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Solving the mystery surrounding the decline of the Drakensberg Bone Breaker

Scientists have turned to outer space to explain the mysterious disappearing act of one of Africa's most famous birds.

Satellite trackers attached to 18 Bearded Vultures have confirmed conservationists' worst fears: humans are largely to blame for the rapid demise of the species.

Once widespread throughout much of Southern Africa, the Bearded Vulture is now critically endangered in the sub-continent, with a nearly 50 percent reduction in nesting sites since the 1960s.

And the main reasons for their decline are collisions with power lines and poisoning, two major vulture hazards that killed half of the birds in the satellite tracking survey.

Once widespread across South Africa, the Bearded Vulture population is now restricted to the Drakensberg mountains in Lesotho and South Africa. But even in these isolated mountains the population continues to decline due to human encroachment on nesting sites and feeding territory.

These are some of the key findings contained in two new research projects published this month. The studies paint the most detailed picture to date of the challenges facing the Bearded Vulture, also known as the 'bone breaker' due to its habit of dropping bones from a height to feed off the marrow inside.

The first paper, published in the international ornithological journal *The Condor* [1] by scientists from EKZN Wildlife and the Percy FitzPatrick Institute [2] at the University of Cape Town, found that human-related factors were the common denominator in differences between abandoned and occupied Bearded Vulture territories. Lead author on the study Dr Sonja Krueger [3] said: "We explored where the biggest difference lay between abandoned and occupied territories and found that human related factors such as human settlement density and powerlines were consistently different between these sites".

Power line density and human settlement density were more than twice as high within abandoned vulture territories compared to occupied territories, the study found.

Results also suggested that food abundance may influence the bird's overall distribution, and that supplementary vulture feeding schemes may be beneficial.

By contrast climate change was not found to be a major contributing factor in nest abandonment.

“Though not definitive, the results strongly suggest that we humans are our own worst enemies when it comes to conserving one of Africa's iconic birds,” Krueger said.

The study recommended a new approach to vulture conservation management: “Based on the identified threats and mechanisms of abandonment, we recommend that conservation management focus on actions that will limit increased human densities and associated developments and influence the attitudes of people living within the territories of (vulture) breeding pairs,” the study concluded. “We recommend that mitigation of existing power lines, stricter scrutiny of development proposals, and proactive engagement with developers to influence the placement of structures is essential within the home range of a territorial pair.”

The study's findings are backed up by a second paper published in open access journal PLOS ONE [4], which relied on data from satellite trackers attached to 18 Bearded Vultures. The trackers not only showed the exact location of the tagged birds every hour, they also provided critical information on movement patterns and mortality. Tagging enabled dead birds to be quickly recovered and their cause of death determined.

The study confirmed that, in addition to power lines, poisoning was considered the main threat to vultures across Africa and was contributing to the so-called “African Vulture Crisis” -- a large decline of many vulture species across the continent.

The tracking data also provided new information about the birds' ranging behaviour. It revealed that non-breeding birds traveled significantly further than breeding birds and were therefore more vulnerable to human impact. Some young non-breeding birds patrolled an area the size of Denmark. The average adult bird had a home range of about 286 square kilometres, but the range was much smaller for breeding adults at just 95 square kilometres.

The tracking study, conducted between 2007 and 2014, required some innovative fieldwork. Researchers used meat lures to capture the birds at vulture feeding sites. Each captured bird was then fitted with a 70g solar-powered tracker designed to relay detailed information every hour between 5am and 8pm – including GPS coordinates and flight speed.

Tracking results also prompted the study authors to suggest several possible strategies to combat the threats posed by human infrastructure such as wind farms and power lines. These include: “ i) the mitigation of existing and proposed energy structures to reduce collision risks; ii) the establishment and improved management of supplementary feeding sites to reduce the risk of exposure to human persecution and poisoning incidents; and iii) focussed outreach programmes aimed at reducing poisoning incidents,” the study said.

Dr Arjun Amar [5] from UCT said detailed knowledge about Bearded Vulture home ranges could be hugely beneficial to vulture conservation: “We knew the species

was likely to have large home ranges, but our results show just how far these birds travel – and therefore how exposed they are. The more they travel, the more they risk colliding with power lines or falling prey to poisoning.” He continued “what these two new studies suggest is that the impact of human activity on the survival of the Bearded Vulture is even more serious than we suspected. Plans for multiple wind farms in and around the highland regions of Lesotho will likely place even more pressure on this vulnerable species and may be the final death nail in this species coffin”.

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Editor's notes:

- Full reference for this paper is: Krüger, S., Simmons, R.E. & Amar, A. 2015. Anthropogenic activities influence the abandonment of Bearded Vultures (*Gypaetus barbatus*) territories in southern Africa. *Condor*. 117: 94-107.
Free access to full paper here: <http://www.bioone.org/doi/abs/10.1650/CONDOR-14-121.1?af=R>
- The Percy FitzPatrick Institute for African Ornithology is a research institute situated in the Biological Sciences Department of Cape Town University. It is one of the world's leading ornithological research institutes and is a South African Department of Science and Technology-National Research Foundation Centre of Excellence.
- Dr Sonja Krueger is the lead author of the paper. The research was undertaken as part of her PhD research at the University of Cape Town.
- The full paper is freely available via open access. The full reference for the paper is: Krüger S, Reid T, Amar A. (2014) Differential Range Use between Age Classes of Southern African Bearded Vultures *Gypaetus barbatus*. PLoS ONE 9(12): e114920. doi: 10.1371/journal.pone.0114920 <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0114920>
- Dr Arjun Amar is a Senior Lecturer at the Percy FitzPatrick Institute, University of Cape Town and was the lead supervisor of this research project.