Non-detriment finding assessment for *Diceros bicornis* (black rhinoceros)

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Summary of findings

The South African population of *Diceros bicornis* (black rhinoceros) is included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), to which South Africa is a signatory. In accordance with the provisions of CITES relating to Appendix I species, the export of wild-sourced specimens of black rhinoceros for commercial purposes is prohibited. Article III of the Convention stipulates that an export permit shall only be granted for a specimen of an Appendix I species (e.g. in the case of a hunting trophy) when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species. Since 2005, South Africa has been allowed an annual export quota of five hunting trophies of adult male black rhinoceroses (Resolution Conf. 13.5 (Rev. CoP14)). In 2019, the 18th Conference of the Parties to CITES approved a revision to the black rhinoceros hunting trophy export quota. In accordance with CITES Resolution Conf. 13.5 (Rev. CoP18) South Africa may now export a total number of hunting trophies of adult male black rhinoceros not exceeding 0.5% of the current total black rhinoceros populations in South Africa in the year of the export (equally applied to all three subspecies i.e. 0.5% of the total population of each of the three subspecies).

This NDF for *Diceros bicornis* was compiled through deliberations held at an expert workshop that was convened by the South African National Biodiversity Institute on 1 February 2018 (see list of workshop participants at the end of this document), and amended through various further consultations with experts. A comprehensive review of the relevant scientific literature and reports (see reference list) ensured all available information on the species was considered and captured in this document, current as of October 2024.

The black rhinoceros is a long-lived species with both sexes living between 30 and 40 years in the wild. The species has a low reproductive rate, with females in wild populations producing their first calf at around seven years on average (median 6.8, range 4-14), while males start to mate effectively only between 7 and 12 years depending on the social dominance of other males. Calving intervals average 2.7 years, with a gestation period of approximately 16 months. The black rhinoceros is a relatively adaptable, generalist browser and naturally occurs in a wide variety of habitats from deserts to wetter forested montane areas. In general, black rhinoceros is slow to disperse from established populations to colonise new areas, although there are many cases of individual (usually young) black rhinoceroses moving great distances from time to time. In South Africa, the species is conservation dependent, occurring solely in protected areas, game reserves and on game farms. Black rhinoceroses are somewhat sensitive to general human presence and activity but do become habituated to regular human presence and activity when no overt threats arise therefrom.

As all black rhinoceros populations exist in fenced protected areas or on private/community game farms or reserves, the distribution of the black rhinoceros in South Africa is fragmented and populations are isolated from each other. The total area occupied by black rhinoceros is estimated at close to 33,000 km^2 or less than 3% of the total land surface of the country. The species occurs in more than 69 state, private and communal reserves and game farms in seven of the nine provinces. Due to the low numbers (2,065 in December 2023), it is regarded as a rare species in South Africa. According to data gathered from a survey of black rhinoceroses by the Southern African Development Community (SADC) Rhino Management Group (RMG) 1,440 (70%) and 625 (30%) black rhinoceros occur on state-owned and private/communal land respectively.

While black rhinoceros populations in most other African range states have declined over the past three generations (43.5 years), numbers of black rhinoceros within South Africa have increased from approximately 110 animals in 1930 to 2,065 animals at the end of 2023, increasing the relative contribution of South Africa to

continental black rhino numbers. Numbers of both the out-of-range eastern black rhinoceros (*D. b. michaeli*) and the indigenous south-western black rhinoceros (*D. b. bicornis*) have increased, with long-term average population growth rates of 5.0% and 11.5% respectively. Neither of these subspecies has experienced much loss to poaching. In contrast, the more numerous indigenous southern-central black rhinoceros (*D. b. minor*) has performed less well. Up to 2010, the long-term average annual population growth rate was 3.3%. Since then, poaching losses resulted in an average annual growth of 0.0% with considerable inter-annual variation. This subspecies has borne the brunt of the poaching impact, with the Kruger National Park (KNP) population being especially impacted. COVID-19 restrictions in 2020 resulted in reduced poaching and *D. b. minor* has increased slightly since then at 0.3% per annum.

Detailed quantitative data exist on black rhinoceros numbers, poaching rates and population performances over the past 30 years due to a process of confidential annual black rhinoceros status reporting to the SADC RMG, as well as regular reporting to the International Union for Conservation of Nature Species Survival Commission (IUCN/SSC) African Rhino Specialist Group (AfRSG). The sizes of most black rhinoceros populations, which are monitored using individual identification methods, are also known exactly or to within a few animals. Although there are some concerns with regards to adequate budgets to conduct regular counts and implement intensive monitoring on the ground, generally good population estimates exist and, in most cases, direct population estimates are used to monitor the effects of any harvesting. The quality of monitoring in some populations has been compromised as field staff increasingly focus on anti-poaching with less time available for activities such as monitoring.

The current major threat to South Africa's black rhinoceros population is the continuing loss of individuals to poaching for their horn. This is mainly due to a persistent demand for rhinoceros horn in Asia in the absence of a regulated and sustainable legal trade. Poaching of wild black rhinoceroses has been increasing each year from 2010 (when 12 animals were poached) and reached a peak in 2017 when 65 were poached in the country (an estimated 3.3% of the national population). Poaching losses have since declined, with an average 1.6% (c. 34 individuals) of the black rhinoceros population being poached annually. The "offtake" from poaching is at levels that are sustainable (total births still exceed total deaths) and is not yet causing a population decline at the national scale. The exception is the *D. b. minor* population in KNP where a decline since 2015 was detected. The *D. b. minor* population experienced high poaching rates, but this declined likely in response to the various interventions employed nationally and specifically in KNP. A key intervention in the past two years has been the dehorning of rhinoceros within the park. Should the current measures to curb poaching be removed, poaching of black rhinoceroses in KNP would most likely increase and the severity of the national threat will increase substantially. In order for the current efforts to continue, significant continued and additional financial inputs are required.

Since 2010, the South African government has launched a variety of initiatives in collaboration with various stakeholders to address the poaching threat and ensure the long-term conservation of the species. In 2014, Cabinet adopted an integrated five-pronged approach to curb rhinoceros poaching. Prior to this, in January 2013, a Biodiversity Management Plan (BMP) for the Black Rhinoceros (*Diceros bicornis*) was gazetted for implementation in terms of section 43 of the National Environmental Management Biodiversity Act of 2004 (No. 10 of 2004) (NEM:BA). This plan formed the basis for greater coordination between existing and future plans and was informed by the National Strategy for the Safety and Security of Rhinoceros Populations in South Africa as well as the Rhinoceros Issues Management Report. This BMP is currently undergoing a revision in accordance with outcomes of the Committee of Inquiry (CoI), the Rhinoceros Lab, the ministerial High Level Panel, the White Paper on the Conservation and Sustainable Use of Biodiversity in South Africa and the Policy Position on the Conservation and Sustainable Use of Elephant, Lion, Leopard and Rhinoceros. A draft BMP was recently published for public comment. Although the White Paper does not have direct implications for rhinoceros management, it broadly requires the incorporation of ethical practices and standards into the management and use of wildlife in South Africa, and further requires that threats to biodiversity, such as over-exploitation, be avoided or minimised, and mitigated.

The Policy Position on the Conservation and Sustainable Use of Elephant, Lion, Leopard and Rhinoceros, an outcome of the recommendations emanating from the High-Level Panel of experts for the review of policies, legislation and practices on matters of elephant, lion, leopard and rhinoceros management, breeding, hunting, trade and handling, was published for implementation on 24 April 2024. The Policy Position contains three

objectives pertinent to rhinoceros, largely white rhinoceros, including 1) phasing out the intensive management and captive breeding operations of rhinoceros for commercial purposes and enhance wild populations, 2) promoting live export of specimens of the five species (including rhinoceros) to range states or any appropriate and acceptable destinations with suitable habitats on the African continent and 3) South Africa working with range states and potential destination countries to support a proposal for international commercial trade in rhinoceros horn from protected wild rhinoceros, for conservation purposes, when conditions become favourable. Conditions to be met were established by the COI and are indicators of the five pillars; namely security (law enforcement); community empowerment; biological management; responsive legislative provisions and effective implementation, and demand management.

