

FIELD NOTES

Black rhinoceros mortality in Matusadona National Park, Zimbabwe: 1992–2003

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Introduction

In 1987 Zimbabwe had the largest population (c. 1775) of black rhinoceros, *Diceros bicornis*, L. in Africa. Over the next five years it lost over 80% of its population as a result of poaching activities (Alibhai et al. 1999). In 1992 the government of Zimbabwe, through the Department of National Parks and Wildlife Management, established intensive protection zones (IPZs) on state land and conservancies on private land as part of a comprehensive strategy to save the rhino. In the Zimbabwe context, an IPZ is a designated area where resources are concentrated for the purpose of conserving particular species. Matusadona National Park was one of four IPZs that were formed in 1993 to conserve rhinos.

Rhinos that remained in unprotected areas or in areas where protection was inadequate were relocated to these new conservation areas. Relocation meant immobilizing and transporting the animals. Matusadona National Park received about 25 wild rhinos from other areas between 1991 and 1995. In addition, the park received 12 hand-raised rhinos either for final release or for further hand-raising and rehabilitation before final release between 1994 and 2001. New animals were kept in a *boma* (kraal) to acclimatize them to the new environment or to hand-raise them for some time. Before their release, some rhinos were radio-collared for tracking purposes and ear-notched for identification, and some were dehorned to discourage poaching. After their release some were periodically recaptured for recollaring.

The study area

Matusadona National Park stretches from 28°23' to 28°51'E and from 16°41' to 17°13'S (fig. 1). The park is 1407 km² in area. It is divided by an escarpment into two major geomorphologic landscapes: the semi-arid eutrophic valley floor lying at an altitude of between 485 and 600 m, and the wet, dystrophic, rugged highland section lying between 600 and 1200 m. The lowland area is dominated by semi-arid vegetation, mainly *Colophospermum mopane* woodland, while the highland area supports *Brachystegia*–*Julbernardia* woodlands.

Observations

As noted in file records and field observations, 18 rhinos died in Matusadona National Park between 1992 and 31 December 2003 (table 1). Deaths took place mostly among rhinos that originated from within the park (44.4%) and from Chizarira National Park (27.8%). Mortality was recorded in all age groups—adults, subadults and calves—with the highest number of deaths (44.4%) recorded in each of the adult and subadult segments. The highest number (5) of deaths in a single year took place in 1994 (fig. 2).

Between 1992 and 1995, 42 rhinos were darted an average of 2.64 times each (range 1–6 times); 11 of the animals darted died during that period. Deaths of animals that were relocated from other areas took place at an average of 4.47 months (range 1 month 3 days to 12 months 7 days) after release from holding

