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BIRD DISTRIBUTION DYNAMICS

BIRD DISTRIBUTION DYNAMICS 10 – PALE-CROWNED CISTICOLA *CISTICOLA CINNAMOMEUS* IN SOUTH AFRICA

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Introduction

This is the 10th paper of a new series in *Biodiversity Observations.* The objective of this series 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), about two decades apart.

This series of papers is also 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 the papers in this series use these two new maps, the rules for interpretation are not provided in detail in each paper in this series.

This paper deals with the observed range change of the Pale-crowned Cisticola *Cisticola cinnamomeus* (Figure 1) within the atlas area. In particular, it considers the extent to which the range change is due to genuine change or is attributable to improved observer skills.

Figure 1. Breeding male Pale-crowned Cisticola Cisticola cinnamomeus, *Vryheid, KwaZulu- Natal. © DR McKenzie*

Pale-crowned Cisticola *Cisticola cinnamomeus* Reichenow 1904

Background

This diminutive bird in the Cisticolidae family forms part of the similar-looking short-tailed cisticola group which contains nine other African species (Sinclair & Ryan 2010). It weighs c. 10g with a total length of 10 cm and possesses a display flight which takes it many metres into the air (Peacock 2012). It is easy to understand why it is often over-looked. It is patchily distributed from Gabon in the north, southward through the Democratic Republic of the Congo, Angola, Zambia, Tanzania, Zimbabwe and South Africa (Hockey et al. 2005). It is mostly regarded as resident with some local movements but, due to its silent nature in the non-breeding season, has a far greater reporting rate in summer than in winter (Berruti 1997).

It favours moist, tall grassland environments such as seeps, edges of pans and wetlands, marshes and dambos at both high and low altitudes (Peacock 2012) but the atlas data reflects a strong association with upland wetlands in South Africa. It is not currently considered to be Threatened or Near Threatened (Taylor et al. 2015).

Historical status

The status of the Pale-crowned Cisticola in the atlas region has been variously described by different authors but has certainly changed over the last few decades. McLachlan & Liversidge (1957) described it as “local and uncommon”, Newman (1983) as an “uncommon, localised resident”, Maclean (1985) as a “locally fairly common to uncommon; resident in some areas”, Hockey et al. (2005) as “locally common” and Peacock (2012) as “common but localised”. The trend suggests that this species is increasing in abundance. The published distribution maps, pre-SABAP2, did not change much through time; with a general brush-stroke covering from the far southern part of KwaZulu-Natal as far north as the Escarpment of Mpumalanga.

