Assorted unpublished reports on the behaviour of Cape Vulture recorded using satellite transmitters, 2006 to 2008

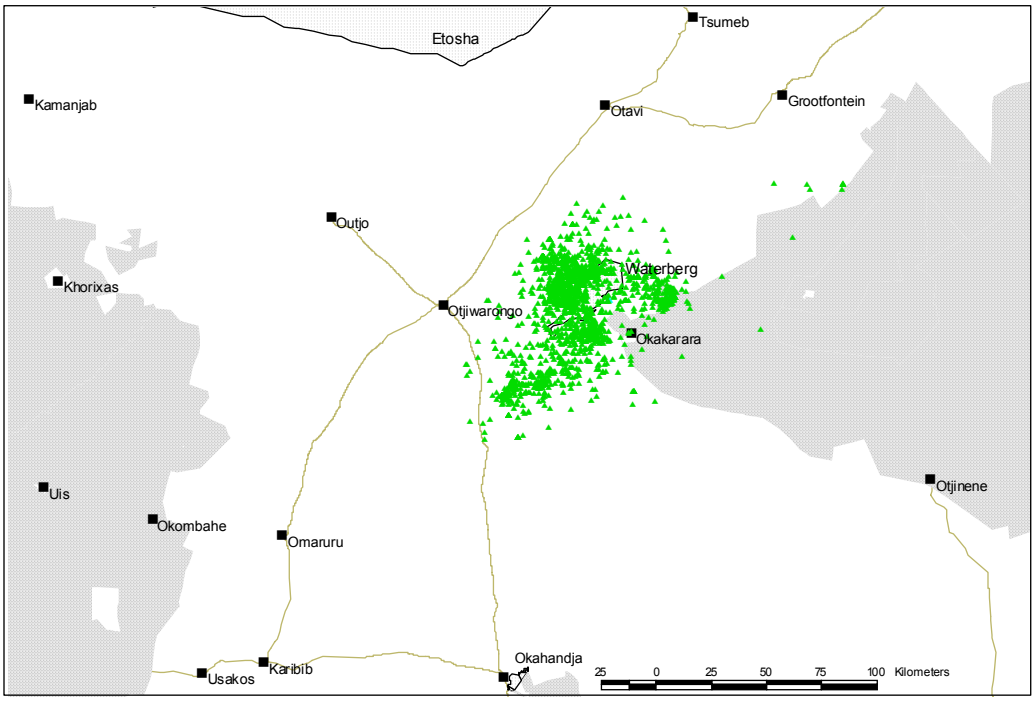
This document contains four reports:

1. June 2006 update on the Cape Vultures being tracked with satellite transmitters
2. January 2007 update on Cape Vultures tracked with satellite transmitters
3. 2008 update on Cape Vultures tracked with satellite transmitters
4. The misfortunes of a Cape Vulture - 2007

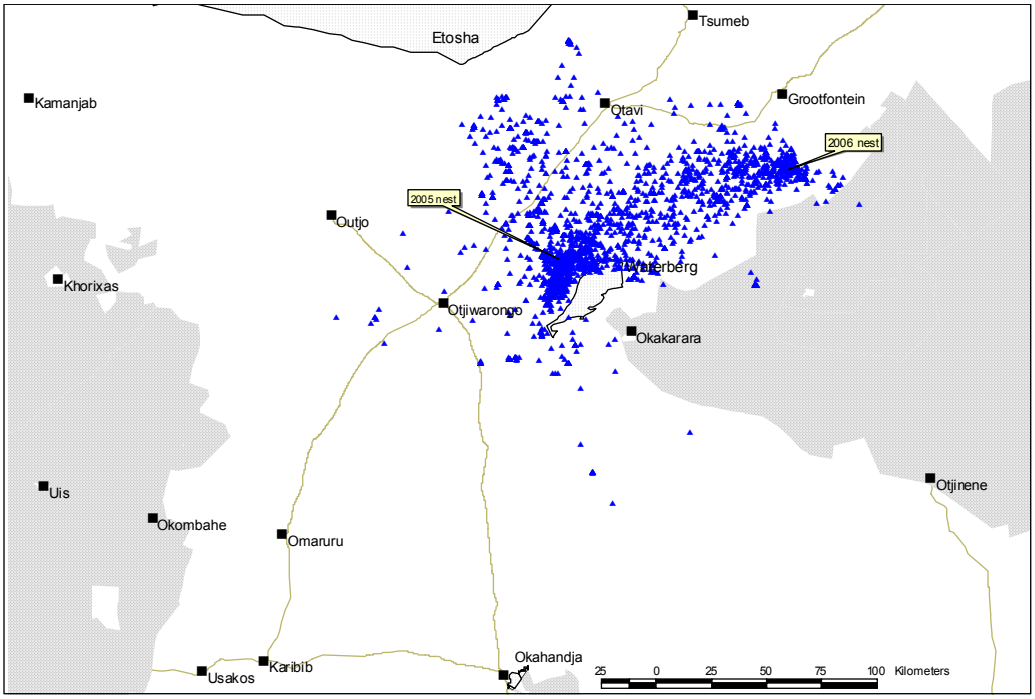
An update on the Cape Vultures being tracked with satellite transmitters

As of the end of May 2006, this is what has happened to the five Cape Vultures that are now being monitored. Three are adult males (CV3, CV4 and CV5), one is an immature female (CV6), while the fifth (CV7) is a young bird that was bred in captivity and then released at the age of 5 ½ years. The stippled areas in the maps are communal areas and national parks.

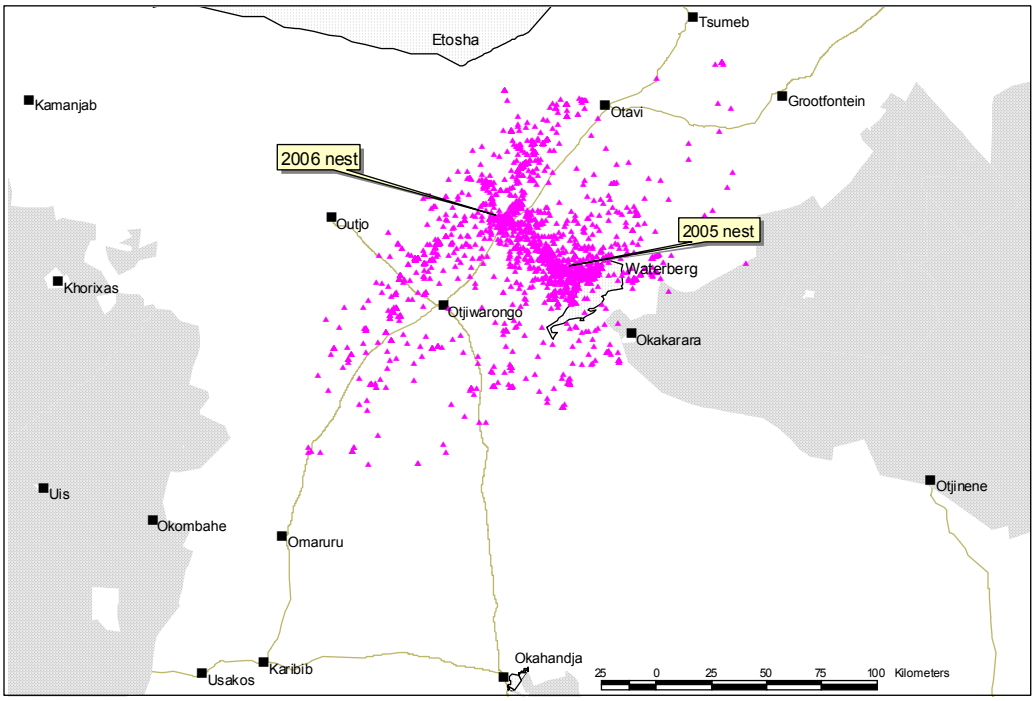
The transmitters on three other birds ceased transmitting: CV1 and CV2 (both adult males) and a juvenile Whitebacked Vulture (that looked like a hybrid, roosted in the tree nest of CV1, and later died). Together with data from these birds, a total of 30,344 locations have been recorded during this vulture tracking programme.