Whereas management of black rhinoceroses on private land is variable, they are generally well managed within protected areas, with offtakes managed in terms of species-specific or ecological management plans. The black rhinoceros population in the KNP (approximately 14% of the national population) is managed in accordance with an adaptive management plan. In KwaZulu-Natal (KZN), black rhinoceroses on state and private land are managed strictly according to the KZN Black Rhino Management Strategy. The Eastern Cape Parks and Tourism Agency (ECPTA) has managed its population in accordance with the National BMP and 15% of animals are removed every 3rd year since 2011. This stimulates growth and provides animals for range expansion. From 2003, the WWF Black Rhinoceros Range Expansion Project (BRREP), working in partnership with Ezemvelo KZN Wildlife (Ezemvelo) and more recently (since 2012) also with ECPTA, has helped create 16 new areas for the conservation of black rhinoceros with 252 founders, and currently holds 372 black rhinoceroses on over 2,800 km^2 of private and communal land in South Africa. These management translocations are making a significant contribution to the recovery of the species.

Diceros bicornis is listed as endangered in terms of section 56 of NEM:BA, and various provincial ordinances and acts provide further legislative protection. Permits are therefore required to undertake a variety of activities, e.g., hunting, keeping, selling and other forms of direct use. The black rhinoceros population in South Africa is generally subjected to two forms of legal offtake based on strict biological criteria, namely management removals of animals and trophy hunting. An estimated 2.7% of the national herd across state and private protected areas is translocated annually. The removal of live animals for translocation purposes is not considered to be a form of harvest since these animals are not permanently removed from the national population. There are however some international exports of live animals. A total of 95 live black rhinoceros were exported from South Africa between 2010 and 2020, this constituted more than 60% of the total exports of the species from South Africa during this time period. Live animals were exported primarily for re-introduction purposes (92 out of the 95 live exports). To date, South Africa has donated, sold or placed under custodianship founder black rhinoceroses to Botswana, Chad, Eswatini, Malawi, Mozambique, Rwanda, Tanzania, Zambia, and Zimbabwe. Exports of live rhinoceros is driven by the conservation expansion program as part of the SADC Regional Rhinoceros Conservation Strategy and the African Rhinoceros Conservation Plan, and there is currently no quota in place for the export of live animals.

Legal hunting of black rhinoceroses, mostly on private land, is predominantly economically motivated. With an average of 2 – 3 trophy bulls hunted per year (between 2010 and 2023), only a very small proportion of the population (0.12%) is hunted for trophies. Given the strict approval criteria and approval process, there is a high confidence that offtakes are sustainable, even taking poaching impacts into account. According to the DFFE (Department of Forestry, Fisheries and the Environment) Professional Hunter's Register, approximately 31 black rhinoceros males were hunted between 2010 and 2019. Since 2019 no black rhinoceros has been hunted in South Africa due to ongoing court procedures (Humane Society International - Africa Trust and Others v Min of Forestry, Fisheries and the Environment and Another (6939/22) [2024] ZAWCHC (Unreported) (26 January 2024)). According to the CITES Trade Database, 39 black rhinoceros trophies were exported over the same time period (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). (The discrepancy between the PH Register and the CITES trade database is likely due to the time delay between the actual hunt and the export of the trophy.) The main destination countries for the export of rhinoceros horn as part of a hunting trophy included Malaysia (24%), Australia (18%), Canada (18%), and Denmark (18%). The main destination countries for the export of hunting trophies included Mexico (18%), Malaysia (10%), Hungary (10%) United Arab Emirates (8%), Denmark (8%), France (8%), and Romania (8%).

A domestic moratorium on the sale of rhinoceros horn or rhinoceros horn products was implemented on 13 February 2009 (Government Gazette No. 31899, Notice No. 148). The moratorium was a temporary measure to afford the Department of Environmental Affairs (DEA) (now DFFE) an opportunity to develop and implement permanent measures aimed at eliminating the illegal international trade in rhinoceros horns. However, the moratorium was set aside by the High Court of South Africa in November 2015, thereby rendering the domestic trade in rhinoceros horn within the borders of the country legal once again. To effectively manage the legal domestic trade in rhinoceros horn, DEA published Norms and Standards for the Marking of Rhinoceros and Rhinoceros Horn, and for the Hunting of Rhinoceros for Trophy Hunting Purposes for implementation in September 2018 (Gazette No. 41913). The Minister also prohibited the carrying out of certain restricted activities involving rhinoceros horn, or part, product or derivative of such horn, belonging to the species black rhinoceros (*Diceros bicornis bicornis*, *Diceros bicornis minor*, *Diceros bicornis michaeli*) and white rhinoceros (*Ceratotherium simum simum*) through a notice for implementation on 3 June 2020 (*Gazette* No. 43386) and which was set to commence on 3 February 2023. The commencement notice was however withdrawn on 31 March 2023; thus, these regulatory measures have been published for implementation but have not yet commenced.

The amended Norms and Standards for the Marking of Rhinoceros and Rhinoceros Horn and for the Hunting of Rhinoceros for Trophy Hunting Purposes require that all rhinoceros hunts and dehornings are attended by state conservation officials. Provincial conservation agencies indicate that these legal requirements are being complied with in full. The main purpose of dehorning at present is to reduce the incentive to poach rhinoceros. The Norms and Standards require the collection of a DNA sample at the time of dehorning for genetic profiling purposes. DNA samples are also required from live animals, including both horns, when rhinoceros are sold and translocated. A possession permit as well as a DNA certificate is issued to the owner of the rhinoceros horn and all DNA samples are stored on the RhODIS (Rhino DNA Indexing System) database to ensure traceability. The system is well managed, and rhinoceros horn stock piles are regularly audited. Reporting of rhinoceros horn stockpiles within the private sector continues to improve in part due to improved declaration and reporting. It has been reliably established that stockpiles of rhino horn in South Africa (predominantly from the white rhino) amount to around 65 tons (with 25 tons in private ownership). There is a high level of confidence in the monitoring of both illegal and legal harvests of black rhinoceroses in most state protected areas. On smaller properties, rhinoceroses are individually known and there is also a high confidence in carcass detection rates.

In March 2018, the Private Rhino Owners Association (PROA) launched Rhino Horn Trade Africa (RHTA), an initiative to facilitate the legal trade of rhinoceros horn via an online trade desk, and aiming to provide a managed, efficient platform from which genuine buyers and sellers can trade in legal, humanely acquired rhinoceros horn. An online auction, however, was met with little interest. A recent private initiative, Rhinomics (https://Rhinomics.com/), aims to develop a legal rhinoceros horn trade that is regulated and traceable, and to create a self-sustaining finance mechanism for the long-term survival of rhinoceros, people and nature. A vault and software management system for all of South Africa's rhinoceros horn, as well as a national network for logistics and storage have already been established under this private initiative.

The export of live black rhinoceros for reintroduction purposes benefits the regional and global conservation of the species. Since 1990, in order to promote high population growth rates, national and provincial conservation agencies have harvested and sold black rhinoceroses to private landowners. This has served to generate revenue for state conservation agencies, and at the same time has increased rhinoceros numbers in the donor populations by stimulating growth rates while expanding black rhinoceros range within South Africa through the establishment of new populations. Adequately managed and secure habitat suitable for black rhinoceros is however limited. The scarcity of available and suitably secure habitat limits the effectiveness of this approach in countering poaching offtakes. The current overall species conservation benefit associated with trophy hunting of black rhinoceros is low, though conservation revenues could be improved by allowing the hunting of additional surplus trophy bulls. There is also currently no benefit derived for habitat conservation due to low levels of offtake, though the amended CITES Resolution Conf. 13.5 (Rev. CoP18) is designed to increase conservation incentives in relation to trophy hunting. The sale of live black rhinoceroses is currently limited and excess animals are donated towards range expansion.

