AN EXERT OF THE 2008 SURVEY OF WHITE RHINOCEROS, *CERATOTHERIUM SIMUM SIMUM*, ON PRIVATE LAND IN SOUTH AFRICA

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For

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(ARP)

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LIST OF ACRONYMS

AfRSG	African Rhino Specialist Group
AROA	African Rhino Owners Association
CDB	Central Data Base
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CTGSTSA	Commercial Taxidermists and Game Skin Tanners of South Africa
DEAT	Department of Environmental Affairs and Tourism (now Department of Environment Affairs)
EU	European Union
EWT	Endangered Wildlife Trust
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
GKPNR	Greater Kruger Private Nature Reserves
KZN	KwaZulu-Natal
NEMA	National Environmental Management Act
OIE	Office International des Epizooties
PHASA	Professional Hunters Association of South Africa
SADC	Southern African Development Community
RMG	SADC Rhino Management Group
SANParks	South African National Parks

SAQA	South African Qualification Authority
TASA	Taxidermy Association of Southern Africa
TESA	TRAFFIC East / Southern Africa
TOPS	Threatened or Protected Species
TRAFFIC	Trade Records Analysis of Flora and Fauna in Commerce
USA	United States of America
USD	US Dollar
WESA	Wildlife and Environmental Society of South Africa
WWF	World Wide Fund for Nature
WRSA	Wildlife Ranching South Africa
WTA	Wildlife Translocation Association
ZAR	South African Rand

ABSTRACT

The status of white rhinoceros on private land in South Africa was assessed by means of mailed questionnaires, telephonic interviews, emails and visits to properties conducted late in 2008 and early 2009. The disappointing response to the questionnaire and interviews compelled the survey team to incorporate third party reports to complete the database and arrive at an estimate of white rhino numbers. A second estimate of numbers of white rhinoceros on private land was derived from the population growth rate of previous surveys applied to the known population of 2004. A third prediction of population size was derived from applying the average number of white rhino per property from the known populations, to the number of properties holding rhino (for many of which rhino numbers were not known). The high level of agreement between the three estimates provides a measure of confidence in the results. It was found that the population of white rhinoceros in the database had increased by 7.1% per annum from 3247 in 2004 to a total of 4174 in 2008. These privately owned white rhinoceros are now distributed on 395 properties covering 2 227 346 ha compared to 318 properties in 2004 covering 1 693 600 ha.

Most of the privately owned white rhinoceros are found in Limpopo and KwaZulu Natal provinces and the Greater Kruger Private Nature Reserves (Limpopo and Mpumalanga) with 72% of the total found in these three areas. There are now six Key1 populations (more than 100 animals) on private properties outside of the Greater Kruger PNR and five Key 2 populations (50-100). There are at least 10 known Important populations (20-50) and there could be more. Over the four years covered by the survey the State management agencies sold at least 581 white rhinoceros to the private sector contributing R98 384 352 to the budgets of the three agencies. At least 240 white rhino were traded within the private sector. A minimum of 20 animals were poached on private land, 284 were exported (according to permits issued) of which 30% went to China, and 392 were hunted. There were few changes to the demography of the population with a sex ratio among adults of 1.0:1.4. The reason females still outnumber males is that the State agencies sell more females and most hunted animals are males. The average size of private properties holding white rhinoceros is 5638 ha which is smaller than the 6162 ha of the 2004 survey suggesting that the new properties acquiring white rhino since 2004 are smaller.

There has been a dramatic increase in the illegal killing of white rhinoceros on private land in the past year with at least 20 animals poached in 2008 and even more in the first six months of 2009. This is following the trend of increased poaching of rhino in state protected areas in South Africa and in Zimbabwe. The theft of rhino horns from private properties and museums and armed robberies aimed at acquiring rhino horn are worrying elements in the decline of rhino security in South Africa. The dramatic increase in white rhinoceros hunting permits taken out by Vietnamese citizens appeared to be to acquire rhino horn for commercial purposes rather than as hunting trophies. This could have resulted in at least 176 horns weighing about 528 kg entering the Far Eastern medicinal horn trade during 2006 and 2007 alone.

A brief evaluation of the historical record shows that the private sector has made a huge contribution to conservation, not only by providing habitat for white rhinoceros but also for the economic inputs to the ecotourism and hunting industries as well as to the conservation initiatives of the State.

CHAPTER 1

THE 2008 SURVEY OF WHITE RHINOCEROS ON PRIVATE LAND

Introduction

A survey of the status of Southern white rhinoceros (*Ceratotherium simum simum*) on private land in South Africa over the period 2005-2008 was undertaken for WWF International's African Rhino Programme (WWF-ARP). This followed earlier surveys of Buijs (1998, 2000). Hall-Martin & Castley (2001) and Castley & Hall-Martin (2002, 2003, 2005).While the major objective of the survey was to obtain an updated estimate of the number of white rhinoceros on private land, the changed circumstances of the rhino industry necessitated a broader investigation. There are concerns about the recent increase in poaching of rhino on private land, and the increase in numbers of animals legally hunted (most of which were purchased from private landowners). Attention was, therefore, focussed on the trade in live animals and legal hunting as a means of providing rhino horn to the medicinal market. Most interviews with owners of rhinoceros included a discussion of whether a legal mechanism for trading in rhino horn harvested from live animals could curtail the legal and illegal killing of white rhinoceros.

Methods and Objectives

Survey and interviews to establish numbers of white rhinoceros

Questionnaires (see Appendix 1) were distributed to all rhinoceros owners on the existing 2004 WWF-African Rhino Programme database requesting information for the period 2005 to 2008. A team of investigators who are all known in the conservation, game ranching, wildlife veterinary and game translocation industries were tasked with interviewing as many owners of white rhinoceros as practical and visiting their properties. Owners and/or managers who had not responded to the questionnaire by the end of 2008 were contacted telephonically and via electronic mail. As the flow of information was still not satisfactory the Provincial conservation management agencies were approached (with limited success) as was the national CITES implementing agency. Because of the obvious overlap between the objectives of this survey and those of the SADC Rhino Management Group (RMG), the Chairman Dr M.H. Knight was invited to contribute data and his expertise to the survey.

The survey objective was to gather data on private properties, including municipal reserves and Zoological Gardens but excluding Provincial Reserves and National Parks. Rhinoceros numbers on State reserves are captured in the country assessments of the RMG and the IUCN African Rhinoceros Specialist Group (AfRSG) and are adequately recorded by the respective provincial and national authorities.

Every effort was made to obtain accurate data from the owners or managers, and sometimes from third parties (e.g. games dealers, auctioneers, hunters, security officials and provincial conservation staff) with relevant knowledge (property registers, permit applications, sale records etc.). Not all of the identified properties had contact information available since the details for some were obtained from third parties. All properties without rhinoceros in the previous survey (2004) were deleted from the database. New properties were identified (shown in capitals in the database) during the survey with the aid of private landowners who knew of

additional properties in their respective districts as well as through internet searches and information from conservation authorities.

When a preliminary assessment of the results obtained from the surveys and interviews was made, it was apparent that our data might still be incomplete (even with the incorporation of the RMG database). Two other methods were, therefore, employed to arrive at estimates of the white rhino population size. One is to calculate the population size from the average number of white rhinoceros per property where the number of properties is known. The second is to calculate the population growth from the known rate of natural recruitment, taking into account additions to, and losses from, the population brought about by hunting and the live export trade.

Average number of animals per property

Six subsets of data are available of numbers of white rhinoceros and numbers of properties between 1987 and 2004. The average number of rhino per property was calculated for all of these and used to derive an estimate of the number of rhino on the known number of properties in the 2008 database.

Calculated population growth

The population growth rate of white rhinoceros on private land through reproduction was found to be 6.1% in the 2004 survey (Castley & Hall-Martin 2005). This is roughly similar to the 6% annual increase recorded for white rhinoceros on State land between 1999- 2007 (Knight 2008). We have, therefore, used 6.1% to calculate the expected increase in numbers of white rhino from the previous survey in 2004 through the formula $N=N_0 e^{rt}$

Where

N = Calculated number white rhinoceros numbers for end of 2008

N_0 = Number of white rhinoceros in 2004

e = Log function

r = Population growth of 6.1% that was achieved by private ranchers during 2002-2004

t = 4 years period (2004 – 2008)

Additionally the inflow (bought from State populations) and outflow (hunted, exported, capture mortalities) of animals in the population are added and deducted to arrive at the net population for the end of each year (2005, 2006, 2007, 2008). The animals exported alive are included on the basis that the government did not export any animals and all exports came from the private sector. Furthermore it was assumed for calculation purposes that all animals for which CITES export permits were applied for were actually exported.

Trade in live rhinoceros

The questionnaires contained a section asking for numbers of animals bought or sold and prices paid or received. Furthermore all landowners interviewed were asked about their purchases. The state institutions that were active in the market for live white rhino i.e.South African National Parks (SANParks); Ezemvelo- KZN- Wildlife; and the North West Parks Board were also approached for their records of numbers of animals sold and prices obtained. Information was solicited from the private sector such as Vleissentraal, the Wildlife Translocation Association (WTA) (see Appendix 2) and the records kept by Dr J.G. du Toit.

The CITES permits issued for live exports of white rhinoceros for the period 2004 – 2007, as recorded in the annual reports of DEAT (the National CITES management authority), were also examined. The data was arranged for each year by country. A permit that expired or that was replaced was removed from the data set. The CITES permit data, in their present form, have to be used with caution as not all animals for which permits were issued were exported. The CITES permit data for 2008 were not available for this study.

Hunting of white rhinoceros

The questionnaire included a section on hunting but responses to this did not deliver much information. Other sources were, therefore, consulted such as the Professional Hunters Association of South Africa (PHASA) (see Appendix 2), the CITES permit reports of DEAT and interviews with players in the industry. Data from CITES permits were available to the end of 2007. Some information was also obtained from professional hunters and outfitters.

Private stock of rhinoceros horn

An attempt was made to update the information on the number of rhino horns held by private owners. A relevant section was, therefore, included in the questionnaire (see Appendix 1) and landowners were also questioned about their stocks during interviews. This yielded some firm information that could be extrapolated to the broader picture. Most rhino owners retained all horns from natural and accidental deaths, but oddly none reported horns obtained from capture mortalities which are known to occur from time to time. By 2008 some landowners had begun to dehorn their rhino as a precaution against poaching.. While poaching mortality generally resulted in the loss of the horns to the landowner, there was certainly some wounding of animals that died later and whose horns might have been recovered by landowners. This impact is likely to be much greater for the period beginning 2009, than for the earlier period. No such cases were, however, reported to the survey.

In addition to rhino horn acquired from mortalities, animals do occasionally lose their horns during transport and while being held in bomas (holding pens). This very likely provides a further source of rhino horn which is kept by landowners.

RESULTS

The white rhinoceros database

Only 67 questionnaires were returned by landowners after the initial mailing. This represents only 20% of the properties in the 2004 database or 17% of the properties in the consolidated 2008 database. A total of 171 properties holding white rhinoceros were visited by the survey team or their owners/managers were interviewed at neutral venues like auction premises. This sample included many of those owners/managers who had returned the questionnaires and generally provided useful information. However even during many visits or engagements with owners/managers no detailed information beyond numbers of animals on a property was obtained. A significant amount of information, however, was obtained from third-party sources and usually resulted in a total number or estimate of numbers of white rhinoceros per property with no details on the composition of the populations, trade or horn stocks. Demographic information was also largely missing from the returned questionnaires and the sample used for discussion was strongly based on the interviews with rhino owners.

