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BIRD DISTRIBUTION DYNAMICS 1 – HAMERKOP *SCOPUS UMBRETTA* IN SOUTH AFRICA, LESOTHO AND SWAZILAND

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Recommended citation format:
Underhill LG, Brooks M 2016 Bird distribution dynamics 1 – Hamerkop *Scopus umbretta* in South Africa, Lesotho and Swaziland. Biodiversity Observations 7.87: 1–6

URL: http://bo.adu.org.za/content.php?id=280

Published online: 8 December 2016

– ISSN 2219-0341 –

BIRD DISTRIBUTION DYNAMICS

BIRD DISTRIBUTION DYNAMICS 1 – HAMERKOP *SCOPUS UMBRETTA* IN SOUTH AFRICA, LESOTHO AND SWAZILAND

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Introduction

This is the first in a new series of papers in *Biodiversity Observations*. We will report on the ranges of bird species as revealed by the Second Southern African Bird Atlas Project (SABAP2) and how their ranges have changed since the first bird atlas (SABAP1) about two decades apart. The objective is to provide a citeable record of these new distribution maps. Previously, this information was presented as news items on the SABAP2 website (http://sabap2.adu.org.za). However, they were ephemeral there, and not easily tracked down and cited. The ideas and insights which they contained were largely lost.

This new series is also made feasible by the development of new standards for the presentation of pentad-scale distribution maps derived from SABAP2 data, and for the presentation of range-change maps between SABAP1 and SABAP2 (Underhill & Brooks 2016a, b). Although these are, in reality, interim standards, the rules for interpretation of the maps do not need to be explained in each paper.

Hamerkop *Scopus umbretta*

The Hamerkop *Scopus umbretta* is one of the iconic species of Africa (Figure 1). It is the only species in the genus *Scopus*, which in turn is the only genus in the Family Scopidae (del Hoyo et al. 1992). This means that it is a genetically distinct bird species. Its distribution is limited to sub-saharan Africa, and also Madagascar, and it extends marginally into Asia at the southwestern Arabian Peninsula (del Hoyo et al. 1992).

Figure 1. The Hamerkop is one of the iconic bird species of Africa. Photo by Johan Heyns in BirdPix. Record http://vmus.adu.org.za/?vm=BirdPix-7715

Responsibility for the conservation of this distinctive species therefore rests with Africa. It was not listed in any threat category by Taylor et al. (2015) in the South African Red List.

On the pentad scale, the SABAP2 distribution map shows that the Hamerkop is largely restricted to the moister eastern and southern parts of South Africa, Lesotho and Swaziland (Figure 2). By 6 December 2016, it had been recorded 23,386 times in 4,505 pentads. This constitutes 25.9% of all pentads in these countries, and 26.5% of the pentads for which we have data. The distribution is strikingly fragmented, with many isolated records of occurrence (Figure 2). The core of the range lies within the Kruger National Park and adjacent areas in northwestern South Africa. This is where the largest concentration of pentads with reporting rates above the median reporting rate of 20.3% occur, and are shaded dark green, light blue or dark blue. There is another concentration along the fold mountains of the Western Cape, and there is one in the Northern Cape along the Orange River east and west of Upington.

