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BIRD DISTRIBUTION DYNAMICS**BIRD DISTRIBUTION DYNAMICS 6 – CAPE VULTURE
Gyps coprotheres IN SOUTH AFRICA, LESOTHO
AND SWAZILAND**

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Introduction

Most initiatives to monitor a species, or group of species, focus on records of occurrence; the genius of a bird atlas project such as the Second Southern African Bird Atlas Project (SABAP2) (Underhill 2016) is that its focus is on a region rather than a species. For every species, every checklist helps to monitor that species, either by reporting it present, or by reporting it as absent.

The vultures of southern Africa are in trouble. The seven species with substantial parts of their breeding ranges in the region are all in Red List categories in both South Africa and Namibia (Simmons & Brown 2015, Taylor et al. 2015). As numbers decrease, the ranges for each species are shrinking. Thus the bird atlas project is therefore of especial value for the vultures, because it relentlessly tracks where vultures once occurred, but are no longer present. An atlas record of



Figure 1. Cape Vulture, VulPro. Photographer © Kerri Wolter

presence in a grid cell may be replaced in time by multiple records of absence, collectively providing evidence of a local extinction event.

This is the first paper in the VultureMAP series. VultureMAP is a partnership between VulPro and the Animal Demography Unit to provide an internet-based resource for information about southern

Africa vultures which helps meet the needs of the educational, conservation and research communities.

This is also the sixth paper of a series in *Biodiversity Observations*, called Bird Distribution Dynamics. The aim is to report on the ranges of bird species as revealed by the Second Southern African Bird Atlas Project (SABAP2, 2007 onwards) and to describe how their ranges have changed since the first bird atlas (SABAP1, mainly 1987–1991). The two bird atlas projects are about two decades apart.

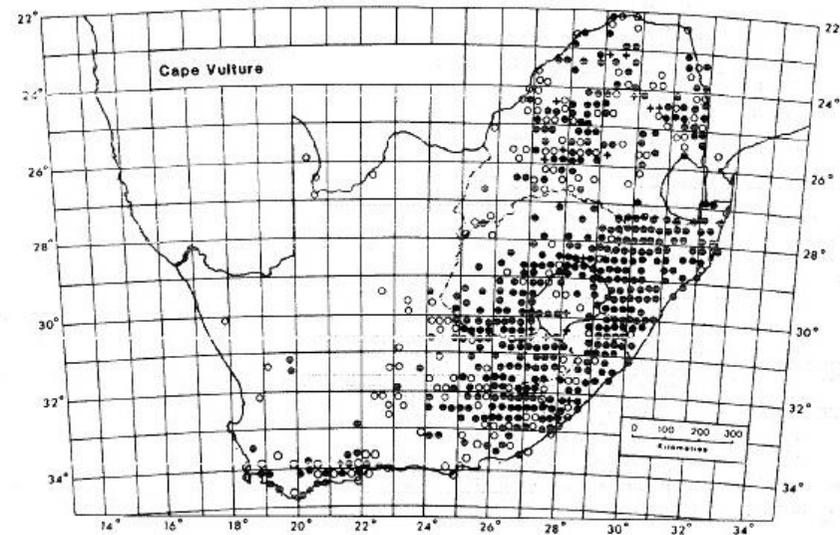
This series of papers is made feasible by the development of two new standards for the presentation of maps, firstly pentad-scale distribution maps derived from SABAP2 data, and secondly range-change maps showing how distributions have changed between SABAP1 and SABAP2 (Underhill & Brooks 2016a, b). Because all of the papers in this series use these two new maps, the rules for interpretation are not provided in detail in each of the papers.

This paper is the first of a series dealing with the vultures. They are written in partnership with VulPro and form part of the VultureMAP initiative. Here, we write about the Cape Vulture *Gyps coprotheres* (Figure 1), a species classified with a global conservation status of “Endangered” (Taylor et al. 2015). In Namibia, it has a conservation status of “Critically Endangered” (Simmons & Brown 2015).

Cape Vulture *Gyps coprotheres*

Background to the species

The Cape Vulture is one of the best studied bird species in southern Africa. A bibliography of papers related to the Cape Vulture would be a bulky document. Even in 1984, the “Selected bibliography” in the first



CAPE VULTURE

Kransaasvoël

Gyps coprotheres (Forster) 1798: Cape Town.

Order FALCONIFORMES

VULNERABLE

Family ACCIPITRIDAE (Aegyptiidae)

Figure 2. Cape Vulture distribution map, developed by Brooke (1984). Solid circles show quarter degree grid cells where the species had been recorded in the period 1970–1983. Open circles show records in the period 1800–1969.

comprehensive Red Data Book for South African birds was longer than that for any other species covered in the book, and contained references to 97 papers and other documents (with the African Penguin *Spheniscus demersus* second at 93) (Brooke 1984).