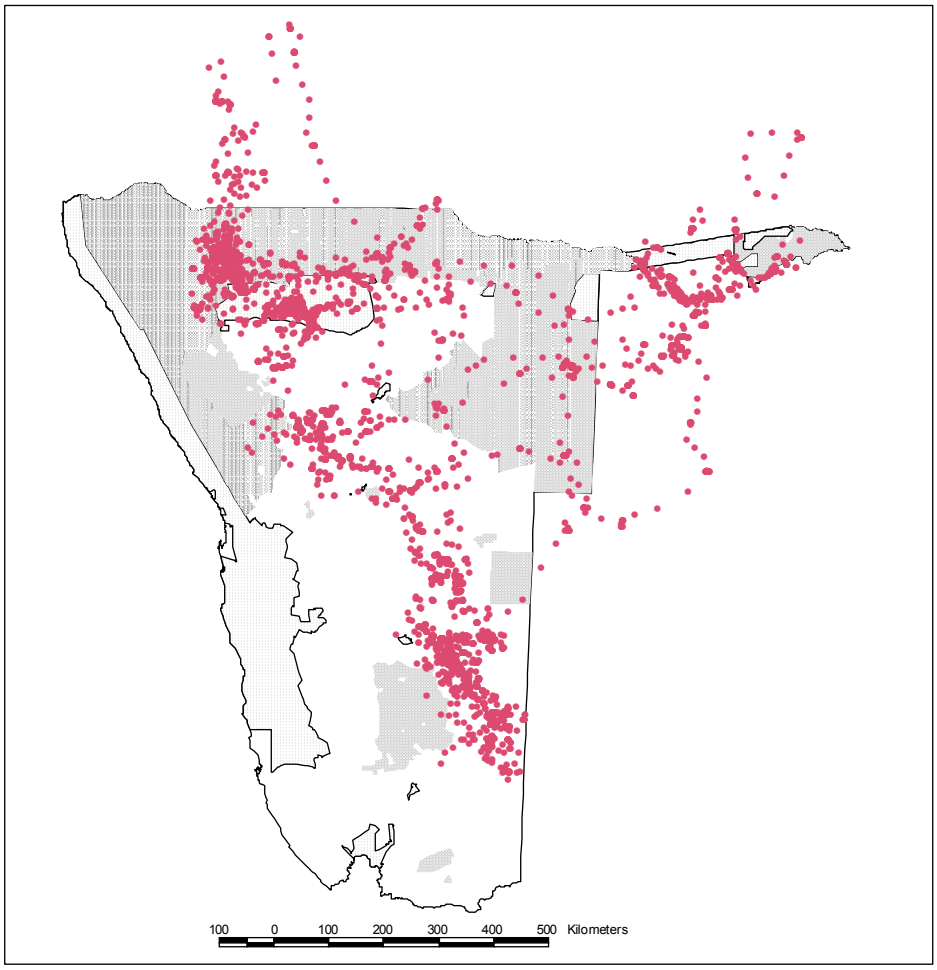
CV3 – an adult male and the only bird to roost regularly on the Waterberg cliffs (at two sites on the western cliffs, and at one site on the eastern cliffs). The bird did not breed either in 2005 or 2006. It was caught and fitted with its transmitter on 28 November 2006 and 4,618 locations have been plotted since then. The bird often feeds at the REST vulture restaurant.



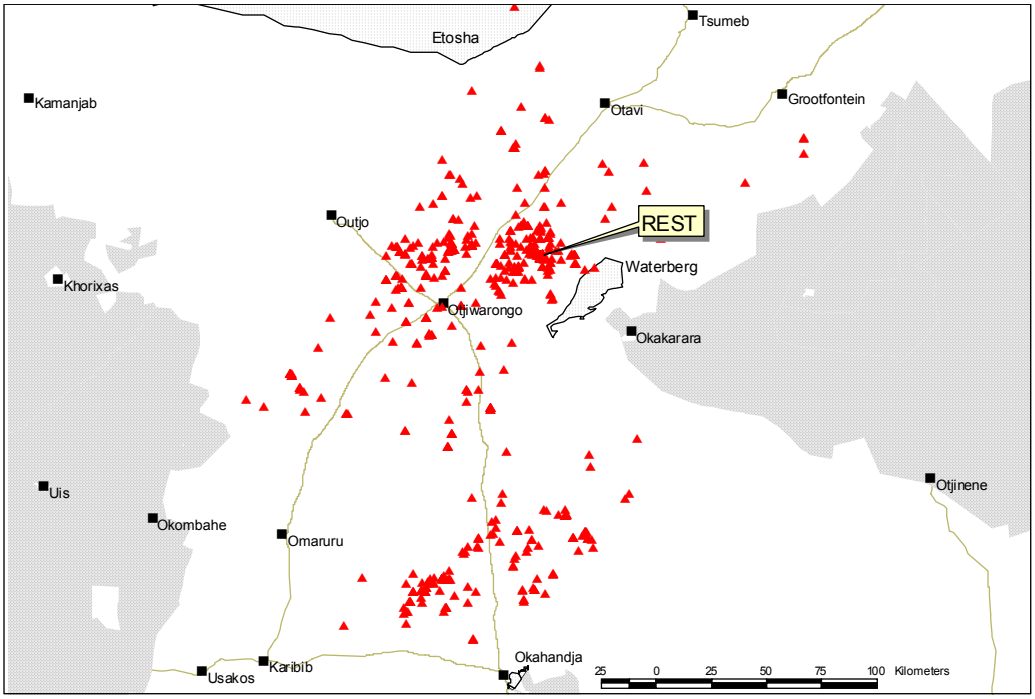
CV4 – adult male, caught and fitted with its transmitter on 28 November 2004. A total of 7,779 positions have since been recorded. Its nesting attempt in a tree near REST during 2005 was not successful, and the bird is now breeding in a tree some 35 kilometres south of Grootfontein. It frequently feeds at the REST vulture restaurant.



CV5 – an adult male, caught and fitted with its transmitter on 15 January 2005. A total of 5,727 locations have since been recorded. As with CV4, its 2005 attempt at breeding in a tree near REST failed, and this year it is breeding in a tree just west of the Otjiwarongo-Otavi main road. It feeds regularly at the REST vulture restaurant.



CV6 – immature female, caught and fitted with its transmitter on 15 February 2005. Since then a total of 6,740 locations have been recorded. The bird has made several separate, but brief excursions into Angola, and one into Zambia. Several weeks were spent in the Panhandle of the Okavango Delta and in southern Caprivi. For the remainder of the past 15 months, the vulture has concentrated its time in three separate areas: south-western Omusati, the central areas of Etosha, and in south-eastern Namibia. It has returned to each of these areas several times.

