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

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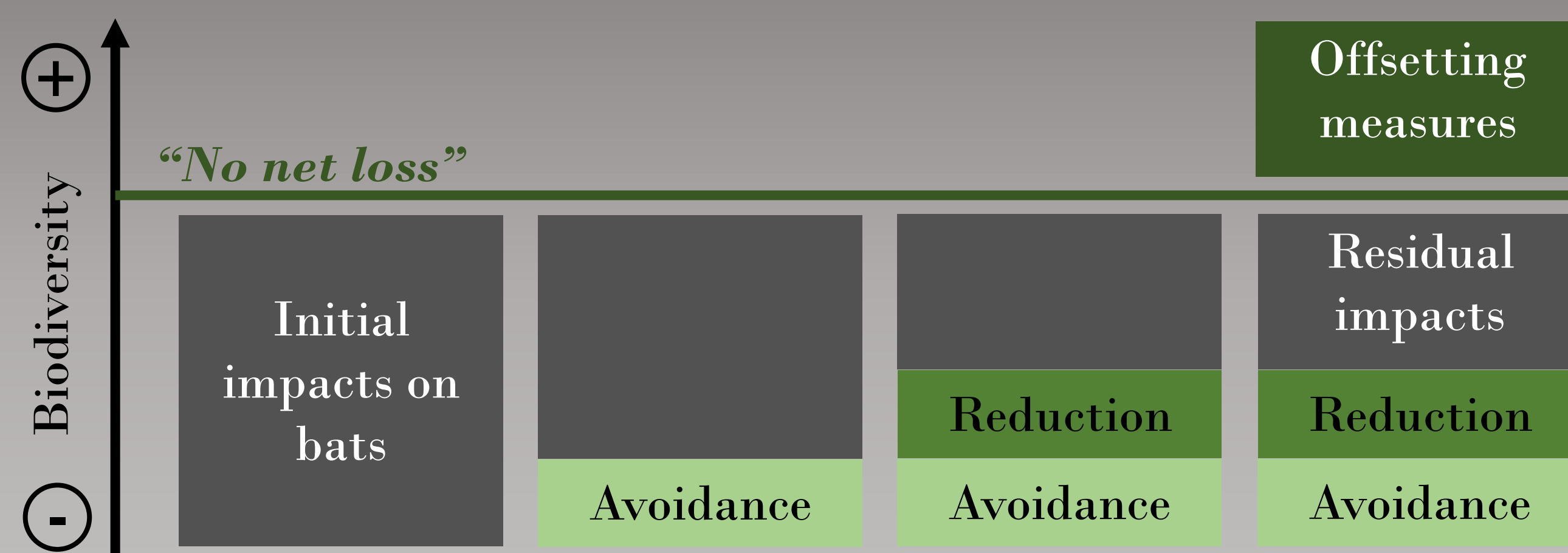
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INTRODUCTION

