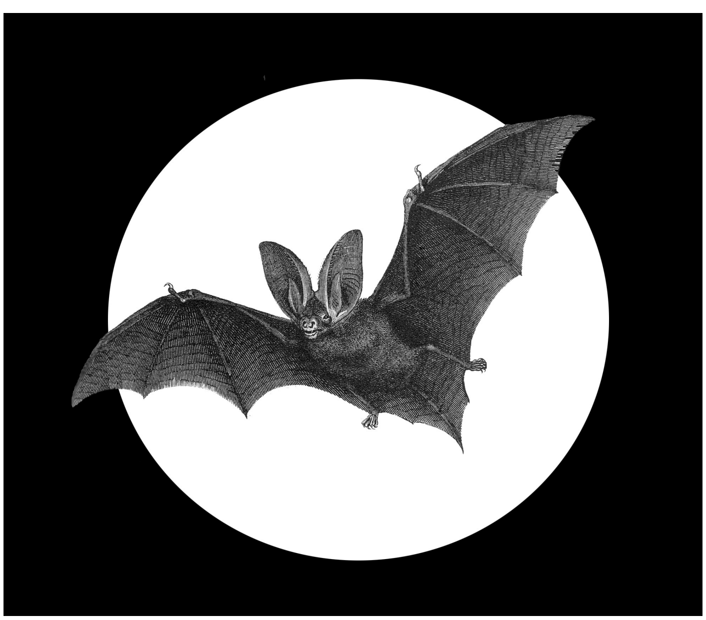
Northeastern Cave Conservancy News

Volume 18, Number 2 **June 2016**

The Northeastern Cave Conservancy, Inc. (NCC) is a not-for-profit corporation committed to the conservation, study, management, and acquisition of caves and karst areas having significant geological, hydrological, biological, recreational, historical, or aesthetic features. To these ends, the NCC combines the resources and expertise of affiliated cave explorers, educators, scientists, landowners, and conservation officials.

Sellecks Sink - Photo by Bill Folsom



In this Issue

Next Board Meeting

Spring Board Meeting
Saturday, June 4, 2016 10:00 a.m.
Mike Chu's Home

Fall Board Meeting
Saturday, September 11, 2016 10:00 a.m.
Mass Wildlife District Office
Dalton, Massachusetts

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To these ends, the NCC combines the resources and expertise of affiliated cave explorers, educators, scientists, landowners, and conservation officials.

The NCC programs are focused mainly on the preservation of caves and karst. Outreach includes education in schools and local communities, establishment of park spaces on karstlands, and educational messages about the significance of groundwater pollution on this sensitive underground ecosystem.

NCC members assist in the exploration, survey, and protection of these natural resources, and manage them so you can explore them yourself.

SPIDER CAVE UPDATES
— Bob Addis —

Long time cave owners, Midge Carl and her son Joe, decided to donate Spider Cave to the NCC, as we were perceived as good stewards of the property. The story of the acquisition is told elsewhere, but in early spring 2016, the subdivision was completed and approved by the local Planning Board. We were given approximately three acres, the minimum subdivision containing the entrance to Spider Cave, a steep side hill, and a small portion of the escarpment above. The first trail up to the cave has been installed, and plans are being made for a loop trail enabling future visitors to enjoy the view from above.

On March 26, 2016, eight volunteers turned out to work on two important projects. Mike Chu, Kevin Dumont, and Chuck Porter did the trail work, while Bob Addis, Emily Davis, Kevin Dumont (splitting his efforts), Thom Engel, Christa Hay, and Town Supervisor, Alex Luniewski, did a highway cleanup. We started at "our new parking lot" for Spider (a wide gravel lot owned by NY State and about 1,000 feet down Route 146 towards Gallupville). We cleaned both sides of the road up Route 146 to the four-way intersection with Larry Hill and Sellecks Roads, gathering 15 large bags of trash and $5.60 of refundables for the NCC. During the course of our cleanup work along Route 146, a woman stopped to thank us for our efforts—a very nice gesture that we appreciated.

Alex got permission for us to unload the Suburban full of trash at the transfer station in Gallupville, saving us from a smelly trip home! Note for future cleanups: pickup trucks or open trailers are probably better than an enclosed Suburban for hauling trash!

Chuck Porter has, subsequently, placed more boundary marker signs around the property.

The Dedication Ceremony for the Spider Cave Preserve, Preserve No. 9 for us, will be on Sunday, April 24, at 2:00 pm. The ceremonies will be held at the Carl residence on Sellecks Road, which is the first farm down Sellecks Road from Route 146. All are invited to join the NCC in this celebration featuring cake by Emily, speeches by Bob, and the fellowship of friends.

Bob Addis and Chuck Porter with Midge and Joe Carl during the closing. Photo Christine Young.

Bob and Emily bagging up trash during the Highway cleanup. Photo by Christa Hay.

Alex, Kevin, Bob, and Emily at the start of the highway cleanup and dumping the trash at the Gallupville Transfer Stationst. Photos by Christa Hay.

SPIDER CAVE DEDICATION CEREMONY

—Kevin Dumont —

On Sunday, April 24, 2016, at 2:00 pm, a dedication ceremony for the NCC's newest acquisition, the Spider Cave Preserve, was held at the residence of Midge and Joe Carl in Gallupville, New York. The weather was gorgeous, and approximately 32 people of all ages were in attendance. Midge and Joe made the generous donation of the cave and surrounding land last year, and the donation was completed earlier this year. Bob Addis was the master of ceremonies. Midge shared a few stories with the group and Kevin Dumont, the Spider Cave Preserve manager for the NCC, made a brief statement of gratitude and presented Midge with a framed photograph of the cave entrance. Emily Davis was kind enough to bake a cake for the event and also brought along homemade cider pressed from apples from her own trees. After the brief ceremony, about a dozen people walked up to the cave entrance, with most venturing into the historic section of the cave. Overall, it was an excellent event, and the efforts of all attendees and volunteers are much appreciated!

Ceremony attendees hike to Spider Cave for a short visit to the historic section. Photo by Kevin Dumont.

Joe Carl displays the beautifully framed photograph of the entrance to Spider Cave. Photo by Michael Martuscello.

Kevin Dumont at the moss-covered entrance to Spider Cave. Photo by Kevin Dumont.

Kristin Woodell and Colin framed in the entrance of Spider Cave. Photo by Michael Martuscello.

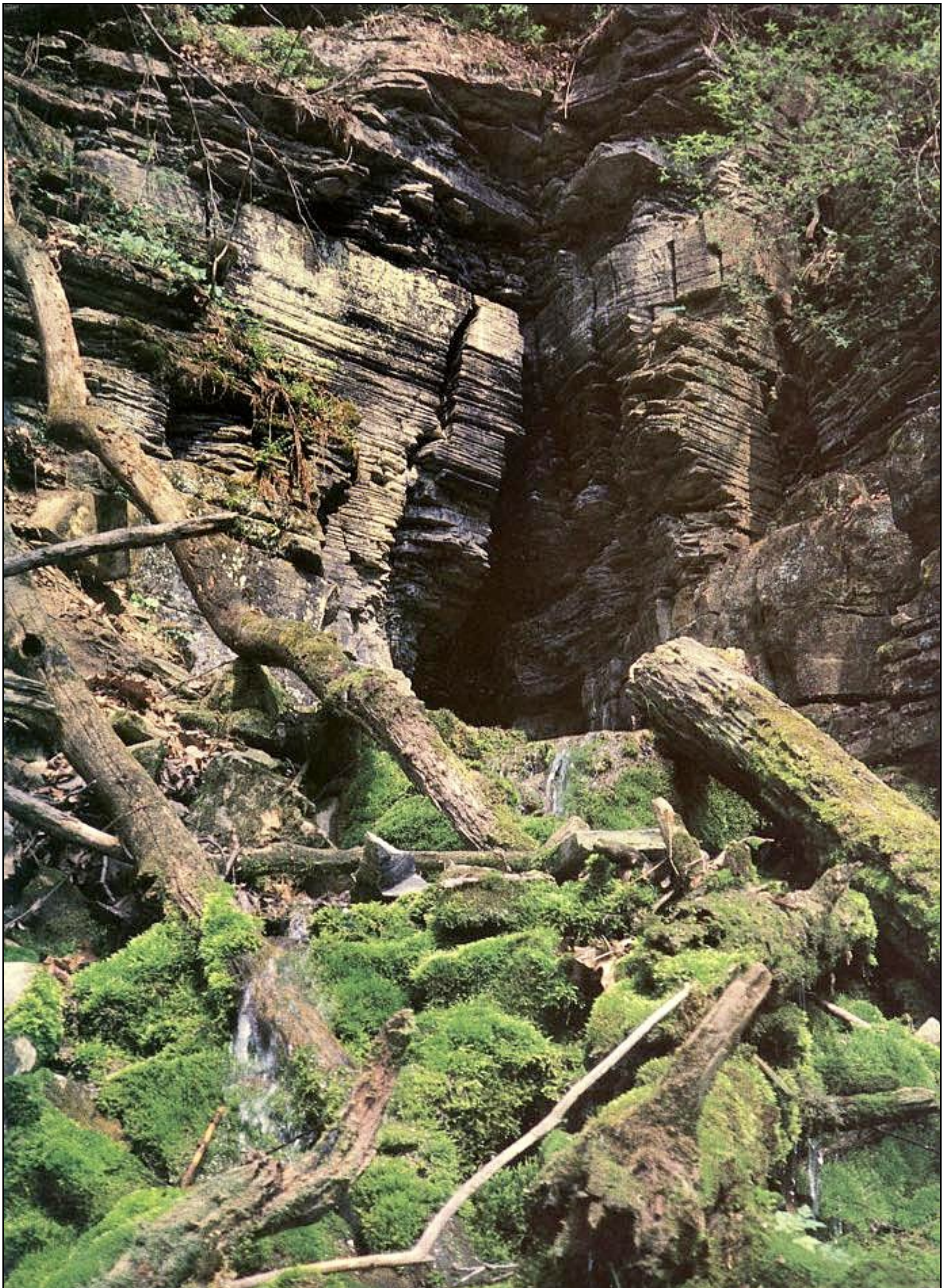
Photos on page 9: Top left - Some of the many dedication ceremony attendees. Top right - Emily Davis provides a Spider Cave/NCC cake. Bottom left - Kevin Dumont and Midge Carl. Bottom right - Luke Mazza (and son Paul) and Kristin Woodell (and son Colin) at the entrance to Spider Cave. All photos by Kevin Dumont, except bottom left by Matt O'Donnell.

