Non-detriment finding for *Ceratotherium simum simum* (white rhinoceros)

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Summary of findings

The South African population of *Ceratotherium simum simum* (white rhinoceros) is included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) for the exclusive purpose of allowing international trade in live animals to appropriate and acceptable destinations and the export of hunting trophies. In terms of Article IV of the Convention, an export permit shall only be granted for an Appendix II species when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species. This document details the undertaking of a non-detriment finding (NDF) (Figure 1) for *C. simum simum* and is based on the best current available information.

The white rhinoceros is a long-lived species with a low reproductive rate. It is relatively adaptable, being able to survive in a variety of grassland and savanna habitats. Individuals disperse rapidly into new areas and in unfenced areas can move over very large distances. The species is sensitive to human activity and is thus conservation dependent, occurring solely in protected areas and on game farms.

The distribution of the white rhinoceros in South Africa is fragmented. However, it is a widespread and common species in the country, with the approximate size of the national population estimated to number 18,800 individuals in 2010, a significant increase from the approximately 6,000 white rhinos in 1991. Analyses undertaken by the IUCN African Rhino Specialist Group indicate that the national average growth rate of the white rhino population was just over 7% from 1991 to 2010. A number of key events apparently contributed to the exponential increase in the national population of white rhino since the late 1800s, such as the advent of translocations and policy changes both locally and internationally that created economic incentives for the private ownership and protection of rhinos. There is however some uncertainty about the future national population trend since population models indicate that the white rhino population in the Kruger National Park, which represents just over 50% of the national herd, may be expected to fluctuate non-directionally between 9,000 and 12,000 animals.

The current major threat to South Africa's white rhino population is the continuing loss of individuals to poaching for their horn. During 2010, 1.8% of the national population was lost to poaching, while 2.4% of the national population, effectively representing 30% of the potential annual population increment, was illegally killed in 2011. The rate of poaching has increased exponentially nationwide from 0.03 rhinos per day prior to 2007 to 1.23 rhinos per day in 2011. While 1.69 rhinos were poached per day in

the first quarter of 2012, the rate of poaching has dramatically declined in the second quarter to less than 1 rhino per day. Disinvestment of private rhino owners, especially in the provinces of Limpopo and Mpumalanga, is a further negative consequence of poaching due to the rising costs of security. Since approximately 23% of the national herd is kept on 22,274 km^2 of privately owned land, the loss of private sector interest in keeping white rhinos is a significant concern for the conservation of the species and the reduced introduction of rhinos to new areas is expected to result in a decline in the metapopulation growth rate. The average value of white rhino sold by the three biggest sellers between 2008 and 2011 has decreased by just over R29,000 per head. This translates into a R424 million loss in white rhino asset value to the country between 2008 and mid 2011. Increased poaching also means there will be fewer surplus rhino that could be removed from populations to maintain productive densities and then sold. If turnover were to drop to half the 2008-2011 levels over the next 10 years, revenue that could have been generated from the sale of a surplus of approximately 6,920 white rhinos over a period of 10 years would be reduced by just under a quarter of a billion Rand, revenue that could have been used to purchase new conservation land and to fund anti-poaching measures. Although the off-take from poaching is still at levels that are sustainable and are not yet causing a population decline, if the rate of poaching increase from 2010 to 2011 continues, there will be a detectable negative population growth rate in the Kruger National Park by 2016. A similar national trend is anticipated. However, the decreased poaching rate recorded for the second quarter of 2012 may in fact mean that the year of anticipated population decline would be pushed back to 2018.

A high proportion (73%) of the white rhino population is generally well managed within protected areas, with off-takes managed in terms of ecological management plans. The white rhino population in the Kruger National Park (just over 50% of the national population) is managed in accordance with an adaptive management plan. In KwaZulu-Natal, a management strategy and a status reporting framework currently supports harvest management for the species. There are no provincial plans in the remaining 8 provinces. A national biodiversity management plan for white rhino is currently being revised by the SADC Rhino Management Group (RMG) in accordance with the format for Biodiversity Management Plans (section 43 of the National Environmental Management: Biodiversity Act (NEMBA) of 2004).

