The Relationship Between Seasonal Temperature Change and Bird Biodiversity in NYC

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INTRODUCTION

Climate change has been an ongoing issue in NYC, impacting the urban ecosystem. Recent studies on the vulnerability of birds to climate change found that 389 out of 604 North American bird species are highly vulnerable to a 3°C or 5.4°F increase in global mean temperature (Bateman et al., 2020). The annual mean temperature in NYC has increased by 3.4°F between 1900 and 2013 and is projected to increase by 4.1°F to 5.7°F by the 2050s (*NPCC*, 2015). Recent research also found that the summer usually has the lowest bird biodiversity. The researchers observed only 30 species during the summer out of a total of 66 for the year (Dawson & Hostetler, 2021). Therefore, we're interested in studying how the change in average temperature during summer can affect the biodiversity of birds.

RESEARCH QUESTION

Do rising temperatures in summer affect bird biodiversity in New York City?

HYPOTHESIS

Rising temperatures will result in a decrease in bird biodiversity in New York City.

METHODS

We collected bird data from iNaturalist and temperature data from AccuWeather.com. Our study is focused on the summer 2022 from June to September in the Bronx and Brooklyn. We measured the diversity of bird species by using the Shannon Diversity Index. We used the average monthly temperature and Shannon Diversity Index to calculate the correlation coefficient (r) to determine if there is a correlation between temperature and bird biodiversity.

RESULTS

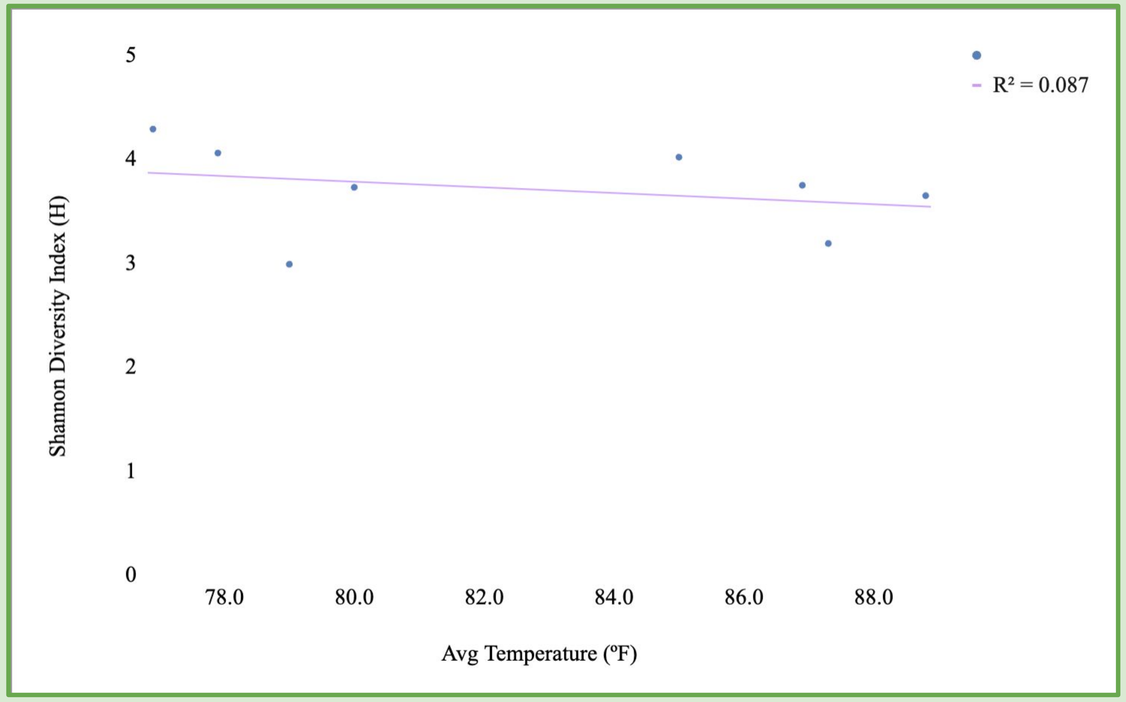

Figure 1. Shannon Diversity Index (H) vs. Avg Temperature in NYC parks, June to September 2022

We found a weak negative correlation between temperature and bird biodiversity in New York City, $r(6) = -0.30$, $p = 0.48$. This indicates that there is insufficient evidence to reject the null hypothesis.

CONCLUSIONS

Our findings don't convey that there is a statistically significant relationship between temperature and bird biodiversity in NYC, which rejected our hypothesis. Bird biodiversity may not be immediately affected by rising temperatures so it wouldn't be detectable within just a season. Other factors such as food availability, habitat alteration, and interactions with other species can also influence bird biodiversity since different types of birds responds differently to temperature change (US EPA, 2023).

FUTURE RESEARCH

Future research could study the impact of temperature change on different bird populations, analyze the change in their migratory patterns, examine the relationship between the biodiversity of birds and the habitat restoration efforts. This could provide a better understanding on how other factors contribute to the changing bird diversity in NYC.

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