Kevin Dumont and Bob Addis with Midge and Joe Carl. Photo by Michael Martuscello.

Block of *Tentaculites* fossils from Spider Cave. Photo by Michael Martuscello.

Peter Youngbaer in the historic section of Spider Cave. Photo by Michael Martuscello.

Cristina Chu and daughter Elena enjoying the dedication ceremony. Photo by Kevin Dumont.



The Entrance to Spider Cave. Photo by Kevin Dumont.

PUSHING SPIDER CAVE

— Brad Smith and Vi Schweiker —

Spider Cave was the focus of a couple of Jack Middleton's digs. At the end of the historic section of Spider Cave is a flowstone dam, which partially blocks a beckoning fissure and conducts the stream flow. Jack removed some of the flowstone from the top of the dam, in the hope of allowing further exploration. On one weekend in the summer of 1978, I went with Vi Schweiker and Dave Allured to Spider Cave. Dave and Vi made it over the flowstone dam. I wasn't sure I could get over the dam and back, so I stayed on the downstream side of the dam. I held a metal tape measure reel, as Dave and Vi took the end of the tape upstream. They slowly worked their way along this almost-straight passage for somewhere near 200 feet to the pool room. I could hear them, but could not understand what they said until they were nearly back to the dam.

On a following weekend, Dave and I went back to push Spider Cave. The stream flow was low at the time. I wore my nylon 2 side wetsuit, with a military landing-craft dry suit as coveralls. Nick Vicio was there at the entrance. He filmed a movie with sound, as Dave and I went in Spider Cave. At the end of the historic section, I was relieved to discover that I was able to make it over the flowstone dam without exceptional difficulty. From the dam, we floated upstream perhaps 40 feet to a slight kink in the passage. At this point, the passage looks like a longer version of the gun barrel in Knox Cave. The floor has some projections that look like vice jaws. There are also small rimstone dams in the floor. After this, the passage is a tall, narrow fissure for several feet. To make progress requires crawling on one's side a few inches above ponded water. After this, it is a bit easier going to the pool room. The pool room is a few feet across and has clear water. I don't think I was able to touch the bottom. I recommend that someone take a face mask and snorkel in there to get a good look at what is down there.

Heading upstream from the pool room, the passage consists of several zigzags. This may be caused by the intersecting of joints. There are chunks of partly dissolved flowstone caught at various heights along the passage. This passage is tall enough to allow standing up, but is so narrow that it is necessary to proceed only at a height where the passage is wide enough to allow forward progress. I call this passage Easy Street. At one point, while continuing upstream, an inviting tube is encountered on the left side of the passage at about five feet above the floor. We continued to the end of Easy Street to the T room. Here we were both able to stand comfortably. The T room is an intersection. To the left is the upstream direction. It is too small to push. To the right is a passage which may be a secondary downstream route. Dave climbed up in the T room to get down into this secondary route. He didn't find a way to go farther, so he came back to the T room.

We went back to the inviting tube. This tube, we think, is the primary route for water flow. The tube appears to be a joint-controlled meander. The tube is not a squeeze, but isn't quite hands-and-knees crawling. We pushed it for a while. There are places to rest and turn around. There was always another corner ahead. We decided to head out. My drysuit was well torn. I carried it out by hand. We were in Spider cave for about five hours. This was an endurance barrier trip. My wetsuit elbow and knees were worn through. I came out with a bloody elbow and two bloody knees.

On a cave trip, it is common practice to expend much effort to get past the hard parts to enjoy the rest of the cave. Consider anything beyond the historic section of Spider cave to be the hard part. If you want to push Spider Cave, then plan on your trip being the hard part. Overcome the natural urge to get past the hard part. Pace yourself. Wear a full wetsuit, including the socks and gloves. Take food and water. Take equipment to warm yourself.

At the 1979 NSS convention, Miles Drake, Vi Schweiker, and Dave Allured did a push trip in Spider Cave. They invited me to go also. The difficulty of such a trip caused me to decline. When they returned, Vi complimented me on my good sense at NOT going with them into Spider cave.

In the 1980s, others did a push into Spider cave. I believe they went further than Dave and I went. As with previous pushes, none have reached the end of Spider Cave.

I said Jack Middleton had a couple of digs in Spider Cave. The other dig is also in the historic section. From the flowstone dam, head downstream. The dig is in a fissure on the right. It is clogged with clay and rocks. This fissure is parallel to the passage with the flowstone dam that leads to the rest of the cave. A possible approach to continuing this dig would be to use an electric water pump with hoses and spray nozzles to wash the clay out of the fissure. If the ratio of clay to rock is favorable, then the fissure could be dug with water alone for some distance. With adequate stream flow, this would be a fun experiment in digging.

Spider Cave needs hardcore pushing, surveying, and digging. I wonder what is yet to be discovered.

EARLY EXPLORATION OF SPIDER CAVE, 1978 - 1979

— Vi Schweiker —

Saturday August 12, 1978

Brad took us to check a lead at Spider Cave. The lead was at the very end where Nick Viscio [that's how I spelled it, but no guarantees] had been blasting the rimstone dams. Dave was able to squeeze over and go 200 feet down nasty crawl to a T-intersection, where it got larger. Neither Brad nor I could follow, so he came back. But meanwhile, Brad was able to take the dam down a little with a hammer. We quit because it was time for a meeting, I think about the Cobleskill convention.

Sunday August 13, 1978

We took the Brunton and tape, notebook, spare flashlight, and towel in the little ammo box. Dave went in and Kevin [Downey] was nearly ready, so [Roioli] and I went to call Nick and tell him the good news. He was glad to hear it, but couldn't come (it turned out his wife wouldn't let him go caving because she was having a big birthday surprise barbeque for him). I went in and found Dave and Kevin cold and just ready to come out to warm up. They'd done some work on the dam and Kevin had gotten over, but they got cold laying in the water. Kevin had his helmet off on the way out and a small rock fell on his head. Brad arrived about then. We left him to do what work he wanted and bring the tools out.

We went out, rested, warmed up, and ate lunch. Kevin's head hurt from the rock and he didn't want to go back in. Dave and I went back, with Brad following later. This time I got over. Brad held the end of the tape at the dam. while we measured. After 150 feet, I just got too cold laying in the water, with that breeze, and I kept waiting for Dave. We had to leave. Fortunately, when Brad left ahead of us, he was able to get all the gear so we only had the ammo box. [Some details about the Skipper and Mallory flashlights we were using and changing batteries] We were all tired and all our coveralls were in shreds, as well as Dave's elbow and wetsuit elbow.

Sunday August 20, 1978

I had a bad reaction to a sting I got on my hand at the cabin a couple days earlier, which is why I didn't go on this trip. Nick took movies of Dave and Brad getting suited up to go in. The plan was for Dave to go in, and Brad to try. Regardless of Brad's success, Dave was to explore as much as possible. Ken (I think Desaltes) and I waited at the entrance.

Dave came rushing out at 8:30 to say that they were OK, not to come rescue them, then went back to help Brad out. When they got out, we sat in the light of Ken's kerosene lantern and fed Dave and Brad while they told us what they'd found. They doubled the length of Spider again, another 660 feet of jointed fissure passage, mostly low, wet, nasty crawl, some walking or stooping, but all miserable. They hadn't gotten to the end, just got sick of it and came out. At the cabin, Dave made a sketch map, for which he had carefully estimated distances in the cave.

Sunday August 5, 1979

On Sunday at the Cobleskill pre-convention Speleocamp, Jeff Zinc arrived, and he, Dave, Miles (Drake), and I went to Spider. Jeff and Miles wore wetsuit hoods, and Dave and Jeff wore wetsuit gloves. Dave wore his helmet. I wore mine less than 100 feet past the dam, then left it in a crack and continued on in my knit cap. I used no cave pack, just tucked food in the front of my wetsuit and put my spare Skipper in my coverall pocket (also a cyalume up my wetsuit leg).

At the start of the Tubular passages, Jeff and Miles got ahead because Dave and I stopped to eat. We caught up to Miles at about the previous limit of exploration. About a hundred feet farther on, when the passage continued the same, I decided I'd better turn back. I hadn't been warm in half an hour and was half-exhausted—that is, I'd be exhausted when I re-did what I'd just done. Dave said he'd go back with me, but I didn't want him to give up 'his cave,' so talked Miles into going out, too. We found a fairly large joint, and Dave passed both of us, then we started out.

Before too long, I thought I heard noises behind us. At the junction of the 'walking passage' (there seems a lot more walking passage on the way out that on the way in) I was sure I'd heard them. I was very tired going back through the Chest Compressor, but not panicky this time. My coveralls were ripped to shreds, so I took them off to go through. Continuing down the passage, it was very hard work pushing the coveralls, with the flashlight still in the pocket, ahead of me. It was a bit better when I got my helmet and stuffed them it. About this time Dave and Jeff caught up. Jeff had gotten about another hundred feet, everything was the same, so he said 'screw it' and started back, meeting Dave only 30 feet beyond where we'd gone.

I'm pretty sure Jeff Zinc went back again, but I'm not sure how much farther he got. I should have a copy of the sketch map Dave made, but it might take me a long time to find it. Maybe it was published in the *NE Caver*?

SPIDER CAVE
ANOTHER PIECE OF THE BARTON HILL PUZZLE

— Mike Nardacci —

Barton Hill looms above Route 146 as it descends to the village of Gallupville and extends north as a series of impressive limestone cliffs along Route 443 to its intersection with Route 30. From there it stretches to the east with long, gentle slopes and is capped by flat stretches and some of the glacial hills above Routes 7 and I-88. The name "Hill" here is generic, for it is in fact a plateau, an isolated segment of the Appalachian Plateau, cut off millions of years ago from Terrace Mountain (also a plateau), Vroman's Nose (a mesa) and the Cobleskill Plateau by the respective creeks known as the Fox, the Schoharie, and the Cobleskill. In addition to the craggy cliffs, its landscape features include broad, fertile farmlands and thick forests—and it also contains numerous karst features: sinkholes, underground streams, and extensive cave systems, not all of which can be entered but which betray their existence through cold springs that burst from the base of the lofty cliffs. Caboose Cave, Schoharie Caverns, Single X cave, and Gage Caverns (historically and again today known as Ball's Cave) are some of the caves known to geologists and sport cavers, and enormous occluded sinkholes such as the oddly named Joober Hole indicate there are many more.