The Cape Vulture is endemic to southern Africa (defined as the region south of the Kunene and Zambezi Rivers), but has been recorded in southern Zambia, in the Kafue Flats (Mundy et al. 1992, 1997, Piper 2005). Tracking studies have subsequently demonstrated that it also ranges into southern Angola (Bamford et al. 2007).

The Cape Vulture forages over both grassland and fairly sparse woodland, ranging widely, without a regular migration (Mundy et al. 1997). It breeds on tall cliffs and prefers cliffs as roosts; if it forages away from cliffs it roosts in trees, and on pylons if there are no trees. Juveniles and pre-breeding adults tend to concentrate in “nursery” areas distant from breeding colonies (Mundy et al. 1997). The term “nursery area” seems to have first been used by Mundy (1982), who attributed its invention to AJ Anthony. The advantage of nursery areas is that they enable young birds to avoid foraging in direct competition with adults, the more efficient and aggressive feeders at carcasses.

This review focuses on the changing distribution of the Cape Vulture and Brooke (1984) provided the best available starting point (Figure 2). This was the first data-based distribution map for the Cape Vulture which aimed to be comprehensive, and fortunately it was produced using a quarter-degree grid. In 1984, a map like this would have been produced by hand, sticking black dots on a background master map. This explains why the dots of Figure 2 are not quite in straight lines.

Writing in 1983, Brooke (1984) crystalized the status of the Cape Vulture into a single summary sentence. He wrote: “A Vulnerable endemic species of southern Africa which has lost much of its population and abandoned many of its traditional breeding sites.”

Brooke’s (1984) multi-century perspective on the reasons for the decrease provides a valuable historical backdrop to the current assessment of the reasons for the changes in distribution of this species: “Cape Vultures were originally dependent for food on the herds of large migratory animals and then on the open range domestic stock which replaced them. The domestic stock population crashed in 1896 with the rinderpest epidemic. Subsequent changes in farming practices have reduced the number of cattle and sheep left dead in open veld thus reducing the food supply of Cape Vultures. There is now a shortage of bone fragments discarded by mammalian carnivores from which nestlings can get sufficient calcium to prevent

osteodystrophy. Eating poisoned carcasses whether poisoned to destroy a human health hazard or to kill jackals *Canis* spp, Caracal *Felix caracal*, other predatory mammals or even vultures themselves is a particularly serious matter since the assembly at such a carcass may destroy most or even all the vultures inhabiting a district” (Brooke 1984, with references omitted, refer to his text).

Amplifying this perspective, Boshoff & Vernon (1980) considered that the Cape Vulture had been relatively common in the former Cape Province before a strong decrease around 1900, widely attributed to the rinderpest epidemic and the Anglo-Boer War but most likely to be due to the “extermination of the game herds.” They noted that “while the slaughter of the game herds was already taking place during the 17th and 18th centuries, it appears that the main period of large-scale destruction was during the 19th century and even the early part of the 20th century.” From around 1900 until about the mid-1960s, the numbers of livestock on farms increased, and Cape Vultures were also considered in most districts of the Cape Province to be increasing (Figure 6 in Boshoff & Vernon 1980). In the mid-1960s, animal husbandry improved radically (eg development of drugs to control internal parasites of cattle and sheep) and stocking rates were greatly reduced. In 1976, in a survey of 386 farmers in the former Cape Province, all except one was of the opinion that Cape Vultures were decreasing in abundance; the remaining farmer considered that numbers were stable. The distribution of these farmers is shown in Figure 10 of Boshoff & Vernon (1980) and coincides closely with the distribution of Cape Vultures in the former Cape Province in Figure 2. Boshoff & Vernon (1980) considered that the increase in Cape Vulture numbers during the 20th century up to the mid-1960s was slow, but nevertheless had generated a “flourishing population”. Using this date as their turning point, they regarded the decrease, in contrast, as rapid, and by the late 1970s “the decline was almost complete.”

Based on ring recoveries and ring resightings made during his PhD studies from 1973 to 1975, Mundy (1982) suggested that young Cape

