FAA Reported Bird Strikes by Time of Day at Florida Airports

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Abstract

Bird strikes can have detrimental effects on aircraft and can lead to serious or even fatal accidents. Understanding when bird strikes are most likely to occur would help the aviation industry be more cognizant of the risks. After reviewing reports to the Federal Aviation Administration's (FAA) Wildlife Database over a span of 5 years at only Florida airports, it was determined that there was a significant difference between the number of bird strikes reported by time of day, with midday having the most strikes overall.

Background

- Since 1988, over 262 people have died, and about 250 aircraft have been destroyed due to wildlife strikes (Dolbeer, Weller, Anderson, & Begier 2016).
- The FAA Wildlife Strike Database contains reports of wildlife strikes since 1990 (FAA, 2018).
- Bird behavior is dictated by biological circadian rhythms (Avery et al., 2016).
- In Florida, spring is when bird activity peaks due to migration factors (Lafleur, Buler, & Moore 2016).

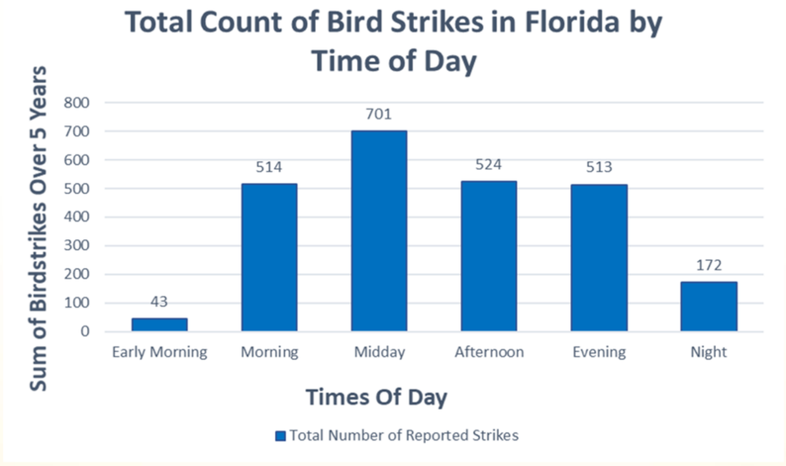
The purpose of this study was to determine if there was a difference in the quantity of bird strikes at Florida airports reported to the FAA's Wildlife Strike Database by time of day.

Methods

- Archival data from the FAA Wildlife Strike Database website was downloaded in Excel. Entries were limited to Florida, birds only, civilian aircraft, and the date range 7/1/2011-6/30/2016. Entries missing time of day or other pertinent information were filtered out.
- Strike reports were classified into time categories: early morning (0200-0559), morning (0600-0959), midday (1000-1359), afternoon (1400-1759), evening (1800-2159), and night (2200-0159).
- Reports were tallied by month, then analyzed using R Studio for descriptive statistics, an ANOVA, and a Tukey's pairwise comparison, and finally an effect size was determined.

Results

- The findings of the research indicated that midday had the highest number of reported bird strikes at Florida airports during the five-year time period.
- More birds were struck between the hours of morning to evening (0600-2159).
- The ANOVA was significant, indicating that there is a difference in reported bird strikes by time of day: $F(5,354) = 42.04$, $p = 2e\text{-}16$.
- The Tukey pairwise comparison showed that all pairs were significantly different at $p<0.05$, except for the evening-afternoon, morning-afternoon, and morning-evening pairs.
- A small to medium effect size was determined by calculating the eta squared ($\eta^2 = 0.37$).



Descriptive Statistics for Reported Bird Strikes at Florida Airports

Time of Day	Mean	Median	Range	Standard Deviation
Early Morning	0.7	0	0-3	0.9
Morning	8.6	8	2-38	5.6
Midday	11.7	9	3-39	7.2
Afternoon	8.7	8	1-25	4.7
Evening	8.6	7	0-26	5.8
Night	2.9	2	0-11	2.9

Discussion

The descriptive and inferential statistics show that there is a significant difference between the number of reported bird strikes by time of day. One limitation of this research was that total operations were not included as a variable and were not reflected in the results. All times of day had bird strikes; however, day times were significantly higher, possibly due to humans and most birds being diurnal. Based on the results, midday was determined to have the largest average of reported bird strikes at Florida airports. The results show that midday (1000-1400) and the times around it (morning and afternoon) can potentially be dangerous times for aircraft operators, and they need to be wary of the potential risks that arise. Even though a significant statistical difference was found, the effect size was determined to be small to medium.

Future Research

This study should be repeated with data that controls the number of operations in order to determine the rate of bird strikes per total number of operations. Another future study should be done to include the entirety of the United States or different geographical regions with different habitats. Future studies should also include more research done from an ornithological standpoint, focusing on the biological factors that influence bird strikes including seasonal differences due to migration.

References

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