Until recently, just two of these caves—Gage and Schoharie caverns--have been accessible to sport cavers with the proper credentials because they are owned and managed by the National Speleological Society, an international society devoted to the science and sport of cave exploration. But recently, through a generous donation, another organization known as the Northeastern Cave Conservancy has acquired Spider Cave on the south side of Barton Hill, making it available for both student study groups and exploration. The Northeastern Cave Conservancy (NCC) is a not-for-profit organization which has been managing and acquiring through purchase or donation a number of caves in this part of the country. The NCC has thus been able to keep open a number of caves which might otherwise have been declared off-limits by their owners for fear of liability or for other personal reasons.

For many years Spider Cave was off-limits to cavers, but the cave with its beautiful entranceway, easily visible from a road, was described in old guide books as having a "storybook entrance but a short story!" (Figure 1). To enter the cave one must first climb a trail up a precarious slope that borders a stream gushing from the entrance. The stream tumbles over rocks that are rich with Devonian Period fossils and brilliantly green with mosses and

Figure 1 - Research assistant Devin Delevan at the "storybook entrance" of Spider cave, newly acquired by the Northeastern Cave Conservancy. Photo by Mike Nardacci.

algae. The picturesque entrance is a shadowy opening in the Manlius Limestone and it leads to a narrow, twisting passageway (Figure 2) which can be traversed on foot through the stream for some distance, though squeamish cavers may find themselves contorting their bodies to avoid disturbing the residents of the eponymously-named cave: dozens (sometimes scores) of large black spiders sequestered in nooks and crannies or openly displaying themselves on the cave walls. But then the walls of the cave begin to pinch inward, the floor rises, and most visitors turn around as it becomes increasingly difficult to move without having one's clothing caught and torn by the hard fossils and sharp erosional features on the passage walls. The extent of the cave remains unknown but cavers' anecdotes tell of intrepid explorers crawling painfully on their sides through pools of icy water, their necessary wet suits being shredded by the sharp projections from the walls, and turning back after 1200 feet—or perhaps 1500 feet—or possibly more, but leaving a small

Figure 2 - The twisting interior of Spider Cave. In warmer weather the numerous spiders which populate the cave may be seen throughout its easily accessible passages, but in cold weather they tend to retreat to the cave's warmer interior section. Photo by Mike Nardacci.

rock cairn to indicate their turn-around point. Caves with small dimensions can suddenly and without warning open up into caverns of vast proportions—but Spider seems simply to plunge onward into the plateau, guarding well whatever secrets it holds.

And therein lies the puzzle that is Barton Hill. A topographical map featuring the underground passages shows that the known caves run parallel to each other—following what geologists call the "dip" of the rock layers; the "dip" is nothing more than the angle and direction at which rock layers (called "strata") are tilted. In this region, the dip of the strata of Barton Hill is gentle and to the southwest. For some of the caves, the insurgences—that is, the points at which water enters the caves from the surface, usually through sinkholes and fissures—is known. For others, the insurgence points have not been identified. This is not unusual, especially in a place like Barton Hill which in many places is covered with layers of glacial deposits which may obscure features such as sinkholes. But finding the insurgence point for the water in Spider Cave would give an indication of its length, and might provide a way into the cave's larger sections—if larger sections exist—through a sinkhole or an enlarged fissure.

And particularly odd are the physics and the chemistry of the water emerging from the springs—or "resurgence points"--along the base of the cliffs. During times of normal rainfall, some of the springs above Route 146 may be releasing water—and yet others, sometimes only a couple of hundred feet away—may be dry, though during spring snowmelt or following times of excessively heavy precipitation all of the streams may be gushing. Clearly, something odd is going on underground regarding the flow cycles of the subterranean streams.

The chemistry of these streams also raises complex questions. Cave waters are often saturated with calcium carbonate, and so a cave's ceilings, walls, and floors may exhibit stalactites, flowstone, stalagmites and curious dam-like structures in the streambeds themselves called "rimstone pools." These form as the water flowing through the cave or entering through cracks in the ceiling "de-gasses": that is, it loses its carbon dioxide that makes the water acidic and causes the dissolved calcium carbonate to be deposited on ceiling, wall, or floor.

But Barton Hill has some springs known as "tufa" springs: these occur when for some reason the cave water retains its carbon dioxide and calcium carbonate as it flows underground, perhaps in a very small aquifer without any air space, preventing the saturated water from "de-gassing." In these situations, as the stream resurges from the cliff base into the open air, the sudden pressure release will

Figure 3 - Devin Delevan points to a large chunk of "tufa," a spongey-looking rock formed when calcium-carbonate-saturated water is agitated as it flows over debris in the streambed and deposits its minerals. Photo by Mike Nardacci.

Figure 4 - A section of the conglomerate bedrock along Route 443. The glacially-deposited sediments were cemented together by mineral-saturated water from ancient springs which have since sealed themselves up. The heavily-fractured outcrop could at some point slump down onto the road surface. Photo by Mike Nardacci.

cause the water to "de-gas" much as a carbonated beverage de-gasses when its bottle cap is removed. Now the dissolved calcium carbonate will be deposited on whatever is in the path of the stream: rocks, twigs, or masses of moss or plant fragments, making the materials appear to be coated with light-colored paint or forming a spongey-appearing rock known as "tufa" (Figure 3). Calcium carbonate can also form a natural cement and bind together enormous quantities of what geologists call "glacial till," the mixture of rock fragments and soil left by the retreating glaciers. An extensive area of the hill slope between Gallupville and Shutter's Corners has been cemented together into a kind of conglomerate by this process; here mineral-saturated water from ancient springs in the cliff far above the slope deposited so much of their dissolved calcium carbonate that they eventually sealed themselves up (Figure 4). This particular outcrop is heavily fractured and appears poised at some point to slump down the hillside onto Route 443.

The stretch of Route 146 approaching Gallupville has several other springs besides Spider Cave, but only one is easily recognizable as a tufa spring and at various times of the year when there is heavy precipitation or snowmelt, the underground stream feeding the spring produces great quantities of tufa which end up tumbling down the stream bed as cobbles or boulders. Yet, oddly enough, the stream cascading down from Spider Cave also has a mass of algae-and-moss covered tufa in a small area its bed, but not in the stretch above or below it (Figure 5). Clearly, there is something unusual occurring in the chemistry of the stream flowing through Spider Cave that is seasonally altering the acidity of the stream—what chemists call "pH."

Finding the stream's insurgence point and examining the terrain under which the water flows on its way through Spider Cave might help to explain its curious behavior.

Numerous studies have been done of the geology and the known caves on Barton Hill; perhaps the best known among cavers and professional geologists is contained in Prof. John Mylroie's doctoral thesis, "Speleogenesis and Karst Geomorphology of the Helderberg Plateau, Schoharie County, New York," published in 1977. But the occluded sinkholes, the shadowy fissures, the numerous bubbling springs, and the still-unexplored stretches of caves both known and unknown tell us that the beautiful forested plateau yet holds many secrets.

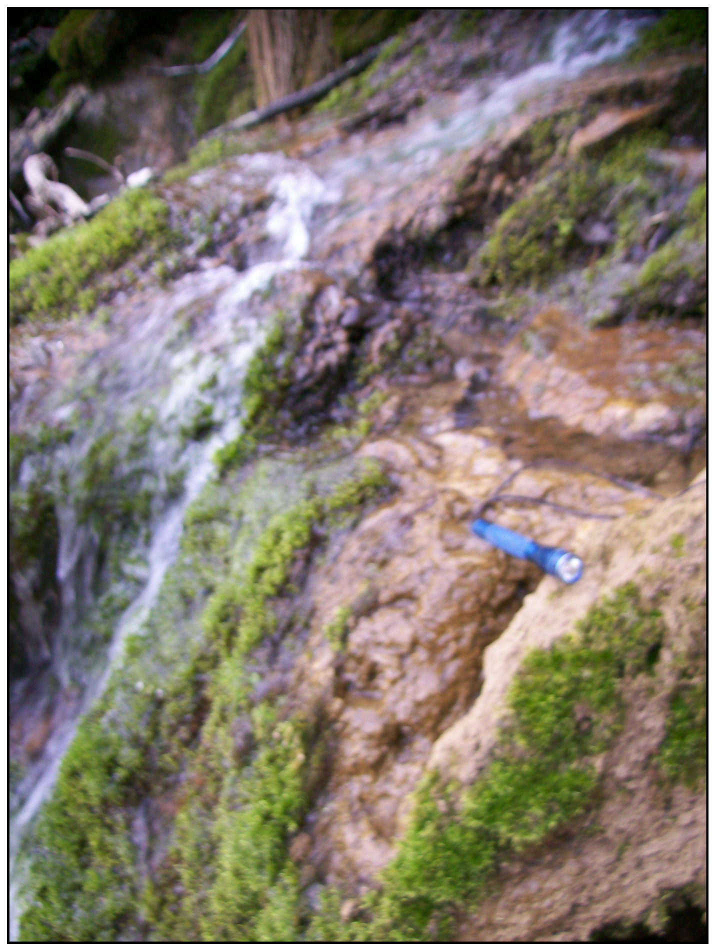


Figure 5 - A mass of tufa in the bed of the stream that resurges from Spider Cave; little or none of the rock appears elsewhere in the stream bed. A Maglite appears for scale. Photo by Mike Nardacci.

This article was reprinted, with permission, from the April 21, 2016 issue of the *Altamont Enterprise* (Altamont, New York).

BAT WITH WHITE-NOSE SYNDROME CONFIRMED IN WASHINGTON STATE

Washington Department of Fish and Wildlife
600 Capitol Way North, Olympia, Washington 98501-1091
Internet Address: http://wdfw.wa.gov
U.S. Fish and Wildlife Service
U.S. Geological Survey

OLYMPIA – White-nose syndrome (WNS) has been confirmed in a little brown bat (*Myotis lucifugus*) found near North Bend – the first recorded occurrence of this devastating bat disease in western North America. The presence of this disease was verified by the U.S. Geological Survey's National Wildlife Health Center.

WNS has spread quickly among bats in other affected areas, killing more than six million beneficial insect-eating bats in North America since it was first documented nearly a decade ago.

WNS is not known to pose a threat to humans, pets, livestock or other wildlife.