The Endangered Wildlife Trust (EWT) and the Wildlife Society of South Africa (WESA) hosted a meeting early in June at Skukuza to discuss the threats to the white rhinoceros population in southern Africa. At this meeting an appeal was made to the private landowners and their representatives to assist with the survey. This unfortunately resulted in no additional data from these sources.

Accurate data on the number of animals on all properties of Gauteng, KwaZulu-Natal, Mpumalanga, Western Cape, North West and the Greater Kruger Nature Reserves were obtained. There are some gaps in the data for the Eastern Cape, Free State and Northern Cape. The data for Limpopo Province, which has the most private properties holding white rhino, is probably not complete but is representative. Properties included in the 2004 database that still had rhino were recorded in a consolidated database with the new properties to give the 2008 database. However, only the total numbers of rhino are given and not a more detailed demographic breakdown. The owners of the 2004 survey that did not respond or were not interviewed were allocated the same number of animals assuming that the populations stayed stable if there was no reason to suppose that they had sold their rhino. A further assumption was made that the new properties will balance out the properties that sold their animals.

Table 1.1: White rhinoceros numbers and properties in each of the nine South African provinces and the Greater Kruger Private Nature Reserves for 2004 and 2008.

	2004	2004	2008	2008	INCREASE ANIMALS
PROVINCE	**NUMBER PROPERTIES**	**NUMBER RHINOCEROS**	**NUMBER PROPERTIES**	**NUMBER RHINOCEROS**	**%**
Gauteng	19	139	22	173	**24**
Limpopo	143	1600	156	1646	**3**
North West Province	29	199	62	465	**134**
KwaZuluNatal	39	326	39	517	**59**
Northern Cape	16	125	16	105	**-16**
Eastern Cape	24	155	26	213	**37**
Free State	23	86	36	201	**134**
Western Cape	7	23	11	34	**48**
Mpumalanga	29	496	24	251	**-50**
Greater Kruger PNR	3	355	3	569	**60**
TOTAL	**332**	**3504**	**395**	**4174**	19

The data recorded in **Table 1.1** showed that the rhinoceros numbers increased in all the provinces except in Mpumalanga and the Northern Cape accounting for a total of **4174** animals at an average rate of 7.1% per annum**.** The table also shows the increase in the number of properties holding white rhino in each province. The Greater Kruger Private Nature Reserves are shown as a single entity as the properties span both Mpumalanga and Limpopo Provinces, and the areas are open to the Kruger National Park with free movement of animals across their common boundaries.

Not only is the total number of white rhinoceros on private land increasing, but the importance of many individual groups on private properties is growing. When classified according to the AfRSG criteria of population importance (Emslie & Brooks 1999) it was found that there has

been a major increase in **Key** and **Important** populations by comparison with the situation in 2004 (Castley & Hall-Martin 2005). There are six Key 1 populations (n>100), all but one increasing. Numbers declined in one due to a management reduction of the population. There are also six Key 2 populations (51-100 increasing), 32 Important 1 populations (20-50 increasing) and two Important 2 populations (20-50 decreasing).

Estimate based on average number of rhinoceros per property

The average number of white rhinoceros per property derived from previous surveys is shown in **Table 1.2**. The average of these surveys is 10.2 animals per property. The known number of properties holding rhino in 2008 is 395 and so by multiplication an estimate for 2008 of 4 029 white rhinoceros is arrived at. One advantage of this method is that it could be used to calculate an estimated total population size for the many instances where owners refused to provide information but where a property was known to have rhino as indicated by movement permits, auction results and local knowledge.

Table 1.2: The average number of white rhinoceros per property

YEAR	PROPERTIES	NUMBERS	AVERAGE ANIMALS/PROPERTY
1987	103	931	9
1995	153	1445	9.4
1997	165	1742	10.6
1999	164	1922	11.7
2001	242	2543	10.5
2005	318	3247	10.2
2008	395	**4029**	
AVERAGE			**10.2**

Calculated total population of white rhinoceros

The minimum number of rhinoceros calculated by means of this method is shown in **Table 1.3.** The total arrived at is **3 983** animals in 2008. Knight (2008) estimated the white rhinos on private land to be about 3800 in 2007, a figure which is close to the 3791 estimated here.

Table 1.3: Population growth of white rhinoceros in private hands at 6.1% with the inflow and outflow of animals included (2005 – 2008)

CALCULATED NUMBERS						
INCREASE NUMBERS	**2005**	**2006**	**2007**	**2008**	**2009**	**TOTAL**
Number animals	3247	3472	3666	3791	3983	
Natural growth (6.1%) **	204	218	231	238		891
Animals sold government	117	168	125	171		581
	3568	**3858**	**4022**	**4200**		
DECREASE NUMBERS						
Poached	0	0	3	17		20
Exported (permits)	8	90	94	92		284
Hunted	78	92	124	98*		392
Capture related mortalities (500 at 2%)	10 **96**	10 **192**	10 **231**	10 **217**		40
NETT NUMBER	**3472**	**3666**	**3791**	**3983**		

* Calculated average of 2006 & 2007 (2008 data not available)

** Population Growth Rate calculated by Castley & Hall-Martin (2005)

Private properties holding white rhinoceros
The total number of private properties on which white rhinoceros are found increased from 332 in 2004 to 395 in 2008. The data indicate that a number of properties in the 2004 database no longer had white rhinoceros in 2008 and the reasons could not always be established. It is likely that most of the animals had been sold and some of these animals were incorporated into new properties now added to the database.

Structure of the white rhinoceros population
Sufficiently detailed information was provided in the questionnaires from102 properties to arrive at an estimate of the sex ratio of the adult and subadult population (in practice animals older than about 3 years). The sample of rhino for which the sex was recorded was 1113 animals. Of these 42% were male and 58% were female. The sex ratio, therefore, is about 1.0:1.4. A further 152 calves (less than one year old) and 116 animals older than one year in the sample were unsexed (19.4%). While most of the 152 calves would have been born during 2008, it is obvious that any estimates derived from the early questionnaire returns would have been referring to calves born in 2007. The sample is, therefore, taken as representing the calf crops of 2007 and 2008 and would indicate a calving rate of 5.5% per annum.

Information from 104 questionnaires was considered suitable for an analysis of mortality in the population other than poaching. Rhino mortality, amounting to 50 animals, was reported from 30 (28.8%) of the 104 properties. If it is assumed that this is a valid sample then it represents an average mortality of 1.67 rhino per property. If this is extrapolated to the total number of 395 properties holding white rhino it would indicate that there was mortality on 114 properties (28.8%). At an average of 1.67 rhino deaths per property this would amount to 190 rhino deaths over the four year period 2005-2008. Of the 50 animals in the sample 21 were adults (42%), 13 were recorded as sub-adults (26%), 16 (32%) were recorded as calves of which only three (6%) were specified as calves less than 12 months old. Nevertheless it is clear that the bulk of the mortalities were among sub-adult and immature animals. The sample of 50 deaths is too small to meaningfully compare to the analysis of causes of death given by Castley & Hall-Martin (2005). However social conflict between rhino, usually a dominant bull killing younger bulls or newly translocated animals accounted (see du Toit 1998) for 8 animals (16%), unknown causes accounted for 12 animals (24%), 5 sub-adults and calves (10%) were killed by lions, 8 animals (16%) died in accidents or were drowned in dams or swimming pools, 4 (8%) were killed by black rhinoceros or elephants, 6 (12%) died due to weather incidents (lightning or exposure to extreme cold) and 7 (14%) died of natural causes (colic, dystochia, illness, drought).

Trade in live rhinoceros
The trade in live white rhinoceros has been strong with increasing numbers sold in every year since 2005. A total of at least 581 animals were sold by State agencies to the private sector over the four year period (**Table 1.3 & Table 1.4**). Within the private sector 240 animals were reported sold on auction by Vleissentraal alone (**Table 1.5**). These data suggest that a minimum of 821 white rhinoceros were traded during the four year period. These data, however, do not include the number of animals sold in private transactions not recorded in the auction database and a reliable figure could not be arrived at from the interviews and questionnaires. This is a

major gap in our information, and is a further reason for a centralised database covering all transactions involving white rhino (see Chapter 4).

The number of rhino moved by the Wildlife Translocation Association of SA gives a further lead as to the size of the trade. During 2008 alone WTA members reported moving 530 white rhinoceros in South Africa. This includes the 64 rhino that were reported sold on private sector auctions and 144 of the total of 171 white rhino sold by the State. Only KZN offers a delivery service for animals and in 2008 it delivered 27 of the 32 animals sold. This accounts for 208 of the 530 animals moved by WTA members. The remaining 322 animals must have been sold privately, for breeding or hunting, and are not accounted for in our figures.

The number of white rhinoceros sold by the State during the period 2005-2008, together with the total income per year is shown in **Table 1.4.** The average price for animals increased in each year and more than doubled over the four year period from an average price of R101 408 per animal in 2005 to R249 666 in 2008.

Table 1.4: White rhinoceros sold by the State to the private sector (2005 -2008)

YEAR	SAN PARKS		KZNATAL		NW PROV.	
	NUMBER ANIMALS	TOTAL (ZAR)	NUMBER	TOTAL (ZAR)	NUMBER	TOTAL (ZAR)
2005	59	R 5 985 432	50	R 5 095 350	8	R 784 000
2006	96	R 11 392 800	33	R 4 405 005	39	R 5 167 500
2007	81	R 15 481 297	24	R 4 420 008	20	R 2 960 000
2008	96	R 23 304 960	32	R 6 268 000	43	R 13 120 000
TOTAL	**332**	**R 56 164 489**	**139**	**R 20 188 363**	**110**	**R 22 031 500**

The numbers of white rhinoceros sold on public auctions from the private sector is shown in **Table 1.5**. The average prices are in the same range as those from the State but in each of the last three years were somewhat higher.

Table 1.5: White rhinoceros sold on private auctions (2005 - 2008)

YEAR	NUMBER ANIMALS	AVERAGE PRICE (ZAR)	TOTAL (ZAR)
2005	20	R 95 281	R 1 905 620
2006	60	R 128 897	R 7 733 820
2007	96	R 221 230	R 21 238 080
2008	64	R 274 712	R 17 581 568
TOTAL	**240**		**R 48 459 088**

There is also a continuing demand for white rhinoceros in the international market. Although not all permits were used the permit data is indicative of the number of live rhinoceros exported. **Table 1.6** shows the export of live white rhinoceros for the period (2004 – 2007). A total of 235 white rhinoceros were exported to 24 countries. However only three countries accounted for half of the animals exported. These are China (30%), Namibia (17%) and Swaziland (12%).

