

BATS & WATER

in New York City

Introduction

Bats are important urban wildlife species, and in many environments they are known to concentrate near water because these areas provide abundant insect prey and open space for foraging. However, it is unclear whether this pattern holds in dense urban settings like New York City, where factors such as light pollution, noise, and altered shorelines may influence habitat use. Using bat observations collected from the Macaulay Honors College BioBlitz, our study examines whether proximity to water bodies affects bat abundance in NYC parks. Understanding this relationship can provide insight into how bats use urban habitats and help inform park management and conservation planning.

Hypothesis

Bats will be more abundant at observation sites that are closer to permanent water bodies. Specifically, we predict that bat abundance will be highest in the Adjacent (≤ 50 m) category, moderate in the Nearby (51–250 m) category, and lowest in the Distant (> 250 m) category, reflecting ecological patterns documented in non-urban habitats. Despite the unique conditions of NYC parks—artificial light, noise pollution, and engineered shorelines—we expect the ecological benefits of water-rich habitats (higher insect density and open foraging space) to remain influential.

Methods

Bat observations were obtained from Macaulay Honors College BioBlitz events, which record species using iNaturalist with GPS coordinates and observation counts. Each observation site was measured in Google Maps and assigned to one of three distance categories based on proximity to the nearest permanent water body: Adjacent (≤ 50 m), Nearby (51–250 m), or Distant (> 250 m). Bat abundance was measured as the number of individual bats recorded at each sampling event. Bat abundance for each distance category was calculated and compared using a bar graph to determine whether bats were more frequently observed closer to water.

Does proximity to water bodies influence bat abundance in NYC parks?

Data / Results

During the 2022 Randall's Island BioBlitz, participants used iNaturalist to upload verified visual bat observations. Each observation was categorized by distance to nearby water features using three distance classes: distant (> 1213 ft), adjacent (809–1213 ft), and nearby (< 809 ft). Across four main sites, 23 detections were recorded, with the highest activity in areas closest to water. Field 54 and the Salt Marsh—both bordering the Harlem River—recorded 11 and 7 observations, while inland sites recorded only 2 each. Overall, 60.67% of detections occurred in areas classified as adjacent to water.

Additional data were collected from the 2025 Brooklyn Bridge Park BioBlitz at two sites: Pier 1 and Pier 5. Pier 1, only 23.21 ft from the East River, recorded 6 observations. Pier 5, located 198.83 ft away, recorded 1 observation. This pattern mirrors the Randall's Island results—sites nearer to water supported substantially higher bat activity.

Bat detections are substantially higher in sites directly bordering or adjacent to water than in inland locations.

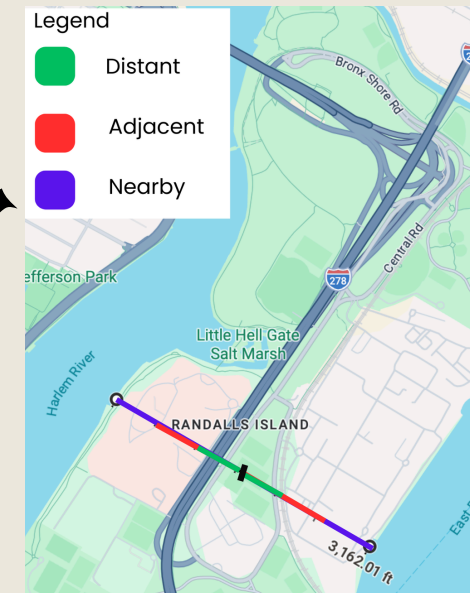
Conclusion

Together, the Randall's Island and Brooklyn Bridge Park datasets show a consistent positive relationship between proximity to water and bat abundance in urban parks.

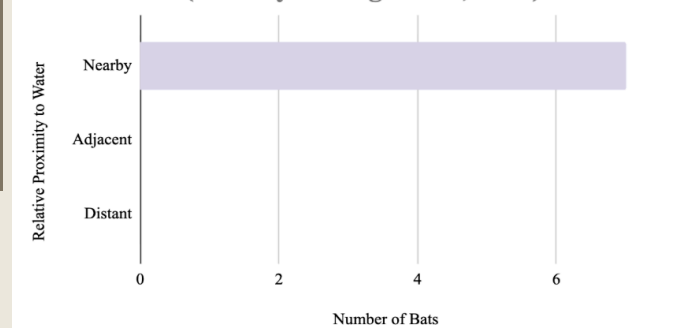
Sites closest to water had the highest observation counts, suggesting that aquatic features enhance foraging and movement opportunities for bats even in highly urbanized areas.

This pattern is supported by known ecological mechanisms: water attracts insects, provides open flight corridors, and improves acoustic conditions for hunting.

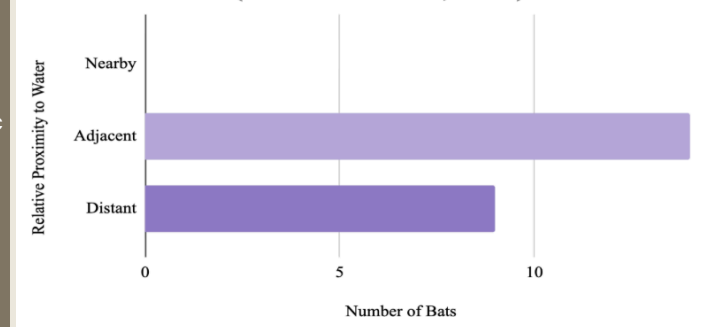
Overall, bats consistently favored areas near water, underscoring its importance as a habitat feature in urban environments.



Number of Bats vs. Relative Proximity to Water (Brooklyn Bridge Park, 2025)



Number of Bats vs. Relative Proximity to Water (Randalls Island, 2022)



Works Cited

Discussion

Our research question was grounded in existing ecological literature, which widely supports the idea that bats preferentially forage near water due to higher concentrations of insect prey and the presence of open commuting corridors. Our study aimed to build on this by testing this relationship within highly urbanized parks.

Brooklyn Bridge Park data strongly supported this pattern: the "Adjacent" site (Pier 1) recorded six times more detections than the "Nearby" site. Randall's Island results, however, were mixed. Although Field 54 ("Adjacent") showed the highest activity. Data from Randall's Island and Brooklyn Bridge Park demonstrate different results that could have an underlying factor. Therefore, while we can interpret an overall mild positive relationship, as stated in our results, our hypothesis was not unequivocally supported across all sites, highlighting the complex interplay of variables in an urban ecosystem.

Limitations

Several limitations and potential sources of error must be considered. First, our data relies on citizen science observations from the BioBlitz, which can have inconsistencies in observer effort and detection methods (visual vs. acoustic). Second, as noted in our results, we cannot rule out the possibility of repeated observations of the same individual bat. Third, the short, 24-hour sampling duration of a BioBlitz provides only a snapshot of bat activity and may not represent typical patterns. Finally, our study did not directly measure the confounding urban variables—such as specific light intensity, noise levels, or vegetation quality—that our literature review identified as important. These factors likely contributed to the ambiguous results at Randall's Island. Our study suggests that to conserve and promote this biodiversity, park managers should prioritize the protection of natural shorelines, work to mitigate artificial light pollution near water features, and create green spaces that allow bats and other wildlife to safely access these key resources.