On March 11, hikers found the sick bat about 30 miles east of Seattle near North Bend, and took it to Progressive Animal Welfare Society (PAWS) for care. The bat died two days later, and had visible symptoms of a skin infection common in bats with WNS.

PAWS then submitted the bat for testing to the USGS National Wildlife Health Center, which confirmed through fungal culture, molecular and pathology analyses that it had WNS.

"We are extremely concerned about the confirmation of WNS in Washington state, about 1,300 miles from the previous westernmost detection of the fungus that causes the disease," said U.S. Fish and Wildlife Service Director Dan Ashe. "Bats are a crucial part of our ecology and provide essential pest control for our farmers, foresters and city residents, so it is important that we stay focused on stopping the spread of this fungus. People can help by following decontamination guidance to reduce the risk of accidentally transporting the fungus."

First seen in North America in the winter of 2006/2007 in eastern New York, WNS has now spread to 28 states and five Canadian provinces. USGS microbiologist David Blehert first identified the unknown fungus, *Pseudogymnoascus destructans,* which causes the disease. WNS is named for the fuzzy white fungal growth that is sometimes observed on the muzzles of infected bats. The fungus invades hibernating bats' skin and causes damage, especially to delicate wing tissue, and physiologic imbalances that can lead to disturbed hibernation, depleted fat reserves, dehydration and death.

"This finding in a far-western location is unfortunately indicative of the challenges we face with the unpredictability of WNS," said Suzette Kimball, director of the USGS. "This underscores the critical importance of our work to develop tools for early detection and rapid response to potentially devastating wildlife diseases."

The U.S. Fish and Wildlife Service leads the national WNS response effort, working with state and federal partners to respond to the disease. The Service's National White-nose Syndrome Coordinator Jeremy Coleman said the first step will be to conduct surveillance near where the bat was found to determine the extent of WNS in the area. The Washington Department of Fish and Wildlife (WDFW) is responsible for bat management and conservation in Washington and will coordinate surveillance and response efforts.

WDFW veterinarian Katie Haman said the disease is transmitted primarily from bat to bat, although people can carry fungal spores on their clothing, shoes or caving gear.

"The bat found near North Bend most likely had been roused from hibernation and was attempting to feed at a time of very low insect availability," Haman said. "At this point we don't know where the infected bat may have spent the winter, but it seems likely that it was somewhere in the central Cascades."

Haman said Washington state has 15 species of bats that benefit humans by consuming large quantities of insects that can impact forest health and commercial crops.

WDFW advises against handling animals that appear sick or are found dead. If you find dead bats or notice bats exhibiting unusual behavior such as flying outside during the day or during freezing weather, please report your observation online at http://wdfw.wa.gov/conservation/health/wns or contact the WDFW Wildlife Health Hotline at (800) 606-8768.

To learn more about WNS and access the most updated decontamination protocols and cave access advisories, visit www.whitenosesyndrome.org.

Contacts: Katherine Haman, Washington Department of Fish and Wildlife, Katherine.haman@dfw.wa.gov, 360-870-2135. Catherine Hibbard, United States Fish and Wildlife Service, catherine_hibbard@fws.gov, 413-531-4276. Marisa Lubeck, United States Geological Survey, mlubeck@usgs.gov, 303-526-6694.

RECOMMENDATIONS FOR MANAGING ACCESS TO SUBTERRANEAN BAT ROOSTS TO REDUCE THE IMPACTS OF WHITE-NOSE SYNDROME IN BATS

— U.S. Fish & Wildlife Service —

Background

White-nose syndrome (WNS) is a devastating fungal disease that has killed unprecedented numbers of hibernating bats in eastern North America. The first evidence of WNS was documented in photographs from New York State in 2006; as of January 2016 WNS has spread to 26 states and five Canadian provinces. The fungus causing the disease, *Pseudogymnoascus destructans* (*Pd*), has been detected in an additional four states where signs of the disease have not yet been observed (see current map available at www.whitenosesyndrome.org).

In North America, seven bat species have been confirmed with WNS, and five additional species have been detected carrying *Pd*. *Pd* invades the skin of hibernating bats and the resulting disease often leads to death. Genetic analyses indicate the fungus is likely not native to North America and it is expected that human activity led to its introduction to North America. *Pd* may have originated in Europe or Asia, where it or the disease has been confirmed on 13 bat species. There have been no documented deaths of European bats from WNS.

The best available information indicates *Pd* will continue to spread across North America, exposing more populations and species to the disease. Although bat-to-bat and bat-to-environment-to-bat transmission are believed to be the primary ways *Pd* is spread, human-assisted transmission is also possible. The severity of the impacts of WNS on bat populations justifies taking universal precautions[1] to reduce the risk of human-assisted transmission of *Pd* and to minimize disturbance to hibernating bats potentially susceptible to WNS.

Purpose

The recommendations below are intended to reduce the potential for humans to disturb hibernating bats or inadvertently transport *Pd* to uncontaminated bat habitats. However, we acknowledge that in some cases, subterranean bat roosts[2] may be under regulatory authority or usage policies that cannot accommodate these recommendations. Where possible, we advise following these recommendations to the extent practicable in the development of site-specific recommendations or policies. Additional guidance is being developed to assist with implementing these recommendations at subterranean sites managed specifically for visitation or tourism. The recommendations below address four main objectives to help wildlife and resource management agencies and non-government organizations develop local strategies to protect bats and subterranean ecosystems.

Objectives

1. Minimize the risk of human-assisted spread of *Pd* to decrease the probability of long-distance transfer of the fungus to uncontaminated areas.
2. Avoid disturbing bats in their roosts to the greatest extent possible.
3. Carry out science-based best management practices for achieving conservation and recovery goals for bats.
4. Foster cooperation and collaboration among government agencies, non-government organizations, and landowners.

Supporting Evidence for Concern

(See Appendix 1 for description of scientific literature)

1. *Pd* can persist and grow in the absence of bats.
2. Spores of *Pd* can remain viable outside of subterranean environments.
3. Spores of *Pd* cling to clothing, footwear, and gear and can be inadvertently transported out of contaminated sites.
4. *Pd* may be present on bats or in bat roosts without being visibly detectable.
5. Spread of *Pd* may be slowed by geographic or biological barriers to bat movements that may not be barriers to human movement.
6. Repeated and/or prolonged human disturbance during hibernation is detrimental to bats, especially bats already

[1] http://www.nwhc.usgs.gov/publications/wildlife_health_bulletins/WHB_2011-05_UniversalPrecautions.pdf

[2] For the sake of these recommendations, "subterranean bat roost" refers to cave-like habitats where bats roost or cave-like habitats identified by site-management authorities to be suitable for use as bat roosts (e.g. caves, abandoned mines, tunnels, bunkers or other structures, etc.).

stressed by WNS.

Recommendations

1. Where feasible, prevent unrestricted access to subterranean bat roosts, especially while bats are present.
2. Decontamination protocols greatly reduce the risk of transporting viable *Pd* spores on gear but are not 100% effective. In accordance with the National White-nose Syndrome Decontamination Protocol[3], equipment that has been used in a subterranean bat roost should only be reused in a roost that is similarly or progressively more contaminated.
3. Require visitors to subterranean bat roosts to clean and treat clothing and gear after visiting a subterranean bat roost regardless of season or time of year (refer to the National WNS Decontamination Protocol). On a site-specific basis, management agencies may consider identifying reduced or additional cleaning requirements for gear between roosts in small geographic areas.
4. Minimize disturbance to bats by coordinating and combining, when possible, scientific and management activities involving access to subterranean bat roosts, especially while bats are likely present.
5. Designate "no entry" restriction for subterranean bat roosts when wintering bats are present unless access is to conduct agency-sanctioned or permitted activities. The period of winter occupancy may include fall and spring as well. Additional restrictions to access may be required for sites with sensitive colonies of bats during summer.
6. Partner with individuals and organizations that utilize subterranean bat roosts to best conserve underground environments and their fauna and flora.
7. Work to educate visitors and local communities about WNS and conservation of bats, caves, and other subterranean habitats.

Conclusion

Many species of North American bats are highly vulnerable to this lethal fungus. Multiple efforts are underway to determine how we can halt the spread of *Pd* and/or reduce the threat of WNS to bats. These efforts involve states, provinces, tribes, federal agencies, universities, conservation organizations, and local communities. Our collaborative efforts are essential to bat and cave conservation. Key to this effort is reducing the risk of human-assisted spread of the fungus and avoiding activities that disturb bats during critical periods of hibernation.

This document is the product of a multi-agency and organization committee working within the framework of the National WNS Plan (A National Plan for Assisting States, Federal Agencies, and Tribes in Managing White-Nose Syndrome in Bats, finalized May 2011). On March 18, 2016, this document, Recommendations for Managing Access to Subterranean Bat Roosts to Reduce the Impacts of White-Nose Syndrome in Bats, was accepted by the WNS Executive Committee, a body consisting of representatives from Federal, State, and Tribal agencies which oversees the implementation of the National WNS Plan. These recommendations serve as a revision to the 2009 Cave Advisory issued by the U.S. Fish and Wildlife Service (USFWS 2009).

Appendix 1. Supporting evidence for *RECOMMENDATIONS FOR MANAGING ACCESS TO SUBTERRANEAN BAT ROOSTS TO REDUCE THE IMPACTS OF WHITE-NOSE SYNDROME IN BATS*

Since the discovery of WNS in January 2007 and the identification of *Pseudogymnoascus. destructans* in 2009 (initially as *Geomyces destructans*, Blehert et al., 2009), considerable attention has been paid to understanding the cause and occurrence of this disease, and the biology and distribution of the fungus. Research in these areas has been funded and conducted by numerous government agencies and nonprofit, private, and academic institutions. The findings of the following studies, published and unpublished, have provided evidence that indicates human activity in subterranean bat roosts has the potential to contribute to the spread of WNS and may impact the survival of hibernating bats.

In the statements below, we use "*Pd*", although the cited publications may have used the "*Gd*" nomenclature for the fungus.

1. *Pd* can persist and grow in the absence of bats.
   a. Genetic tests (PCR) confirmed presence of *Pd* and related species in sediment samples from caves and mines that previously held infected bats (Lindner et al., 2011; Lorch et al., 2012a; Peuchmaille et al., 2011a).
   b. Caves can harbor viable *Pd* for over two years after bats are absent (Lorch et al., 2013).
   c. Growth of *Pd* on a variety of cave sediments can lead to accumulation of *Pd* spores in the absence of bats (Reynolds et al., 2015).

