

**Budget request for funds for Black Harrier GPS/GSM trackers to determine  
behaviour around wind farms**

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**To Tygerberg Bird Club**

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**Project:**

**IMPACTS OF WIND FARMS ON BLACK HARRIER ECOLOGY AND SURVIVAL**

**Rationale:**

Black Harriers are *Endangered* raptors that face many challenges. They are the least common raptor in Southern Africa, endemic to South Africa and Namibia, and breed only in coastal and montane regions of the western Cape, and rarely in the Northern Cape and Eastern Cape (Curtis et al. 2004, Garcia-Heras 2017, Simmons et al. 2020). They now face a new threat in the form of wind farms that kill adult birds (Simmons and Martins 2018).



**Figure 1:** An adult male Black Harrier downed by an Eastern Cape wind turbine. This bird had to be euthanised.

Since some of these casualties are breeding birds the breeding events often fail as both parents are required to rear the young. As the principle author of Birdlife South Africa's Black Harrier – Wind Energy guidelines (Simmons et al. 2020) it has become evident that we know little about how Black Harriers react to new wind farms in their breeding areas. We need this to provide robust guidelines on appropriate buffers around Black Harrier nest sites to reduce deaths and displacement impacts to the harriers.

Initial tracking harriers of harriers has revealed that they forage on average 16 km from their nests (Garcia-Heras et al. 2019) and a 3-5 km buffer around nests is recommended to help protect them from wind farm fatalities. However, there are few data on the heights at which they forage or why they are so susceptible to wind farm mortality during the breeding season.

The technology now exists in the form of very light-weight GPS transmitters to answer the questions:

- How often do Black Harriers fly within the blade-swept areas of wind turbines (= risky flights),
- At what distance from their nests are these risky flights mainly performed and
- How do they use the natural vs. transformed habitats available to them within their foraging ranges (this is valuable for identifying 'no go' areas for future proposed wind farm development).

At one wind farm the possibility also exists that some turbine blades will be altered by painting one of the blades signal red or black to increase the visibility of the blade to reduce collisions (Stokke et al. 2017, May et al. 2020). This may allow us to additionally test how birds react around the painted blades relative to unpainted blades.

### **Aims:**

- (i) To understand the 3-dimensional risk space of Black Harriers around wind farms
- (ii) to determine if harriers actively avoid wind farms within their foraging ranges.
- (iii) to provide quantified assessments of the risks to wind farms
- (iv) to provide mitigations measures for wind farm managers and future developers to reduce harrier fatalities
- (v) understand more precisely habitat usage around wind farm areas to inform mitigations (e.g. haying, or burning management to keep harriers away)

### **Methods**

Adult Black Harriers will be captured in November- December 2020 by luring them in with a stuffed Spotted Eagle Owl and a collapsible net near their nests in the Overberg. This Dho Gaza set up is well known in raptor circles and has been used for decades to capture raptorial birds (Bub 1991). Most raptors will dive-bomb a predator at their nests and harriers are no exception (Hamerstrom 1986, RES and OAC pers. obs.). The harrier hits the net after diving at the owl and the mist net collapses around the bird without harming it. The harrier is then extracted by unfolding the mist net and then the 10g tag is attached using typical and accepted techniques using black Teflon ribbon around the bird. This is a harness (and is not pinned or in any way) attached around the bird's back and belly. This has since proven highly successful for us previously with Black Harriers (Garcia-Heras et al. 2019). If this is successful a further 8 birds will be tracked at different wind farms.

The birds will be tagged birds with 10g GPS trackers imported from Europe. These trackers give fine-scale information on the location (to 5 m accuracy) and, as important, the height at which they are flying. This allows us to determine the risk they face with turbines of different hub heights and blade lengths. They represent 2.7% of the harrier's weight and have been approved by UCT ethics committee.

These data will also be compared with what has been collected visually through height estimation at an operational wind farm in the Eastern Cape.