Legal harvest of white rhinos (i.e. hunting) is economically motivated and is regulated through a system of permits, mostly on private land. Prior to 2005, the number of white rhinos hunted was generally a function of market forces, with the market supporting the hunting of an average of 36 – 70 animals annually. Harvest has increased since 2005 to an average of 116 hunted animals (0.6% of the national population) annually, with less than 10 of these hunted from state controlled protected areas. Setting a hunting quota has been unnecessary to date as the off-take has been well within sustainable levels. Legal hunting, combined with the impact of poaching, has not yet reached a level where it has caused a cessation in population growth. An estimated 1.4% of the national herd is translocated to other areas annually. However, the removal of live animals for translocation purposes is not considered to be a form of harvest as these animals are not permanently removed from the national population.

Hunting of white rhinos is well managed in the province of KwaZulu-Natal, while in certain provinces management of hunting on private land faces some challenges. In at least two provinces the numbers of white rhino kept on private land is inadequately known, and therefore sustainability of hunting,

particularly in smaller populations, is also unknown, while management plans for ensuring sustainable harvest are lacking. High confidence can be placed in the monitoring of illegal and legal harvest in the Kruger National Park and KwaZulu-Natal as a whole, which together make up 70% of the national herd. However, highly variable monitoring of hunting is undertaken for the remainder of the national herd. Although the hunting permit system requires that all hunts are attended by conservation officials, this is not implemented effectively in at least two provinces.

The financial gains to the state and the private sector generated from owning, selling, translocating, viewing via ecotourism and hunting white rhino has greatly contributed to the conservation of this species in South Africa, and the white rhino population is now 10 times larger than the 1,800 individuals in the 1960s. Due to the significant economic benefits of hunting to game farmers (worth approximately $19 million over the period 2004 – 2008), together with live sales and ecotourism, the private sector has increasingly stocked these animals, effectively maintaining rapid metapopulation growth and contributing to the expansion of the species' range with a further 22,274 km^2 added to the conservation estate in South Africa. Live sales of surplus animals to the private sector have also been highly beneficial to conservation agencies, generating vital conservation revenue and preventing overstocking in established populations.

The 77% of the national herd that is kept in state controlled protected areas is strictly protected from excessive hunting, with on average only 10 animals legally hunted annually. However, the increasing poaching rate is indicative of the limited effectiveness of the current protection measures, despite the significant resources that have been deployed towards gaining control over illegal activities. Nevertheless there may be signs that these measures are having a positive impact with the reduction in rhinos lost per day having dropped to less than 1 in the second quarter of 2012. Poaching has occurred in most protected areas and some protected areas (e.g. the Kruger National Park and Pilanesberg National Park) are struggling to combat these illegal activities. Improved protection measures (enhanced intelligence gathering and effective prosecution with deterrent sentences) are required to both combat and prevent poaching.

In conclusion, the non-detriment finding (Figure 1) undertaken for the white rhinoceros as summarized in the analyses of the key considerations above, demonstrates that legal international trade in live animals and the export of hunting trophies poses a low risk to the survival of this species in South Africa and should be allowed to continue, provided that effective measures are put in place to curb the illegal hunting of white rhino. Currently legal and illegal harvests combined are still within sustainable levels. On average 116 white rhinos are legally hunted annually (0.6% of the national population), while approximately 2.4% of the national population is currently lost to poachers, well below the net 7.1% rate of increase in the white rhino population. The population is thus currently growing at about 4% per annum.

It has been argued that a quota system for hunting of white rhino is unnecessary at this stage because legal hunting, even factoring in the animals lost to poaching, is currently sustainable and is market driven (requiring less regulatory management). However, due to the increasing poaching rate and problems with the implementation and enforcement of the hunting permit system in some provinces, it is anticipated that this situation will change and a quota system should be developed by the SADC

Rhino Management Group for future application. Improved implementation of the current regulatory system as well as the introduction of an integrated permit system that provides for a more streamlined process that has greater general support and that incentivizes greater participation by land owners is recommended, along with the gathering of additional data on hunted populations.

