

# Northeastern Cave Conservancy News

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March 2017



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## Next Board Meeting

Sunday, March 5, 2017 at 10:00 am

Sam's Point Preserve

400 Sams Point Rd., Cragsmoor, NY 12420

## Summer Board Meeting

June 11, 2017 at 10:00 am (location TBD)

**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.

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.



## CAVE VISITATION MONITORING

### — Norm Berg —

#### Introduction

Cave owners and managers may improve a cave-management plan by using historical information on cave visitation. Using an electronic device called a data logger, we can find out when the cave is visited. The data logger discussed in this article is a Hobo U9-002 Light On/Off. It checks for the presence of light at one-second intervals, and records the date and time that light is sensed. Besides visitation monitoring done at the request of land managers, monitoring was also done to field-test various logging techniques. Portions of three monitoring studies, one in Clarksville Cave (NY) and two in Tory's Cave (CT), are discussed in this article.

#### Outline of the Data-Logging Procedure

- 1) Connect the logger to a computer using the manufacturer's software and set the logger's internal clock to the current date and time.
- 2) While connected to the computer, activate the logger to begin collecting data. The logger remains activated until it is reconnected to the computer (step 6).
- 3) Wrap the logger in protective packaging (an inner waterproof layer and an outer abrasion-resistant layer). Note: the logger is activated before being packaged, as it's not accessible once packaged.
- 4) Place the logger in the cave and carefully conceal all but the sensor.
- 5) Remove the logger from the cave. Optionally, install another logger. The logger continues to record data until the next step.
- 6) Remove the protective packaging and connect the logger to a computer to retrieve the data.
- 7) Import the data into Microsoft Access, where Light-On/Off events and groups are made and the duration of the events and groups are calculated. During this process, if there was a change in daylight savings time during the study, the data's time stamp would be adjusted. Data collected on and before the date that the logger was placed in the cave, as well as the data collected on or after the date it was removed from the cave, are ignored in the calculations.
- 8) Using the data from Microsoft Access, tables and charts (usually in Microsoft Excel) are made.

#### Placement of Data Logger in the Cave

The logger should be placed where human traffic is likely to occur and where it can be concealed and remain undisturbed. Ideally, the light sensor should be flush with the rock/mud of the wall, making the exposed portion of the sensor small enough so as not to be obvious to the typical visitor. The sensor should face the direction from which people are likely to shine their lights, thereby maximizing its likelihood of detecting them.

A suitable placement site must also have appropriate cracks or crevices within which the logger can be hidden, not be subject to intermittent flowing water, and not affected by outside light (keeping in mind that the sun's position changes with the time of day and the seasons, and that winter can bring snow and ice far into the entrance resulting in a light-tunnel). The length of time the logger is in the cave may be determined by factors such as the period of interest (e.g., installing just prior to winter closure and removing just after the closure ends), the capabilities of the logger (i.e., battery life and data-storage limitations), and access to the cave to install and retrieve the logger (which is ideally done outside of the bat-hibernation season).

#### Accuracy of Logging Methods

Visitors to a monitored cave, other than those involved in the study, are unaware that visits are being monitored.



The Hobo U9-002 Light On/Off data logger modified for use in a cave environment. Photo by Norm Berg.



Preparation of logger to survive the cave environment includes wrapping the logger in inner (left) and outer (right) protective layers. The layers help waterproof the logger, protect it against abrasion, and help to camouflage it. Data collection by the logger actually begins before it is wrapped. However, data not relevant to the study is discarded prior to analysis. Photos by Norm Berg.



Stages in sensor placement within the cave. The case housing the electronics and wires are carefully buried and concealed (left) so that only the sensor is exposed (right). Only about 1/8 inch in diameter, the sensor looks much like other shiny crystals in the cave wall and is largely invisible to anyone passing near it. Photos by Norm Berg.

The logging method used in these studies cannot produce an accurate head count. However, if a cave has a long and narrow passage that everyone travels through, it may be possible to obtain an indication of group size and direction of travel by strategically employing multiple loggers. Regardless, the logger will still produce baseline data showing the dates and times when groups or individuals are present at a specific point in the cave.

When a continuous light, such as a candle, is present near the logger, it will be interpreted as a very long and uninterrupted visitation. During this time, the passage of visitors cannot be determined. It is possible, for example, that the candle remained lit long after the person or persons left the area containing the logger (or the cave itself). The tables of long Light-On events shows examples of times when visitation may be less than what is charted.

### **Factors that Affect the Accuracy of Information Gathered**

#### **Characteristics of Cave and Sensor**

- The size of the cave passage that the logger is in - A smaller passage makes it more likely that visitors will pass near the logger. In large caves or caves with multiple passages and entrances, a person may travel through passages other than the one containing the sensor.
- The field of view of the sensor - A light sensor requires careful positioning to provide an unobstructed view of passing persons, yet it should also be well-camouflaged to avoid detection.
- The sensitivity of the sensor - Sensors vary in the amount of light required to record a Light-On data

point and also in their response to different frequencies of light. Minor differences between units may affect their overall response to light.

### **False Negatives and False Positives**

False negatives (underrepresentation of light detection in the data) occur when people passing by the logger are not detected by it. Consequently, the presence of some people may be missed. One reason for the occurrence of false negatives is that their light did not shine on the sensors as they passed by it (or else their light was too dim to register). The logger itself may cause false negatives if, for example, the sensor becomes dirty or is pushed out of position.

False positives (overrepresentation of light detection in the data) will occur when a person or group passes by a sensor multiple times and is counted more than once. In the visitation studies described in this report, we are looking at periods of visitation, and not attempting to count individual visitors. False positives can also occur if circuit instability causes a spurious signal, which will be interpreted as a real event. In practice, false positives are very rare, and usually result from the unit getting stuck on. When the logger is installed and removed, it should accurately record the presence of those doing it. This is used to confirm that the logger was working properly at these times. The data recorded on and before the day of installation and on and after the day of removal are not included in the analysis.

### **Comparing Visitation Monitoring Studies**

Comparing visitation monitoring studies should be done with caution as several factors not related to visitation can cause more or less data to be recorded during each study. For example, the logger used may be a different unit. Even though the loggers used in our studies are all the same model, each unit differs in sensitivity to light. When a data logger is placed in a cave, the location of the sensor (its “view” of the visitors) cannot be exactly repeated to match that of prior visitation studies.

### **Visitation Logging Terminology**

**Logger or Data Logger:** The entire unit, including the case and electronics within, and the attached sensor.

**Sensor:** The part of the logger that reacts to the presence of light. Our loggers use either a photo-resistor or a photo-diode.

**State:** The value most recently sensed by the logger, either Light-On or Light-Off. Light-Off is the default.

**Point:** Point is short for data point. When a change in

the detection of light by the sensor occurs, either Light-Off to Light-On or Light-On to Light-Off, the logger records both the new state (Light-On or Light-Off) and the date/time that the new state began. The Hobo logger that we use samples the state at one-second intervals. The logger only records the state and the date/time of the change. Therefore, points always alternate between Light-On and Light-Off. Two points in succession constitute an event.

**Event:** The time period from the start of one state to the start of another (and always different) state constitutes an event. Events alternate between Light-Off and Light-On. An event can be as short as the recording interval, which is one second. A visitor briefly shining a light on the logger’s sensor would be recorded as a one-second Light-On event. A lantern left near the sensor would record a much longer Light-On event. Visitors congregating in the room in which a sensor is located would likely produce many Light-On events of varying length. The longest Light-On events are listed in the table of Five Longest Light-On Events for each of the studies.

**Group:** Multiple Light-On events that occur in quick succession are combined into a single Light-On group, simplifying interpretation and charting, without significant loss of detail.

The criteria used in these studies eliminates the in-between Light-Off event if it shorter than one minute. A Light-On group begins with the starting time of the first Light-On event and finishes with the ending time of the last Light-On event that is followed by a Light Off event of one minute or longer. Most of the charts and reports are based on Light-On groups. The longest Light-On groups are listed in the table of Five Longest Light-On Groups for each of the studies.

### **Examples of Events and Groups**

A person walking by the logger will likely record a few Light-On events, as that person’s light shines around the area of the sensor. These events could occur within a minute or two, and would be grouped into one Light-On group.

Someone lighting a candle next to the logger would likely be recorded as many separate Light-On events—from their flashlight or headlamp as they move around the room—until the candle is lit. All these events may be grouped into one long Light-On group. Assuming the person doesn’t get between the candle and the sensor, there would now be one long Light-On event from the candle’s light.

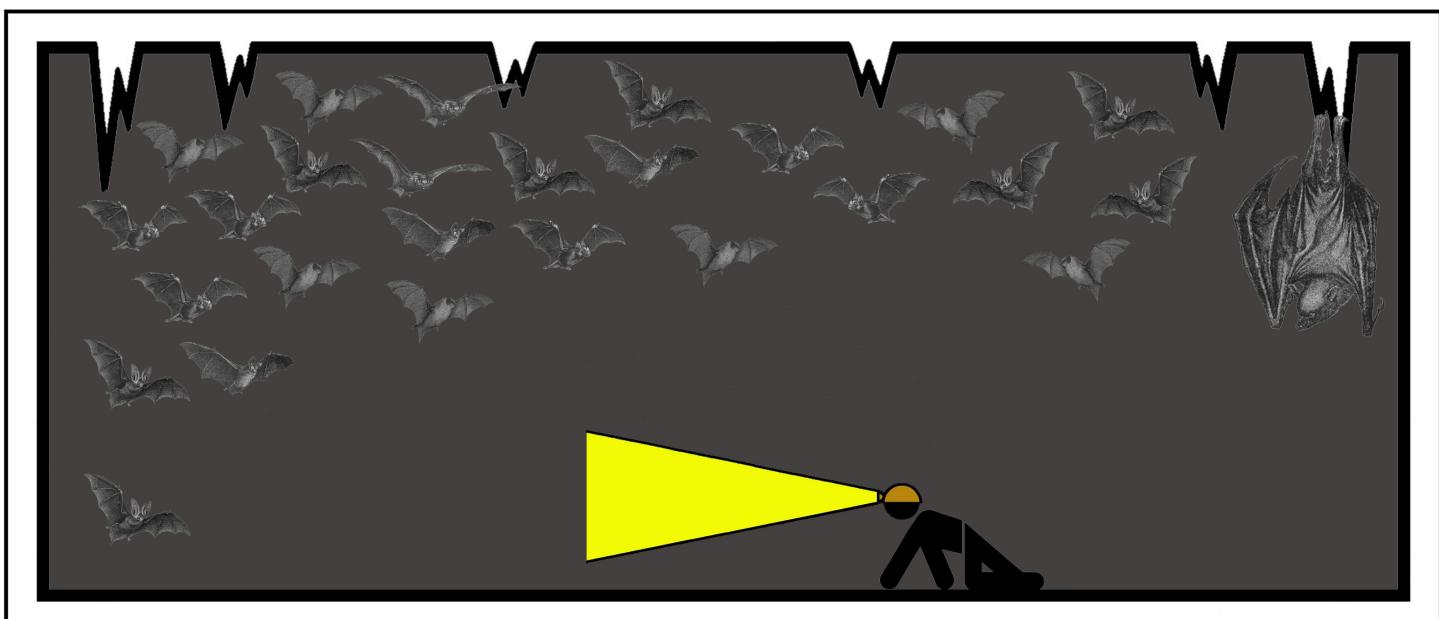


The Tory's Cave sinkhole is the only entrance into the cave. Therefore, anyone entering the cave will have to travel through the passage containing the light sensor. Photos by Sarah Ritter.

