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Psych 101
5 October 2015

Final Project Research Plan: Due Monday, October 5th.

1. What is your research question?

Do migratory birds a significant risk to aircraft in the United States? More specifically, do flights crossing migratory paths of birds during migration season face a higher risk of wildlife strikes? If so, how have those risks changed over the past five years?

2. What past theory or research has been conducted on this research question? List at least 5 citations here relevant to your research question. This will form the basis of your lit review.

Wildlife strikes is an area of aeronautic safety that has yet to be fully discussed and embraced, both by the aeronautic community and general environmental conservation circles. Richard Dolbeer, widely acknowledged as the leading authority and researcher on the topic, has produced multiple studies on the subject, all with largely the same message—that wildlife collisions with aircraft are in fact an issue and deserve more awareness and consideration when attempting to reduce hazards in aviation. Dolbeer has published some analysis regarding the seasonal trends of wildlife strikes (they are mostly in the months between June and November) as well as the species involved most in collisions with airstrikes (mostly gulls, blackbirds, sparrows and geese; most are aquatic birds, but there is a notable number of collisions with non-aquatic birds, deer, and coyotes), but there does not appear to be previous research detailing the correlation between wildlife strikes and migratory patterns of birds.

Cleary, E. C., Dolbeer, R. A., & Wright, S. E. (2006). Wildlife strikes to civil aircraft in the United States 1990-2005.

Dolbeer, R. A. (2011). Increasing trend of damaging bird strikes with aircraft outside the airport boundary: implications for mitigation measures. *Human-Wildlife Interactions*, 5(2), 235-248.

Dolbeer, R. A. (2009). Birds and aircraft—fighting for airspace in ever more crowded skies.

Dolbeer, R. A., & Wright, S. E. (2008). Wildlife strikes to civil aircraft in the United States 1990–2007.

Dolbeer, R. A., Wright, S. E., & Cleary, E. C. (2000). Ranking the hazard level of wildlife species to aviation. *Wildlife Society Bulletin*, 372-378.

Robbins, C. S., Sauer, J. R., Greenberg, R. S., & Droege, S. (1989). Population declines in North American birds that migrate to the Neotropics. *Proceedings of the National Academy of Sciences*, 86(19), 7658-7662.

http://people.mbi.ohio-state.edu/hurtado.10/US_Composite_Radar/
(for migration paths & seasons)

3. What are your hypotheses?

I have several null hypotheses.

- First:
Flights during migration periods but not on flightpaths of migratory birds will see an increase or significant difference in rates of wildlife strikes.
- Second:
Flights not during migration periods but on flightpaths of migratory birds will see an increase or significant difference in rates of wildlife strikes.
- Third:
Flights during migration periods and on flightpaths of migratory birds will see a decrease or negligible difference in rates of wildlife strikes..

My directional alternative hypothesis is as follows:

- After controlling for my confounding variables listed below, there is a higher rate of collisions with wildlife in flights that cross the paths of migrating birds during migratory periods.

4. What are the key variables you will measure? How will you operationalize these measures?

- *Dependent Variable (note : this needs to be a CONTINUOUS variable. If you want to predict a categorical variable, you must talk to your GSI and/or Prof. first; we will not cover material needed to analyze and interpret categorical DVs until the end of your semester, which means you will need to do outside and independent reading.):*
D1: incident rate – raw number of incidents OR percentage of incidents to total flights in given area during given time; will look at both
- *Independent Variable:*
I1: Location of flights: on/off migration paths, as defined by current literature
I2: Timing of flights: during/not during migration season, as defined by current literature
- *Control Variable:*
There may be a higher number of flights in a particular area, which would increase the gross numbers of impacts with wildlife, regardless of any location-centered effect. Similarly, there may be a higher number of flights during a particular season (winter or summer holidays, etc.) that would also increase the numbers of wildlife strikes through pure chance. I will attempt to control for these two variables in my analysis, as well as any others I may find as I gather and clean data.

5. What is your model? Do you expect that the effect of your IV will hold for all participants in your sample, or will some other variable explain when your effect “works”?

Number/percentage of incidents ~ migration paths AND migration season + error
 $D1 \sim I1 \text{ \& } I2 + e$

Regarding outside variables, see the confounding variable I defined above: a larger volume of flights in a particular season or region may conflate incident numbers, as more flights statistically increases the number of incidents regardless of any effect from my independent variables. I will also look for other factors prevalent in data and consider them in my analysis.

6. How will you collect data?

This will be a correlational study. I have neither the means nor absence of morals required to set up a controlled experimental setting with aircraft and migratory birds. However, an abundance of recorded data exists at the national level, which has been released to the public. To guide my investigation, I will use these public datasets released through the Department of Transportation, Federal Aviation Administration, and Bureau of Transportation Statistics, as accessible through the BTS' repository of public data.

7. Complete a timeline of the steps you need to take in order to complete the final project.

- I will finalize my study design and materials by Oct 19
- I will start data collection on Nov 2
- I will have all data collected by Nov 9
- I will start writing my introduction and method sections by Nov 16
- I will turn in my final project on Dec 1

Remember: the FINAL deadline for project submissions is December 4th at 11:59 PM!!!