Table 1.6: Permit applications for export of live white rhinoceros

COUNTRY	2004	2005	2006	2007	TOTAL
Swaziland	4	7	12	6	29
Botswana	0	3	2	0	5
Namibia	2	0	31	6	39
Mozambique	10	0	0	0	10
Togo	2	0	0	0	2
China	*4*	*5*	*18*	*43*	*70*
Pakistan	0	0	2	0	2
Vietnam	0	0	2	6	8
Myanmar	0	0	1	0	1
Germany	0	0	3	0	3
Czech Rep	0	0	4	0	4
Spain	0	0	6	3	9
Hungary	0	0	2	0	2
Kazakhstan	0	0	2	0	2
United States	0	0	6	0	6
Japan	0	0	0	11	11
Denmark	0	0	0	3	3
France	0	0	0	4	4
Portugal	0	0	0	9	9
Emirates (Arab)	0	0	0	5	5
Brazil	5	0	0	0	5
Thailand	1	0	0	0	1
Ireland	3	0	0	0	3
United Kingdom	2	0	0	0	2
TOTAL	**33**	**15**	**91**	**96**	**235**

Hunting of white rhinoceros

A total of 532 white rhinoceros trophies (horns, feet, capes) were exported to 38 countries over the period 2004-2007 (see **Table 1.7**). More than half of the trophies were imported by hunters from four countries. These are the USA (36%), Vietnam (18%), Spain (11%) and Russia (8%). The countries were divided into traditional trophy hunting or "conventional" hunting countries (19) whose nationals have a tradition of hunting for trophies in South Africa and "non-conventional" hunting countries. Nationals of the latter countries have no well established tradition of trophy hunting in South Africa and are generally regarded as newcomers to the South African market. This split is indicated in **Table 1.7** and **Figure 1.1.** During the period 330 trophy permits for "conventional" destinations were applied for, and 202 permits for non-conventional or non-traditional destinations. During 2007 the non-conventional trophy exports (111) exceeded the conventional exports (99) for the first time. This statistic is clearly heavily influenced by the entry of Vietnamese nationals into the market. It is widely believed that most of the non-conventional hunts undertaken by Vietnamese were for the purpose of acquiring rhinoceros horn legally for the medicinal trade in the Far East.

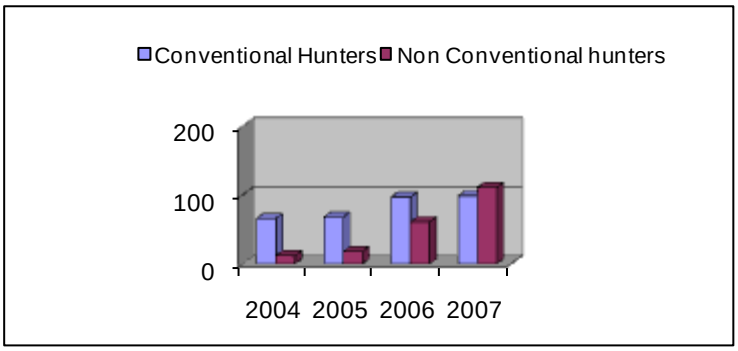


Figure 1.1: Comparison between Conventional and Non-conventional hunters.

It is clear, however, that the hunting statistics could be improved upon. When a comparison is made of the CITES permits issued and the hunts reported by the Provinces the two sets of figures do not agree. The discrepancy grows over the period reviewed and in 2007 there was a 70% difference between permit applications and hunts reported. These data are shown in **Table 1.8.** The growing discrepancy between the two sets of figures could be due to under reporting of hunts by provinces, or due to old skulls and unregistered trophies being fraudulently exported as recently hunted trophies. Clearly the data need to be investigated and a better explanation arrived at.

Table 1.7: Export permits for hunting trophies from white rhinoceros (2004-2007).

COUNTRY	**2004**	**2005**	**2006**	**2007**	**TOTAL**
Conventional Hunters					
United States America	26	42	58	65	191
Canada	3	0	0	0	3
United Kingdom	2	0	1	0	3
Spain	13	14	21	10	58
Portugal	1	2	1	1	5
France		5	1	4	10
Italy	0	1	1	1	3
Germany	0	1	4	7	12
Belgium	1	1	0	1	3
Austria	3	0	2	1	6
Netherlands	0	0	0	1	1
Denmark	8	0	1	5	14
Norway	2	0	1	0	3
Sweden	3	0	0	0	3
Finland	4	2	2	2	10
Emirates	0	0	1	0	1
Egypt	0	0	1	0	1
Namibia	0	0	2	0	2
Australia	0	0	0	1	1
SUB TOTAL	**66**	**68**	**97**	**99**	**330**

Non Conventional Hunters					
Poland	1	3	0	3	7
Estonia	0	0	1	2	3
Latvia	1	2	0	1	4
Croatia	2	3	0	0	5
Slovakia	0	0	2	0	2
Ukraine	2	0	1	0	3
Romania	0	0	1	0	1
Chile	0	0	5	0	5
Hungary	0	0	2	1	3
Russia	*3*	*6*	*22*	*10*	*41*
Vietnam	*3*	*3*	*19*	*69*	*94*
Lithuania	0	0	1	0	1
China	0	0	0	4	4
Slovakia	0	0	0	4	4
Czech Republic	0	0	0	4	4
Bulgaria	0	0	0	2	2
Japan	0	0	0	1	1
Slovenia	0	0	0	1	1
Mexico	0	1	7	9	17
SUB TOTAL	**12**	**18**	**61**	**111**	**202**
TOTAL	**78**	**86**	**158**	**210**	**532**

Table 1.8: Ratio of hunts reported to CITES permits issued

	2004	**2005**	**2006**	**2007**
Permit Applications	78	86	158	210
Hunts Reported	60	78	92	124
Ratio Hunts:Permits	1:1.3	1:1.1	1:1.7	1:1.7

A comparison of hunting permits and live export permits is shown in **Table 1.9.** The data from 2004 - 2007 illustrate that the trophies (532) versus the live exports (235) were running at a ratio of 2.3:1, but the trend towards more animals being killed to provide trophies or horn for the medicinal trade is clear.

Table 1.9: Relationship between CITES permits issued for hunts and live exports

	2004	**2005**	**2006**	**2007**
Permits hunting	78	86	158	210
Permits live export	33	15	91	96
Ratio live:hunt	1:2.4	1:5.7	1:1.7	1:2.2

Rhino horn stocks

The section of the questionnaire on rhino horn stocks was completed by respondents, or interviewees, for 104 properties. This information is treated as a sample from which extrapolations can be made. Forty of the 104 properties (38.5%) reported holding rhino horn stocks which amounted to 438 complete horns or pieces of horn. The horns are recorded per property regardless of whether they were physically located on the property, stored in a bank vault, or had been handed to provincial authorities for safekeeping. In some case horn tips cut off during translocations to minimize injuries to animals fighting after their release were recorded as a "horn". The data show an average of 10.95 horns or pieces of horn per property that reported stocks. The owners did not always have records of the weight of the rhino horn, or declined to provide the information. Individual weights could only be linked to 340 horns or pieces of horn. These made up a total weight of 688.39 kg, or an average of 2.02 kg per horn or piece of horn.

If these data are extrapolated from the sample of 104 properties to the total number of 395 properties holding white rhino (see Table 1.1) then 38.5% of the total number of properties, or 152 properties, should hold rhino horn stocks. At an average of 10.95 horns or pieces of horn for each of these 152 properties there could be 1664 horns or pieces of horn in the private stockpile. At an average weight of 2.02 kg per horn or piece of horn this would amount to a stockpile of 3361.28 kg.

It is not known how much of the rhino horn stock reported in 2008 was already on the property in 2004 and reported in that survey's stockpile of 1389 kg. If the reported stock in 2008 includes the entire 2004 stock then the accumulation over the 4-year period 2005-2008 amounts to 1972.28 kg. We have attempted to test this assumption through another series of extrapolations.

The natural and accidental mortality of white rhino reported in the questionnaires (see section above) accounted for at least 190 rhino over the period 2005-2008. The data in the questionnaires indicated that 12% of these were calves less than 12 months old, 20% were immature (thought to be 12-48 months old) and 68% were sud-adults or adults. We assume that calves produce no more than 0.5 kg of horn, immatures 3.0 kg of horn and sub-adults and adults produce 5.88 kg of horn per animal (as reported by Pienaar, Hall-Martin & Hitchins 1991). The records show that mortalities during capture and transport were not reported and we assume, based on opinions of operators in the business, that these amount to 10 animals per year, mostly adults, each yielding 5.88 kg of horn. The combined mortalities could, therefore, have yielded a total of 1119.22 kg of rhino horn over the four year period. This amount, added to the 2004 stockpile produces a second estimate of 2508.22 kg of rhino horn in the private stockpile by the end of 2008. To this should also be added the amount of rhino horn produced from dehorning which is currently unknown, but could be significant.

With the rationale and extrapolations presented above we have arrived at two estimates of the private rhino horn stockpile of 2508.22 kg and 3361.28 kg. Our interpretation is that the privately held stockpile of rhino horn is about 3000 kg. It is not known how much of the rhino horn accumulated over time might have been sold clandestinely and exported to the medicinal

market in the Far East. One respondent to the questionnaire reported selling the stock of horn on the property (which would have been illegal) but with no further details provided.

DISCUSSION

Data collection

The major difficulty encountered in the survey was the reluctance, and often outright refusal of landowners and managers to provide information on their white rhinoceros populations. The difficulties that were experienced in data gathering in 2004 (Castley & Hall-Martin 2005) appear to have been exacerbated by the concerns of rhino owners around the upsurge in rhino poaching on private land (see Chapter 3), and a degree of militancy among rhino owners who are slowly organising themselves into collectives to protect and promote their interests. Wildlife Ranching SA (see Appendix 2) is one such organisation at the national level and there are several associations organised at a local or regional level

Despite the recognition of the landowners, their associations, and the Provincial management authorities of the need for sound information on which to base recommended actions the cooperation from many elements was far from ideal. In particular Wildlife Ranching SA was reluctant to assist the survey. Their main fear, supposedly, was that the database could end up in the hands of poaching syndicates and thus allow them to target vulnerable properties. A mass of confidential information, and even hearsay information, however would also suggest that some landowners and operators in the industry were reluctant to provide information for fear of unethical practices being exposed. Among these are non-disclosure of rhino sales and hunts to the tax authorities and the avoidance of Value Added Taxes. Cooperation from the official Provincial management authorities was also variable, with some offering their full cooperation (Mpumalanga, North West and Gauteng), some refusing to assist the survey (Northern Cape), and some not even acknowledging correspondence or returning telephone calls. It is clear that a more efficient approach to gathering information for the database is required and this is dealt with in the recommendations.

Population estimates

The three lines of enquiry yielded estimates of the total population of white rhinoceros on private land of similar orders of magnitude and confirm that the population continues to increase. These were 3983 rhino from the calculated population size, 4029 from the calculation based on the average number of animals per property and 4174 from the database itself (albeit with some assumptions). The variation between the lowest and highest estimates is 191 animals or 4.8% of the upper figure. It seems reasonable, therefore, to use a figure of 4000 as the estimated total white rhinoceros population on private land in 2008. This is entirely realistic given that many rhino owners with populations in excess of about 20 animals can seldom give precise numbers of animals on their land.

The increase in numbers of rhinoceros since the first survey in 1987 can be seen in **Table 1.2** and in **Figure 1.2**. These data clearly indicate the important role that the private sector in South Africa has played in white rhinoceros conservation. The increase in the Key and Important populations has been achieved as much by the purchase of animals to consolidate populations as by natural reproduction. The Kruger National Park population remains by far the most important white rhino population in South Africa. It is, however, significant to note that there

are now more Key and Important populations protected on private land than in State-owned national parks and game reserves.