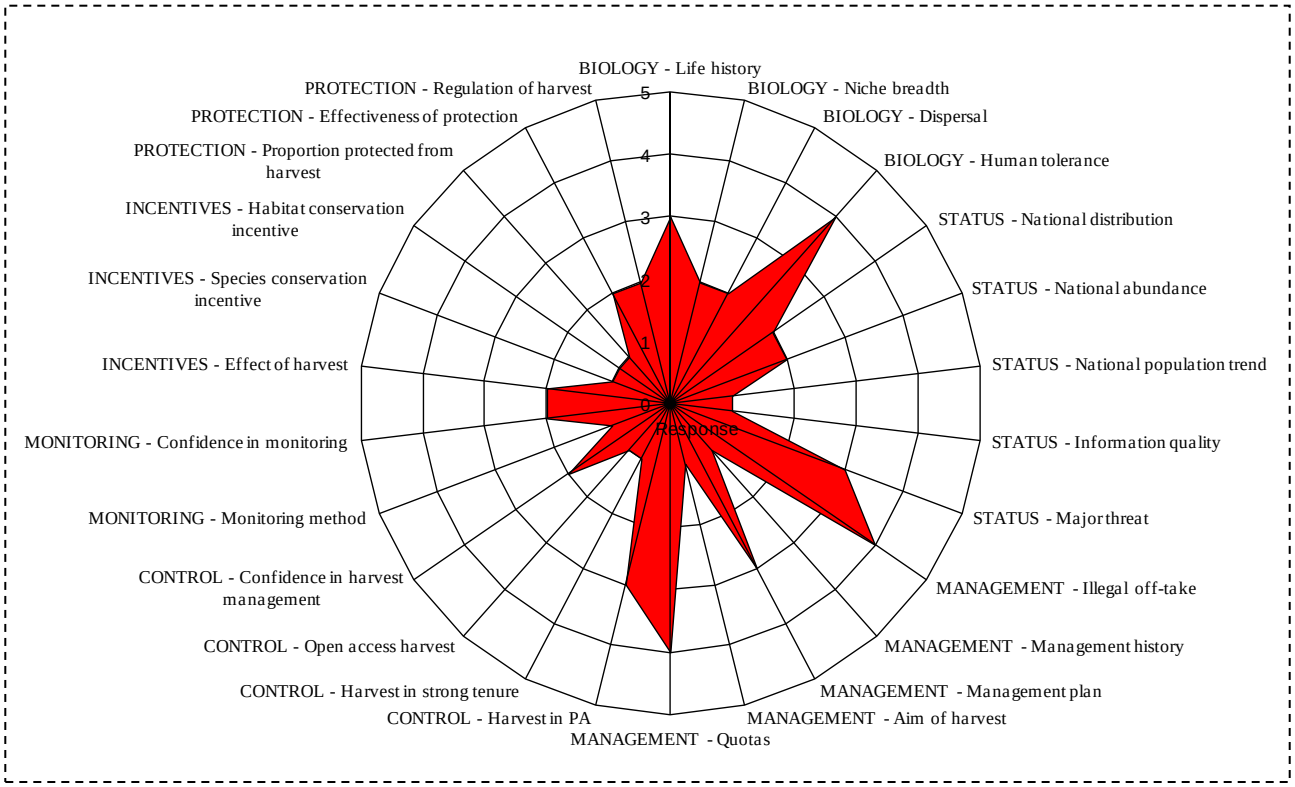

Figure 1. Radar chart summarizing the non detriment finding assessment for *Ceratotherium simum simum* (white rhinoceros) in accordance with the CITES NDF checklist. Explanations of scores given are detailed in Table 1. Higher scores are indicative of higher risks. The limited area shaded in the radar chart demonstrates an overall low risk to the species.

Table 1. NDF assessment for *Ceratotherium simum simum* (white rhinoceros) summarized in accordance with the CITES NDF checklist. Scores assigned to each question are indicated along with detailed explanations/justifications where relevant. Higher scores are indicative of higher risks.