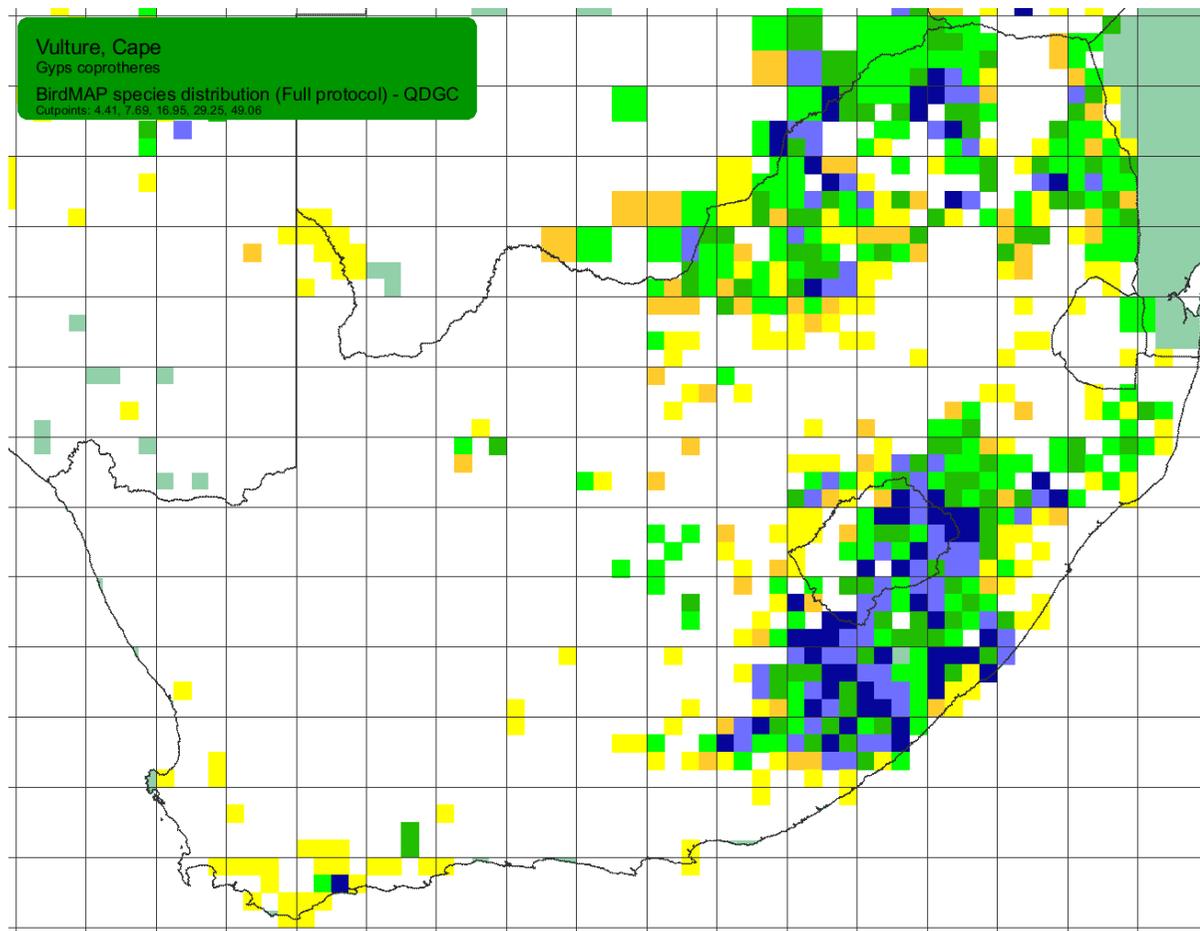


Figure 3. SABAP1 distribution of the Cape Vulture. All quarter degree grid cells with checklists are in colour with shades based on reporting rate: yellow 0–4.4%, orange 4.4–7.7%, light green 7.7–17.0%, dark green 17.0–29.2%, light blue 29.2–49.1 and dark blue 49.1–100%. Quarter degree grid cells with no checklists are shaded turquoise.

Vultures followed a route from the breeding colonies in the Magaliesberg and Botswana through the cattle country of the western Free State to their nursery areas in sheep farming regions of the eastern Grassy Karoo. Its SABAP1 distribution was closely associated

with subsistence communal-grazing areas, which were characterized by large stock losses and lack of use of poisons and, to a lesser extent, with protected areas (Mundy et al. 1997). A perceptive and probably prophetic paper by Vernon (1978) showed that the proportion of fledglings to the sheep-farming areas of the former Cape Province from colonies in the former Transvaal (mainly in the Magaliesberg) had starting showing a steady decrease from the mid-1960s, the same turning point as suggested by Boshoff & Vernon (1980). It therefore seems probable that the pattern of decrease, described by Boshoff & Vernon (1980) for the former Cape Province, were replicated over the remainder of the range of the species in South Africa as well.

In Namibia, Simmons & Brown (2015) placed the timing of the “precipitous crash” about a decade later than in South Africa. The Cape Vulture colony on the Waterberg Plateaux had about 300 birds in 1970, and about 10 in the early 1980s.

SABAP1 distribution

The distribution maps generated by SABAP1 are a snapshot of distribution through the late-1980s and early 1990s (Harrison & Underhill 1997). Mundy et al. (1997) undertook the textual summary of the SABAP1 distribution

map for the Cape Vulture (Figure 3). They considered it as distributed fairly widely in the eastern and northern regions of southern Africa, with an isolated cluster of records in the Western Cape. Most sightings

