

READER RESPONSE

How many southern white rhinos were there? A response to Kees Rookmaaker

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In the last edition of *Pachyderm*, no. 32, Kees Rookmaaker published a paper in which he concluded that 'there is no reason to believe that there were ever less than 200 white rhino in Zululand before 1929' and that reported numbers at the end of the 19th century 'were kept low for political reasons'. We would like to make two points.

First, we do not believe the evidence he presented is sufficient for him to conclude so categorically that there had to have been at least 200 animals. Rather we contend that we cannot accurately estimate the true number around 1900 but that it was most likely to have been in the region of 20 to 50 animals.

Secondly, while we accept that it is quite possible that southern white rhino numbers in the late 1890s and early part of the 20th century were deliberately underestimated for political reasons, an alternative explanation for the low figures is simply that they could have been guestimates or minimum counts that underestimated the true number of animals.

Accuracy of early estimates unknown

To evaluate the potential accuracy and bias of the early estimates, additional information is required on the sampling approaches used, the search effort made, the frequency distribution of sightings of all individually recognizable animals, the numbers of sightings of 'clean' rhino (that is, those without obvious distinguishing features), and whether or not many new identifiable adult animals were continuing to be seen for the

first time or not at the end of sampling. Around 1900, the science of population estimation was not highly developed, and such additional information is unlikely to be available for the earliest estimates. This makes it difficult to critically evaluate the numbers given.

In all probability, those making the earliest estimates would have made no attempt to estimate undercounting bias (that is, how many additional animals were likely to be in the population but that were not seen during the surveys). It is most likely that early estimates would have been either the minimum number seen or 'gut-feel' guestimates. The latter are notorious for underestimating true numbers.

Number of founders needed

While we can't be sure about the accuracy of early figures, another approach is to ask the question: If there had been as few as only 10–15 or so founders around 1903, could numbers have reached the estimated 150 in 1929 only 26 years later and the estimated 206 by 1934?

To answer this question we simulated how many rhinos there would be, given different initial numbers of rhinos (from 10 to 200), and differing annual growth rates (5 to 8.4%) over 26- and 31-year periods (1903–29 and 1903–34). At low densities in prime habitat, natural population growth rates of white rhino are likely to have been good, unless significant unrecorded poaching continued to chip away at numbers. The growth rates modelled were 5% (minimum target for growth in national and continental rhino plans), 7% (should be

achievable in a rapidly growing population well below ecological carrying capacity) and 8.4% (rate achieved by white rhino in the rapidly expanding Kruger National Park population over an approximately 15-year period, 1980–95; Danie Pienaar pers. comm.). The results are given in table 1.

The figures in table 1 suggest that it is unlikely that numbers could have been as low as 10 or 15 in 1903 and this gives support to the assertion that ‘reported numbers [at the end of the 19th century] were kept low for political reasons’.

However, allowing for the fact that the 1929 and 1934 estimates may have been underestimates of the true numbers, the results indicate that there most likely were between 20 and 50 animals left in 1903. Unless poaching had a significant impact on growth rates, it was most likely that the number left was closer to 20–25 than to 50.

Conclusion

We disagree with Rookmaaker that ‘there is no reason to believe that there were ever less than 200 white rhino in Zululand before 1929’. We feel it would be better to conclude, based on some simple population modelling, that there were most probably somewhere between 20 and 50 animals at the beginning of the 20th century, unless poaching levels during the early part of the 20th century were so high that they largely cancelled out the likely rapid population growth during this period. However, the modelling does suggest that there were probably more than 10 or 15 rhinos left in 1903 and that these early estimates were probably either deliberately low for political reasons or were simple minimum counts or guesses that underestimated the true number at the time, or both.

Table 1. Modelled growth rates of white rhino populations over 26- and 31-year periods

Annual growth rates	Starting number of rhinos in 1903						
	10	15	20	25	50	100	200
Expected number of rhino in 1929 (after 26 years) (population estimate for 1929 = 150)							
5%	36	56	71	89	187	373	747
7%	58	93	116	155	311	621	1243
8.4%	81	132	163	221	441	883	1765
Expected numbers of rhino in 1934 (after 31 years) (population estimate for 1934 = 206)							
5%	45	68	91	113	227	454	908
7%	81	122	163	204	407	814	1629
8.4%	122	183	243	305	609	1219	2437

Erratum: The title of the article by Kees Rookmaaker on page 22 and in the contents of issue 32 should have read ‘Miscounted population of the southern white rhinoceros (*Ceratotherium simum simum*) in the early 20th century?’ — not ‘... in the early 19th’. Our apologies for overlooking such a blatant error.