



This is the print version of the [Skeptical Science](http://sks.to/windwildlife) article '[Wind turbines are a major threat to birds, bats, and other wildlife](http://sks.to/windwildlife)', which can be found at <http://sks.to/windwildlife>.

Are wind turbines a major threat to wildlife?

What The Science Says:

Wind power is a relatively minor source of mortality for birds compared to climate change, which threatens two-thirds of all North American bird species with a heightened risk of extinction.

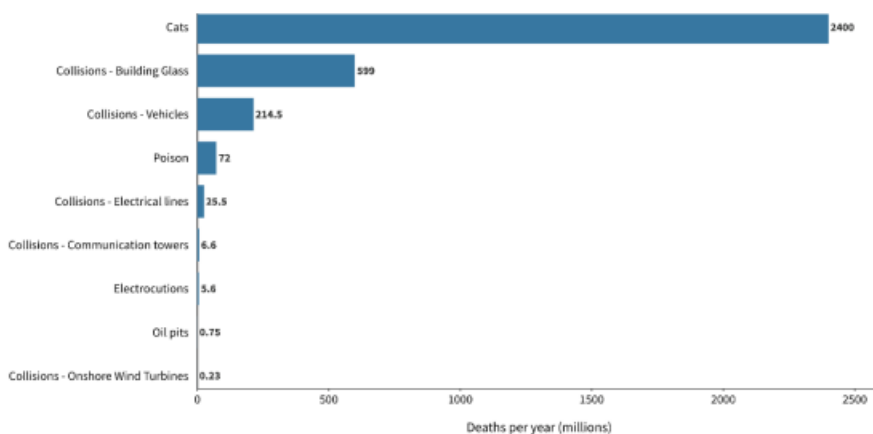
Climate Myth: Wind turbines are a major threat to birds, bats, and other wildlife.

"The evidence is clear . . . that wind turbines present yet another threat to the lives of birds and bats." ([Wind watch](#))

According to the National Audubon Society, two-thirds of all North American bird species are at heightened risk of extinction due to climate change.¹ Wildfires will destroy the nesting grounds of many species², while extreme heatwaves will render their typical habitats uninhabitable.² For example, the American Goldfinch is projected to lose 65% of its range under a scenario of 3 degrees Celsius global warming, while the Allen's Hummingbird is projected to lose 64% of its range.²

By contrast, wind power is a relatively minor source of mortality for birds. The U.S. Fish and Wildlife Service has estimated that, throughout the United States, cats kill an average of 2.4 billion birds per year, and collisions with building glass kill an average of 599 million birds, while wind turbines kill an average of 234,000 birds per year.³ Collisions with electrical lines cause an average of 25.5 million deaths per year, a number that could grow with the construction of new transmission lines to connect wind projects (and other renewables) to the grid.³ These mortality figures rely on studies dating back to 2013 or 2014 and may be outdated due to the fact that there were fewer wind turbines 10 years ago than there are today.⁴ However, research has found that wind power causes far fewer bird deaths than fossil fuels per unit of energy output, a metric that is not sensitive to the total number of wind turbines installed. While fossil fuels cause 5.2 avian fatalities per GWh, wind turbines cause only 0.3–0.4 avian fatalities per GWh (Sovacool 2013).⁵

Leading anthropogenic causes of bird mortality in the United States



Source: US Fish and Wildlife Service (2013)
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Figure 1: Leading anthropogenic causes of deaths to birds in the United States. Source Boston University Institute for Global Sustainability.⁶

The impacts of wind development on certain bat species may be more severe. One study published in 2021

estimated that the population of hoary bats in North America could decline by 50% by 2028 without adoption of measures to reduce fatalities (Friedenberg & Frick 2021).

