Impact of wind turbines on bat activity: an ommited long-distance concern

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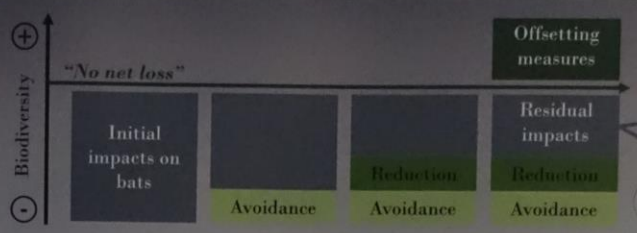
INTRODUCTION

Wind farm setting-up project → Impact assessment: mitigation hierarchy application → Fail in mortality mitigation



To determine the loss of habitat by revulsion according to the distance to wind turbine, we performed a sampling design focused on hedgerows, known to be a structuring habitat widely used for moving and foraging.

Only one study tested the impact distance of wind turbine on bat abundance (i.e. activity; [2]), studying small wind turbines (< 25m) and short-distances (0-500m). Authors have shown a negative effect on activity until 500 m from the wind turbine

METHODS

Generalized Linear/Additive Mixed Models

Activity ~ dist. to turbine + landscape variables, random = 1| **Date**

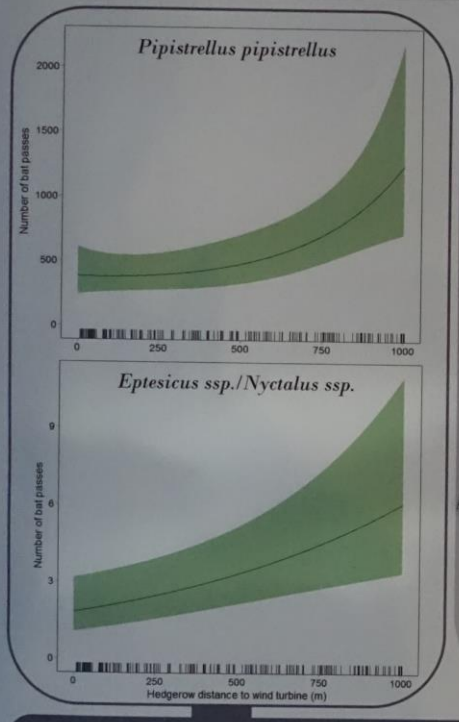
Sampling design :
(i) 10 simultaneously sampled sites/night on hedgerows at 10 different distances to wind turbine
(ii) 1 farm/night
(iii) 340 sites in autumn

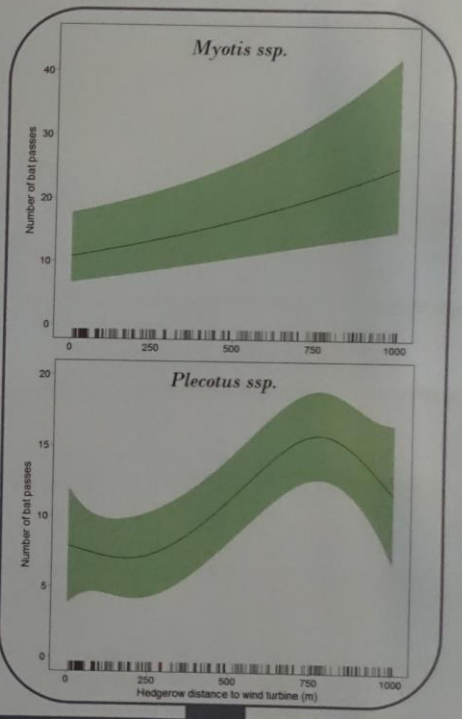
Automatic identification toolbox using Random Forest classifer: TADARIDA [3;4]

212 906 recorded bat passes using the Song Meter Bat on full nights

Vigie-Chiro Suivi des chiroptères

→ Bat pass = series of echolocation calls of 5 seconds





RESULTS

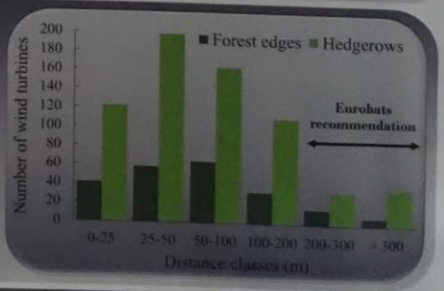
Results show for all species and groups, a significant negative impact of wind farms on bat activity. We found quadratic or linear positive relationship between bat activity and distance to wind farm, without threshold effects, except for *Plecotus ssp.* (around 750 meters). Predicted number of bat passes from models reveals activity losses of a minimum of 50% close to wind turbines compared to a distance of 1000 m.

CONSERVATION IMPLICATIONS

Some species known to be less sensitive to wind turbines in literature (i.e. mortality) are affected by long distances, although little taken into account in impact assessment studies.

The distances of establishment to edges regarding the European recommendations and our results on the activity, appear to be highly unsatisfactory. Indeed more than 73% of the 889 wind turbines of the study area, in service since the 2008 Eurobats recommendations, were implemented at less than 100 m from the edges (see figure).

This concern should be considered in mitigation reflections and implementation ways, especially in wooded countryside areas.



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