

A Survey to Assess the Diversity and Speciation of the Bat Population at the Sands Point Preserve

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ABSTRACT

Little is known about the species of bats present on Long Island. Therefore, by using a binary acoustic frequency detector, the high frequency calls used by bats for feeding and navigation were able to be recorded and later analyzed using its complementary computer software/the SPECTR III® and SCANR® computer programs. This study served to examine the Sands Point Park and Preserve with a focus on ponds found within the area. To assess the population, a static survey was performed at the peak hours of activity. From these surveys, *Lasiurus borealis* (red bat) was found to be most prominent. By performing this study, future researchers will now be more able to compare and track this species of bat, as well as other species found throughout Long Island. Any changes in the population and habitat can also be better observed.

INTRODUCTION

Due to a drastic increase in the decline of various species of bats (order Chiroptera) in the Northeastern region of the United States, interest in the bat population has risen greatly (8). The witnessed drop in population size is attributed to various factors, such as human disturbance and expansion, deforestation, and climate change. Additional sources of mortality and population change include wind energy development and White Nose Syndrome (WNS) (2), which is a cutaneous fungal disease believed to be caused by the growth of the psychrophilic fungus *Geomyces destructans*, resulting in a depletion of fat reserves needed by bats during hibernation in the winter, leading to death by starvation due to the low supply of food available during the winter months (4,7). White Nose Syndrome is currently known to affect the big brown bat (*Eptesicus fuscus*), the eastern-small-footed bat (*Myotis leibii*), the little brown bat (*Myotis lucifugus*), the northern long-eared bat (*Myotis septentrionalis*), the tri-colored bat (*Perimyotis subflavus*), and the Indiana bat (*Myotis sodalis*) (11). All six of these species, in addition to the red bat (*Lasiurus borealis*), the hoary bat (*Lasiurus cinereus*), and the silver-haired bat (*Lasiyonicterius noctivagans*) are commonly found in New York State (10). Therefore, to best aid the species and prevent extinction, it is necessary to monitor trends in the bat populations of Long Island. By analyzing the ultrasonic sounds emitted during echolocation, the species present can be determined and more accurate protocol for management and control can be enacted.



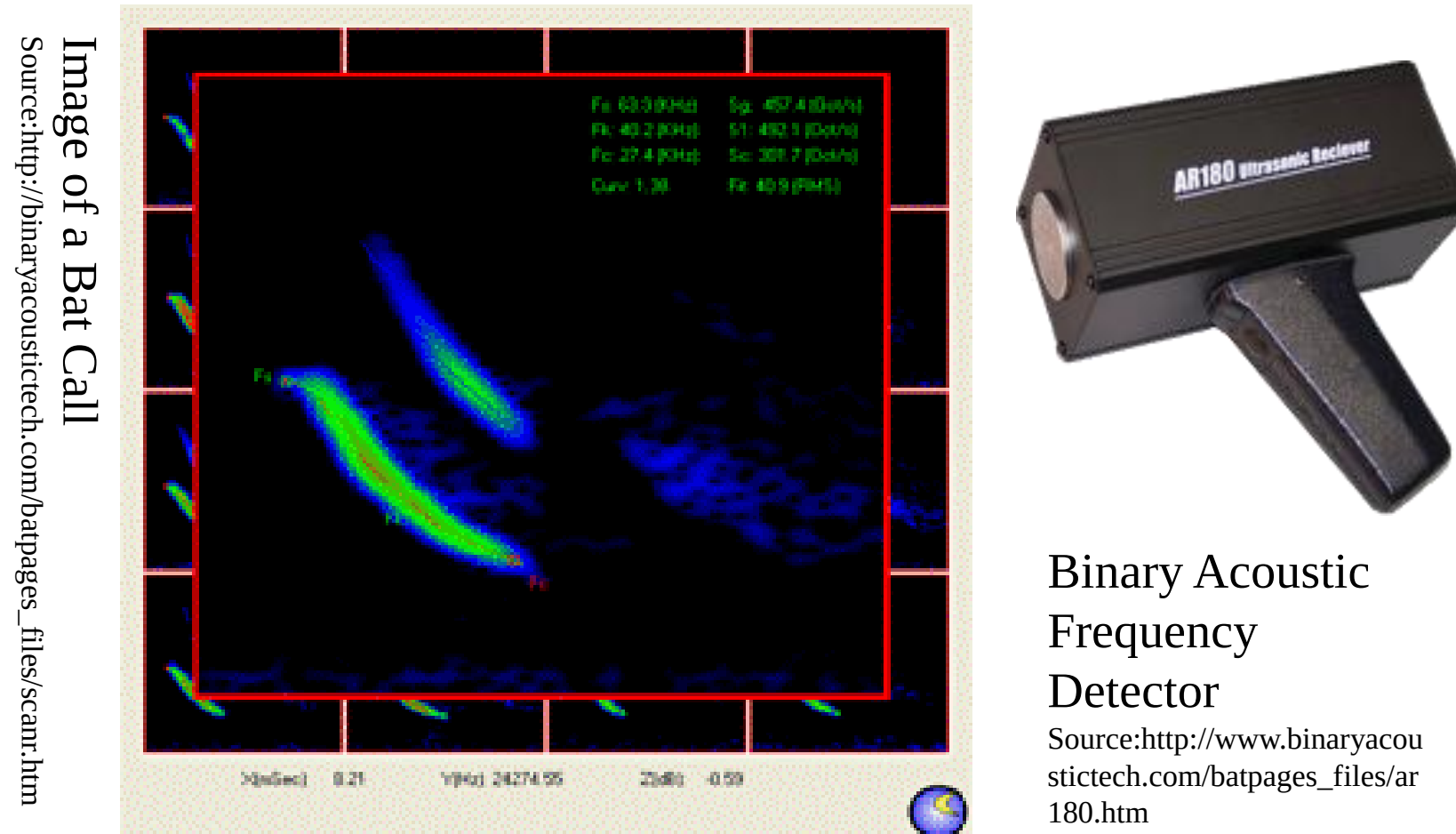
Freshwater Pond Located At Sands Point Park and Preserve

