

Repatriation and translocation of ungulates into South African national parks: an assessment of past attempts

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The results of 36 attempts to repatriate or translocate ungulates into South African national parks are examined. Habitat suitability appeared to be an important factor influencing the success rate. Of six cases in which individuals were translocated outside the range occupied by the species in historical times, only one succeeded. Of 10 cases where the park was within the historical range of the species but the habitat was rated as unsuitable (little or none of the required habitat present in the park) only one succeeded. In contrast 17 out of 20 cases in which the habitat was classified as adequate resulted in success. The repatriation and translocation attempts were poorly documented and this hampered identification of the factors associated with success.

Key words: introduction, habitat suitability, distribution

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Introduction

The release of animals into areas from which they have been eliminated is a well-established practice in nature conservation. Despite the prevalence of this practice the success rate is sometimes poor, and numerous authors have made a plea for better documentation of such attempts in order to identify the factors that determine success (Conant 1988; Griffith *et al.* 1989; Dodd & Siegel 1991). In South Africa many populations of indigenous ungulates have been restored to different parts of their historical range in this way, but for the most part these projects have been poorly monitored.

The purpose of this paper is to examine the results of attempts to establish ungulates in various South African national parks. The data set used is that of Penzhorn (1971) which listed 36 such attempts which occurred before 31 December 1970. This gives a minimum period of 22 years over which to evaluate the results. In most of these cases individuals were released into parks where the species was known to have occurred in historical times. In some cases, however, an-

imals were released outside their historical range. The terminology used in this paper follows that of Dodd & Siegel (1991): the release of individuals of a species into an area formerly occupied by that species is termed a repatriation, whereas releases of individuals into geographic areas not historically occupied by that species are termed translocations.

The data set reported here has a number of shortcomings. No record has remained of the total numbers of animals originally released, nor of their ages and sexes. In many cases the year of release is not precisely known. Despite the inadequacies it is possible to examine the relationship between the success rate and the suitability of the habitat in the release area.

Ungulate species

The ungulate species involved in the repatriation or translocation attempts were:

black rhino *Diceros bicornis*,
white rhino *Ceratotherium simum*,
zebra *Equus burchellii*,

black wildebeest *Connochaetes gnou*,
blesbok *Damaliscus dorcas phillipsi*,
buffalo *Syncerus caffer*,
bushbuck *Tragelaphus scriptus*,
kudu *Tragelaphus strepsiceros*,
eland *Taurotragus oryx*,
gemsbok *Oryx gazella*,
grey rhebok *Pelea capreolus*,
mountain reedbuck *Redunca fulvorufula*,
reedbuck *Redunca arundinum*,
oribi *Ourebia ourebi*,
red hartebeest *Alcelaphus buselaphus*,
springbok *Antidorcas marsupialis*,
warthog *Phacochoerus aethiopicus*, and
hippopotamus *Hippopotamus amphibius*.

Methods

Each repatriation or translocation attempt listed by Penzhorn (1971) was classified as a 'success' if the species in question was still present in the park at the time of writing (22 years or more after the first release of animals) or a 'failure' if the species either died out naturally, or performed so badly that the last remaining individuals were removed. The sole exception to this is the case of springbok introduced to the Bontebok National Park, which was classified as a success even though the population was subsequently removed. This case is explained below.

Each case was classified as being either a repatriation (within the historical range of the species) or a translocation (outside the historical range). Decisions as to whether the release of animals constituted a repatriation or a translocation were made on the basis of the distributions of the different ungulate species in historical times (Du Plessis 1969; Skead 1980, 1987; Rookmaaker 1989).

For the repatriations the quality of the habitat in each case was classified as either adequate or unsuitable. The latter category applied if there was little or none of the habitat known to be required by the species present in the park. This classification was made without taking the result of the restoration attempt into consideration. Decisions made as to the adequacy of the habitat were inevitably somewhat subjective. The approach adopted was to classify the habitat as adequate if there was any doubt.