We are seeking funds for 2 more GPS-trackers priced at Euro 1400.0 per unit with download incorporated (Ornitela GPS/GSM) trackers. At present exchange rates, that is R26 960 per unit. The total price is given below (Table 1). We are seeking funds elsewhere simultaneously. Even a contribution to this total would go a long way in assisting our studies in this endeavour. Other funding sources have been tried but NRF funds to RES have dried up and a major fund applied to by OEC was diverted to Covid-related research.

### **Outcomes**

We will publish our results in at least two papers highlighting the quantified data on risky heights of birds breeding near an operational wind farm and determine the factors making them susceptible to fatalities. A second paper will focus on determining if they are avoiding the wind farm both during breeding and by assessing if they return to the wind farm environment following migration to the Eastern Cape. Each will allow us to provide mitigation measures (e.g. appropriate buffers around known nests, or the painting of blades: <https://www.birds-and-bats-unlimited.com/specialist-studies> to reduce impacts to harriers and other susceptible raptors.

### **References**

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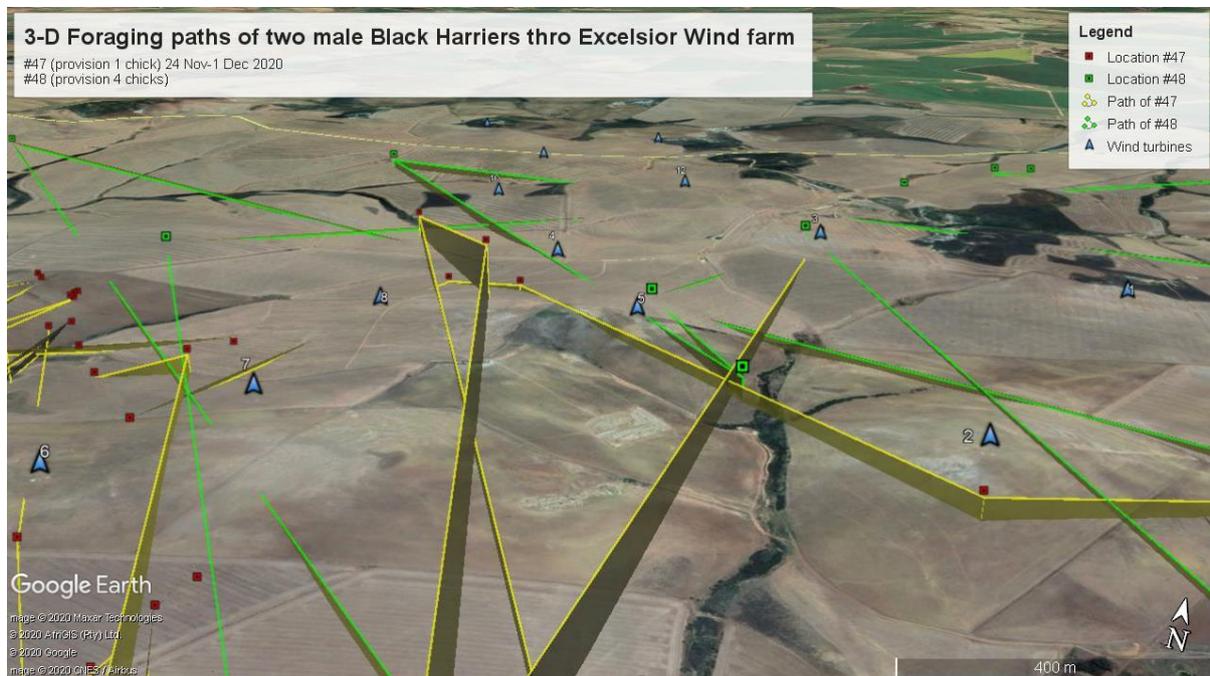
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## Budget

Item	Number	Cost/item	Total
GPS tracker (Ornitela GPS/GSM trackers, Lithuania)	2	Euro 1400*	2 x R26 960 =R53 920
Travel costs	4 trips CT-Napier	360 km @ R5.00/km 4 trips	R7200
<b>Totals</b>			<b>R61 120</b>

\*Euro/Rand = 19.26 1 Tracker costs 1400 \* 19.26 = R26 960



**Figure 1:** First 3-D foraging maps for harriers from first two GPS/GSM trackers. Two different breeding males are shown in yellow and green