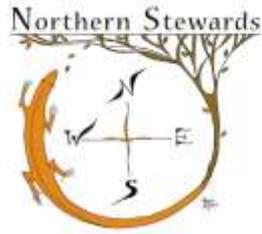


# Bat Inventory Hartford Town Forest

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The acoustic bat survey was completed during August 8<sup>th</sup> 2011 to August 12<sup>th</sup> 2011. A SM2 ultrasonic recorder (Wildlife Acoustics Inc) was used for 4 recording nights. Recording parameters used were: mono R, Compression: WAC 0, Gains: 0.0 dB, high pass filter: fs/16, Low Pass Filter OFF, Trigger Level 12 SNR, Trigger Window 1.0/s, Div Ratio: 16. Recording schedule: 21:00hrs – 05:00hrs; each file 1 hour long.

The SM2 was attached at the top of a 10' pole and placed at the Lower Reservoir 10' from the forest edge (dam), 20' up a slope from the water. The microphone was horizontal and facing in the direction of water.

One hour long WAC files are converted to .WAV files. Using Wildlife Acoustics .Wac to .Wav converter (WAC2WAV 3.2.3). Each file contains 1 hour of recorded events. During the conversion files were parsed out by splitting triggers with max duration of 16 seconds and minimum spacing of 3 seconds of no noise. SMX US filter was used. Minimum frequency 12 Hz and max 180000Hz. Files determined to have frequencies like that of bats were saved and files without frequencies like bats were discarded and not considered here.

Files were batch analyzed using automated method and mechanical methods. Sonobat 3.0 will only classify calls when call parameters are highly confident. Files that are not classified are done so manually with Sonobat 3.0. The following parameters were used: Discriminate probability threshold: 0.90. Acceptable call quality: 0.80.

Weather Conditions:

Daytime temperatures: 65-75 °F. Rain during evening of 8/10/2011. Sunny to partly cloudy all other days.

## Results

The SM2 recorded 4 nights of bat activity. 425 bat passes were recorded during the 4 nights of inventory. Sonobat classified (table 1.0) 32% (n=137) of the files to species. 68% of the files were manually classified to a species, *Myotis* spp, non-*Myotis* spp, or unknown bat. Sonobat 3.0 did not classify any files as *Myotis* species.

Species detected include the big brown bat (48% n= 206), eastern red bat (33% n=142), hoary bat (3.7, n= 16), silver-haired bat (0.95% n= 4), eastern small-footed bat (0.5%, n=2), little brown bat (4.3%, n=18), unknown *Myotis*(2.1%, n=9) and unknown non-*Myotis* (6.6% n=28).

No files were classified as the Indiana bat, tri-colored bat, or the northern long-eared bat.

**Table 1.0. Methods of classifying files to species (# of files)**

Common Name	Scientific Name	Sonobat 3.0 Classification	Manual Classification	Total
Big brown	<i>Eptesicus fuscus</i>	104	102	206
Eastern red	<i>Lasiurus borealis</i>	21	121	142
Hoary	<i>Lasiurus cinereus</i>	9	7	16
Silver-haired	<i>Lasionycteris noctivagans</i>	3	1	4
Eastern small-footed	<i>Myotis leibii</i>		2	2
Little brown% n	<i>Myotis lucifugus</i>		18	18
Northern long-eared	<i>Myotis septentrionalis</i>		0	
Indiana	<i>Myotis sodalis</i>		0	
Tri-colored	<i>Perimyotis subflavus</i>		0	
Unknown <i>Myotis</i> spp			9	9
Unknown non- <i>Myotis</i> spp			28	28
Total		137	288	425
Percentage of Total		32%	68%	100%

**Table 2.0. Classification of bat pass files (# of files)**

Common Name	Scientific Name	Percent of total	Total	8/8/2011 - 8/9/2011	8/9/2011- 8/10/2011	8/10/2011- 9/11/2011	8/11/2011- 8/12/2011
Big brown	<i>Eptesicus fuscus</i>	48.4%	206	107	14	43	42
Eastern red	<i>Lasiurus borealis</i>	33.4%	142	2	19	53	69
Hoary	<i>Lasiurus cinereus</i>	3.7%	16	7	7	0	2
Silver-haired	<i>Lasionycteris noctivagans</i>	0.95%	4	1	1	1	1
Eastern small-footed	<i>Myotis leibii</i>	0.5%	2	1	0	0	0
Little brown	<i>Myotis lucifugus</i>	4.3%	18	0	0	13	5
Northern long-eared	<i>Myotis septentrionalis</i>	0%	0	0	0	0	0
Indiana	<i>Myotis sodalis</i>	0%	0	0	0	0	0
Tri-colored	<i>Perimyotis subflavus</i>	0%	0	0	0	0	0
Unknown <i>Myotis</i> spp		2.1%	9	7	2	0	0
Unknown non- <i>Myotis</i> spp		6.6%	28	0	9	11	8
Bat passes/night		100%	425	125	52	121	127
Bat passes/hour				16	7	15	16

## **Discussion**

### *Abundance*

The acoustic survey is a survey of bats using ultrasonic calls for foraging and navigation (echolocation). The acoustic survey is a tool to determine presence and species diversity at a particular site. The survey does not distinguish between individuals or determine abundance. The survey only records a bat flying within recording distance. For example, big brown bats were recorded more often than any other bat. This could be the result of many different bats or 1 bat flying past the microphone many times.

### *White nose syndrome (WNS)*

Prior to WNS little brown bats were the most commonly observed bats during surveys in Vermont. Big brown bats were typically as common or slightly less common. This survey is typical of other surveys throughout the state. It is unclear how species not susceptible to WNS will respond to different species composition.

### *Implications*

No known work correlates results from acoustic surveys to roost sites, which is to say, all we know is that six species of bats use the Lower Reservoir for foraging. Bats will forage 0.5-2 miles away from roost sites. Silver-haired, hoary and red bats, possibly farther.

It is likely that the eastern red bat and hoary bat are roosting at the HTF and HFWR. They will be using canopies of hemlocks (hoary) or oak, pine (eastern red bat) to hang in the dense foliage or hanging dead foliage of a tree.

Little brown bats are also likely using the HTF and HFWR for roosting sites, and more likely just males are. Females are setting maternity colonies in buildings. Big brown bats are also likely using buildings for roost sites, though to what extent is unknown.

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## Bat Specific Management

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No immediate needs

Within forest management, in target areas, promote

- Mature forests with large diameter trees
  - Tall canopies
  - Open midstories
  - Close proximity to forest openings or wetlands
- Large diameter roost trees
  - With exfoliating bark
  - 6-10 per acre 12-24"+ with at least 1 per acre >24"
  - To meet target girdle trees, and release on south side to provide flyway and solar exposure on bole of tree
  - No foliar application of chemicals
- Forest management
  - Uneven aged
    - small groups 0.25ac-1 acre openings
    - Single tree to work towards with high percentage of large diameter (24" ) hardwoods with small percentage of small diameter trees to attain an open midstory (low q).
  - Even aged
    - Patches 1 acre
    - Thinning from below to increase diameter growth
    - Irregular group shelter wood with reserves. Groups of 0.25 acres treating 25%per of the stand on a 25 year entries. Thinning between groups.