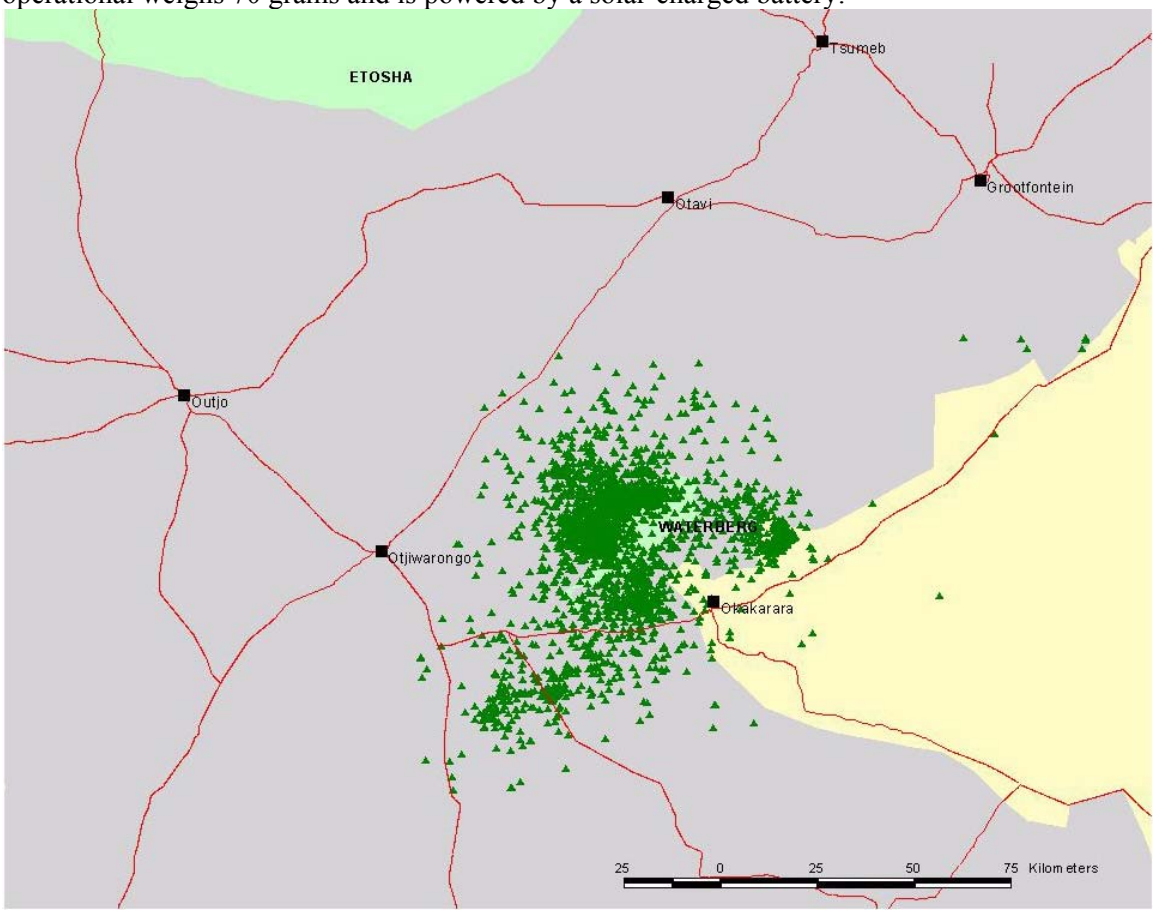


CV7 - young captive bred female, released on 22 October 2005. A total of 1,002 locations have been received. The bird remained close to (within 5 kilometres) its release site at REST for about three and a half months. Then, on 7 February 2006, it took off and has been wandering around ever since, spending much of its time north of Okahandja. It returned to REST for brief visits at the end of April and on a few days in May.

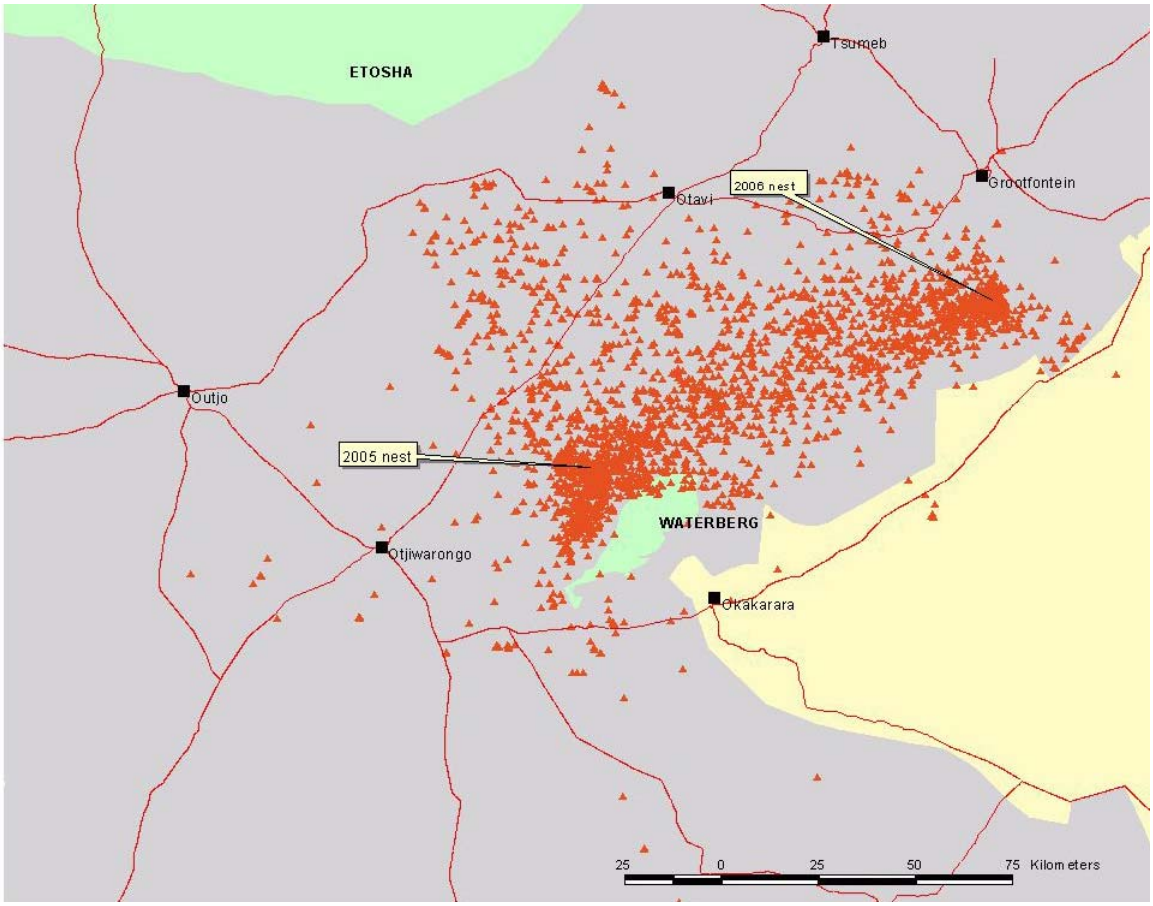
January 2007 update on Cape Vultures tracked with satellite transmitters

As of mid January 2007, this is what has happened to the six Cape Vultures that are now being monitored. All the birds were caught at REST (Rare & Endangered Species Trust), 50 kilometres north-east of Otjiwarongo. Four vultures were caught as wild birds, three being adult males (CV3, CV4 and CV5) and one as an immature female (CV6). The remaining two were released from captivity: CV7 was bred in captivity and then released at the age of 5 ½ years, while CV8 is an old adult male that had been captive for many years in South Africa (from where it came) and at REST. The grey areas in the maps consist largely of freehold farms, the yellow is mostly communal land, while the green is for national parks.

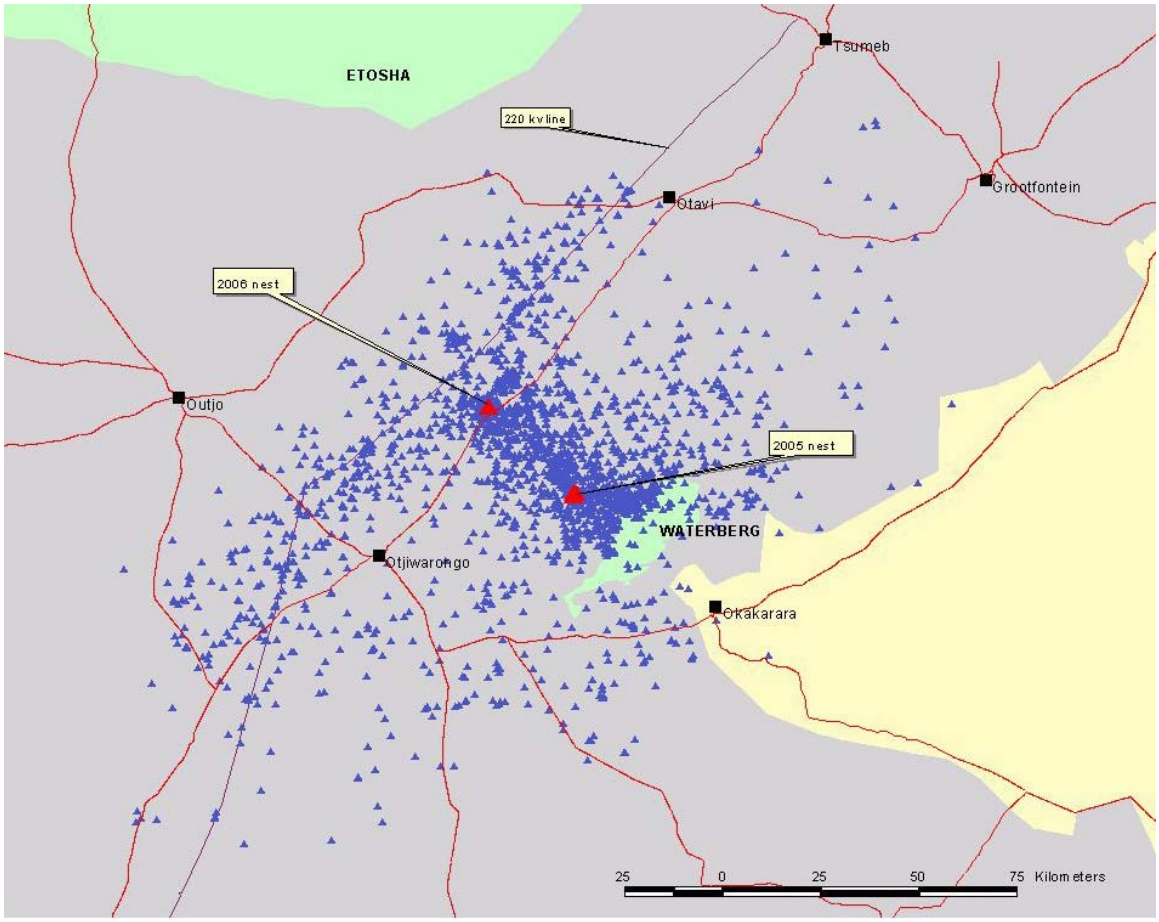
The transmitters on three other birds ceased transmitting: CV1 and CV2 (both adult males) and a juvenile Whitebacked Vulture. Together with data from these birds, a total of 42,446 locations have been recorded during this vulture tracking programme. Each of the transmitters that are now operational weighs 70 grams and is powered by a solar-charged battery.