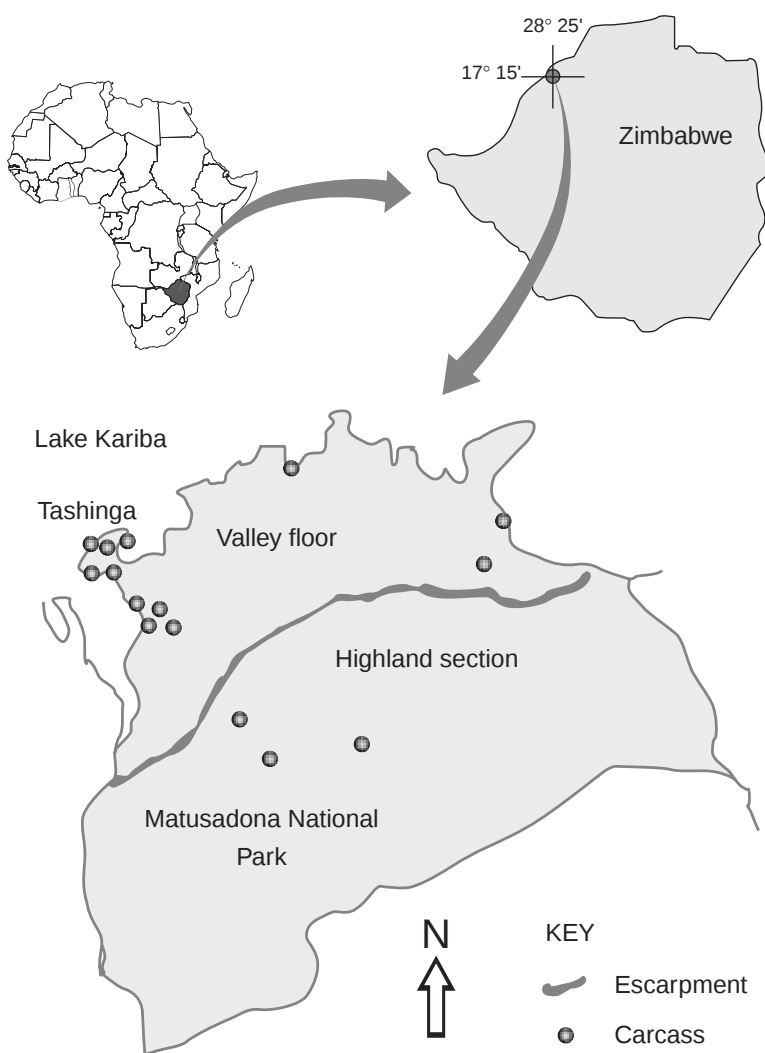


Figure 1. Location of Matusadona National Park in Zimbabwe and location of 15 of the 18 rhino carcasses found in the park; location of the other 3 is not known.

pens, and at an average of 5 months and 12.5 days (range 1 month 10.8 days to 8 months 14 days) after the last darting.

File records show that there were logistical problems during capture operations. Once, rhinos destined for Matusadona National Park were rerouted to Sinamatella because heavy rains prevented transport into the park. During boma holding, some animals did not feed for at least 24 hours on the browse placed in pens after they were offloaded, possibly due to stress and/or to loss of appetite caused by long-acting tranquillizing drugs administered at capture. The

stress on some animals might have been great enough that during post-capture and release they died. Deaths of adult and subadult animals may have been due to the effects of darting for relocation, dehorning or collaring. No intraspecific rhino fights with fatal results were observed. However, the high number of adult and subadult deaths was consistent with reports of post-release fatal intraspecific fights (Brett 1998).

An abortion, not included in table 1, occurred on 23 August 1994 from a cow that had been darted twice, in June and in August 1994. Abortion took place five days after the cow was darted the second time, when she was 29 weeks pregnant. Alibhai et al. (1999) observed that chemical immobilization can compromise the fertility of female rhinos and result in abortion if the animal is darted in the first five months of pregnancy. In this instance the cow was over five months pregnant. Darting an animal that was under stress and confined in a boma twice within three months might have brought on the abortion.

Lions and leopards were responsible for the loss of two emaciated and diarrhoea-ridden calves, aged between four and seven months. The mothers of the calves were also in poor body condition: one cow had diarrhoea and struggled to stand, and the other died five weeks after losing her calf. Postnatal calf mortality in black rhinos is known to occur under natural conditions through predation on calves under the age of three months, which are the most vulnerable (Alibhai et al. 1999). In Ngorongoro Crater, Tanzania, lions preyed upon a rhino calf, and the mother died four months later (Maige 2001). In the Hwange National Park, Zimbabwe, hyenas preyed upon emaciated newborn elephants whose mothers were apparently also thin in the late dry season (Salnicki et

