

# MANAGEMENT

## The effect of removing a dividing fence between two populations of black rhinos

*F.J. Patton<sup>1</sup>, M.S. Mulama<sup>2</sup>, S. Mutisya<sup>2</sup>, P.E. Campbell*

<sup>1</sup>School of Biology, Chemistry and Health Science, Manchester Metropolitan University, Manchester M1 5GD, UK

<sup>2</sup>OI Pejeta Conservancy, Nanyuki, Kenya

email: felixp@africaonline.co.ke; samuel@olpejetaconservancy.org

### Abstract

OI Pejeta Ranching Limited in central Kenya was a 36,500 ha cattle ranch that included the 9,700 ha Sweetwaters Game Reserve, a sanctuary for black rhinos (*Diceros bicornis*). A change of ownership in 2004 led to an extension of the reserve to create OI Pejeta Conservancy. By the end of 2006, the old reserve was reaching its Maximum Sustainable Yield of 45 rhinos, while at the beginning of 2007, 27 black rhinos were introduced into the new area. In order to reduce the density of rhinos in the old area, the fence dividing the two areas was removed, although opinions varied as to the likelihood of success of this action. Results of rhino movements between the two areas are presented. After 18 months, there was little movement of rhinos either from the old into the new area or from the new into the old area. Two sub-adult females were translocated from the old to the new area and settled close to their release sites.

**Key words:** conservation, dispersal, maximum sustainable yield

### Résumé

OI Pejeta Ranching Limited au Kenya Central était un ranch de 36.500 ha qui comprenait la Réserve Naturelle Sweetwaters de 9.700 ha, un sanctuaire pour les rhinocéros noirs (*Diceros bicornis*). Un changement de propriétaire en 2004 a conduit à l'élargissement de la réserve pour créer la Conservation d'OI Pejeta. Vers la fin de 2006, la vieille réserve atteignait son rendement maximum durable de 45 rhinocéros, alors qu'au début de 2007, on avait introduit 27 rhinocéros noirs dans la nouvelle aire. Pour réduire la densité de rhinocéros dans la vieille aire, on a enlevé la clôture qui divisait les deux aires, malgré la différence d'opinions concernant la probabilité de succès de cette action. On présente les résultats des mouvements de rhinocéros entre les deux aires. Après 18 mois, il y avait peu de mouvement de rhinocéros ou bien de la vieille aire vers la nouvelle aire ou vice-versa. Deux femelles sous-adultes étaient transférées de la vieille aire à la nouvelle aire et se sont installées près de leurs sites de relâchement.

## Introduction

In 2004, Fauna and Flora International, a UK based conservation organization, purchased the 36,500 ha Ol Pejeta Ranching Limited situated in the Laikipia area of central Kenya. The purchase included the 9700 ha Sweetwaters Game Reserve at the eastern side of the ranch. The entire reserve was by then a sanctuary for 46 critically endangered black rhinos while there were none in the ranching area.

The Sweetwaters Game Reserve, also referred to in this paper as the rhino sanctuary, was subsequently extended to encompass most of the ranching area to create the Ol Pejeta Conservancy. The fence along the western side of the Game Reserve was removed making a further 20,000 ha available for black rhinos. Prior to the removal of the fence, 27 black rhinos were released into the 'new' area—23 from Solio Game Reserve and 4 from Ol Jogi (see Patton et al. 2009).

## Background

Habitat monitoring and population performance in the Sweetwaters Game Reserve had been intensively researched and a habitat monitoring model developed in 2001 (Birkett 2002). The model suggested that the Ecological Carrying Capacity (ECC) of this black rhino sanctuary was 60 rhinos. This estimate was made on the basis of either the elephant population being 50 and the giraffe population 150 or the elephant population being 100 and the giraffe population 75. In 2001, the elephant population was reduced by 50% to bring it to 50 elephants as one way of reducing the impact on rhino habitat and thus maintaining the then minimum recommended rhino population growth rate of 5% per annum.