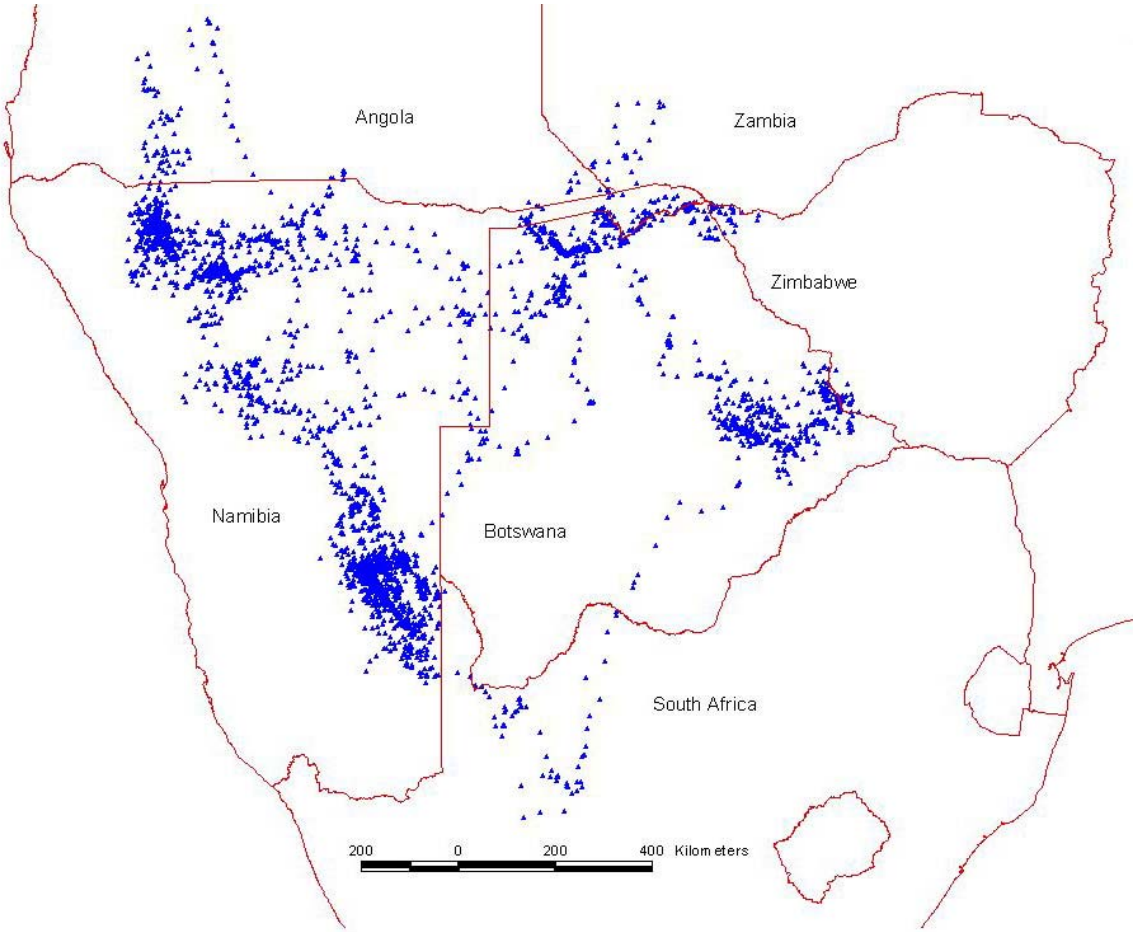
CV3 – an adult male and the only bird to roost regularly on the Waterberg cliffs (at two sites on the western cliffs, and at one site on the eastern cliffs). The bird did not breed either in 2005 or 2006. It was caught and fitted with its transmitter on 28 November 2006 and 6,478 locations have been plotted since then. The bird often feeds at the REST vulture restaurant.



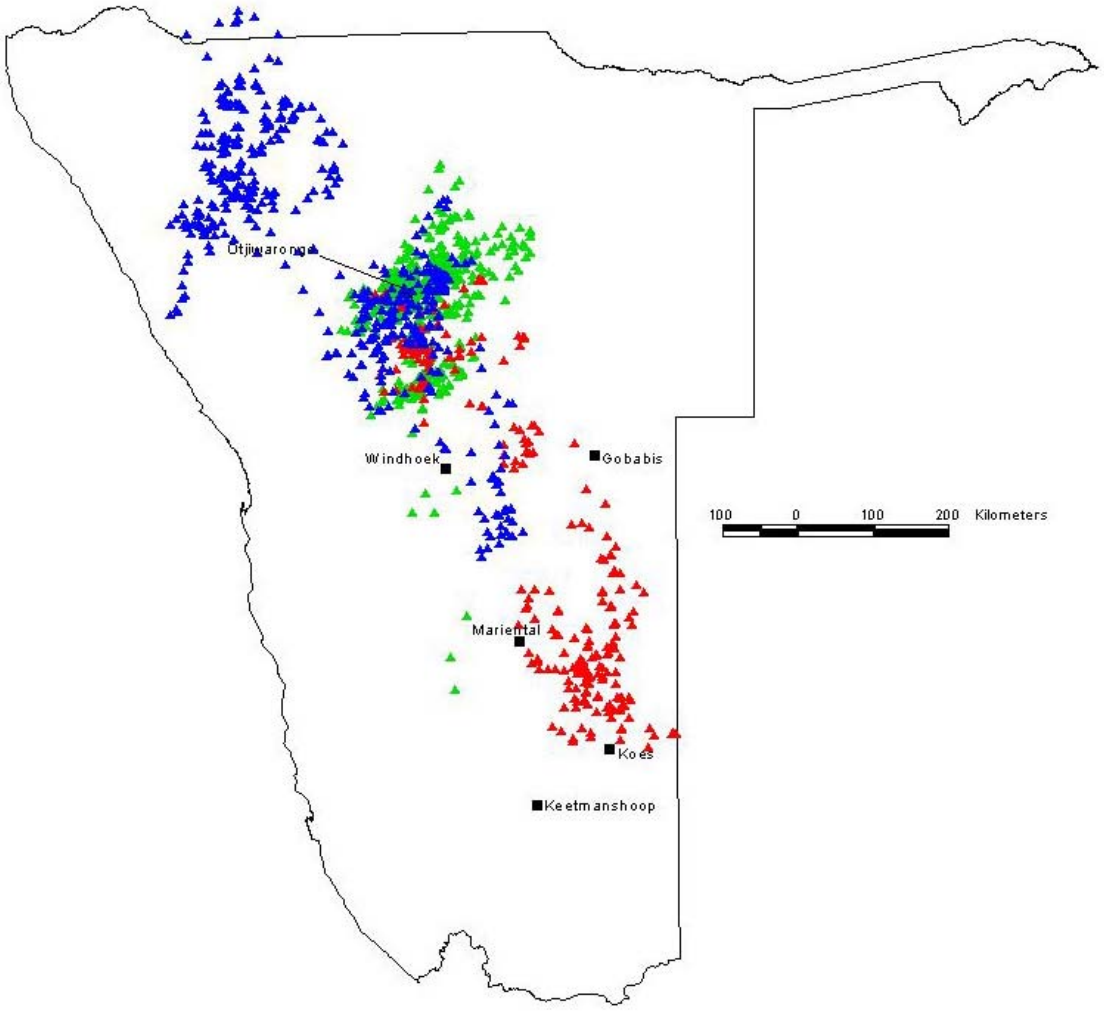
CV4 – adult male, caught and fitted with its transmitter on 28 November 2004. A total of 10,768 positions have since been recorded. Its nesting attempt in a tree near REST during 2005 was not successful. However, its 2006 nesting was probably successful since it was recorded at its nest tree between March and November. It frequently feeds at the REST vulture restaurant.