### Sample Data Output from a Hobo Data Logger

Sequence Number	Date	Time	State
178	6/22/2008	16:20:43	0
179	6/22/2008	16:20:56	1
180	6/22/2008	16:20:57	0
181	6/22/2008	17:02:06	1
182	6/22/2008	17:02:12	0
183	6/22/2008	17:08:23	1
184	6/22/2008	17:08:27	0
185	6/22/2008	17:17:38	1
186	6/22/2008	17:17:39	0
187	6/22/2008	17:30:23	1
188	6/22/2008	17:30:25	0
189	6/24/2008	10:32:51	1
190	6/24/2008	10:32:54	0
191	6/24/2008	10:37:44	1
192	6/24/2008	10:37:57	0
193	6/24/2008	10:42:23	1
194	6/24/2008	10:42:24	0

Sample data obtained from a visitation study showing how data output from the data logger appears. The consecutive numbers in the left column represent the sequence of changes in state recorded by the sensor (i.e., from Light-On to Light-Off or Light-Off to Light-On). Numbers in the right column (0 or 1) indicate the actual change in state (Light-On or Light-Off) that was recorded (1 = Light-On, 0 = Light-Off).



## CAVE VISITATION STUDY - CLARKSVILLE CAVE (CLARKSVILLE, NY)

**— March 23, 2008 - June 26, 2008 —**

### Introduction

The Clarksville Cave visitation monitoring was done by the Central Connecticut Grotto as part of a project for the Northeastern Cave Conservancy (NCC). A full report of this and other monitoring studies was presented to the NCC. Portions of the results are shown here.

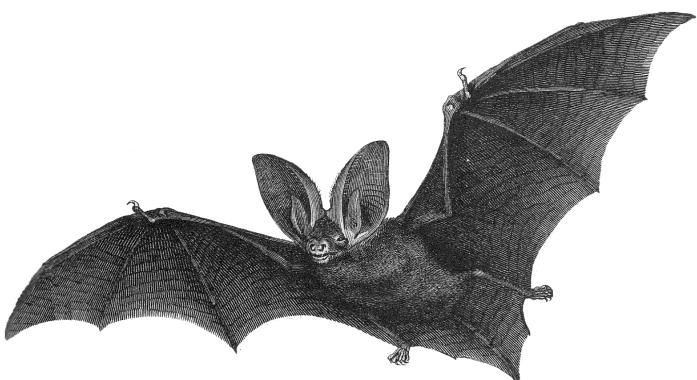
### Materials and Methods

On March 22, 2008, one data logger was concealed in the main entrance room of Clarksville Cave. Installation methods are described earlier. The logger was left in place until June 27, 2008, a total of 98 days. The first and last day's data were discarded (these were partial days and recorded the logger installation and retrieval), leaving 96 days of monitoring.

### Results

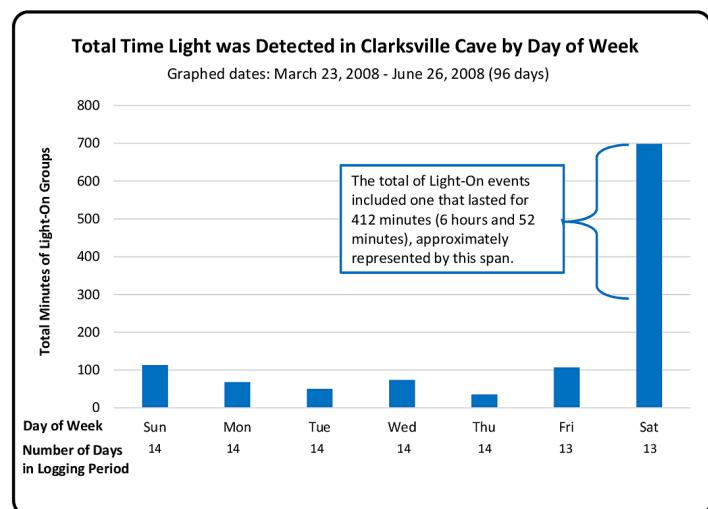
In the light-detection charts for each study, the dark lines and rectangles show periods when the presence of light was recorded by the logger. Note the long Light-On event that started on May 3 at 2:27 am and continued for 6 hours and 52 minutes until 9:19 am. This is part of a group of events that began at 2:24 am and continued for 7 hours and 3 minutes until 9:27 am.

Another long Light-On event began on May 30 at 10:44 pm and lasted until 1:42 am the following day. A few weeks later, when the logger was removed, many "tea lights" were noticed near it, one being only about a foot from the sensor. The long and unbroken Light-On events may have been caused by the light of nearby candles. The five longest Light-On events and groups listed in the tables below.



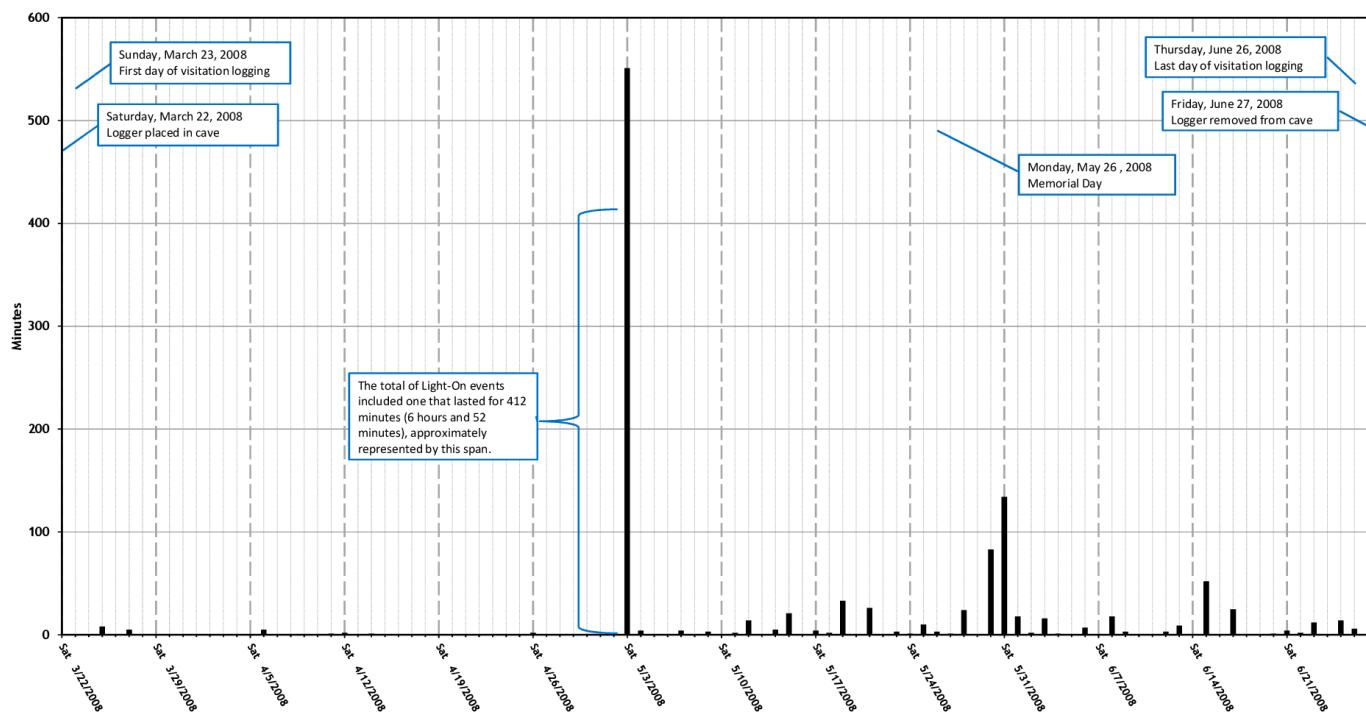
Five Longest Light-On Events		
Start Date/Time		Duration Hours:Minutes
5/3/2008	2:27 am	6:52
5/30/2008	10:44 am	2:58
5/3/2008	11:50 am	0:49
6/15/2008	3:02 am	0:14
5/19/2008	10:37 am	0:14

Five Longest Light-On Groups		
Start Date/Time		Duration Hours:Minutes
5/3/2008	2:24 am	7:03
5/30/2008	10:42 pm	3:00
5/3/2008	10:47 am	1:54
5/19/2008	10:35 am	0.16
6/15/2008	3:01 pm	0.16



