

IZW – 02.07.2012:

German wind farms kill bats from near and far

Local wind turbines may have large-scale negative effects on distant ecosystems. Results of research by the Leibniz Institute for Zoo and Wildlife Research (IZW) published today demonstrate that bats killed at German wind turbines originate mostly from northeastern Europe.

The study investigated the provenance of those four bat species which are most frequently killed by German wind turbines. Bats are of particular interest because they have a vital and important service function for ecosystems in regulating population densities of pest insects, and because many species migrate during spring and autumn across Europe between their breeding and wintering ranges.

The IZW-researchers analysed the hydrogen stable isotope ratio in the fur keratin of the bats. Hydrogen has two stable isotopes that share similar chemical properties but differ in mass. The distribution of these isotopes varies in a systematic pattern across Europe, with the light isotopes increasing in atmospheric water from south to north. Since bats incorporate the hydrogen stable isotope ratios of their breeding habitat into their fur, they carry an inert isotopic fingerprint on their way to their wintering grounds. Therefore, by determining this isotopic fingerprint, researchers can identify the approximate location where the animals lived during the breeding season for a few months before they died at a wind farm.

The study demonstrated that killed *Nathusius pipistrelles* originated almost exclusively from the Baltic countries, Belarus and Russia. Also, greater noctule bats and Leisler's bats killed by German wind turbines came from northeastern Europe, probably from Scandinavia, Poland and the Baltic countries. In contrast, common pipistrelles most probably lived in nearby local areas around the wind turbines.

Previous studies have already highlighted that more than 200,000 bats are killed each year by German wind turbines. Researchers are convinced that such high mortality rates may not be sustainable and lead to drastic population declines in their breeding ranges. "Bats have a very low reproductive output, with only one or two offspring per year", says Christian Voigt from the IZW. Bat populations may need a long time to recover from any additional losses owing to fatalities at wind turbines if they recover at all.

Voigt calls for stronger legislative agreements between the E.U. and eastern European countries. Current international legislation seems to be missing the large geographical scale of this problem. Germany must play a more decisive role in this process, given the recent governmental decision to promote alternative sources of renewable energy, says Voigt. The large-scale development of wind farms throughout Germany may have negative consequences for even remote ecosystems in northeastern Europe. Overall, conservationists and scientists record an increasing number of bat fatalities at wind turbines. This is partly due to the fact that wind farms are being increasingly established in forested areas – where people are less annoyed by their presence but where bats foraging above the tree canopy get into dangerously close contact with the blades of turbines. Recently, researchers discovered that most bats are not killed by directly hitting the blades of wind turbines but rather by "barotraumas" – the inner organs and lungs of bats are lethally damaged when bats are exposed to rapid pressure reductions behind the blades.

The problem of bat fatalities at wind turbines could be easily solved, says Voigt. Bat activity is highest at dusk, most importantly during the time of autumn migration. If the turbines were switched off during this period for one to two hours, then this would drastically lower the frequency of bat fatalities, as recent studies suggest, and cause little loss of revenue to the companies that run the wind turbines. Voigt argues “We need an intelligent change in our energy policy, where we minimise the negative consequences for both people and wildlife”.

Original publication:

Voigt, C.C., Popa-Lisseanu, A., Niermann, I., Kramer-Schadt, S. (2012) The catchment area of wind farms for European bats: A plea for international regulations. *Biological Conservation* 10.1016/j.biocon.2012.04.027

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