CV5 – an adult male, caught and fitted with its transmitter on 15 January 2005. A total of 8,453 locations have since been recorded. As with CV4, its 2005 attempt at breeding in a tree near REST failed, but judging from its continuous and frequent presence at its nest, the bird probably bred successfully in 2006. CV5 has spent at least 46 nights roosting on pylons supporting a 220 kilovolt electricity line. This bird and the others tracked in that area keep a wide berth around the town of Otjiwarongo, as shown clearly in this map.



CV6 – immature female, caught and fitted with its transmitter on 15 February 2005. Since then a total of 10,091 locations have been recorded. The bird has covered a sizeable area of southern Africa, having been in six countries. The straight line distances covered from point to point (these are recorded each hour) indicate that CV6 has flown at least 64,000 kilometres. These distances do not include circling and meanders flown between each hourly location. While many of its movements appear nomadic, what is interesting is that CV6 has repeatedly returned to several, perhaps favoured foraging areas. These are in western Omusati (roughly south of Ruacana), where it spent several weeks at a stretch in each of March, May, July and December 2005-January 2006. Likewise, it spent several weeks in northern Botswana and Caprivi (mainly around the Panhandle of the Okavango Delta and in the Linyanti area) in July-September 2005 and again in August-September 2006. Lastly, it has spent time in south-eastern Namibia on three separate occasions: October-November 2005, April-July 2006, and December 2006-January 2007. Other favoured foraging areas have been in south-eastern Botswana and to the west and east of Okaukuejo along the Etosha salt pan. Interestingly, while in south-eastern Namibia it has only once crossed (and for only an hour) into the nearby Kgalagadi National and Transfrontier Park, suggesting that much more food is available on the Namibian farmlands.

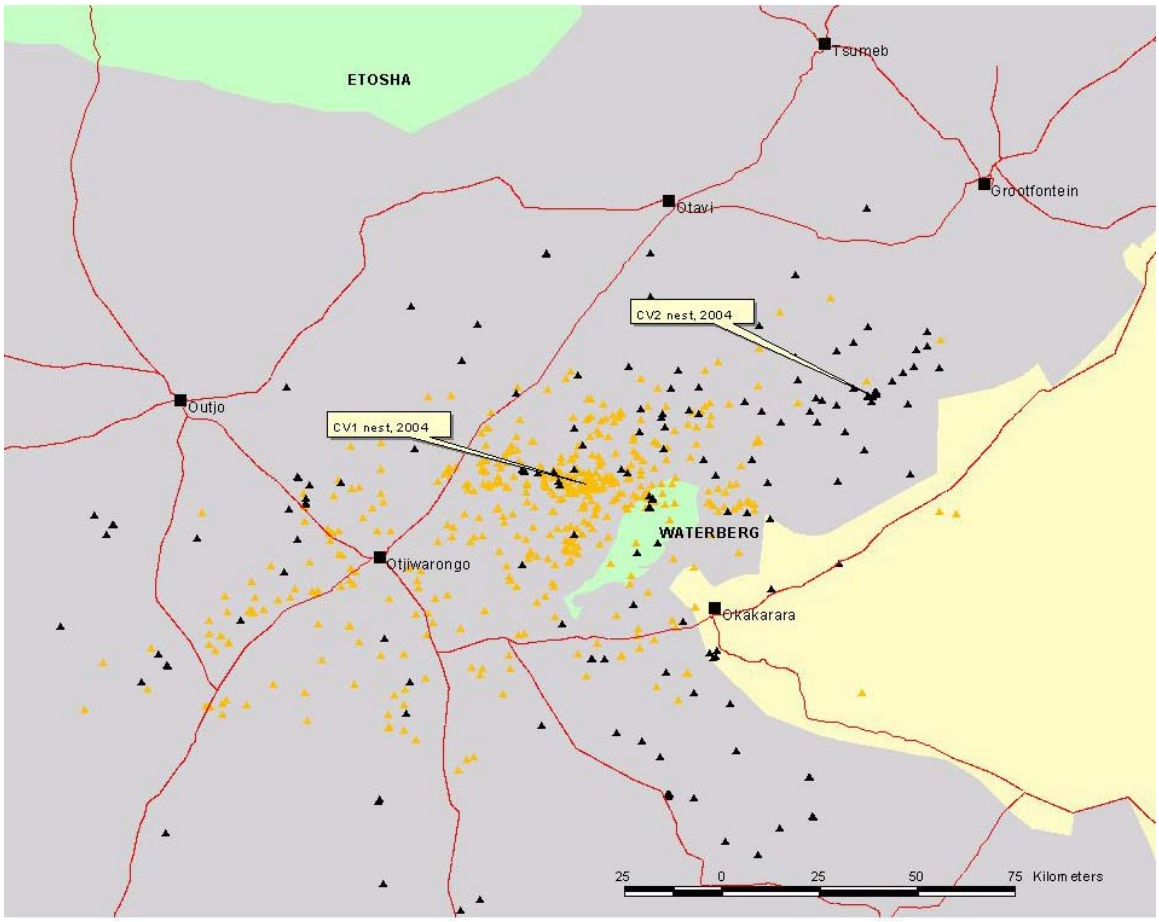


CV7 (green dots) - young captive bred female, released on 22 October 2005. A total of 1,624 locations have been received. The bird remained within 5 kilometres of its release site at REST for about three and a half months. Then, on 7 February 2006, it took off and has been wandering around ever since, but also returned frequently to hang around the Diekmann's house and the REST vulture restaurant a few hundred metres away. Just recently in early January 2007, it appears to have finally 'left home' and moved into southern Namibia.

CV8 (red dots) – also a captive bird that was released on 28 August 2006. A total of 554 locations have been recorded (co-ordinates from this bird and CV7 are only recorded every two hours, unlike the hourly records received for the other vultures). CV7 hung around its release site and home (over the past several years) at REST for about 10 days, and then headed off. It remained foraging over a large area south of Otjiwarongo until early November, when it moved to south-eastern Namibia. This is the same area that has been favoured by CV6.

WBV (blue dots) – this juvenile was an enigma. After capture at REST and being examined in the hand, the bird appeared to several observers to be not quite a Whitebacked Vulture, almost edging towards looking like a Cape Vulture. To support the wild idea that this could be a hybrid, recorded co-ordinates showed that the young bird frequently roosted in the tree nest of CV1,

suggesting that CV1 could be its parent and while the parent was perhaps a Whitebacked. The young bird remained around in a broad zone near its possible nest until early May 2004. It then took off for north-western Namibia and a brief sortie into Angola. It later returned south, spending a good deal of time south of Otjiwarongo. Sadly, the bird was found in a weak state and later died, perhaps of poisoning. A total of 1,600 locations were reported between 21 March and 19 September 2004.