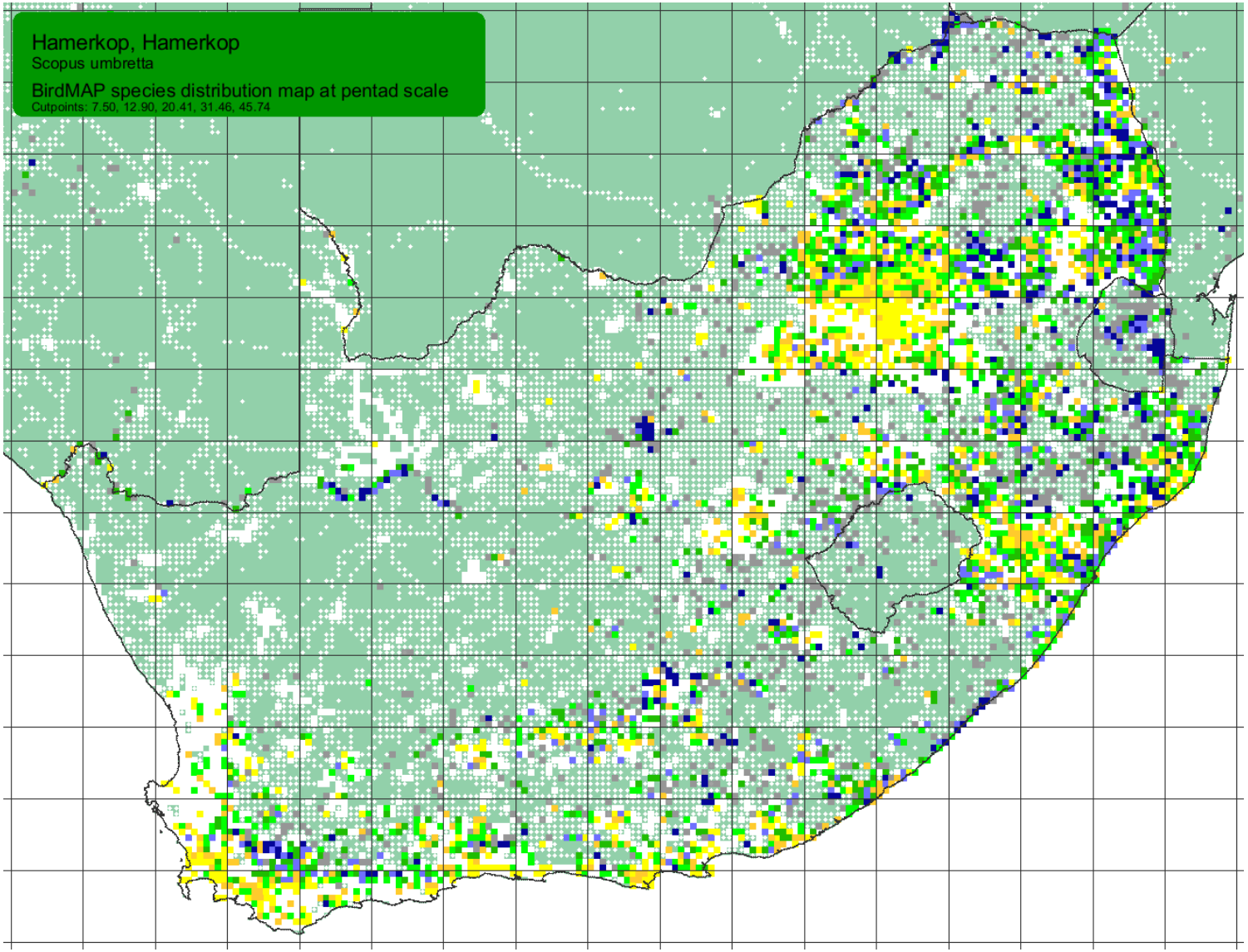

Figure 2: SABAP2 distribution map for the Hamerkop, downloaded 6 December 2016. The Hamerkop has been recorded in 4,505 pentads in South Africa, Lesotho and Swaziland. The detailed interpretation of this map is provided by Underhill & Brooks (2016a). Pentads with four or more checklists are either shaded white, species not recorded, or in colour, with shades based on reporting rate: yellow 0–7.5%, orange 7.5–12.9%, light green 12.9–20.4%, dark green 20.4–31.5%, light blue 31.5–45.7% and dark blue 45.7–100%. 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 recorded, it is shaded yellow, indicating that the species has a small reporting rate.