STUDY SITE

This research was conducted primarily in the Sands Point Park and Preserve in Nassau County, Long Island, New York. The Sands Point Park and Preserve is a 216 acre habitat consisting of forests, meadows, beach and cliffs, lawns, gardens and a freshwater pond. A survey of the property yielded that the population of bats inhabiting the area were most abundantly located at the freshwater pond. In addition, wooden structures known as bat houses that are located throughout the forest and nearby the edge of the pond were monitored. Further observation of other areas where bats have also been noted in the Sands Point Park and Preserve will be completed at a future date.

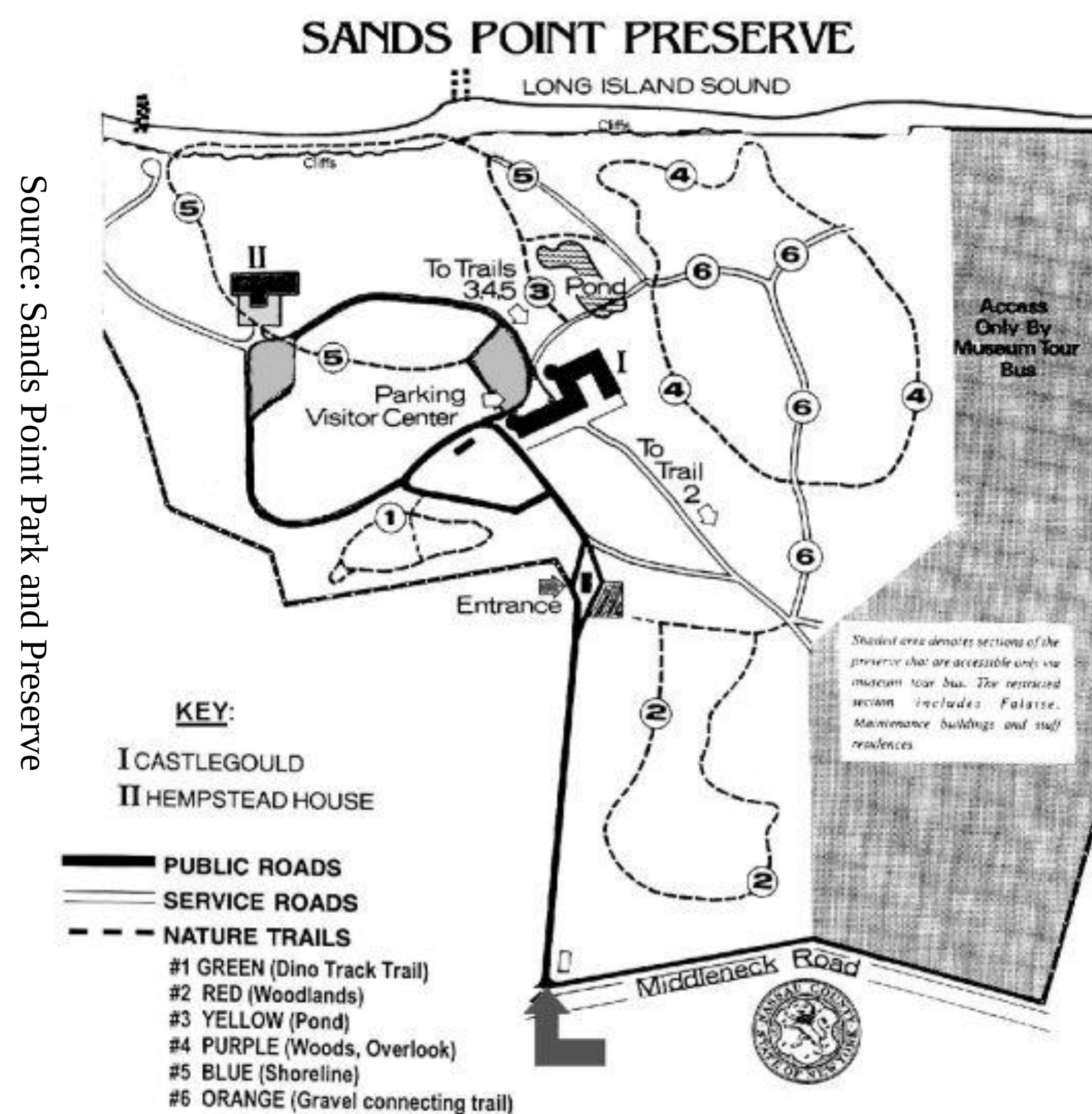
METHODS AND MATERIALS

Two, one hour long static surveys were conducted at the pond located on the Sands Point Preserve. Each survey was started between ten and thirty minutes after sunset using a binary acoustic frequency detector. The device was positioned upright with receiver facing towards the pond and was connected to a laptop running the SPECTR III® software, which serves to convert the high frequency calls detected by the binary acoustic frequency detector into an audible sound. Following this, the files are then inputted to the ScanR® program, which analyzed each recording and separated positive bat calls from failed files. These results were then examined by hand in order to differentiate search calls from feeding and approach calls, which appear less evenly spaced and more vertical on the trace screen and are often a higher frequency than the search calls. The minimum frequency (Fc) of the search calls, which are more comma shaped and horizontal, can be used to identify the species. Furthermore, should the minimum frequency be between 38 and 42 kHz, the CF (constant frequency) call and Sc, is analyzed. During this study, weather was also recorded before and after the survey.



RESULTS

Within the Sands Point Park and Preserve, the red bat (*Lasiurus borealis*) was identified as the predominant species. While ___ of the ___ positive, non-approach calls recorded were characteristic of the frequencies emitted by the red bat, ___ were noted as possibly having a minimum frequency above 38 kHz and a CF call, implying that there may be a small population of tri-colored bats (*Perimyotis subflavus*) as well.