[3] https://www.whitenosesyndrome.org/topics/decontamination

2. Spores of *Pd* can remain viable outside of subterranean environments.
    a. *Pd* can remain viable for at least 5 months at room temperature, and under laboratory conditions (USGS-National Wildlife Health Center, unpublished data).
    b. *Pd* spores can remain viable after being stored for up to eight months dry and/or frozen (Puechmaille et al., 2011b).
    c. *Pd* stored on dry agar plates at 5°C and 20-30% relative humidity (which is low compared to typical hibernaculum conditions) can remain viable for more than 5 years in the absence of bats (Hoyt et al., 2014).
3. Spores of *Pd* cling to clothing and footwear and can be inadvertently transported out of contaminated sites.
    a. *Pd* spores were identified by morphology on clothing and gear used in contaminated caves and mines (Joe Okoniewski, New York Dept. of Environmental Conservation, unpublished data).
    b. Viable fungal spores (many species, not specifically *Pd*) were retrieved from shoes of visitors after tours through Mammoth Cave (Hazel Barton, University of Akron, unpublished data).
    c. *Pd* has been detected by genetic screening (PCR) and fungal culture on equipment used to capture bats and on gear used in contaminated sites (USGS – National Wildlife Health Center, unpublished data).
4. *Pd* may be present on bats or in bat roosts without being visibly detectable.
    a. Bats, including Rafinesque's big-eared bats, eastern red bats, and silver haired bats, in and near contaminated sites may test positive for presence of *Pd* via PCR or fungal culture while failing to exhibit obvious signs of WNS (USGS – National Wildlife Health Center, unpublished data; Bernard et al., 2015; Langwig et al., 2015).
    b. *Pd* was detected by microscopy, genetic screening (PCR), and culture on bats and bat houses during summer months in upstate NY (Dobony et al., 2011; US Army, unpublished data); *Pd* was detected by PCR on two species of bats in May and June in Tennessee (Grace Carpenter, University of Tennessee, unpublished data).
5. Spread of *Pd* may be slowed by geographic or biological barriers to bat movements that may not be barriers to human movement.
    a. Genetically dissimilar colonies of wintering little brown myotis in westernmost Pennsylvania remained *Pd*-free for 1-2 years after WNS had spread through the rest of Pennsylvania and beyond to the south (Miller-Butterworth et al., 2014).
6. Repeated and/or prolonged human disturbance during hibernation is detrimental to bats (McCracken, 1989; Mohr, 1972; Thomas, 1995; Tuttle, 1979), especially bats already stressed by WNS.
    a. More frequent arousals during hibernation hasten depletion of critical fat reserves (Boyles and Willis, 2009), which can threaten bats' survival.
    b. Increased arousal frequency is associated with more severe cutaneous infections in WNS-affected bats and likely contributes to mortality (Reeder et al., 2012).

Secondary evidence:

7. If done correctly, current decontamination procedures have a high probability of significantly reducing the risk of spreading viable *Pd*.
    a. The effective kill rate of correctly applied decontamination agents or techniques is greater than 99.995% in laboratory experiments (Shelley et al., 2013).
    b. Appropriate application methods are critical for effective decontamination.

References

Bernard, R.F., J.T. Foster, E.V. Willcox, K.L. Parise, and G.F. McCracken. 2015. Molecular detections of the causative agent of white-nose syndrome on Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) and two species of migratory bats in the Southeastern USA. Journal of Wildlife Diseases. 51:2. doi:10.7589/2014-08-202

Blehert, D.S., A.C. Hicks, M.J. Behr, C.U. Meteyer, B.M. Berlowski-Zier, E.L. Buckles, J.T.H. Coleman, S.R. Darling, A. Gargas, R. Niver, J.C. Okoniewski, R.J. Rudd, and W.B. Stone. 2009. Bat white-nose syndrome: An emerging fungal pathogen? Science 323:227

Boyles, J.G., and C.K.R. Willis. 2010. Could localized warm areas inside cold caves reduce mortality of hibernating bats affected white-nose syndrome? Frontiers in Ecology and the Environment 8: 92-98

Dobony, C.A., A.C. Hicks, K.E. Langwig, R.I. von Linden, J.C. Okoniewski, and R.E. Rainbolt. 2011. Little brown myotis persist despite exposure to white-nose syndrome. Journal of Fish and Wildlife Management 2:190-195. doi:10.3996/022011-JFWM-014

Janicki, A.F., W.F. Frick, A.M. Kilpatrick, K.L. Parise, J.T. Foster, and G.F. McCracken. 2015. Efficacy of visual surveys for white-nose syndrome at bat hibernacula. PLoS One. doi: 10.1371/journal.pone.0133390

Hoyt, J.R., K.E. Langwig, J. Okeniewski, W.F. Frick, W.B. Stone, and A.M. Kilpatrick. 2014. Long-term persistence of *Pseudogymnoascus destructans*, the causative agent of white-nose syndrome, in the absence of bats. EcoHealth. doi: 10.1007/s10393-014-0981-4

Hoyt, J. R., K. Sun, K. L. Parise, G. Lu, K. E. Langwig, T. Jiang, S. Yang, W. F. Frick, A. M. Kilpatrick, J. T. Foster, and J. Feng. 2016. Widespread bat white-nose syndrome fungus, Northeastern China. Emerging Infectious Diseases 22:140-142. doi: http://dx.doi.org/10.3201/eid2201.151314

Langwig, K.E., W.F. Frick, R. Reynolds, et al. 2014. Hibernation drives seasonal dynamics of a fungal disease. Proceedings of the Royal Society B. http://dx.doi.org/10.1098/rspb.2014.2335

Lindner, D.L., A. Gargas, J.M. Lorch, M.T. Banik, J. Glaeser, T.H. Kunz, and D.S. Blehert. 2011. DNA-based detection of the fungal pathogen *Geomyces destructans* in soils from bat hibernacula. Mycologia 103:241-246

Lorch, J.M., D.L. Lindner, A. Gargas, L.K. Muller, A.M. Minnis, and D.S. Blehert. 2012. A culture-based survey of fungi in soil from bat hibernacula in the eastern United States and its implications for detection of *Geomyces destructans*, the causal agent of bat white-nose syndrome. Mycologia. doi:10.3852/12-207

Lorch, J.M., L.K. Muller, R.E. Russell, M. O'Connor, D.L. Lindner, and D.S. Blehert. 2013. Distribution and environmental persistence of the causative agent of white-nose syndrome, *Geomyces destructans*, in bat hibernacula of the eastern United States: Applied and Environmental Microbiology 79: 1293-1301

McCracken, G. 1989. Cave conservation: special problems for bats. The NSS Bulletin 51: 47-51

Miller-Butterworth, C.M., M.J. Vonhof, J. Rosenstern, G.G. Turner, and A.L. Russell. 2014. Genetic structure of little brown bats (*Myotis lucifugus*) corresponds with spread of white-nose syndrome among hibernacula. Journal of Heredity. doi:10.1093/jhered/esu012

Minnis, A.M., and D.L. Lindner. 2014. Phylogenetic evaluation of *Geomyces* and allies reveals no close relatives of *Pseudogymnoascus destructans*, comb. nov., in bat hibernacula of eastern North America. Fungal Biology. http://dx.doi.org/10.1016/j.funbio.2013.07.001

Mohr, C.E. 1972. The status of threatened species of cave dwelling bats. Bulletin of the National Speleological Society 34: 33-47

Puechmaille S.J., G. Wibbelt, V. Korn, H. Fuller, F. Forget, et al. 2011a. Pan-european distribution of white-nose syndrome fungus (*Geomyces destructans*) not associated with mass mortality. PLoS ONE 6: e19167. doi: 10.1371/journal.pone.0019167

Puechmaille, S.J., H. Fuller, and E.C. Teeling. 2011b. Effect of sample preservation methods on the viability of *Geomyces destructans*, the fungus associated with white-nose syndrome in bats. Acta Chiropterologica 13:217-221

Reeder D.M., C.L. Frank, G.G. Turner, C.U. Meteyer, A. Kurta, et al. 2012. Frequent arousal from hibernation linked to severity of infection and mortality in bats with white-nose syndrome. PLoS ONE 7(6): e38920. doi:10.1371/journal.pone.0038920

Reynolds, H.T., T. Ingersoll, and H.A. Barton. 2015. Modeling the environmental growth of *Pseudogymnoascus destructans* and its impact on the white-nose syndrome epidemic. Journal of Wildlife Diseases 51: 318-331

Shelley, V., S. Kaiser, E. Shelley, T. Williams, M. Kramer, K. Haman, K. Keel, and H.A. Barton. 2013. Evaluation of strategies for the decontamination of equipment for *Geomyces destructans*, the causative agent of white-nose syndrome. Journal of Cave and Karst Studies 75: 1–10. doi: 10.4311/2011LSC0249

Thomas, D.W. 1995. Hibernating bats are sensitive to nontactile human disturbance. Journal of Mammalogy 76: 940-946

Tuttle, M.D. 1979. Status, causes of decline, and management of endangered gray bats. The Journal of Wildlife Management 43: 1-17

Turner, G.G., D.M. Reeder, and J.T.H. Coleman. 2011, A five-year assessment of mortality and geographic spread of white-nose syndrome in North American bats and a look to the future. Bat Research News 52: 13-27

U.S. Geological Survey. 2011. Wildlife Health Bulletin 2011-05. Retrieved from http://www.nwhc.usgs.gov/publications/wildlife_health_bulletins/WHB_2011-05_UniversalPrecautions.pdf

U.S. Fish and Wildlife Service. 2009. Cave Advisory. Hadley, Massachusetts. 4pp. http://www.whitenosesyndrome.org/resource/2009-fws-cave-advisory. Accessed 18 October 2015

U.S. Fish and Wildlife Service. 2012. North American bat death toll exceeds 5.5 million from white-nose syndrome [press release]. Hadley, Massachusetts. http://whitenosesyndrome.org/news/north-american-bat-death-toll-exceeds-55-million-white-nose-syndrome. Accessed 18 October 2015

Verant M.L., J.G. Boyles, W. Waldrep Jr., G. Wibbelt, D.S. Blehert. 2012. Temperature-dependent growth of *Geomyces destructans*, the fungus that causes bat white-nose syndrome. PLoS ONE 7(9): e46280. doi:10.1371/journal.pone.0046280

Warnecke, L., J.M. Turner, T.K. Bollinger, J.M. Lorch, V. Misra, P.M. Cryan, G. Wibbelt, D.S. Blehert, and C.K.R. Willis. 2012. Inoculation of bats with European *Geomyces destructans* supports the novel pathogen hypothesis for the origin of white-nose syndrome. PNAS 2012; doi:10.1073/pnas.1200374109

Zukal, J., H. Bandouchova, J. Brichta, A. Cmokova, K. S. Jaron, M. Kolarik, V. Kovacova, A. Kubátová, A. Nováková, O. Orlov, J. Pikula, P. Presetnik, J. Šuba, A. Zahradníková Jr., and N. Martínková. 2016. White-nose syndrome without borders: Pseudogymnoascus destructans infection tolerated in Europe and Palearctic Asia but not in North America. Scientific Reports 6:19829. http://dx.doi.org/10.1038/srep19829

NYSDEC BAT ACOUSTIC SURVEY SUMMARY REPORT 2015

Introduction

With the original goal of determining trends for migratory bats, our acoustical monitoring effort has provided us with long-term data of summer distribution and abundance not just for our three migratory species, but for all of New York's bat species. This has become increasingly important in the face of white nose syndrome (WNS), a fungal disease devastating large numbers of the states hibernating bats that originated in Albany and Schoharie Counties in 2006. Since then the disease has spread rapidly across the eastern United States and Canada, resulting in massive mortality of hibernating bat species.