### Total Time Light was Detected in Clarksville Cave by Date

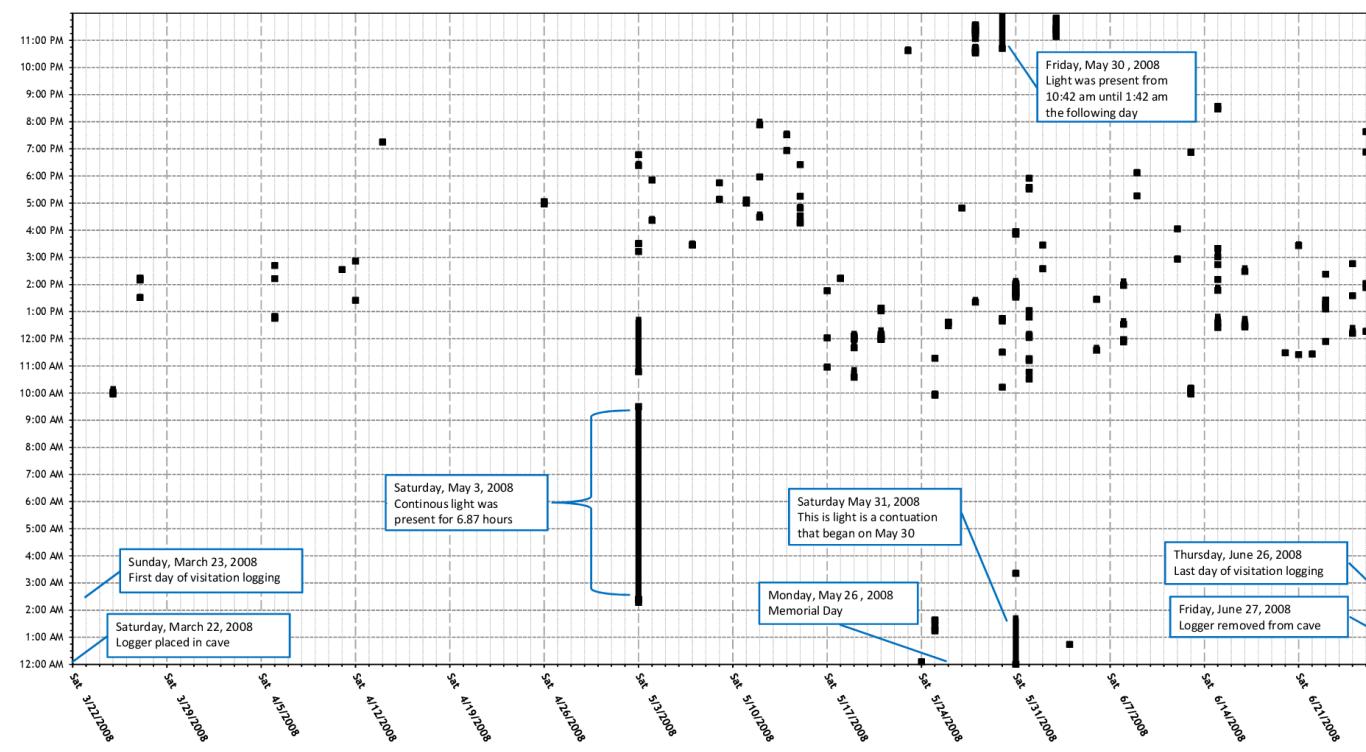
Graphed dates: March 23, 2008 - June 26, 2008 (96 days)



### Light Detected in Clarksville Cave by Date and Time

Graphed dates: March 23, 2008 - June 26, 2008 (96 days)

Dark rectangles indicate Light-On groups. Light-On groups of short duration are charted with exaggerated vertical height to make them visible on the chart.



## CAVE VISITATION STUDY - TORY'S CAVE (NEW MILFORD, CT)

**— June 23, 2008 - October 3, 2008 —**

### Introduction

This visitation monitoring was done by members of the Central Connecticut Grotto. It was done to further test and improve the data logging process and data analysis. The results are likely to be representative of typical visitation to this cave at this time of year and prior to the seasonal cave closures related to white-nose syndrome (WNS).

### Materials and Methods

On June 22, 2008, one data logger (Hobo U9-002 Light On/Off) was concealed in Tory's Cave. Installation methods are described earlier. The logger was left in place until October 4, 2008, a total of 105 days. The first and last day's data were discarded (these were partial days and recorded the logger installation and retrieval), leaving 103 days of monitoring.

### Results

Overall, the data show that the cave was visited throughout the monitoring period, with the most visitation in July and August. Over the 103 days of the study, the day of the week that the cave was most visited was Tuesday, followed by Thursday, Wednesday, Sunday, Saturday, Monday, and Friday. Perhaps the mid-week usage is from people attending local summer camps.

An interesting visitation pattern occurred from Sunday August 17 through Monday August 25. During this period of time, the cave showed heavy visitation from around 7:30 am to 10:00 am every other day. Other than this period, visitation was rare before 10:00 am. There was no recorded visitation after 11:00 pm or before around 7:30 am.

Unlike the other studies discussed in this article, this study had no long Light-On events or groups. This is likely due to the location of the logger, which was in a part of the cave which visitors quickly pass through and do not congregate in.

Five Longest Light-On Events

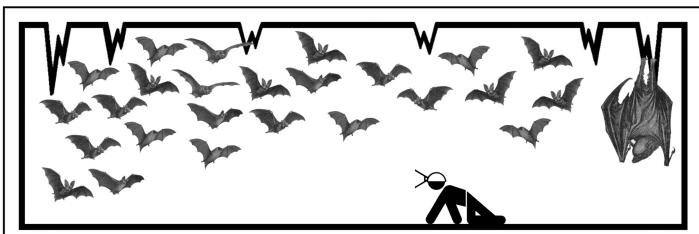
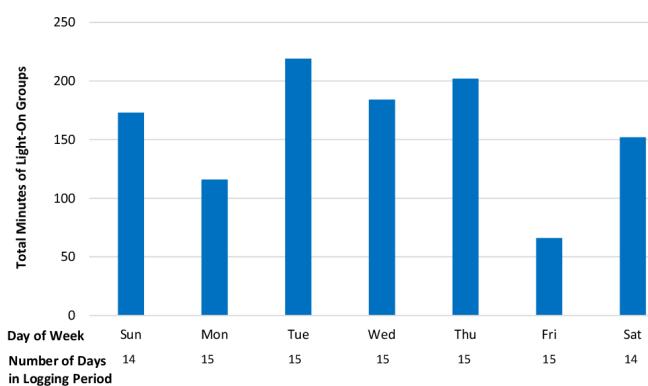
Start Date/Time		Duration Hours:Minutes
9/14/2008	3:07 pm	0:02
7/29/2008	10:36 am	0:02
7/9/2008	11:15 am	0:01
7/21/2008	10:44 am	0:01
7/5/2008	7:49 pm	0:01

Five Longest Light-On Groups

Start Date/Time		Duration Hours:Minutes
8/17/2008	7:37 am	0:17
8/21/2008	9:00 am	0:11
7/23/2008	11:52 am	0:10
8/6/2008	11:14 am	0:08
8/21/2008	9:12 am	0:08

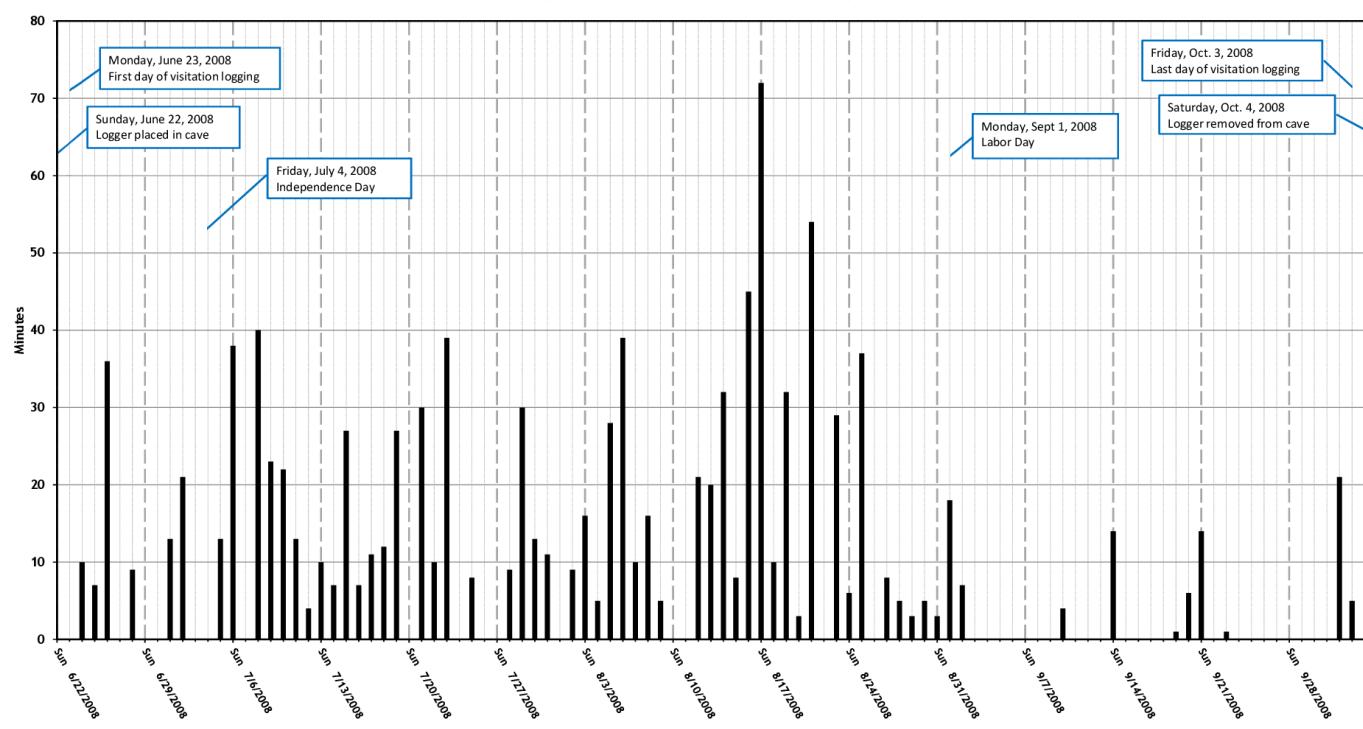
Total Time Light was Detected in Tory's Cave by Day of Week

Graphed dates: June 23, 2008 - October 3, 2008 (103 days)



