

Wind and Wildlife Impacts : Bats

Many conservation groups are very concerned about massive bat mortality that occurs at industrial wind projects. Wind turbines operating on forested ridges in the Alleghenies kill a significant number of bats, especially during critical fall migration times when the winds are low.

The majority of bats that are killed by wind turbines are the migratory tree bats. But even cave bats, like the federally endangered Indiana bat (*Myotis sodalis*), suffer mortality from wind turbines. Most bats are killed in late summer and fall, during low wind periods at night. No one knows why some bats fly into the blades. Other bats may never hit a blade, but the sudden drop in air pressure kills them as they fly by the spinning rotor. Blood vessels in the lungs explode due to the drop in air pressure – a phenomenon called barotrauma. Barotrauma for bats is like the bends for scuba divers, when they rise too quickly after a deep dive.

The Pennsylvania Game Commission "Wind Energy Voluntary Cooperation Agreement Second Summary Report" states: ***The average estimated [mortality of] bats/turbine/year for the five surveys that followed PGC protocol was 24.6 (range 6.8 – 42.7).***¹ This estimate is within the range of mean bat fatalities per turbine, determined by Arnett et al, where estimated fatalities ranged from 20.8 to 69.6 per turbine per year at 7 projects on ridges of the eastern U.S. Fatalities are poorly understood, hindered by the lack of published data. Moreover, estimates are biased, in part due to carcass removal by scavengers, searcher efficiency, and fatalities that land outside the search areas.²

With thousands of additional wind turbines proposed for construction in the Mid-Atlantic Highlands, the possibility of an average mortality rate of 25 or more bats per turbine will be devastating to bat populations. By 2020, an estimated 33,000 to 111,000 bats will be killed annually by wind turbines in the Mid-Atlantic Highlands alone.³

It has been argued that there is no proof that wind development has impacted bat populations, but bats have a low reproductive rate and increased mortality caused by wind turbines is likely to have an unsustainable impact. Although much more research needs to be done on population viability analyses, we need to protect these keystone species as much as possible. White-nose syndrome (WNS) is decimating the hibernating bats, and industrial wind turbines are decimating the migratory tree-dwelling species. We don't have a clue how to stop white-nose syndrome, but we do know how to protect bats from turbine hits.



Dr. Merlin D. Tuttle and Jessica Kerns study bats killed by wind turbines in West Virginia.

Worldwide, bats are of great economic impact to agriculture and to forest viability.

A single colony of 150 big brown bats in Indiana has been estimated to eat nearly 1.3 million pest insects each year. Considering the number of insects eaten by cave bats and the number of bats killed by WNS, between 660 and 1320 metric tons of insects are no longer being consumed each year in WNS-affected areas.⁴ The above study also determined the economic importance of bats to agriculture in each state. In Virginia alone, the conservative economic value of bats to farmers is estimated to be over \$2.5 million each year.

Bats consume a significant number of agricultural pests, thereby reducing the amount of pesticide needed on crops. Furthermore, bats critically control the numbers of pests that impact forests. Studies in Canada on the diet of the eastern red bat (*Lasiurus borealis*), showed that it ate gypsy moths, tent caterpillars, cone worms, cutworms, and a variety of agricultural and forest moth pests.⁵

photo © Michael Durham/Minden Pictures/Bat Conservation International

Research at the Casselman Wind project in Somerset County, Pennsylvania, shows that stopping the turbines during low-wind conditions results in an annual power production decrease of just 0.3 to 1%.⁶ The most critical period is when bats migrate from late July through mid-October. The proposed curtailment will not create undue economic hardships for developers.



Little brown myotis in flight pursuing a forest moth.

Results from the second year of the Casselman study (BCI Annual Report 2009-10) showed that bat mortality was reduced by 44 to 93% when turbines were curtailed.⁶ There is no evidence that human-induced impacts to the affected tree bats are of similar magnitude to mortality at wind turbines.⁷ The impact of turbines on bats is an unprecedented human consequence that would be relatively easy for wind projects to mitigate through turbine curtailment.

A number of proposed wind projects in the Mid-Atlantic Highlands have applied for an incidental take permit (ITP) from the U.S. Fish and Wildlife Service (FWS), which would allow a certain number of bats to be killed. A federal district judge halted one such project, the Beech Ridge Wind Power Project in West Virginia, in early December 2009. It was ruled that Invenergy could complete the 40 wind turbines that were under construction, but the other 79 turbines could not be built until the company applied for and received the ITP, allowing incidental killing of Indiana bats. The company was also ordered to operate the 40 existing turbines only during winter months. In August 2012, the FWS asked for public comments on the draft environmental impact statement, the application for an Endangered Species Act incidental take permit, and the associated habitat conservation plan from Beech Ridge Energy, LLC. The public was asked to comment before the FWS issued a final decision. If approved, the permit would authorize take of endangered Indiana and Virginia big-eared bats associated with construction, operation, and decommissioning of the project. The decision is still pending.⁸

We simply cannot afford to ignore the impacts to bats from industrial wind development. The FWS is charged to protect our country's wildlife, and to uphold the Endangered Species Act. We have the science to show that industrial wind turbines cause significant mortality to bats and we have the science to show that turbine curtailment is effective. The course of action is clearly drawn: we need regulated curtailment of existing industrial wind turbines during critical times of bat migration. Furthermore, high-risk areas in the Mid-Atlantic Highlands should be declared off-limits to industrial wind development.

1. Wind Energy Voluntary Cooperation Agreement Second Summary Report.pdf

2. Arnett, Edward et al, 2008, Patterns of Bat Fatalities at Wind Energy Facilities in North America, The Journal of Wildlife Management, v. 72(1), p. 61-78

3. T. H. Kunz et al., Front. Ecol. Environ 5, 315 (2007).

4. Justin Boyles et al., Economic Importance of Bats in Agriculture, Science 332, 41 (2011)

5. T. H. Kunz, Ecosystem services provided by Bats, Annals of the NY Academy of Sciences 1223 (2011) 1-38.

6. Bat Conservation International Annual Report 2008-2009 and 2009-2010:

<http://www.batcon.org/index.php/media-and-info/about-bci/annual-report.html> And: <http://www.batcon.org/index.php/media-and-info/bats-archives.html?task=viewArticle&magArticleID=1038>

7. Paul Cryan, Research Biologist, USGS Fort Collins Science Center, Web Version of Presentation to the Wind Turbine Guidelines Advisory Committee, Technical Workshop & Federal Advisory Committee Meeting, Washington, D.C., 26 February 2008 Overview of Issues Related to Bats and Wind Energy

8. <https://www.federalregister.gov/articles/2012/08/24/2012-20223/draft-environmental-impact-statement-and-habitat-conservation-plan-receipt-of-application-for>