

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002. Collision mortality of local and migrant birds at a large-scale wind-power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30:879-887.

Abstract: In 1994 Xcel Energy initiated a wind-power development project in southwestern Minnesota that will eventually produce 425 megawatts (MW) of electricity. During our study the wind farm consisted of 3 phases of development totaling 354 turbines capable of generating 236 MW, depending on wind speed. We assessed effects of the wind farm on birds from 1996 to 1999, with 55 documented collision fatalities. Recovered carcasses included 42 passerines, 5 waterbirds, 3 ducks, 3 upland game birds, 1 raptor, and 1 shorebird. Most fatalities (71 %) were likely migrants through the area, 20% were species that likely were breeding in the study area, and 9% were permanent residents. Wind farm-related mortality was estimated by extrapolating the number of carcasses found at a sample of the turbines and adjusting for scavenger removal and searcher efficiency rates. We estimated total annual mortality at 72 (90% CI=36-108) in the Phase 1 wind farm, 324 (90% CI=175-473) in the Phase 2 wind farm, and 613 (90% CI=132-1093) in the Phase 3 wind farm. The Phase 3 wind-farm estimate was based on 1 year of data and was largely influenced by a single mortality event involving 14 passerines at 2 adjacent turbines during 1 night. Radar data indicated that approximately 3.5 million birds migrate over the wind farm each year; however, the proportion of birds flying at heights susceptible to turbine collisions is not known. Wind-power development will likely contribute to cumulative collision mortality of birds in the United States.