

Indiana Bat Fatalities at Wind Energy Facilities (December 2014)

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Wind energy is one of the fastest growing sources of renewable energy in the United States. The U.S. Fish and Wildlife Service is committed to working collaboratively with the wind industry and other partners to encourage responsible development of wind energy while protecting and enhancing the Nation's natural resources. One particular challenge has been an unforeseen byproduct of wind energy development ... large-scale fatalities of bats at wind energy facilities. Much of the emphasis of early wind energy-wildlife research was on bird impacts. However, the results of more recent studies indicate that, generally, far more bats than birds are killed, particularly in the Midwest and Eastern United States. Increasingly monitoring efforts have focused on bat fatalities, and research to understand bat interactions with turbines is providing new insights into this problem.

Studies of bat fatalities have shown that turbines have been consistently associated with fatalities of some species of bats in many different areas of the continent. Specifically, migratory tree-roosting bats including hoary bats (*Lasiurus cinereus*), eastern red bats (*L. borealis*), and the silver-haired bats (*Lasionycteris noctivagans*) make up a large proportion of the bats killed. The number of bats of these species being killed at wind facilities far exceeds any other documented natural or human-caused sources of mortality.¹ The species of migratory tree bats most susceptible to turbine strikes are not protected by the [Endangered Species Act](#) (ESA) and there is no international treaty, comparable to the [Migratory Bird Treaty Act](#), to protect migratory bats.

The Indiana bat is a federally endangered species that ranges throughout 21 states in the eastern U.S. While there has long been concern that Indiana bats may be vulnerable to wind turbines, the first known fatality of an Indiana bat occurred in northern Indiana in September 2009, and a second fatality was documented at the same site in September 2010. Since that time, there have been five additional known fatalities of Indiana bats at wind facilities (Table 1) throughout the range of the species (Figure 1). To put these fatalities in context, it is important to understand that monitoring of bat fatalities at wind facilities is expensive and difficult. Not all facilities conduct fatality monitoring, and even when monitoring is conducted only a small proportion of dead bats are found. It is likely that additional Indiana bat mortality has occurred at these facilities and at other wind facilities throughout the range of the species. Investigations of interactions between wind turbines suggest that bats are particularly susceptible to fatality at turbines during the period associated with fall migration (which includes late summer). The Indiana bat fatalities to date suggest that this is also the most vulnerable time for this species. Five of the seven known fatalities to date appear to be associated with fall migration, one occurred in July, and one occurred in April, probably during spring migration (Table 1).

These fatalities have heightened the awareness that Indiana bats are at risk from wind turbines and developers and operators of wind energy facilities within the range of the species are urged to coordinate with the Service in assessing potential impacts to Indiana bats. The Service recommends that wind facility operators evaluate ESA prohibitions against take of endangered species, and work with the Service to minimize risk of violating those prohibitions.

As the principal federal partner responsible for administering the ESA, the Service takes the lead in recovering and conserving our Nation's imperiled species. As we work in partnership with others to conserve bats, our two major goals are to: 1) Protect endangered and threatened species, and pursue their recovery; and 2) Conserve candidate species and species-at-risk so that listing under the ESA is not necessary. We also promote the voluntary conservation of other vulnerable wildlife. With reference specifically to wind energy development, our statutory authority and responsibility under ESA mandates that we work with the wind industry to address impacts to listed species, including the Indiana bat. Some facilities address those impacts through the development of [Habitat Conservation Plans](#) (HCPs) to provide for limited take of Indiana bats (associated with the wind facility) within the context of a species conservation plan. The Service is also working to raise awareness of the impacts of wind energy development on non-listed bats, particularly migratory tree bats, and promote measures that will reduce fatalities of all species of bats. Such measures are in the best interest of bat conservation, and are also in the best interest of industry if these measures preclude the need for future listings of species of migratory tree bats.

Service Field Offices throughout the range of the Indiana bat are working with the wind industry to address impacts to Indiana bats, through HCPs and in some cases [Section 7 consultations](#). Teams within the Service have been working to provide biologists with tools and information needed to effectively coordinate these projects, and to provide recommendations to the wind industry on mechanisms to comply with the ESA. One of these teams developed [Service guidance for use in assessing the effects of wind energy projects on Indiana bats](#). Another initiative in the Midwest Region of the Service (R3) is the development of a Regional Wind HCP. The natural resource agencies within R3 plan to develop a landscape-level, multi-species HCP throughout the eight states in the Region to provide conservation benefits to listed species (including the Indiana bat), while accommodating wind development. The plan will provide a means for wind energy developers to avoid, minimize, and mitigate for adverse effects to covered species.

Solutions to the problem of reducing bat fatalities at wind turbines are not easy, but too much is at stake not to seek those solutions. These challenges come at a time when populations of many bat species, including the Indiana bat, are already threatened by [white-nose syndrome](#), a disease that has killed an estimated 5-6 million bats. There is tremendous concern about declining bat populations and the loss of ecosystem services that those bats provide. A paper published in Science estimates that bats typically save farmers \$74 per acre, and that the value of bats to agriculture in the continental United States is roughly \$22.9 billion annually.² Other ecosystem services provided by bats are just beginning to be evaluated, let alone quantified. Above and beyond the services that can be assigned an economic value, bats provide cultural benefits ... well known to those who enjoy watching the silhouette of a bat against the night sky. The challenge before us is to work with the wind industry and other partners to provide for both sustainable wind energy development and sustainable bat populations.

¹ Cryan, P.M. 2011. Wind turbines as landscape impediments to the migratory connectivity of bats. Environmental Law 41:355-370. Available at: <https://www.lclark.edu/live/files/8520-412cryan>.

² Boyles, J.G., P.M. Cryan, F.F. McCracken, and T.H. Kunz. 2011. Economic importance of bats in agriculture. Science 332:41-42.

Table 1. Documented Indiana bat fatalities at wind energy facilities.

State	Estimated Date of Death	Sex	Age	Habitat Description
Indiana	September 8-9, 2009	Female	Adult	93% agricultural land use; less than 1% forest
Indiana	September 17, 2010	Female	Adult	93% agricultural land use; less than 1% forest
Pennsylvania	September 25, 2011	Female	Young of Year	Primarily forested area
West Virginia	July 7, 2012	Male	Adult	Forested Ridgeline with a few wetland resources (small streams and wetlands along the ridgeline)
Ohio	October 2-3, 2012	Female	Adult	Crop land and developed land are 98% of project area.
Ohio	October 7-9, 2013	unknown	Adult	Crop land and developed land are 98% of project area.
Ohio	April 13-14, 2014	Female	Adult	Crop land and developed land are 98% of project area.

Figure 1. Location of documented Indiana bat fatalities at wind facilities relative to range of the species.

(see attached map – to be incorporated into summary)