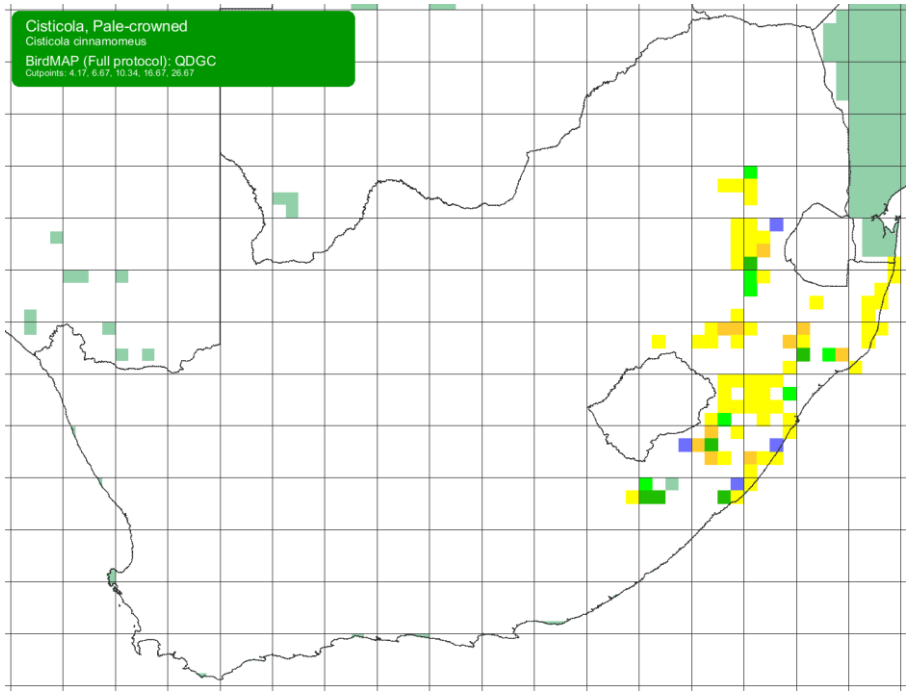


Figure 2. SABAP1 distribution map. Note that quarter degree grid cells shaded turquoise had no SABAP1 data (Mozambique, Botswana, Namibia and one in the former Transkei). The colours represent reporting rates, and the cutpoints for the different colours are the same as used for SABAP2, see Figure 3.

SABAP1 distribution

Compared to the generalized early maps, the SABAP1 distribution map, with data on a quarter degree scale (Berruti 1997) (Figure 2), reflected a slight increase in range for the Pale-crowned Cisticola, especially into the highland grasslands of the Eastern Cape and eastern Free State, but now with three clear centres of distribution: one in the KwaZulu-Natal Midlands, on the Maputaland coastal plain - and the other on the KwaZulu-Natal/Mpumalanga Escarpment.

