

## **Wind-farms threaten Southern Africa's critically endangered Bearded Vulture**

The Lesotho government has approved the development of a wind-farm in the Maloti Mountains of southern Africa. The proposed development is within the breeding and foraging range of the Critically Endangered Bearded Vulture *Gypaetus barbatus meridionalis* and the endemic Cape Vulture *Coprotheres Gyps*. The development consists of 42 x 850 Kilo Watt turbines and associated infrastructure such as powerlines, substations and access roads. Although the Lesotho Government recognises that both species are declining, they do not consider the site an area of concern despite the results of a Population Viability Analysis modelling exercise undertaken by Ian Rushworth and Sonja Krüger of Ezemvelo KwaZulu-Natal Wildlife in 2012 to predict the impacts of this development on the Bearded Vulture population.

Environmental clearance has been given for an initial period of a year in order to assess bird mortality risks associated with the project. This assessment will be done via the Merlin Avian Radar System during the pre-construction phase. The Department of Environment of the Ministry of Tourism, Environment and Culture reserves the right to revoke the clearance if there are environmental concerns caused by the project that are beyond mitigation.

If the results of the modelling exercise (reported on below) are realized, then the future of the cliff nesting vultures in the Maloti-Mountains is bleak!

### **Modelling Wind-farm Impacts**

Rushworth and Krüger used data from ten Bearded Vultures fitted with 70g solar-powered Argos GPS transmitters (Microwave Telemetry *Inc.*) between 2007 and 2012 to determine the size and location of the core foraging range of the species as well as the speed of travel and height above ground at which they forage. The ranging data comprised 5.8 juvenile years, 4.8

immature years, 1 sub-adult year and 2 adult years. Only data points representing foraging behavior (a total of 10 640 flying records in Lesotho) were used for the analysis.

Flying height above ground level was determined and compared with maximum wind-turbine height (including the turbine blades), reported as 100 m for the proposed wind-farm. Vortex 9.99 (Lacey et al. 2005) was used to model population level impacts. The baseline model was calibrated with actual data on mortality factors and population size changes (Brown 1992 vs. Krüger et al. 2013). Mortalities were included in the model and the proximity of breeding sites was used as a crude assessment of collision risk with turbines.

Adult Bearded Vultures foraged predominantly within a 15 km radius of their nest site while non-adult birds foraged extensively over the highlands. Bearded Vultures spent 92% of their flying time at foraging speeds (11-77 km/h) and more than half (53.5%, n=9791) of this was spent  $\leq 100$  m above ground level, within the blade swept height and hence at risk of collision. The Population Viability Analysis predicted the impacts of mortalities caused by wind-farms to be extreme with the population rate of decline increasing from the current -1.4% per annum to -3.7% per annum. The predicted time to extinction of the species was reduced from 260 years to 110 years.

The fact that Bearded Vultures actively select ridge tops and upper slopes and spend at least half their foraging time less than 100 m above ground level, puts them at risk both in terms of the areas they select and the height at which they fly. This coupled with a small, isolated and declining population means that wind-farm developments in the Lesotho highlands, even at a modest scale, will have a catastrophic impact on this species. Because of their low reproductive rate and long life span, this population will be unable to recover from an accumulative loss of individuals.

The model's predictions are conservative because it does not take into account an increase in the number of wind-farms to meet the energy demand or ever increasing mortalities from other anthropogenic factors such as power line collisions and poisoning, The Bearded Vulture is a protected species in both South Africa and Lesotho, the extinction of which will be a major failure of our efforts to conserve our natural heritage for future generations.

## References

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- Krüger SC, Allan DG, Jenkins AR, Amar A. 2013. Territorial occupancy, distribution and density of the Bearded Vulture *Gypaetus barbatus meridionalis* in southern Africa. *Bird Conservation International*. doi:10.1017/S0959270913000440
- Lacy RC, Borbat M, Pollak JP. 2005. VORTEX: A Stochastic Simulation of the Extinction Process. Version 9.99. Brookfield IL: Chicago Zoological Society.



Adult Bearded Vulture – at risk from proposed wind-farm development