

HOW DOES URBAN GREEN SPACE AFFECT NATIVE AND NON-NATIVE BIRD POPULATIONS?

VIVIAN GILLMAN, RUBENSTEIN SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES, UNIVERSITY OF VERMONT

Background and Motivation

- We share our urban spaces with many different animal species, including birds, and how we manage our areas has a great impact on them. Much of research surrounding bird populations centers around natural areas but with growing urban populations and urban sprawl, urbanization is becoming a greater threat to bird populations (Gavareski, 1976). It is more important than ever to explore the impact urban centers have on native and non-native species and analyze methods of maintaining or improving bird populations. Bringing attention to urban green spaces and how they affect bird populations can help shed light on the benefits of urban green space not only on bird populations, but all animals (Savard, Clergeau, & Mennechez, 2000).
- Not only is it important to study bird populations in urban spaces to ensure there is continued biodiversity and a healthy habitat, but birds play a major role in our ecosystems and protecting them is crucial. Birds are a natural form of pest control, more than 50% of birds are predominantly insectivores and keep insect populations in check (Wenny et al., 2011). Birds also help pollinate plants, disperse their seeds, and act as scavengers helping to break down dead animals, a crucial part of the nutrient cycle (Wenny et al., 2011).
- I hope that this study can help us learn new ways to aid in the success of native bird species and uncover situations that put non-native species above natives.

Hypothesis

- I hypothesize that there is a relationship between the amount of urban green space and the population numbers of native and nonnative bird species, and that the amount of green space affects the populations differently.



Figure 1: Photo depicting Central Park in New York City. A great example of a large patch of uninterrupted urban green space. Photo from Urban Espora.