However, actionable steps can be taken to reduce bird and bat fatalities from wind turbines. With respect to birds, most deaths occur when turbines are sited near nesting places. Siting facilities to avoid where birds nest, feed and mate, as well as where they stop when migrating, has proved successful at reducing fatalities.⁵ In addition, the wind turbine components that pose the greatest risk to birds are the blades and tower. The relatively simple action of painting the tower black has been shown to reduce deaths of ptarmigans (a bird in the grouse family) by roughly 48% (Stokke et al. 2020), while painting one of the blades black has reduced deaths by 70% (May et al. 2020).⁷ Other successful methods include slowing or stopping turbine motors when vulnerable species are present, in order to reduce the likelihood of collisions.⁸ Deployment of this method in Wyoming has contributed to an 80% decline in eagle fatalities (McLure et al. 2021). With respect to bats, strategies to minimize fatalities include curtailment (i.e., stopping wind turbines from spinning under certain circumstances), as well as ultrasonic acoustic deterrents (Friedenberg & Frick 2021) and visual deterrents.⁹ In 2022, the U.S. Department of Energy awarded \$7.5 million in research grants to study bat deterrent technologies.¹⁰

Overall, though it remains difficult to eliminate the risk of collisions entirely, wind power can ultimately help to protect bird and bat populations by displacing fossil fuels and mitigating climate change impacts.¹¹

Footnotes:

[1] Audubon Society, [Survival by Degrees: 389 Bird Species on the Brink](#), Nat'l. Audubon Soc'y. (last visited March 25, 2024).

[2] Audubon Society, [How Wildfires Affect Birds](#), Nat'l. Audubon Soc'y. (last visited March 25, 2024).

[3] [Threats to Birds](#), U.S. Fish & Wildlife Service (last visited March 25, 2024).

[4] [Do wind turbines kill birds?](#) MIT Climate Portal (Aug. 17, 2023) - noting that the cited studies were published in 2013 and 2014, and the numbers are likely to be higher today because more wind farms have been built since then.

[5] Sovacool's 2013 study explains that fossil fuels cause avian fatalities upstream during coal mining, through collision and electrocution with operating plant equipment, and indirectly through acid rain, mercury pollution, and climate change (see [4] at 21). The study is based on operating performance in the United States and Europe. Id. at 19. Note that an earlier version of Sovacool's study, published in 2009, was critiqued for conflating birds and bats, among other issues; Sovacool responded directly to these critiques in a 2010 article and addressed many of them in the 2013 version of the study that is cited in this report. See Craig K.R. Willis, et al., Bats are not birds and other problems with Sovacool's (2009) analysis of animal fatalities due to electricity generation, 38 Energy Policy 2067 (2010); Benjamin K. Sovacool, Megawatts are not megawatt-hours and other responses to Willis et al., 38 Energy Policy 2,070 (2010) (responding to critiques raised about an earlier version of the study on the avian benefits of wind energy).

[6] Cutler Cleveland et al., [Is Wind Energy a Major Threat to Birds?](#) Visualizing Energy, Oct. 9, 2023.

[7] see also Neel Dhanesha, [Can Painting Wind Turbine Blades Black Really Save Birds?](#) Audubon Magazine, Sep. 18, 2020.

[8] U.S. Dep't. of Energy Wind Energy Technologies Office, [Environmental Impacts and Siting of Wind Projects](#), U.S. Dep't of Energy: Office of Energy Efficiency and Renewable Energy (last visited March 25, 2024).

[9] [Chapter 4: Minimizing Collision Risk to Wildlife During Operations: Minimization: Deterrence](#) Renewable Energy Wildlife Inst. (Dec. 27, 2022).

[10] U.S. Dep't. of Energy Wind Energy Technologies Office, [DOE Wind Energy Technologies Office Selects 15 Projects Totaling \\$27 Million to Address Key Deployment Challenges for Offshore, Land-Based, and Distributed Wind](#), U.S. Dep't of Energy, Sep. 21, 2023.

[11] Audubon Society, [Wind Power and Birds](#), Nat'l. Audubon Soc'y. (Jul. 21, 2020).

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