



The Effects of Beaver Ponds on Bat Activity at Nahant Marsh

Abbigail Raes



Summary:

Nahant Marsh is a diverse wetland ecosystem that provides opportunities to investigate ecological relationships between unlikely species. This study focuses on the indirect relationship between beavers and bats. Using SM4-BAT detectors I captured ultrasonic bat recordings at nine locations at Nahant Marsh with varying levels of beaver activity. After analyzing the data we could not come to a definitive conclusion but with further research a relationship could be found.

Introduction:

Beavers are important in wetland ecosystems because they create wetlands known as beaver ponds. Beaver ponds are created when a beaver builds a dam, which slows the flow of water in the area. When beaver's collect materials to build dams they also selectively clear out wooded areas creating a more open space. These beaver ponds are susceptible to flooding which increases the amount of standing hollow dead trees that attract different insect and bat species. During the day, bats will roost inside these hollow trees or under pieces of peeled bark. At night they aerial hunt the insects around and on top of water.

Iowa is home to nine species of bats: the Big Brown Bat (*Eptesicus fuscus*), Eastern Red Bat (*Lasiurus borealis*), Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), Little Brown Bat (*Myotis lucifugus*), Northern Long-eared Bat (*Myotis septentrionalis*), Indiana Bat (*Myotis sodalis*), Evening Bat (*Nycticeius humeralis*), and Tricolored Bat (*Perimyotis subflavus*).

The Northern Long-eared Bat and the Indiana Bat are both federally endangered due to a mixture of habitat loss, disturbance during hibernation, and a fungal disease known as White-nose Syndrome. Although Nahant Marsh has conducted generalized bat surveys for several years, this study aims to better understand the indirect relationship between bats and beavers to possibly aid in managing the preserve.



Methodology:

This study used the Wildlife Acoustics SM4-BAT FS detectors to capture ultrasonic bat recordings around Nahant Marsh. The device collected data through a microphone that was 3.9 meters above the ground that was attached to a monitor. The monitors were set to record nightly from 30 minutes before sunset to 30 minutes after sunrise. I deployed monitors in four locations where there was evidence of beavers and five locations where there was no evidence. Monitors were deployed June 4th through July 6th, and data collected during that time period was then analyzed using a software called Kaleidoscope Pro. For statistical accuracy, data was only utilized if it reached 95% species identification confidence. One monitor that was located over a beaver pond was removed halfway through the study. To compensate, we moved one of the monitors that was not near a beaver pond to a different beaver pond.

Results:

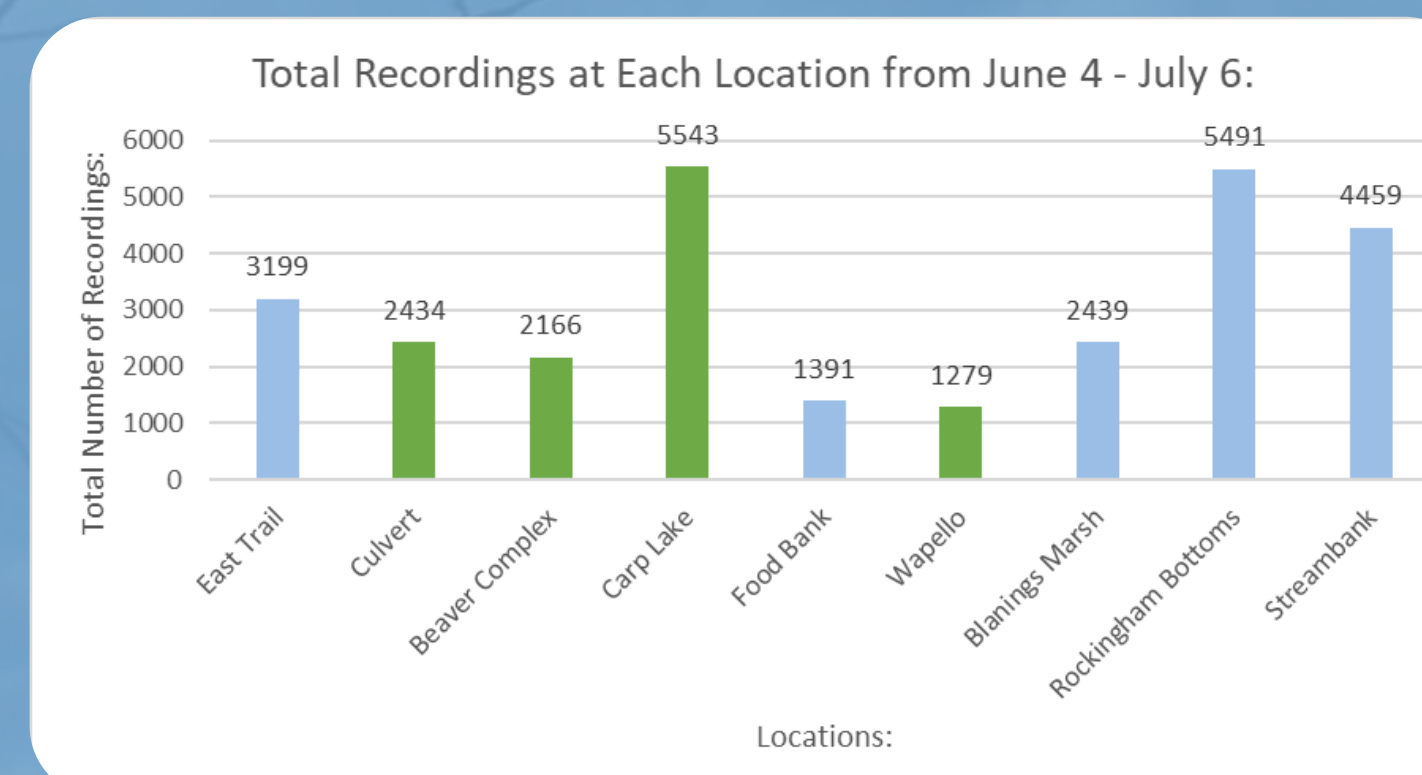


Figure 1. The bar graph shows the total number of recordings at each location with the non-beaver locations highlighted in blue and the beaver locations highlighted in green.

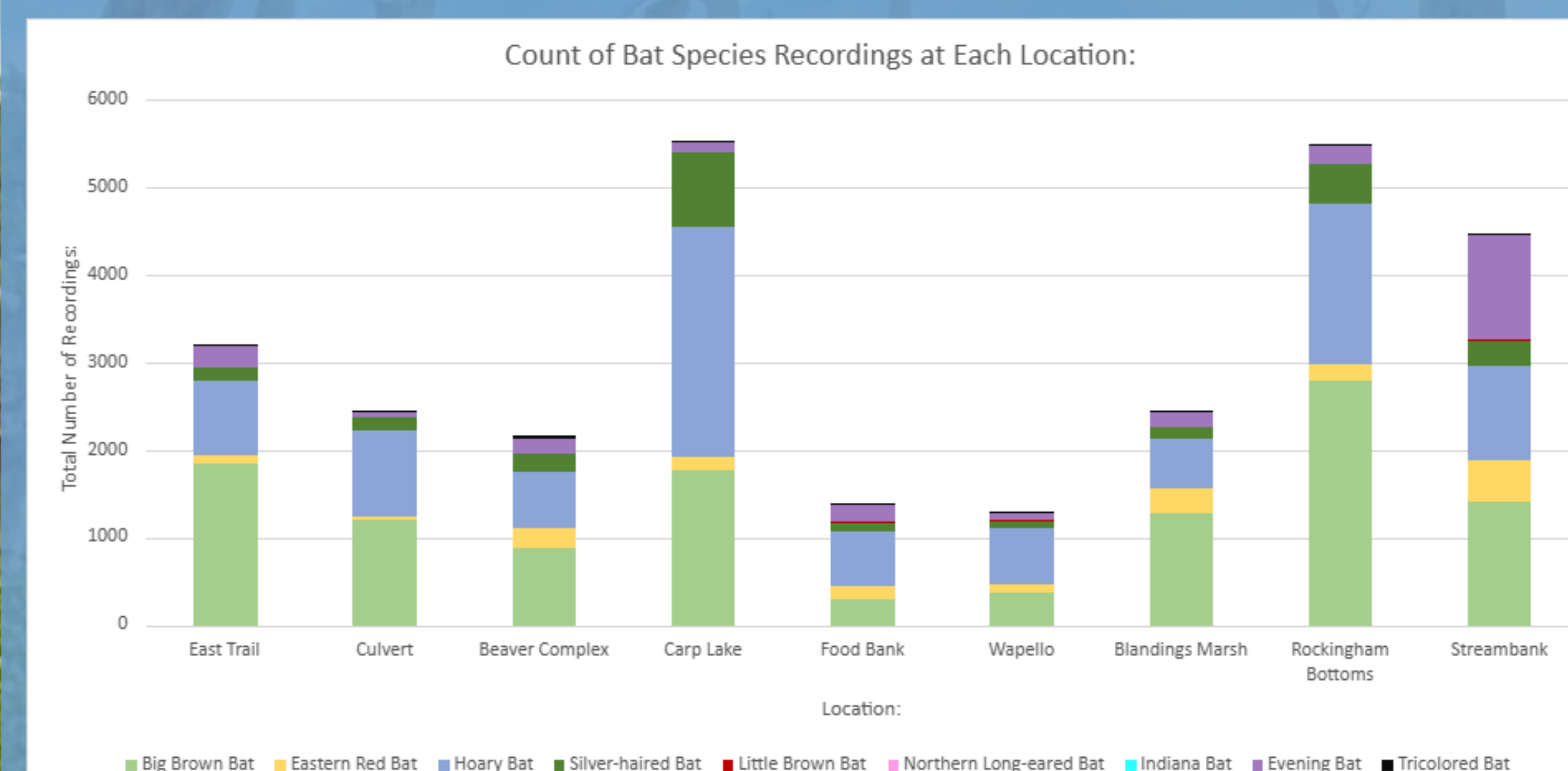


Figure 2. The bar graph shows the total amount of recordings at each location, differentiating the various species by color to show what species make up the majority of the total recordings.