Biological characteristics		
1. Life history: What is the species' life history?	High reproductive rate, long-lived	
	High reproductive rate, short-lived	
	Low reproductive rate, long-lived	**X**
	Low reproductive rate, short-lived	
	Uncertain	
2. Ecological adaptability: To what extent is the species adaptable (habitat, diet, environmental tolerance etc.)?	Extreme generalist	
	Generalist	**X**
	Specialist	
	Extreme specialist	
	Uncertain	
The white rhinoceros is a relatively adaptable species and is able to survive in a variety of habitats from grassland to savanna and inhabits areas with rainfall averages ranging from 350 mm per year to 1500 mm per year. Due to the low temperatures and poor grazing quality during the winter months, juvenile mortality rates on the Highveld are however high. Although animals are able to survive in low nutrient coarse grasslands, grass of a higher nutrient content is the preferred diet.		
3. Dispersal efficiency: How efficient is the species' dispersal mechanism at key life stages?	Very good	
	Good	**X**
	Medium	
	Poor	
	Uncertain	
Individuals are generally limited to medium-sized home ranges and dispersal is a process that takes place at the juvenile stage. White rhino calves generally leave their mothers from 2.5 – 3.5 years of age to form groupings with other adult females and/or other sub-adults, subsequently dispersing into new areas. White rhinos in the Kruger National Park are encountered in new landscapes at a rate of 6% per annum. Individuals move over distances of 40 – 50 km during drought conditions. In unfenced areas white rhinos can move over very large distances as they did in the past in the Garamba National Park and as the white rhinos do in Botswana today.		
4. Interaction with humans: Is the species tolerant to human activity other than harvest?	No interaction	
	Pest / Commensal	
	Tolerant	
	Sensitive	**X**
	Uncertain	
White rhinos are conservation dependent, occurring solely in protected areas and on game farms.		
National status		
5. National distribution: How is the species distributed nationally?	Widespread, contiguous in country	
	Widespread, fragmented in country	**X**
	Restricted and fragmented	
	Localized	
	Uncertain	

6. National abundance: What is the abundance nationally?	Very abundant	
	Common	**X**
	Uncommon	
	Rare	
	Uncertain	

Although uncommon in Africa, the white rhinoceros is certainly not uncommon in South Africa. According to data gathered from a survey of rhinos on private and state land by the IUCN African Rhino Specialist Group, the total South African white rhino population consists of approximately 18,800 individuals (as at the end of 2010). This estimate takes into account animals lost to poaching. A new national survey is currently underway.

7. National population trend: What is the recent national population trend?	Increasing	**X**
	Stable	
	Reduced, but stable	
	Reduced and still decreasing	
	Uncertain	

According to analyses undertaken by the IUCN African Rhino Specialist Group, the national average growth rate of the white rhino population was 7.1% from 1991 to 2010. This figure takes poaching related mortalities into account and is based on an assessment of population data gathered between 1999 and 2010 that assumes exponential growth. In 1991 there were less than 6,000 white rhinos in South Africa. By 2010 the population had increased three times to an estimated 18,800 animals.

A number of key events apparently contributed to the exponential increase in the national population of white rhino since the late 1800s, a time when no more than 50 white rhinos survived in the iMfolozi Game Reserve in Natal, such as (1) the first successful translocation of white rhino in 1961, followed by many subsequent translocations; (2) the commencement of the first sport hunting of white rhino in 1968; (3) the translocation of over 500 white rhino into the Kruger National Park in the early 1980s from the Hluhluwe iMfolozi Park due to a record drought there; (4) a change in policy by the Natal Parks Board that allowed the auctioning of white rhino at their true economic value, effectively increasing the numbers and protection of rhinos on private land from the late 1980s onwards; and (5) a CITES annotated Appendix II listing in 1995 that allowed for live sales and continued exports of hunting trophies.

There is some uncertainty with respect to the future national population trend for white rhinos since SANParks's best population model (which includes estimates of various biases in the data such as observer and detection biases) indicates that the white rhino population in the Kruger National Park may fluctuate non-directionally between 9,000 and 12,000 animals (95% CI: 8767-12682), although these numbers will be verified in a survey planned for 2012. *The population size in the Kruger National Park is an estimated 25% lower than it would have been in the absence of poaching and management removals. As the white rhino population in the Kruger National Park comprises just over 50% of the national population, trends in the Kruger National Park population will directly affect the national population trend. Current mortality rates for males in the Kruger National Park are estimated to be 2.7% (1% due to poaching and 1.7% due to natural mortality), while mortality rate estimates for females are 1.7% (1% mortality due to poaching).*

The intrinsic rate of increase of white rhino populations ranges between 8% and 9% on average, although the rate of increase will vary among individual populations. The population growth rate can be as much as 11 – 13% for recently introduced young populations that are skewed towards females.