### Total Time Light was Detected in Tory's Cave by Date

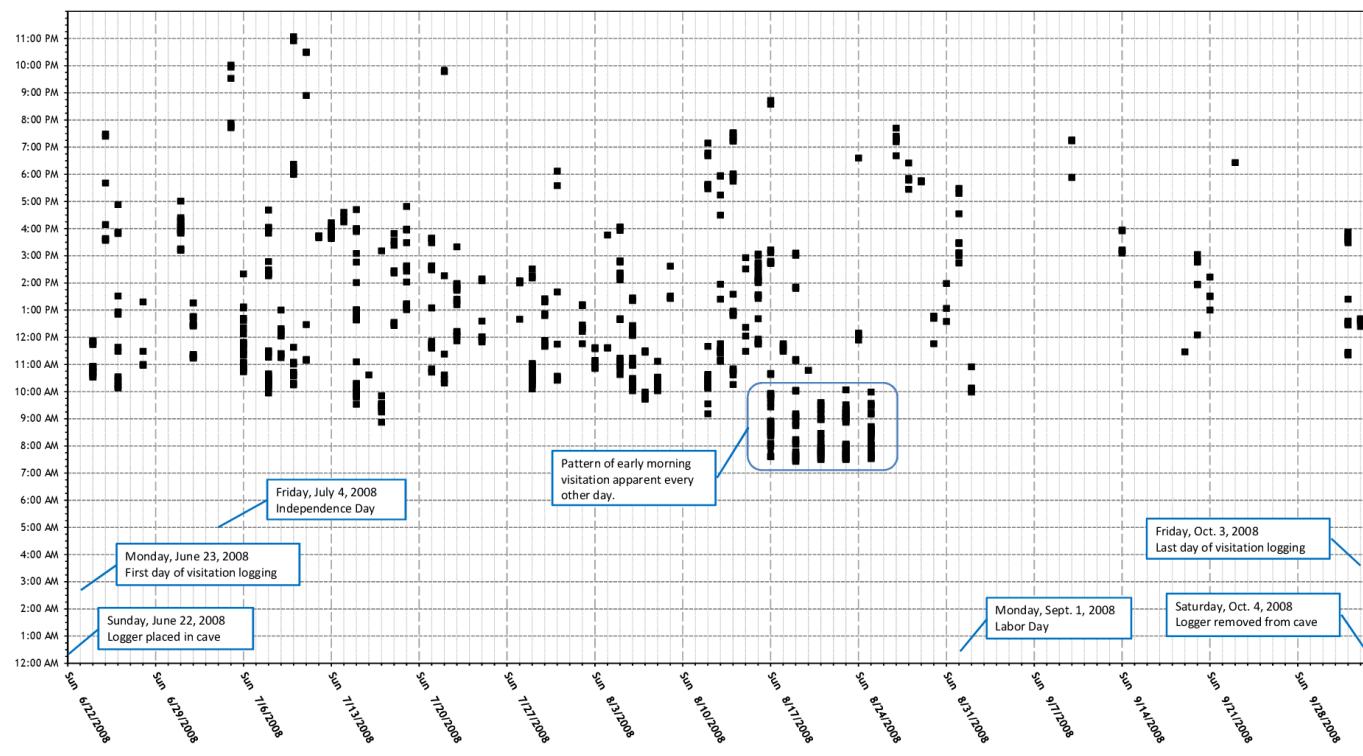
Graphed dates: June 23, 2008 - October 3, 2008 (103 days)



### Light Detected in Tory's Cave by Date and Time

Graphed dates: June 23, 2008 - October 3, 2008 (103 days)

Dark rectangles indicate Light-On groups. Light-On groups of short duration are charted with exaggerated vertical height to make them visible on the chart.



## CAVE VISITATION STUDY - TORY'S CAVE (NEW MILFORD, CT)

**— April 18, 2016 - September 30, 2016 —**

### Introduction

To better quantify the occurrence of unauthorized human visitation during the administrative closure of Tory's Cave, owned by the Weantinoge Heritage Land Trust, members of the Northeastern Cave Conservancy and the Central Connecticut Grotto placed a data logger in the cave. Data collection covered the period from April 18, 2016 through September 30, 2016. During this monitoring period, the cave was closed to visitation in accordance with the Tory's Cave Preserve Management Plan, which addresses the identification of endangered bat species in and around the cave (by both direct observation and acoustic monitoring) as well as the presence of white-nose syndrome in bat hibernacula in the area.

### Materials and Methods

On April 17, 2016, one data logger (Hobo U9-002 Light On/Off) was concealed in the main room of Tory's Cave. Installation methods are as described earlier. The logger was left in place until October 1, 2016, a total of 168 days. The first and last day's data were discarded (these were partial days and recorded the logger installation and retrieval), leaving 166 days of monitoring.

### Results

Overall, the data show that the cave was entered on 60 days (36% of the total days). There was no authorized visitation during the monitoring period.

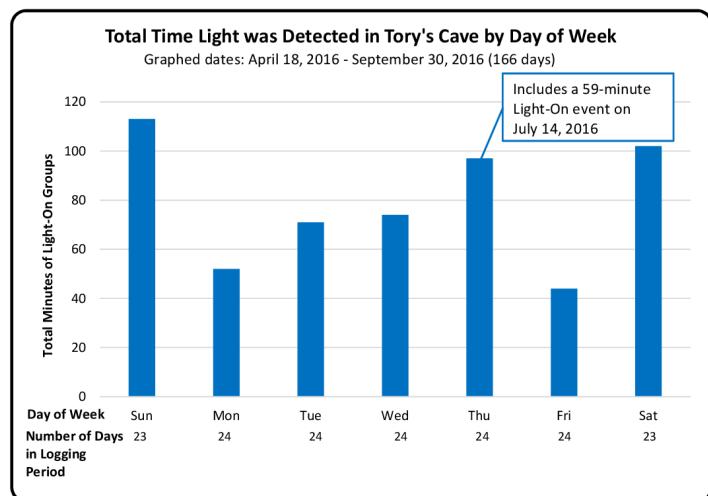
The data indicate activity throughout the monitoring period. The day of week that recorded the most visitation (based on total recorded light) was Sunday, followed by Saturday, Thursday, Wednesday, Tuesday, Monday, and Friday. The months of June and July had the most visitation.

Three major holidays occurred during the monitoring period: Memorial Day, Independence Day, and Labor Day. Visitation on and around these holidays was similar to that on non-holidays. These holidays are labeled on the charts.

The longest continuous Light-On duration was 59 minutes, measured on Thursday July 14. This indicates that a continuous light source was present and in unobstructed view of the sensor, and could be consistent with a candle or lantern.

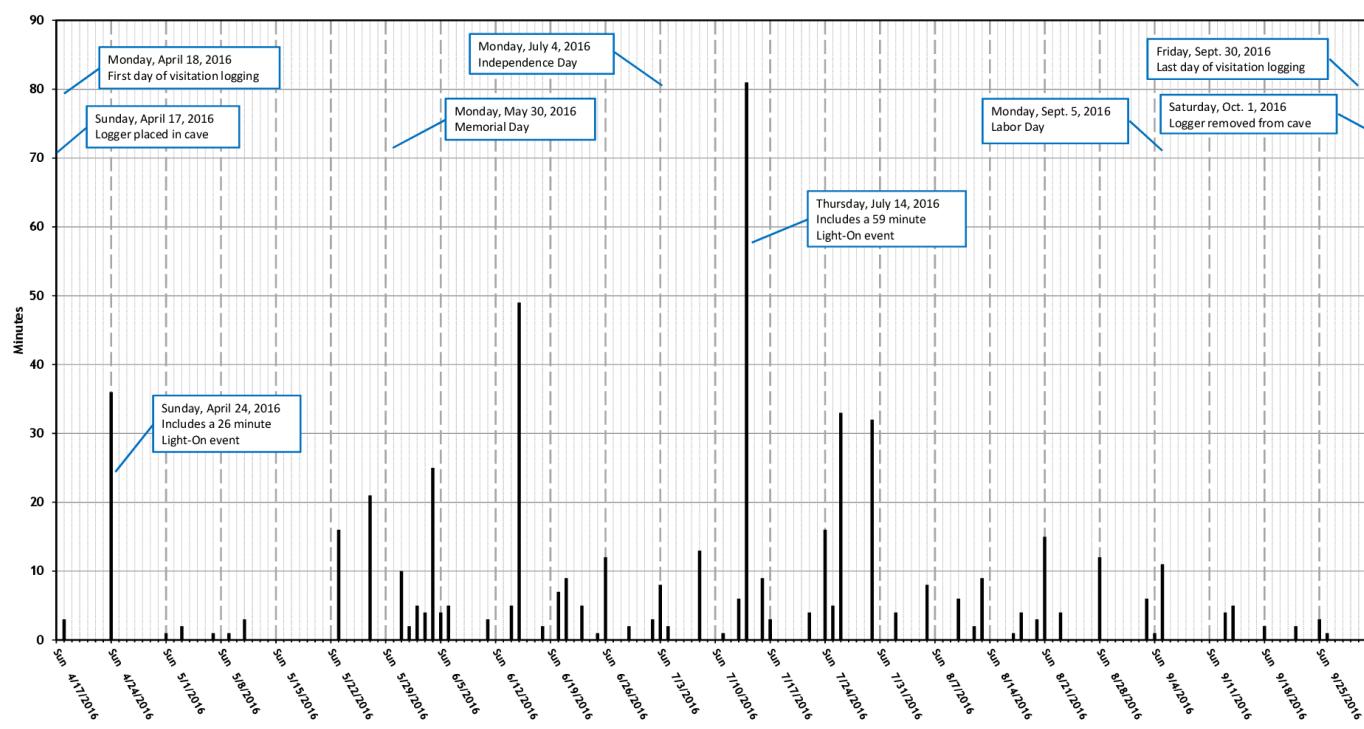
Five Longest Light-On Events		
Start Date/Time		Duration Hours:Minutes
7/14/2016	6:11 pm	1:00
4/24/2016	12:01 pm	0:26
7/14/2016	5:54 pm	0:17
4/24/2016	12:28 pm	0:07
7/14/2016	5:52 pm	0:01

Five Longest Light-On Groups		
Start Date/Time		Duration Hours:Minutes
7/14/2016	5:52 pm	1:20
4/24/2016	12:00 pm	0:27
4/24/2016	12:28 pm	0:07
5/23/2016	2:57 pm	0:07
8/28/2016	2:48 pm	0:06