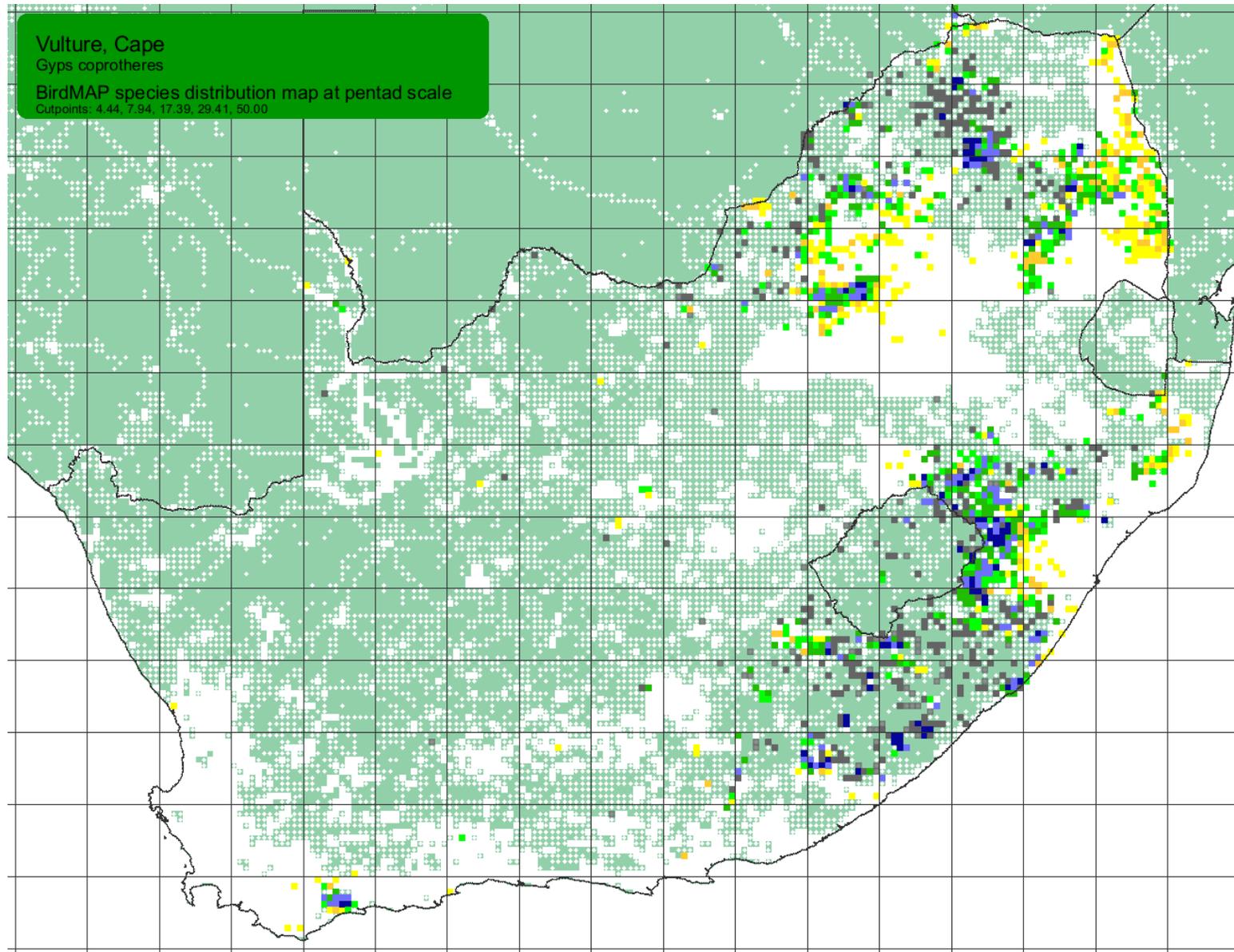


Figure 4. SABAP2 distribution map for the Cape vulture, downloaded 7 January 2017. The detailed interpretation of this map is provided by Underhill & Brooks (2016a). Pentads with four or more checklists are either shaded white, species not recorded, or in colour, with shades based on reporting rate: yellow 0–4.4%, orange 4.4–7.9%, dark green 7.9–17.4%, light green 17.4–29.4%, light blue 29.4–50.0 and dark blue 50.0–100%. In pentads shaded grey or with white dots, there are one, two or three full protocol checklists, or there are ad hoc lists, or incidental records. In pentads shaded grey, the species was recorded as present; in pentads with white dots the species has not been recorded. If a pentad has four or more checklists, and the species has been recorded on an ad hoc checklist or as an incidental record, it is shaded yellow, indicating that the species has a small reporting rate. Pentads shaded turquoise have no data.

were concentrated around breeding colonies and the bulk of these were located in two discrete regions: north-western South Africa and eastern Botswana and the Lesotho highlands, the former Transkei and western KwaZulu-Natal. A major insight from SABAP1 was the extent to which “the distribution map illustrates the hitherto unappreciated geographical separation of these two major strong-holds, probably brought about by the extinction of intervening populations in recent times. There is also an anomalous break in the distribution corresponding with the Escarpment in Limpopo” (Mundy et al. 1997).