8. Quality of information: What type of information is available to describe abundance and trend in the national population?	Quantitative data, recent	**X**
	Good local knowledge	
	Quantitative data, outdated	
	Anecdotal information	
	None	
9. Major threats: What major threat is the species facing (underline following: overuse/ habitat loss and alteration/ invasive species/ other:) and how severe is it?	None	
	Limited/Reversible	
	Substantial	**X**
	Severe/Irreversible	
	Uncertain	

The current major threat to South Africa's white rhino population is the continuing loss of individuals to poaching for their horn. During 2010, 333 white rhinos (approximately 1.8% of the national population) were lost to poaching. In 2011, 448 rhinos (approximately 2.4% of the national population) were illegally killed in South Africa, with 252 rhinos killed by poachers in the Kruger National Park alone. The rate of poaching has increased exponentially nationwide over the last five years. Prior to 2007, the rate of poaching was 0.03 rhinos per day, increasing to 0.23 per day in 2008, 0.33 per day in 2009, 0.91 per day in 2010 and 1.23 rhinos per day in 2011. Within the first three quarters of 2011, the average poaching rate was 1.16 rhinos per day, while in the last quarter of 2011 this had increased to 1.48 rhinos per day. While 1.69 rhinos were poached per day in the first quarter of 2012, the rate of poaching has dramatically declined in the second quarter to less than 1 rhino per day. The primary driver of the increasing poaching rate is the exponential increase in the black market price for rhino horn and new uses and demand from south-east Asia and especially Viet Nam. Compounding this is the threat posed by organized crime. Based on recent trends, an exponential model constructed by SANParks predicts that the number of white rhinos poached in the Kruger National Park will approximate the surplus number that managers would have wanted to remove in order to prevent overstocking.

Disinvestment of private rhino owners is a further negative consequence of poaching due to the rising costs of security. Auctioning patterns indicate that there may be a decline in interest in keeping rhinos on private land particularly in the provinces of Limpopo and Mpumalanga. Considering that approximately 23% of the national herd (4,300 animals) is kept on 22,274 km^2 of privately owned land, the loss of private sector interest in keeping white rhinos is a significant concern for the conservation of the species.

The average value of a white rhino sold by the three biggest sellers (SANParks, Ezemvelo KZN Wildlife and Vleisscentraal auctioneers) between 2008 and 2011 has decreased by R29,231 per head. The drop in live sale value from 2008 to mid 2011 represents a R424 million loss in white rhino asset value to the country, R150 million of which would have been potentially generated by the private sector. The subsequent loss of revenue to both state and private sector owners generated from the sale of surplus rhinos will translate into reduced funds for new conservation land and anti-poaching measures. Active involvement of the private sector in the acquisition of rhinos since 2005 was estimated to generate $29 million for conservation authorities. A further consequence of the decline in the sale and subsequent introduction of rhinos to new areas is the expected decline in the metapopulation growth rate.

Increased poaching also means there will be fewer surplus rhino that could be sold to maintain productive densities. Turnover from the 1,066 white rhino sold by SANParks, Ezemvelo KZN Wildlife and Vleisscentraal auctioneers over the 2008 – 2011 period totaled R236.3 million, averaging R47.26 million per year. If turnover were to drop to half this level over the next 10 years this would reduce

revenue by just under a quarter of a billion Rand that could have been generated from the sale of a surplus of approximately 6,920 white rhinos over a period of 10 years.

Nevertheless, the off-take from poaching is still at levels that are sustainable (total births still exceed total deaths) and are not yet causing a population decline.

Habitat loss is not a threat to the white rhino and the species' range has in fact expanded.