Statistical analysis

The Fisher exact test (Siegel 1956) was used to test two hypotheses: (i) that success depended on whether the attempt represented a translocation or a repatria-

tion and (ii) in the case of repatriations, whether success depended on the suitability of the habitat.

Results and discussion

Table 1 shows the results of each translocation or repatriation attempt. On the basis of available evidence the following releases of animals were categorised as translocations rather than repatriations: buffalo and warthog to the Golden Gate Highlands National Park (see Du Plessis 1969), gemsbok to the Mountain Zebra National Park (see Du Plessis 1969; Skead 1987) and springbok to the Bontebok National Park (Du Plessis 1969; Skead 1980). The historical distribution of reedbuck is difficult to determine because of confusion with mountain reedbuck and grey rhebok, but it seems doubtful whether reedbuck occurred in the vicinities of either the Bontebok or the Mountain Zebra National Parks in historical times (see Skead 1980, 1987; Rookmaaker 1989). The release of reedbuck into these two parks were therefore deemed to be translocations rather than repatriations.

There are two doubtful cases — those of Burchell's zebra and springbok in the Golden Gate Highlands National Park. Du Plessis (1969) suggests that the quagga, rather than Burchell's zebra may have been present in the area in historical times. However, the early observers frequently confused quaggas and zebras and today it is impossible to say which occurred in any particular part of the Orange Free State (Skead 1987; Rookmaaker 1989). In view of the evidence that the quagga was merely a southern variety of Burchell's zebra (Greig 1983) the distinction between them may not in any case be relevant for the purpose of this study. Golden Gate is probably on the limit of the historical range of springbok, but the evidence reviewed by Du Plessis (1969) indicates that they occurred in north-eastern Lesotho in the valleys of the Maluti Range. Golden Gate Highlands National Park is thus accepted as being within the historical range of both zebras and springbok.

Table 1
Results of attempts to establish ungulate populations in different national parks in South Africa, shown in relation to an evaluation of the habitat in the release area

Species	Park	Result	Habitat Evaluation
Black rhino	AENP	Success	Repatriation; Adequate
Black rhino	KNP	Success	Repatriation; Adequate
Black wildebeest	GGNP	Success	Repatriation; Adequate
Black wildebeest	MZNP	Success	Repatriation; Adequate
Blesbok	GGNP	Success	Repatriation; Adequate
Blesbok	MZNP	Success	Repatriation; Adequate
Buffalo	BNP	Failure	Repatriation; Unsuitable
Buffalo	GGNP	Failure	Translocation
Bushbuck	BNP	Failure	Repatriation; Unsuitable
Eland	AENP	Success	Repatriation; Adequate
Eland	BNP	Failure	Repatriation; Adequate
Eland	GGNP	Success	Repatriation; Adequate
Eland	MZNP	Success	Repatriation; Adequate
Gemsbok	MZNP	Failure	Translocation
Grey rhebok	AENP	Failure	Repatriation; Unsuitable
Hippopotamus	AENP	Failure	Repatriation; Unsuitable
Kudu	AENP	Success	Repatriation; Adequate
Mountain reedbuck	AENP	Failure	Repatriation; Unsuitable
Mountain reedbuck	GGNP	Success	Repatriation; Adequate
Oribi	GGNP	Success	Repatriation; Adequate
Oribi	KNP	Failure	Repatriation; Unsuitable
Red hartebeest	AENP	Success	Repatriation; Unsuitable
Red hartebeest	BNP	Failure	Repatriation; Adequate
Red hartebeest	GGNP	Failure	Repatriation; Adequate
Red hartebeest	MZNP	Success	Repatriation; Adequate
Reedbuck	AENP	Failure	Repatriation; Unsuitable
Reedbuck	BNP	Failure	Translocation
Reedbuck	GGNP	Failure	Repatriation; Unsuitable
Reedbuck	MZNP	Failure	Translocation
Springbok	AENP	Failure	Repatriation; Unsuitable
Springbok	BNP	Success	Translocation
Springbok	GGNP	Success	Repatriation; Adequate
Springbok	MZNP	Success	Repatriation; Adequate
Warthog	GGNP	Failure	Translocation
White rhino	KNP	Success	Repatriation; Adequate
Zebra	GGNP	Success	Repatriation; Adequate

