

## Final gap analyses: March 2011

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The final gap analyses were conducted during March 2011, based on the final SABCA distribution database (347 284 records in total in the database, but the gap analyses used only those records for the atlas region and those records which had their specimen identifications confirmed). Gap analyses were conducted for three time periods, namely for the entire distribution database, for data from 1980 onwards (roundabout the time that LepSoc came into being) and from 2007 onwards (when SABCA was launched) (Figure 1). The three time periods were used for the gap analyses in order to compare coverage and species richness between recent data records to the entire database containing older records. The three time periods also correlate with the time periods that will be used for the species distribution maps in the *Red List and Atlas* publication.

Table 1 below summarises the gap analyses for each region (entire atlas region, each country and each South African province). Gauteng is the only province with no empty or species-poor areas for each of the three time periods. This is not surprising as Gauteng is the smallest province and is the most easily accessible for sampling. Northern Cape consistently was the province with the highest proportion of empty or species-poor areas in each time period, which reflects the difficulty with sampling this province due to its vastness and isolation from major urban areas. The Free State and North West provinces were close behind the Northern Cape with regards to being under-sampled.

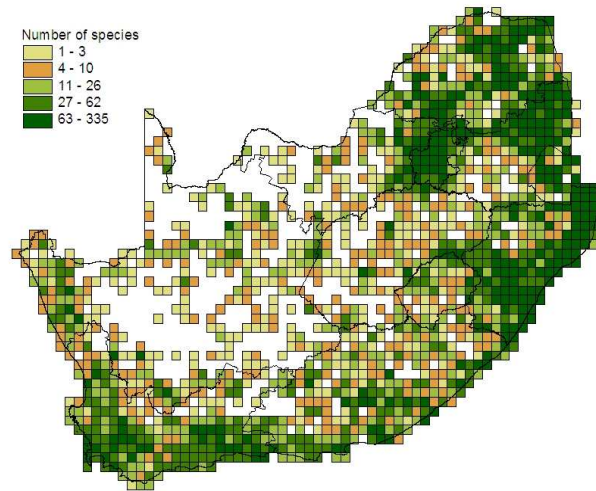
Generally, in the recent time period (2007 onwards), all provinces except for Gauteng displayed undersampled areas of 45% and higher, 71% of the area of South Africa displayed undersampling and 75% for the entire atlas region. Lesotho and Swaziland also have a very low proportion of their areas sampled in recent times, Lesotho being the more undersampled than Swaziland. Northern Cape, North West, Free State and Lesotho had a similar proportion of their areas with no records (69-73%), whereas less than 40% of the areas of KwaZulu-Natal, Western Cape, Mpumalanga and Limpopo had no records and had the best coverage.

To help fill in the gaps, future sampling should focus on the Northern Cape, North West and Free State provinces. The Eastern Cape, Limpopo and Western Cape also require prioritised sampling, as do Lesotho and Swaziland. Gauteng seems to have been well atlased and is best suited for monitoring populations over time.

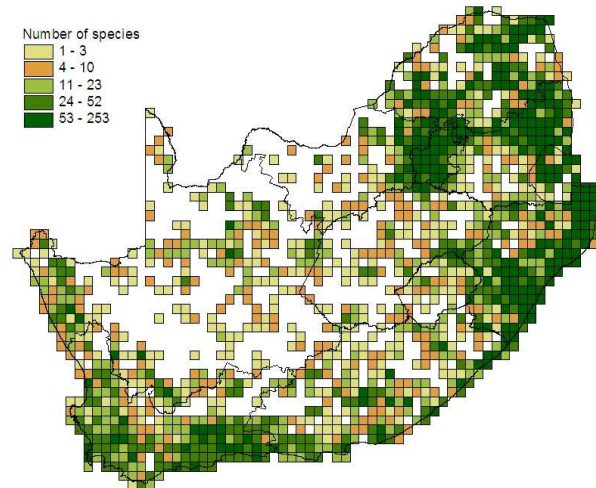
**Table 1:** The proportion of the area of a region (atlas region, country or South African province) which has no butterfly records, which contains records in the lowest two 20% quantiles (i.e. species-poor) and the total of these, for the entire SABCA database, for data from 1980 onwards and for data from 2007 onwards. Data were assigned to quarter degree grid squares (QDGSs), following which empty QDGSs and QDGSs falling within the lowest two 20% quantiles were determined, prior to calculating the proportions of the area for each region (20% quantiles were determined by ordering the data according to number of species in each QDGS and then dividing the data into groups containing the same number of records, thus 20% quantiles divides the data in five groups each containing 20% of the number of records, but ranked according to number of species).