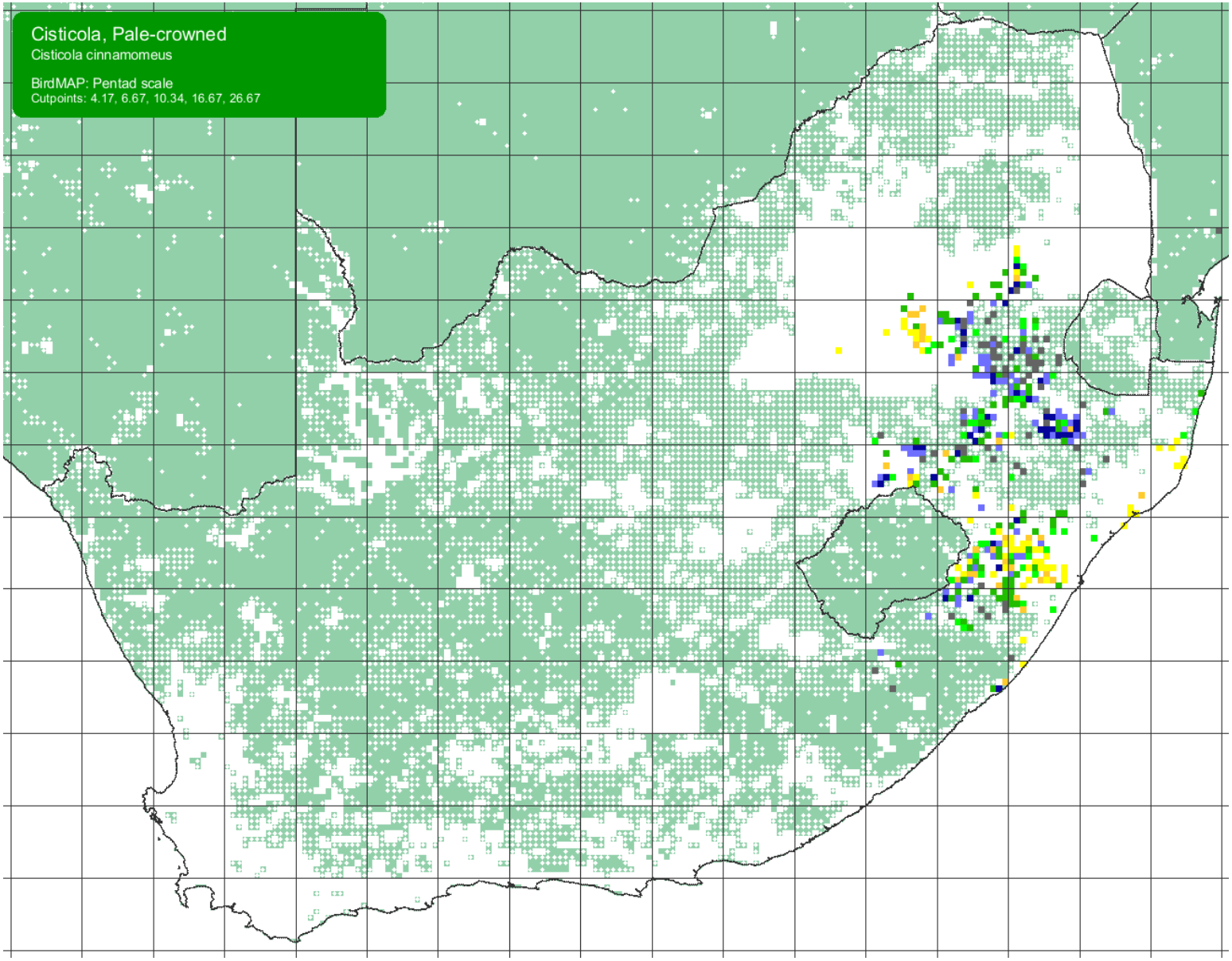


Figure 3: SABAP2 dis-tribution map for the Pale-crowned Cisticola, down-loaded 31 March 2017. The Pale-crowned Cist-icola has been recorded in 177 pentads in South Africa. The detailed interpretation of this map is provided by Underhill & Brooks (2016a). Pentads with four or more check-lists are either shaded white, species not re-corded, or in colour, with shades based on re-porting rate: yellow 0–4.2%, orange 4.2–6.7%, light green 67–10.3%, dark green 10.3–16.7%, light blue 16.7–26.7% and dark blue 26.7–100%. 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.

Relatively high reporting rates were also obtained from a small, isolated population in the Eastern Cape near Rhodes. This species was recorded 433 times within 105 grid cells during SABAP1 (Berruti 1997). The overall reporting rates within each quarter degree square from which it had been reported ranged from 0.3% to 1.7%.

SABAP2 distribution

Distribution data for this cisticola from SABAP2 (July 2007–January 2017) reflects an apparent dramatic increase in both range and reporting rate across South Africa (Figure 3). By 18 January 2017 it had been recorded 910 times in 390 pentads (1 April 2017, SABAP2 website). On the pentad scale, the SABAP2 distribution map reflects that, compared with SABAP1, Pale-crowned Cisticola shows two additional centres of distribution: the eastern Free State around Harrismith and around Vryheid in northern KwaZulu-Natal (Figure 3). The centre on the Mpumalanga Escarpment has enlarged to include the adjacent Highveld and the Pale-crowned Cisticola was reported for the first time in Gauteng in January 2013, in the far south-eastern edge of the province (http://www.niall.co.za/species/bird-pages/668.htm). Gaps in the distribution, in places where suitable habitat occurs are amplified on the SABAP2 map, for example the hot, thorny Thukela and Buffalo River Valleys. Reporting rates for the species have increased compared with SABAP1; one-sixth of the pentads where the species occurs and where there are at least four checklists have reporting rates exceeding 26.7% (Figure 3). During SABAP1, no grid cells reached this reporting rate (evidenced by the lack of dark blue grid cells in Figure 2)

Range change between SABAP1 and SABAP2

Taking the data at face value, the quarter degree grid cells were classified into six categories of increase and decrease (Figures 4 and 5) (Underhill & Brooks 2016b). The relative increases and decreases are estimated using the Griffioen transformation (Underhill & Brooks 2016b), and involve an assumption that, in pentads where Pale-crowned Cisticola occurs, it is randomly distributed across the landscape, i.e. they are not clustered into large flocks. For this species, this is likely to be a reasonable assumption, because, although it is habitat specific, it occurs in pairs or family groups (Hockey et al. 1997).