CV1 (orange dots) and **CV2** (black) were both adult males that apparently nested in trees in 2004. Their transmitters ceased functioning or fell off, and they were therefore only tracked for a relatively short period (CV1: from 21 March to 31 October 2004, giving 2,224 co-ordinates; CV2: from 21 March to 17 May 2004, with 654 records). The movements and ranges of these two birds was very similar to those of the other three wild adults (CV3, 4 and 5). What is perhaps most noteworthy is the lack of foraging by all the birds over either the nearby communal land to the east or southern Etosha to the north. Most birds have also avoided foraging over the Waterberg Plateau Park.

John Mendelsohn, 20 January 2007

Some findings from tracking Cape Vultures in Namibia

John Mendelsohn and Maria Diekmann

Introduction

The Rare & Endangered Species Trust (REST) secured funds in 2004 to embark on a study of Cape Vultures *Gyps coprotheres* using so-called PTT (platform transmitting terminal) transmitters that relay the birds' locations via Argos satellites. So far, ten vultures have been fitted with PTTs, four of which have operated for over two years. Each PTT weighs 70 grams and is powered by tiny solar panels. The PTTs use GPS (global positioning system) recorders to log locations that are usually accurate to about 15 metres. Most of the transmitters record locations each hour from early morning to early evening, thus giving up to 14 locations each day. In addition, the PTTs transmit estimates of altitude and flight speed. All the birds were caught at the REST vulture feeding site or restaurant, 50 kilometres north-east of Otjiwarongo.

Of the ten birds fitted with PTTs five were wild-caught adult males and two were young birds: a wild-caught immature female and a possible hybrid juvenile that may have fledged from a nest apparently occupied by an adult male (named CV1) and a White-backed Vulture *Gyps africanus*. The remaining three transmitters were fitted to captive adults: one was found dead a few days after release, while the other two were tracked for several months while they dispersed over large areas of the country.

By mid-May when this article was written, an impressive volume of data had been logged, amounting to about 48,700 separate locations, altitudes and speeds when the birds were in flight. Most of the locations were from the four birds tracked for over two years: CV3 and CV4 for almost 30 months, CV5 for 28 months and CV6 for 27 months.

Home ranges and movements

The five adult males all concentrated their movements within broad home ranges, each covering between 10,000 and 30,000 square kilometres (Figure 1); for comparison, the area of Etosha National Park is 22,900 square kilometres. Although their ranges overlapped a good deal, each bird tended to favour different zones. Thus, CV3 seldom moved far from the Waterberg and had the smallest range, whereas CV5 was often in areas to the west and CV4 favoured areas to the north-east of Waterberg.

Figure 1 shows that all the adults spent the majority of their time on freehold farms. None of the birds has ever ventured into the nearby Etosha National Park, and closer examination of places where the birds fed showed that very few carcasses were ever found in the Waterberg Plateau Park. Except for the regular roosting by CV4 in trees 25 kilometres north-east of Okararara, the birds also spent little of their time in communal land to the east of Waterberg; which is the former Hereroland. We speculate that this is because few wild large mammals occur in these areas, probably because wildlife is of little value to farmers there and because of the paucity of large mammals on the Kalahari Sand habitats that dominate the soils east of Waterberg.

The importance of wildlife as food for the vultures is indicated by the work of Pippa Schults, a student from the University of Cape Town. She used the PTT data to find places where the vultures had fed on farms near REST. Of the 24 carcasses located, 13 were kudu, followed by 4 cattle, 2 eland, 2 oryx and 1 horse. Several of the kudus had snared themselves on fences. Her work is reported in Schultz, P. 2007. *Does bush encroachment impact foraging success of the critically endangered Namibian population of the Cape Vulture Gyps coprotheres?* Thesis for MSc in Conservation Biology, University of Cape Town.

The young vultures and the released captives moved much more widely than the adults (Figure 2). The most spectacular movements have been by CV6, which was also tracked over a much longer period than any other young or captive birds. While many of this immature female's movements appeared to be nomadic, it is noteworthy that CV6 repeatedly returned to several, perhaps favoured foraging areas. These are in:

- western Omusati, roughly south of Ruacana, where it spent several weeks at a stretch in each of March, May, July and December 2005-January 2006,
- northern Botswana and Caprivi, mainly around the Panhandle of the Okavango Delta and in the Linyanti area in July-September 2005 and again in August-September 2006)
- south-eastern Namibia on three separate occasions: October-November 2005, April-July 2006, and December 2006-January 2007, and
- south-eastern Botswana in September-November 2006 and from March until at least May 2007.

Other favoured foraging areas have been to the west and east of Okaukuejo around the Etosha Pan and to the east of Windhoek. Interestingly, while in south-eastern Namibia CV6 only once crossed (and for only an hour) into the nearby Kgalagadi National and Transfrontier Park, suggesting that much more food is available on the Namibian farmlands. Enquiries among farmers in south-eastern Namibia suggest that their farms offer a good supply of sheep carcasses to vultures.

Nesting

All ornithological references unanimously report that Cape Vultures breed on cliffs. Thus, perhaps the most surprising finding from the tracked birds is of them nesting in trees, at least four, and perhaps six times. The four more definite records were from CV4 and 5, which nested in widely separate places in 2005 and 2006. Several brief observations of birds appearing like White-backed Vultures on the same nests suggested that they were hybrid breeding attempts, but unequivocal evidence of this remains lacking. The strongest indication of hybrid breeding came from the juvenile fitted with a PTT. While being examined in the hand after it was caught at REST, several observers noted that the juvenile was most like a White-backed Vulture but also had features suggestive of a Cape Vulture. Later support for this wild idea came from PTT co-ordinates that showed this young bird to have frequently roosted over several weeks in the very tree nest attended by CV1. Another adult observed on this nest looked like a White-backed Vulture.

If these breeding attempts in trees were indeed with White-backed Vultures, it may have been a shortage of female Cape Vultures that led males to consort with females of this much

more abundant species. This explanation is suggested by the fact that only one adult female has been seen repeatedly at the REST restaurant in recent years. More study of possible hybridisation and tree nesting would be of great value, both to explain what is happening to this remnant population of Namibian Cape Vultures and to suggest what might happen to other small populations of vultures elsewhere in the world. Of course, we have no clues about the fertility or viability of hybrids.

None of the birds has been found to nest at the old Cape Vulture breeding colony on the western cliffs of the Waterberg massif. However, CV5 is now (in May 2007) spending a great deal of time there, giving us suspicious hope that he may now breed there. The only other bird to frequent and roost on these cliffs was CV3. He did not breed there, or anywhere else in 2005 or 2006, and has yet to show signs of settling at a nest in 2007. Despite all this, some other Cape Vultures may have bred at the cliffs in recent years, a possibility suggested by the observations of Christa Diekmann and by regular sightings of at least one young juvenile at the REST restaurant after the end of the breeding season.

One of the tree nests used by CV5. This is on the farm Okaputa Sudwest, north of Otjiwarongo.

Foraging

The locations, altitudes and flight speeds recorded each hour provide some information on foraging behaviour. Typically, the birds remain at or close to their over-night roosts until about 09h00 or 10h00 before taking off to soar in search of food. The time then spent foraging varies greatly. Some days are fully spent in flight, the vultures only descending to roost at about 15h00 or 16h00. On other days, the vultures fly for less than an hour before their locations, altitudes and flight speeds indicate that they are on the ground, presumably at

a carcass. It is these locations that Pippa Schultz tracked down to see what carcasses the vultures had found.

Flying speeds normally vary between 50 and 70 km/hour. The highest speed recorded was 127 km/hour, a figure reached 11 times, suggesting that this is about as fast as a Cape Vulture ever goes. The majority of faster flights of over 90 km/hr appear to be clocked when the vultures are not foraging, for example when flying back to a nest or roost, or moving from one part of the country to another. It is also during these long-distance flights that the birds often fly really high, reaching altitudes of 700 to 1,000 metres above ground. While foraging, however, their heights typically range between 200 and 500 metres above ground. One factor that does relate to altitude is vegetation cover, the birds soaring at greater heights over areas with less cover. For example, average foraging heights (433 metres) in the much more arid and open habitats of south-eastern Namibia are about 100 metres higher than over the much denser cover around Otjiwarongo, Waterberg, Otavi and Grootfontein. Moreover, there is a clear linear relationship between average flying height and plant production (see page 102 in Mendelsohn, J.M., Jarvis, A.M., Roberts, C.S. & Robertson, T. 2002. *Atlas of Namibia*. David Philip, Cape Town.).

