

A Decade of Data

Sonja Krüger has been studying the Bearded Vulture population in southern Africa since 2000. She obtained her PhD using data obtained from MTI's PTTs to determine the status of the population and investigate the reasons for its decline. Dr. Krüger works for Ezemvelo KwaZulu-Natal Wildlife as an Ecologist for the Maloti-Drakensberg Park, a transfrontier World Heritage Site between South Africa and Lesotho, for which the Bearded Vulture is an icon.



Photo by Shane Elliott



Adult Bearded Vulture fitted with a transmitter.

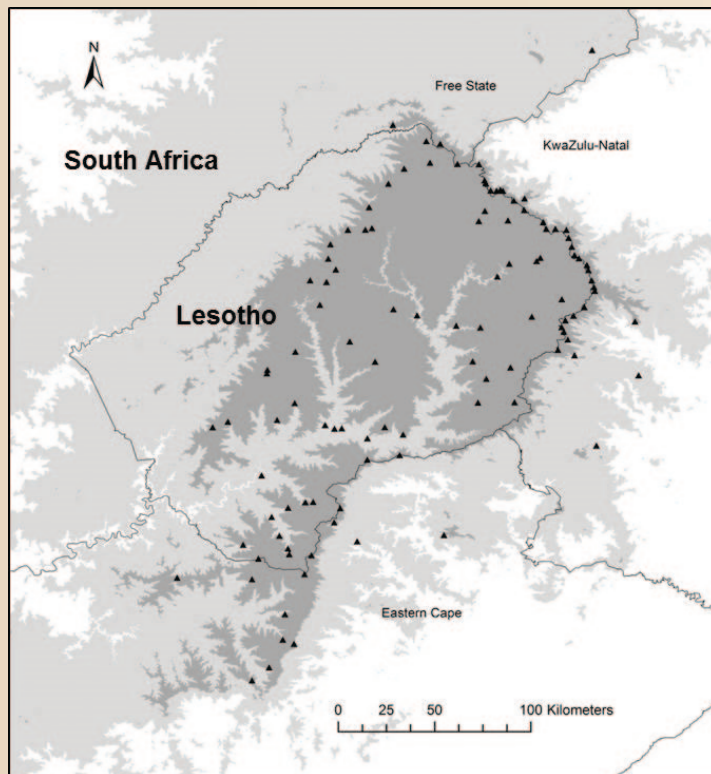
For the past decade, I have been using Microwave Telemetry Inc.'s (MTI) incredible technology to answer questions to inform the conservation of the critically endangered Bearded Vulture (*Gypaetus barbatus*) population which ranges over the Maloti-Drakensberg mountains of South Africa and Lesotho (see map). It has been an ongoing battle to fund the download costs, but the data obtained has been worth every cent. The support from MTI in the past decade and the transmitters they produce have been fantastic. They have always been extremely helpful and the conferences they organise and newsletters they produce have been very informative and beneficial to my project.

When I considered fitting satellite transmitters to Bearded Vultures in 2007, nobody was using this technology in South Africa and available wildlife transmitters were too large and heavy. Two colleagues working with Bearded Vultures in Europe provided me with two refurbished battery-powered Argos PTTs and two solar-powered GPS PTTs which they helped me fit in 2007 and 2008. In 2009, I purchased eight 70g solar-powered GPS PTT-100s, most of which were fitted to first year birds that winter. In 2012, a further six were purchased to fit to adult birds. Over the past 10 years, these 18 PTTs have been fitted to 27 individuals (including six Cape Vultures). Those that were recovered from birds that had died or dropped their transmitters were refitted to other individuals, one being used on three different individuals over the years (without even requiring refurbishment). Only one PTT was badly damaged and could not be re-used. No transmitter failures were experienced. Three of the PTTs stopped transmitting while they were moving and were not able to be recovered. Even the most recently recovered PTT looks almost brand new after 10 years in a harsh mountain environment where the birds fly at altitudes over 2000 m above sea level in temperatures ranging between -20°C and 35°C.

The original purpose of the study was to determine the causes of mortality in the species. The result, after finding 10 of the tracked birds dead, was that poisoning was the primary cause of death. Individuals were either deliberately poisoned for belief-based uses or accidentally poisoned when they ate poisoned bait used illegally for predator control. In addition to addressing the project's primary aim, the data has been used to address numerous other questions to guide conservation action.

The movement data were used to establish trends in territory occupancy, distribution, and density of the Bearded Vulture in southern Africa, information that led to the species being uplisted from endangered to critically endangered in an assessment of the species' status for the regional Red Data Book of Birds. The movement data were further used to determine the differential range use and anthropogenic risk exposure between age classes, provide insights into the post-fledging dispersal, and compare home ranges of Bearded Vultures from southern Africa, Nepal, and Spain. Since some of the tracked birds

were adults when fitted with transmitters, or became adults a few years later, the tracking data were also used to assess the productivity of the population and confirm that anthropogenic activities influenced the abandonment of their breeding territories. Spatial analyses of the tracking data have also been used to assess the threat of proposed wind farm developments to inform wind turbine placement. In addition, a feasibility analysis was undertaken for the reintroduction of Bearded Vultures in South Africa, providing pertinent information for the newly established captive breeding programme by determining release strategies and identifying release sites.



The range of the Bearded Vulture in southern Africa showing the location of occupied breeding territories, where darker shades indicate higher altitudes (■ dark grey = >2800 m a.s.l.)

Catching the birds to fit transmitters also provided an opportunity to take blood samples for genetic analyses which identified a reduced genetic diversity in Bearded Vultures and provided the evidence of genetic structure across African and European populations of the Bearded Vulture, placing the South African population in a global context. Blood samples as well as bone samples collected from tracked birds found dead revealed that they experienced long-term exposure to lead which may have contributed to their deaths.

One of the most rewarding parts of the project was following two individuals, fitted with transmitters in 2009 in their first year post-fledging, mature and establish their own breeding territories 6–7 years later. One bird was found dead in late 2018 and the other dropped its transmitter in early 2019, with both units still working well!

The species has been the catalyst for international collaboration. The project has enjoyed ongoing technical support from MTI and the assistance of numerous individuals in the research and monitoring activities that started with the goal of using satellite tracking technology. The data obtained over the past decade and data from the four transmitters currently still fitted to birds have provided, and will continue to provide, invaluable information allowing us to make more informed decisions to ensure the persistence of the species into the future.