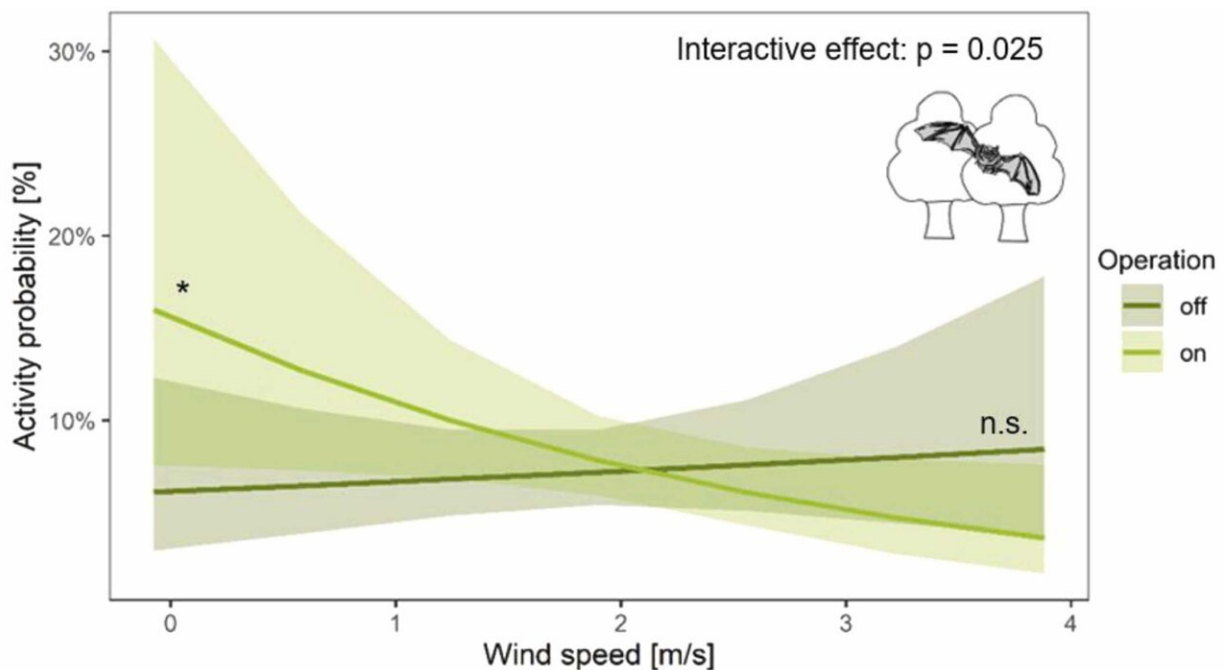


Conflict in full swing: Forest bats found to avoid large areas around fast-moving wind turbines

January 4 2024



Activity probability of narrow-space foraging bats in relation to wind speed around operating and non-operating wind turbines. Mean estimates (lines) and 95%-confidence intervals (shades) of activity probability in narrow-space foraging bats depending on wind speed at times of wind turbine operation ('on') and standstill ('off') in 10-min intervals of the night. Credit: *Global Ecology and Conservation* (2023). DOI: 10.1016/j.gecco.2023.e02782

Not only do many bats die at wind turbines, the turbines also displace some species from their habitats over large areas. When the turbines are in operation at relatively high wind speeds, the activity of bat species that hunt in structurally dense habitats such as forests drops by almost 80% within a radius of 80 to 450 meters around the turbine.

This is the result of a scientific investigation led by scientists from the Leibniz Institute for Zoo and Wildlife Research (Leibniz-IZW) and the Philipps-Universität Marburg, which is [published](#) in the journal *Global Ecology and Conservation*. The team suggests that one of the causes of this avoidance behavior is the noise emission of the [turbine](#) rotors, which increases with increasing [wind speed](#).

More and more wind turbines are being installed worldwide in order to meet the need for an increase in the proportion of renewable energy sources in response to the goals of national climate strategies. In Germany, about 30,000 onshore wind turbines are currently in operation, and as suitable locations become increasingly scarce, the search for sites now also extends to additional, potentially less suitable locations. These include forests as potential sites—and with these diverse and sensitive habitats.

Many European bat species, such as the greater mouse-eared bat (*Myotis myotis*), live and forage in forests and are therefore potentially affected by the expansion of wind energy in or near forests. A new scientific investigation by a team led by Christian Voigt from the Leibniz-IZW and Nina Farwig from the Philipps-Universität Marburg shows that this not only poses the direct risk of colliding with the wind turbine rotors, but also has indirect negative effects on these species.

The scientists found that the [forest](#) specialists among the bats avoid wind turbines over a distance of several hundred meters once the turbines are in operation and the [wind speeds](#) are relatively high.

"We investigated the activity of different bat species in different wind conditions and during the operation of wind turbines in forests in the German federal state of Hessen," says Julia Ellerbrok, a former doctoral student in the project and now a postdoctoral research fellow in the Department of Biology at the Philipps-Universität Marburg.

"We found that the activity of bats, which usually forage in narrow, structurally dense vegetation of forests, decreases by 77 % on average within a radius of 80 to 450 meters around the wind turbines with increasing wind speed when the turbines are in operation. In contrast, bat activity was unaffected by wind speed when the turbines were switched off."

The team therefore concludes that factors directly related to the operation of the turbines at relatively high wind speeds must be responsible for such avoidance behavior.

"The rotor movements of wind turbines not only generate so-called wake turbulences, but also substantial noise. Both factors can affect bats over several hundred meters," says Christian Voigt, head of the Department of Evolutionary Ecology at the Leibniz-IZW.

"Forest bats that hunt under the canopy presumably do not come into contact with the wake vortices. Rather, they could be affected by the noise emissions of the turbines, even if the frequency range of the noise is far below those of the echolocation calls. If bats actively avoid noise emissions from wind turbines, they lose valuable habitat on a large scale."

Wind turbines in forests pose several problems for bats, the scientists sum up: Not only do forest bats lose valuable habitats—both through clearing during the construction of the wind turbines and by avoiding the wind turbines once they are in operation. Bats that hunt above the

treetops can also be potentially killed by the rotating blades.

In order to minimize the potential long-term ecological impact of wind turbines on bat populations in forested areas, [wind](#) turbines should only be erected in structurally poor forest plantations where only few bats live. Future research should focus on investigating the effects of noise emissions from [wind turbines](#) on [bats](#) in more detail, the team concludes in the paper.

More information: Julia S. Ellerbrok et al, Forest bat activity declines with increasing wind speed in proximity of operating wind turbines, *Global Ecology and Conservation* (2023). [DOI: 10.1016/j.gecco.2023.e02782](#)

Provided by Forschungsverbund Berlin e.V. (FVB)

Citation: Conflict in full swing: Forest bats found to avoid large areas around fast-moving wind turbines (2024, January 4) retrieved 26 June 2024 from <https://phys.org/news/2024-01-conflict-full-forest-large-areas.html>

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