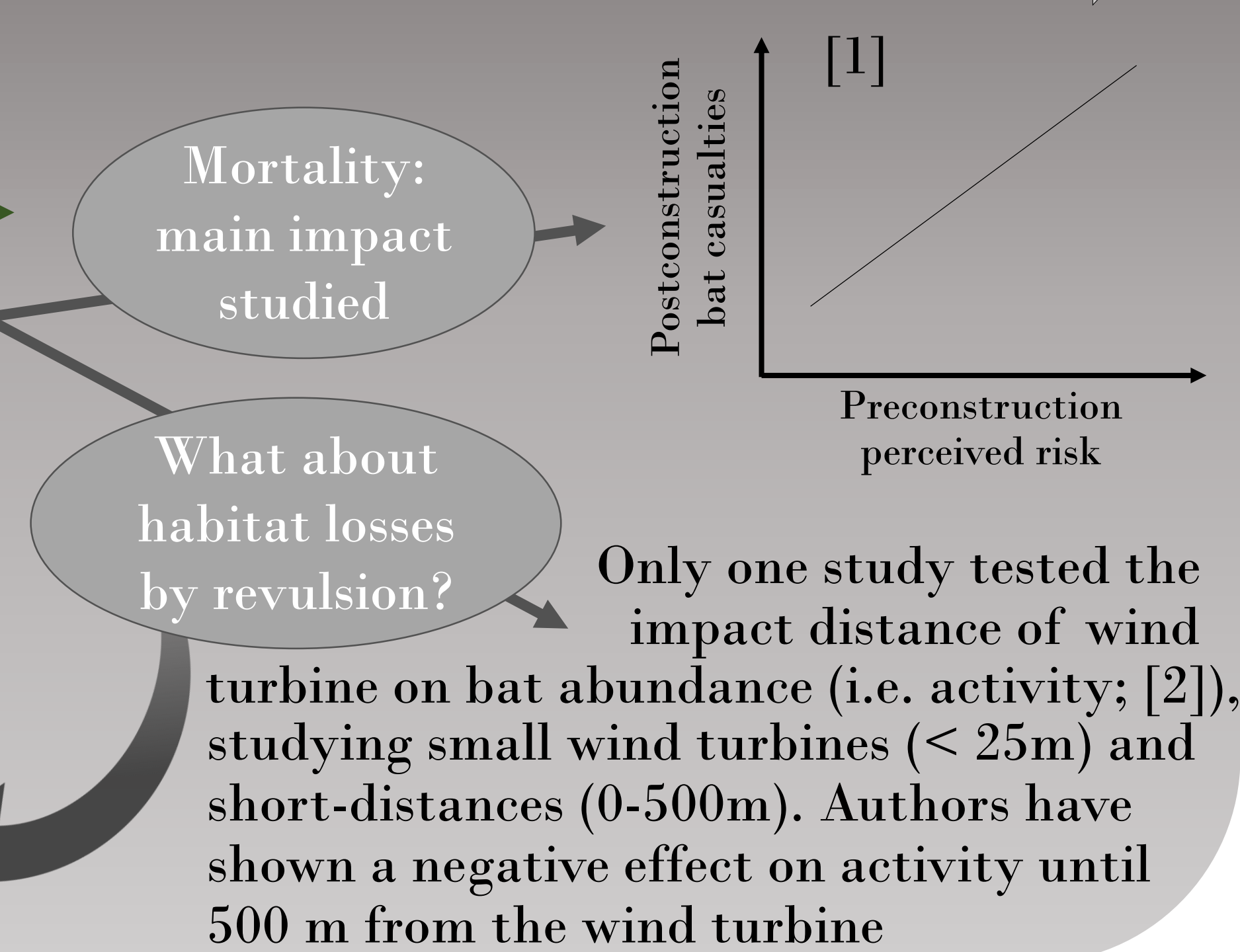
Wind farm setting-up project



Impact assessment: mitigation hierarchy application

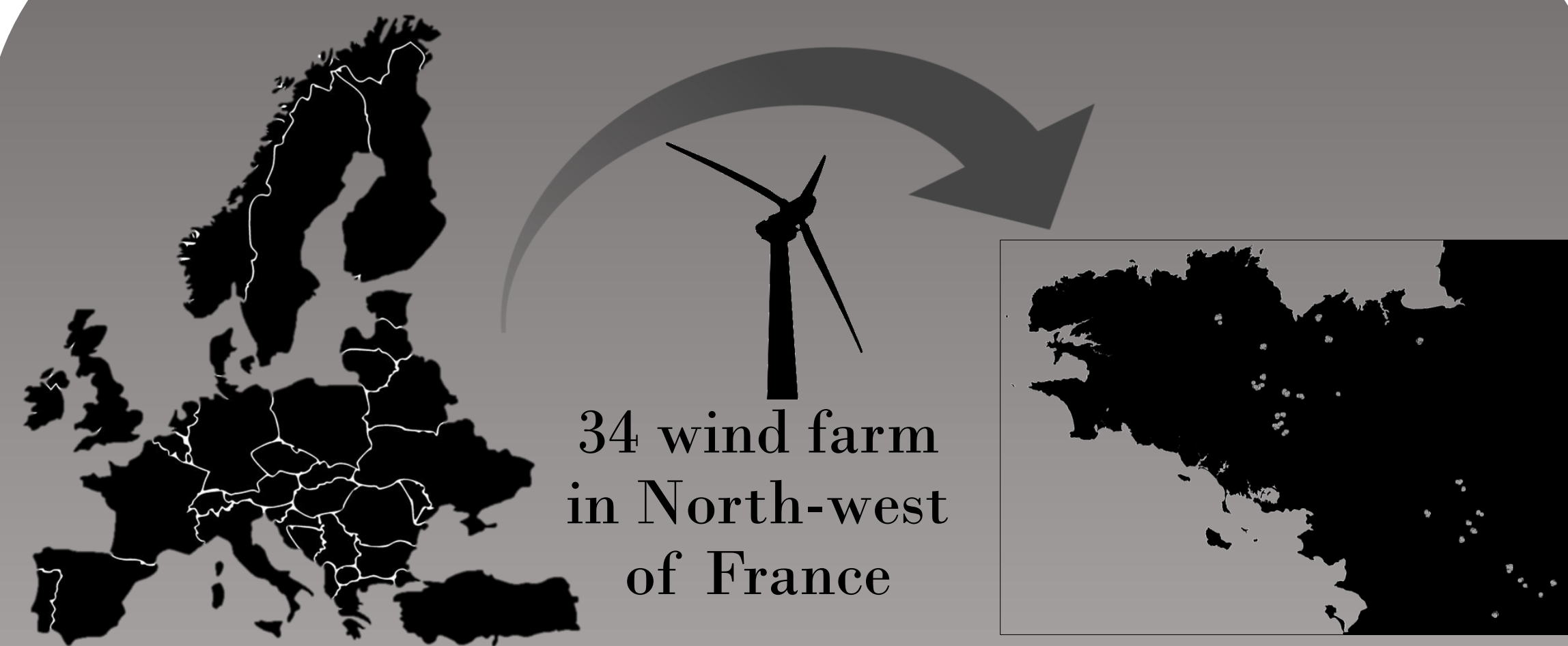


Fail in mortality mitigation



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.