Over two thirds of the national population of black rhinoceros (70%) is conserved within state protected areas (1,440 individuals). South African National Parks (SANParks) is custodian to 31% of the country's black

rhinoceroses. However, ongoing poaching is indicative of the limited effectiveness of these protected areas, despite the significant resources that have been deployed towards gaining control over illegal activities. Poaching has occurred in most protected areas with some protected areas, notably the KNP, struggling to combat these illegal activities. This primarily arises from the long permeable border with Mozambique and that country's inadequate legal and wildlife protection systems, though Mozambique's legislation was amended in May 2019 to criminalize wildlife poaching and trafficking. Improved protection measures (enhanced intelligence gathering and effective prosecution with deterrent sentences), as well as active regional cooperation (especially from Mozambique), are required to combat poaching. The international ban on the commercial trade in rhinoceros horn, in place now for more than 40 years, has apparently also failed to effectively provide adequate protection to the species over the last decade, despite the numerous anti-poaching measures implemented in South Africa. These measures importantly 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, coupled with poverty and unemployment in rural communities). Socio-economic research suggests that the demand for scarcity weakens the impact of anti-poaching measures, and rarity in the market (a result of the trade prohibition) in fact increases demand. International trade prohibitions are ironically one of the primary drivers of speculation in Asian markets.

It is unlikely that the current investment in the protection of rhinoceros from current sources (government and donors) can be sustained in the long term. It is estimated that between R0.87 billion and R1.29 billon per annum is required to secure rhinoceroses in the state owned protected area system, while private game farms and reserves have spent collectively approximately R2 billion on the management and specifically the protection of rhinoceroses between 2009 and 2017. Furthermore, a large portion of the rhinoceros security and enforcement budgets in a number of provinces are funded by international donors and are therefore at risk of donor fatigue. It is thus important that alternative sources be explored to protect rhinoceros. There is a certain economic value that could be derived from rhinoceros horn that could be allocated to the protection of rhinoceros. At present, most private reserves have to fund their own security measures, but income derived from the sale of rhinoceros horn will assist both government and the private sector to continue funding the current investment in rhinoceros protection measures. As a result of the continued illegal trade in rhinoceros horn and the apparent failure of the CITES trade ban, there have been calls from some segments of the conservation community to reconsider current policies, especially the 40-year ban on the international commercial trade in rhinoceros products, and to establish a legal, well-regulated international market for trading rhinoceros horn. A plethora of recently published peer-reviewed papers argue for a legal trade. Recent research has concluded that behaviour change will be difficult to achieve, and behavioural change interventions may have unintended and undesirable consequences. While demand reduction campaigns have seen some success in raising awareness, their influence on consumer behaviour is limited by cultural beliefs, distrust in campaign promoters, and the ineffective targeting of key social groups. Consumers show a preference for legal rhino horn, and there is no strong empirical or theoretical evidence that stigmatising demand would be at a sufficient scale that it can compensate for the lack of legal competition

In conclusion, the non-detriment finding undertaken for the black rhinoceros (*D. bicornis*), as summarized in the analyses of the key considerations above, demonstrates that current exports of live animals and hunting trophies pose a low risk to the survival of *D. bicornis* in South Africa and trade is not detrimental (Fig. 1 and 2). Periodic international exports of live animals for the purposes of establishing new populations generate a conservation benefit through ensuring rapid growth in numbers and expansion of the species' range, while at the same time generating conservation revenue and preventing overstocking in established populations. Trophy hunting of black rhinoceros incentivizes the conservation and protection of the species in South Africa, and the delay in implementing the new CITES export quota (number of adult male trophies not exceeding 0.5% of the total population of each of the three subspecies in the year of the export) is a concern.

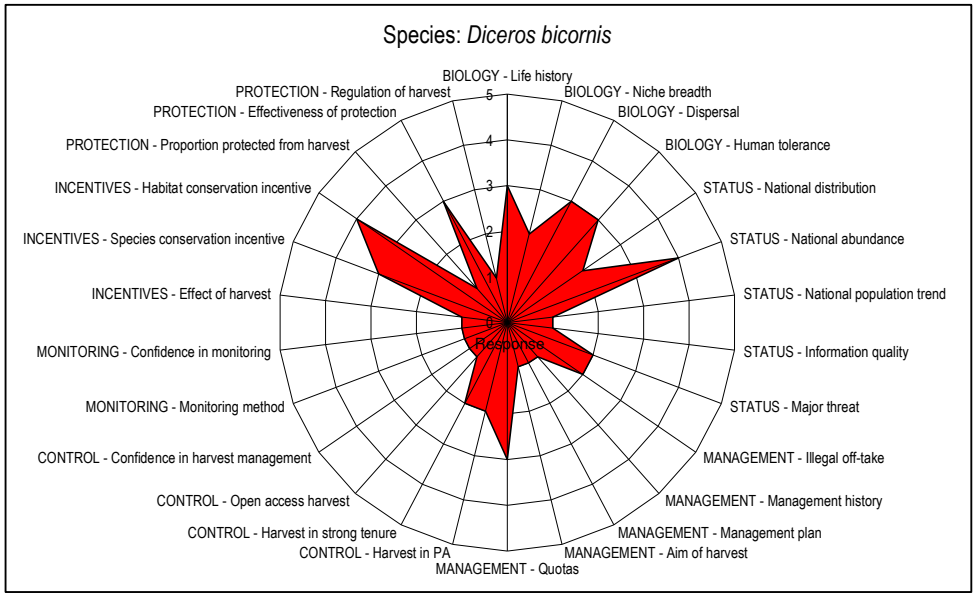

Figure 1: Radar chart summarizing the non-detriment finding assessment for *Diceros bicornis* (black rhinoceros) in South Africa in accordance with the CITES NDF checklist. Explanations of scores given are detailed in Table 1. Higher scores are indicative of higher risks to the species. The limited area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

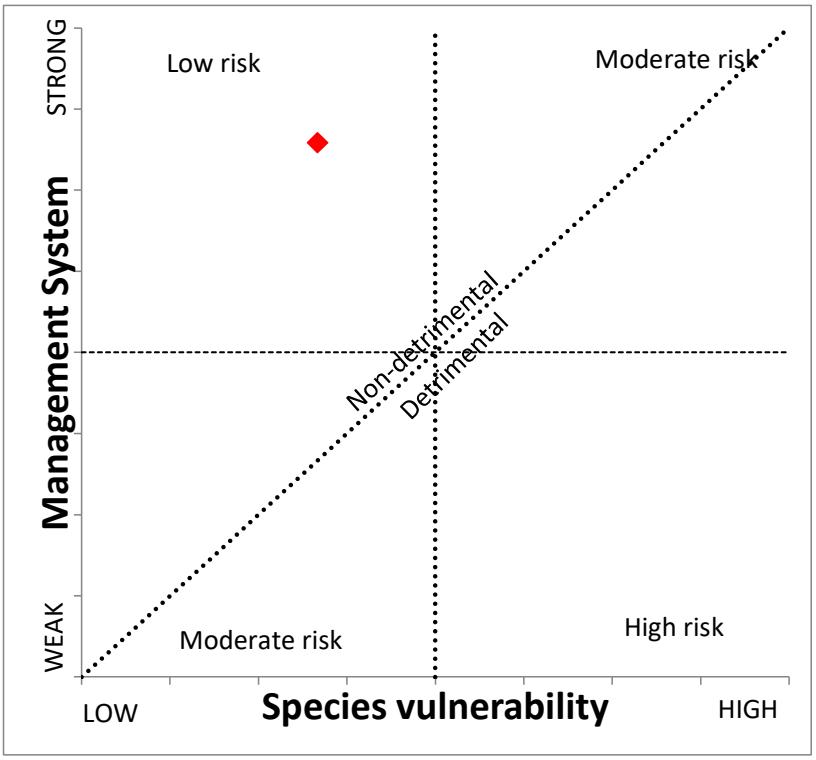

Figure 2: The risk of trading in *Diceros bicornis* (black rhinoceros) by South Africa, as represented by the relationship between species vulnerability (biology and status) and the management system to which the species is subjected (management, control, monitoring, incentives and protection). The figure demonstrates that the species is at a low risk, and that trade is not detrimental.

Table 1. Detailed non-detriment finding (NDF) assessment for *Diceros bicornis* (black rhinoceros) for South Africa undertaken in accordance with the CITES NDF checklist. Scores assigned to each question are indicated (bold text and shaded blocks) along with detailed explanations/justifications where relevant. Higher scores are indicative of higher risks to the species.