AENP = Addo Elephant National Park

KNP = Kruger National Park

GGNP = Golden Gate Highlands National Park

MZNP = Mountain Zebra National Park

BNP = Bontebok National Park

In five of the six cases listed as being translocations rather than repatriations the result was a failure (Table 2). The exception was the introduction of springbok into the Bontebok National Park. Despite being extralimital, the

springbok performed extremely well, increasing from the 20 originally introduced in 1960 to nearly 250 in 1975, when the decision was taken to remove them (De Graaff & Penzhorn 1976).

Table 2
Results of attempts to establish ungulate populations in different national parks: the numbers of successes and failures classified according to an evaluation of the habitat in the release area (for explanation see text)

	Success	Failure
Translocations	1	5
Repatriations unsuitable habitat	1	9
Repatriations adequate habitat	17	3

In 10 of the 30 cases of repatriation the habitat was classified as being unsuitable (Table 1). These are discussed briefly below. In the Bontebok National Park the only thicket vegetation is a narrow fringe of riverine vegetation just over 4 km in length, and is thus clearly unsuitable for bushbuck. This park is small (just over 2 700 ha) with very little of the woody cover and tall grass required by buffalo. The vegetation in the Addo Elephant National Park is mostly valley bushveld (succulent thicket) with a few islands of grassveld, and is thus clearly unsuitable for hippopotamus, mountain reedbuck, grey rhebok, springbok or red hartebeest. Reedbuck are generally associated with hygrophilous grassland or vleis (Rowe-Rowe 1991) which are limited or entirely absent in all the parks into which this species was released. Oribi occur in grassland rather than bushveld (Rowe-Rowe 1991) and therefore the Kruger National Park must be regarded as being unsuitable for this species.

The suitability of Golden Gate Highlands National Park for black wildebeest, blesbok, hartebeest, springbok, zebra and oribi may be considered to be dubious because of the steep terrain. There are, however, expanses of flat to slightly undulating terrain on plateaux, pediments and valley bottoms so it is reasonable to classify the habitat in this park as adequate — if not good — for species that favour open plains.

Of the 10 cases of repatriation into unsuitable habitat only one was successful (hartebeest in the Addo Elephant National Park — Table 2). In contrast, 17 of the 20 cases that involved adequate habitat succeeded.

For the test of the hypothesis that success depended on whether a repatriation or a translocation was involved, the Fisher exact test yielded a one-tailed probability of 0,067. This approaches significance at the 5% level. Considering only repatriations, the success rate was significantly higher for adequate habitat than for unsuitable habitat (Fisher exact test one-tailed probability = 0,0013). The importance of habitat suitability as a factor influencing the outcome of repatriations has been demonstrated in other studies. For a data set including 134 translocations/repatriations of birds and 64 translocations/repatriations of mammals in various parts of the world Griffith *et al.* (1989) recorded a success rate of 84% in 'excellent' habitat compared with 38% in 'fair or poor' habitat.

A number of repatriation or translocation attempts listed in Table 1 were clearly ill-considered, and such gross errors are unlikely to be repeated today. The high failure rate of the translocations underlines the importance of using historical records, such as those of Du Plessis (1969), Skead (1980, 1987) and Rookmaaker (1989), in planning repatriation programmes. The results also emphasise the need for a close understanding of the habitat requirements of species considered for repatriation.

There are numerous other factors which may influence the success of repatriation attempts, an important one being the size of the founder group (Griffith *et al.* 1989; Berger 1990). However, this could not be examined in the present study because of the inadequacy of the original records. Clearly more empirical information is required to evaluate the factors that determine the success of restoration attempts. Most attempts to re-establish ungulate populations in southern Africa have been poorly monitored. Much more could have

been learned from the data set examined above if basic information, such as the numbers and age and sex composition of the founder populations, had been properly recorded.

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