Harvest management

10. Illegal off-take or trade: How significant is the national problem of illegal or unmanaged off-take or trade?	None	
	Small	
	Medium	
	Large	**X**
	Uncertain	

Approximately 2.4% of the white rhino population is currently lost to poachers, effectively representing 30% of the potential annual population increment. Although the current poaching levels are considered to be sustainable, they are not insignificant. Two percent less growth over a period of 10 years equates to approximately 6,920 fewer white rhinos, and approximately 27,332 fewer white rhinos over a period of 20 years, animals that could be sold to generate conservation revenue and/or translocated to increase the metapopulation and expand the species' range (assuming that there is sufficient land to accommodate these additional animals) (figures based on a starting population size of 18,800 and the intrinsic rate of increase of 8%). The sale of white rhinos removed for management purposes from the Kruger National Park has been reduced substantially since rhinos earmarked for management removals are now lost to poachers. This effectively represents a R6 billion loss in asset value for the country and will impact significantly on the generation of revenue for conservation and the expansion of the white rhino range.

At the predicted increasing poaching rate, there will be a detectable negative population growth rate in the Kruger National Park by 2016. A similar national trend was anticipated as poaching is occurring nationwide at almost the same rate. However, as of 29 May 2012 the annual increase in poaching in 2012 compared to 2011 has declined and it is now estimated that if this rate were to continue nationally numbers would start to decline in 2018. Management removals of surplus animals preferentially target subadult females, while poachers remove many more adults than are proportionally represented in the population.

The sophistication of the poaching methods employed is a concern, especially as poaching is taking place throughout the country in both protected areas and privately owned land. The occurrence of "pseudo-hunts", the legal hunting of trophies for the purpose of obtaining rhino horn, is a concern.

11. Management history: What is the history of harvest?	Managed harvest: ongoing with adaptive framework	**X**
	Managed harvest: ongoing but informal	
	Managed harvest: new	
	Unmanaged harvest: ongoing or new	
	Uncertain	

A high proportion (73%) of the white rhino population is generally well managed within protected areas, with off-takes managed in terms of ecological management plans. The white rhino population in the Kruger National Park (just over 50% of the national population) is managed in accordance with an adaptive management plan. Management of white rhino on private land is quite variable.

Harvest (hunting) is regulated through a system of permits, mostly on private land, this harvest in general being economically motivated. Legal hunting of white rhinoceros commenced in South Africa when the size of the rhino population was 1,800. Prior to 2005, the number of white rhinos hunted was generally a function of market forces, with the market supporting the hunting of an average of 36 – 70 animals. Harvest has increased since 2005 to an average of 116 hunted animals, with the vast majority of these hunts being undertaken by non-traditional hunters ("pseudo-hunters"). Despite translocation of significant numbers of white rhino out of the country to stock other African countries and zoos and safari parks worldwide, the white rhino population in South Africa is now 10 times larger since hunting was introduced, clearly demonstrating that this harvest has been sustainable and positive for conservation.

12. Management plan or equivalent: Is there a management plan related to the harvest of the species?	Approved and co-ordinated local and national management plans	
	Approved national/state/provincial management plan(s)	
	Approved local management plan	**X**
	No approved plan: informal unplanned management	
	Uncertain	

A national white rhino strategy was approved in 2000. A national biodiversity management plan (BMP) for white rhino is currently being developed by the SADC Rhino Management Group in accordance with the format for Biodiversity Management Plans (section 43 of the National Environmental Management: Biodiversity Act (NEMBA) of 2004) and this will form the basis for greater coordination between existing and future plans. In KwaZulu-Natal, a management strategy and a status reporting framework currently supports harvest management for the species, however, there are no provincial plans in the remaining 8 provinces. Some of the state owned protected areas have approved management plans that take white rhinos into account, while there are also management plans for the larger privately owned areas. SANParks has a management plan for rhino (dated 2003-2013) that is currently under revision. Coordination among all these plans will hopefully be addressed through the national white rhino BMP.

13. Aim of harvest regime in management planning: What is harvest aiming to achieve?	Generate conservation benefit	**X**
	Population management/control	
	Maximize economic yield	
	Opportunistic, unselective harvest, or none	
	Uncertain	

The white rhino population in South Africa is generally subjected to two forms of off-take, including management removals of surplus animals and hunting. Management removals are not considered in this NDF to be a form of harvest as animals are not permanently removed from the national population but are sold and then moved to new areas. This generates a conservation benefit through ensuring rapid growth in numbers and expansion of the species' range, while at the same time generating conservation revenue. Since 1986 about 2,500 white rhinos have been sold into the private sector.

