REGIONAL CONSERVATION GOALS FOR BLACK RHINOS IN NAMIBIA/SOUTH AFRICA

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REGIONAL BLACK RHINO CONSERVATION GOALS

The primary aim of the regional conservation plan for the black rhinoceros in the Rhino Management Group (RMG) region (Namibia and South Africa) is to build up *in situ* populations of at least 2 000 *Diceros bicornis minor* (south-central ecotype), and 2 000 *D.b.bicornis* (arid-adapted south western ecotype) ***as rapidly as possible***; and to conserve them in the long term[1].

The aim of breeding up the non-endemic *D.b.michaeli* (north-eastern ecotype) to 100 as soon as possible in the RMG region looks set to fall away soon, given the stated policy of the National Parks Board to move all the *D.b.michaeli* in Addo Elephant National Park back to their region of origin (Northern Tanzania and Kenya).

A subsidiary goal of the regional conservation plan for the species[1] is to support captive breeding programmes for all three ecotypes, both within and outside the African continent, providing they can play a significant and sustained role in maintaining or improving the conservation status of the species.

All formal state conservation organisations with black rhino in the RMG region are signatories to the conservation plan, as are a number of the main Non-Government Organisations and other governmental conservation departments. In 1993 South Africa and Namibia together accounted for 58% of Africa's black rhinos and just over 95% of Africa's white rhino.

Based on the 1993 IUCN SSC African Rhino Specialist Group population estimates prepared at Mombasa, Kenya (May 1994), South Africa and Namibia together currently are 42,0% and 30,3% of the way towards meeting the regional conservation plan goals for *D.b.minor* and *D.b.bicornis* respectively.

RATIONALE BEHIND THE PRIMARY REGIONAL CONSERVATION GOAL TO BREED UP POPULATIONS AS FAST AS POSSIBLE

In the author's opinion, the key part of the primary rhino conservation goals is the phrase "***as rapidly as possible***". I have devoted the rest of this paper to explain why I believe this is so important.

1. Conservation biology

The goal of 2 000 per ecotype was originally based on recommendations by conservation biologists that a metapopulation of about 2 000 ($\approx$ effective population size of 500) would maintain long-term genetic variability[1].

However, although small populations can loose genetic diversity in time, this loss will be minimised if population growth is rapid (Mike Gilpin pers comm.). The latter is one reason why it was deemed desirable to build up numbers as rapidly as possible.

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However, recent assessments of risk factors facing black rhino populations [Population Vulnerability Analysis (PVA) modelling by Karen Swart (Willem Ferguson pers.comm) and by Richard Emslie in BR2000 final report Volume 6 (Emslie & Adcock in prep.)] have led to conclusion that genetic threats to the conservation of black rhino by inbreeding depression and potential loss of genetic diversity have been greatly over-emphasised.

Analyses of black rhino samples from Zimbabwe, and Natal's Hluhluwe-Umfolozi and Mkuzi by Karen Swart (Willem Ferguson pers.comm.) show that Southern African black rhinos have a very high degree of heterozygosity.

Time for geneticists is measured in number of generations, not years. With black rhinos having generation times of approximately 18 years (estimated using VORTEX PVA modelling - BR2000 final report Volume 6: Emslie & Adcock in prep) potential genetic problems must be viewed as very long term problems (- if they are practically problems at all). We should not forget that conservation biology considerations simply represent a long-term insurance policy. There is no direct evidence that any long-term loss of heterozygosity of black rhinos will necessarily translate directly into reduced performance in future.

Seen against the very real and more immediate threats from poaching, genetic considerations are relatively unimportant. Nevertheless, we can still minimise any long-term risks by breeding populations up as fast as possible.

However, there are other far more pressing reasons why we need to breed up numbers as fast as possible.

2. The greater the number of rhinos *in situ*, the greater the buffer against poaching threat

Obviously the more animals we have, the more able we are to withstand a limited poaching onslaught. **Given that the poaching threat to Namibia and South Africa's rhinos is very real and immediate, it is imperative that we build up numbers of rhino as fast as possible to give us the biggest buffer against poaching as possible.** Time is not on our side.

3. The compounded effect of long term sub-optimal performance is similar in effect to poaching - we end up with far fewer rhino

From a mathematical perspective the role of compound interest in population dynamics appears all too frequently to not be given due importance by conservation decision makers.

