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# DIFFERENCE IN MIGRATION DISTANCES OF WOOD DUCKS BANDED IN PENNSYLVANIA BASED ON SEX

Lydia Gladfelter, Jack Johnson, Olivia Marker, Hunter Price and Jairus Werner

## ABSTRACT

The Wood Duck, scientifically termed *Aix sponsa*, is commonly found throughout the northern parts of the United States but is one of the few duck species that migrates south during the winter months to escape cold temperatures. They typically migrate to Florida and other states bordering the Gulf of Mexico but have also been known to travel as far as Mexico and Cuba. For our study, we predicted that males would travel farther distances than females. To test our hypothesis, we used band-recovery data from the Pennsylvania Game Commission. To determine whether there was a difference in the distances migrated between male and female Wood Ducks, we conducted a two-sample t-test with assumed equal variance. Our results concluded that there is a statistical difference in the distances traveled between male and female Wood Ducks, which supports our hypothesis. However, further studies need to be done to determine why male Wood Ducks migrate further.

*Key words: banding, distance, migration, Pennsylvania Game Commission, Wood duck (Aix sponsa)*

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## INTRODUCTION

The Wood duck is a species that is well known for its migration to warmer climates during the winter months. The Wood duck is known for residing near ponds and sluggish streams which are surrounded by forest. Wood ducks are also known for belonging to a group of dabbling ducks which mean they feed on or near the surface of shallow streams and ponds as opposed to diving for food. Most Wood ducks migrate to areas from South Carolina to the Gulf of Mexico and reach west to eastern Texas. A Wood duck is normally 18-24 inches long with a 24-inch wingspan and is known to be one of the most colorful duck species (Fergus, 2020).

As stated earlier Wood ducks are known to be one of the many duck species which migrate to

northern states during the summer and migrate south during the winter months. What many people do not know is that there are permanent habitat Wood ducks which stay north and the other migratory Wood ducks. The main reason that Wood ducks migrate south in the winter is to avoid the brutal temperatures that come with inhabiting northern states. There is also a reason for the Wood ducks migrating north over the summer months as they use the northern states for breeding. Wood ducks main travel path for migration is through the Atlantic flyway which runs from New Brunswick to Georgia and south to eastern Texas and the West Indies (Wood Duck, n.d.).

With all of the information that has been gathered about the Wood duck, the focus of our study was to look deeper at how these birds migrate by sex. It is our belief that male Wood ducks will migrate

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further than the female Wood ducks. We arrived at this hypothesis after preliminary research was done looking at numbers that were collected by the Pennsylvania State Game Commission. (PA State Game Commission).

## METHODS AND MATERIALS

When the data was collected for the banding of Wood Ducks, a variety of methods and tools were used to successfully collect data. Banding data was collected from all over the world using GIS (Geographical Information Systems). This allowed the data points to show the different areas where the ducks were banded. Rocket netting, molting period capture, and other traps were used to collect more samples. The Wood Ducks that were captured, were then banded and recorded by placing a silver band with an identification number on their leg. On the band, it has an identification number, the area it was caught and banded, and its sex. Lastly, when hunters would harvest a Wood Duck, if it has a band, some hunters would log into a tracking service and record the kill and where it was. This helped the Game Commission put together an analysis of the travel. This is best depicted in figure 1 below, the green dots (Pennsylvania), is where the birds were banded, and the red dots are where the birds were recovered and reported.