Results are shown for the 177 quarter degree grid cells for which there are four or more checklists for both SABAP1 and SABAP2 and in which Pale-crowned Cisticola occurred in either SABAP1 or SABAP2 (Table 1). In other words, grid cells in which Pale-crowned Cisticola did not occur in either project are not included in this analysis.

Of these 177 quarter degree grid cells, the numbers of grid cells shaded blue (very large increase) and dark green (large increase) are 109 (62%) and 12 (7%) respectively. 36 (20%) are red, and 8 (5%) are orange (very large or large decreases). This suggests very large or large increases in 69% of the quarter degree grid cells. The apparent increases (69%) massively outweigh the apparent decreases (25%).

Table 1. Range-change summary for the Pale-crowned Cisticola between SABAP1 and SABAP2. Numbers (and percentages) in each colour category of Figure 4, 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 & SABAP2**		**30+ checklists for SABAP1 and SABAP2**	
	Count	%	Count	%
Red (very large decrease)	36	20	18	15
Orange (large decrease)	8	5	6	5
Yellow (small decrease)	6	3	6	5
Light green (small increase)	6	3	6	5
Dark green (large increase)	12	7	8	7
Blue (very large increase)	109	62	79	64
Total	177	100	123	100

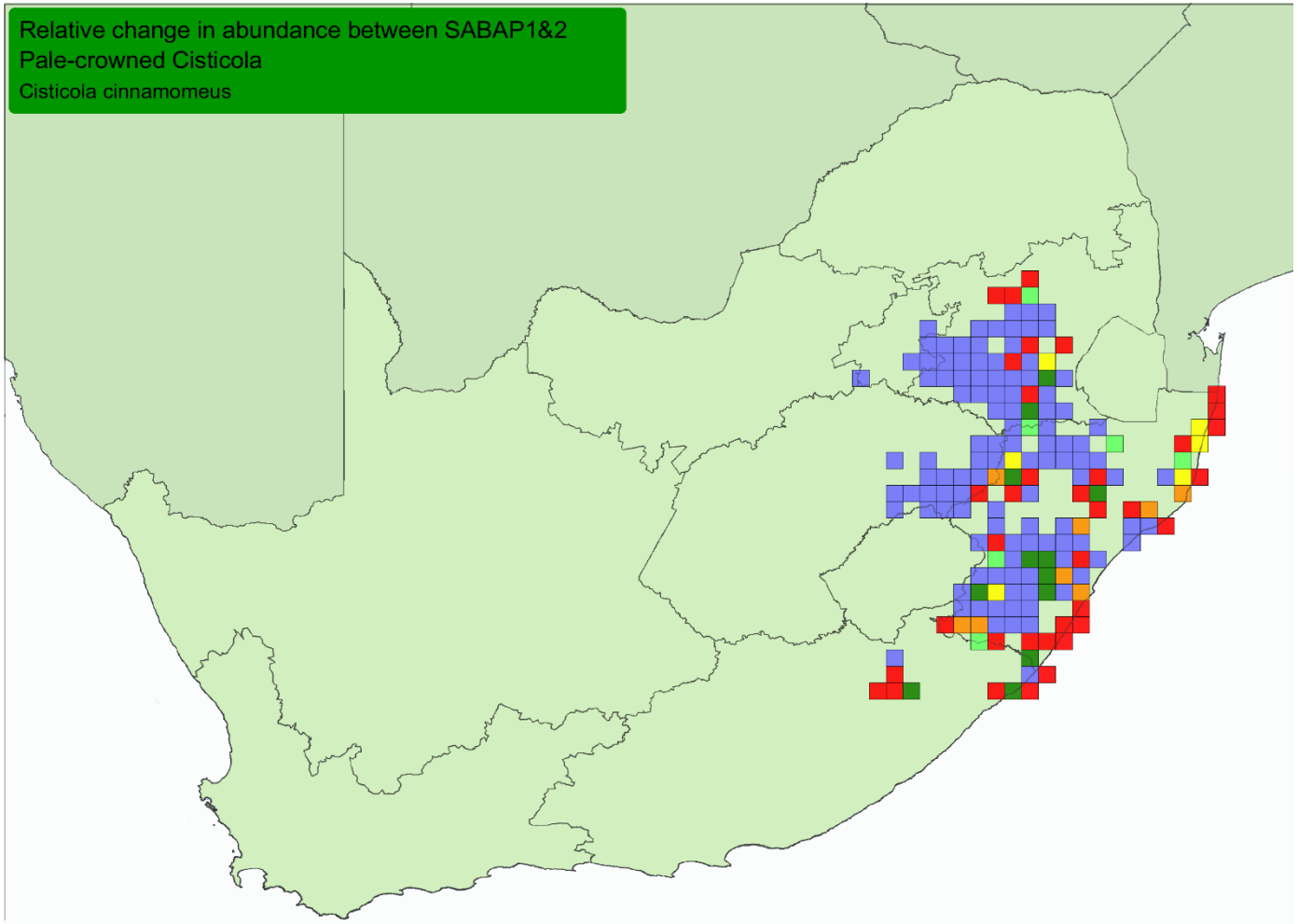
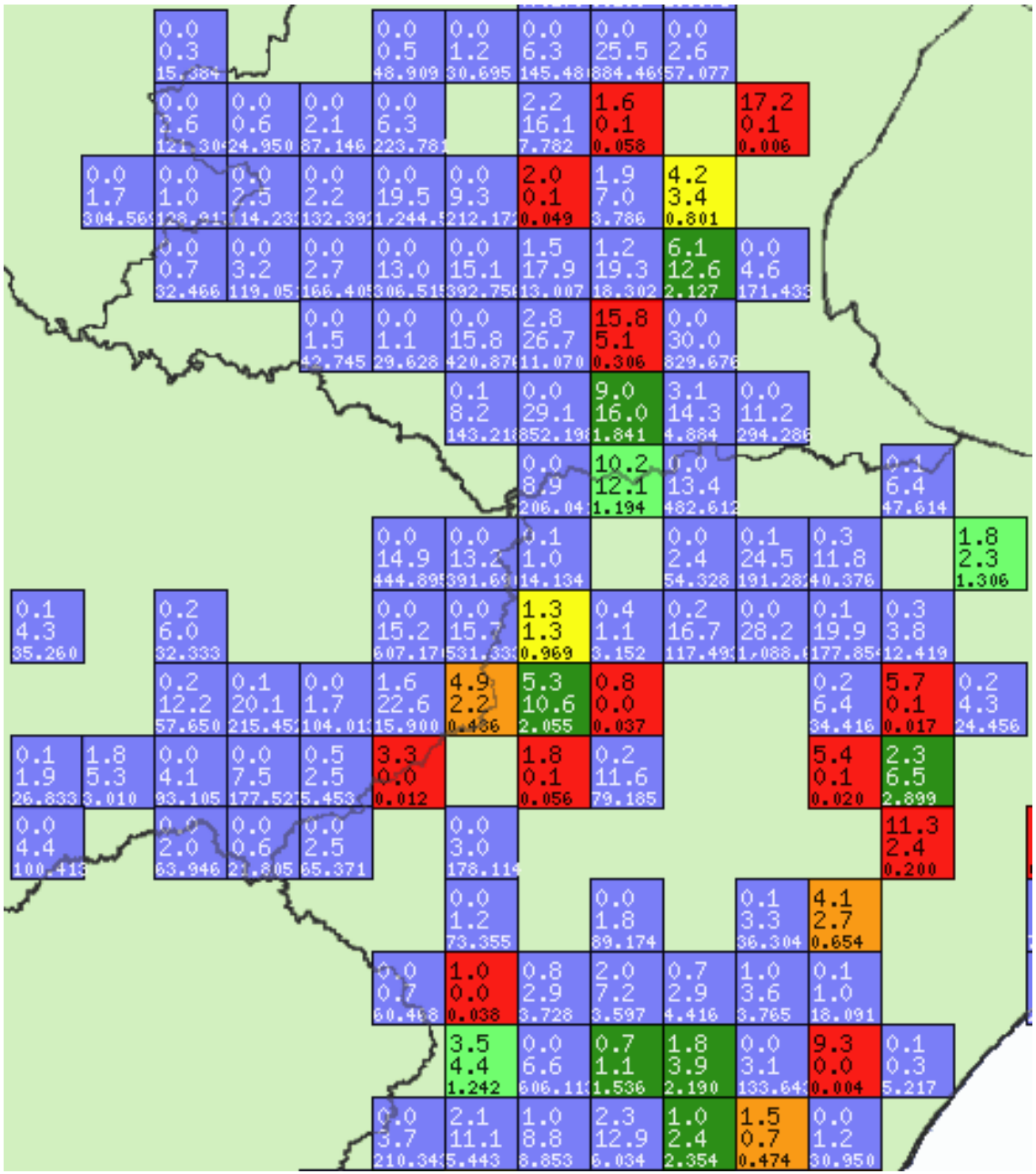


