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ASSESSING SANDHILL CRANE FLIGHT ALTERATIONS TO POWER LINES IN SOUTH-CENTRAL WISCONSIN

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Abstract: We examined how weather and power line type affected abrupt flight alterations of sandhill cranes (*Grus canadensis tabida*) near electric lines in south-central Wisconsin at 4 U.S. Fish and Wildlife Service fall crane roost count sites near the Wisconsin River in Adams, Columbia, and Iowa counties between September and November 2007. We selected 4 distribution (10-12 m tall, <50 kV) and 2 transmission lines (>20 m tall, >110 kV) in high crane density areas near corn fields within 1.6 km of either the Wisconsin River or local roosting wetland. We recorded frequencies of 3 types of abrupt flight alterations near power lines across 1-2 km of electric line at each site. These included “flare” (dropped legs to vigorously fly over the line within 10 m of wires), “zigzag” (flight parallel, then upwards and over the wire), and “change direction” (flight trajectory change of 90 or 180 degrees of the wire). During 43 2-hour observations, we recorded 6,001 crane flight alterations within 20 m of power lines. We considered any crane flying within 20 m of power lines at high risk of injury from striking a wire. Most cranes (37.18%, $n = 2,231$) flew 11-15 m above power lines; only 11.25% ($n = 675$) flew 1-5 m above power lines. We tested flight alterations against weather and power line types using chi-square tests. Although we found that cranes had the same chance of altering and not altering their flight pattern near power lines in both calm/clear and windy/cloudy weather, when cranes did alter their flight paths, they were 2.8 times more likely to react abruptly in windy/cloudy weather ($\chi^2 = 25.3$, $P < 0.001$, $n = 97$). However, weather did not directly correlate with how often cranes abruptly reacted, but was likely one of several factors (e.g. power line type, flight altitude, or season) contributing to frequency of abrupt reactions. Cranes that altered their flight over more distribution lines ($\chi^2 = 73.6$, $P < 0.001$, $n = 3,892$) and were 2.04 times more likely to abruptly alter their flight over them ($\chi^2 = 8.1$, $P < 0.004$, $n = 109$). Of cranes that abruptly reacted over both line types, cranes flared more over transmission lines ($\chi^2 = 22.3$, $P < 0.001$, $n = 17$). We hypothesize cranes need to increase their flight altitude more and possibly flare to clear transmission lines. In summary, although only 2.1% of cranes ($n = 126$) abruptly reacted near power lines, they more abruptly alter their flight patterns depending on power line type. This may indicate a higher collision risk with distribution lines. By classifying these 3 abrupt crane flight alterations near power lines, we provide a standardized method for recording crane flight patterns. In response to this pilot study, we are using this observation technique along with recording digital video of crane flight alterations to identify power lines that pose a collision risk to cranes by concentrating our efforts on distribution lines. We are currently studying how local landscape-level topography and weather in Wisconsin affect crane flight alterations.

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Key words: flight reactions, *Grus canadensis*, power line collisions, sandhill cranes, Wisconsin.