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

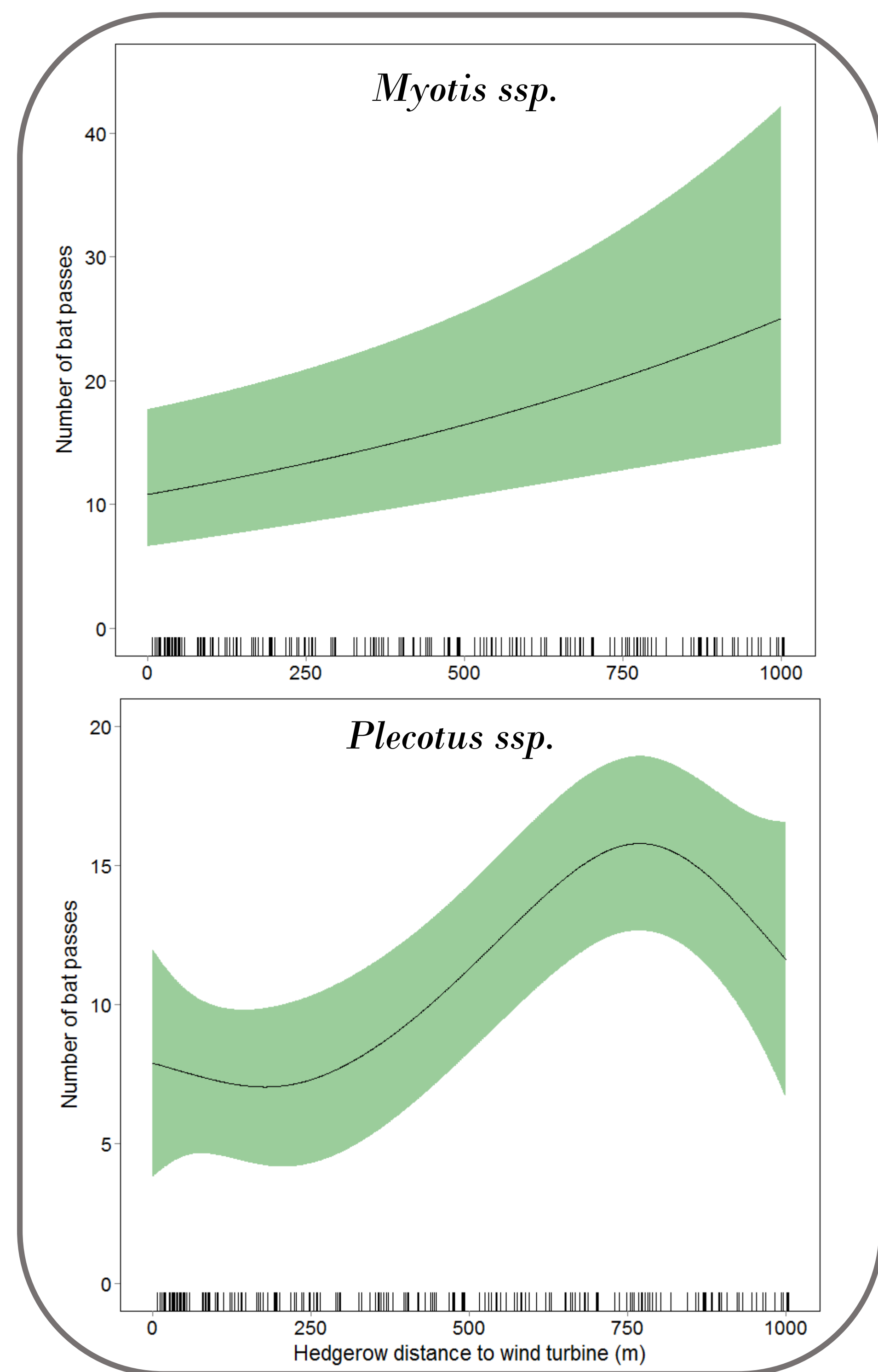