*Figure **4**: Range-change map between SABAP1 and SABAP2 for the Pale-crowned Cisticola, downloaded 1 April 2017. Red, orange and yellow represent quarter-degree grid cells with very large, large, and small relative decreases and blue, dark green and light green represent grid cells with very large, 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 Pale-crowned Cisticola 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).*

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 123 grid cells which meet this criterion (Table 1). In this restricted analysis, 71% of grid cells show large or very large increases and 20% show large or very large decrease.

Blocks of grid cells showing increases in abundance include large areas in the KwaZulu-Natal Midlands, far northern KwaZulu-Natal around Vryheid, the high-altitude grasslands of the eastern Free State, the Escarpment of Mpumalanga as far north as Dullstroom and, largest of all, the Highveld of central and western Mpumalanga up to the Gauteng border (Figure 4). Areas with reduced abundance include most of the KwaZulu-Natal coast and the Rhodes area of the Eastern Cape (Figure 4).



Discussion

So why has this small, unobtrusive species, dependent on moist grasslands (Figure 6), increased in reporting rate and distribution so dramatically? It is unlikely that additional habitat has been created for this species because South Africa had already, by 1996, lost half of its wetlands (Davies & Day 1998), and the grasslands are under increasing threat from mining and transformation (Marnewick et al. 2015).

In the bird atlas for KwaZulu-Natal, based on fieldwork from 1970–1979, the Pale-crowned Cisticola was recorded in a total of six quarter-degree grid cells, and in only one month in each of these grid cells (Cyrus & Robson 1980). During SABAP1, it was recorded extensively in KwaZulu-Natal (Figure 2). In his species account for the Pale-crowned Cisticola in *The Atlas of Southern African Birds*, Berruti (1997) stated that it had been more frequently reported during SABAP1 than before and attributed this to an improvement in identification skills so that observers were instrumental in this apparent increase. While this is probably accurate, observers still need to be aware of what the species actually sounds like because most records are of calling birds; the Pale-crowned Cisticola is morphologically very similar to the other small cisticolas with which it overlaps (Peacock 2012).

Figure 5. The central part of the range-change map for Pale-crowned Cisticola (Figure 4) showing reporting rates from SABAP1 and SABAP2 (top and middle numbers in quarter degree grid cells, with the bottom number being the estimated change in relative abundance in the grid cell based on the Griffioen transformation (see text)

It is widely appreciated that Len Gillard's *Southern African Bird Calls,* released in 1987 as a three cassette-tape set, made bird calls far more accessible to recreational birders; previously they had to rely on other more experienced birders for the audio-identification of birds. These cassettes, however, did not contain a recording of Pale-crowned Cisticola and it was therefore almost unknown among that era. In his *magnum opus*, the book entitled *The Birds of Natal and Zululand*, Clancey (1964) even formally attempted to give the Pale-crowned Cisticola the English common name of "Silent Cisticola" in reference to the generally quiet vocalisations which, back then, were unknown.