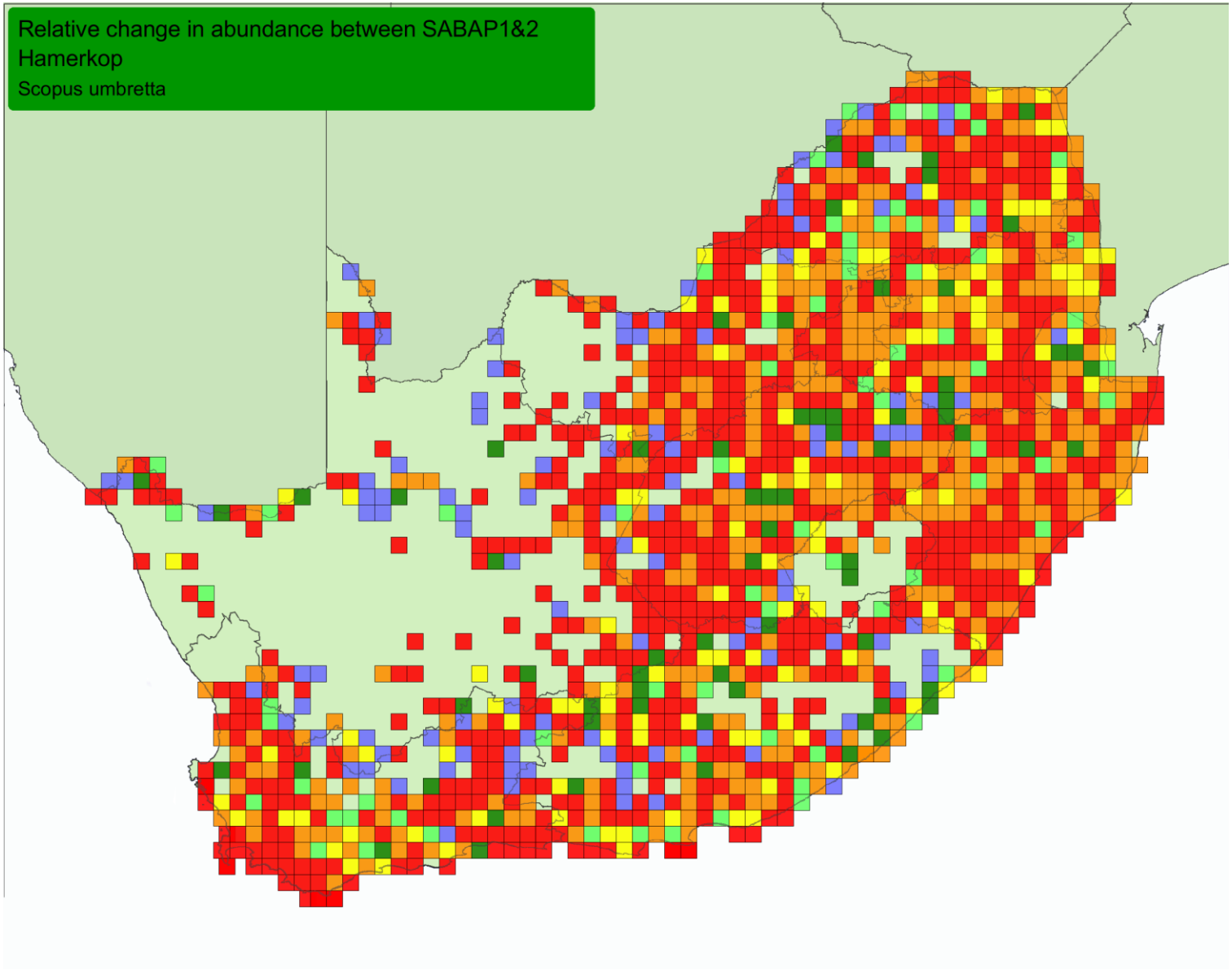

Figure 3: Range-change map between SABAP1 and SABAP2 for the Hamerkop, downloaded 6 December 2016. Red, orange and yellow represent quarter-degree grid cells with very large, large, and small relative decreases and blue, dark green and light green represent grid cells with very large, large and small 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 gird cells had Hamerkop 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)

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The range change map showing the estimated relative change in abundance of the Hamerkop between SABAP1 and SABAP2 suggests large-scale and widespread decreases (Figure 3). The detailed interpretation of this map is provided by Underhill & Brooks (2016b). In Figure 3, each quarter degree grid cell is shaded into one of six categories representing levels 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 Hamerkops occur, they are randomly distributed across the landscape, ie they are not clustered or in flocks. For the Hamerkop, this seems a fairly reasonable assumption.

Results are shown for only the 1,428 quarter degree grid cells for which there are four or more checklists for both SABAP1 and SABAP2 and in which Hamerkop occurred in either SABAP1 or SABAP2 (Table 1). In other words, grid cells in which Hamerkop did not occur in either project are not included in this analysis.

Of these 1,428 quarter degree grid cells, 683 (48%) are red, and 363 (25%) are orange. This suggests very large (red) or large (orange) decreases in 73% of the quarter degree grid cells in which Hamerkop has been recorded. The numbers of grid cells shaded blue (very large increase) and dark green (large increase) are 113 (8%) and 69 (5%) respectively. 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 611 grid cells which meet this criterion (Table 1). In this restricted analysis, 80% of grid cells show large or very large decreases, and 5% show large or very large decreases.

Overall, the conclusion has to be that the Hamerkop is extremely likely to have experienced a severe decrease in abundance in the two-decade period between SABAP1 and SABAP2. In Underhill & Brooks (2014), the Hamerkop was already listed as the species with the third largest number of quarter degree grid cells in which it was showing a major decrease. The top two species in that analysis were seabirds, and there is no other terrestrial species which has a range-change map which shows decreases in population on this scale.

Table 1. Range-change summary for the Hamerkop between SABAP1 and SABAP2. Numbers (and percentages) in each colour category of Figure 3, for which there are at least four checklists per quarter degree grid cell in both SABAP1 and SABAP2. 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 and 2**		**30 checklists for SABAP1 and 2**	
	Count	**%**	**Count**	**%**
Red (very large decrease)	683	48	297	49
Orange (large decrease)	363	25	188	31
Yellow (small decrease)	127	9	66	11
Light green (small increase)	73	5	30	5
Dark green (large increase)	69	5	19	3
Blue (very large increase)	113	8	11	2
Totals	1,428	100	611	100