The full colour SABAP1 distribution map presented in Figure 3 splits the reporting rates into six categories, whereas the published atlas, limited to using two-colour printing, was only able to present three categories (Mundy et al, 1997). Figure 3 thus shows detail that was not visible to Mundy et al. (1997), especially the extent to which the inner core (shaded dark blue in Figure 3) lay in the second of the two discrete regions they mentioned.

SABAP2 distribution

In comparison with Figures 2 and 3, the SABAP2 distribution map for the Cape Vulture (Figure 4) shows that the range has undergone further, and radical, fragmentation in South Africa, Lesotho and Swaziland. Another striking feature of Figure 4 is the extent to which the traditional nursery areas have shrunk, with a near complete absence over the central interior, especially the eastern Free State. Records in the Western Cape are now largely confined to the area immediately around the breeding colony at Potberg, in the de Hoop Nature Reserve. Overall, there are relatively few records away from the current breeding colonies (see Figure 1 of Wolter et al. 2016).

By 6 December 2016, it had been recorded 4,542 times in 1,280 pentads in South Africa, Lesotho and Swaziland. This constitutes 7.4% of all pentads, and 9.5% of the pentads which have been visited. Cape Vultures formed 0.05% of all records submitted for the region.

Range change between SABAP1 and SABAP2

In Figure 5, the approach described in Underhill & Brooks (2016b) was used to classify the quarter degree grid cells into six categories of increase and decrease. The relative increases and decreases are estimated using the Griffioen transformation (Underhill & Brooks 2016b), and involve an assumption that, in pentads where Cape Vulture occurs, they are randomly distributed across the landscape, i.e. they are not clustered or in flocks. For the Cape Vulture, this is probably not true. Thus this quantitative analysis underpinning this map needs to be treated with caution, but it is nevertheless likely that the qualitative and verbal descriptions are correct.

Results are shown for only the 642 quarter degree grid cells for which there are four or more checklists for both SABAP1 and SABAP2 and in which Cape Vulture occurred in either SABAP1 or SABAP2 (Table 1). In other words, grid cells in which Cape Vulture did not occur in either project are not included in this analysis.

Of these 642 quarter degree grid cells, 318 (50%) are red, and 75 (11%) are orange. This suggests very large (red) or large (orange) decreases in 61% of the quarter degree grid cells. The numbers of grid cells shaded blue (very large increase) and dark green (large increase) are 113 (18%) and 43 (7%) respectively, 25% in total. The apparent decreases massively outweigh the apparent increases.

Because this analysis uses grid cells with as few as four checklists in either SABAP1 or SABAP2, results are subject to sampling error (Underhill & Brooks 2016b). When the analysis is restricted to grid cells with at least 30 checklists in both SABAP1 and SABAP2, sampling error is considerably smaller, but there are only 327 grid cells which meet this criterion (Table 1). In this restricted analysis, 64% of grid cells show large or very large decreases, and 20% show large or very large increases.