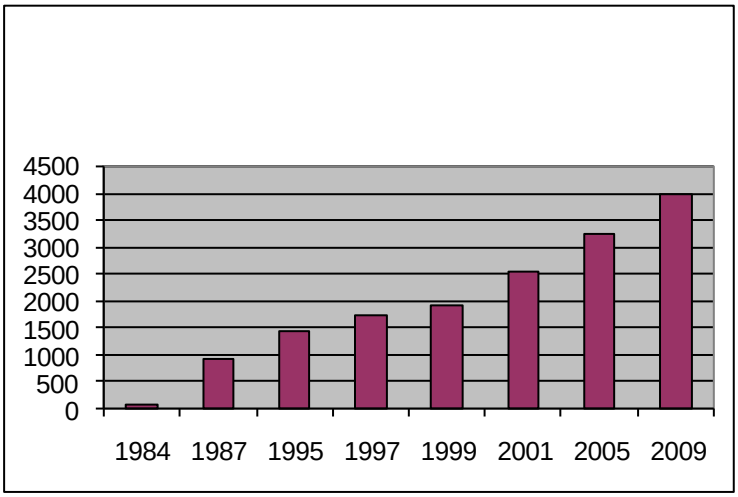


Figure 1.2: Estimates of white rhinoceros numbers on private land

The properties

It has been shown that the total number of properties in the database increased from 332 to 395 (**Table 1.1**). Some further explanation of differences over the four year period in some provinces is, however, useful. In Mpumalanga Province, the number of properties decreased from 29 in the 2004 database to 24 properties even though seven new properties were listed and the number of animals decreased from 496 to 251. However, the following eight properties were re-zoned into Limpopo Province in the intervening period (Roodewal 193 JS, Luncart 310 KT, Waterval 184 JS, Tiegershoek 140 JS, Rooibooskloof 53 JS, Welgevonden 521 KT, Rietfontein and Klipplaatdrift) accounting for some of these changes. The property Aventura (Loskop Noord 12 JS) was classified as private property in the 2004 database but belongs to Mpumalanga Park Board, and is therefore removed from the database. If adjustments are made to the 2004 data in the light of these circumstances then the actual number of rhino in Mpumalanga in 2004 would have been 194 and not 496 thus giving an increase in white rhino numbers of 57 animals or 29% to reach the 2008 total of 251 animals.

The number of properties in Gauteng increased from 19 to 22 and the number of animals from 139 to 173. The private sector started a joint venture with the Gauteng Provincial Nature Conservation department to form a Big Five Reserve (Dinokeng) which has been included in the database.

The number of properties in Kwa-Zulu Natal remains the same on 39 despite 20 new properties being incorporated and the number of animals increased from 326 to 517. The amalgamation of several properties to form large conservancies as part of the Black Rhino Range Expansion Programme of WWF and Ezemvelo KZN created some of the new properties in the database, and eliminated some of the original properties. Landowners that stopped ranching with rhinoceros balanced the remaining number of new properties with rhinoceros so the total

remains on 39. As all properties in this province were visited during the survey there is a high degree of confidence in this interpretation of the results.

The data in **Table 1.1** indicate marginal increases in the number of properties holding white rhinoceros in the Western Cape and Eastern Cape, a somewhat greater increase in the Free State and an unchanged situation in the Northern Cape. However, at least three new properties were recorded in the Northern Cape so this must have been balanced by some properties losing their rhino. In all cases where the details could be established it was because landowners had sold their white rhinoceros as they were unable to provide security against poaching and could not contemplate the potential financial losses from poaching.

The total area of the 395 private properties in South Africa on which white rhinoceros are found now covers 2 227 346 ha compared to the 1 693 600 ha of 2004. The average size of the properties is 5 638 ha which is smaller than the 6162 ha average size of rhino properties in 2004. This figure has clearly been influenced by the numerous smaller properties holding rhino found in the Free State (average 1488 ha), Gauteng (2516 ha) and North West Province (3497 ha).

Structure of the white rhinoceros population

The demographic information obtained was not as detailed as that reported for the 2004 survey (Castley & Hall-Martin 2005). In that report the sex ratio of adult white rhino (animals over 7 years old) was given as 1.0:1.71 and sub-adults was 1.0:1.14. In the 2008 sample adults and sub-adults were combined and the sex ratio was 1.0:1.4. Because of the very different sample sizes it is probably not statistically valid to compare the two samples. However, the average sex ratio of the 2004 population (adults and sub-adults combined) was 1.0: 1.42 which if valid, indicates no change in the sex ratio between the 2004 and 2008 populations. The suggestion of 5.5% of the animals being less than one year old is close to the figure of 6.1% used for annual recruitment in the estimates of population increase. There is little comment to be added about the recorded mortalities, other than the five animals killed by lions, a cause of rhino deaths not previously recorded on private land.

Trade in live white rhinoceros

The data shows that of the 235 live white rhinoceros that were exported during 2004-2007 to 24 different countries, half of the animals went to only three countries. These were China (30%), Namibia (17%) and Swaziland (12%). Local knowledge suggests that the Namibian and Swaziland market is for animals for ecotourism properties and game ranches. It has been suggested, though we cannot confirm it, that white rhino exported to China will be used for sustainable live harvesting of rhino horn in the future, if this is not already the case.

The data indicate that the trade in live white rhinoceros is very active and is increasing by the year (see **Table 1.4 and Table 1.5**). It is difficult to unravel discrepancies between reported sales and the numbers of rhino actually moved for the period 2005-2007 as detailed information is not available. However for the year 2008 much more solid information can be accounted for. The number of animals sold by the State in 2008 (171) and by the private sector (64) amounted to 235 animals. Of these the state delivered only 27 to purchasers and the remaining 208 were moved by private operators. However it has been recorded above that the members of the WTA

alone moved 530 white rhinoceros during 2008. If it is assumed that members of the WTA moved all of the remaining 208 animals for which we can account, then there is a discrepancy of at least 322 animals that were sold and moved and which are not reflected in our figures. However, animals moved from one property to another do not change the net outcome to the total rhino population, only hunting or export can do that. Furthermore this can only be regarded as a minimum figure, as there are many small operators and wildlife veterinarians who are not members of the WTA but who may move small numbers of animals over short distances. Many of these have equipment for moving only one animal at a time.

It is difficult to reconcile this discrepancy of a minimum of 322 animals moved and not accounted for. It is known that many animals that were hunted in 2008 were purchased from one property, and then sometimes moved to another property where they were shot. If we assess the situation from our questionnaire surveys alone, then one property would have recorded a sale, and one property would have recorded an animal hunted. Many of these animals would be included in the WTA figure.

White rhinoceros hunted

The survey depended heavily on the CITES permit applications for its data on hunting as very little hard information was derived from completed questionnaires or site visits. Only two out of the 10 hunting operators approached were prepared to share information with the survey. A further difficulty is the fact that the 2008 hunting permit records are not yet available. However, insofar as it was possible the permit data was checked against the hunting reports given to DEAT by the Provinces. The trend in the data for 2004-2007 is, however, clear with increasing numbers of white rhinoceros being hunted. There is a also a clear trend in the dramatic increase in hunters from Vietnam acquiring rhino horns as legal trophies in terms of CITES regulations, but the suggestions are that the horns will enter the medicinal trade in the Far East. There is no suggestion yet that the number of white rhino being hunted represents a threat to the survival or even to the continued increase of the population on private land.

Private rhino horn stocks

The private stock of rhino horn is generally stored securely in safes, strong-rooms or in bank vaults. Some owners have left their horn in the hands of the provincial conservation authorities for secure storage. However the record of numbers of horns, and their weight seems poorly kept and the excellent protocols of Milledge (2004) are not closely followed. The new legislation in South Africa requires registration of all horns in private hands, and the micro-chipping of horns. This is a sensible step forward in helping to control the stocks, but there is as yet no central repository for all of this information. It is worth noting that the estimate of 3000 kg of horn held by the private sector could be much smaller than the potential stockpile as some illegal sales of horn might have taken place. At the current market price of rhino horn in South Africa of R150 000 per kg, the stockpile represents a store of value of R450 000 000. This is legally owned private property, and the pressure to be able to utilise this store of value to cover the increasing costs of protecting and managing the white rhinoceros population is growing.

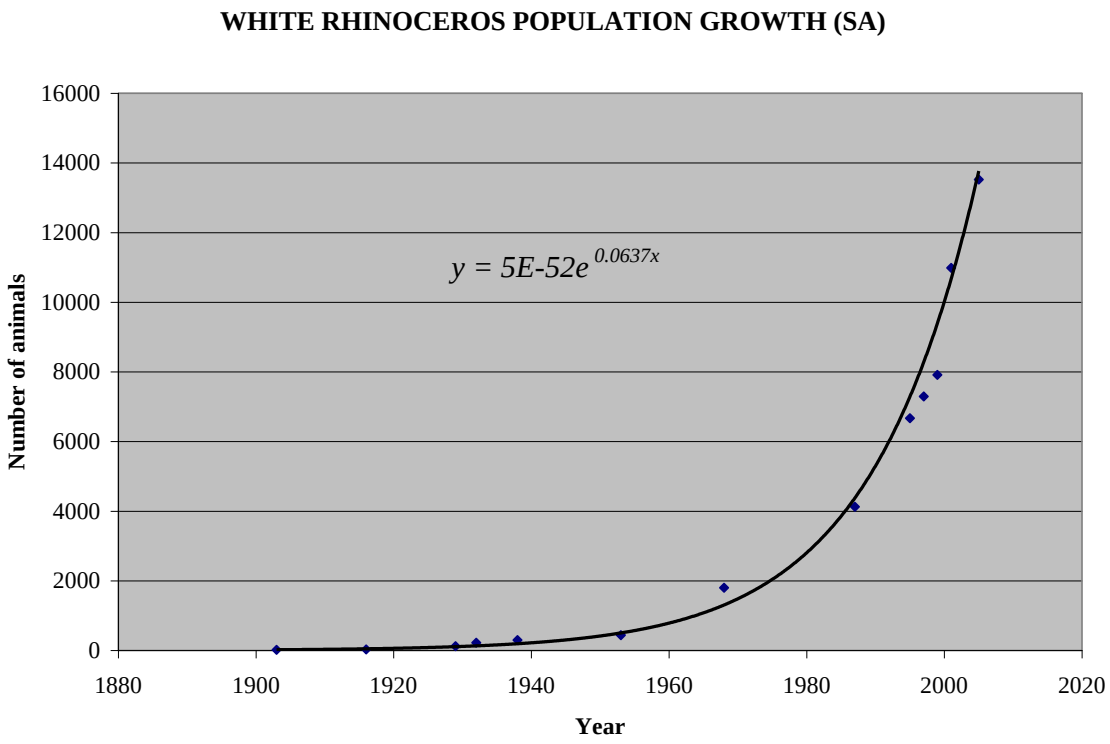
CHAPTER 2

BACKGROUND TO WHITE RHINOCEROS CONSERVATION ON PRIVATE LAND

Historical overview

Simon (1966) noted four reasons for the decline in numbers of the white rhinoceros; "…..*it was easy to approach and kill, the flesh was highly esteemed for its tastiness, the skin was prized for the making of whips and the horns were of value overseas.*" A combination of these factors resulted in numbers dropping below 100 animals in the Mfolozi-Hluhluwe game reserve complex. However the numbers grew steadily once effective protection was provided by Government authorities, later to become the Natal Parks Board **(See Figure 2.1)** (Du Plessis, 1969).