Table 1. Black rhino mortality in Matusadona National Park, 1992–2003

Entry no.	ID no. or name	Sex	Date of birth	Date of death	Source	Cause of mortality
1	1	male	adult	09 Feb 93	Matusadona NP	poached
2	4	female	1983, adult	24 Nov 95	Matusadona NP	natural, pregnant, near full term
3	5	male	subadult	13 Oct 92	Matusadona NP	natural. broken jaw
4	6	male	subadult	06 Nov 92	Matusadona NP	poached
5	10	female	subadult	01 Jan 93	Matusadona NP	natural
6	31	female	adult	26 Jun 94	Chizarira NP	stuck in mud
7	32	male	1989, subadult	13 Mar 94	Chizarira NP	natural
8	34	male	adult	17 Nov 94	Chirisa SA	natural
9	35	male	1984, subadult	27 Sep 94	Chizarira NP	unknown, close to spring
10	39	female	1990, subadult	08 Oct 94	Chizarira NP	natural
11	36	female	subadult	07 Oct 95	Chizarira NP	natural, supernumerary tooth in nose
12	?	?	adult	c.1996	?	unknown, carcass in dry pan
13	?	?	10 Apr 98, calf	08 Nov 98	Matusadona NP	lion predation
14	?	?	04 Jun 00, calf	30 Sep 00	Matusadona NP	leopard predation
15	15	female	1963, adult	06 Nov 01	Partridge Islands	natural
16	?	?	adult	May 2002	?	poached
17	Chibage	male	24 Aug 99, subadult	28 Mar 02	Imire	poached in bomas
18	50	male	adult	12 Feb 03	?	poached

? – information unknown; NP – national park; SA – safari area

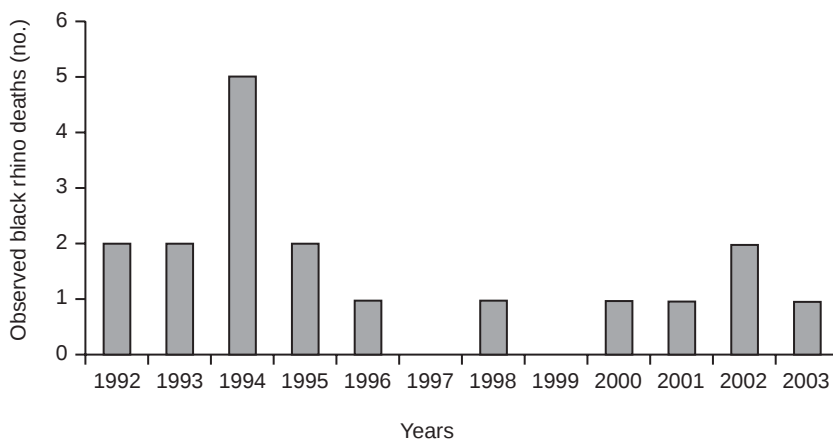


Figure 2. Number of rhino carcasses recovered in Matusadona National Park, 1992–2003.

al. 2001). Rhino and elephant mothers in poor body condition seemed unfit to provide their calves with adequate protection, and similarly calves in poor

health appeared to be poorly provided with adequate parental security. This occurrence of cows and calves in a poor state of health implies that there might have been a transmittable disease affecting mother and calf.

Reports that deaths were due to 'natural' factors show how difficult it is to identify mortality factors in the field when carcasses have decomposed. Natural factors were believed to have caused

rhinos to poaching had been last recorded in 1993 until poaching recurred in 2002 and 2003; the poaching included a hand-raised subadult male that was being rehabilitated. Poaching caused the highest number of mortalities until the park was designated an IPZ in 1993. The current upswing in poaching activity is a worrisome development for rhino conservation.

The distribution of mortality in the park is shown in figure 1. Captured animals were kept in bomas at Tashinga Camp. Four deaths took place close to the bomas after release; four deaths were observed near water bodies or holes and the reason for their dying close to waterholes was not established. More deaths (83.3%) were observed in the valley floor than in the highland section of the park because a significant number of animals died within five months not far from Tashinga boma after release. Also, the spatial distribution of the observed mortality was biased because ground patrols have easier access to the valley floor than to the rugged highland section.

Conclusion

It is not easy to identify the mortality factor in natural populations, especially several days after death. Effects of capture operations should be monitored and studied for longer than five months after animals, including pregnant cows, are manipulated. Although death figures are generally low in a given year, for an endangered species they have significant impact on population growth. Poaching activities are on the

upswing in the park. Past lessons show that a comprehensive multiple-pronged strategy for rhino conservation drastically reduces losses to poaching.

Acknowledgements

Previously, ecologists M. Murphree and P. Wood collected valuable information retrieved from station files. Scouts from both Management and Research Units of the then Department of National Parks and Wildlife Management helped with data collection in the field. Finally, the director and directorate of the Parks and Wildlife Authority are thanked for supporting the publication of this article.

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