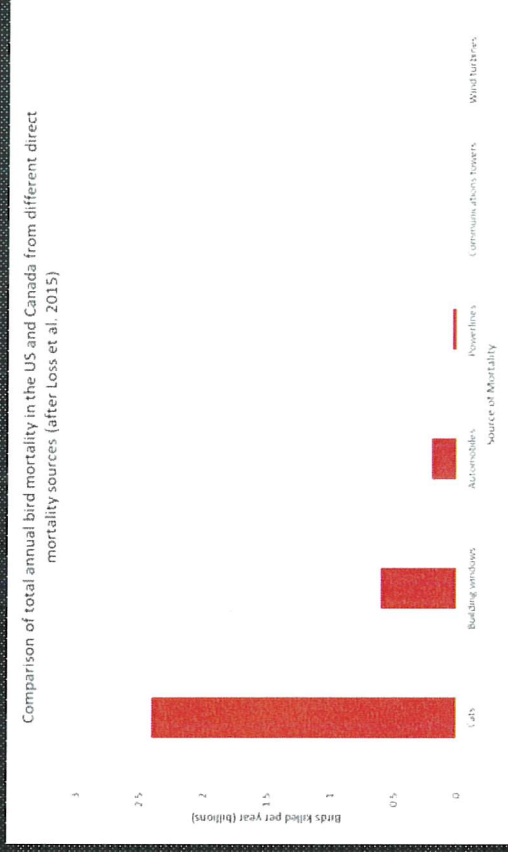


Bird Mortality

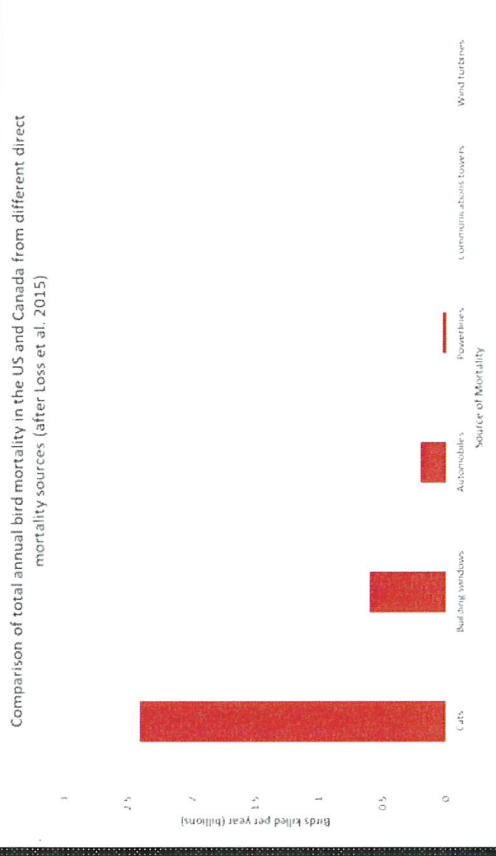
- Less than estimated annual mortality from many other human-associated causes (i.e., cats (2.4 billion), building windows (599 million), automobiles (200 million), powerlines (28.6 million), communication towers (6.6 million)), but a definite marked increase over the current baseline mortality levels in rural areas, where all onshore wind energy facilities are sited.



Loss, S.R., T. Will, and P.P. Marra. 2015. Direct mortality of birds from anthropogenic causes. *Ann. Rev. Ecol., Evol. And Syst.* 46:99-120

Bird Mortality

- The data seems to indicate the majority of fatalities caused by cats, building windows, and automobiles may occur in urbanized areas, which have much higher occurrence and densities of these mortality sources. Loss et al. (2015) found that a majority of the annual building window mortality occurs at urban structures, particularly residences.



Loss, S.R., T. Will, and P.P. Marra. 2015. Direct mortality of birds from anthropogenic causes. *Ann. Rev. Ecol. Evol. And Syst.* 46:99-120

Bird Mortality

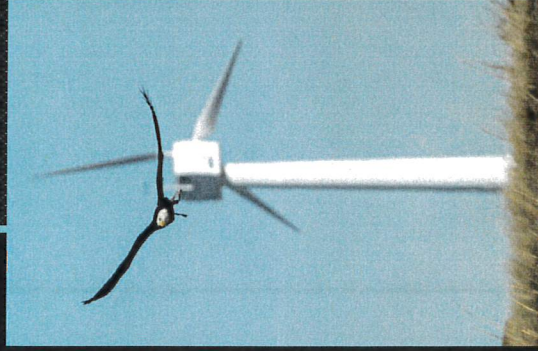
- “Current estimates of bird mortality at wind facilities are low compared with many other mortality sources. However, rapid expansion of wind energy along with a projected increase in turbine size could lead to substantially greater mortality (Loss et al. 2013a).” (Loss et al. 2015)
- Most non-wind turbine sources of bird mortality are like “sunk” costs – they are somewhat fixed and/or local county jurisdictions in rural areas have little to no control over them. However, the addition of utility-scale wind turbines facilities as a new source of mortality in rural areas effectively raises the rural baseline of mortality and contributes to cumulative effects on bird and other wildlife populations, especially in intensive agricultural areas where wildlife is already subject to significant impacts. Local jurisdictions can improve long-term outcomes by strengthening wind energy conversion systems ordinances to better protect wildlife.

Bird Mortality

- 300 species of birds have been reported as collision fatalities.
- Most observed fatalities (about 57%) are small songbirds.
- While most bird species are thought to be at low level-risk of population-level impacts, some species populations such as T&E species and raptors may be adversely affected, especially on the local level.
- Cumulative effects. “. . . great uncertainty exists about the independent and cumulative impacts of [anthropogenic] mortality on avian populations.” (Loss et al. 2015)

Hawks and Eagles

- Raptors appear to be among the most vulnerable to collisions.
- Locally-breeding raptors are killed while flying near the turbines, looking downward for prey and failing to avoid the turbine blades.
- Raptors are of particular concern because of their slow reproductive cycles and long lifespans relative to other bird species (Kuvlesky 2007)
- “Some raptor species may experience population declines from even a small amount of turbine collision mortality (Carrete et al. 2009, Dahl et al. 2012).” (Loss et al. 2015)



Missouri Dept. Cons.

Red-tailed hawk, *Buteo jamaicensis*



Bald Eagle, *Haliaeetus leucocephalus*

Night-migrating Birds

- The majority of land birds migrate at night.
- “While the numbers of night-migrating birds that are killed by one turbine in a year are not expected to be large, the overall impact of a large number of turbines could be cause for concern. These kills are prohibited under the Federal Migratory Bird Treaty Act, but few serious measures to reduce the danger have been suggested.” (IDNR 2017)

Important migratory route, part of the Mississippi Flyway

Excerpts from: *A Report on Fish and Wildlife Resources in Relation to the Water Development Plan for the Petersburg Reservoir Project on Sangamon River (Reservoir No. 6) Illinois River Basin. May, 1947. USFWS.*

The Sangamon River is an important migration route for Songbirds. While the field investigation of this project was being conducted in November 1946, 35 species were noted. Bird Students have compiled lists of 200 species during a years observation in this region. – p. 19 (44 of 399 pdf)

In the course of a year, many species of songbirds follow the winding stream course of the South Fork and tributaries and eventually spread out over the adjacent uplands. At the time of this survey (November 1946), 40 species were observed. Throughout the year, 170 species have been noted by ornithologists in Springfield. – p. 20 (106 of 399 pdf)

In the course of a year, many species of birds either migrate through or nest in this area. At the time of the survey, thirty nesting species of birds were recorded. – p. 11 (296 of 399 pdf)