Biological characteristics		
1. Life history: What is the species' life history?	High reproductive rate, long-lived	1
	High reproductive rate, short-lived	2
	Low reproductive rate, long-lived	**3**
	Low reproductive rate, short-lived	4
	Uncertain	5
The black rhinoceros is long-lived with both sexes living to approximately 30 – 40 years in the wild. Black rhinoceros are generally solitary. Cohesive groups consist mostly of mother-offspring associations (Owen-Smith, 1988). Smith (1988) indicated that females reach sexual maturity at approximately 5-6 years. They produce their first calves at 7 years on average (median 6.8, range 4 – 14), while males mate effectively only at 7 to 12 years of age depending on the social dominance of other males (Emslie, IUCN African Rhino Specialist Group (AfRSG), pers. comm.). The calving interval on average is 2.7 (range 1.7 – 4) years after a gestation period of approximately 15 – 16 months (Adcock, *et al*., 2010). Black rhinoceros thus have a low reproductive rate.		
2. Ecological adaptability: To what extent is the species adaptable (habitat, diet, environmental tolerance etc.)?	Extreme generalist	1
	Generalist	**2**
	Specialist	3
	Extreme specialist	4
	Uncertain	5
Black rhinoceroses are generalist browsers and can occur in a wide variety of habitats from deserts to wetter forested montane areas. Their achievable population density is correlated with the interacting factors of actual standing browse availability and suitability in the 0 – 2 m black rhinoceros feeding height range, soil nutrient status, average annual rainfall, and the densities of competing herbivores. Highest densities are found at sites with 350 – 700 mm annual rainfall, with rainfall well spread throughout the seasons, where low thicket, scrublands, or understorey forbs predominate, and on more nutrient-rich soils (Emslie & Adcock, 2016; Adcock, 2014). Intraspecific conflict between rhinoceros individuals may increase in areas where densities are too high (Hitchins & Anderson, 1983). Diet studies across Africa show that black rhinoceros feed on a wide range of plant genera. Important diet types include most African *Acacia*s (now *Vachellia* and *Senegalia* genera), *Grewia* species, certain *Gymnosporia* and *Combretum* species, and many Euphorbiaceae (including *Spirostachys africana*), forbs and dwarf shrubs such as *Justicia*, *Indigofera, Tephrosia*, *Monechma, Lycium, Rhigozum,* and *Zygophyllum*. Generally smaller plants less than 1 m in size are most preferred with most browsing occurring under 2 m. Browse in long grass areas tends to be avoided. Grass is usually only eaten incidentally with browse, or where browse availability is limited (grass stalks may comprise over 30% of faecal mass) but is poorly digested (Clause, *et al*., 2006) and is thus often over-represented in the dung (Malan, 2011). Black rhinoceros require a permanent water source, except in areas with high palatable succulent plant availability. High levels of secondary plant chemicals in some browse species and other indigestible components in many evergreen species means that much of the available browse in an area can be unsuitable for black rhinoceros. The large body size of the black rhinoceros further predisposes it to being a generalist (Owen-Smith, 1988).		
3. Dispersal efficiency: How efficient is the species' dispersal mechanism at key life stages?	Very good	1
	Good	2
	Medium	**3**
	Poor	4
	Uncertain	5
Home range size varies with the quality of the habitat, averaging well over 100 km^2 in desert sites, 15 – 60 km^2 in many woody savannahs and below 10 km^2 in nutrient rich thicket (SADC RMG status report data). Dispersal is a process that most often takes place at the sub-adult stage. Youngsters become independent of their mothers at 2.5 – 5 years old, mainly triggered by the birth of the next offspring, or the process of sexual maturation. In general, black rhinoceros populations are slow to colonise new sites, although there are many cases of individual rhinoceroses wandering great distances from time to time in many different habitat types. Where space is constrained, high degrees of overlap in the ranges of adult females and their adult offspring have been observed (D. Peinke, pers. comm.).		
4. Interaction with humans: Is the species tolerant to human activity other than harvest?	No interaction	1
	Pest / Commensal	2
	Tolerant	**3**
	Sensitive	4

	Uncertain	5

Black rhinoceroses are conservation dependent, occurring solely in protected areas and on game farms and game reserves. They are considered somewhat sensitive to general human activity (e.g. Beytell, 2010; Buk & Knight, 2012) but do become habituated to regular human activity when no overt threats arise therefrom.

National status

5. National distribution: How is the species distributed nationally?	Widespread, contiguous in country	1
	Widespread, fragmented in country	**2**
	Restricted and fragmented	**3**
	Localized	4
	Uncertain	5

Black rhinoceros is considered widespread and fragmented in South Africa, occurring in more than 69 state, private and communal reserves and game farms across seven out of the nine provinces. The total area occupied by black rhinoceros in South Africa was estimated at close to 33,000 km^2 in 2014 (Table 2) which is less than 3% of the total land surface of the country. The black rhinoceros population is severely fragmented as all subpopulations are isolated from each other in fenced protected areas or private/community game reserves. However, periodic translocations among reserves ensure genetic interchange between many subpopulations. Additional individuals that become available through population growth are reintroduced to new available land on an ongoing basis.

There are two recognized subspecies/ecotypes of black rhinoceros indigenous to South Africa (*D. b. minor* and *D. b. bicornis*), both of which are conserved on state and private land, while a single ex-situ population of *D. b. michaeli* occurs within the country. The historical geographical separation of the two subspecies of black rhinoceros in South Africa is not precisely known and there was likely a broad transition zone. Nevertheless, the boundary depicted in Fig. 3 below, defines the functional separation of the two subspecies for management purposes. There are existing exceptions where *D. b. minor* occurs in the distribution range of *D. b. bicornis*, but rectifying this would be too costly due to the large size of the populations that would need to be translocated. For example, a reserve within the Eastern Cape which should contain *D. b. bicornis* but has *D. b. minor* and the population is too large to cost effectively change the situation.

In 2014, south-western black rhinoceroses (*D. b. bicornis*) occurred on 11 sites in western and south-eastern South Africa (Adcock, 2016) (Table 2) and it is likely that the number of sites have increased since then. Southern-central black rhinoceroses (*D. b. minor*) are believed to have occurred from southern Tanzania through Zambia, Zimbabwe, and Mozambique to the northern, north-western and north-eastern parts of South Africa (north of the Mtamvuna River). Today, its stronghold is South Africa and, to a lesser extent Zimbabwe. Specifically, it occurs within the eastern Lowveld in Limpopo and Mpumalanga and KwaZulu-Natal Lowveld habitats. In the province of Limpopo, its range extends westwards to the North West Province. Its putative distribution is partially predicted by rainfall but also the potential barrier to movement to the south of KwaZulu-Natal posed by the "Transkei gap". There are 57 breeding locations within the region and the estimated area of occupancy in 2014 was 28,469 km^2 (Adcock, 2016) (Table 2). The eastern black rhinoceros (*D. b. michaeli*) was introduced to South Africa in 1962 and currently exists in a single population on private land estimated at 349 km^2 (Adcock, 2016) (Table 2).

Table 2: The area of occupancy (km^2) for black rhinoceros subspecies in South Africa as at the end of 2014. Private custodian land is properties where rhinos are kept on a property under a custodian arrangement, thus ownership of rhinos remains that of the donor organisation (i.e., ECPTA); BRREP is the Black Rhinoceros Range Expansion Project. With the development of the SANBI national species population database (SAWPS) the population and area of occupancy data will be updated annually.