Based on the ECC estimate, the Maximum Sustainable Yield (MSY), to maintain optimum breeding performance, was calculated as 75% of ECC, i.e. 45 rhinos. At the end of December 2004 there were 38 rhinos recorded in the sanctuary. However, during 2005 and the first half of 2006, it was estimated that 9 females would give birth. This would have created a population of 47 in 2006, therefore exceeding the MSY.

Rhinos are also known to require 'living space' (Joubert and Eloff 1971) and this becomes a limiting factor in an enclosed (fenced) sanctuary. When the carrying capacity of a reserve is being reached, the rhinos exhibit behavioural signs of stress. In males, the key sign is intraspecific aggression and with females reduced breeding performance. Both signs

were recorded in this sanctuary in 2004 and 2005. In addition to recommending the reduction of elephant and giraffe numbers, Birkett (2002) also suggested the expansion of the sanctuary by 50% as an option to alleviate the impact on the rhino habitat.

In consideration of the expansion option, the question for the sanctuary management was 'would the removal of the fence adjoining the old and new areas lead to some (enough) rhinos moving out of the old high density area into the new low density area?' Even if they did, would they do so in a way that alleviated the density pressure in all parts of the old area rather than just in the western area that adjoined the boundary of the new area, and in a period short enough to overcome the overcrowding problem?

Dispersal of black rhinos has received little research and is therefore little understood. Opinions, not unexpectedly, vary. On the one hand, it is known that sub-adult rhinos travel on excursions to find suitable territory where males seek areas outside the territories of other breeding male or they fight a breeding male for its territory and if the older loses, it retires to a peripheral small area (Adcock et al. 1998). Females will seek areas with suitable resources—food, water and shelter—in which to breed. While in a low-density reserve they may share an area that has sufficient resources with other females, but in a high density reserve they will need to find uninhabited or low use areas. This consideration seemed to favour the opinion that at Sweetwaters, with a potential surfeit of males and high usage of resources, the sub-adults would be forced to disperse into the new areas available when the fence on the western boundary was to be removed. However, there was concern that the removal of the fence would be unlikely to relieve the pressure on the majority of the sanctuary to the east of the north–south flowing river, at least not in a period short enough to overcome the overcrowding problem.

On the other hand, from what is known, black rhinos are considered to be poor at dispersing. It had also been reported that, once animals have established their home range existing fences are usually regarded as a boundary such that even if the fences are taken down, for example for capture purposes, animals will generally not cross this line (la Grange 2006).

It was therefore thought essential for good management to translocate a significant number from the sanctuary into the new area (Patton 2006). At the same time plans were underway to move 30 rhinos (10 females and 20 males) to the new area of Ol Pejeta Conservancy (Patton et al. 2009). It was thus recommended that 9

females should be moved from the sanctuary to join the 10 females to be translocated from outside to make a founder population of 19 females and 20 males in the new area. However, there was some concern that some of the Sweetwaters rhinos moved from their old, familiar area to the new, strange, area would find their way back to their old area, once the fence was removed, especially if they were able to smell on the wind the scent of 'friendly' rhinos that had remained in the old area.

Consequently, only 27 rhinos—not including any from within the sanctuary—were moved to the new area (Patton et al. 2009) and the cautious, most economical, option of 'wait-and-see' was adopted. Plans to remove the dividing fence were brought forward. A two- to three-month settling in period for the newly moved rhinos was originally planned, but fence removal was started in the middle of March 2007, some 30 days after the last rhino was released in the new area. By 22 March the entire fence along the western boundary had been taken down. This abutted an area where several of the new rhinos were located.

At the time the fence was removed there were 13 rhinos in the sectors A and B, which abutted the western fence—one adult male, Jupiter, three adult females with calves, Mrembo, Tulivu and Waya, four immature males, Baraka, Jama, Maendeleo and Uhuru, one immature female, Tatizo and one sub-adult female, Cathy. One immature female, Roberto, sometimes spent brief periods in sector B as well. These would be those most likely to cross into the new area.