Figure 2.1: Population growth of the white rhinoceros in South Africa



The population history of white rhinoceros in Southern Africa can be roughly divided into the following phases:

1810 – 1900: Hunters depleted the numbers to less than 100 animals in Zululand, remnants elsewhere

1901 – 1960: Zululand population recovers, extinction elsewhere.

1961 – 1970: Export animals to overseas breeding facilities and other African countries..

1971 – 1985: Restocking State protected areas and selected private properties.

1986 - Present: Animals sold on open auctions to the private sector

The numbers of animals exported by the Natal Parks Board up to 1971, and the present status of the animals can be seen in **Table 2.1.** The outcome of exporting animals to the rest of Africa and overseas was not a success. When the population growth rate of 6.1% (same as the

performance of the private sector) is used to calculate the expected growth in translocated populations it is clear that the actual populations fall far short of what they might have been.
The shortfall of rhinoceros not produced by 2005 as compared with the private ranches in South Africa is 7 267 animals for other African countries and 10 562 animals for other overseas countries as illustrated in **Table 2.1.** The export of white rhinoceros from South Africa by the Natal Parks Board for conservation purposes was, therefore, a significant failure. Our figures suggest that had the surplus white rhinoceros from Zululand been distributed to protected areas in South Africa and to private property instead of exported there might have been an additional 22 593 animals by 2008 with a total South African population of 40 351 animals.

Table 2.1: The calculated and real population growth of white rhinoceros for the rest of Africa and overseas countries.

	EXPORT 1971	CALCULATED (2005)	REAL (2005)	SHORTFALL NUMBERS
AFRICA (Excluding SA)	229	8 276	1 009	7 267
OTHER COUNTRIES	298	10 769	207	10 562
TOTALS	527	19 045	1 216	17 829

In Africa some introductions have proved successful such as in Namibia, Swaziland and Kenya. Other countries had less success with Mozambique and Botswana experiencing the extinction of the species twice. Recent introductions of white rhinoceros to Botswana, with better security provided, have been successful and the population is now increasing once again.

The first white rhinoceros on private property were delivered to Ubizana Game Ranch, the property of Mr Norman Deane in Kwa-Zulu Natal being one male, and one female delivered on 25 July and 3 August 1967. Today the property still has white rhinoceros (P.M. Hitchins, *pers. com*). From 1979 white rhino were sold by the Natal Parks Board for R800 each to landowners on a waiting list and by 1971 the first surplus bulls were sold for hunting purposes. The numbers of white rhinoceros on private land have increased steadily as can be seen in **Table 1.2.**

Game auctions
Game auctions are the mechanism that sets prices for animals in the private sector. The first game auction in South Africa was held on 7 May 1975 in the Hoedspruit district. Only 128 game animals were sold at this auction and the turnover was R 20 362. During 2008 there were 46 game auctions in South Africa with a total turnover of R 162 389 000. There were 64 white rhinoceros sold for R 17 582 000 on these 46 auctions. A record price of R 720 000 was paid for a white rhinoceros bull on auction during 2008.

The Natal Parks Board sold the first white rhinoceros on auction in 1986 fetching more than R10 000 per animal. The average game auction prices and animals sold since are shown in **Table 2.2.** The highest number sold in a single year was 255 animals during 2001 (2.24% of the total white rhinoceros population) by which time both SANParks and North West Parks were also selling white rhinoceros. The income to the State institutions and private ranches

from the sale of 2560 white rhinoceros between1986-2008 amounted to R357 702 938 (approx. US$48 million-values not adjusted for currency fluctuations) (**Table 2.2).** The income to the State alone during the period 2005-2008 was R98 384 352 (US$ 13 295 135) and to the private sector R48 459 088 (US$ 6 548 513) from the sales of live white rhinoceros (see **Table 1.4** and **Table 1.5**). This income represents a major contribution to the budgets of the State for conservation, and to the private sector, and clearly contributes not only to the conservation of the white rhinoceros and many other species but also to the sustainability of wildlife conservation as a viable form of land use in South Africa. The sharp increase in price during 2008 might possibly be due to the demand for animals by hunters from Vietnam.

Table 2.2: Average game auction prices and number of white rhinoceros sold

GAME AUCTIONS						
YEAR	**AVERAGE PRIZE (ZAR)**		**TOTAL SOLD**	**POPULATION SIZE**	**% POPULATION AUCTIONED**	**TOTAL TURNOVER**
	Direct sales Natal Parks	**Auctions**				
1979	R 800					
1982	R 1,100			3389		
1983	R 2,300			3612		
1984	R 3,500			3850		
1985	R 4,300			4103		
1986	R 4,000	R 10,167	6	4373	0.14	R 61,002
1987	R 5,500	R 14,780	10	4661	0.21	R 147,800
1988	R 10,000	R 34,714	14	4967	0.28	R 485,996
1989	R 25,000	R 48,732	41	5294	0.77	R 1,998,012
1990	Stop selling directly public	R 48,524	42	5642	0.74	R 2,038,008
1991		R 44,188	32	6013	0.53	R 1,414,016
1992		R 29,230	64	6409	0.99	R 1,870,720
1993		R 28,350	56	6830	0.82	R 1,587,600
1994		R 32,770	30	7279	0.42	R 983,100
1995		R 40,667	70	7758	0.9	R 2,846,690
1996		R 44,491	161	8268	1.95	R 7,163,051
1997		R 69,333	88	8812	0.99	R 6,101,304
1998		R 98,813	110	9392	1.17	R 10,869,430
1999		R 127,130	104	10010	1.04	R 13,221,520
2000		R 176,801	178	10668	1.67	R 31,470,578
2001		R 169,300	255	11370	2.24	R 43,171,500
2002		R 192,383	123	12118	1.02	R 23,663,109
2003		R 148,133	235	12915	1.82	R 34,811,255
2004		R 128,130	120	13764	0.87	R 15,375,600
2005		R 95,281	137	14669	0.93	R 13,053,497
2006		R 140,000	228	15634	1.46	R 31,920,000
2007		R 221,230	221	16662	1.33	R 48,891,830
2008		R 274,712	235	17758	1.32	R 64,557,320
TOTAL			**2560**			**R 357,702,938**

Trophy hunting

The first white rhinoceros shot in the modern era for a trophy was hunted during 1972 for what was considered to be an astronomical price of R 8 000 at that time. The prices gradually increased as demand grew and also because of the weakening of the South African Rand

against the US$. The trophy price is the driver of the auction prices in the private sector du Toit 1998). Castley & Hall-Martin (2005) recorded that virtually all white rhinoceros hunting was by international trophy hunters from a variety of countries (only one rhinoceros was reportedly hunted by a local hunter). The average hunting prices since 1972 can be seen in **Table 2.3.**

Table 2.3: Average trophy hunting prices of white rhinoceros

YEAR	PRICE US$	PRICE ZAR
1972		8 000
Private sector		
1982	6 500	6 000
1983	6 354	7 060
1984	5 680	8 000
1985	8 700	18 511
1986	8 660	21 665
1987	10 357	21 577
1988	17 500	35 000
1989	36 669	91 673
1998	25 000	
1999	25 000	
2001	31 000	
2004	26 575	
2006	29 785	
2007	32 000	

The number of animals hunted as a percentage of the total calculated population (from the formula in Fig. 2.1) since 1971 is shown in **Table 2.4.** For those years where no data was available, but it is known that rhino hunting took place, a calculated average number of 32 animals was used. Between 1972 -2004 the total number believed to have been hunted was 1148 (36 animals per year) and between 2005-2008 the total was 338 (85 animals per year). As the CITES figures for 2008 were not yet available a minimum calculated figure of 94 animals was used for that year. The large increase was due to hunters from the Far East. The average percentage of the total South African population hunted each year for the period 1972-2008 was 0.69%. The number of animals hunted is, of course, a higher percentage of the total animals on private property. The average for the period 2005-2008 being 2.59% with a peak of 3.27% in 2007 but in all cases still well below the natural rate of increase of the private population and, therefore, sustainable. These figures, however imperfect, would crudely suggest that a quota of up to 95 adult males and up to 40 old females could be sustainably hunted per year (total 135 = 0.83% of the total population). It has been suggested by the RMG that a quota of 1% of the total population (177 animals) could be hunted without doing any damage. The data support this suggestion.

Poaching

The record of illegal killing (poaching) of white rhinoceros in South Africa can be seen in **Table 2.5.** The data show that the number of animals poached annually is usually about 0,1% of the total population (see Knight 2004). However, poaching of white rhinoceros increased four-fold during 2008 and seems to be still increasing. The number of poaching records

Table 2.4: Number of white rhinoceros hunted as a percentage of the total population in South Africa (1972 – 2008)

YEAR	CALCULATED NUMBERS	CENSUS NUMBERS	NUMBERS HUNTED	CALCULATED % HUNTED
1972	1 793		40	2.2
1973	1 910		1	0.05
1974	2 036		44	2.2
1975	2 170		26	1.2
1976	2 312		13	0.56
1977	2 464		1	0.04
1978	2 627		3	0.11
1979	2 800		28	1.00
1980	2 984		32	
1981	3 180		37	1.16
1982	3 389		32	
1983	3 612		32	
1984	3 850		32	
1985	4 103		32	
1986	4 373		32	
1987	4 661	4126	42	0.90
1988	4 967		42	0.85
1989	5 294		39	0.74
1990	5 642		34	0.6
1991	6 013		34	0.56
1992	6 409		42	0.65
1993	6 830		39	0.57
1994	7 279		69	0.94
1995	7 758	6 670	32	
1996	8 268		32	
1997	8 812	7 292	32	
1998	9 392		32	0.34
1999	10 010	7 913	43	0.43
2000	10 668		48	0.45
2001	11 370	10 988	60	0.53
2002	12 118		38	0.31
2003	12 915		45	0.35
2004	13 764		60	0.43
LAST SURVEY			**1148**	
2005	14 669	13 521	78	0.53
2006	15 634		92	0.59
2007	16 662		124	0.74
2008	17 758		94	0.53
SUB-TOTAL			**338**	
TOTAL			**1486**	Av. 0.69

accumulated by the end of September 2009, if extrapolated, suggest that as many as 126 white rhino will be poached for the full year. Information suggests that much of the white rhinoceros poaching in South Africa is carried out by syndicates that are supplying rhino horn to the medicinal market in the Far East. All poaching of rhinoceros, of either species, up to 2007 was carried out on State-owned protected areas and chiefly the Provincial nature reserves in Kwa-Zulu Natal and the Kruger National Park. Castley & Hall-Martin (2005) recorded dubious reports of white rhinoceros being poached on private land in 2004. The first confirmed incident of a white rhinoceros being poached on private property occurred during 2007.