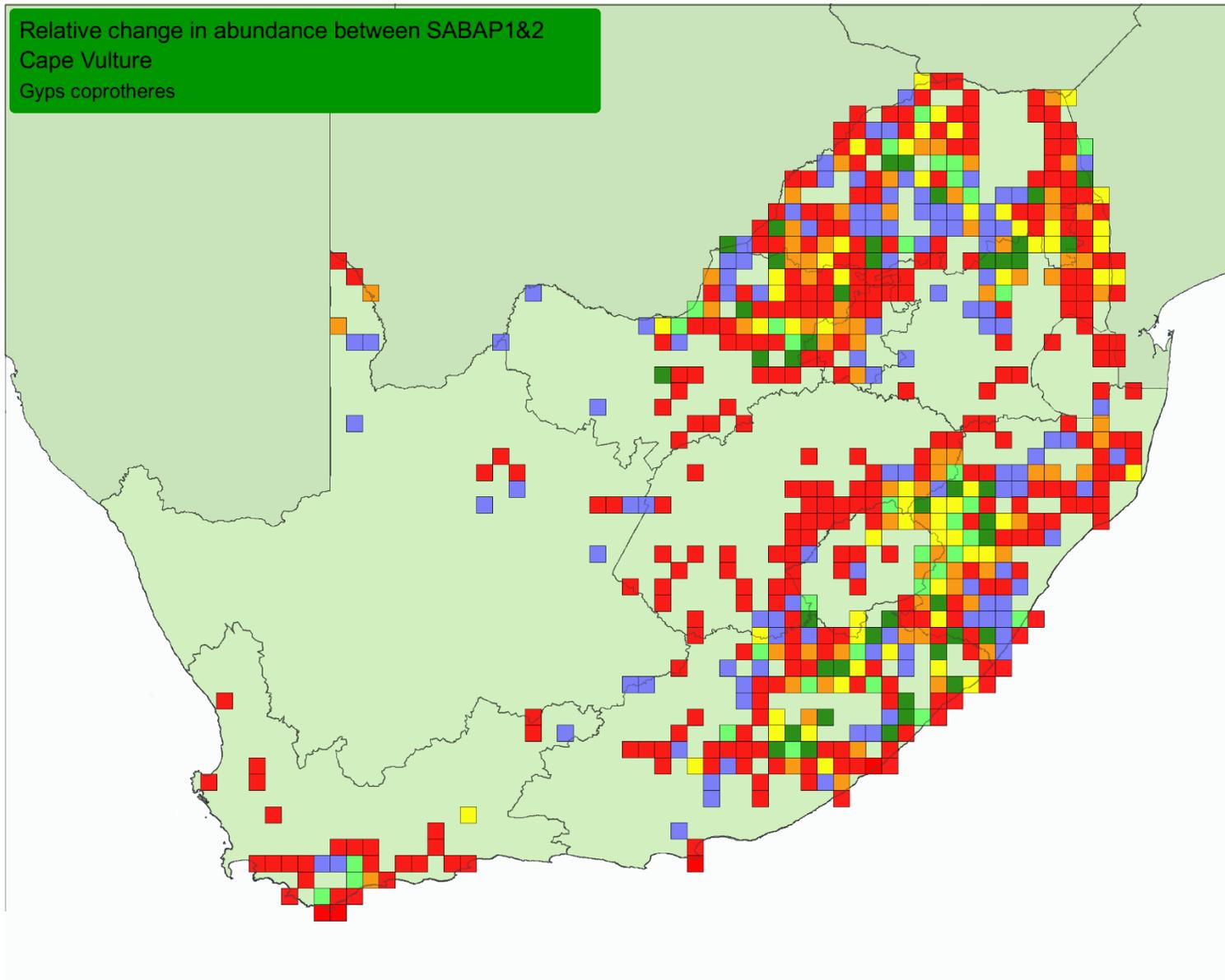


Figure 5. Range-change map between SABAP1 and SABAP2 for the Cape Vulture, downloaded 8 January 2016. Red, orange and yellow represent quarter-degree grid cells with very large, large, and small relative decreases and blue, dark green and light green represent grid cells with very large, large and small relative increases. A count of the number of grid cells in each category is provided in Table 1. Only grid cells with at least four checklists in both SABAP1 and SABAP2 are shown. All these grid cells had Cape Vulture recorded in them either in SABAP1 or in SABAP2 or in both. Fuller information on the interpretation of this range-change map is provided in Underhill & Brooks (2016b)

Table 1. Range-change summary for the Cape Vulture between SABAP1 and SABAP2. The table provides a count of the number of quarter degree grid cells of each colour in Figure 5. Also shown are the same summaries when the analysis is restricted to grid cells with at least 30 checklists for both SABAP1 and SABAP2.

Status	Four checklists for SABAP1 & SABAP2		30 checklists for SABAP1 & SABAP2	
	Count	%	Count	%
Red (very large decrease)	318	50	169	52
Orange (large decrease)	75	11	39	12
Yellow (small decrease)	59	9	33	10
Light green (small increase)	34	5	19	6
Dark green (large increase)	43	7	21	6
Blue (very large increase)	113	18	46	14
Total	642	100	327	100

Conclusions and recommendations

Overall, the conclusion has to be that the Cape Vulture is extremely likely to have experienced a major decrease in abundance in South Africa, Lesotho and Swaziland in the two-decade period between SABAP1 and SABAP2. Given the fact that the species tends not to occur at random across the landscape, the magnitude of the decrease cannot be quantified using the Griffioen transformation (Underhill & Brooks 2015b).

This result appears to be in stark contradiction of the results of Benson (2015), who compared numbers of Cape Vultures at breeding colonies in the former Transvaal province of South Africa, and found that these were remarkably stable (2,741 nestlings in 1985, 2,169 in 2000 and 2,616 in 2013). One way to reconcile this difference is to suggest that the former nursery areas in South Africa have been deserted, and replaced by nursery areas in other countries: see below.

Taylor et al. (2015) described three primary threats to the Cape Vulture: (1) poisoning; (2) electrocution and collisions; and (3) “their demand for use in the traditional health industry.” Two pages are devoted to elaborating and discussing the first two threats and suggesting mitigation measures, and the third is not mentioned again in the Cape Vulture text. Given the juxtaposition of the core areas of Cape Vulture distribution as shown by the SABAP2 map (Figure 4), and the layout of the former so-called “homelands” of South Africa (Readers Digest 1984), it is likely that the Taylor et al. (2015) text underestimates the magnitude and importance of the third threat. For example, Williams et al. (2014, Table 9) performed a quantitative analysis of the impact of African traditional medicine on 354 bird species recorded in traditional medicine markets in 25 countries. They ranked the Cape Vulture as the species most at risk from traditional medicine (Table 9 in Williams et al. 2014). Solutions to this threat are more likely to be found by sociologists than by scientists.