Permanent removal of white rhinos from the national population through hunting is economically motivated and justified. Sustainable hunting aims to generate a conservation benefit through incentivizing the private sector to keep rhino and to purchase land in order to stock rhino.

14. Quotas: Is the harvest based on a system of quotas?	Ongoing national quota: based on biologically derived local quotas	
	Ongoing quotas: "cautious" national or local	
	Untried quota: recent and based on biologically derived local quotas	
	Market-driven quota(s), arbitrary quota(s), or no quotas	**X**
	Uncertain	
The number of white rhinos hunted annually is market driven. Setting a quota has been unnecessary to date as the off-take has been well within sustainable levels (on average 116 rhinos have been hunted annually over the last 4 years equating to approximately 0.6% of the national population).		
Control of harvest		
15. Harvesting in Protected Areas: What percentage of the legal national harvest occurs in State-controlled Protected Areas?	High	
	Medium	
	Low	**X**
	None	
	Uncertain	
An estimated 1.4% of the national herd is translocated to other areas annually. The removal of live animals for translocation purposes is not considered to be a form of harvest in terms of this NDF as these animals are not permanently removed from the national population. On average 116 white rhinos are legally hunted annually (0.6% of the national population). Of these less than 10 are hunted from state controlled protected areas.		
16. Harvesting in areas with strong resource tenure or ownership: What percentage of the legal national harvest occurs outside Protected Areas, in areas with strong local control over resource use?	High	**X**
	Medium	
	Low	
	None	
	Uncertain	
On average 116 white rhinos are legally hunted annually (0.6% of the national population). Most of these animals are hunted on private land.		
17. Harvesting in areas with open access: What percentage of the legal national harvest occurs in areas where there is no strong local control, giving *de facto* or actual open access?	None	**X**
	Low	
	Medium	
	High	
	Uncertain	
18. Confidence in harvest management: Do budgetary and other factors allow effective implementation of management plan(s) and harvest controls?	High confidence	
	Medium confidence	**X**
	Low confidence	
	No confidence	
	Uncertain	
Hunting of white rhinos is well managed in the province of KwaZulu-Natal as well as the Northern Cape (high confidence); while in certain provinces management of hunting on private land faces some challenges (low confidence). In at least two provinces the numbers of white rhino kept on private land is inadequately known (although estimates exist), and therefore sustainability of hunting, particularly in smaller populations, is also unknown, while management plans for ensuring sustainable		

harvest are lacking. An increase of "pseudo-hunting" in these provinces, the issuing of many permits by one province and many hunts on some properties is indicative of problems with the implementation and enforcement of the hunting permit system. There are also concerns that in some cases young animals or prime breeding females have been hunted.

Monitoring of harvest

19. Methods used to monitor the harvest: What is the principal method used to monitor the effects of the harvest?	Direct population estimates	**X**
	Quantitative indices	
	Qualitative indices	
	National monitoring of exports	
	No monitoring or uncertain	

Monitoring methods employed in the Kruger National Park involve distance sampling techniques and block counts. Formal distance sampling and aerial survey methods are also employed in the Hluhluwe iMfolozi Park in KwaZulu-Natal. Together these populations make up about 70% of the national herd. Monitoring of the remainder of the national herd is variable with many private land owners monitoring their rhinos closely, although provision of the information remains an issue of trust between parties. A survey is currently being undertaken of white rhino on private land. The hunting permit system requires that all hunts are monitored by conservation officials, although some conservation authorities are less diligent with this than others.

20. Confidence in harvest monitoring: Do budgetary and other factors allow effective harvest monitoring?	High confidence	
	Medium confidence	**X**
	Low confidence	
	No confidence	
	Uncertain	

Monitoring of harvest (illegal and legal) in the Kruger National Park and provincial protected areas in KwaZulu-Natal, which together represents 70% of the national herd, can be regarded with high confidence. The hunting permit system requires that all hunts are attended by conservation officials; however, this is not implemented effectively in at least two provinces (low confidence). Improved information is required from the private sector, soon to be provided by a survey that is currently underway.