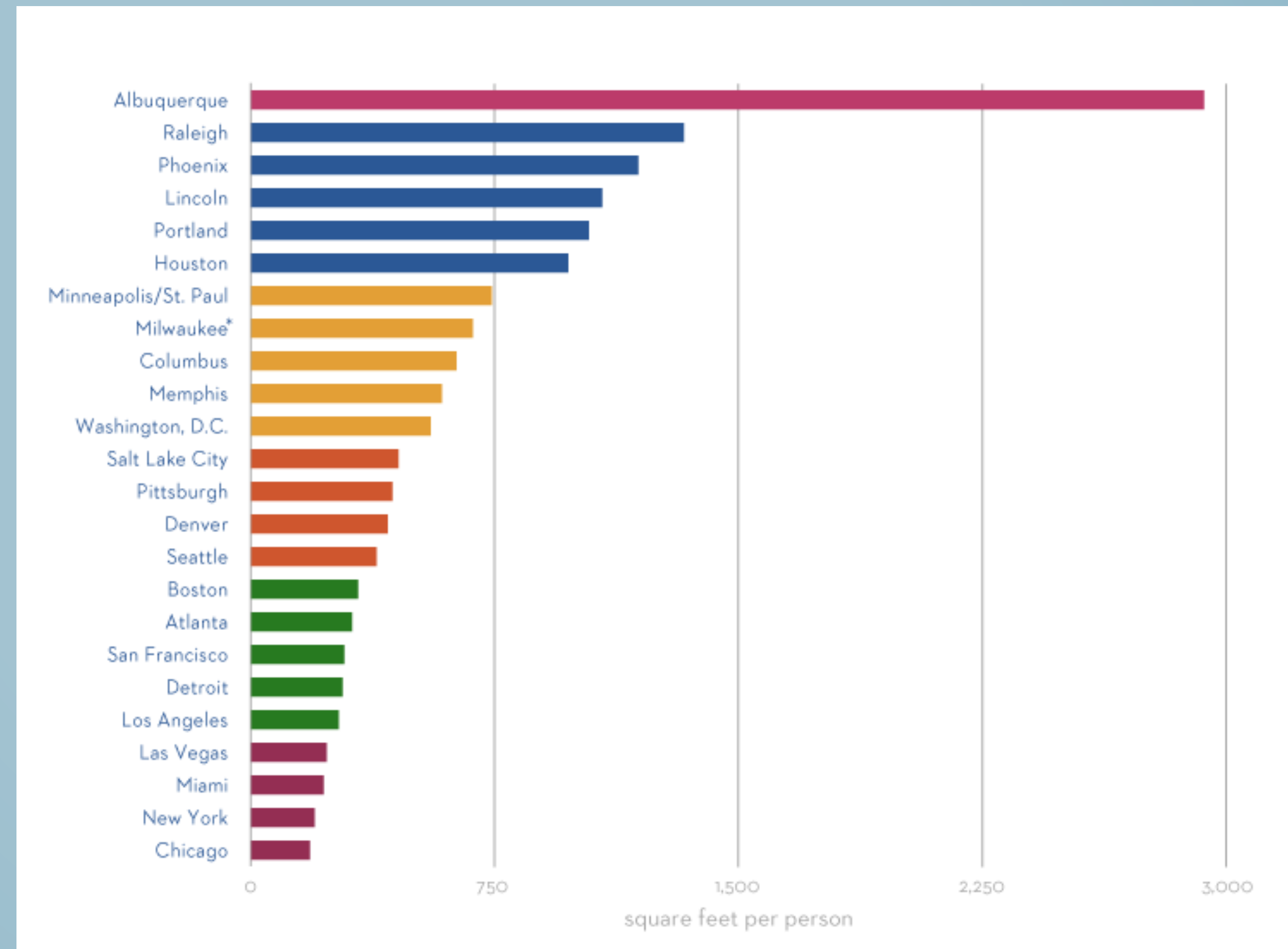


Figure 2: Graph depicting parkland per person in US cities. Photo from Per Square Mile

Expected Benefits and Greater Impact

- As seen in figure 3, since 1970 bird populations across the United States and Canada have dropped by 2.9 billion. That is almost 30% of the total population (Axelson, 2019).
- Birds a crucial part of our ecosystems that cannot be replaced and with the fast-paced growth of urbanization and land use change we need to understand how urban areas affect bird populations, especially native birds.
- This study will help provide evidence for the need of urban green space to help provide habitat for these necessary populations.

Study Design

- I will conduct an observational study using multiple cities across the continental United States to compare urban green space and bird populations.
- I will choose 6 cities with varying amounts of urban green space and observe the native and non-native bird populations in each city. I will obtain the data about percentage of green space in each city using a GIS software.
- The independent variable in this study will be percentage of green space in each city (continuous) and the dependent variables will be native bird population size and non-native bird population size (continuous). The population numbers will be divided by the area of the city to even out the data between larger and smaller cities.
- Since both my independent and dependent variables are continuous, I will analyze the data collected with a regression analysis. The analysis will help to determine if there is a relationship between urban green space and bird populations, and how it may affect native and non-native populations differently.