### Total Time Light was Detected in Tory's Cave by Date

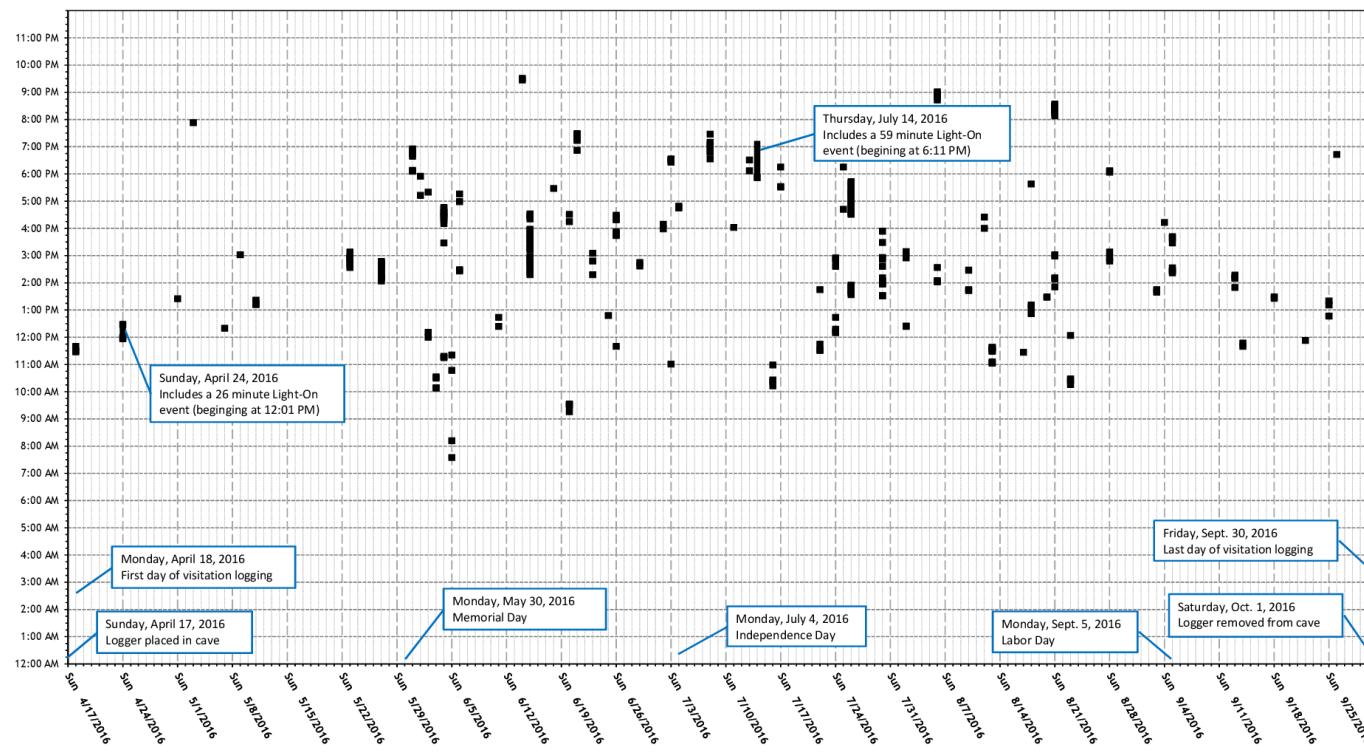
Graphed dates: April 18, 2016 - September 30, 2016 (166 days)



### Light Detected in Tory's Cave by Date and Time

Graphed dates: April 18, 2016 - September 30, 2016 (166 days)

Dark rectangles indicate Light-On groups. Light-On groups of short duration are charted with exaggerated vertical height to make them visible on the chart.



## History of CCG Data Logging

At the 2007 NSS Convention, Ray Keeler introduced Jansen Cardy and me to the Hobo light logger, and told us how he was beginning to use these to monitor cave visitation. He gave us one of his loggers to try out. We tested it in a local cave and soon found that while the logger worked, it had some shortcomings. We then set about to design and build a logger specifically for use in caves. This effort lasted for several years and, while we got to a semi-working prototype, the project was eventually shelved.

Over the ensuing years, we learned a lot about cave-proofing the loggers, placement of the loggers in a cave, selection of sensor electronics, and analysis of data. In addition to the data logger initially provided by Ray, the Central Connecticut Grotto has purchased a few additional log-

gers. The number of working loggers owned by the grotto has decreased in recent years, and the model of Hobo logger that we use is no longer made.

Many people have assisted with data logging over the years. These include Jansen Cardy, Ray Keeler, and John Froehlich (who worked on the hardware and software of the data logger being developed), plus many grotto members who have assisted in the installation and removal of data loggers in the caves.

## Future Cave Visitation Monitoring Studies

Additional visitation monitoring is planned for other regional caves. Currently, the grotto has a limited number of working data loggers, and efforts are underway to find a source of data loggers appropriate for visitation monitoring in caves.



The administrative closure of Tory's Cave was meant to protect bats from disturbance during hibernation. The posted closure dates were extended beyond that shown above. Photo by Sarah Ritter.

## ACOUSTIC BAT SURVEY - TORY'S CAVE

**— Weantinoge Heritage Land Trust · New Milford, Connecticut · April, 2016 —**

Kate Moran, Wildlife Biologist of the Connecticut DEEP Wildlife Division, conducted an acoustic bat survey at Tory's Cave located on Weantinoge Heritage Land Trust property in New Milford, Connecticut. Vocalizations of bats during spring emergence were recorded on multiple nights in April, 2016. Data analysis was performed by Kate Moran using Sonobat 3.2.0 NNE.

A Pettersson D500x bat detector was deployed from sunset ~19:34 to sunrise ~06:05 from April 12 to April 21, 2016 in an effort to document bats emerging from winter hibernation. Weather conditions during the survey period were clear and somewhat breezy, with overnight lows ranging from 32 - 50 degrees F, and daytime highs of 50 - 75 degrees F. The microphone was positioned south of the cave entrance, pointing northward and mounted on a pole eight feet above ground level. This configuration was intended to record bats in the airspace above the cave entrance when they emerged at night.

There were an estimated 40 bat passes during the survey period. This does not mean there were 40 bats. Acoustic monitoring does not facilitate counting individual bats because it is possible that one bat could be responsible for multiple recordings. The number of bat passes does, however, provide an indication of the relative level of bat activity at the site. That there was this level of bat activity at Tory's Cave on multiple nights during the early spring is a strong indication that bats are utilizing this underground resource to overwinter. More detailed analysis of the bat calls confirmed the presence of two State-listed bat species: the tri-colored bat (*Perimyotis subflavus*), and the little brown bat (*Myotis lucifugus*). Both of these species have suffered steep population declines due to white-nose syndrome (WNS) and, consequently, have been listed as "endangered" under the Connecticut Endangered Species Act (CT ESA). A third species, the big brown bat (*Eptesicus fuscus*) may also have been present, but without the same certainty as the others because recordings were fewer and below the quality standards that would support confident species identification. The big brown bat is also affected by WNS, but is currently not listed under the CT ESA.

In summary, three species of bats were detected during spring emergence at Tory's Cave: tri-colored bat, little brown bat, and possibly big brown bat. The presence of multiple bat species is encouraging and an indication that Tory's Cave is still being used by bats for hibernation.

Connecticut is a WNS-positive state. Because WNS causes bats to prematurely consume critical fat reserves during winter months, we recommend gating the cave to restrict access, minimize unnecessary human disturbance to hibernating bats, and minimize the potential for human-facilitated transmission of WNS. Additional guidance for managing cave access and minimizing the effects of WNS is available in the recently updated [USFWS 2016 Cave Advisory](#).



Bat detector deployment - Bat detector microphone atop an eight-foot pole. Photo by Kate Moran.



Bat detector deployment - Cone of detection facing north over the sinkhole cave entrance. Photo by Kate Moran.

## ACOUSTIC BAT SURVEY - TORY'S CAVE

— Weantinoge Heritage Land Trust · New Milford, Connecticut · October, 2016 —

Connecticut DEEP Wildlife Division conducted an acoustic bat survey during October 2016 at Tory's Cave. The cave is located in a mixed-forest habitat along the Housatonic River on Weantinoge Heritage Land Trust property in New Milford, Connecticut. As a follow-up to surveys conducted during the spring emergence, when both little brown bat and tri-colored bat were documented, this survey effort was aimed at recording bats as they gather and swarm at the cave entrance before entering for hibernation. Data analysis was performed by Kate Moran, CT DEEP Wildlife Biologist, using Sonobat 3.2.0 NNE.

A Pettersson D500x bat detector was programmed to turn on at sunset and off at sunrise from September 30 to October 27, 2016 for a total of 28 detector nights. The microphone was positioned south of the cave entrance, pointing northward and mounted on a pole 8 feet above ground level. This configuration was intended to record bats in the airspace above the cave entrance, where swarm activity would take place.

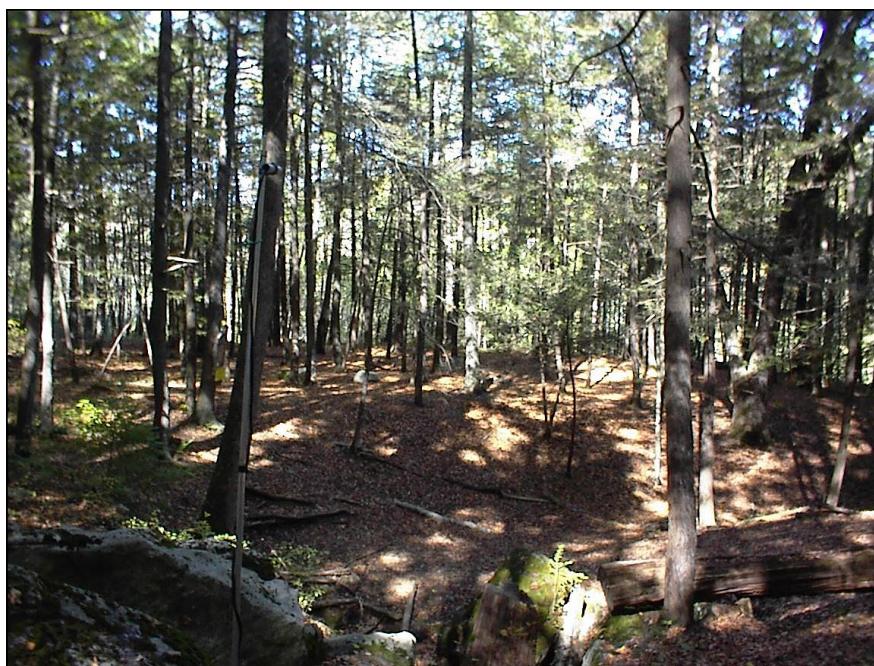
During the survey period, 1047 high-frequency recordings were triggered. Using Sonobat software, nearly half of these were scrubbed out as non-bat noise. This is not unusual or excessive because lots of noises can be generated by wind, light rain, insects, frogs, birds, and traffic from the nearby road. The remaining 578 files were further processed, yielding only 11 that were estimated to be bats. Inspecting each of these files revealed that only two had the tonal qualities that might be characteristic of a bat.