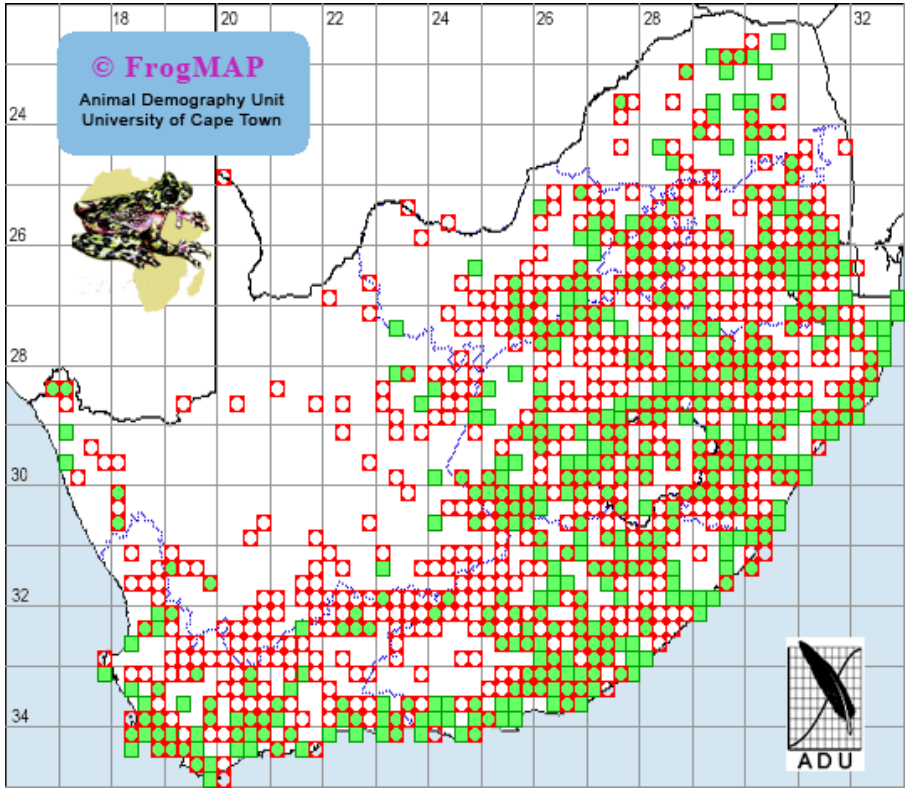

Figure 4. The distribution of the Common Platanna Xenopus laevis *in South Africa, Lesotho and Swaziland. The 908 quarter degree grid cells shaded green have records made up to the end of 1996, and the 953 grid cells shaded with red circles have records made after the beginning of 1997; this cutpoint was chosen because it splits the records into two groups as evenly as possible. There are suggestions within this map of a range expansion of this platanna northwestwards into the more arid parts of this region (grid cells with red circles only), and a range contraction away from the coastal plain (grid cells shaded green only). Compare this map with the range of Hamerkop (Figure 2). Note than another member of the genus* Xenopus *occurs in the Kruger National Park and Limpopo Valley, Tropical Platanna* Xenopus muelleri*. This map was downloaded from the FrogMAP section of the ADU Virtual Museum at http://vmus.adu.org.za on 6 December 2016.*

The conservation status of the Hamerkop clearly needs reconsideration. The assessment of conservation in the first bird atlas concluded, on the basis of information available at this time: "… on balance, the Hamerkop remains widespread and common, and is currently not of conservation concern" (Anderson 1997). The CWAC report (Taylor et al. 1999) also did not provide a hint of any conservation warnings: "Some of the highest counts come from man-made habitats, which have enabled it to expand its overall range, particularly in arid areas." The main focus on the CWAC project is wetlands, whereas Hamerkops occur mainly along rivers and streams. However, in parts of the Western Cape, Hockey et al. (1989) considered that "numbers have decreased appreciably in the last 30–40 years [ie since the 1950s], possibly due to nests being taken over by Egyptian Geese *Alopochen aegyptiacus* in areas where the two species co-occur."

Siegfried (1975) considered the Hamerkop a specialist feeder on frogs of the genus *Xenopus*, the platannas, "a resource which is widely yet sparsely distributed spatially." He pointed out that the distributions of Hamerkops and *Xenopus* were "broadly similar", a relationship which is not particularly strongly supported by a comparison of Figures 2 and 4.

A full investigation of the abundance of the Hamerkop should be undertaken, as well as trends in its abundance. We recommend an assessment of the impact of Egyptian Geese on nest sites. We also need to examine how dependent Hamerkops are on frogs of the genus *Xenopus* as a food resource (Siegfried 1975), and to understand how the distribution and abundance of these frogs has been modified. Finally, a consideration of the full spectrum of threats faced by the Hamerskop is needed.

Acknowledgements

This paper is the first in a new 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). SABAP2 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.

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