Are Eagles Aware of Wind Turbines?

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BACKGROUND

Although there is existing research on wind turbine curtailment technology, there is a lack of information regarding the effect that wind turbines may have on eagle behavior. This study explores eagle behavior around wind turbines to further refine parameters of eagle detection software and to gain insight on the extent to which wind farms may affect eagle ecology.

PREDICTIONS

Hypothesis: Eagles flying closer to wind turbines will demonstrate a higher ratio of distracted/undistracted behavior. Conversely, eagles that exhibit a higher ratio of distracted behavior compared to undistracted behavior will fly closer to wind turbines.

Null hypothesis: There is no correlation between eagle behavior and distance from turbine.

METHODS

- Flight path images taken by IdentiFlight® avian detection systems were compiled from flights between August and November 2018 at Top of The World (TOTW) wind farm in Wyoming.

- Four-six tracks were taken from four random days per month and three-four high-quality tracks were chosen from each day.

- Each image was classified as U (head up), S (head sideways), or D (head down) based on the observed head position of the eagle. U and S were classified as distracted behavior, depending on the relative position to surrounding turbines.

- Relative position was examined using flight path mapping in Google Earth.

RESULTS

Note: 51 flight paths and 1414 images were analyzed in this study.

Two species of eagles were identified in the images: 1) Golden Eagles (GAs) and 2) Bald Eagles (BAEAs).

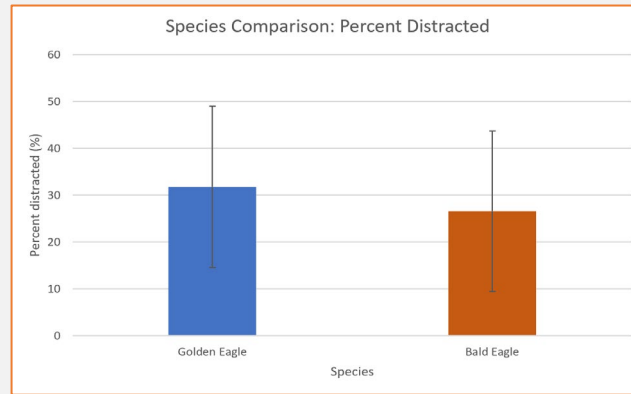*Figure 1: Species comparison for percent of total images showing distracted behavior*

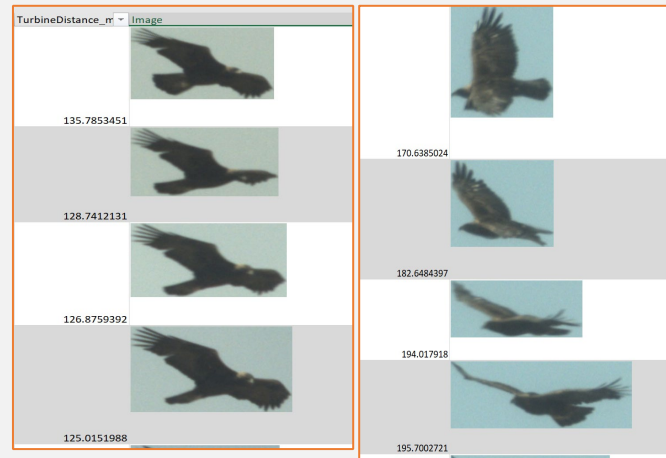*Figure 2: Relationship between head movement frequency and the eagle's average distance from turbine. Each dot represents one flight path.*

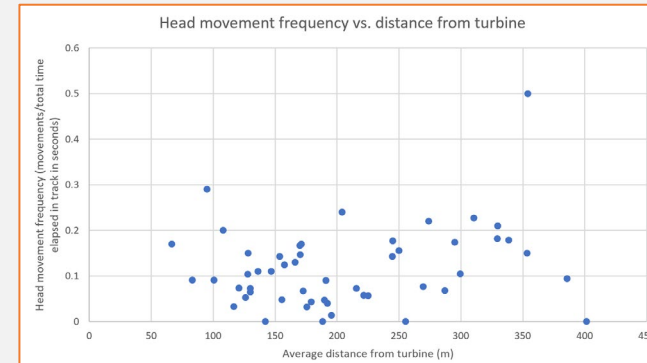*Figure 3: Examples of distracted flight path images (left) and undistracted flight path images (right).*

Table 1: Example of image data and categorization

9/7/2018 14:47:48.410	U	124.7296755
9/7/2018 14:47:49.387	U	123.0163564
9/7/2018 14:47:50.383	U	123.0573685
9/7/2018 14:47:54.390	S	161.9928639
9/7/2018 14:47:56.533	S	171.9567305
9/7/2018 14:47:58.657	S	164.4738191
9/7/2018 14:48:00.607	U	145.0615013
9/7/2018 14:48:01.567	U	141.0355316
9/7/2018 14:48:02.513	S	140.8999545
9/7/2018 14:48:03.517	S	134.5868685
9/7/2018 14:48:04.493	S	128.4160316
9/7/2018 14:48:06.473	S	110.6275877
9/7/2018 14:48:08.573	S	96.59634139
9/7/2018 14:48:09.520	U	90.08166944
9/7/2018 14:48:11.623	U	85.72979161
9/7/2018 14:48:12.533	S	85.42133907
9/7/2018 14:48:14.463	U	90.51183994
9/7/2018 14:48:15.563	D	100.1250876
9/7/2018 14:48:16.850	D	110.2130808
9/7/2018 14:48:17.563	U	121.7040064
9/7/2018 14:48:18.500	U	127.4385074
9/7/2018 14:48:24.527	S	145.5207379
9/7/2018 14:48:25.600	S	150.5702998

CONCLUSIONS

We found that there were no significant differences between species (GAs and BAEAs) in terms of the percent of time spent distracted while flying (Figure 1).

The data analysis showed that there is no correlation between the eagle's average distance from turbine and the observed frequency of head movements (Figure 2).

CONTACT INFORMATION

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