Little is historically known about the abundance and distribution of migratory tree bats; those present in New York are eastern red bats (*Lasiurus borealis*), hoary bats (*Lasiurus cinereus*), and silver-haired bats (*Lasionycteris noctivagans*). This has become progressively problematic in the face of wind energy development, as large numbers of migratory bats are found dead at the base of wind turbines each year. These species occur throughout the summer in New York and begin migrate south in July to spend the winter months.

Of our six hibernating bat species, little brown bats (*Myotis lucifugus*), northern long-eared bats (*Myotis septentrionalis*), Indiana bats (*Myotis sodalis*) and tri-colored bats (*Perimyotis subflavus*) have been hit the hardest by WNS. Populations have declined 85, 99, 71 and 96%, respectively. Big brown bats (*Eptesicus fuscus*) and small-footed bats (*Myotis lebeii*) appear to be less effected by the disease, although both are difficult to count during winter hibernation surveys for various reasons.

Results

2015 marks the seventh year of our statewide acoustic surveys, and we would be incapable of covering the state and generating this invaluable dataset without the efforts of our volunteers. Over 500 volunteer hours have been contributed and over 6,400 miles driven this year alone, so without this effort the project would not be possible.

Figure 1 depicts the routes that were run this past summer. Technical difficulties affected some of the other routes we typically run, but we were able to increase our sampling in western New York to further examine the great declines we have seen over the past few years in that portion of the state. 38 routes were surveyed resulting in a total of 75 route nights. Figure 2 shows the number of detections by species for all years.

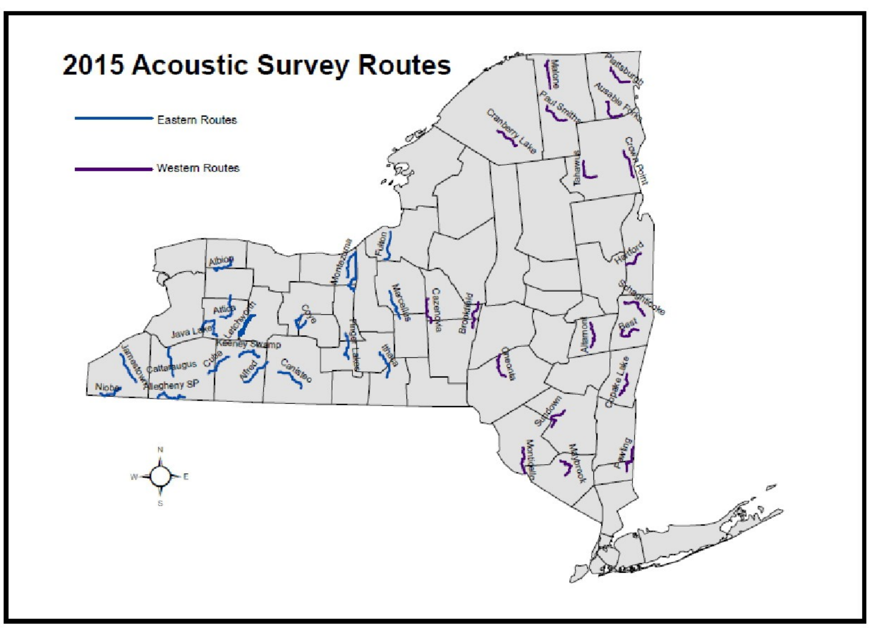


Figure 1. New York acoustic routes sampled in 2015 (38 total for 75 route nights).

Year	EPFU/ LANO	LABO	LACI	MYLE	MYLU	MYSE	MYSO	PESU	Total
2015	3083	381	833	0	161	5	3	13	5401
2014	3130	549	842	1	147	4	6	35	6200
2013	2902	354	651	0	194	13	7	21	5556
2012	2590	363	615	3	295	31	9	51	5289
2011	2452	259	591	1	301	31	15	39	4868
2010	2484	319	414	3	407	12	16	41	4985
2009	1936	325	479	0	575	60	24	54	4414

Figure 2. Total counts of detections per species from 2009 – 2015 (excluded are counts of unknown files; EPFU = big brown, LANO = silver-haired, LABO = eastern red, LACI = hoary, MYLE = small-footed, MYLU = little brown, MYSE = northern long-eared, MYSO = Indiana, PESU = tri-colored).

Surveys have been most effective for monitoring two species of migratory bats, red bats and hoary bats. Silver-haired bats produce calls that are structurally similar to big brown bats, and we have yet to be able to differentiate between the two species with current analysis technology, therefore results for both species are lumped together. Although there is yearly variation in numbers, statewide averages for these species have been trending upward since the start of the project (see Figure 3). Big brown bats are currently the most common species in New York, and while some hibernate in caves, many spend the winter in human structures. This makes it hard to get a good idea of current population size through surveys at hibernacula sites, so our acoustic surveys seem to be the optimal method for monitoring the population trend. Silver-haired bats are hard to distinguish from big brown calls. They are also much less common than big browns so we can assume the majority of the calls in this group are likely big-browns.

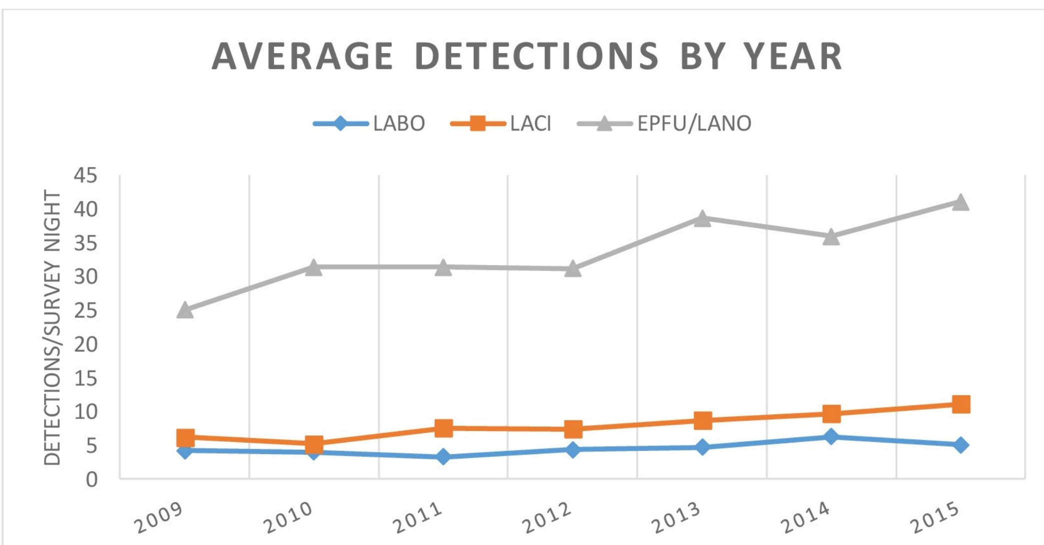


Figure 3. Average detections per survey night of migratory bats and the silver-haired/big brown complex by year.

Our most interesting result is that for the first time little brown bat detections have not continued their drastic decline and we finally see a slight increase in the number of detections (Figure 4). Mirroring this result is evidence for potential stabilization in our winter hibernation survey counts for little brown bat sites that have now had several years of WNS infection. Populations have been severely declining since the onset of WNS (575 files were identified in 2009 vs. 161 in 2015), and all of our other Myotis bats have virtually disappeared from our acoustic surveys. When lumped together, the increase for all Myotis bats is completely driven by the increase in little brown bat detections (see the Myotis trend line in Figure 4). Although it's too early to say whether there is true stabilization of little brown populations or bats condensing into more optimal sites, increases are a good sign that individuals may be adapting to the disease, but only time will tell.