Similarly, banks wouldn't make so much money from house mortgages if more people were more aware of the long-term effects of compound interest; and the huge benefits to be gained by simply paying a little more/month than the minimum bond repayment.

To digress, and illustrate the effects of compound interest, let us start with a practical every day life example closer to home. Suppose Joe Soap took out a 20-year bond on a R200 000 house at 16% interest:

Scenario 1: If he were to pay the minimum required per month (R2 782), it would take him 20 years to pay off his house. The total interest he would pay over the period would amount to a staggering R467 802!. At the end of 20 years Joe owns a house but has no money in the bank.

Scenario 2: Let us suppose that Joe managed to save some money each month so he could pay an extra 33% per month into his bond (extra R924/month). He would pay off his house in only 8 years instead of 20. He also would end up paying the bank only R155 752 in interest. Thus by spending an extra R88 704 over the 8 year period he effectively saved himself R312 050 in interest charges on his bond.

Let us also suppose that Joe was a disciplined chap, and continued to invest the minimum bond amount (R2 782/month) in another investment for the next 12 years which returned 14% per annum. At the end of 12 years this investment would be worth R1 028 616.

Thus after the same 20 year period, by just appreciating the effect of compound interest, and managing to save enough to spend an extra R924/month for the first 8 years, Joe still ends up owning his house, but now he also has a million rand in the bank.

The lesson from this example is that one can earn huge returns by paying a little extra each month, and making compound interest work for you rather than against you.

Now let us look at how compounded net population growth rates affect metapopulation sizes, and the time it will take us to reach the regional black rhino conservation goals. The principle is the same - we ignore compound interest rates at our peril. It is important that we consider the real longer term costs of not optimally managing our rhino.

Whenever a rhino is poached it invariably (and rightly) receives a lot of attention. By way of contrast sub-optimal performance often appears to hardly rate a mention by some conservationists. The cause of this may be that poaching results in something which we can see (carcasses) and has a dramatic impact. Considering compounded growth rates is by comparison a bit abstract and academic, and is much harder to relate to. However the main point I want to make in this paper is that the latter is something which should also receive due attention. The words ***as rapidly as possible*** in the conservation plan goals are in part intended to do just that.

I hope the following examples illustrate that sub-optimal performance in the long run may have an even more devastating long-term effect on metapopulation performance than limited poaching over a period.

Using an analogy, concentrating on trying to reduce poaching but not being unduly concerned about maximising growth rates is like playing football with a view to only stopping the opposing team from scoring. Granted, all good teams need a strong defence; but if we also helped our attack to score more goals we would in all probability be very much more successful.

In South Africa six lots of five black rhinos (totalling 30) have been sold to the private sector by the Natal Parks Board in the five years 1990-94. The amount sold per lot (5) is small. However, it is important we do not fall into the trap of thinking "well, its only x rhinos" when moving small numbers of rhinos like this in any one year. That would be short-sighted.

To illustrate my point, let us consider a range of scenarios between two extremes where a conservation department has 5 surplus rhinos a year to translocate over a 25-year period to reestablish new populations elsewhere.

Extreme Scenario A: Let us suppose we were to put all the rhinos in areas where net maximum productivity of around 6,5% growth per annum could be maintained. (Vortex modelling, and actual observed performance of productive black rhino populations indicate that a net long term growth rate of between 6 and 7% represents a good performance level for wild black rhino populations).

Extreme Scenario B: Suppose the same number of animals were instead put at higher densities in a number of small properties. Let us suppose that in many cases we ended up stocking parks at densities higher than maximum productivity carrying capacity; that some new owners of rhino were hesitant about moving rhino once numbers had build up; and taking a worst case scenario let us imagine that as a result of incorrectly overestimating the carrying capacity of some parks we end up overstocking some parks from day 1. In addition with very small populations, chance events such as having all male calves can act to depress long-term metapopulation performance. Let us suppose that in such a worst case scenario we actually achieved a net average population decline in our new parks of 1% per annum.

Figure 1 shows the net growth in rhino numbers which would occur on the new properties over the complete range of net growth rates from -1% to +6,5% per annum.

If we only achieved a net growth rate of 1,5% we would end up with 25 more rhino. This equals an average increase of only 1 rhino/year. Limited poaching outbreaks under this scenario could easily depress populations.