Table 2.5: Percentage rhinoceros poached in South Africa (1980 – 2008)

YEAR	CALCULATED NUMBERS	CENSUS NUMBERS	POACHED NUMBERS	CALCULATED % POACHED
1980	2 984		0	0
1981	3 180		0	0
1982	3 389		0	0
1983	3 612		4	0,11
1984	3 850		5	0,13
1985	4 103		4	0,10
1986	4 373		6	0,09
1987	4 661	4126	4	0,09
1988	4 967		4	0,08
1989	5 294		4	0,08
1990	5 642		8	0,14
1991	6 013		5	0,08
1992	6 409		15	0,23
1993	6 830		13	0,19
1994	7 279		26	0,36
1995	7 758	6 670	10	0,13
1996	8 268		2	0,02
1997	8 812	7 292	4	0,05
1998	9 392		8	0,07
1999	10 010	7 913	10	0,09
2000	10 668		7	0,07
2001	11 370	10 988	6	0,05
2002	12 118		23	0,19
2003	12 915		19	0,15
2004	13 764		8	0,06
LAST SURVEY				
2005	14 669	13 521	15	0,10
2006	15 634		23	0,15
2007	16 662		12	0,07
2008	17 758		76	0,43

Law enforcement officials from the various conservation agencies, and the national police have been successful in arresting numerous poachers and middlemen. But since 2004 their success rate in recovering poached rhino horns has declined significantly (horns lost has increased from 16% to 49 %– see **Table 2.6**). The non-recovery of poached horns is either an indication that the product is moved quickly out of the country, or of inefficient law enforcement.

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Table 2.6: The horns lost/recovered from anti-poaching operations before and after the medicinal hunts started in 2005.

	ARRESTS	HORN RECOVERED	HORN LOST	TOTAL HORNS
2002	11	22	5	
2003	21	35	7	
2004	5	6	0	
TOTAL	**37**	**63**	**12**	**75**
%		**84**	**16**	
2005	11	63	0	
2006	15	19	10	
2007	5	31	0	
2008	17	28	125	
TOTAL	**48**	**141**	**135**	**276**
%		**51**	**49**	

CHAPTER 3

FACTORS IMPACTING ON RHINOCEROS CONSERVATION SINCE THE 2004 SURVEY

Increase in numbers of Key populations

The increase in the number of Key and Important white rhinoceros populations on private land (sensu Emslie & Brooks 1999) has been a feature of the past four years. Whereas there were three Key 1 populations and five Key 2 populations in 2004 there are now six Key 1 and six Key 2 populations. The white rhino populations within the GKPN area have increased by 60% since the last survey in 2004. These reserves, made up of numerous individual properties banded together into three main conservancies form an open system with the Kruger National Park and there is free movement of rhino across all boundaries within the GKPN area. The increase in numbers can be seen in **Table 1.1** where they are listed as one unit outside of the provincial boundaries**.** These reserves play an important role in the conservation of white rhinoceros on private land in South Africa. They could also be important in the future from a disease management point of view. If a disease like tuberculosis should break out in the white rhinoceros population of the Kruger National Park these reserves could be fenced off temporarily to protect these key populations for natural restocking of the park in the future.

Increase in white rhinoceros sales from State institutions

During the period 2005 – 2008 a total of 581 white rhinoceros were sold by government conservation institutions (SANParks, KZN Wildlife and North West Parks) to the private sector. During the same period 240 animals were sold on private auctions. These statistics indicate that the ratio of government to private sales is roughly 2:1. It can be concluded that private sellers can only supply a third of the requirements of the private sector and that the industry depends on the State feeding new animals into the sector. The State institutions are, therefore, major players in the private sector white rhino industry. There are, however, also clear indications that the State conservation agencies are beginning to depend on white rhino sales contributing to their budgets. SANParks alone is reported to be planning to sell 300 white rhinoceros during 2009 which could generate an income of R 51 million.

Poaching on private property

A most significant development has been the appearance of poaching of white rhinoceros on private land since 2007. The number and sexes of rhinoceros poached on private property is illustrated in **Table 3.1** below. These are the first officially confirmed cases of poaching of rhinoceros on private land. The wounding rate of the animals varied from 20 – 60%. However some animals recovered in the process, but it is quite likely that many more animals would have died later from their wounds. A consequence of the outbreak of poaching has been reluctance on the part of landowners to share information on their properties or rhino populations with the survey team on the grounds that the information could end up in the wrong hands. It has, however, also sparked a mood of concern among rhino owners. Numbers of owners have offered all their rhino for sale on the grounds that they can no longer take the risks associated with owning such valuable animals. As the average size of the properties on which white rhino occur is close to 6000 ha that represents a sizeable area to patrol and guard. A number of private agri-security companies have seen their business increase and no doubt this

will escalate if the threat to rhino populations continues to escalate. A positive outcome of the poaching scare is that many owners are now more interested than ever in banding together in national, regional or local associations that will have as a primary interest the better management and security of their game ranches.

Table 3.1: Numbers and value of white rhinoceros poached on private property (2007 – 2008)

PRIVATE RANCHES	NUMBER ANIMALS	VALUE (ZAR)
2007	3?	R 1 050 000
Subtotal	*3*	*R 1 050 000*
2008	1M	R 350 000
	1M	R 350 000
	1M	R 350 000
	1M	R 1 400 000
	3?	R 1 050 000
	1M	R 350 000
	1F	R 350 000
	1F	R 350 000
	6?	R 2 080 000
	1M	R 350 000
Subtotal	*17*	*R 6 980 000*
TOTAL	**20**	**R 8 030 000**

Poaching versus trophy hunting

The legal hunting of white rhinoceros for the medicinal value of their horns, rather than for trophies, started early in 2005. The average number of rhinoceros hunted per year for the period (1971 – 2004) was 36 animals compared to an average of 85 animals for the period (2005 – 2008) . This increase of 236% for the last four years is a strong indication that the trophy hunting system was abused. When the TOPS permit system (see Appendix 3) was implemented during mid 2008 there was a sharp decline in the numbers of animals legally hunted, and a significant increase in the numbers of white rhino poached as illustrated in **Figure 3.1** and **Table 3.2.**

Table 3.2: White rhinoceros hunted compared to poached 2005- 2009

DATE	CALCULATED NUMBER	NUMBER HUNTED	NUMBER POACHED	HUNTED %	POACHED %
2005	14 669	78	15	0.53	0.10
2006	15 634	92	23	0.59	0.15
2007	16 662	124	12	0.74	0.07
2008	17 758	94	76	0.53	0.43
2009	18 900	97*	126**	0.51	0.67

* Average calculated from previous four years

** Number extrapolated from 84 rhinoceros poached at end of August

The percentage of rhinoceros hunted for 2008 as a percentage of the animals in the nine provinces can be seen in **Table 3.3.** Northwest Province (6.5%) and the Eastern Cape (6.1%) hunt more animals than the natural population growth of 6.1% on private property as calculated by Castley & Hall-Martin (2005) suggesting that animals are imported for hunting purposes. An interesting scenario is that the poaching in these two provinces is relatively low with losses of only 1(Eastern Cape) and 5 (North West) animals by the end of August 2009.

Table 3.3: White rhinoceros numbers on private property and the percentage hunted in each of the nine South African provinces

PROVINCE	NUMBER RHINOCEROS	NUMBER PROPERTIES	NUMBER HUNTED	RHINOS/PROV. HUNTED (%)
Gauteng	173	22	0	0
Limpopo	1646	156	19	1.2
North West Province	465	62	30	6.5
KwaZuluNatal	517	39	23	4.4
Northern Cape	105	16	Refused info	
Eastern Cape	213	26	13	6.1
Free State	201	36	5	2.5
Western Cape	34	11	0	0
Mpumalanga	251	24	5	2.0
Greater Kruger PNR	569	3		
TOTAL	**4174**	**395**		

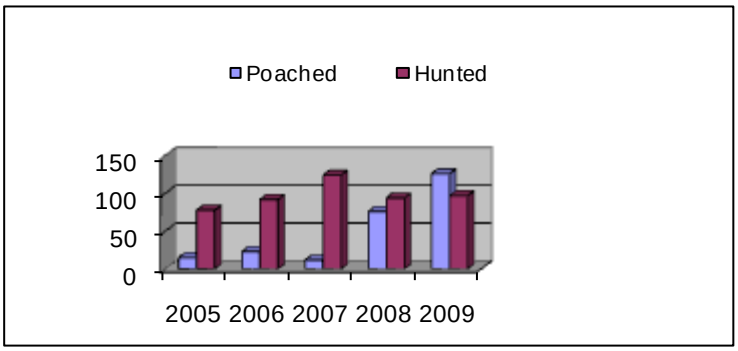


Figure 3.1: White rhinoceros poached vs. hunted for period 2005 - 2009

New poaching methods

All the rhino poached on private land in 2007 and 2008 were shot using conventional or semi-automatic firearms. During June 2009 a white rhinoceros bull was killed by an overdose of an immobilising drug on a private property near Krugersdorp. The horn was removed with a chain saw from the dead animal. Two days later a second rhino was also darted but the animal did not collapse or die. The dart remained in the animal providing confirmation of a new and disturbing method of poaching. Since then, five more incidents of illegally darted white rhino have been recorded in the Hammanskraal area of Gauteng and in the Eastern Cape. Not only do these incidents reflect a new and disturbing trend in poaching methods it also indicates that there is

corruption in the procedures for the control, sale and use of chemical agents that are controlled under the dangerous drugs legislation. As recently as August 2009 an attempt was recorded of poachers attempting to poison a waterhole on a game ranch at which white rhino and other animals were known to drink. This indiscriminate method of killing animals, if it becomes more widespread, could be disastrous.

Legal medicinal hunts

During 2005 the first legal white rhino hunts with Vietnamese clients were conducted in South Africa. These hunts were legal as a trophy hunt but there can be little doubt that the trophy became medicine on its way to the East and we have therefore referred to these hunts as medicinal hunts. According to local information the Vietnamese clients seldom displayed much interest in trophy size or quality other than the weight of the horn. Genuine trophy hunters are more concerned about the length of the horn, which is the accepted measure by which rhino horn trophies are ranked. The Vietnamese were prepared to take relatively cheaper animals with small trophies that would be unacceptable to clients from a traditional trophy hunting environment like the USA where only the longest horns, at top prices, are taken. This is reflected in the trophy pricing with trophy fees for traditional hunters being adjusted according to the length of the trophy. For medicinal hunts it has been reported that the price was derived from the weight of the horn at R150 000 per kg resulting in an average fee of R450 000 for an average 3kg of horn (F.Coetzee *pers. com*.- Limpopo Province conservation authority) It was also reported that several clients purchased multiple hunts whereas traditional trophy hunters would generally only take one rhino trophy on a hunt. The impact of these medicinal hunts on the rhino industry was huge, with an estimated income between 2005 -2008 of R121 050 000 (**Table 3.4**). The number of medicinal hunts reported in Table 3.2 exceeds the numbers of hunts or permits recorded elsewhere in this report. These data are based on confidential sources within the hunting industry. We cannot vouch for the accuracy of these data, but if they are correct, then they could help explain some of the other discrepancies already noted.

Table 3.4: Income from medicinal hunts 2005 to 2008

YEAR	MEDICINAL HUNT	AVERAGE PRICE (ZAR)	TOTAL INCOME (ZAR)
2005	4	R 450 000	R 1,800,000
2006	56	R 450 000	R 25 200 000
2007	143	R 450 000	R 64,350,000
2008	66	R 450 000	R 29,700,000
TOTAL	**269**		**R 121 050 000**

Reports on these medicinal hunts alarmed bona fide operators in the trophy hunting market and PHASA took up the call to regulate the medicinal hunting activities before the situation resulted in a ban on all legal white rhinoceros hunts. DEAT published relevant legislation early in 2008 (see Appendix 3) that put new controls in place and limited the hunting of white rhinoceros to one animal per person per year. There are, however, still reports of "families" of hunters from the Far East circumventing this rule with each family member taking a trophy hunt. Nevertheless, the controls achieved a reduction in the number of rhinos hunted by Vietnamese. This was, however, followed by an increase in the number of white rhinoceros

poached on private land (see **Table 3.2**). Whether there is a connection between these figures remains to be proven.