Type of land	*D. b. bicornis*	*D. b. minor*	*D. b. michaeli*	Total
National Parks	2,046	15,664		17,710
Provincial protected areas	200	5,124		5,324
Private custodian land	245			245
Private land	1,584	5,839	349	7,772
BRREP land		1,842		1,842
	4,075	**28469**	**349**	**32,893**

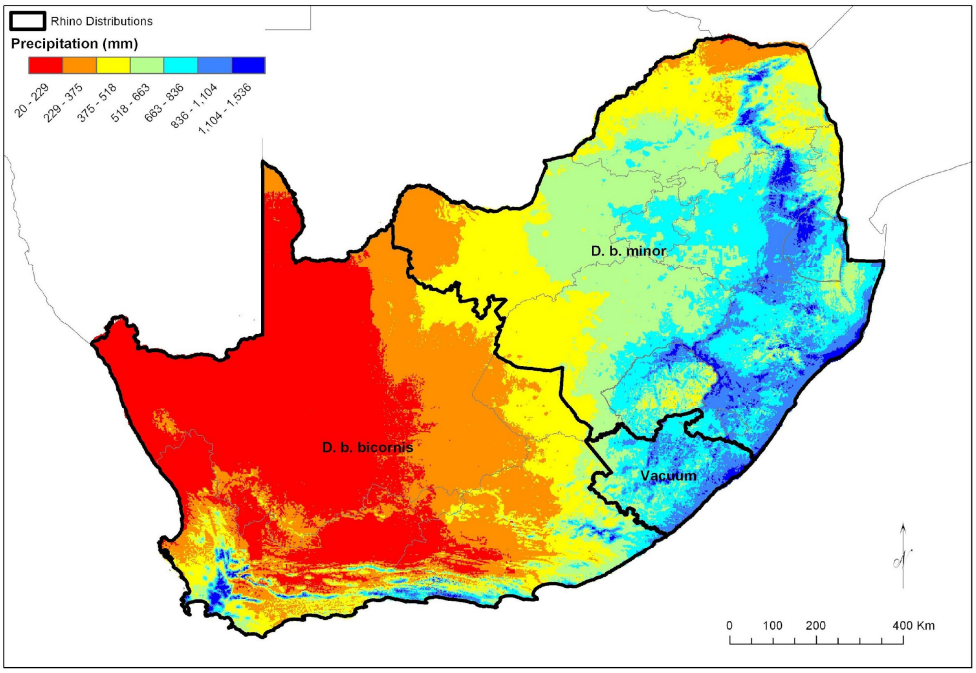

Figure 3: Geographic distribution of the black rhinoceros subspecies overlaid on the rainfall pattern for South Africa. The boundary separating the two subspecies has been designated for management purposes. The area south of Lesotho is an area where black rhinoceros were historically absent (a vacuum). Figure obtained from Balfour *et al*., (2024).

6. National abundance: What is the abundance nationally?		
	Very abundant	1
	Common	2
	Uncommon	3
	Rare	**4**
	Uncertain	5

The African continent has around 6,421 black rhinoceroses (as of the end of 2023). Four range States are home to the largest proportion of the African rhinoceros population and largely determine the continental trends. By the end of 2023, Namibia contributed 32.9% (2,1114 out of 6,421), South Africa 32.2% (2,065), Kenya 15.6% (1,004) and Zimbabwe 11.3% (725) of the continental black rhinoceros population. According to a survey of rhinoceros on private and state land conducted by the AfRSG and Southern African Development Community (SADC) Rhinoceros Management Group (RMG), the total South African black rhinoceros population consists of approximately 2,065 individuals (as at the end of 2023) of which 1,440 and 625 occur on state-owned and private and communal land respectively (Table 3). The estimated number of south-western black rhinoceroses (*D. b. bicornis*) in South Africa at the end of 2023 was 470. By the end of 2023 the southern-central black rhinoceros (*D. b. minor*) was estimated at 1,495 in South Africa (Table 3). The single *D. b. michaeli* population in South Africa numbered 100 at the end of 2023 (Table 3). The total population estimate for *D. b. minor* for Kruger National Park (KNP) at the end of 2023 was 209, approximately 14% of the national subspecies total.

Four IUCN SSC African Rhino Specialist Group (AfRSG) rated Key 1 (>100 individuals) black rhinoceros populations are located in South Africa, highlighting the level of importance of the country for continental black rhinoceros conservation (Balfour *et al*., 2024). South Africa is recognised as a world leader in conserving both the black and white rhinoceros (Knight, Balfour & Emslie, 2012).

Very few captive breeding operations for the breeding of black rhinoceros exist within South Africa.

Table 3: Population estimates for each of the black rhinoceros subspecies kept in state owned and on private and community properties across all provinces of South Africa at the end of 2023.

	State owned		**Privately and community owned**			
	South-central black rhino	**South-western black rhino**	**South-central black rhino**	**South-western black rhino**	**Eastern black rhino**	**Total per Province/ entity**

	D. b. minor	*D. b. bicornis*	*D. b. minor*	*D. b. bicornis*	*D. b. michaeli*	
Eastern Cape	255	25	83	0	0	**363**
Free State	0	0	0	0	0	**0**
Gauteng	0	0	0	0	0	**0**
KwaZulu-Natal	373	0	184	0	0	**557**
Limpopo	0	0	109	0	100	**209**
Mpumalanga	1	0	29	0	0	**30**
Northern Cape	0	0	0	85	0	**85**
North West	144	0	23	0	0	**167**
Western Cape	0	0	0	12	0	**12**
SANParks	294	348	0	0	0	**642**
TOTAL	**1,067**	**373**	**428**	**97**	**100**	
NATIONAL TOTAL						**2,065**

7. National population trend: What is the recent national population trend?

Increasing	**1**
Stable	2
Reduced, but stable	3
Reduced and still decreasing	4
Uncertain	5

In 1970 there were an estimated 65,000 black rhinoceroses in Africa. Currently there are approximately 6,195 black rhinoceroses on the continent (IUCN, TRAFFIC 2022, CITES CoP E-CoP19-75), which means that at a continental level, current black rhinoceros numbers are still 90% lower than three generations (43.5 years) ago (Emslie & Adcock, 2016).

The black rhinoceros population within South Africa has however been increasing for many years, from only 110 black rhinoceroses in 1930 and 407 in 1970, to today's estimate of 2,065 (Fig. 4). By 1973 there were no south-western black rhinoceroses (*D. b. bicornis*) remaining in South Africa, but the subspecies was reintroduced in 1985. By 2014, the area of occupancy of *D. b. bicornis* had increased to 4,075 km^2 (Table 2). Since 2003, new populations have been established under the Black Rhinoceros Range Expansion Project (BREPP). Nearly all range States with extant black rhinoceros populations recorded increases in numbers between 2017 and 2021 (IUCN, TRAFFIC 2022, CITES CoP E-CoP19-75). (One exception was Botswana, which reported a substantial decline (-19.4% per annum) in the south-central black rhinoceros (*D. b. minor*)). Between 2017 and 2021, South Africa reported relatively little change with 0.1% annual population growth. In 2022 South Africa reported an 8.1% increase for south-central black rhinoceros (*D. b. minor*) from 2021, but in 2023 a decrease again (-10.7%). Eastern black rhinoceros (*D. b. michaeli*) and south-western black rhinoceros (*D. b. bicornis*) were respectively stable or increasing by 2023 (Fig. 4). Neither of these subspecies were exposed to much poaching pressure.

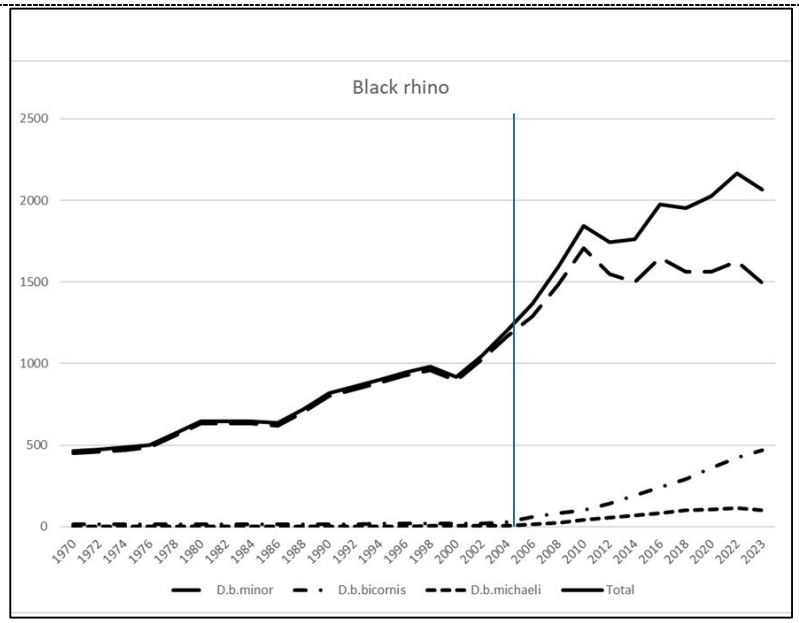

Figure 4. Trends in the number of black rhinoceros (per subspecies) in South Africa (1970 to 2023) (SADC RMG). Vertical line indicate the year (2005) when South Africa was allowed an export quota of five hunting trophies.

