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Birds make themselves heard above wind farm noise

Wind farms are rapidly becoming prominent features of landscapes around the world. This is good news for the environment, because each turbine represents one small step towards renewable energy replacing coal-fired power stations and other fossil-fuel technologies that contribute directly to global warming. But wind energy is not free of environmental impacts and it has long been known that the farms can pose a significant hazard to birds (and bats) flying in the vicinity of the turbines.

Wind farms erected before much was known about the dangers they pose have, in some cases, proved to be very bad news for birds. California's now infamous Altamont Pass wind farm killed several thousand birds a year, many of which were raptors. Even in South Africa, where the environmental impact assessment process for wind farms has been guided by lessons learnt at Altamont Pass and elsewhere, the past few years have seen mortalities involving several threatened species, including recent Cape Vulture deaths in the Eastern Cape.

In addition to the direct impacts of wind farms, which are manifested mainly as flying birds killed or injured by spinning turbine blades, there is a host of indirect impacts associated with wind energy. Many of these are much more subtle and far more difficult to detect. One category of indirect

impacts arises from the noise the turbines generate. Large numbers of rotating turbines produce significant levels of low-frequency noise and ornithologists have long suspected that birds could be affected by this source of noise pollution.

In the United States, a recent study of Greater Prairie-Chickens around a wind farm in Nebraska provides interesting insights into this issue. Red-listed as Vulnerable, Greater Prairie-Chickens have a breeding system in which groups of males display at leks. Previous work on this particular population revealed that the wind farm has no obvious effect on the breeding biology of the prairie-chickens, with breeding success near the turbines just as high as further away. In fact, there is even some evidence that predation risk may be lower in the vicinity of the turbines on account of predators avoiding the area.

The effects of noise, however, remained a missing piece of the puzzle. Cara Whalen of the University of Nebraska and her colleagues recorded the calls of displaying males at 14 lek sites located between 700 metres and 23 kilometres from the turbines. Male prairie-chickens' efforts to attract mates include a repertoire of low-frequency calls, described by these authors as boom, cackle, whine and whoop vocalisations.

Levels of low-frequency noise at leks within 1000 metres of the wind farm were

Noise pollution from wind farms is a challenge that some bird species appear able to overcome.

elevated significantly above natural levels. Intriguingly, analyses of the recordings revealed that male prairie-chickens adjusted their calls to compensate. Males displaying at leks near the wind farm increased the volume of boom and whoop calls, slightly shortened the duration of booms and also produced whine calls that were higher pitched than those of individuals displaying at leks further away from the turbines.

Taken together with previous findings that European Robins also adjust their vocalisations in response to wind turbine noise, these results are encouraging in that they suggest that birds are able to mitigate some of the indirect impacts of wind energy through behavioural flexibility. The study by Whalen et al adds one more layer to our understanding of the complex ways in which birds interact with wind farms and contributes to a better knowledge of the environmental benefits and costs of wind energy.

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Reference

Whalen, C.E. et al. 2018. 'Male Greater Prairie-Chickens adjust their vocalizations in the presence of wind turbine noise.' *Condor* 120: 137-148.