Occurrence of Birds of Conservation Concern at Nahant Marsh

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Introduction

This study was conducted at Nahant Marsh, a freshwater wetland reserve in southwest Davenport, Iowa. The site contains multiple habitat types that support a diverse community of resident and migratory birds. It is bordered by industrial development, a railroad, and a major highway, making it an ideal location to examine how habitat availability and human disturbance influence birds of conservation concern. The primary objective was to document the presence of endangered, threatened, and conservation-priority bird species at Nahant Marsh using passive acoustic monitoring. Species of interest included American Bittern, Least Bittern, Virginia Rail, King Rail, Black Tern, Least Tern, Osprey, Bald Eagle, Rusty Blackbird, and other conservation-priority species. Double-crested Cormorants were also included in the analysis because they can serve as indicators of ecosystem health even though they are not birds of conservation concern.

Methodology

Acoustic Monitoring

To monitor birds of conservation concern, eight Wildlife Acoustics SM4 Song Meter recording units were deployed at various locations throughout Nahant Marsh. Recording sites were chosen to represent different habitat zones and capture variation in bird activity across the landscape. More SM4 devices were placed near wetland shores, where birds of interest are most likely to nest and be present. Each recorder remained fixed at its assigned location throughout the sampling period, mounted on T-posts and secured with zip ties. Locations were georeferenced and linked to site characteristics for easier data comparison. To determine my list of species of interest, I referenced Iowa's DNR website and Iowa LandCAN Library.

Recording Schedule

Bird sampling occurred at some locations as soon as late March and then followed through late July. SM4 Song Meters were programmed to record during periods of peak bird vocal activity using two survey windows:

- **Dawn:** 30 minutes before sunrise to 30 minutes after sunrise
- **Dusk:** 30 minutes before sunset to 30 minutes after sunset

These periods maximize the probability of detecting the species of interest due to high vocalization at dawn and dusk.

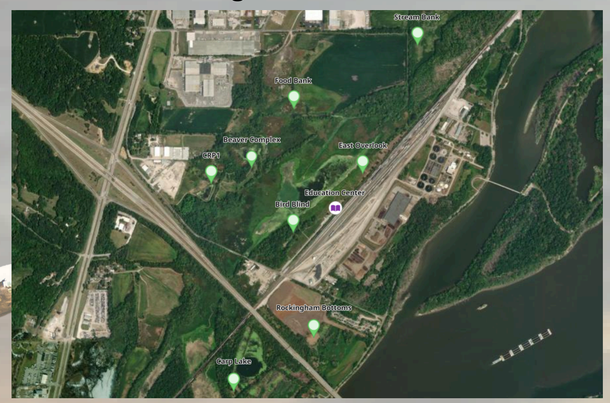
Acoustic Data Processing

Audio recordings from each SM4 unit were downloaded and reviewed using an application called BirdNET. Recordings were examined for vocal detections of target bird species. For each detection, species identity, date, time, and recorder location were documented. Detection data was then summarized to evaluate the occurrence and distribution of conservation-priority bird species across habitats within Nahant Marsh.

Summary

This study used acoustic monitoring to document the presence and distribution of birds of conservation concern at Nahant Marsh. Of the 35 target species, 10 were detected, and results indicated that conservation-priority species were more commonly found in less developed areas of the marsh rather than at sites with the highest overall bird diversity.

Song Meter Locations



Results

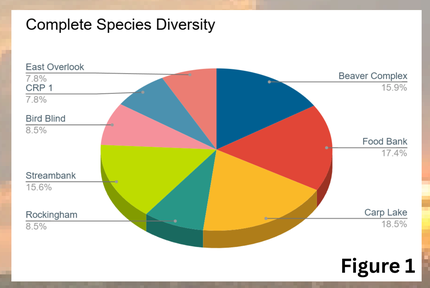


Figure 1

Overall bird species diversity recorded at each of the eight acoustic monitoring locations at Nahant Marsh.