The *D. b. minor* population in KNP has declined from 627 (95% CI: 588-666) in 2008 to 202 (95% CI: 172-237) in 2020 (Ferreira *et al*., 2021) due to direct and indirect impacts of poaching (Ferreira *et al*., 2018 and 2021). The indirect impacts of poaching are often not considered and likely more important in the KNP where the black rhinoceros population is small and spread over a large area. The indirect poaching impacts contributing to the recent declines in the KNP black rhinoceros population include 1) the likely loss of all dependent offspring when a female is killed and a subsequent increase in the inter-calving interval from 2.45 years to 5-6 years, 2) the loss of all future reproduction from a poached female, and 3) reduced reproduction in surviving females. Evidence suggests that black rhinoceros fecundity/recruitment has been slowly declining for some years in KNP (le Roex & Ferreira, 2021). This long-term decline appears to be unrelated to the drought experienced in KNP over 2015/2016 and is more likely due to indirect impacts of poaching in the park (le Roex & Ferreira, 2020). Reduced mating opportunities when populations are small can influence birth rates (Courchamp *et al*. 2008), and black rhinoceros are likely to be particularly susceptible to localised impacts due to their low density in KNP and poor dispersal (Linklater & Hutcheson, 2010). Similarly, delayed mating as a result of social disturbance may reduce fecundity and recruitment over long periods (le Roex & Ferreira, 2021). Recently though, the KNP *D. b. minor* population has been stable at around 200 individuals (Ferreira *et al*., 2024) with recruitment rates in balance with the combined loss rates (natural deaths, poaching deaths and deaths related to dependent calves).

Black rhinoceros populations in the Eastern Cape (*D. b. minor and D. b. bicornis*) and North West provinces (*D. b. minor*) are stable to increasing. The numbers of black rhinoceros in Eastern Cape Parks and Tourism Agency (ECPTA) reserves have increased from approximately 129 in 2007 to 260 in 2023. Over the period 2011 – 2024, 109 animals have been translocated to other properties. The black rhinoceros population (*D. b. minor*) In KwaZulu-Natal (KZN) increased to approximately 500 individuals in 2013 and has remained stable since then.

South-western black rhinoceros (*D. b. bicornis*) within Addo Elephant, Karoo, Mountain Zebra, and Mokala National Parks increased significantly over the 2011-2015 period (Ferreira *et al*., 2017). The overall high growth rates can be explained by a population skewed in favour of females from the initial introductions and a high female calving rate in the initial years after introduction (Ferreira *et al*., 2017). Southern-central black rhinoceros (*D. b. minor*) in Marakele National Park also increased significantly between 2011 and 2015 (Ferreira *et al*., 2017).

In order to promote high population growth rates, national and provincial conservation agencies have harvested and sold black rhinoceroses to private landowners since 1990. This has increased rhinoceros numbers in the donor populations by stimulating growth rates while expanding black rhinoceros range within South Africa through the establishment of new subpopulations. From 2003, the World Wildlife Fund (WWF) Black Rhinoceros Range Expansion Project (BRREP), in partnership with Ezemvelo KZN Wildlife and more recently the ECPTA, has helped create 16 new areas for black rhinoceros totalling more than 2,800 km^2 of private, state and communal land in South Africa. These populations have grown to 372 individuals. Founder groups of rhinoceros from KZN and Eastern Cape provincial reserves are introduced to private land and managed on a custodianship basis (where black rhinoceros are placed on suitable private, communal or State land by a Conservation Management Authority, the custodial is responsible for the management, but ownership of the founder animals remains that of the Management Authority) and progeny shared between the provincial donor and the landowner. These management translocations are contributing significantly to the increase in the national population.

Prior to the 1990s, there were no privately or community owned black rhinoceros in South Africa, but by 2010, 22.9% (440 animals) of the national population was owned by the private sector, with private ownership reaching a peak of 27.4% (505 animals) in 2014. This trend has seen a decline to 21.1% (434 of South Africa's 2,056 black rhinoceros) in 2021 (Ferreira *et al*., 2022), though by 2021, custodian and community ownership contributed another 5.8% (119 animals) to the national black rhinoceros population (Ferreira *et al*., 2022). At the end of 2023, custodian and private- or community-owned rhinoceros were estimated at 625 individuals.

8. Quality of information: What type of information is available to describe abundance and trend in the national population?	**Quantitative data, recent**	**1**
	Good local knowledge	2
	Quantitative data, outdated	3
	Anecdotal information	4
	None	5

Detailed data exist on black rhinoceros numbers, poaching and population performances for most subpopulations over time. This is thanks to a process of confidential annual black rhinoceros status reporting to the SADC RMG that has been ongoing since 1989, and regular reporting to IUCN/SSC AfRSG. The size of many black rhinoceros populations, which are monitored using individual identification methods, is known exactly or to within a few individuals. In KNP, where black rhinoceros numbers are monitored using intensive helicopter block counts (and which then have wider confidence levels) (Ferreira, *et al*., 2017), individual identification methods are beginning to form part of the overall black rhinoceros monitoring as well. Monitoring has been improved by making use of additional mark-recapture estimates (Ferreira *et al*., 2020, Ferreira *et al*., 2024). Generally, however, the quality of monitoring in some populations has declined as field staff are having to increasingly focus on anti-poaching with less time available for other conservation activities.

There are currently two processes underway that could further assist with the collation and accessibility of data. The South African National Biodiversity Institute (SANBI) is currently in the process of developing a national online species population database. The South African Wildlife Population System (SAWPS) will allow reserve managers to submit all population and offtake data into the online system that can be used on a provincial and national basis to monitor and report on population trends. Wildlife Ranching South Africa (WRSA) has also initiated the development of a similar online system for their members.

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	1
	Limited/Reversible	**2**
	Substantial	**3**
	Severe/Irreversible	4
	Uncertain	5

The current major threat to South Africa's black rhinoceros population is the continuing loss of individuals to poaching for their horn (Knight, 2017). This is mainly due to a persistent demand for rhinoceros horn in Asia in the absence of a regulated and sustainable legal trade. Since 2007, there has been an upsurge in black market prices for horn and apparently new uses and demand from south-east Asia and especially Vietnam, which has caused an increase in rhinoceros poaching in some range states including South Africa (Thomas, 2010; MacMillan *et al*., 2017). Compounding this is the threat posed by organised crime which has emerged in response to the international trade prohibition.

In 2021 approximately 28 black rhinoceroses (around 1.4% of the national population) were lost to poaching (Table 4). Prior to the onset of rhinoceros poaching in 2008, black rhinoceroses were performing well in KNP (Ferreira, *et al*., 2011) but are now declining. Poaching not only reduces the abundance of a species (Emslie & Brooks, 1999) but is also likely to disrupt breeding and calf recruitment rates since poaching is biased towards adults (Ferreira, Botha & Emmett, 2012; Ferreira *et al*., 2018 and 2021). The poaching rate in KZN, which was on average below 1% of the provincial population annually between 2003 and 2012, has increased to 2.8% of the KZN population as at the end of 2023, effectively representing 50% of the potential annual population increment.

Poaching of black rhinoceroses increased each year from 2010 (12 poached) reaching a peak of 62 in 2015 and 65 in 2017 (an estimated 3.3% of the national population). Poaching has since declined to 1.6% of the population (Table 4). The recent decline in poaching is likely to indicate a positive response to the anti-poaching interventions employed nationally and specifically in KNP. Poaching of black rhinoceroses may in fact be a by-catch of white rhinoceros poaching. White rhinoceroses are preferentially poached since they are easier to find (on account of their preference for more open habitats), they carry larger and heavier horns, and they occur more frequently in larger groups.