Then in 1991 Guy Gibbon released a set of 888 bird calls on cassettes which was updated into a set of CDs in 1995. These two products included the vocalisations of Pale-crowned Cisticola, and made them broadly available for the first time. The launch of the cassettes coincided with the end of the data collection phase of SABAP1. This, therefore, could only have had a limited influence on the increase in and distribution for this species during SABAP1, mentioned by Berruti (1997).

But then what of the further huge increase range and reporting rate in SABAP2 compared to SABAP1? (Figures 4 and 5). The answer almost certainly lies in the advancement in technology and the improved accessibility of this technology, and in the growth of interest in birding in South Africa. There are now vast numbers of guidebooks, courses, social media groups, webinars, smartphone applications and sound recordings and amplifying equipment as well as a larger number of atlasers participating in SABAP2 than in SABAP1. The general increase in avifaunal awareness is probably resulting in a far more accurate picture being painted of the status and distribution of the Pale-crowned Cisticola.

The apparently vast increase across the Highveld of Mpumalanga could possibly be accredited to the increase in coal mining activities in the late 1990s and 2000s. According to the National Environmental Management Act (No. 107 of 1998) any mining activities are subject to the outcomes of environmental studies and these areas would therefore require biodiversity assessments to be performed by specialist consultants as part of an Environmental Impact Assessment. This Act was promulgated in 1998, a decade after the completion of fieldwork for SABAP1; as a result, the formerly poorly birded Mpumalanga Highveld was suddenly invaded by avifaunal specialists with excellent knowledge of the call of the Pale-crowned Cisticola. Testament to this is the large number of Out Of Range forms submitted by these specialists and vetted by DRM and former SABAP2 vetters for Mpumalanga for this species.

However, the apparent decrease in reporting rate along the coast and the uplands of the Eastern Cape is a genuine cause for concern. These two regions mostly show large decreases (Figure 4) and, at least for the KwaZulu-Natal coast, do possibly highlight the poor status of coastal wetlands in eastern South Africa. These areas require further monitoring to take place.

Conclusions

Overall, the conclusion is that the Pale-crowned Cisticola is extremely unlikely to have experienced a dramatic increase in range and reporting rate due to rapid colonisation of new areas in the two-decade period between SABAP1 and SABAP2. Instead, the observed expansion needs to be attributed to a dramatic growth in observer skill. In Underhill & Brooks (2014), based on the raw data alone, the Pale-crowned Cisticola was listed as one of the species with the largest number of quarter degree grid cells in which it was showing a major increase. Citizen scientists, in both SABAP1 and especially in SABAP2, have probably had a larger, more profound effect on our knowledge of the status and distribution of the Pale-crowned Cisticola in South Africa than any ornithologists have managed since its discovery in 1904.

This paper is also a case study in demonstrating that careful consideration and analysis needs to be undertaken before taking range changes of species, as in Figure 4, at face value. A key assumption that is explicitly made in the range-change maps developed by Underhill & Brooks (2016b) is that the detection probability for the species is the same for both SABAP1 and SABAP2. For a species such as the Hadeda *Bostrychia hagadash* this assumption would be easy to accept, and the range expansion shown by this species is genuine (Ainsley et al. 2017). In the case of the Pale-crowned Cisticola the key explanation of the range change map of Figures 4 and 5 is mostly related to the improved ability of atlasers to identify the species, generating a change in detection probability.

Acknowledgements

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). From 2007 to March 2017, SABAP2 (Underhill 2016) was 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. Peter Lawson, member of the SABAP2 Regional Committee for Mpumalanga is thanked for his advice.

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Figure 6. Pale-crowned Cisticola in its moist grassland habitat at Seekoeivlei Nature Reserve, Free State, 8 July 2015. Photograph by © Lia Steen. Record 1883 in the BirdPix section of the ADU Virtual Museum. For the full details of this record, see http://vmus.adu.org.za/?vm=BirdPix-1883