# The Effect of Golf Courses on Avian Population

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Introduction

According to the Arizona Department of Revenue, a golf course of "good design" given a GCC designation has an average total acreage of 287 (GOLF COURSES n.d.). With over 300 golf courses in Arizona, that comes out to a minimum of 86,100 acres covered by golf courses (Course Directory n.d.). This area could have a significant impact on the local ecosystems of areas with golf courses. We questioned if highly complex landscapes have more birds than low complex area golf courses.

Our goal with this study is to determine if avians are more populous in highly complex landscapes, about 80% complexity, or in low complex golf courses, about 10% complexity. The data collected in our experiment will allow us to test our hypothesis, that high-complex areas will have a higher count of birds than low-complex areas, as the complexity reflects their natural habitat. Our null hypothesis is that the high complex area (park) will not have a higher amount of birds than the low complex area (golf course).
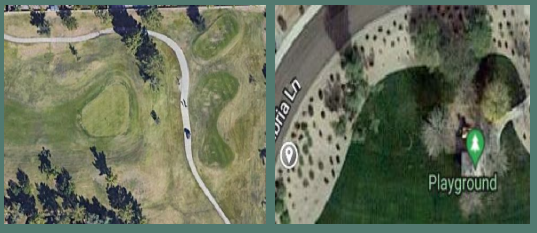
Golf Course 10% Diversity	Park 80% Diversity

Methods

One person will go to two highly complex structural areas (80% complexity) to count birds in five-minute intervals starting at nine am and repeating every thirty minutes until eleven am resulting in five samples per area. The other person will repeat these methods in a low structurally complex golf course (10% complexity). Each person will arrive on the scene five minutes early to each time interval to allow the birds to acclimate. We will use the point count method with binoculars to tally the birds. Any unusual circumstances will be recorded such as weather or people. Each bird will only be counted once and it must be perched. The numbers will be tallied along with the date and times. Once data is collected it will be compiled in an Excel sheet using the Mann-Whitney U calculation to determine if the results are significant. Golf courses will be interchangeably referred to as "GC.

Results

The average number of birds overall for the GC was 21.2 and the median was 18. The average for the park was 5 and the median was 5. The GC rank sum was 13.1 and the park rank sum was 7.9. Our critical value was 61.9. According to the Mann-Whitney U distribution table, our test statistic needed to be <27 to be counted as statistically significant. Because our number is not within this range, it can not be considered statistically significant and we are not able to reject our null hypothesis. The inability to reject the null hypothesis shows that there is no significant difference in the count of birds in the low structurally diverse area vs the high structurally diverse area.

In data set one, the average number of birds in the GC was 5.4, and in the Park, it was 4.8. The U-value was 11 and the critical value was 5.

In data set two, the average number of birds in the GC was 37, and in the Park, it was 5.2. The U-value was 0 and the critical value was 5.

Bird Count Set #1

Bird Count Set #2

Conclusion

Based on our data collected we are unable to support our alternative hypothesis. Some important notes about potential errors and biases include human error, differences in counting between sites, the suboptimal time of day for birds, the small data pool, and human interference from our sites being in public spaces. Based on our data we are unable to assess if the low complex structure in the golf course affected the avian population.

Works Cited

Course directory (n.d.). Go Golf Arizona. Available at: https://gogolfarizona.com/course-directory/ (Accessed: 13 November 2023).

GOLF COURSES - Arizona Department of Revenue (n.d.). Arizona Department of Revenue. Available at: https://azdor.gov/sites/default/files/2023-03/PROPERTY_GolfCourses.pdf (Accessed: 13 November 2023).

Google Maps. (n.d.). [Augusta Ranch Golf Course and Wayne Ranch Park., Available at: https://www.google.com/maps/@33.3919224,-111.9281011,12z?entry=ttu (Accessed: 13 November 2023)