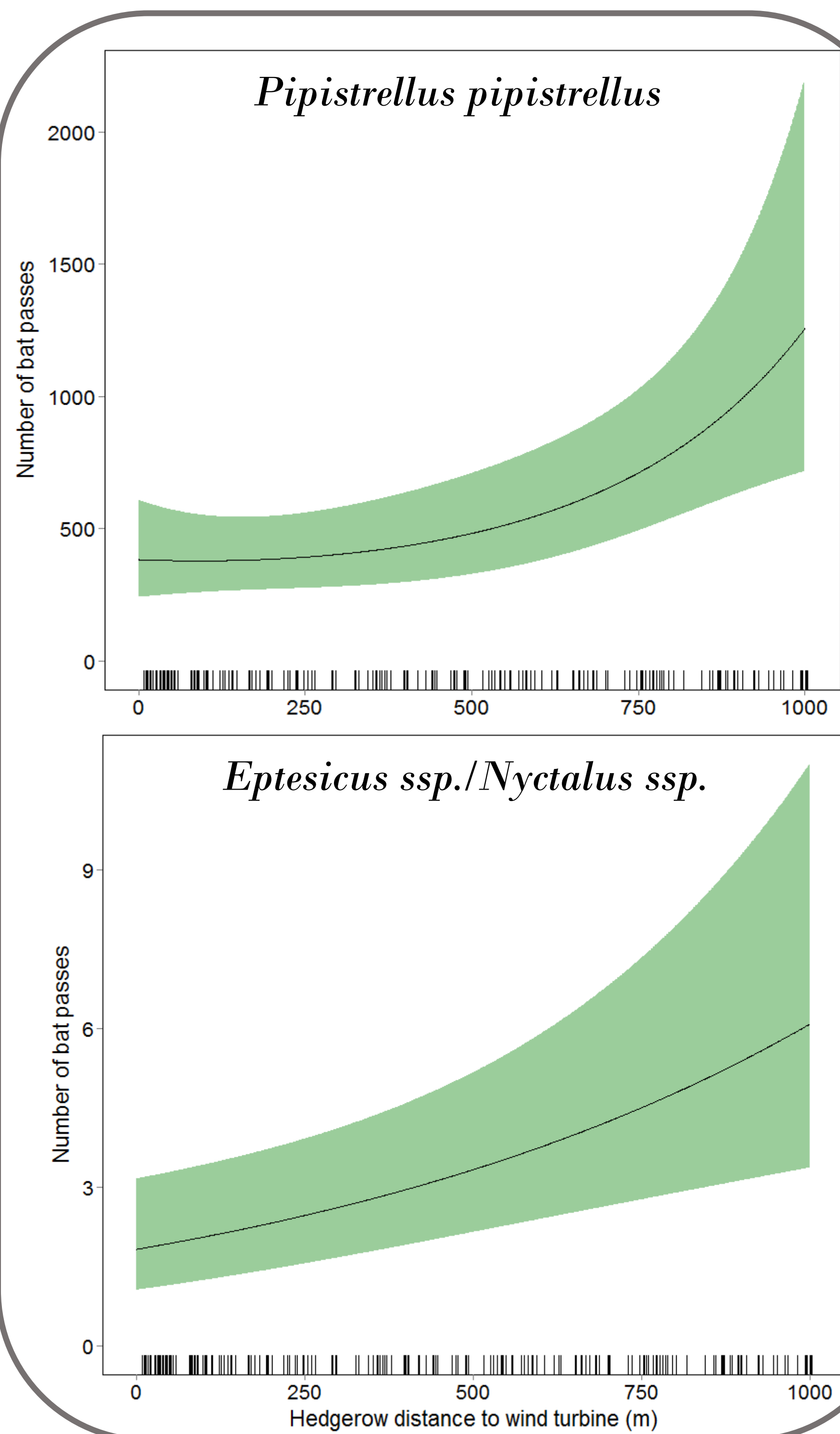
Automatic identification toolbox using Random forest classifier: TADARIDA [3;4]