What might explain this trend? Perhaps thermals are stronger, lifting the birds more rapidly in more open country. The density of large mammals (and their carcasses) is probably lower in more arid, open zones, and the birds may improve their chances of finding food by searching over wider expanses from higher up. A third, perhaps better possibility is that vultures need to search more intensively or carefully where bush cover is thicker, and thus soar at lower levels to spot carcasses that are partially hidden by vegetation. Pretty solid evidence that carcasses are harder to find in dense cover comes from a neat experiment by Pippa Schultz. She placed food in areas of varying cover and found that the vultures located food quicker in low density bush than in high density cover. The probability of food being found also declined as bush density increased, to the extent that food was never found where there were more than 2,600 trees/hectare.

These observations lead us to the conclusion that bush encroachment, one of the most serious environmental problems in Namibia, probably reduces the availability of food to vultures. What impact this has on vulture populations is hard to say. Since Namibia's few adults seem concentrated in the area shown in Figure 1, it is unfortunate that much of this part of the country also suffers from severe encroachment. As a result, the value of supplementary food provided by local vulture restaurants may be especially high value in compensating for the effects of food being hard to find.

Acknowledgements
Many people and organisations have contributed to this project, and we particularly grateful for funding for the PTTs provided by Nedbank Namibia, Namibia Nature Foundation, Wilderness Safaris, Steve Martin's Natural Encounters, Ned and Diana Twining, and Jack Hanna.

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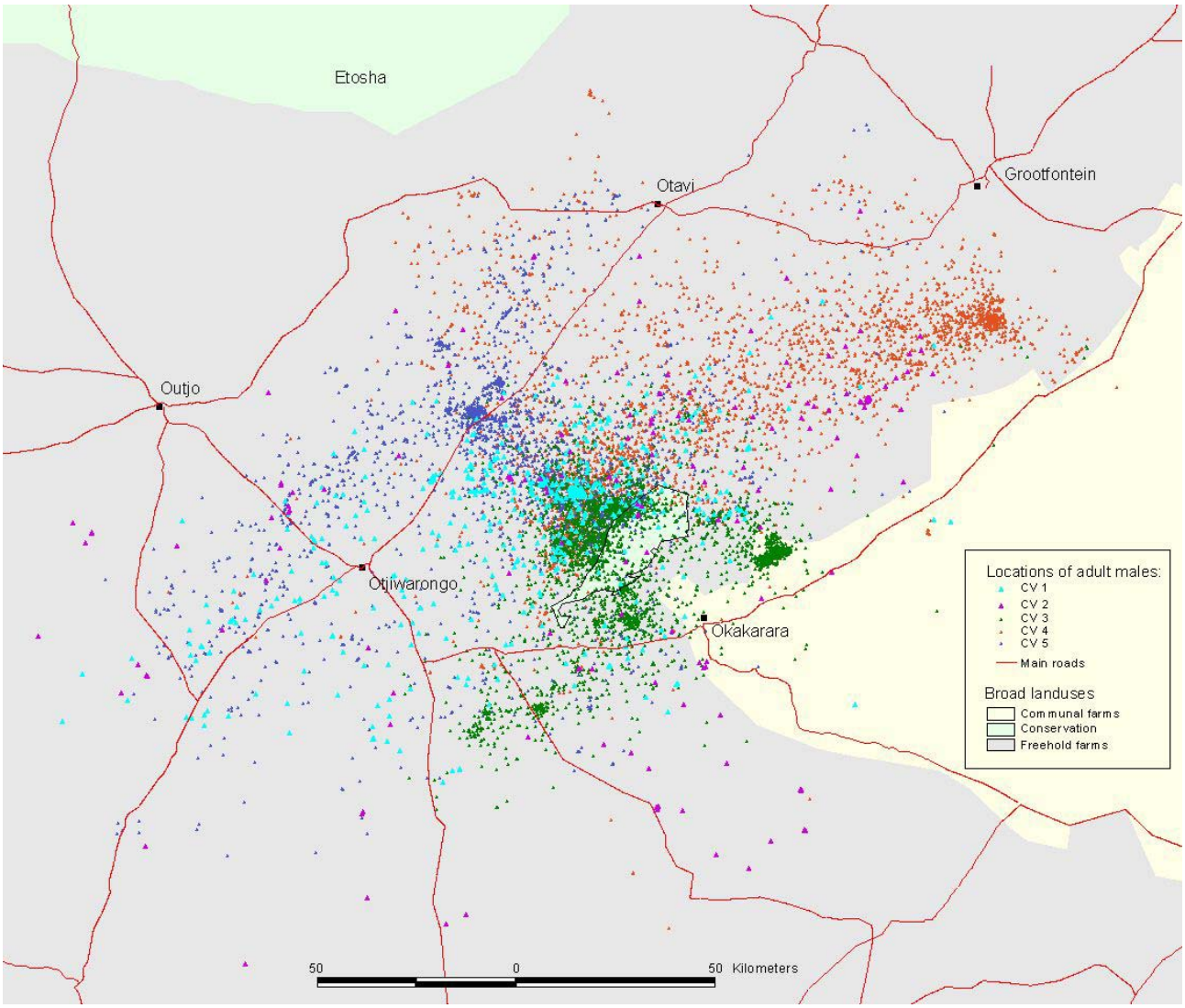

Figure 1 The dots on the map are locations where the five adult males Cape Vultures were recorded. The concentrations of dots are around favoured roost or nest sites.

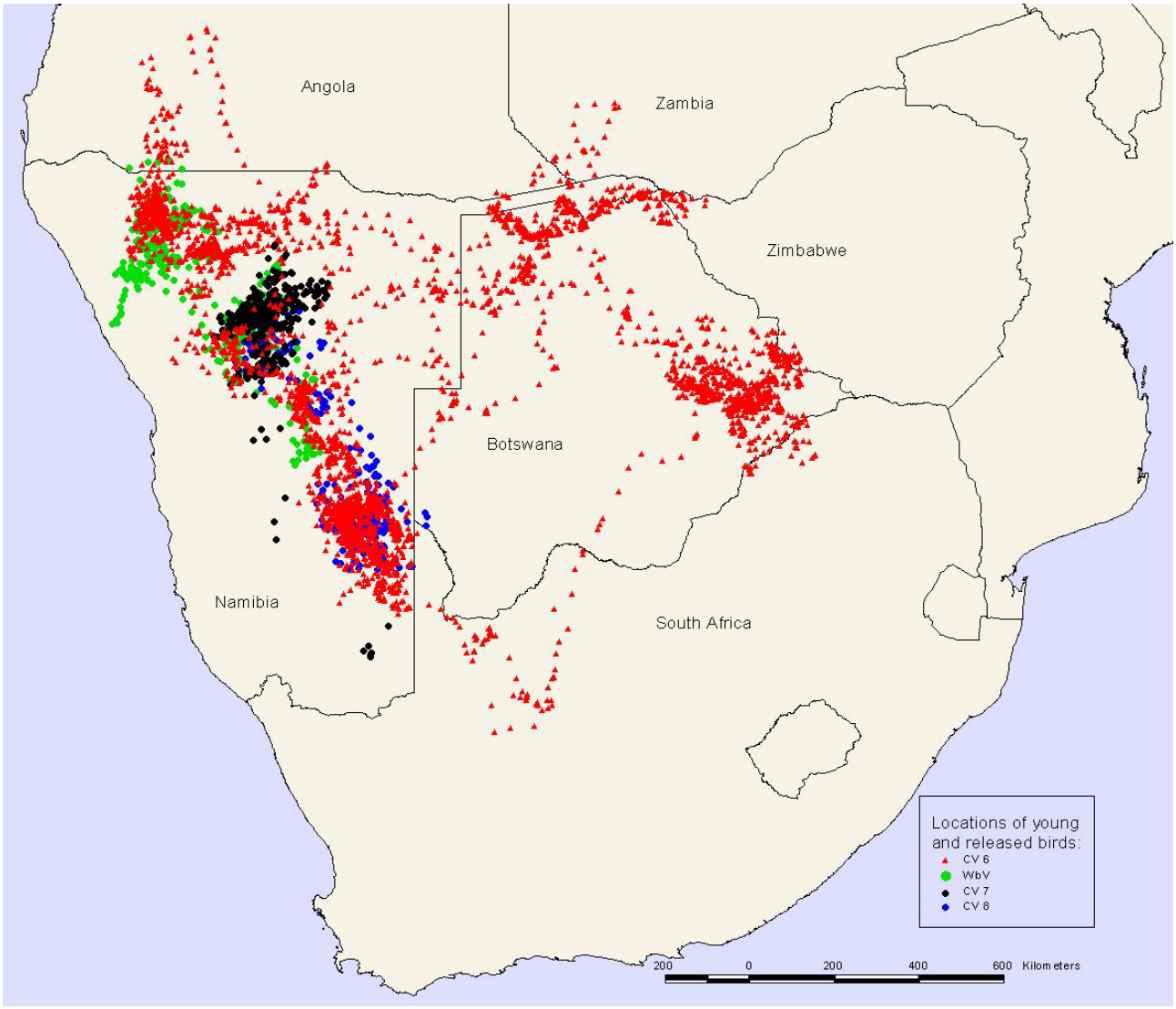

Figure 2: Locations at which two wild young vultures (CV6 and the possible hybrid WBV) and two released captive birds (CV7 and 8) were recorded.

