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BSG TECHNICAL REVIEW

BIRD COLLISIONS AT ONSHORE WIND FARMS

Technical Review of Presentations from the Trondheim Conference May 2011

Common tern: Common tern has been regularly recorded as a collision victim from monitoring studies in Flanders. *Photo © Copyright Stuart Thomas*

Lesser black-backed gulls feature commonly as collision victims at wind farms in the Netherlands. *Photo © Copyright Micky Maher*

Study 1: Impact on birds from collisions with wind turbines in Belgium

Joris Everaert of the Research Institute for Nature and Forest (INBO)

The government of Flanders in the northern part of Belgium has a target to increase the amount of renewable sources of electricity. An increase in wind energy capacity has stimulated research into the effects of bird collision in relation to wind turbines. INBO has a long-term project to study this, and have monitored seven wind farms for bird collision fatalities within the Flanders area.

In most cases weekly or bi-weekly searches were undertaken to look for collision fatalities underneath the turbines.The radius of the search circle around each turbine was in most cases 110% of the mast height. Systematic searches were performed by walking in parallel line transects with a distance of 4 to 6 metres between each line.

Only bird fatalities that were obviously or highly likely to have been caused by collision were included in the study. Not all collision fatalities were found, due to carcass removal by predators or because of the nature of the habitats surrounding the turbine. The estimated number of collision fatalities was therefore calculated using correction factors to reflect the available search area, search efficiency and predation/scavenging levels.

The mean number of fatalities (with correction factors) varied substantially (between one and forty three bird fatalities per turbine per year). The researchers also found that results were not significantly different between wind farms with small (older) and large (modern) turbines. Most of the fatalities in Flanders were of locally occurring common birds, such as grey heron, wigeon, common teal, Sandwich tern, common tern, little tern, sparrowhawk, kestrel, peregrine falcon, redshank, black tailed godwit, woodcock and swift.

For two of the windfarms the large number of gulls and terns that collided was notable, all the more because these species are diurnally active. It was suggested by the author that the high number of collisions was due to the local migration of gulls across the site to their roosting place, as well as high number of foraging flights across the site by gulls and terns to and from their breeding colonies. A significant negative impact on a local tern colony was calculated (1.4-2.0% additional mortality).

The study found that the number of gull and tern fatalities was directly related to the number of birds flying through turbine arrays at rotor height. The size of the turbines appeared to be a less important factor, although there was a tendency (not significant) towards slightly more fatalities with larger turbines (numbers per turbine per area). It was found that large gulls, such as lesser black-backed gull, had a higher collision risk at rotor height compared to smaller gulls, such as black-headed or common gull.

Study 2: Bird fatalities at wind turbines on the island of Fehmarn in northern Germany

Thomas Grunkorn of Bio Consult SH

Fehmarn is an island in northern Germany and is important because it is the first land fall for birds moving south-east from Scandinavia across the Baltic into northern Germany.

Bio Consult conducted a year-long research project on the impact of four wind farms on Fehmarn. As in the study by Joris Everaert (see above) the researchers applied some correction factors. In this case, they accounted for search effort, search efficiency and carcass removal rates,to calculate collision rates at wind turbines.

The rate of detected carcasses in relation to their total number depends on many different parameters. An experimental approach was employed, using birds that had died from road and lighthouse collisions in order to derive appropriate correction factors.

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Different sized birds were deposited in different vegetation coverage and their detectability was examined twice over two weeks. After seven days of exposure 89% of large and intermediate and 59% of small birds were still detectable.

Sixteen transects were walked on a weekly basis and a total 61 bird carcasses were found. As the cause of death was not always obvious,only fatalities within the radius of the total height of the turbine were considered to be collision victims. The study by Joris Everaert had a more limited search area (a radius of 1.1 x mast height only).

Eighteen species of bird were classed as collision fatalities.The species with the greatest number of deaths were herring gull (15 birds), black-headed gull (9 birds), house martin (7 birds) and common buzzard (4 birds) with two other individual raptors (one osprey and one red kite) also being found. The authors concluded that many of the species that were recorded were migratory birds,reflecting the narrow-fronted mass migration that takes place over Fehmarn.

After applying the various correction factors, it was concluded that on average 13 birds were killed per turbine per year.

Study 3: Collision victims at wind farms in the Netherlands

Karen Krijgsveld, Camiel Heunks, Mark Collier, and Sjoerd Dirksen of Bureau Waardenburgb.

Collision rates and flight behaviour were studied at eight wind farms in the Netherlands. Two studies were undertaken all year round but the majority (six) focussed on autumn migration and the winter season, and concentrated on waterfowl such as geese and swans.

The authors inferred from their studies that collision rate is strongly influenced by search efficiency, which varied between 79% and 100%.The collision rate was found to be strongly dependant on the number of birds flying through the wind farm which varied between 1 and 40 birds per turbine per year.

Collision victims were found at distances up to 110m from the turbines with a total of 66 birds were found (31 were definite collision victims and 35 showed no clear collision marks). The majority of fatalities were gulls (lesser black-backed, black headed and common gull) and small passerines (goldcrest, meadow pipit, pied flycatcher, house martin, redwing, tree sparrow and starling). However, during migration, flight altitudes of passerines were mostly above rotor height (measured with mobile marine radars).

Viewpoint

Data is gradually emerging from across Europe that is better describing the wind farm collision frequency of a range of birds. Given that many of these species occur in the UK and some are birds for which European protected sites (Special Protection Areas or [SPAs]) or internationally important sites (Ramsar Sites) are designated, particular consideration should be given to these studies and to whether wind farm interactions at particular locations, even at some distance from a designated area, might give rise to significant effects on such protected sites.

There is evidence to suggest that there are considerable differences in mortality rates between turbines (and even between turbines in the same wind farm). This suggests that the micro-positioning of turbines in relation to flight lines could result in changes in anticipated mortality from a given wind farm.

These papers and this sort of research are important because they give us an understanding of different species' likely response to wind turbines. This understanding can be used to helps design turbine layouts to minimise impacts.

It is worth noting, however, that between the three studies reviewed there are differences in how monitoring studies are set up and their results interpreted. It is therefore important to understand the experimental design of a particular study before collisions comparisons can be meaningfully made.