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



Vigie-Chiro
Suivi des chauves-souris

→ Bat pass = series of echolocation calls of 5 seconds

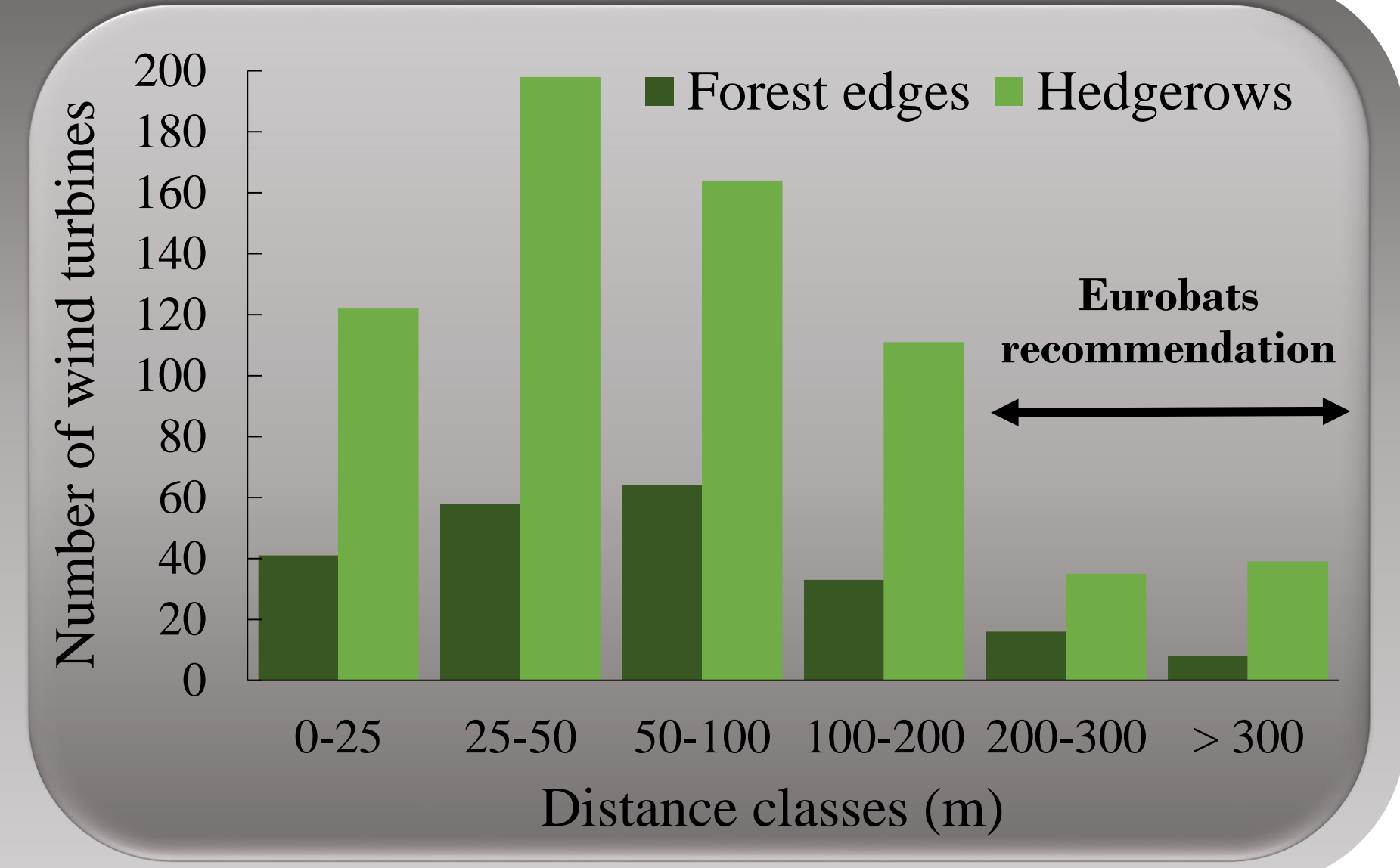


RESULTS

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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