Rhino horn theft

The appearance of poaching of white rhinoceros on private land in 2007 has been referred to in Chapter 1. However a further recent phenomenon has been the burglaries and theft of rhino horns from natural history museums, private and State property. During the past three years at least 46 rhino horns or pieces of horn have been stolen during burglaries from ten different locations as follows:

* Graaff-Reinet museum; 2 horns
* King Williamstown; Amathole Museum; 2 burglaries, 1 horn stolen
* Grahamstown; Albany Museum: Thieves broke in and removed one horn which was a fibreglass replica
* Oudtshoorn Museum; broke in stole 2 horns
* Cape Town Museum; broke in stole 2 horns
* Pietermaritzburg Museum; 7 horns stolen.
* Grahamstown; 16 horns stolen from a game farm
* Thomas Baines Nature Reserve; removed 2 safes, presumably believing that horns were inside.
* Lephalala District, Limpopo; 1 rhino horn stolen on a game ranch
* Eastern Cape; 7 horns stolen from a private game reserve

Of even greater concern is the advent of armed robberies as a means of acquiring rhino horn. There was one unsuccessful attempt on a private game reserve and one successful raid on the Addo Elephant National Park. On 24 June 2009 a gang of six armed men held up several members of the park staff and forced the manager to open the walk-in safe where they gained access to the rhinoceros horn stockpile. The stockpile consisted of eight horn tips and entire horns and weighed 10 kg. The robbers also stole four firearms and made off with three motor vehicles. An earlier attempt to break in to the safe had been thwarted by park staff, but clearly the robbers were not to be deterred.

In all cases the circumstances suggest that the robbers had information relating to the presence of the rhino horns and the exact location of the horns. This might suggest collusion between the thieves and staff of the various places burgled.

CHAPTER 4

RECOMMENDATION FOR THE ESTABLISHMENT OF A CENTRALISED WHITE RHINOCEROS DATABASE

Introduction

In all the previous surveys carried out for the WWF-African Rhino Programme landowners were asked if they would be interested in assistance in managing their rhino populations. The majority of respondents in each survey answered in the affirmative. In the 2004 survey this entity was referred to as the Rhino Registry (Castley & Hall-Martin 2005). Even though each of these reports contained recommendations to establish such an entity nothing has ever been done. The closest that anyone has come to addressing the recommendations has been the work of the RMG in maintaining a database (initially only for State populations of white rhinoceros and black rhinoceros) and more recently engaging with rhino owners from the private sector. A significant spur to this engagement has been the proliferation of rhino poaching incidents and the growth of organised game ranching associations. The African Rhino Programme of WWF is now also to be based with WWF-South Africa in Stellenbosch These circumstances may, therefore, have created a more favourable environment for consideration of a more organised owner-based approach to white rhinoceros conservation on private land in South Africa.

Establish a Central Data Base (CDB)

The establishment of a database containing all relevant information on white rhinoceros in South Africa including details of their ownership, the properties where they occur, and the identity of the animals could be a vital tool for the better management of the species. The uncertainties about the number of animals on private land, the number moved from one place to another, the number actually hunted, exported and poached that have been shown earlier in this report could be resolved if a credible and regulated database for the species existed. In the event that progress is made towards a legalised harvesting and sale system for rhino horn, such a database would be an essential mechanism for controlling the industry. Such controls would almost certainly be mandatory for ensuring CITES approval of trade in rhino horn.

At the present time statistical information on wildlife populations in South Africa is, with the notable exception of the RMG database, fragmentary. There is also very little coordination between the provincial management agencies and the national authorities. The current situation is depicted in **Figure 4.1**. A first step towards improving the situation would be the creation of a national central database for selected species for the country.

The advantage of having a central database is recognised by the Department of Agriculture (. 2006) in a draft policy document on game farming published for public comment. This document (Notice 874 of 2006 section 5.1.2.) advocated a national game farm and animal database which in part, reads as follows: "*Accurate information and statistics (human resources, skills, budget and equipment) is essential for effective long and short term planning and management. This will require effective liaison and linkages between institutions collecting information and statistics such as Statistics SA, Agricultural Statistics, Customs and Excise and other organizations within the industry and would best be coordinated by the lead Department. This should include a detailed geo-referenced database of all game farms.*" However no

mention was made of how this admirable concept would be implemented. Nevertheless it is clear that the State would recognise the value of such a

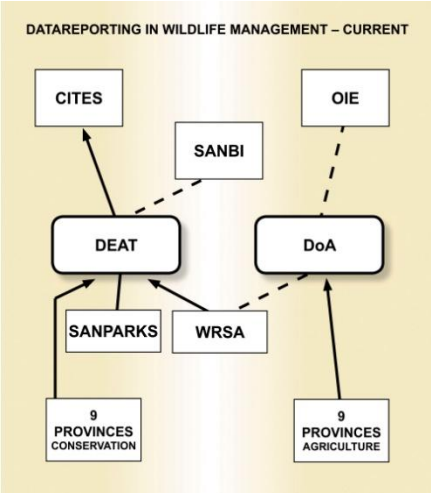


Figure 4.1: Reporting system of wildlife at present

system if better control on the movement of white rhino from one property to another is to be implemented, let alone the setting up of a legal trade in rhino horn. The value of a centralised database for the prevention of criminal transactions is adequately demonstrated in the database of vehicles kept by Government authorities and through which stolen vehicles can be tracked.

A well-administered database could be used to produce all the information which was sought in the rhino survey questionnaire (see Appendix 1) and that which is kept by the RMG. This includes numbers of animals per property, records of reproduction, mortality, sales, purchases, hunting, movements and poaching. If the database is secure it could also become the logical repository of all information on rhino horn stocks held by the private sector with records of microchip tags. Of course the establishment of the database presupposes at least one full time person entering, tracking and analysing the data as required. Recent regulations promulgated in South Africa (see Appendix 3) require all rhino that are traded to be identified by the insertion of microchips into the animals and their horns. Such a system would be essential for the database to reach its full usefulness.

Other purposes that such a database could serve are the identification of research topics relevant to the industry, the monitoring of disease outbreaks and countermeasures that could be formulated and it would avoid the resistance to providing data for irregular surveys if providing information to the database is an obligatory step in any transaction involving a white rhinoceros.

Membership of the Database

It is assumed that all owners of white rhino will be obliged to become members of the database and contribute their information as a precondition for the conservation management authorities

issuing any permits for the capture, purchase, sale or movement of white rhino. The results of the WWF-ARP surveys indicate that most owners of rhino would be prepared to submit their details and the details of their white rhino if they could be assured that the data would be secure and could not be accessed by criminals. On a broader front it would be necessary to secure the full cooperation of PHASA and the WTA and their membership to ensure that any rhino handled by them comply with the database requirements.

Surveys taken of wildlife ranchers in the past (Reilly *et al* 2002) indicate that 75% of the respondents would not be averse to joining a wildlife farming association. To achieve this outcome would, of course require an educational drive by the established associations. There are already 1000 paid up members of Wildlife Ranching SA and for purposes of the white rhinoceros database only the owners of white rhino would be required to become members of such an association. The State could in any event make membership of the database compulsory for owners of white rhinoceros – in the same way as vehicle owners are members of the vehicle database of South Africa. A further similar example is the Firearms Act which stipulates that a requirement for a licence for a hunting rifle is that the owner must be a member of a hunting association.

Location of the Database

It has been suggested that the database could be a useful tool for tracking the populations of Cape buffalo *Syncerus caffer* on private land which represent a far greater disease risk than is currently recognised for white rhinoceros. Such a database could serve the OIE reporting requirements and might therefore be located at Onderstepoort. If the rhino coordinator of WWF-ARP were to become part of the database administration then WWF's offices in Stellenbosch might also be considered, at least in the interim until the rhino owners mange the system themselves. Clearly the authorities (especially DEAT and the Department of Agriculture) whose support would be required to achieve the setting up of the database and whose regulations would be required to make its use compulsory will need to be consulted as to where it could best be located. The private owners of rhino should also be consulted and at least two channels exist for such consultation, one being through Wildlife Ranching SA and one through the RMG. Procedures for routing permit applications for rhinoceros transactions through this office will also be required. It may even be prudent to start a Rhino Management Group for white rhinoceros as the current RMG is concerned mostly with black rhinoceros and the two species are quite different and require different attention. The functioning of the proposed database is depicted in **Figure 4.2.**

Requirements for the Central Database

It is likely that the attractiveness of a CDB for owners of white rhinoceros, and for the conservation authorities, could be enhanced if the following conditions are met:

* The database must "belong" to the landowners ie. they should buy into the concept.
* The database should be controlled by a non-government organization.
* There must be no political affiliations attached to the database.
* Incentives and advantages of participation by landowners must be clearly spelled out.
* Data from the State-owned populations (as currently collected and collated by the RMG) could usefully be integrated with the data from private landowners to provide an overview for the whole of South Africa.

* Governance of the database should fall under a Board on which the landowners, Government and relevant conservation bodies are represented. White rhino owners could be represented by an organization such as Wildlife Ranching SA (WRSA) or there might be other suitable organisations or independent Trustees appointed. The Government holders of rhino could be represented through the RMG and the international rhino conservation community through AfRSG, TRAFFIC or even the CITES Secretariat itself.
* Individual data is confidential and may only be released in a collective format of all the members to reflect the statistics on a National basis.

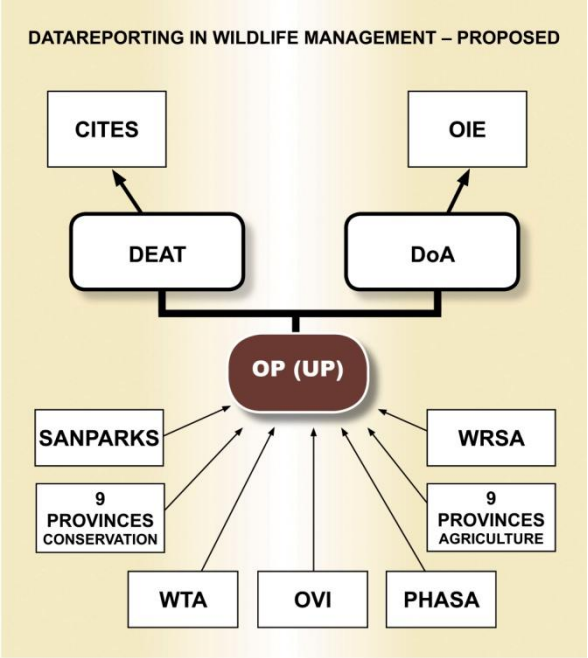


Figure 4.2: Recommended reporting system for wildlife

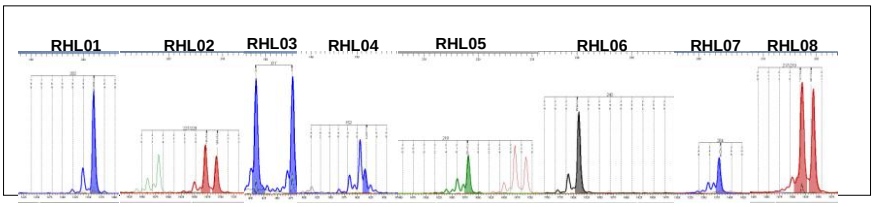
Incorporating DNA profiles of animals into the Database

Recent work on the DNA of white rhinoceros carried out by the Onderstepoort Veterinary Genetic Laboratory in Pretoria shows that an accurate match of rhino horn to blood or tissue samples can be achieved. This can provide strong evidence in a court of law. It has been suggested, therefore, that a DNA profile of all white rhinoceros should be kept as part of the database. In the event of any dispute regarding the origin of horns, or the need for forensic matching of horns to a particular animal, this can then easily be done. The profile of the specific animal can be kept on the database together with it's other details and these can then be matched with poached horn. An example of the profile of the blood and horn of a specific animal is shown in **Figure 4.3** below. The initial laboratory cost for processing the sample per animal is R200. The cost to match the horn with an animal on the database is R500.