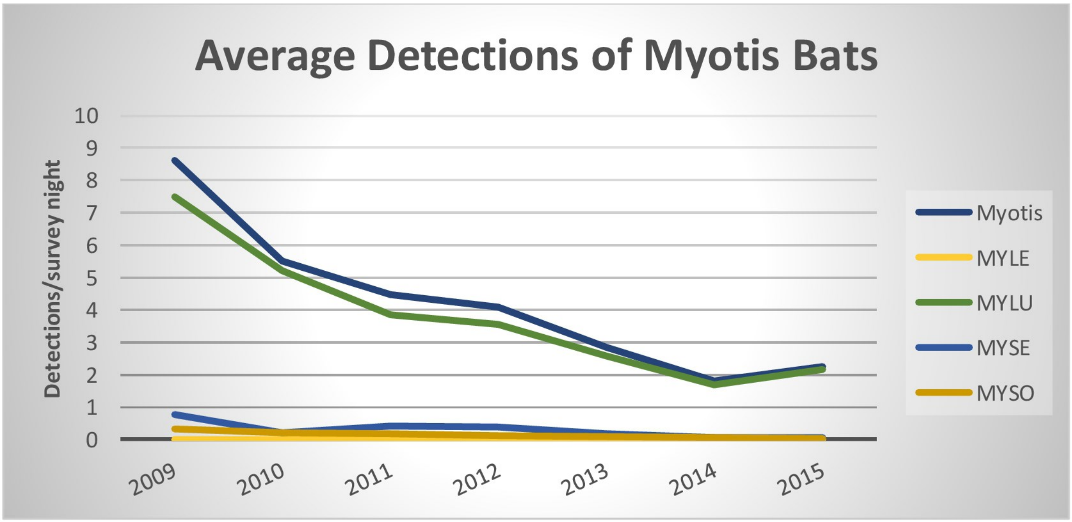


Figure 4. Average detections per survey night of all Myotis bats by year (MYLE = small-footed, MYLU = little brown, MYSE = northern long-eared, MYSO = Indiana)

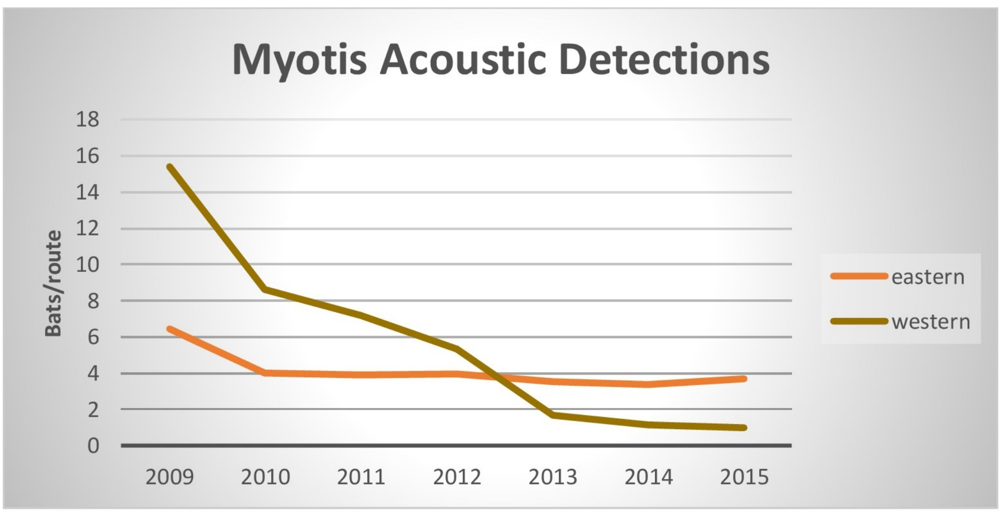


Figure 5. Average bat detection per route for all Myotis bats, split into eastern and western NY routes (see figure 1 for map of the routes).

The western half of the state has experienced steep declines since the onset of WNS, but it seems populations may finally be leveling off at very low numbers. It took longer for WNS to reach that half of the state, so when acoustic surveys began in 2009, little brown bats could still be easily detected on western routes. For the eastern routes, detections have been relatively stable since 2010, likely because bats in this region have dealt with the effects of WNS for a longer period of time.

Tri-colored bats have never been detected at high numbers, but we have seen devastating declines in both acoustic surveys and hibernacula surveys. New York is on the northeastern portion of this species range, so it's not unusual that we still see higher number of detections in our western routes.

Northern long-eared bats are one of the most impacted species by WNS, leading to their federal listing as threatened in 2015. Prior to the start of the disease, this species was widespread, found in over 90 hibernacula throughout the state, and they were common on the summer landscape as well, albeit at low numbers. Post WNS we have recorded great declines during winter at hibernacula sites, and summer acoustic detections have declined from a high of 60 in 2009 to 4 in 2015. This species can be difficult to detect in both winter and summer acoustic surveys due to its cryptic hibernation behavior (often found in cracks and small crevices) and foraging behavior (usually in clustered, forested areas), which produces relatively quiet calls. Due to this difficulty, we began doing some stationary acoustic surveys on Long Island this past summer, where there seems to be a remnant population, in order to get better trend information. This has proven to be an effective survey method in locations where we know they still occur, and we plan to increase our stationary survey effort in the summer of 2016.

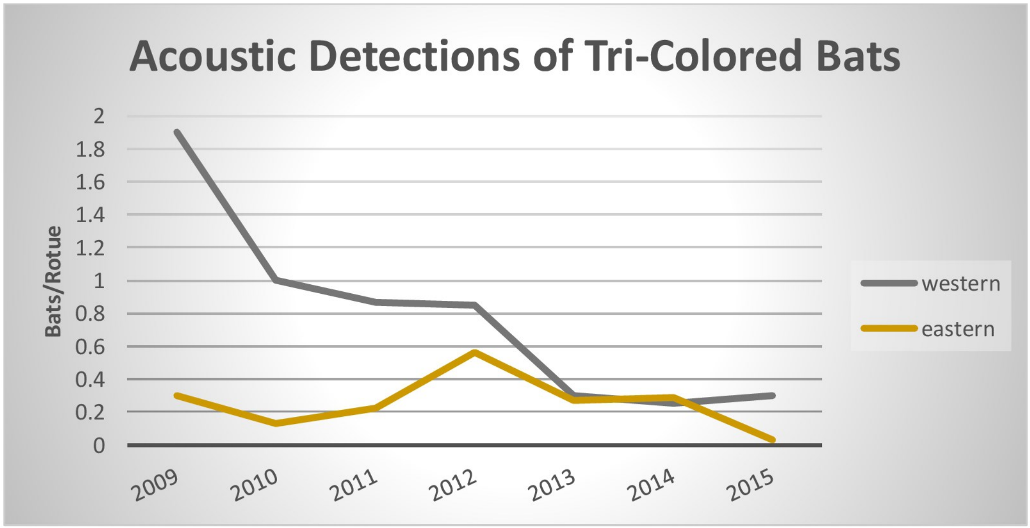


Figure 6. Average detections of bats per route by year for Tri-colored bats (*Perimyotis subflavus*).

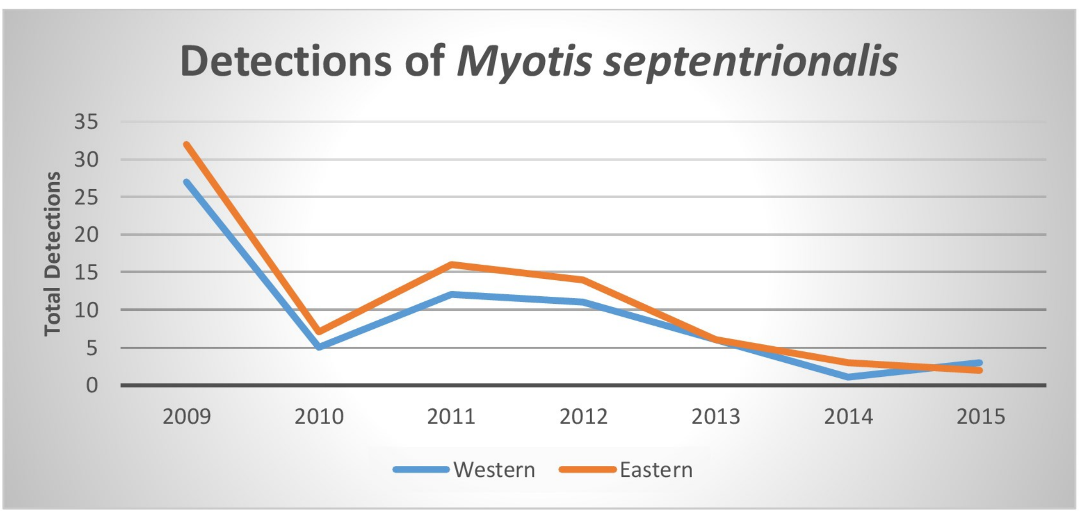


Figure 7. Total detections of northern long-eared bat by year.

Conclusion

Each year of data collection increases the value of the project, and we look forward to continuing the effort in the future. With the help of our citizen scientists, the program has been a great success and provided an increadibly valuable dataset to monitor New York's bats. Due the importance of bats and the many threats facing their populations, there is finally an effort to monitor bats on a national scale. The US Geological Survey has created the North American Bat Monitoring Program (NABat) to provide a coordinated effort for learning more about trends in distribution and abundance in response to the myriad threats facing species across North America. This project was inspired in no small part by the results demonstrated here in New York, so all volunteers can justifiably feel proud to have helped make this happen! They provide a framework (randomized routes spread across a grid for each state) and the database maintenance needed to make this program easy and feasible for states to join. We are looking into how we can contribute our current long-term data into their newly established database and possibly integrate our future surveys into their framework. Contributing to a wider national survey effort will help us better understand our bat species, particularly those migratory species that have large geographical ranges, and this makes our project even more beneficial.

NORTHEASTERN CAVE CONSERVANCY, INC.

March 6, 2016 Minutes - Summary

Mahoney-Hewat Science and Technology Center Building, Housatonic Valley Regional High School, 246 Warren Turnpike, Canaan (Falls Village), CT

Merlins management plan was reviewed and approved.

Technology Committee is a permanent committee assigned to the Treasurer's Department. This committee will maintain all aspects of the website and add additional features as needs arise. The committee chairman may appoint persons to assist with construction and maintenance of the various sections of the site.

Mike Chu is appointed Interim Technology Committee Chairman.

Ramon Armen is appointed Chairman of Bentley Cave Preserve.

Jonah Spivak is thanked for his years of service as the Chairman of Bentley Cave Preserve.

Kevin Dumont is appointed Chairman of Spider Cave Preserve.