Incentives and benefits from harvesting

21. Utilization compared to other threats: What is the effect of the harvest when taken together with the major threat that has been identified for this species?	Beneficial	
	Neutral	**X**
	Harmful	
	Highly negative	
	Uncertain	

Legal hunting of white rhino has been beneficial to the conservation of the species. Due to the significant economic benefits of hunting to game farmers (worth approximately $19 million over the period 2004 – 2008), together with live sales and ecotourism, the private sector has increasingly stocked these animals, contributing to the expansion of the species' range and maintaining rapid metapopulation growth. Live sales of surplus animals to the private sector have been highly beneficial to conservation agencies, generating vital conservation revenue (e.g. sales by SANParks, and Ezemvelo KZN Wildlife as well as Vleisscentraal from 2008 to end 2011 totaled R236.3 million) and preventing overstocking in established populations. However, the increase in poaching is starting to limit this positive impact as private sector interest in buying and keeping rhinos continues to decline due to the rising costs of security. Legal hunting, combined with the impact of poaching,

has however not yet reached a level where it has caused a cessation in population growth.

22. Incentives for species conservation: At the national level, how much conservation benefit to this species accrues from harvesting?	High	**X**
	Medium	
	Low	
	None	
	Uncertain	

The ability for the state and the private sector to gain financially from owning, selling, translocating, viewing via ecotourism and hunting white rhino has greatly contributed to the conservation of this species in South Africa. Only 1,800 white rhino remained in the 1960s. Today the population is estimated to be three times bigger at 18,800 animals. Privately owned game farms have contributed significantly to white rhino conservation. Twenty-three percent of the national herd (approximately 4,300 animals) is kept on approximately 22,274 km^2 of privately owned land.

23. Incentives for habitat conservation: At the national level, how much habitat conservation benefit is derived from harvesting?	High	**X**
	Medium	
	Low	
	None	
	Uncertain	

Private game reserves contribute significantly to the conservation estate in South Africa. It is estimated that private game farms with white rhinos have added a further 22,274 km^2 to the conservation footprint.

Protection from harvest

24. Proportion strictly protected: What percentage of the species' natural range or population is legally excluded from harvest?	>15%	**X**
	5-15%	
	<5%	
	None	
	Uncertain	

On average 116 white rhinos are legally hunted annually (0.6% of the national population). Of these less than 10 are hunted from state controlled protected areas, which altogether accommodate 77% of the national herd.

25. Effectiveness of strict protection measures: Do budgetary and other factors give confidence in the effectiveness of measures taken to afford strict protection?	High confidence	
	Medium confidence	**X**
	Low confidence	
	No confidence	
	Uncertain	

The white rhino is a well managed species and its legal utilization in fact benefits its conservation. Strict protection measures (enhanced intelligence gathering and effective prosecution with deterrent sentences) are however required to both combat and prevent poaching. Measures are being taken but their long-term effectiveness is unknown at this stage. Poaching has occurred in most protected areas and some protected areas (e.g. the Kruger National Park and Pilanesberg National Park) are struggling to combat these illegal activities. Due to poaching, the white rhino population in the Kruger National Park has declined so that management removals of surplus animals have been reduced substantially. Protection measures in KwaZulu-Natal appear to be more effective than in other provinces. Despite the significant resources that have been deployed towards gaining control over illegal activities, the increasing poaching rate is indicative of the limited effectiveness of the current protection measures. These measures only address the symptoms and fail to address the cause of

the escalating poaching levels (high demand for black market horn at high prices i.e. the low supply to demand ratio). Nevertheless there may be signs that enhanced protection measures are beginning to have a positive impact, with the number of rhinos poached per day having dropped to less than 1 in the second quarter of 2012.		
26. Regulation of harvest effort: How effective are any restrictions on harvesting (such as age or size, season or equipment) for preventing overuse?	Very effective	
	Effective	**X**
	Ineffective	
	None	
	Uncertain	
Hunting affects only a very small proportion (0.6%) of the national population. While regulation of hunting is very effective in some provinces, it is ineffective in others.		

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