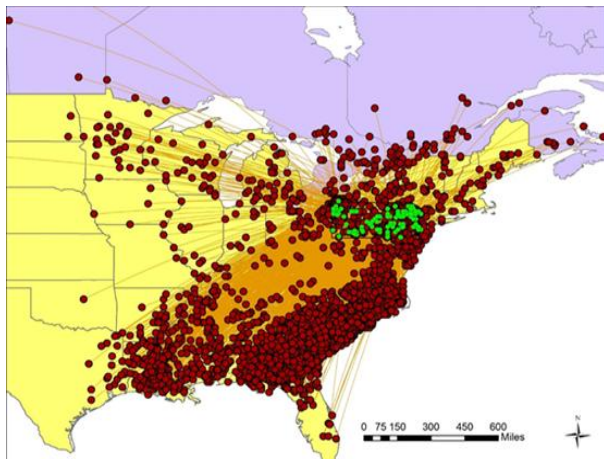


Figure 1. This map illustrates the migration patterns of Wood Ducks (Male & Female). The green dots are where the birds were banded, all of which were in Pennsylvania. The red dots are where the birds traveled to, with the majority ending up in the southern

part of the United States. This data was collected by the Pennsylvania Game Commission between the years of 1920 and 2018.

## RESULTS

The distance traveled among the male Wood ducks ( $M = 376.71$ ,  $SD = 333.5$ ,  $n = 3575$ ) was hypothesized to be greater than the distance traveled by female Wood ducks ( $M = 239.85$ ,  $SD = 315.5$ ,  $n = 2189$ ).

To test our hypothesis, we ran a two-sample t-test and assumed equal variances. Our null hypothesis stated that there would be no significant difference in distance traveled between male and female Wood ducks. We ran the two-sample t-test with an alpha value of 0.05 and a degrees of freedom value of 5762. From this test we obtained a t-stat of 15.433, a p-value of  $5.512E-53$  (1-tail). In addition to these results, figure 2 below confirms that on average, the male Wood duck travels further than the female Wood duck.

*Note: Due to our data containing nearly 6000 data points, it would not be reasonable to include the entire set in our report. Please see the link below containing our raw data, descriptive statistics, and results to our two-sample t-test.*

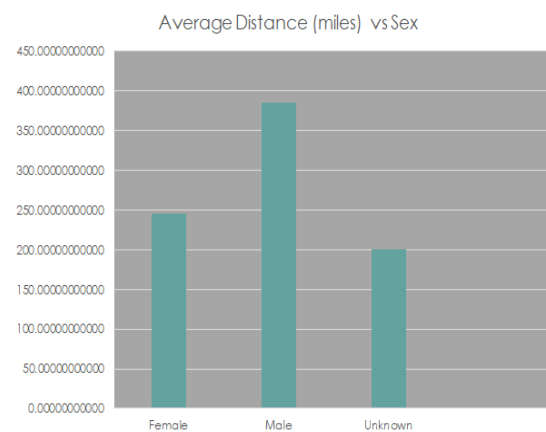


Figure 2. This figure depicts the average distance in miles traveled by both female and male Wood ducks. The unknown bar is the average distance traveled for birds whose sex was not determined. The male Wood ducks travel approximately 135 miles farther than the

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*female Wood ducks on average. This data was collected by the Pennsylvania Game Commission from 1920 to 2018.*

## DISCUSSION

Both our t-stat (15.433) and p-value (5.512E-53) allow the null hypothesis to be rejected. Our t-stat was much greater than the critical t-value of 1.64, and our p-value was much less than the alpha value of 0.05. This means there was a significant difference in distance traveled between male and female Wood ducks. When looking at the raw data, rejecting the null hypothesis makes sense. On average, the male Wood ducks traveled over 100 miles farther than female Wood ducks. There were more male ducks than female ducks in the study, but the overall sample size for each sex was large which increased our statistical power for the two-sample t-test.

Our statistical findings support the overall hypothesis that male Wood ducks will travel farther than female Wood ducks. It is known that Wood ducks migrate as a result of seasonal changes, but our study looks further into Wood duck migration to understand the specific behavior pattern of this species. Based on the data we obtained from the Game Commission, it is clear that there is a statistical difference between male and female migration distances. To take this a step further, more data could be examined to determine the role of age in the migration pattern of Wood ducks.

## ACKNOWLEDGMENTS

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