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TECHNICAL REVIEW | "GREATER IMPACTS OF WIND FARMS ON BIRD POPULATIONS DURING CONSTRUCTION THAN SUBSEQUENT OPERATION: RESULTS OF A MULTI-SITE AND MULTI-SPECIES ANALYSIS" - A PAPER BY PEARCE-HIGGINS, STEPHEN, DOUSE & LANGSTON (APRIL 2012)

Photo by: Artur Stankiewicz

The aim of this recent research paper, published in the Journal of Applied Ecology[1], was firstly to synthesise available ornithological monitoring data from wind farms located in unenclosed upland habitats in the UK. The authors have then attempted to determine whether there is evidence that breeding densities of upland birds are reduced as a result of wind farm construction or operation.

Three predictions were tested:

•That population densities would be reduced on wind farms during construction as a result of disturbance (relative to both the pre-construction baseline and to reference sites);

•That population trends on wind farms post-construction will be different to trends on reference sites, as a result of either operational disturbance or collision mortality; and,

•That negative effects of wind farms will be greatest at sites with a high generating capacity that contain more or larger turbines.

Data were statistically analysed from a total of 18 wind farm sites, and 12 paired reference sites (for which 8 had data extending to the pre-construction period) for a total of 10 species. These were red grouse, five species of wader (curlew, dunlin, snipe, golden plover and lapwing) and four moorland passerines (meadow pipit, skylark, stonechat and wheatear). All wind farm sites were in unenclosed upland habitats.

Five of the ten species were found to show statistically significant changes in density on wind farm sites during the construction period (red grouse, curlew, snipe, stonechat and skylark). In four species (snipe, curlew, skylark and stonechat) there were also significant changes in density between the pre-and post-construction periods, i.e. changes that persisted into the operational phase. In summary, it was found that red grouse density recovered in the first year after construction following a significant decrease in the construction phase, that curlew and snipe densities declined during construction and did not recover during the first year of operation (whether they recover following this remains unclear), and that stonechat and skylark numbers increased during construction and remained higher during the early stages of operation. Post-construction densities of curlew were also significantly lower than densities on reference sites (this was the only species for which this was the case).

The authors conclude that the evidence of a reduction in the density of bird species at unenclosed upland wind farm sites during and following construction is strongest for curlew. Populations appear to decline by up to 40% during the construction phase within a 620 metre area around the outermost turbines of a wind farm. The study also showed a 53% decline of snipe within wind farm sites, which is reasonably consistent with an earlier study by Pearce-Higgins that identified a 48% decline in abundance in the species within 500 metres of turbines. The authors state that declines during construction are associated with direct disturbance and (non-significant) increases in numbers have been noted at reference sites which may indicate these birds move into the wider areas to breed as opposed to being lost to the population. However, there is no clear evidence to support this assertion at present.

The paper states that in general there was little evidence for differences in population trends between operational wind farms and reference sites, suggesting that collision mortality has little effect on breeding populations. It is also suggested in the paper that some species, such as golden plover and red grouse, may habituate to wind farms (a reference to a monitoring study at the Beinn Tharsuinn wind farm that we previously reviewed[2]) The study also reports there is little evidence of population declines in wheatear and golden plover at wind farm sites, despite the fact that a previous study[3] reported a significantly decreased level of use of land within 200m of turbines by these species. The paper concludes that further work is necessary to determine whether this displacement effect results in changes to golden plover populations.

Potentially positive effects, i.e. increased densities of breeding territories, were noted in several passerine species, and may reflect changes in vegetation structure during and shortly after construction. However, the authors conclude this may also be spurious, as the sites which contributed most to this difference being significant also had a large area surveyed that was subsequently outside the turbine array.

The authors then go on to emphasise the importance of good quality monitoring data, in being able to develop our understanding of wind farm impacts, as repeating the study in future with more data will lead to more confident conclusions. A broader range of studies will also allow conclusions to potentially be drawn with regard to effects on raptors and allow for the effectiveness of mitigation measures such as habitat management, and the extent to which they may blur the picture in terms of effective data interpretation, to be considered. These studies need to be long term, to identify if bird populations at wind farms recover over time.

The most pressing research area, however, is identified as being the impact on bird populations if species such as curlew and snipe are displaced from wind farm sites. Is it the case that these birds simply breed elsewhere (as is indicated by non-significant increases in densities on reference sites reported in the paper), do they exhibit lower breeding success when doing so, or are they effectively lost to the population? The authors recommend that from a precautionary perspective the latter scenario is the one that should be assumed when assessing likely impacts.

Viewpoint

Several papers and monitoring studies issued over the past few years have concluded or appear to have demonstrated that there is very limited evidence that waders decline during the post construction period at upland wind farms. These include a review of monitoring at five wind farms and two reference areas by Natural Research (Whitfield, Green & Fielding, 2010), the aforementioned paper concerning waders at Beinn Tharsuinn Wind Farm and the long term monitoring of golden plover numbers and densities at Farr Wind Farm (updated in March 2012 and readily available on the internet). Only the Beinn Tharsuinn work appears to have been considered in this paper. It is possible that this is because the other studies are not in peer reviewed journals. Despite this, however, they appear to be credible studies that typify what the industry should be aspiring to deliver.

The Natural Research paper in particular draws into question the results of the initial paper by Pearce-Higgins[3], with which this study is closely aligned. This begs a question over whether the studies are compatible. It could in fact be that the data for some of the schemes previously reported by Natural Research have been interpreted differently in this paper, but there is no suggestion of this from the authors. Unfortunately, for whatever reason, the authors have been unable to report the sites they have considered in their analysis. This is not helpful in trying to piece together an assessment of likely impacts and understanding the relative weight to attach to the papers.

In practical terms, irrespective of how carefully couched the analysis in this new paper is, the take-away message in impact assessment terms is that curlew and snipe are displaced from wind farms and could be lost to the breeding population. In parts of the UK where curlew breed, particularly in Wales, the population data is incomplete. It follows that the loss of a few pairs may therefore be of regional importance in assessment terms, that there is likely to be renewed pressure on wind farm developments to deliver land management schemes to offset these losses and to provide confidence that impacts resulting from wind farm construction and operation will not be significant. It is also likely that the decline of curlew by 40% within 620 metres of turbines and the 50% reduction in snipe within 500 metres of turbines, which are noted in this paper, will be regularly quoted and given considerable weight by consultees. It is therefore in the interests of developers to ensure that the data collected on waders for upland wind farm sites is of high resolution, robust enough to stand up to scrutiny and to form the basis from which to assess likely impacts and to conduct monitoring. Where it is likely that sites will support upland waders, particularly curlew and snipe, developers must think about where mitigation land will be located from an early stage in the process.

Owain Gabb 16/05/2012

References

[1] http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2012.02110.x/full

[2] http://www.bsg-ecology.com/newsandresources/wp-content/uploads/2011/05/Douglas-Bellamy-Pearce-Higgins-2011.pdf

[3] http://www.bsg-ecology.com/newsandresources/wp-content/uploads/2011/05/Pearce-Higgins-et-al-2009.pdf

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