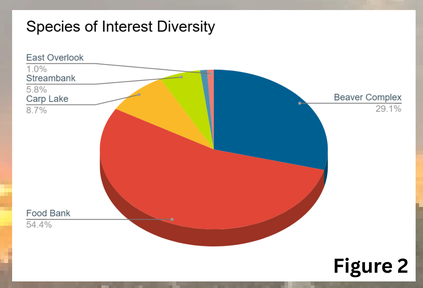


Figure 2

Distribution of conservation-priority bird species across the eight acoustic monitoring locations at Nahant Marsh.

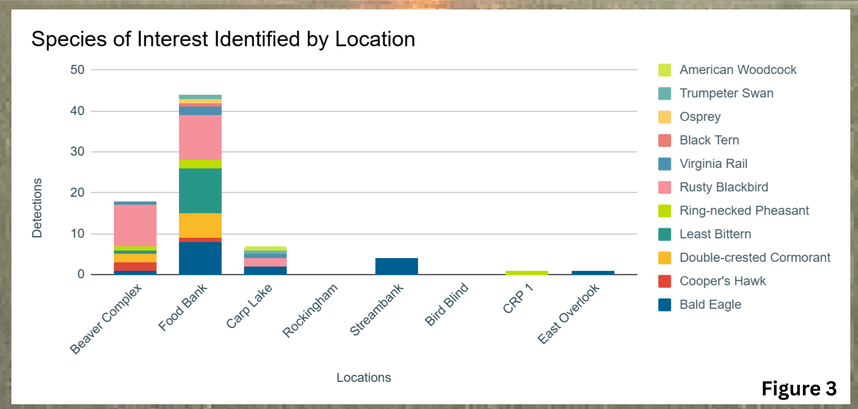


Figure 3

Number of detections for each conservation-priority bird species at the eight SM4 acoustic monitoring locations throughout Nahant Marsh. Colors represent individual species, and stacked bars show the total detections recorded at each site during the sampling period.

Discussion

Passive SM4 acoustic monitoring detected multiple bird species of conservation concern across Nahant Marsh, showing the effectiveness of acoustic surveys for documenting ornithic populations. One problem when analyzing the data was being able to tell how many birds were truly present in the detections, as the software does not differentiate between one bird making multiple calls or many birds making one call each. You knew how many detections there were, but not how large of a population there was. Out of the 35 target species selected for this study, 10 were successfully detected. The detected species are summarized in Figure 3. While not every species identified is currently listed as a bird of conservation concern, some, such as the Cooper's Hawk, have experienced historical population declines and remain important indicators of ecosystem health.

Analysis of the data revealed two primary findings:

1. Overall bird species richness did not exactly correspond with the richness of the specific species of interest. Several recorder locations with high overall species diversity such as Bird blind, Rockingham, CRP 1, and East Overlook supported very few or no conservation-priority birds. This variation is shown in Figure 1 and Figure 2. This finding suggests that areas supporting a diverse bird community are not always the most important habitats for threatened, endangered, or otherwise vulnerable species.

2. Conservation-priority species were more frequently detected at recorder locations situated farther from roads and developed areas. Although human disturbance was not directly measured in this study, this pattern suggests that less developed portions of Nahant Marsh may provide more suitable habitat for sensitive bird species. These findings emphasize the importance of preserving wetland habitats and minimizing habitat disturbance to support birds of conservation concern within Iowa.

Conclusion

Nahant Marsh provides valuable habitat for multiple bird species of conservation concern. Passive SM4 acoustic monitoring proved to be an effective and non-invasive tool for documenting these species and identifying patterns in their distribution. Continued monitoring in following migration and breeding seasons can help guide future conservation and habitat management efforts at Nahant Marsh and other Iowa wetlands. Hopefully in years to come Nahant Marsh will become home to many more bird species of concern and aid in the revitalization of their populations.

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