However, if we made wise translocation decisions, and the rhino were monitored and managed well in the new parks (taking some off if necessary) we might attain a net growth rate of 6,5% This would translate to an increase in rhino numbers of 169 over the period, or an average increase in our newly established populations of 6,76 rhino/year. Our ability to sustain limited poaching would be much improved under this scenario.

At recent market value of black rhinos (R150 000 each) the net increase in asset value of the translocated populations would also increase from +3.75 million (1.5% growth rate) to +25,35 million (6,5% growth rate).

Figure 2 shows how net metapopulation growth rates will affect the number of years it will take to meet the goals of the regional plan for *D.b.minor* and *D.b.bicornis.* Note how the major improvements occur when increasing growth rates from 1% to 2%. It appears from the graph that increasing growth rates above 4% has less impact. This impression is misleading and is partly due to the condensing of the Y axis over the range where X is >4%.

By plotting the metapopulation sizes that would occur in 2010, one can see that substantial increases in rhinos numbers can be achieved if high growth rates are obtained. For example if a growth rate of about 5,25%/annum could be achieved from 1993-2010 we would meet the goal for *D.b.minor* by 2010. Increasing the average net metapopulation growth rate by just 3% (from 3,75% to 6,75%) would (in the absence of increased poaching) result in approximately a 1 000 more rhino in just 17 years time. Once again a small change in growth rate can have major consequences in the longer term.

CONCLUSIONS

It is important that all of us with rhinos don't just pay lip service to the words "*as rapidly as possible*" in the regional plan goals. We must all do our utmost to achieve just that. In this way we will give ourselves the best possible buffer against poaching, whilst at the same time minimising loss of genetic heterozygosity.

The obvious key question which follows is how do we maximise growth rates ?

This topic is discussed in the papers in this volume by Emslie & Adcock on managing rhinos; and by Emslie on property evaluations. The crux relates to maintaining populations at or below maximum productive carrying capacity and preventing habitat quality from declining. Our ability to do this depends both on the quality of our monitoring, and our ability to correctly estimate ecological carrying capacities.

REFERENCES

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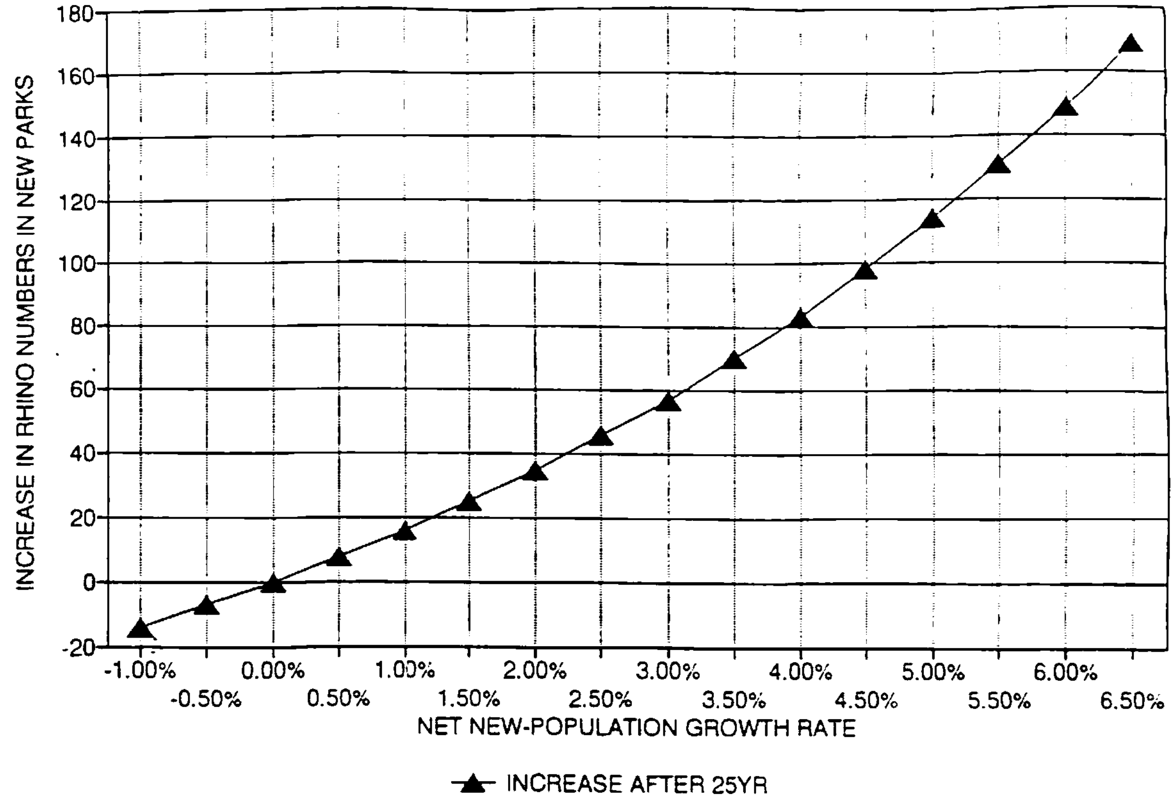