Table 4: The number of black rhinoceroses per subspecies poached annually from 2010 to 2023 (Source: IUCN SSC AfRSG; DFFE). For the period 2019 to 2023 no subspecies (only species) poaching data were recorded and thus only the total number of black rhinoceros poached for these years are available. No black rhinoceros poaching data available for 2022. A total of 448 rhinoceros were poached in 2022, of which the minority is likely to be black rhinoceros.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
D. b. minor	12	34	25	38	54	62	45	65	43						378
D.b. bicornis	0	0	0	0	0	0	0	0	0						0
D. b. michaeli	0	0	0	0	0	0	0	0	0						0
Black rhinoceros total	**12**	**34**	**25**	**38**	**54**	**62**	**45**	**65**	**43**	**32**	**19**	**28**		**34**	**378**

Due to the prohibitive financial and security pressures associated with the current levels of poaching, some private landowners are disinvesting in rhinoceros and limited new suitable habitat is becoming available for the establishment of new rhinoceros populations (Clements *et al*., 2020). This does not only impact on range expansion, but also on current populations that are near carrying capacity by reducing the rates at which these populations can grow. The loss of revenue to both state and private sector owners generated from the sale of rhinoceroses has translated into reduced funds for new conservation land and anti-poaching measures. A further consequence of the decline in the sale and subsequent introduction of rhinoceroses to new areas is the expected decline in the population growth rate. Furthermore, due to poaching losses, there will be fewer surplus rhinoceroses that could be sold to maintain productive densities.

Availability of well managed and secure land for black rhinoceros is limited. The translocation of animals to maintain high underlying population growth rates underpins the meta-population management plan for black rhinoceros, which aims to maintain genetic transfer to future rhinoceros generations, while mitigating poaching losses. The scarcity of available and suitably secure land limits the effectiveness of the meta-population approach to counter poaching offtakes. A further constraint for the conservation of the species is the current veterinary moratorium on the translocation of rhinoceros from KNP due to concerns that rhinoceroses are potential carriers of tuberculosis. This prevents the establishment of new populations and limits gene flow among populations.

The losses from poaching are still at levels that are sustainable (total births still exceed total deaths) and are not yet causing a population decline at the national scale. The poaching threat is thus currently considered limited and reversible, with only 1.6% of the national population lost to poaching in 2023. The AfRSG has determined that the black rhinoceros population will be stable to increasing if poaching rates remain below 3.5% (Ferreira *et al*., 2022).

Harvest management

10. Illegal off-take or trade: How significant is the national problem of illegal or unmanaged off-take or trade?	None	1
	Small	**2**
	Medium	3
	Large	4
	Uncertain	5

High levels of poaching were primarily responsible for the crash in black rhinoceros numbers from a continental population of approximately 65,000 in 1960 (Cumming *et al*., 1990) to a low of 2,410 in 1995. Since then, and with concerted conservation action, continental numbers have increased, reaching 6,195 by the end of 2021 (IUCN & TRAFFIC, 2022). The species remains listed on the IUCN's Global Red List as Critically Endangered, but is listed regionally as Endangered C2a(i) (Emslie & Adcock, 2016).

Total poaching losses in Africa in 2015 amounted to 5.0% of African rhinoceroses (3.8% for black rhinoceros), close to the average continental growth rates (4.7%) that black rhinoceros achieved from 1995 through to 2007. Poaching of black rhinoceros had more than doubled from 2013 through to 2015 due to increased losses in Namibia, Zimbabwe and South Africa (Emslie *et al*., 2016). The poaching rate was lowest at 2.3% in 2020 and higher at 2.5% during 2023, but these are well below the poaching rate of 3.5% beyond which the total continental population will decline (Ferreira *et al*., 2022).

In South Africa, approximately 2.4% of the black rhinoceros population is currently poached annually (averaging 45 individuals), effectively representing 40% of the potential annual population increment (2.4% poached vs the c.6% annual underlying biological growth of 2012 – 2014). To date no south-western black rhinoceros (*D. b. bicornis*) or eastern black rhinoceros (*D. b. michaeli*) has been poached in South Africa (Table 4). The southern-central (*D. b. minor*) black rhinoceros has borne the brunt of the poaching (Table 4), with KNP's *D. b. minor* population being especially impacted (see Ferreira *et al*., 2020; Ferreira *et al*., 2024). In other provinces the poaching rate for black rhinoceros has been relatively low compared to KNP. In KZN, the poaching rate was relatively low (<1% of the population) between 2003 and 2011 but has risen rapidly since 2012, with the mean annual poaching rate of 2.68% (for the period 2012 to 2016) exceeding the 1% per annum acceptable threshold set by the KZN Black Rhino Management Strategy (Conway & Goodman, 2013). The current poaching rate in the province is 2.8% of the population annually (end of 2023), up from 2.4% in 2016. The poaching rate of black rhinoceroses was 3% in 2016 within ECPTA reserves. Since then, 16 black rhinoceros (all *D. b. minor*) have been poached within ECPTA managed properties (2 in 2017; 5 in 2018; 6 in 2023; 3 in 2024).

Mortalities related to illegal activities (poaching, snaring and death of orphaned calves) comprise over half (53.8%) of the total reported mortalities for *D. b. minor*, equating to a 2.85% average annual loss to *D. b. minor* over 2012 – 2014 compared to 1.1% average annual poaching-related loss rate for the previous three year period, 2009 – 2011. Between 2013 and 2014, the number of southern-central black rhinoceroses born that survived the first year in KNP (18 – 26 individuals) was similar to the number of rhinoceros poached (17 individuals).

However, between 2014 and 2015 more southern-central black rhinoceroses were poached (52 individuals) than were born and survived the first year (29 – 42 individuals) (Ferreira *et al*., 2017).

The *D. b. minor* population in KNP declined from 627 (95% CI: 588-666) in 2008 to 202 (95% CI: 172-237) in 2020 (Ferreira *et al*., 2021), because of direct and indirect poaching impacts (Ferreira *et al*., 2018 and 2021). Since then, however, numbers remained stable at around 200 individuals (Ferreira *et al*., 2024). The indirect impacts of poaching are often not considered and likely more important in the case of KNP where the black rhinoceros population is small and spread over a large area. The indirect poaching impacts contributing to the recent declines in the KNP black rhinoceros population include 1) the likely loss of all dependent offspring when a female is killed and a subsequent increase in the inter-calving interval from 2.45 years to 5-6 years, 2) the loss of all future reproduction from a poached female, and 3) reduced reproduction in surviving females.

Evidence suggests that black rhinoceros fecundity/recruitment has been slowly declining for some years in KNP (le Roex & Ferreira, 2021). This long-term decline appears to be unrelated to the drought experienced in KNP over 2015/2016 and is more likely due to indirect impacts of poaching in the park (le Roex & Ferreira, 2020). Reduced mating opportunities when populations are small can influence birth rates (Courchamp *et al*., 2008), and black rhinoceros are likely to be particularly susceptible to localised impacts due to their low density in KNP and poor dispersal (Linklater & Hutcheson, 2010). Similarly, delayed mating as a result of social disturbance may reduce fecundity and recruitment over long periods (le Roex & Ferreira, 2021).

A total of 28 black rhinoceroses were poached in 2021, compared to 45 in 2016, representing a decline of 38%. This is likely to indicate a positive response to the anti-poaching interventions employed nationally and specifically in KNP. However, an increase in the incidences of poaching of rhinoceros were observed in 2021 compared to 2020 (Table 4). This is likely related to the Covid-19 lockdown that effectively disrupted travel and supply chains that may have been used in the illegal rhino horn trade (Ferreira *et al*., 2021).

Poaching of black rhinoceroses may in fact be a by-catch of white rhinoceros poaching. White rhinoceroses are preferentially poached since they are easier to find (on account of their preference for more open habitats), they carry larger and heavier horns, and they occur more frequently in larger groups. Over the period 2010 – 2014, available data indicated that only 4.4% of rhinoceroses poached were black rhinoceros (Emslie & Adcock, 2016). An out-of-province reserve managed by ECPTA lost 10 white rhinoceros and no black rhinoceroses in 2016, while in 2017 the same reserve lost 14 white rhinoceros and three black rhinoceros.

11. Management history: What is the history of harvest?	**Managed harvest: ongoing with adaptive framework**	**1**
	Managed harvest: ongoing but informal	2
	Managed harvest: new	3
	Unmanaged harvest: ongoing or new	4
	Uncertain	5

The majority (68%) of the black rhinoceros population is generally well-managed within protected areas, with off-takes managed in terms of species specific or ecological management plans. The black rhinoceros population in the KNP (approximately 14% of the national population) is managed in accordance with an adaptive management plan. Black rhinoceros populations on private land are mostly well managed on the basis of the same conservation principles and objectives established for the state protected areas. ECPTA has managed its population in accordance with the national Biodiversity Management Plan (BMP) (Government Gazette vol. 571 no. 36096) and 15% of animals have been removed every 3rd year since 2011 to stimulate population growth and to provide animals for range expansion.