Although the quality of these recording was insufficient for Sonobat to classify to species, upon inspection, they were possibly an eastern red bat and a hoary bat, both tree-roosting species that do not hibernate in caves.

In summary, despite the nearly month-long effort, there were only two tree-roosting bats recorded during the survey period at Tory's Cave in October 2016. This result is disappointing since there were cave bats documented, although not in great numbers, during the spring emergence in April and during hibernation in January 2016. If bats are hibernating in Tory's Cave this winter, it may be that they entered before the bat detector was set up on September 30th. Bob Simmons reported seeing a tri-colored bat in another cave in northwest Connecticut on October 1, which supports the idea that bats may have entered before September 30. But there is no evidence to prove it.

The next opportunity to conduct acoustic surveys will be in April 2017, when spring emergence occurs. Perhaps doing surveys at that time will provide evidence that bats overwintered in Tory's Cave. To avoid any unnecessary disturbance to the few, if any, bats using the cave, the CT DEEP will not conduct a survey of the hibernaculum interior this winter.

These projects were funded by State Wildlife Grants, a federal program that provides funding to states for conservation of non-game species.



Bat detector deployment with microphone facing north over the cave entrance. Photo by Kate Moran.

## TORY'S CAVE CLOSURE

Tory's Cave, in New Milford, Connecticut, is owned by the Weantinoge Heritage Land Trust. It is known that several species of bats use the cave as a winter hibernaculum. In view of the vulnerability of bats with white-nose syndrome to human disturbance during their period of hibernation, the presence of people in the cave during winter months is of considerable concern.

Personnel affiliated with the Weantinoge Heritage Land Trust have long suspected that some members of the public have been ignoring the administrative closure and posted *Cave Closed* signs and visiting the cave during the winter months. This was recently confirmed by visitation monitoring carried out by members of the Central Connecticut Grotto and Northeastern Cave Conservancy.

Tory's Cave attracts approximately 1,500 visitors annu-

ally. However, based on results of a winter visitation monitoring study, and in an effort to protect vulnerable bat populations, the Weantinoge Heritage Land Trust has decided to close all public access to the cave. At the present time, this is an administrative, year-round closure. However, according to Paul Elconin, Director of Conservation for the land trust, "we are looking into grants to potentially gate the cave in consultation with DEEP. The cave is overused and there are no controls at the moment. Graffiti, trash, and erosion all need to be controlled." In fact, a new trail to the cave has been rerouted and information in an educational kiosk changed to reflect the dangers that white-nose syndrome and human disturbance pose to bats. Other trails on the preserve (a one-mile section of the Connecticut Blue Blazed Trail) will not be affected by the closure.

## THE WEANTINOGE HERITAGE LAND TRUST

The Weantinoge Heritage Land Trust is the largest land trust in the state of Connecticut, and over the past 50+ years has permanently protected more than 9,900 acres in 17 communities. The organization's protected lands include designated wilderness areas, 15 working farms, streambelts, viewsheds, critical watershed lands, and 12 nature preserves open to the public with 18 miles of hik-

ing trails. Weantinoge achieved Land Trust Accreditation in 2015, was recognized by the Connecticut Land Conservation Council for its leadership role and collaborative land conservation efforts, and was awarded a 2013 EPA Environmental Merit Award for its outstanding commitment to preserving and protecting the natural environment.





Tory's Cave is now fenced off (pending installation of a permanent bat-friendly gate) and closed to visitation. Below is the closure sign now posted at the new kiosk near the sinkhole. Images courtesy of Weantinoge Heritage Land Trust.

# **Tory's Cave is Closed**

## **Until Further Notice**

**This is to protect the bats in Tory's Cave  
and other caves from White-Nose Syndrome.**

**Thank you for your cooperation.**

Weantinoge Heritage  
Land Trust  
[www.weantinoge.org](http://www.weantinoge.org)  
(860) 927-1927  
[info@weantinoge.org](mailto:info@weantinoge.org)



Trails are still open.  
More information on  
White Nose Syndrome  
and the closure is on  
the kiosk near the cave.

## A CONSERVATION MESSAGE

— Danny A. Brass —

Take Nothing but Pictures  
Leave Nothing but Footprints  
Kill Nothing but Time

This time-honored maxim has long been a guiding ideology among cavers affiliated with the National Speleological Society. Encompassing multiple aspects of conservation, this unpretentious statement offers a simple lesson for responsible environmental stewardship.

Wilderness environments, be they forest, river, mountain, or cave are fragile systems, their survival ever-threatened by the constant expansion of modern civilization. Despite this precarious existence, the preservation of these and other wild places can be ensured—but only if government agencies, wilderness travelers, and a conscientious public are willing to form a lasting alliance for the continued protection of our natural resources.

As the remaining patches of wilderness dwindle to mere vestiges, the explorer's impact on the environment increases considerably. It is, therefore, important that the wilderness traveler disrupt the environment as little as possible, striving to leave each ecosystem in the same condition (if not better) as it was found. This is especially important to the caving community, since caves are particularly vulnerable to human disturbance. With successive closure of one site after another, the impact on remaining sites increases that much more. Environmental awareness must keep pace if both caves and our access to them are to survive.

The impact of cavers on cave environments should be minimal. Fortunately, the majority of cavers in this country are members of the National Speleological Society and are, by and large, well-trained, safety-conscious, environmentally friendly, and responsible individuals. They are, in effect, appropriate stewards of underground environments.

Caves are far more than just repositories of bizarre and beautiful mineral formations, and a meaningful approach to ecology and conservation must focus on the biotic as well as the abiotic components of the environment. Thus, trash, pollution, and graffiti may be more than simply unsightly. They may defile more than just the immediate cave environment, often coming back to haunt us in our own drinking water. Moreover, cavers should be cognizant of both the invertebrate and vertebrate life living within or periodically visiting caves. Other than valid and well-planned scientific studies (and then only when carried out under the supervision of a trained biologist with regard for cave ecology), our interaction with fragile underground life should be solely visual in nature.

In this regard, anyone entering a cave should recognize that human-induced damage to a cave system (including carelessly overturning rocks, damaging formations, gouging out handholds, graffiti, trash, pollution, etc.) may not only leave a permanent scar on an ageless and unique environment, but may wreak havoc with microhabitats essential for survival of both vertebrate and invertebrate populations.

It is a mistake to think that these creatures do not enrich our travels and, indeed, our lives. The caver who has not yet observed bats emerging from darkened caves at dusk, seen living carpets of cave crickets crawling slowly along cave walls, glimpsed fish and salamanders gliding silently through stygian pools, or witnessed multitudes of small crustaceans dancing in the water column of an underwater cave by the glow of a dive light has missed some of the most intriguing dimensions that caves have to offer.

That we express concern for both the physical environment of the cave as well as its myriad lifeforms is a reflection of one of the highest ideals of exploration, and bears witness to the fact that we actually can successfully exploit the world belowground and do it no harm. In the long run, the relatively small number of cavers, their ease of intercommunication, and their great capacity for camaraderie are instrumental in keeping disruptive influences upon cave environments to a minimum, and stack up favorably on the side of cave ecology. This attests to our willingness and capacity to join the struggle to preserve the pristine quality of even well-trafficked underground ecosystems, and compares more than favorably with those responsible for stewardship of environments elsewhere.

However, caves remain threatened by the ever-present encroachment of civilization, by pollution and fragmentation of our environment, and by the ongoing activities of persons who are either completely irresponsible in their behavior or simply ignorant (though not necessarily maliciously so) of appropriate cave etiquette. As such, maintaining the health and integrity of underground environments is a never-ending, uphill battle. This has become of increasing concern in the era of white-nose syndrome. In the face of continued spread of this emerging fungal disease of cave-hibernating bats, the need to educate spelunkers (i.e., people not aligned with the National Speleological Society) about the importance of respecting seasonal cave closures and not disturbing vulnerable bat populations is ever more paramount. At the same time, it is imperative that strategies aimed at mitigation of white-nose syndrome be well-grounded in robust studies and sound, epidemiologic-based evidence.

Ultimately, the conservation of cave environments rests squarely upon our shoulders. As cavers affiliated with the National Speleological Society, with local grottos, and with regional cave conservancies, we are the people who care

most about caves. Indeed, we alone can truly understand and appreciate them. In recent years, the caving community has made tremendous strides in educating both the caving and non-caving public towards an increased awareness and understanding of these unique environments—their geology, hydrology, and ecology; their evolutionary past and their importance as a link in man's future.

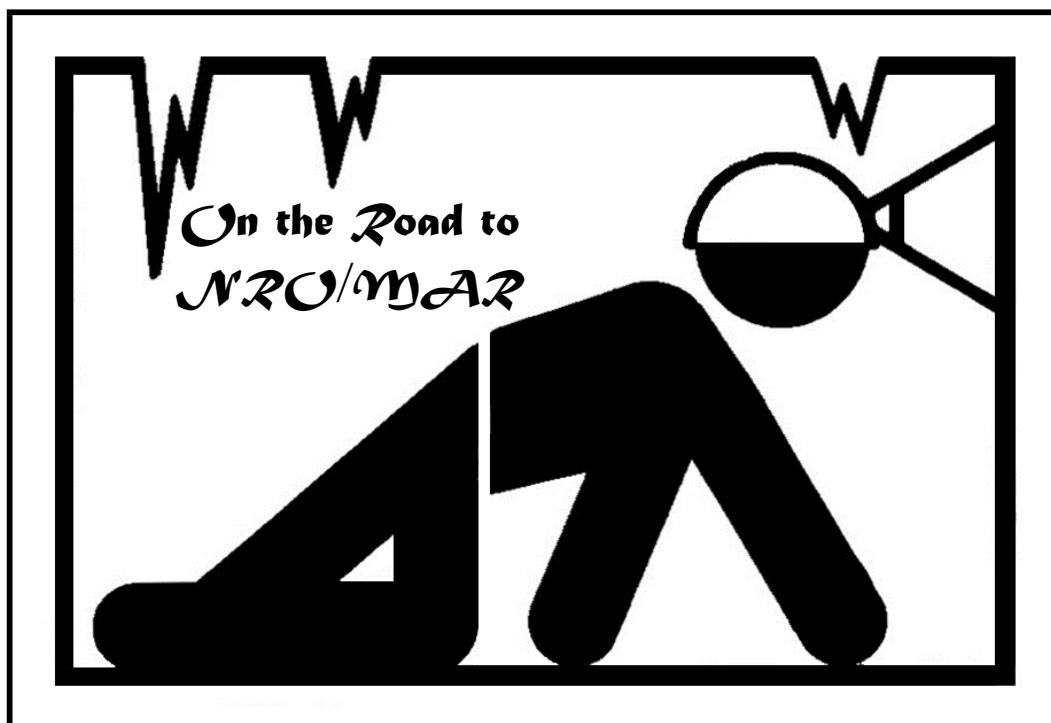
In partnering with various other associations, including land trusts, conservation organizations, and various government and non-governmental agencies, we have been able to extend our educational outreach even further. In this regard, I believe the entire caving community, as well as the diverse groups with which we are working, to be richly deserving of applause.