Figure 1: **Net increase in black rhino numbers in new parks after relocating 5 per year for 25 years**

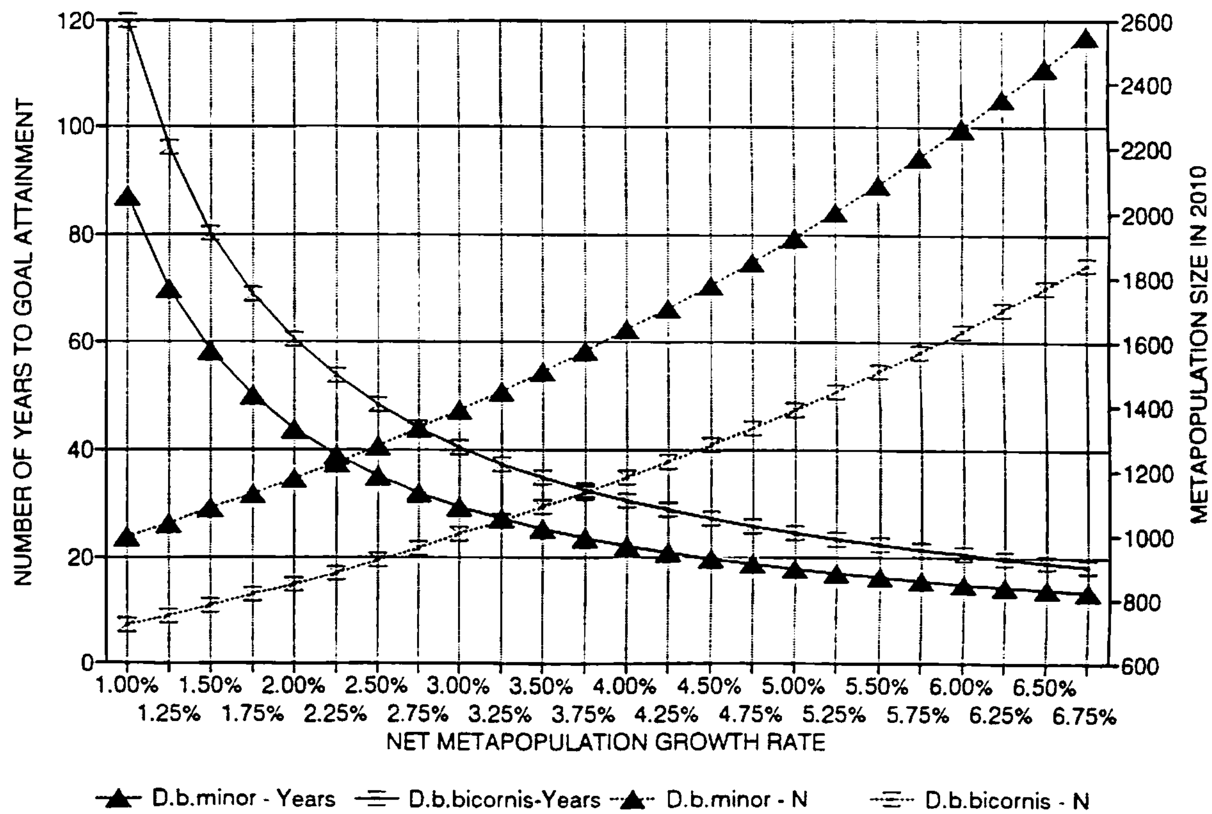

Figure 2: **Net black rhino population growth rate, goal attainment time and metapopulation size in the year 2020**