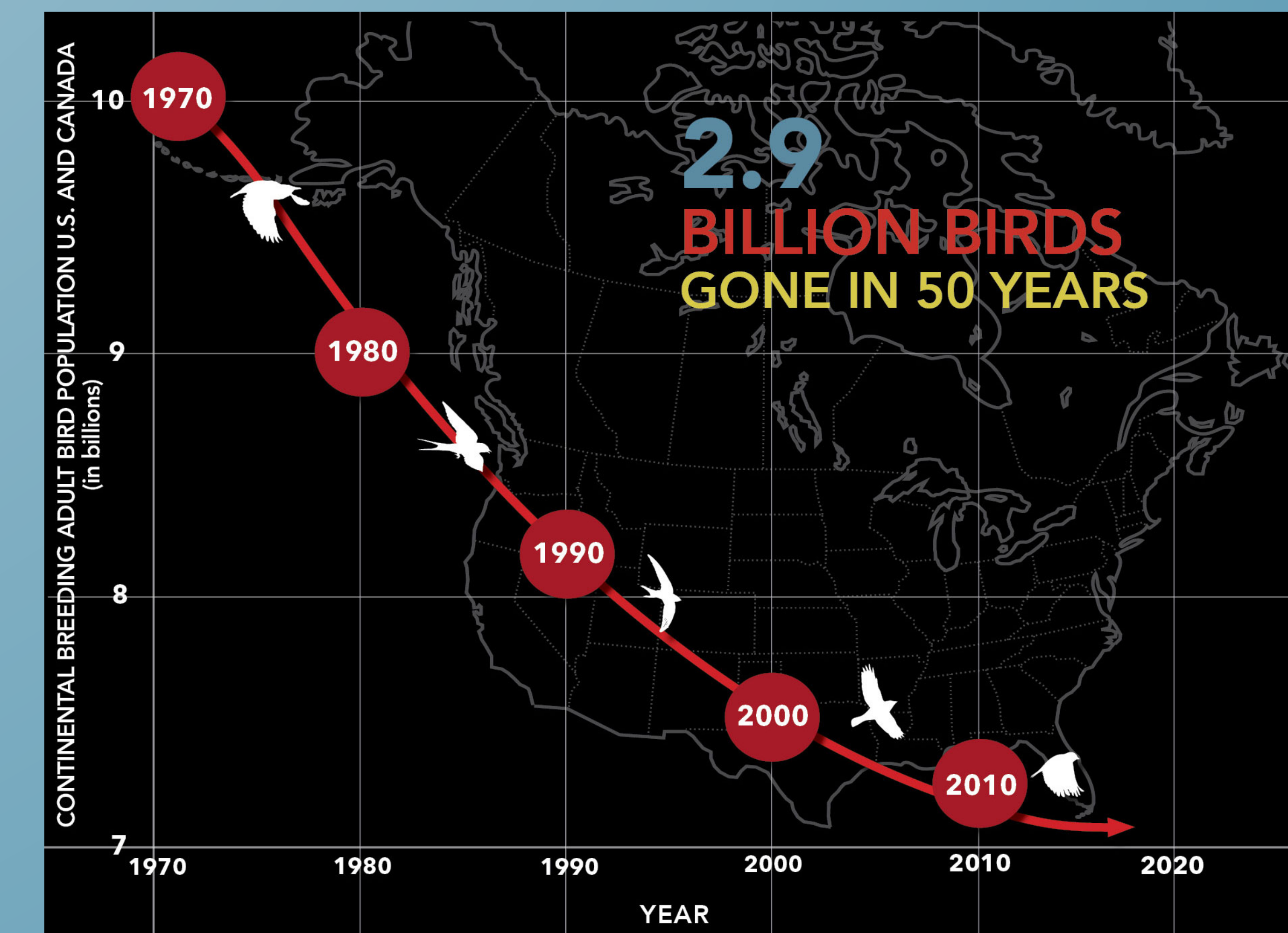


Figure 3: Infographic depicting loss of bird populations over the past 50 years. Photo from the Cornell Lab.

Literature Cited: Axelson, G. (2019, October 09). Vanishing: More Than 1 in 4 Birds Has Disappeared in the Last 50 Years. Retrieved November 23, 2020, from <https://www.allaboutbirds.org/news/vanishing-1-in-4-birds-gone/>; Blair, R. (1996). Land Use and Avian Species Diversity Along an Urban Gradient. *Ecological Applications*, 6(2), 506-519. doi:10.2307/2269387; GARCIA, D., ZAMORA, R., & AMICO, G. (2010). Birds as Suppliers of Seed Dispersal in Temperate Ecosystems: Conservation Guidelines from Real-World Landscapes. *Conservation Biology*, 24(4), 1070-1079. Retrieved November 23, 2020, from <http://www.jstor.org/stable/40864207>; Gavareski, C. (1976). Relation of Park Size and Vegetation to Urban Bird Populations in Seattle, Washington. *The Condor*, 78(3), 375-382. doi:10.2307/1367699; Savard, J., Clergeau, P., & Mennechez, G. (2000, April 07). Biodiversity concepts and urban ecosystems. Retrieved November 23, 2020, from <https://www.sciencedirect.com/science/article/pii/S0169204600000372>; Wenny, D., DeVault, T., Johnson, M., Kelly, D., H. Sekercioglu, C., Tomback, D., & Whelan, C. (2011). The Need to Quantify Ecosystem Services Provided by Birds. *The Auk*, 128(1), 1-14. doi:10.1525/auk.2011.10248; Martin-Albarracin, V., Amico, G., Simberloff, D., & Nuñez, M. (2015, November 17). Impact of Non-Native Birds on Native Ecosystems: A Global Analysis. Retrieved November 23, 2020, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4648570/>