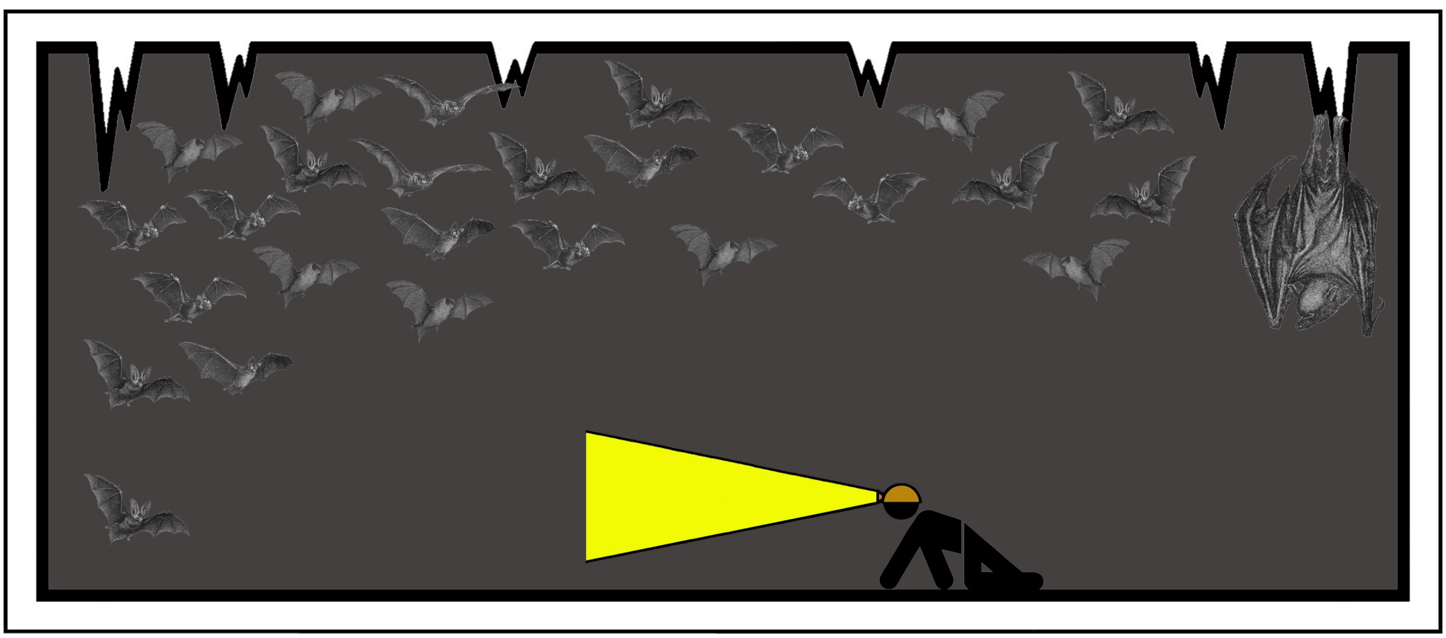
Woodell moved the NCC Board recognize the significant efforts put forth by Robert Addis, Charles Porter, Kevin Dumont and Thom Engel, in the tasks leading to the acquisition of the Spider Cave Preserve, and express our gratitude for their service.

Peter Youngbaer is the NCC's representatives to the cave conservancy roundtable at the 2016 NSS Convention.

Spider management plan is approved as discussed and amended.

Traino moved from the closed meeting of the trustees to amend act 01-38 so publications committee moves to treasurer, bylaws committee to vice president, nominations to president.

Thanks to Bob Simmons for setting up the meeting and the use of the Mahoney-Hewat Science and Technology Center.



TWO NEW WAYS TO DONATE AUTOMATICALLY TO THE NCC!

— Bill Folsom —

Now, you can set up a monthly donation to the Northeastern Cave Conservancy via PayPal. Go to our Donate page on the NCC website: http://necaveconservancy.org/donate.php. There, you will see a new pull-down menu with the option to automatically donate monthly to the NCC in the amounts of $5, $10, 20, $40 or $100.

Even better, a new NCC member recently inquired about automatically depositing into the NCC checking account via their bi-monthly payroll. In this case, his company uses ADP to manage payroll accounts via the web, so he was easily able to set up an additional deposit. If someone else receives direct-deposit paychecks and wishes to do the same, there should have no problem adding the account through either a web portal or via the HR department (depending on what your company uses). He states, "I've done this in the past even before things went to the cloud and HR had no trouble adding a second line to my direct deposit list."

In the latter method illustrated above, the additional advantage is that the NCC avoids PayPal fees. Please contact Bill Folsom if you would like to set up direct deposits via your payroll: treasurer@necaveconservancy.org

NOMINATING COMMITTEE SEEKS BOARD CANDIDATES

The Nominating Committee is continuously soliciting nominations for candidates for the NCC Board of Directors. Each spring, three of the nine board seats come up for election to be seated at the June meeting. If you would like to be considered for candidacy, know of someone who would make a good candidate, or are simply curious about the process, please contact Bob Simmons, Nominating Committee Chair, at rwsimmons1@gmail.com or call 860-620-2055. You can also speak to any NCC board member or officer with no obligations.

CURRENTLY OPEN COMMITTEE CHAIR POSITIONS:

Fundraising Committee Chair - The Fundraising Committee Chair coordinates all fundraising activities for the NCC. The fundraising committee may be authorized by the board to research and apply for grants to generate funds for specific projects, including cave acquisitions. If interested in this position, please contact Vince Kappler at vicepresident@necaveconservancy.org.

Technology Chair - The Technology Committee is a permanent committee assigned to the Treasurer's Department. This committee will maintain all aspects of the NCC website and add additional features as need arise. The Technology Committee Chair may appoint persons to assist with construction and maintenance of the various sections of the site.

NCC VOLUNTEER OPPORTUNITIES AVAILABLE

Cavers can get involved with many volunteer opportunities offered by the NCC. These include work on various committees or assisting with one of the cave-preserve management teams. Volunteers contribute to the maintenance and preservation of unique underground environments and help to support various NCC educational and outreach activities. If interested in learning more about volunteer opportunities with the NCC, please contact Vince Kappler at vicepresident@necaveconservancy.org. You can also speak to any NCC board member or officer. Don't pass up the chance to give something back to the caves that are so important to us all.

PLANNED GIVING: GROW YOUR LEGACY

— Bill Folsom —

Planned giving is an area of fundraising that refers to several specific gifts that can be funded with cash, equity, or property. The specific rules of planned giving are defined by the United States Congress and the Internal Revenue Service.

Planned gifts are referred to as such because they require more planning, negotiation, and counsel than many other gifts. Planned gifts can result in immediate income, income to charity over time or serve to delay a gift for life or other period of time while the donor or others retain income and/or access to the assets used to fund the gift. Because of the current or future charitable benefits, a number of state and/or federal income tax, capital gains, estate, and gift benefits are associated with giving in this way.

Thank you for considering a planned gift to the Northeastern Cave Conservancy, Inc. The NCC can accept both land and monetary donations, as stipulated in either wills or trusts.

A bequest translates your commitment to cave conservation into a lasting legacy. A simple provision in your will, such as the following, will enable you to provide for the NCC in your estate plans:

"I give $_____ [a specific amount, or alternatively, '_____ percent of the residuary of my estate'] to the Northeastern Cave Conservancy, Inc., a nonprofit corporation incorporated in the Commonwealth of New York and having its principal offices at P.O. Box 254, Schoharie, NY 12157, for its general purposes."

The Northeastern Cave Conservancy's tax ID # is 13-4043653. Be sure to consult with your attorney on the language and tax effect of any charitable bequest. Tax implications for your state of residence may be found here:
http://www.landtrustalliance.org/taxonomy/term/121.

For more information on making a planned gift, please contact the Northeastern Cave Conservancy via e-mail at treasurer@necaveconservancy.org.

ENHANCED FEDERAL TAX INCENTIVE FOR CONSERVATION EASEMENT DONATIONS NOW PERMANENT

— Bill Folsom —

In 2015, Congress enacted one of the most powerful conservation measures in decades: the enhanced federal tax incentive for conservation easement donations. The permanent conservation easement tax incentive is a powerful tool that helps Americans conserve their land voluntarily. For land trusts across the country, the permanent incentive represents vastly increased opportunities to protect the special places in their widely varied communities.

If you own land with important natural, agricultural or historic resources, donating a conservation easement can be a prudent way to both save the land you love forever and to realize significant federal tax savings. The permanent incentive increases the benefits to landowners by:

- Raising the deduction a donor can take for donating a conservation easement to 50%, from 30%, of his or her annual income
- Extending the carry-forward period for a donor to take a tax deduction for a conservation agreement to 15 years from 5 years
- Allowing qualifying farmers and ranchers to deduct up to 100% of their income, increased from 50%.

You can print out this short brochure which summarizes the conservation easement tax incentive and provides answers to some frequently asked questions:

http://s3.amazonaws.com/landtrustalliance.org/ConservationEasementTaxIncentiveBrochure2016.pdf

To learn more about using the conservation tax incentive, visit http://www.landtrustalliance.org/income-tax-incentives.

Source: http://www.landtrustalliance.org/issues-action/take-action/tax-incentives

NORTHEASTERN CAVE CONSERVANCY MEMBERSHIP SURPASSES 200

WHERE DO WE COME FROM?

— Peter Youngbaer —

At the March NCC Board Meeting, I was very pleased to announce that, for the first time in the NCC's 38-year history, our membership hit 200 (204 as of this writing). That's a notable benchmark, and prompted me to take a look at where all these members come from.

Who are these people who care enough about cave and karst conservation to join and support the premier organization in the northeastern United States dedicated to this mission?

Founded in New York, and focused initially on Knox Cave, it's not surprising that early membership grew in the caving region immediately surrounding that cave: the limestone-rich area of Schoharie and Albany Counties.

However, in the intervening years, more properties have been acquired and managed, and collaborative relationships built with state agencies, land trusts, and individual members of the caving, scientific, and conservation communities. The geographic attraction of these areas has grown as well.

So, where do our members come from? I was surprised to learn that we have members from 24 U.S. states and two Canadian provinces—far and wide.

By state, it's probably no surprise that our largest number of members comes from New York (89). Connecticut is next, with 25, followed by New Jersey (20), Massachusetts (15), and Vermont (14).

The next tier includes Pennsylvania (6), West Virginia (6), New Hampshire (3) and Quebec (3).

We have two members in each of the following states: California, Illinois, Maine, Mississippi, Missouri, and Virginia.

Finally, we have one member in all of the following: Alabama, Arkansas, Colorado, Hawaii, Kansas, Kentucky, Maryland, Ohio, Ontario, Texas, and Washington.

Clearly, one does not need to be from the Northeast to care about caves and karst in the Northeast. So, next time you're talking to your friends, family, colleagues, or fellow cavers around the country, ask them if they're interested in helping conserve caves and karst in the Northeast. They may very well be interested in joining and helping out.

WHAT ARE SOME NCC MEMBERS ARE SAYING ABOUT THE WORK WE DO?

"Thank you for all that you do. From your friends and fellow cavers in the MAR and NRO."

— the Northern New Jersey Grotto

"The NCC is getting a lot of great stuff done; it is fun to see all that has been accomplished. Our heartfelt thanks to all."

— Joan and John Mylroie

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Northeastern Cave Conservancy Inc. · P.O. Box 254 · Schoharie, N.Y. 12157

www.necaveconservancy.org