Figure 3. The graph compares the mean of calls per night at locations where beavers are present versus where beavers are absent. The bars black bars represent the standard error of the mean.

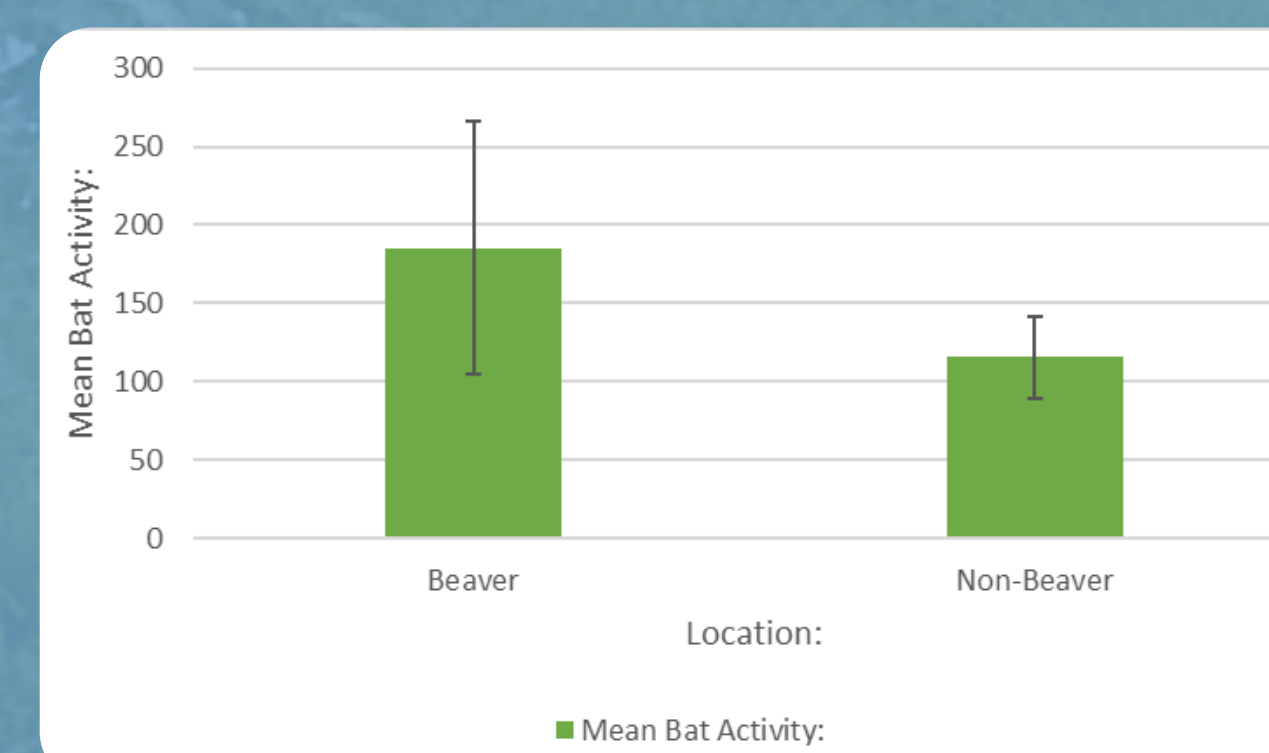


Figure 4. The map shows where all of the SM4-BAT monitors were deployed along with the location of Building B at Nahant Marsh. One monitor was moved on July 1st from the East Trail location (non-beaver) to the Culvert (beaver). The Wapello monitor was removed from the study on June 22nd.

Conclusion:

Looking at the data we can see in Figure 1. with the exception of Carp Lake, the locations where beavers were present had less total bat passes for the summer. It is worth noting that there was a greater number of passes per night on average in the beaver locations (Figure 3.). The average passes per night being higher at beaver locations could support the theory that bats are consistently going back to these areas to roost and hunt. I speculate that with further surveys and research, a definitive correlation could be found. However, with the data currently collected it is difficult to come to a clear conclusion whether beavers and bats have an indirect relationship.

As a whole, Nahant Marsh has a high abundance of bat activity. All nine bats in Iowa were recorded in this study with the Big Brown bat and Hoary bat being the majority (Figure 2.). Additionally, two federally endangered bats, the Northern Long-eared bat and the Indiana bat, were recorded in various locations. The Northern Long-eared bat was recorded a total of five times at four different locations, the Blandings Marsh, Food Bank, Rockingham Bottoms and Wapello. The Indiana bat was recorded a total of four times at three locations, the Streambank, Rockingham Bottoms, and the Beaver Complex.

Acknowledgments:

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