Most of the pentads in which Cape Vulture has been recorded for the SABAP2 project have four or more checklists, and hence are presented in colour in Figure 4 (Underhill & Brooks 2016a). There remain, however, several parts of the range which do not yet have four checklists, and which are shown as dark grey (representing present) in Figure 4. This is true especially in the Eastern Cape, KwaZulu-Natal and Limpopo. Given the level of threat to this species, improving

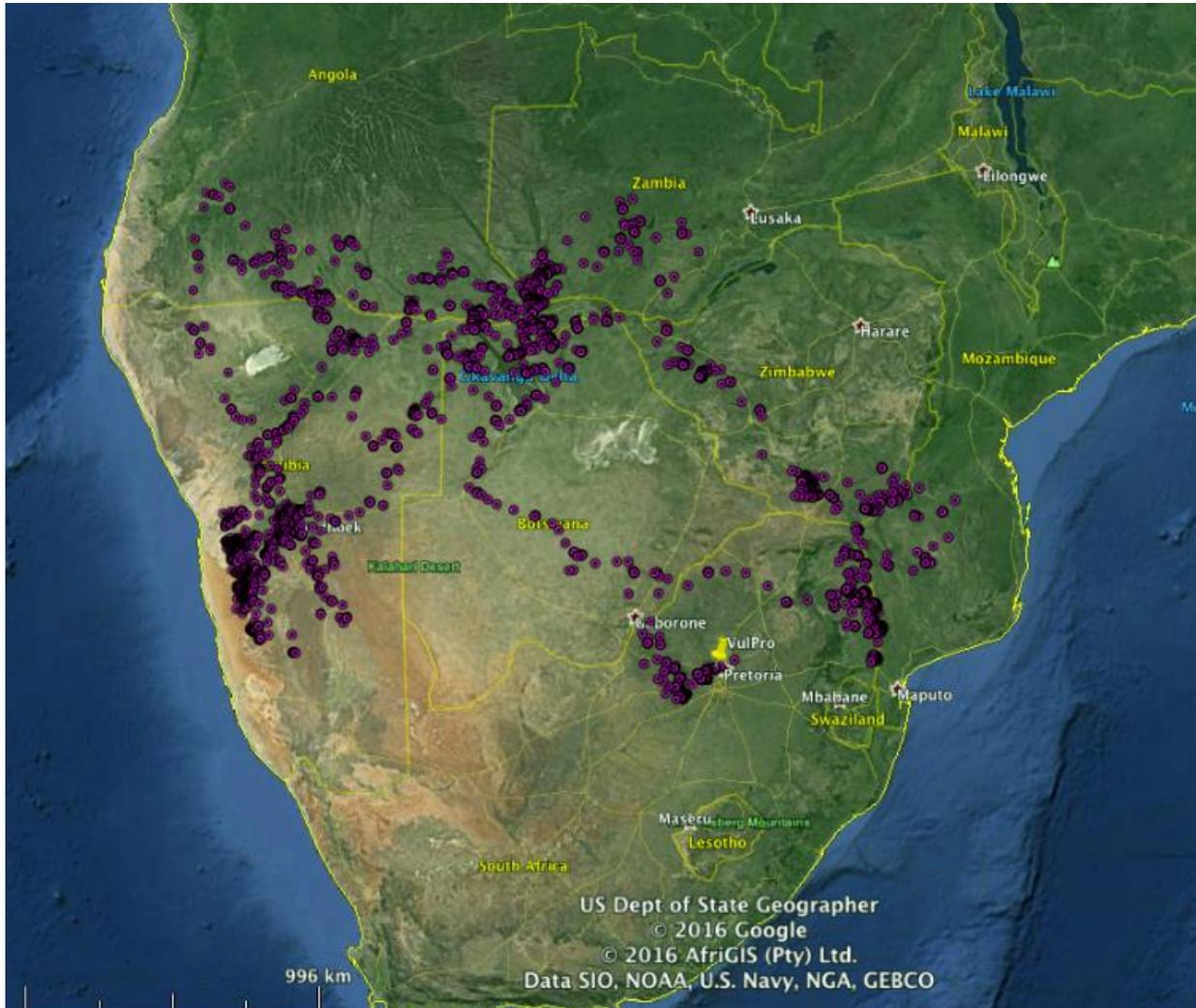


Figure 6. The track of an individual Cape Vulture from the time of its release in February 2015 at VulPro (yellow marker) until December 2016. It had been rehabilitated by VulPro after being found unable to fly, aged about six months, inside the Marekele National Park in the Limpopo Province, where the 'Kransberg' Cape Vulture breeding colony is located; this is the second largest colony (Hirschauer & Wolter in prep.).

SABAP2 coverage in these area is a priority. Much of the poorly covered area is in the former “homelands”.

