

Impacts of a highway construction on great bustards threatened population: threshold distances and effects on population dynamics

Aurora Torres¹ (aurora.torres@mncn.csic.es), Carlos Palacín (cpalacin@mncn.csic.es), Juan C. Alonso (mncn169@mncn.csic.es), Javier Seoane (javier.seoane@uam.es)

¹ Dept. Ecología Evolutiva, Museo Nacional de Ciencias Naturales, CSIC. C/ José Gutiérrez Abascal, 2, 28006 Madrid, Spain. Email: aurora.torres@mncn.csic.es. Phone: +34 91 4111328.

Keywords: BACI, population trends, road effects, steppe birds, reproductive success

Abstract: Road density is being increased due to a constant development of the transport network. This fact is especially noticeable in peri-urban areas, becoming crucial the planning and management of activities. In most of the studies which analyze road effects focused on population items, the weakness of the analysis performed questions the results. We studied the effect of the construction of a highway in a protected area in central Spain, over great bustard (*Otis tarda*), which is a globally threatened species. The study was carried out by demographic time series (1997-2009) analysis, whose data were obtained before, during and after infrastructure building. Generalized additive models (GAMs) and regression trees were built to check the effect of road distance over probability of species' presence, inside a 2 km band from the road. In addition, a Before-After-Control-Impact (BACI) study design was used to analyze changes in population trends and family group density. Our results suggest that the highway has had negative effects on great bustard use of space. The species tended to avoid a buffer zone around 500 m from the roadside, since the beginning of construction. In spring the avoided band was narrower, so the highway perturbing effect can be considered as secondary when compared to the marked site-fidelity to the exhibition grounds. Concerning the demographic trends, the number of individuals was reduced gradually up to 50% since the highway opening. However, in control zones individual's abundance has been maintained or even increased. The effects on density of family groups were not so evident, probably due to a high natural variability in great bustard reproductive success.