Red Bat (*Lasiurus borealis*)



Bat House Located At Sands Point Park and Preserve

DISCUSSION AND CONCLUSIONS

From the data presently collected, the red bat (*Lasiurus borealis*) is the most abundant species found in the Sands Point Preserve. The red bat, which prefers to roost in the foliage of deciduous and evergreen trees, is well camouflaged and aptly suited to inhabit the Sands Point Park and Preserve due to the flora present on the grounds. This includes chestnut oak, white oak, black oak, northern red oak, red maple, sweet birch, American beech, sassafras, and white ash. In addition, during the summer, the red bat is observed to be “among the earliest evening fliers, preferring to feed around forest edges, in clearings, or around street-lights where they consume predominantly moths” (9). While the New York State Department of Environmental Conservation claims that little brown, northern-long eared, Indiana, and tri-colored bat populations have declined between 60 and 90 percent since the disease was first discovered in some New York caves in the winter of 2006-07, the red bat has recently been noted as one of the few species that is resistant to White Nose Syndrome (5). Currently, it is hypothesized that WNS is able to be spread not only from bat to bat, but also by means of human interaction, and, through exposure to various organic pollutants, the immune systems of bats can be suppressed, leading to increased susceptibility to infection by such opportunistic pathogenic organisms as the fungus *Geomyces destructans* (3). Therefore, despite the rising proof that some bats are resistant to this fungal disease, the DEC is still “asking members of the recreational caving community to avoid any caves or mines known to house hibernating bats” (5). The preliminary population survey performed serves to aid future studies monitoring the impact of White Nose Syndrome and various human induced disturbances on the distribution and size of the bat population of Long Island, New York. Additional surveys of the Sands Point Park and Preserve and other areas of Nassau County will be performed before the winter months.

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