A further resource for obtaining data on the overall distribution of an individual species in a bird atlas project comes from tracking studies. Extensive tracking data for the Cape Vulture exists, and has the potential to make a substantial contribution to our understanding of the complete range of this species, especially in areas where there few observers. Figure 6 provides an example of the quantity and quality of such information. In the terminology of SABAP2 (Underhill & Brooks 2016) the tracking data represents a series of incidental records. Adding these data to the SABAP2 database is a priority.

The movements of the Cape Vulture in Figure 6 spanned six countries: Angola, Botswana, Mozambique, Namibia, South Africa and Zimbabwe. This observation, in conjunction with the results from other birds fitted with tracking devices, lends weight to the suggestion above that the nursery areas of Cape Vultures from South African colonies has shifted to countries to the north of us. This hypothesis strengthens the argument for the need to strengthen and expand the bird atlasing initiative to all these countries (Underhill & Brooks 2015c).

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This paper is part of a series which celebrates the contributions of thousands of citizen scientists to the databases of the first and second bird atlas projects in southern Africa (SABAP1 and SABAP2). VultureMAP is supported by the Tusk Trust and VulPro. SABAP2 (Underhill 2016) is a partnership project of SANBI (South African National Biodiversity Institute), BirdLife South Africa and the Animal Demography Unit in the Department of Biological Sciences at the University of Cape Town.

References

- Bamford AJ, Diekmann M, Monadjem A, Mendelsohn J** 2007. Ranging behaviour of Cape Vultures *Gyps coprotheres* from an endangered population in Namibia. *Bird Conservation International*. 17: 331–339. Available online at <https://www.cambridge.org/core/services/aop-cambridge-core/content/view/02FEE2C40A5E723E0BDFCB1E4F784843/S0959270907000846a.pdf/div-class-title-ranging-behaviour-of-cape-vultures-span-class-italic-gyps-coprotheres-span-from-an-endangered-population-in-namibia-div.pdf>
- Benson PC** 2015. A survey of Cape Vulture breeding colonies in South Africa's northern provinces (Transvaal region) – an update 2013. *Ornithological Observations* 6: 31–36. Available online at <http://bo.adu.org.za/content.php?id=170>
- Boshoff AF, Vernon CJ** 1980. The past and present distribution of the Cape Vulture in the Cape Province. *Ostrich* 51: 230–250.
- Hirschauer MT, Wolter K** in prep. Immature Cape Vulture *Gyps coprotheres* breaks species range record, detailed by PTT-GPS device.
- Mundy PJ** 1982. The comparative biology of southern African vultures. Vulture Study Group, Johannesburg.
- Mundy PJ, Benson PC, Allan DG** (1997). Cape Vulture *Gyps coprotheres*. In: Harrison JA, Allan DG, Underhill LG, Herremans M, Tree AJ, Parker V, Brown CJ (eds) *The atlas of southern African birds*. Vol. 1: Non-passerines. pp. 158–159. BirdLife South Africa, Johannesburg.
- Reader's Digest** 1984. Land for blacks. In: Walton C (ed.) *Atlas of southern Africa*. pp. 36–37. Reader's Digest Association of South Africa (Pty) Ltd, Cape Town.
- Simmons RE, Brown CJ** 2015. Cape Vulture *Gyps coprotheres*. In: Simmons RE, Brown CJ, Kemper J. (eds) *Birds to watch in Namibia: red, rare and endemic species*. pp. 106–110. Ministry of Environment and Tourism and Namibia Nature Foundation, Windhoek.
- Taylor MR, Peacock F, Wanless RM** (eds) 2015. *The 2015 Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland*. BirdLife South Africa, Johannesburg.
- Underhill LG** 2016. The fundamentals of the SABAP2 protocol. *Biodiversity Observations* 7.42: 1–12. Available online at <http://bo.adu.org.za/content.php?id=235>
- Underhill LG, Brooks M** 2016a. Pentad-scale distribution maps for bird atlas data. *Biodiversity Observations* 7.52: 1–8. Available online at <http://bo.adu.org.za/content.php?id=245>
- Underhill LG, Brooks M** 2016b. Displaying changes in bird distributions between SABAP1 and SABAP2. *Biodiversity Observations* 7.62: 1–13. Available online at <http://bo.adu.org.za/content.php?id=255>

Underhill LG, Brooks M 2016c. The BirdMAP protocol: bird atlas in Africa in regions where the observer network is thin. Biodiversity Observations 7.69: 1–5. Available online at <http://bo.adu.org.za/content.php?id=262>

Vernon CJ 1978. Change in the reporting locality of the Cape Vultures ringed in the Transvaal in the period 1953–1975. *Safring News* 7(2): 17–19.

Williams VL, Cunningham AB, Kemp AC, Bruyns RK 2014. Risks to birds traded for African traditional medicine: A quantitative assessment. *PLoS ONE* 9(8): e105397. Available online at <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0105397>

Wolter K, Nesor W, Hirschauer MT, Camiña A 2016 Cape Vulture *Gyps coprotheres* breeding status in southern Africa: monitoring results from 2010–2014. *Ostrich* 87: 119–123.