A multi-method approach to determine the impact of existing wind power plants on bird and bat migration on the island of Fehmarn, Germany

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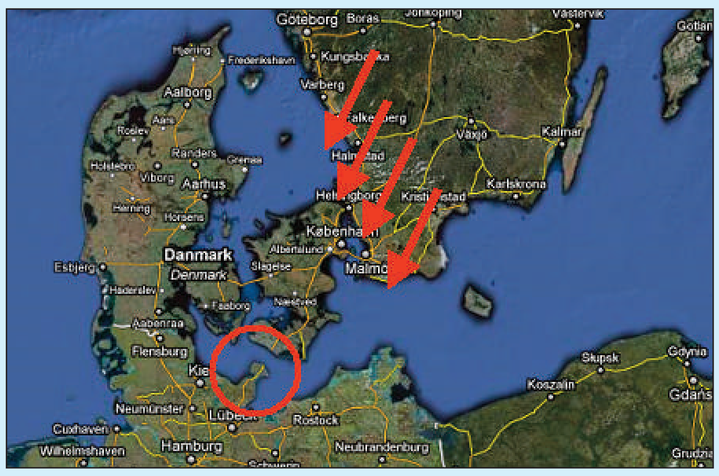
Introduction

The island of Fehmarn, situated off the German Baltic coast, is well-known for being a hotspot for bird migration. It is assumed that about 100 m Scandinavian birds cross the island each year using the shortest connection between the South of Sweden (Falsterbo), the Danish Baltic islands and the German mainland. To investigate the influence of the existing 4 wind farms on bird (and bat) migration and to be able to assess the possible impact of future developments, a comprehensive research project was carried out in 2009.



Methods

- The number of migrating birds at different heights – especially at night – was determined with two vertical radar installations at different locations.
- Daytime bird migration was recorded simultaneously using six observers distributed over the island.
- Staging birds were mapped once a week covering Fehmarn almost totally to investigate the spatial distribution in relation to the wind farms.
- In the autumn period a systematic search for collision victims was conducted under 65 wind turbines. Search efficiency and carcass removal by scavengers was estimated by experiments.
- Bat activity was registered with automatic ultrasound recording at hub height and ground level.

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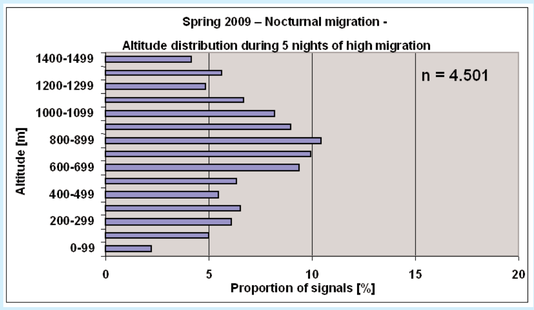
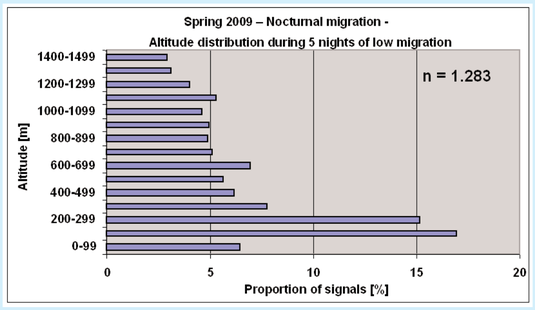
RESULTS

Flight Height:

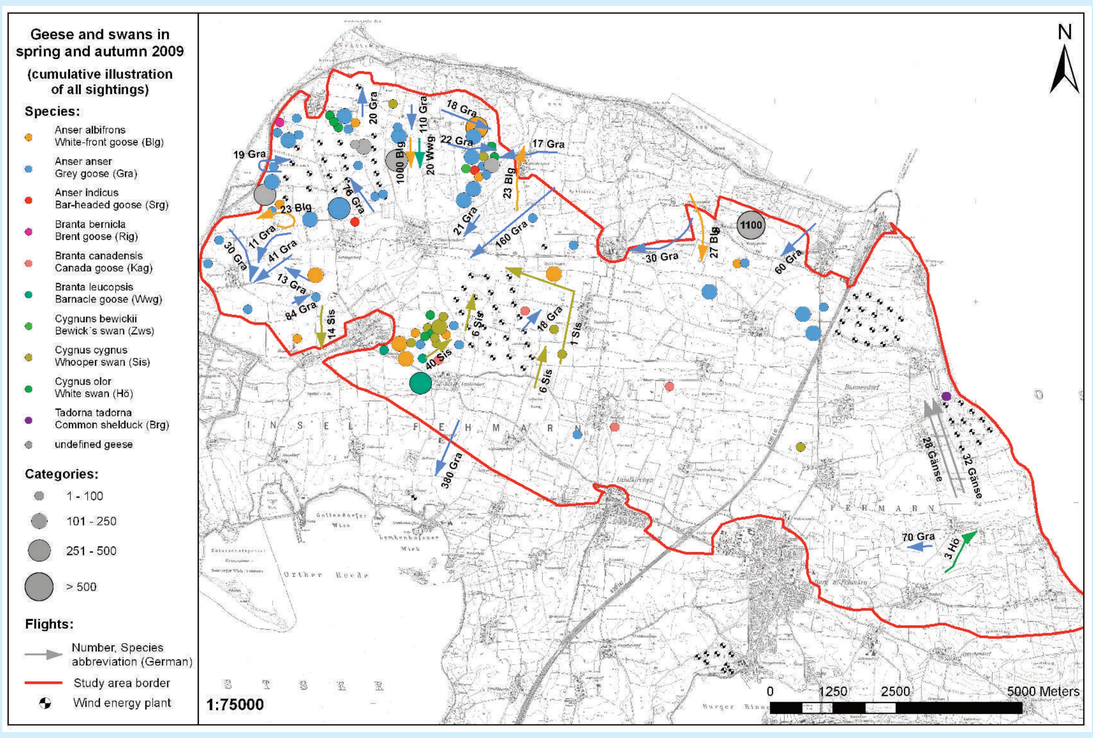
Bird migration over Fehmarn was dominated by songbirds at night. They traveled mainly at heights of several hundred metres and only to a minor extent in the height of the rotor blades. Nights with unfavourable wheather conditions showed a higher degree of birds at blade height, but migration intensity was generally lower in those nights.



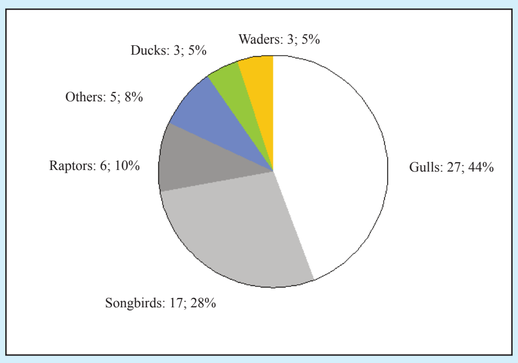


Staging birds:

Large parts of Fehmarn showed a major importance for resting and feeding geese, golden plovers and gulls. Especially geese showed a clear avoidance behaviour and did not use areas inside the wind farms but gathered more densely at their fringes.



Collision victims

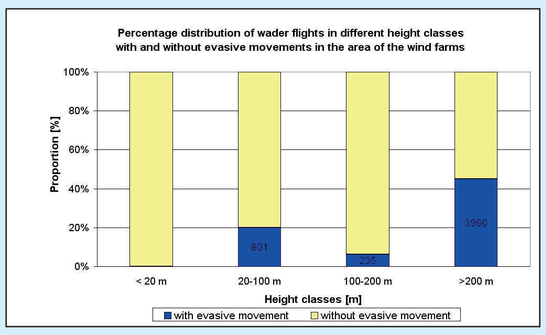


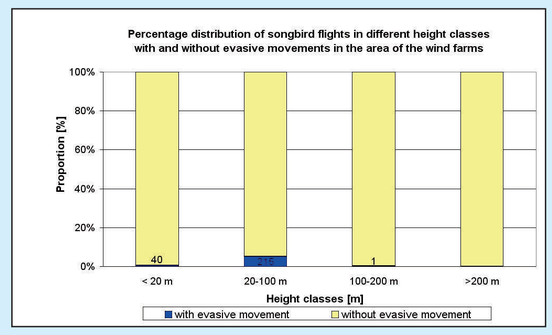
Numbers of collision victims were not higher than known from other areas at the west coast of Schleswig-Holstein or from the Netherlands. Species most affected were gulls and swallows, which were recorded to forage inside the wind farms. Species travelling by night were almost not found at all.

For further details have a look at the poster presentation of Thomas Grünkorn: Estimating the number of bird collisions at operating wind power turbines in northern Germany

Avoidance behaviour

Day-travelling birds flying alone or in small groups showed no or only very little avoidance reactions while flying through wind farms (especially songbirds and birds of prey) propably due to sufficient distances between turbines. In contrast birds flying in large flocks (like starlings, waders and geese) showed vertical and horizontal evasive movements obviously avoiding coming too close to the whole wind farm.





Bats:

There was hardly any bat migration activity recorded at hub height level. Correspondingly only one bat was found as collision victim (compared to 61 birds).

Conclusion

Despite the enormous numbers of birds migrating each year over Fehmarn effects of the already existing 75 wind turbines in the study area on bird migration were rather small. Species mostly affected by displacement while feeding and flying were geese and waders gathering in large flocks. Future developments of wind energy on Fehmarn should take care of their preferred resting and feeding areas and keep a sufficient distance to the coast as a leading line for migrating birds, but in the inner parts of the island there is no need for special restrictions referring to birds travelling over Fehmarn.