DNA Test Format Genotype Data

Individual white rhino profile data quality and locus matching between blood and horn from the same animal:

Blood Sample



Horn Sample

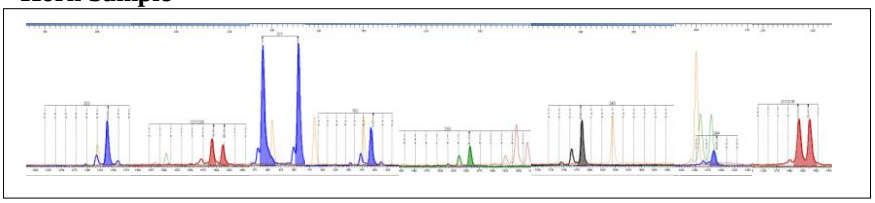


Figure 4.3: Genetic profile of an individual white rhinoceros

Funding of the Database

The database clearly needs to be managed and that will require funding. There are a number of sources that could be considered. PHASA indicated at the Skukuza workshop (June 2009) that it had collected funds for rhinoceros related conservation; the US Fish and Wildlife Service has dedicated funds for rhinoceros conservation as does the WWF-African Rhino Programme. The white rhinoceros owners, who will be the ultimate economic beneficiaries of the initiative could also be asked to contribute towards the costs of maintaining the database. The only challenge to accessing the funds for setting up the database is finding a champion to drive the process. The logical champion is an NGO such as the WWF-ARP or EWT who have demonstrated their concern and commitment to the question of the conservation and management of white rhinoceros on private land in South Africa through their funding of the rhino surveys, and through maintaining a coordinator of rhino conservation programmes.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The carrying out of this survey has been fraught with frustration and endless delays. The level of cooperation afforded by many individual owners of white rhinoceros, their managers, the provincial and national authorities and various elements of the organised game ranchers associations has been disappointing. The professional hunters and individuals involved with hunting were particularly unhelpful. Much of the official cooperation was grudging at best and many owners and management authority officials refused outright to provide information when requested. Indeed, the diffusion of effort, and even chaos, in managing wildlife and the associated trade in many species in South Africa that was addressed by Bodasing and Mulliken (1996) appears to be as great a problem now as it was more than a decade ago.

Conversely the level of involvement and the quality of the contributions of many officials of various organisations mentioned by name in our acknowledgements, a number of landowners with large rhino populations, wildlife vets who work with rhino on a regular basis, and operators in the wildlife trading and transport industry was far more positive than could have been imagined. There is a growing realisation among thinking owners of rhino that the rhino industry in South Africa is at a crossroads. There is satisfaction that rhino numbers are growing, and that the ecotourism, hunting and trading elements of the "rhino industry" are thriving. However there is a also a grave sense of foreboding about the onslaught of poaching of rhino on private property in South Africa and the abuse of the CITES concession to allow trophy hunting. The authors accept that these concerns made many owners reluctant to share information.

The information produced by the survey, therefore, is not nearly as complete or comprehensive as was envisaged in the Terms of Reference. Nevertheless we are certain that the information contained in this report provides a fair basis for evaluating the recommendations set out below.

Monitoring the white rhinoceros population on private land.

The survey showed that white rhinoceros populations are increasing satisfactorily due to breeding, and that natural and accidental mortality is not excessive. The number of properties holding rhino, and therefore the available habitat for rhino on private land is increasing, The State conservation management authorities are selling increasing numbers of rhino to private owners. This holds benefits for the State in that excess rhino are removed from overcrowded parks and reserves and the income is a significant contribution to the national conservation budget. The animals sold to the private sector have contributed to a viable wildlife translocation industry and a growing corps of wildlife veterinarians in private practice. The survey has highlighted discrepancies in the control of the movement of rhino and the need for better standards of husbandry of animals in captive and holding situations. The most significant problem to be overcome in monitoring the private white rhinoceros population is the fragmentation of data, information and permits between the provincial and national authorities.

Among the most important recommendation to emerge from the study, therefore, revolve around the creation of a Centralised Database which could provide the tools for monitoring the status of rhino and their management into the future.

Recommendations:

1. **The 2008 white rhino population database should be maintained by the WWF-African Rhino Programme in the interim until ownership is taken by the rhino owners themselves as a living document by engaging with the rhino owners through their associations, like Wildlife Ranching SA and others, and following up with individual owners and properties on an annual basis.**
2. **The white rhino database produced by this survey should be incorporated into a Centralised Database (CDB) through which all elements of rhino population dynamics (recruitment, trade, hunting, mortality) are recorded and controlled.**
3. **The initiative to establish the Centralised Database for white rhinoceros should be driven by WWF-ARP and the first step should be to establish a Steering Committee for this purpose on which all relevant stakeholders (State, private, institutional) are represented.**
4. **There is a clear need to set up a white rhinoceros management group (similar to the RMG which is primarily concerned with black rhinoceros) to take care of the overall monitoring of the biology and management of white rhinoceros and the necessary recommendations to improve this.**

Security of white rhinoceros on private land

All the information available indicates that poaching of white (and black) rhinoceros on private land is escalating dramatically. Between January and September 2009 at least 84 white rhinoceros were poached. Not only are the numbers increasing, but there are new and disturbing trends in the methods used to kill rhino for their horn. The present law enforcement effort on the part of State authorities is evidently insufficient to curb this plague and the rhino owners will of necessity have to become more involved in providing security for their animals. The Endangered Wildlife Trust has already taken an initiative in this regard and has called meetings/workshops of individuals and organisations involved in rhino management and security. This initiative needs to be supported and developed. At the same time there are several actions that the State authorities can take to help matters.

Recommendations:

1. **Rhino owners will have to spend more money on training and deploying their own rangers and linking these efforts to those of their neighbours in "neighbourhood watches" as has been done with owners of domestic livestock.**
2. **Communication networks are crucial to security and several private operators are already providing a service that quickly disseminates information on poaching incidents so that other landowners can be on the look-out for suspicious vehicles and people.**
3. **It is recommended that a greater degree of cooperation between provincial and national wildlife management and regulatory authorities and the South African Police Service be developed through the creation of a specialised unit like the former "Endangered Species Protection Unit" that can work with the rhino**

owners and the SADC Rhino Security Group to enhance and coordinate the security efforts of the rhino owners and those NGOs assisting them.

4. **The Green Courts which functioned well for a number of years to hear cases of wildlife crime should be reinstated. This will allow a body of jurisprudence and experienced prosecutors and judges to specialise in wildlife crime like rhino and abalone poaching.**
5. **The appropriate authorities should review the penalties for wildlife crime and decide if fines or prison terms should be increased.**
6. **Create a "hotline" on which members of the public can anonymously report suspected cases of rhino poaching, or abuse of permits or other regulations.**

Code of practice for rhino translocation and auctions

The wildlife industry must develop codes of practise and operating procedures for the management of the white rhinoceros population on private land. The South African Burreau of Standards has produced guidelines for capture and translocation of animals, including white rhinoceros, but there are still shortcomings. Among these is the question of selling pregnant females, and females with small calves. Clear guidelines need to be developed for white rhino that become standard practice and that are disseminated to all rhino owners. The basic guidelines are available in the work of du Toit (1994,1998), but these publications require updating particularly to take into account the changed circumstances facing white rhino owners. The more recent management guide for black rhinoceros (Morkel & Kennedy-Benson 2009) also contains much useful information.

Recommendation:

1. **A protocol for the capture, holding, translocation and introduction of white rhinoceros should be agreed by all stakeholders.**

The privately owned rhino horn stockpile

The rhino horn stockpile is large and growing, and will grow even faster as the rhino population increases. However the registration and management of this valuable hoard leaves much to be desired. WWF and its partner, TRAFFIC, could play a greater role in disseminating education to rhino owners, in assisting with the registration of rhino horn, and with ensuring that it is securely stored. Even though DEAT set a deadline for February 2009 for the registration of rhino horn this has not been acted on and the survey was led to believe that there are still large quantities of rhino horn in private ownership that has not been registered. There must be an adequate education campaign to encourage holders of rhino horn to register their stocks, and then penalties beyond a fixed cut-off date for not doing so.

Recommendations:

1. **Extend the deadline for the registration of privately held rhino horn by at least one year, but embark on an intensive and public campaign of information to all rhino horn owners to register and microchip their horn stocks. Set a definite target date beyond which all rhino horn not registered will be forfeit to the State authorities.**
2. **TRAFFIC should undertake to ensure that the stocks of horn are registered with the Central Database, and securely stored.**

Disease management (e.g. Tuberculosis)

While disease management is currently not a concern for the management of white rhinoceros in South Africa, there is some potential concern. If a disease like bovine tuberculosis *Mycobacterium bovis* were to become established in rhinoceros it would result in serious consequences for the game ranching industry. There would almost certainly be the imposition of quarantine measures and a ban on movement of game animals from infected areas. While tuberculosis is currently not known in white rhinoceros a single case of mycobacteriosis was diagnosed in a black rhinoceros *Diceros bicornis* in the Hluhluwe Game Reserve by Keep & Basson (1973). Bovine tuberculosis has spread rapidly in the Cape buffalo population of the Kruger National Park since 1995 (Bengis et al 1996, Rodwell et al 2001) and has also been diagnosed in other species. Among these are four antelope species, lions *Panthera leo*, leopard *P.pardus*, cheetah *Acinonyx jubatus*, spotted hyaena *Crocuta crocuta*, both species of Suidae, chacma baboon (*Papio ursinus*) and other species (Keet et al 1996). The concern of veterinary authorities is demonstrated by both Namibia and Botswana refusing to accept white rhinoceros from the Kruger into their countries during the past decade. There is clearly a case to continue disease surveillance in white rhinoceros in the Kruger National Park, and to perfect a reliable diagnostic method. If there is ever a spill-over of the disease into white rhinoceros it will be as important to prove that an animal is clean as to prove that it is infected. The existence of a reliable database, through which movement of animals from one property to another is controlled, will then be a critically important element in white rhino management.

Recommendation:

1. **State veterinary authorities and academic institutions in the animal health disciplines should be requested and encouraged to conduct research into developing a reliable diagnostic test for the presence of tuberculosis that could be used for testing white rhinoceros.**

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