The misfortunes of a Cape Vulture

This short note about a single Cape Vulture could be just an anecdote, or it may suggest something useful about the reliability of food for these birds and what limits their numbers in Namibia. The bird, a male, boringly called CV5 by me and Dragon Rider by the more evocative Maria Diekmann, has been monitored since the 15th of January 2005 when it was fitted with a radio transmitter at REST, 50 kilometres north-east of Otjiwarongo.

Later that year the bird nested in a tree near REST on the Diekmann's farm Uitsig. The breeding attempt began in late March and ended in late June when the nestling disappeared. Joerg Diekmann thinks that a Tawny Eagle robbed this nest and two others in trees nearby. Dragon Rider nested again in a tree during 2006, this time on the farm Okaputa Suid, close to the Otjiwarongo-Otavi road. The 2006 breeding attempt was probably successful because the bird was recorded at the nest consistently between February and November. The actual nest used in 2006 is shown in Figure 1, although two other vultures were there when the nest was photographed on the 29th of April 2007.

Figure 1. Dragon Rider's nest at Okaputa Suid in 2006.

Since the nesting attempts in trees in 2005 and 2006 were possibly hybrid pairings with White-backed Vultures, imagine our surprise and delight in 2007 when Dragon Rider returned to the traditional Cape Vulture breeding colony on the western cliffs of the Waterberg. Locations received from its transmitter showed the bird to be consistently at

one spot on the cliffs from late March onwards. Was it now possible that the bird had found itself a decent Cape Vulture mate and cliff nest, and was now behaving by the book?

Several of us went to the base of the cliffs on the 28th of July to search for the nest. One bird was spotted lying down as if it was incubating or brooding. Another bird twice flew onto the cliff where it perched about 10-15 metres above the nest. Two patches of fresh white-wash were visible around ledges that might have held other nests but these could also have been roost sites (Figure 2)

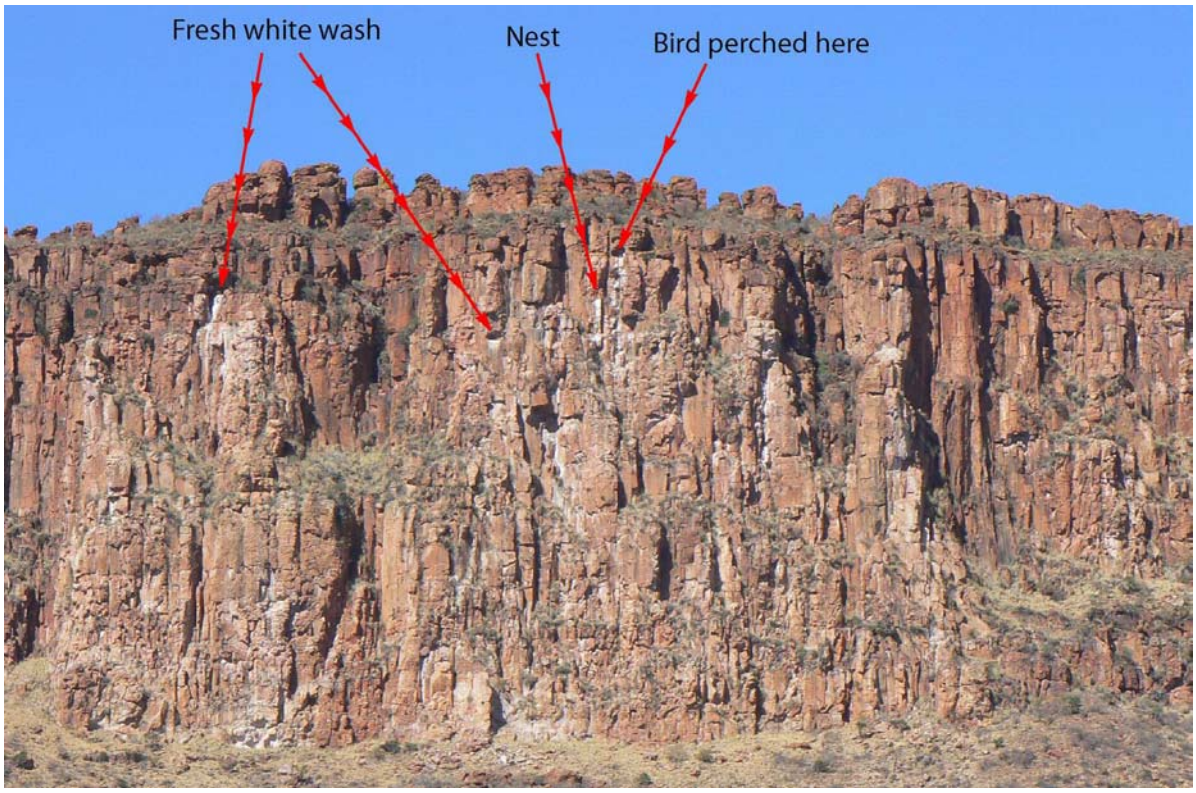

Figure 2. The nest site used by Dragon Rider on the Waterberg cliffs in 2007.

Christa Diekmann then visited the cliff on the 5th of August, when she saw three birds. She saw two birds on the 6th, but then none on the 7th or on any subsequent days over the next week. Her observations tallied with records from Dragon Rider's transmitter which showed that he left the cliffs on the 7th for good. Unfortunately, the transmitter did not provide consistent hourly locations on the 31st of July, or on the 1st and 2nd of August, but more reliable locations later showed that he went off foraging each day on the 3rd, 4th, 5th and 6th.

Our transmitter records from breeding birds at several nests indicate that they seldom leave their nests to go foraging for more than a day, and then normally spend one, two or three days at the nest before again venturing out for food. Dragon Rider's four days' of consecutive foraging was therefore most peculiar, and suggests that he was short of food.

That idea was reinforced by another bout of odd behaviour after the 7th. In the two and a half years that Dragon Rider had been tracked, all his movements had been restricted to an area within a radius of about 100 kilometers of the Waterberg. He had never been to

Etosha or north of Tsumeb or Grootfontein, for example. And so we were again surprised when he took off on an errant excursion through Etosha and up to the Angolan border between the 11th and 13th of August. He then returned south to his usual range around Waterberg.

On the 27th of August he again set off north, beginning this journey east of Grootfontein, from where he flew west to Etosha, then north of the Mangetti farms and later eastwards to the Mangetti Game Reserve. From here, he retraced his northerly arc over the Mangetti farms to return south of Namutoni and back to the Waterberg area on the 3rd of September. I would assume that these wide-ranging trips were undertaken because he failed to find food in his normal range. As of the time of writing in mid-October, Dragon Rider has remained in the Waterberg area, hopefully having regained a regular supply of food.

A last anecdote about this male. This is that he is the only bird we have tracked to regularly roost on electricity pylons. Dragon Rider is therefore an apt name for a bird that possibly ran so short of food that he abandoned his nest, and then made wild trips out of his normal range. And the Dragon spends many nights recharging his batteries close to high voltages.

John Mendelsohn
October 2007