The NCC/CCG Tory's Cave Visitation Monitoring Studies (see article by Norm Berg on page 3) and the DEEP/Weantinoge Acoustic Bat Surveys at Tory's Cave (see articles on pages 14 and 15) are examples of how simple technology is being applied by scientists, land trusts, government agencies, and cavers to help safeguard bat populations against the ravages of white-nose syndrome.



Cave-hibernating bats are especially vulnerable to white-nose syndrome. Photo by Patrick Stephenson.

The Spring 2017 NRO/MAR will be held on June 2 - 4 at the Indian Lookout Country Club in Pattersonville, NY. It will be co-hosted by the Central Connecticut and Philadelphia Grottos. See <http://caves.org/grotto/ccg/NRO-MAR-2017.htm> for additional details.



**NORTHEASTERN CAVE CONSERVANCY, INC.**  
**December 4, 2016 Minutes - Summary**  
**Schoharie, New York**

Addis moves to convene a meeting of the trustees to elect officers. Morris-Siegel will preside over the elections as Chairman of the Trustees and will report.

Trustees go into closed session at 10:20 am and exit closed session at 1:15 pm. Morris-Siegel reports:

Bob Addis is reappointed President  
Bob Simmons is appointed Vice President  
Vince Kappler has been appointed interim Secretary  
Bill Folsom is reappointed Treasurer

Addis moves to thank V. Kappler for his service as Vice President.

2nd by Chu  
For: All  
**Passed**

Berger moves to thank Christa Hay for her fifteen plus years of service as Secretary.

2nd by Traino  
For: All  
**Passed**

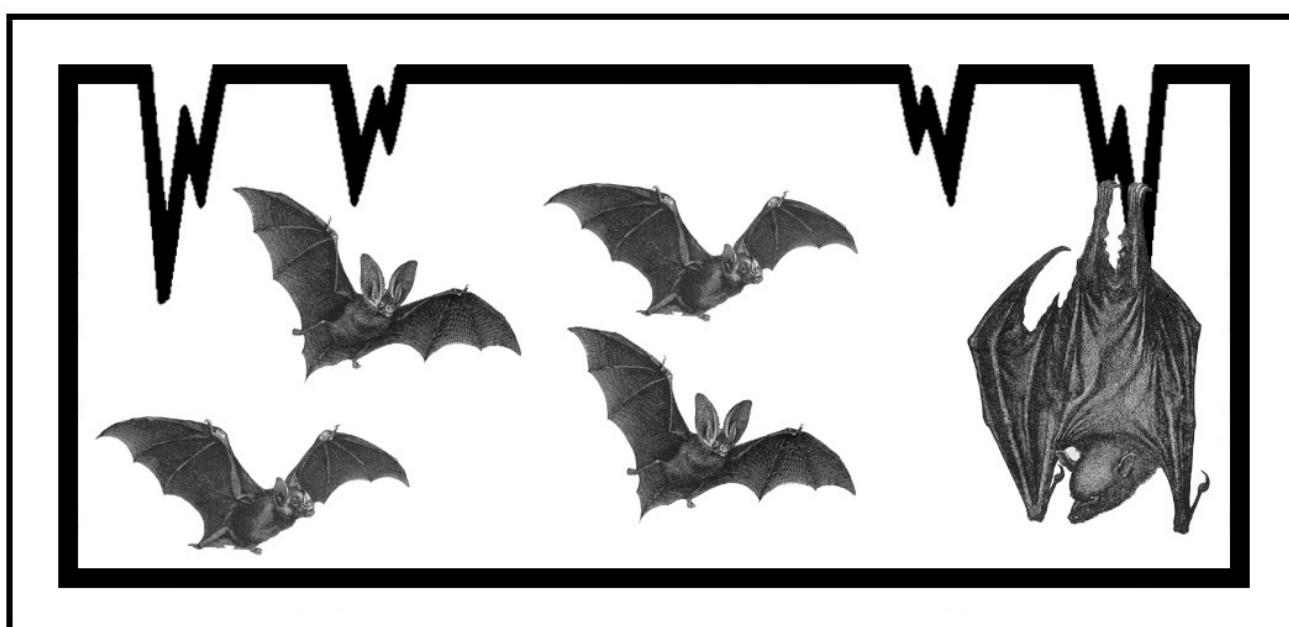
Folsom moves: The Northeastern Cave Conservancy shall establish a Life Membership Fund with the National Speleological Foundation, and deposit all funds collected for Life Memberships into this newly created fund.

2nd by Simmons  
For: All  
**Passed**

Executive committee meeting will be January 22, 2017 in Kerhonkson, New York.

Next Board meeting will be March 5, 2017 at 10:00 am – location TBD.

The NCC summer Board meeting will be June 11, 2017 at 10:00 am – location TBA.



## SELECT COMMITTEE REPORTS

### Cave Preserves

DEC signs advising the caves are closed until May 1 have been posted at all preserves. The preserves are open for surface visits.

### Science Committee - R. Laurence Davis, Ph.D., Chairman

The committee received an email from Dr. Espinasa advising the Science Committee that his article on research on Clarksville Cave crustaceans was published in the October 2016 issue of *Subterranean Biology*. Dr. Espinasa thanked us for our support and added, "Without it, this research would have never happened. Thank you again!" We have permission to link the paper to our website, and Mike created a link within the Clarksville Research Section:

[http://www.necaveconservancy.org/files/research/2014\\_Clarksville-DNA.pdf](http://www.necaveconservancy.org/files/research/2014_Clarksville-DNA.pdf)

### Membership Committee - Peter Youngbaer, Chairman

NCC membership continues at an historic high level, now at 203 as of the date of this report. We hit a landmark this quarter with our 60<sup>th</sup> Life Member. We've had several other new Life Members and Family Life members, no doubt in part due to people taking advantage of the lower price before next year's increase. I expect we'll see a few more before the year is out.

### Technology Committee - Michael Chu, Chairman

New website development is well underway. A beta version has been passed around the website subcommittee and then the full Board for comments. We are aiming to have the site up by the end of the year, if not sooner.

### Volunteer Value Committee - Vince Kappler, Chairman

Year-to-date totals: 1738 hours of volunteer work for NCC projects for a total value of \$47,714.00. Volunteer hours were reported by the Bensons manager, the Secretary, Treasurer, and Office and Acquisitions Committee. Several Trustees also reported hours working on a preserve concern and a grant application.

### 11/6/17 - Executive Committee Meeting Topics

The idea to request the Trustees start an annual review process, beginning with the officers, was discussed at length. Eventually a consensus emerged that a review process would be beneficial to both the volunteer and the Board. Vince was tasked to draft a proposal to initiate the process with the officers being the first group of participants. The proposal was sent to the Trustees on November 15. Going forward, if the personal interviews prove beneficial it could be expanded to include committee chairs and candidates for open positions. Eventually, some type of evaluation tool (self-evaluation, performance matrix, or other) may be adopted for use by the Trustees.

## ABOUT THE NORTHEASTERN CAVE CONSERVANCY, INC.

The Northeastern Cave Conservancy, Inc. (NCC) is a 501(c)(3) charitable organization and land trust 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.

The organization's programs are focused mainly on the preservation of caves and karst. Outreach includes education in schools and local communities, establishment of park spaces on karst lands, and educational messages about the significance of groundwater pollution on these sensitive underground ecosystems.

The NCC presently owns and manages nine cave preserves, containing 16 known caves and aboveground trails on 86 acres. The NCC also has volunteer stewardship/property management agreements for cave properties on New York State Department of Environmental Conservation lands and agreements with New York State Office of Parks, Recreation and Historic Preservation, including a children's cave at Thacher State Park.

## — WHO RUNS THIS JOINT — NOMINATING COMMITTEE SEEKING CANDIDATES FOR OFFICER POSITIONS

Each year at the Annual Meeting in December, the Trustees elect the four Organization Officers (President, Vice President, Secretary, and Treasurer). Each year, the Nominating Committee presents a slate of candidates for these four positions for consideration by the Trustees. Nominations are also solicited from the Trustees. The Nominating Committee is looking for potential candidates for the Officer positions at this time. If you would like to be considered for a position, would like to nominate someone for a position, or would just like more information on the process and requirements, please contact the nominating committee at [nominating@necaveconservancy.org](mailto:nominating@necaveconservancy.org). For reference, the general duties and responsibilities of the four Officer positions are described below.

**President:** The President is the Chief Executive Officer of the NCC, and supervises the activities of the NCC within the scope provided by the bylaws. The President presides at meetings of the Board of Directors. The following committees report to the President: Acquisitions, Preserves, Nominating, and Risk Management, as well as any ad hoc committees established for specific purposes.

**Vice President:** The Vice President assumes the duties of the President in the event of absence, incapacity, or resignation of the President, and presides when the Board meets as a Committee of the Whole. The following committees report to the Vice President: Bylaws, Education, Science, Special Use, Surprise Cave, and Thacher Park.

**Secretary:** The Secretary keeps the minutes of the meetings of the Board of Directors and of the Executive Committee, and maintains the membership roll. The Secretary also carries on all organizational correspondence as delegated by the President and sends out notices of meetings. The Secretary is responsible for editing and publishing the Board Manual. The secretary may appoint assistants, as required.

**Treasurer:** The Treasurer is responsible for the safekeeping of organizational funds; maintaining and reporting financial records and statements to the Board of Directors; and filing all financial documents required by local, state, or federal regulations. The following committees report to the Treasurer: Technology, Fundraising, Membership, Office, Publications, and Volunteer Value.

