 24, November 2014

I chose this article as a last minute story I found on the internet. I thought it was amazing that an organization would gamble a lot of money and time on a "long-shot" like building a cave to save the bats.

Lewis, Keri Collins. "Farmers Face Loss of Beneficial Bats." *Delta Farm Press* (Online Exclusive) 31, October 2012 *Green Gale.* Web. 6, November 2014

I like this article because it explains the White-Nose Syndrome, but it also makes one think about the consequences of losing the bats. Lewis warns people to stay out of caves and culverts even in the south because it disturbs the bats at rest. Lewis also stressed that people "to move beyond the myths and misconceptions about bats". Bats are not here to harm us, they are here to eat insects and fruit.

Kerwin, Jenna and Carl Herzog "Bats On The Brink." *New York State Conservationist*_February 2012: 8-11 *Green Gale*. Web. 6 November. 2014.

Kerwin and Herzog list the six species of bats affected and their percentages of decline. With some bat species being rare in our area to begin with, it is hard for scientist to know just how hard that species has been affected. It is nice to read an article that gives some hope to the declining populations and gives a more up-beat outlook on the decimation that has already occurred. This article ties into my thesis in that it explains WNS and what these groups of scientists think the outcome may be.

McGowan, David. "Battle for Bats: Surviving White-Nose Syndrome." *U.S Fish & Wildlife Service* (2013): Web. 29 September. 2014.

As Merlin Tuttle, Founder of Emeritus Bat Control says, "The world would be buried in insects if it weren't for the bats to keep them under control." A little brown bat can eat 1,000 insects and hour, reducing the risk of mosquito-borne diseases. Two of the most common diseases being combated in our area are West Nile Virus and Equine Encephalitis.

This video, a partnership with Emeritus Bat Control and U.S Fish & Wildlife tell us how important the bats are in our food chain and as controllers of the insects of the world. The video tells of the peril of the bats from White-Nose Syndrome, and the efforts made by many government and non-government agencies to help save them. The video also shows and explains how and why some measures are taken at the caves in Federal and State forests where bats live. I believe that most people have come to realize that we do need bats, and are willing to go through the sterilization of shoes to protect the bats from the spread of the fungus.

Medellin, Rodrigo, Don Melnick, Mary C. Pearl. "Protect Our Bats." *The Opinion Pages* 12May. 2014: *EBSCO* Web 2 September. 2014.

Although this article is also speaking of the bats being killed by wind turbines, it also tells of the decline of the bats by White-Nose Syndrome. This article gives percentages of bat population decline and types of bats that are hit the hardest. Medellin, Melnick, and Pearl tell of the millions of bats killed, but also tells the worth of the bat populations in dollar figures. . "A colony of 150 big brown bats can protect crops from up to 33 million rootworms over a growing season……..Nationwide, the value of bats as pest controllers is estimated to be at least $3.7 billion and possibly much more. (This leaves out the value of two other very important services that bats provide: controlling insect-borne diseases and pollinating commercially valuable plants.)"

I personally don't believe that there are that many bat deaths attributed to the wind turbines, because of the echo-location the bats use. With their echo-location, the bat can hone in on an insect a quarter of an inch long and follow its eradicate flight and catch it in a matter of seconds. How can the bat NOT sense the giant blades of a wind turbine? I like the facts that these authors give for the White-Nose Syndrome, and for the monetary worth of the bats. I also like the last line of the article, "It is foolish to spend enormous sums to create pesticides and transgenic crops to fight insects, while investing little to protect bats, our most efficient insect fighters."

U.S. Fish & Wildlife Service. "White-Nose Syndrome" August 2014. Web. 29, September 2014

As for scientists, there are studies of the bats natural bacteria and skin for biological treatments or non-chemical agents to combat the infection. Scientists are also investigating whether or not they could change the temperature and humidity in the hibernation caves to slow the fungus, and molecular and genetic tools to reduce the ability of the fungus to cause disease. "Biologists in New York and Vermont have found up to 50 percent of marked little brown bats at test sites surviving from one winter to the next in recent years, giving hope that this species might one day be able to recover."(U.S. Fish and Wildlife Service)

The U.S. Fish & Wildlife Service was awarded $4.5 million in grants that will improve and expand the surveillance of *Pseudogymnoascus destructans* and help develop systems to monitor the bats and the disease. In 2009 and 2010, the Service led a team of federal and state agencies and tribes in preparing a nationwide plan combat the disease through monitoring the hibernating bats and is working with biologists to detect White-Nose Syndrome and other unrelated bat disease agents.

Young, Susan. "Culprit behind bat scourge confirmed" Macmillan Publishers Limited

26 October 2011. Web. 29, September 2014

"Although little can be done to control the spread of the disease through bat-to-bat transmission, the US Fish and Wildlife Service (FWS) has asked people to stay out of caves in and near the affected areas, and has closed some caves on agency-managed land."(Young) This article, being written in 2011, obviously does not have all the current facts, but explains the disease and facts that were known at the time. Since 2011, the disease has been pinned down to

Pseudogymnoascus destructans not the *Geomyces destructans* that Young cited in her article. This shows how well the disease has been studied in the last three years.

Young's article is a basic summary of the White-Nose Syndrome and its devastating effects on the bat population. I would like to see her write another article with current facts, as I believe she is truly concerned about the bats and wants the public to be aware of what they are enduring.

Works Cited

McGowan, David. "Battle for Bats: Surviving White-Nose Syndrome" www.fws.gov U.S Fish & Wildlife Service 2013. Web. 29, September 2014

Medellin, Rodrigo, Don Melnick, Mary C. Pearl. "Protect Our Bats" The Opinion Pages 12, May 2014: EBSCO Web 29, September 2014

U.S. Fish & Wildlife Service. "White-Nose Syndrome" August 2014. Web. 29, September 2014

Young, Susan. "Culprit behind bat scourge confirmed" Macmillan Publishers Limited 26 October 2011. Web. 29, September 2014