

Long term survey of wind farms impacts on Common Kestrel's populations and definition of an appropriate mitigation plan

CORDEIRO, Ana; BERNARDINO, Joana; COSTA, Hugo & MASCARENHAS, Miguel

Bio3 – Estudos e Projectos em Biologia e Valorização de Recursos Naturais, Lda. Rua D. Francisco Xavier de Noronha, 37B. Almada, Portugal.
(corresponding author: ana.cordeiro@bio3.pt)

Context

Since 2005, the Portuguese company Bio3 is conducting a survey of the bird community in two wind farms, Candeeiros and Chão Falcão, both located in central Portugal. After three years of monitoring, the estimates indicated a high mortality of common kestrels (*Falco tinnunculus*).

To better understand the impact of these two wind farms, we developed a protocol that aimed to accurately estimate the size of these kestrels populations, in order to obtain mortality rates. This protocol is being applied since 2008 and consists in:

- Transects and observation points to detect the falcons
- Nest searching to detect breeding pairs
- Ringing of adults and nestlings with colored rings to allow individual identification (at Candeeiros ringing only started in 2011)
- Weekly searches of all turbines between February and November to detect death birds



Candeeiros wind farm

- kestrel population comprising 8-12 breeding pairs
- 15 birds found death in 7 years

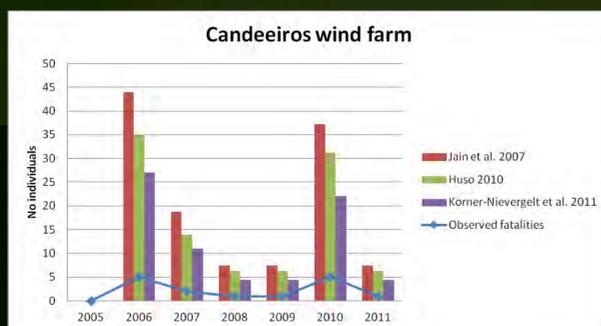


Figure 1 – Number of observed and estimated kestrel fatalities in Candeeiros wind farm (estimates obtained at *Wildlife Fatality Estimator*; observed fatalities based on 14, 30, 34 and 39 searches in years 2005, 2006, 2007 and 2008 to 2011, respectively)

- based on mortality estimates obtained, the average mortality rate due to collision over the 7 years period is about 23 to 39%

Chão Falcão wind farm

- kestrel population comprising 5-6 breeding pairs
- 5 birds found death in 7 years

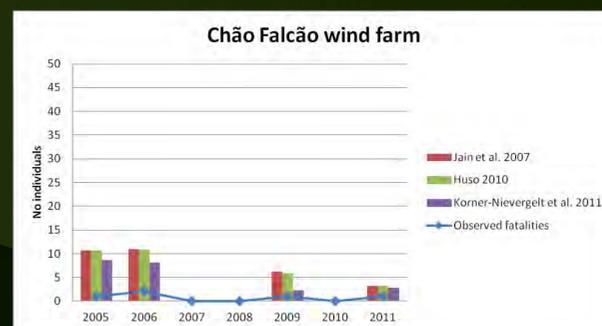


Figure 2 – Number of observed and estimated kestrel fatalities in Chão Falcão wind farm (estimates obtained at *Wildlife Fatality Estimator*; observed fatalities based on 17, 31, 32 and 39 searches in years 2005, 2006, 2007 and 2008 to 2011, respectively)

- based on mortality estimates obtained, the average mortality rate due to collision over the 7 years period is about 9 to 13%

Although there are some uncertainty in both population estimates (especially in Candeeiros wind farm since ringing of individuals only started in 2011) and mortality estimates, these findings suggest more concern for the Candeeiros kestrel population. Therefore a site-specific mitigation program was developed to reduce kestrel mortality in this wind farm.

Site-specific mitigation program for Candeeiros Wind Farm

One essential step when defining offsets is to identify the ecological requirements of target species in the study area. In Candeeiros wind farm, kestrels and other hovering raptors select the ridges and hillsides where the turbines are located as hunting grounds, especially where the vegetation (mostly scrubland) is less dense.

Thus, the Candeeiros mitigation program aims to reduce kestrel mortality due to collision, by habitat management. It consists of 3 actions:

1. Planting of native scrub plants below the turbines to obtain denser vegetation in these areas and make them less attractive for hunting kestrels
 2. Opening of patches inside scrub areas
 3. Promotion of extensive grazing by goats away from turbines
- to enhance habitat heterogeneity and therefore to increase prey density and availability in areas with lower risk of collision

This mitigation program will be conducted between 2013 and 2016. At the same time, the monitoring of the kestrel population and fatality searches will continue, in order to evaluate the success of the implemented measures.

Acknowledgments

The authors would like to thank Iberwind for the support provided in order to accomplish the present research.



at the cutting edge of biodiversity



www.bio3.pt