## CURRENTLY OPEN COMMITTEE CHAIR POSITIONS

### **Fundraising Committee Chair**

The Fundraising Committee Chair coordinates all fundraising activities for the NCC. The 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 the nominating committee at [nominating@necaveconservancy.org](mailto:nominating@necaveconservancy.org)

### **Nominating Committee Chair**

The Nominating Committee will solicit nominees for Board positions, coordinate candidates' platforms, prepare an April ballot for the membership, gather and count ballots in May, and announce election results to the membership prior to the June meeting. The committee will also seek candidates to fill vacant committee positions. If interested in this position, please contact the nominating committee at [nominating@necaveconservancy.org](mailto:nominating@necaveconservancy.org)

## 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 [vvolunteervalue@necaveconservancy.org](mailto:vvolunteervalue@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.

## **CURRENTLY OPEN OFFICER POSITION**

### **PRESIDENT OF THE NORTHEASTERN CAVE CONSERVANCY, INC.**

#### **Application Deadline**

Open until filled.

#### **Summary Description**

This position can be based anywhere in the Northeast.

As leader of the organization, the President and oversees the following committees: Executive, Acquisitions, Cave Preserves, Nominating, Risk Management, and several Ad Hoc Committees.

The President is responsible for providing dynamic leadership for the planning, development, implementation, assessment, and improvement of mission-related programs, revenue-generation and financial-management strategies, partnerships, community relations, legislative relations, marketing/public relations, strategic and annual planning, and other key areas.

The President serves as the primary spokesperson for the organization with funders and stakeholders. As part of the President's responsibilities, s/he will formally and informally present reports, updates, and results to the Board of Trustees on a periodic basis, which will include regular Board meetings and specific committee meetings of the Board.

The President will be responsible for supporting the development of and advancement of a vision for the NCC's impact in the region, for its continuing growth, for ensuring financial viability, and for building collaborative relationships in the northeast.

#### **Specific Responsibilities**

As chief executive officer of the land trust, the President is responsible for the efficient operation of the land trust. This shall include performance of, or timely delegation to the Vice-President or other officer the following duties:

Chairs quarterly Board and Executive Committee meetings.

Facilitates the orderly transaction of land trust business and the attainment of land trust purposes, including the proper functioning of standing committees.

Signs policy and fiscal documents with prior authorization from the Board of Trustees.

Signs routine administrative documents, such as reports on behalf of the land trust Board, and letters relating to fund-raising and similar activities.

Is the principal representative of the land trust at public functions.

Seeks, obtains, and transmits regular reports from land trust committees.

Sets overall land trust priorities, including short-term and long-term goals, with other members of the Board.

Actively works together with the Acquisitions Committee on acquiring new cave preserves.

Actively works together with the Cave Preserve Committee on stewardship matters.

Performs other duties at the request of the Board of Trustees.

Proactively cultivates and solicits donors and prospects, and works toward annual fundraising goals.

#### **Qualifications**

Bachelor's degree or higher desired.

Demonstrated ability to provide forward-looking leadership to the organization to enhance its impact, while growing and maintaining effective partnerships.

Significant experience working with volunteer boards and/or other groups.

Superb verbal and written communication skills.

Leadership, diplomacy, and negotiation skills required.

Ability to work effectively as part of a team and without daily supervision.

Ability to work quickly, meet deadlines, and multitask.

Organized and attentive to details.

Willingness to travel extensively.

Willingness to work a flexible schedule, including occasional weekends.

Computer proficiency, especially with Microsoft Office and email.

## **CURRENTLY OPEN OFFICER POSITION**

### **PRESIDENT OF THE NORTHEASTERN CAVE CONSERVANCY, INC.**

Passion for saving land, caves, and karst features is a must. Knowledge of private land-conservation techniques and/or land trusts highly desirable.

An understanding of the landscape and culture of New York and New England is strongly preferred.

Development experience in individual major gift fundraising, including significant experience with face-to-face solicitations.

#### **Compensation**

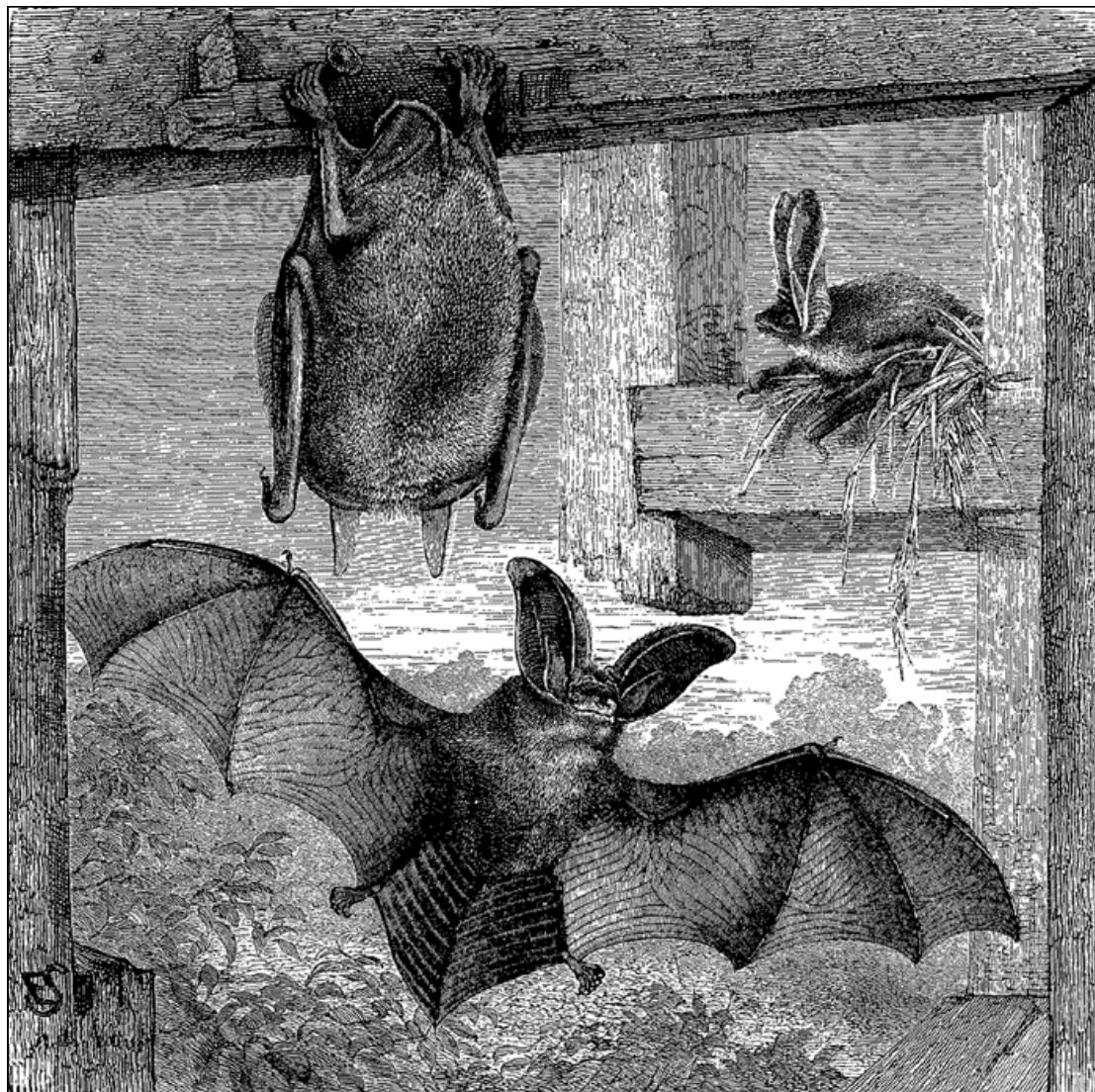
This is a volunteer position and does not provide any compensation. However, reasonable expenses incurred while attending external meetings, conferences, and seminars relating to official land-trust business, and expenses related to land-trust projects may be reimbursed if approved by the Board.

#### **Category**

Officer

#### **How to apply**

Send resume, cover letter, and three references to [nominating@necaveconservancy.org](mailto:nominating@necaveconservancy.org)



## **CURRENTLY OPEN OFFICER POSITION**

### **SECRETARY OF THE BOARD, NORTHEASTERN CAVE CONSERVANCY, INC.**

**Application Deadline**

Open until filled.

**Summary Description**

This position can be based anywhere in the Northeast.

The Secretary is an officer of the NCC who actively participates in the Executive Committee, Board meetings, and other meetings as needed. S/he is an integral part of the leadership of the organization, responsible for managing and recording internal and external communications and assisting with coordination between various committees.

**Specific Responsibilities**

The Secretary is responsible for the following:

Attend Board meetings, Executive Committee meetings, and other meetings as needed.

Prepare the Secretary's Report and Board-meeting agenda, collect committee reports and minutes, and circulate them to all Trustees at least one week prior to the quarterly Board meetings.

Maintain the schedule for preserve management-plan reviews and advise the appropriate managers accordingly.

Announce committee vacancies and bylaw votes to the general membership.

Attend Board meetings, take minutes, circulate draft minutes to Trustees for edits and corrections, make edits and corrections to minutes, and post final minutes on the website.

Take minutes at Executive Committee meetings and participate in decisions on the day-to-day operations of the organization.

Edit, update, and publish the Board Manual on the website after each Board meeting.

Prepare and disseminate all official organization correspondence.

Initiate an email discussion with Board members and others, should there be any urgent business between regularly scheduled meetings requiring immediate attention. Manage and record any votes taken by the Board on such issues.

Send out notices of meetings.

Work proactively to achieve fundraising goals.

Perform other duties at the request of the Board of Directors.

**Qualifications**

Bachelor's degree or higher desired.

Demonstrated ability to provide forward-looking leadership to the organization to enhance its impact while growing and maintaining effective partnerships.

Significant experience working with volunteer boards and/or other groups.

Superb verbal and written communication skills.

Leadership, diplomacy, and negotiation skills required.

Ability to work effectively as part of a team and without daily supervision.

Ability to work quickly, meet deadlines, and multitask.

Organized and attentive to details.

Willingness to work a flexible schedule, including occasional weekends.

Computer proficiency, especially with Microsoft Office and email.

Passion for saving land, caves, and karst features a must.

**Compensation**

This is a volunteer position and does not provide any compensation. However, reasonable expenses incurred while attending external meetings, conferences, and seminars relating to official land trust business, and expenses related to land trust projects may be reimbursed if approved by the Board.

**Category****How to Apply**

Officer

Send resume, cover letter, and three references to [nominating@necaveconservancy.org](mailto:nominating@necaveconservancy.org)