## Results

Over the 18-month study, only one rhino, Baraka, moved from the former Sweetwaters Game Reserve and remained in the new area. Five other rhinos were observed in the new area from the former Sweetwaters Game Reserve: Maendeleo 20 times; Jama 1 time; Tatizo 1 time; Waya 11 times; Roberto 4 times; and Jupiter 3 times. No translocated rhino moved from the new area into the former Sweetwaters Game Reserve while four translocated rhinos were seen in the former Sweetwaters Game Reserve: Nwanku 3 times; Sub 7 times; Nduta 1 time; and Kaka 1 time.

## Discussion

The first sighting of a rhino from the old area in the new area (sector J), the male Maendeleo, was on 4 June 2007, 74 days after the fence removal was

completed. At seven years and nine months of age, Maendeleo was an immature male, hardly more than a sub-adult. The rhino was seen a further 9 more times in sector J in the first six months—on one occasion with a resident male Ojwang and on another occasion with a resident sub-adult male Hatari. Maendeleo continued to be observed in sector J a further 10 times up until the middle of January 2008 after which it moved back to the old area and right across the reserve to the south-east where it had been born and brought up.

Roberto, a female who stayed in the same area as Maendeleo, was also found in sector J four times in the first six months, on one occasion with Maendeleo.

The adult male Jupiter from the old area, sector A, was sighted once in sector M in June 2007 while the 12 year-old male Baraka, from sectors A and B, was sighted once, also in sector M, at the end of July. In the second 6-month period Baraka was sighted twice in sector M. Between March and May 2008 it was found five times in sector J, moving to sector K in June 2008, where it has stayed full time ever since.

From the end of May to the end of August 2008, the adult female Waya, normally located in the old area, sector A, was found on six occasions with the female Sub and alone five times in sector O.

In summary only one rhino, the male Baraka, moved from the old area into the new area in the 18 months following the removal of the dividing fence.

Whilst wishing for rhinos to cross from the old to the new area, there was the opportunity for rhinos in the new area to move into the old area. At the time the fence was removed there were 16 rhinos in sectors O, M and J which abutted the sectors A and B—10 males and 6 females. However, the human activity and smell associated with taking the fence down may have frightened at least some of the translocated rhinos away from the area. However, at the end of 18 months, six rhinos—four males Kaka, Hatari, Ojwang and Nwanku plus two females Sub and Nduta—were still in the new sectors abutting the old area.

Despite the opportunity to cross over, there have only been a few sightings of rhinos from the new area exploring the old area: Sub in sector A three times, once with Shujaa, a sub-adult female, the former calf of Tulivu; the male Kaka once in A; the male Nwanku twice in B, once with the female Tulivu.

With little movement from the old area into the new area, after one year it was decided to relocate two sub-adult females to the new area—Berkely to sector N and Millenium to sector P. Despite concerns that the two rhinos would try and find their way back to their former locations, the two actually did the opposite and moved further into the new area. Berkely was sighted 40 times in sector R and 21 in V while Millenium was found 32 times in R and 14 in U.

The resident male Mbaluki moved from sectors M/N and located Berkely in V in mid-May and they have been found together on 12 further occasions. In July, at four of these sightings, the other female Millenium was also with them.

The translocation of the two females appears to have been a success and it is hoped that their interaction with Mbaluki could lead to breeding.

## Conclusion

There was only a very limited movement of rhinos across the former boundary between the ‘old’ area (the former Sweetwaters Game Reserve) and the ‘new’ area following the removal of the fence dividing the two areas. The rhinos in the old area were accustomed, over the length of their life in the area, to there being a fence obstructing their movements and followed other experiences (La Grange, 2006) by rarely crossing this boundary. The rhinos in the ‘new’ area were not accustomed to there having been a boundary but even more rarely crossed over to the ‘old’ area despite moving around the ‘new’ area (Patton et al. 2009). One theory promulgated is that the rhinos near to the boundary may have smelled ‘familiar’ rhinos within the new area and ‘unfamiliar’ rhinos in the ‘old’ area and moved towards the ones they were familiar with.

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