Region (atlas region/ country/province)	Proportion of region								
	Entire SABCA database			Data from 1980 onwards			Date from 2007 onwards		
	No records	Species-poor	Total	No records	Species-poor	Total	No records	Species-poor	Total
Atlas Region	27.2%	29.8%	<b>57.0%</b>	35.2%	28.1%	<b>63.3%</b>	55.0%	20.0%	<b>75.0%</b>
South Africa	26.9%	28.3%	<b>55.2%</b>	34.5%	26.5%	<b>61.0%</b>	52.6%	18.6%	<b>71.2%</b>
Lesotho	8.9%	43.7%	<b>52.6%</b>	26.6%	45.6%	<b>72.2%</b>	68.5%	25.8%	<b>94.3%</b>
Swaziland	8.1%	28.9%	<b>37.0%</b>	12.1%	32.4%	<b>44.5%</b>	54.9%	21.3%	<b>76.2%</b>
Eastern Cape	14.2%	35.8%	<b>50.0%</b>	29.3%	34.3%	<b>63.6%</b>	55.9%	23.8%	<b>79.7%</b>
Free State	31.4%	44.4%	<b>75.8%</b>	43.6%	36.9%	<b>80.5%</b>	71.0%	19.4%	<b>90.4%</b>
Gauteng	0%	0%	<b>0.0%</b>	0%	0%	<b>0%</b>	0%	0%	<b>0.0%</b>
KwaZulu-Natal	3.1%	10.9%	<b>14.0%</b>	4.4%	16.9%	<b>21.3%</b>	29.3%	18.2%	<b>47.5%</b>
Limpopo	9.8%	24.5%	<b>34.3%</b>	20.9%	25.0%	<b>45.9%</b>	36.1%	21.5%	<b>57.6%</b>
Mpumalanga	10.5%	24.8%	<b>35.3%</b>	13.4%	24.7%	<b>38.1%</b>	22.8%	22.4%	<b>45.2%</b>
Northern Cape	51.0%	31.5%	<b>82.5%</b>	56.2%	29.1%	<b>85.3%</b>	72.6%	17.6%	<b>90.2%</b>
North West	43.4%	29.7%	<b>73.1%</b>	54.5%	22.2%	<b>76.7%</b>	68.8%	14.0%	<b>82.8%</b>
Western Cape	12.3%	24.2%	<b>36.5%</b>	17.4%	24.4%	<b>41.8%</b>	34.9%	21.7%	<b>56.6%</b>

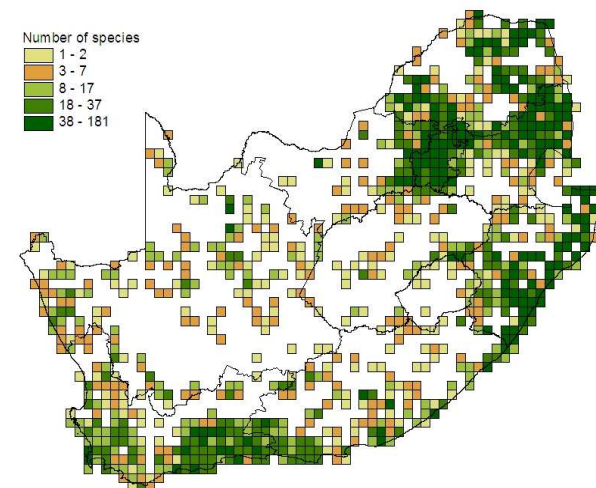
a)



b)



c)



**Figure 1.** Butterfly species richness in the atlas region, grouped into 20% quantiles and at a quarter degree grid scale, for a) the entire SABCA database, b) data from 1980 onwards and c) data from 2007 onwards. The key indicates the 20% quantile groupings (five groups).