The regulatory framework in place allows for sustainable offtakes from South Africa's black rhinoceros population. Managers and/or landowners have an interest in ensuring the stability of their populations and manage their populations and offtakes accordingly. All hunts by international clients must be recorded in the Professional Hunter's Register (PH Register). The professional hunter accompanying the international client is responsible for completing and submitting the register to the provincial conservation authority. The Department of Forestry, Fisheries and the Environment (DFFE) collates the provincial registers into a national register on an annual basis, which facilitates oversight and adaptive management.

Since the 1990s, national and provincial conservation agencies have sold black rhinoceroses to private landowners. These sales generate revenue for state conservation agencies and also increase rhinoceros numbers through the establishment of new populations, thereby expanding black rhinoceros range within South Africa. From 2004, the Black Rhinoceros Range Expansion Project (BRREP), which is managed by WWF in partnership with EKZN Wildlife and more recently the ECPTA, has helped create several new large conservation areas for black rhinoceros. Founder groups of rhinoceroses are translocated from KZN and Eastern Cape provincial reserves to private and communal land where they are managed on a custodianship basis, but progeny are shared between the provincial donor and the landowner. These management translocations are making a significant contribution to the recovery of the species.

In 1976, the CITES Conference of the Parties (CoP) included the entire *Rhinocerotidae* family in Appendix I. In 1994, the CoP transferred South Africa's population of southern white rhinoceros (*Ceratotherium simum simum*) to Appendix II with an annotation to restrict exports

to live animals to appropriate and acceptable destinations and to hunting trophies, with all other parts and derivatives remaining in Appendix I. There has thus been an international ban on the commercial trade in rhinoceros horn since 1976.

A domestic moratorium on the sale of rhinoceros horn or rhinoceros horn products was implemented on 13 February 2009 (Government Gazette No. 31899, Notice No. 148). The moratorium was a temporary measure to afford the Department of Environmental Affairs (DEA) (now Department of Forestry, Fisheries and the Environment (DFFE)) an opportunity to develop and implement permanent measures aimed at eliminating the illegal international trade in rhinoceros horns. The domestic moratorium was set aside by the High Court of South Africa (Gauteng Division) on 29 November 2015 on the basis that an appropriate public consultation process, as required in terms of section 100 of the National Environmental Management: Biodiversity Act (NEMBA) No. 10 of 2004, had not been followed. The High Court judgment was upheld when the Supreme Court of Appeal and the Constitutional Court did not grant leave for appeal, effectively rendering the domestic trade in rhinoceros horn legal once again. To effectively manage the legal domestic trade in rhinoceros horn, the Department of Environmental Affairs published Norms and Standards for the Marking of Rhinoceros and Rhinoceros Horn, and for the Hunting of Rhinoceros for Trophy Hunting Purposes for implementation in September 2018 (Gazette No. 41913). The Minister also prohibited the carrying out of certain restricted activities involving rhinoceros horn, or part, product or derivative of such horn, belonging to the species black rhinoceros (*Diceros bicornis bicornis*, *Diceros bicornis minor*, *Diceros bicornis michaeli*) and white rhinoceros (*Ceratotherium simum simum*) through a notice for implementation on 3 June 2020 (*Gazette* No. 43386) and which was set to commence on 3 February 2023. The commencement notice was however withdrawn on 31 March 2023; thus, these regulatory measures have been published for implementation, but have not yet commenced. The following activities were prohibited 1) powdering of rhinoceros horn, 2) form or create slivers, chips of drill bits or any similar derivative from rhinoceros horn and 3) remove parts or layers from a rhinoceros horn.

The Norms and Standards for the Marking of Rhinoceros and Rhinoceros Horn and for the Hunting of Rhinoceros for Trophy Hunting Purposes require collection of a DNA sample at the time of dehorning for genetic profiling purposes (the main purpose of dehorning at present is to reduce the incentive to poach rhinoceros), as well as from live animals, including both horns, when rhinoceros are sold and translocated. A possession permit as well as a DNA certificate is issued to the owner of the rhinoceros horn and all DNA samples are stored on the RhODIS database to ensure traceability. Rhinoceros horns from all sources including organs of state and private owners must be registered and secured on rhinoceros horn databases with DNA samples submitted to the RhODIS lab. The RhODIS DNA database is operational, and profiling is undertaken for all rhinoceros management/poaching horn/animal samples.

As an indication of government's commitment to combat poaching at the highest level, South Africa's Cabinet adopted an integrated four-pronged approach to stop poaching (Department of Environmental Affairs 2014). The four elements of this approach are: (1) compulsory interventions to protect rhinoceros by implementing widespread and intensive anti-poaching programmes as well as creating particular zones of management using technology and intelligence, (2) game-changing interventions, targeted simultaneously at disrupting organised crime and creating opportunities for more equitable benefit-sharing of ecosystem services with all South Africans, (3) long-term sustainability interventions to explore the development of a legal and sustainable rhinoceros trade system and (4) biological management interventions that focus on strategic removals from areas of high poaching risk to create rhinoceros strongholds elsewhere (Ferreira *et al*., 2017).

Since 2010, the South African government has launched a variety of initiatives in collaboration with various stakeholders to address the poaching threat to rhinoceros and ensure the long-term conservation of the species (Fig.10). In 2014, in response to the ongoing increase in rhinoceros poaching, and in preparation for the 17th Conference of the Parties to CITES, the Minister of Environmental Affairs appointed a Committee of Inquiry (COI) to advise on the southern white rhinoceros and African elephant CITES trade proposals at the time. The scope of the advice sought included consideration of the implications of potential international trade in rhinoceros horn as assessed through different trade models. Through a process of stakeholder consultation, scenario planning, case study analysis, decision-tree and a SWOT analysis processes, the COI identified five key areas that require interventions that not only address poaching of rhinoceros in their natural habitat, but also are needed to address wildlife crime in general and to realise benefits associated with successful conservation. The COI identified four possible options based on different solutions to challenges of managing the demand for rhinoceros horn. Cabinet adopted Option 3 namely application of current policy, with no immediate intention to trade in rhinoceros horn, but maintaining the option to re-consider regulated legal international trade in rhinoceros horn when requirements are met, which recognises that commercial international trade in rhinoceros horn is not allowed under the CITES provisions at the time and that submitting a trade proposal to CITES should only be reconsidered once certain minimum requirements are met.

The Rhinoceros Conservation Lab in 2016 identified challenges and developed detailed action plans and budgets to implement the COI recommendations. The total budget required to implement the Lab's initiatives was estimated at approximately R473 million per year (R379 million for the South African Police initiatives and R94 million for all others). In 2017, a process to develop a rhinoceros research strategy was initiated. The Rhinoceros Research Strategy (DEA, 2019) identifies five key areas that require research interventions aligned with all the areas recognised through previous rhinoceros processes, such as the Integrated Strategic Approach for the Management of Rhinoceros in South Africa and the Rhino Conservation Lab. These focal areas include Enforcement; Community Empowerment; Demand Management; Responsive Legislation; and Biological Management/Management of Rhinoceros population. Additionally, three cross-cutting areas were identified: enabling mechanisms; unexpected or unintended risks associated with Protected Areas; and values and economics. Specific research themes were developed under each of these eight areas.

Since its approval, the Rhino Research Advisory Committee (Advisory Committee) was established by DFFE with a primary role of providing an interim evaluation of the achievement of the Rhinoceros Research Strategy at three (3) year intervals, including the establishment of a research fund, implementation of the Research Strategy and evaluating research outcomes. The Advisory Committee met only once and the decision was taken that they should consider the outcomes of the High-Level Panel (HLP) processes. The BMP requires that the effective implementation of the Rhinoceros Research Strategy should be considered. In 2023 a process to revise the BMPs for black and white rhino was initiated, and a draft BMP for black and white rhino combined (for implementation over the 2024-2034 period) was published for public comment in early 2024.

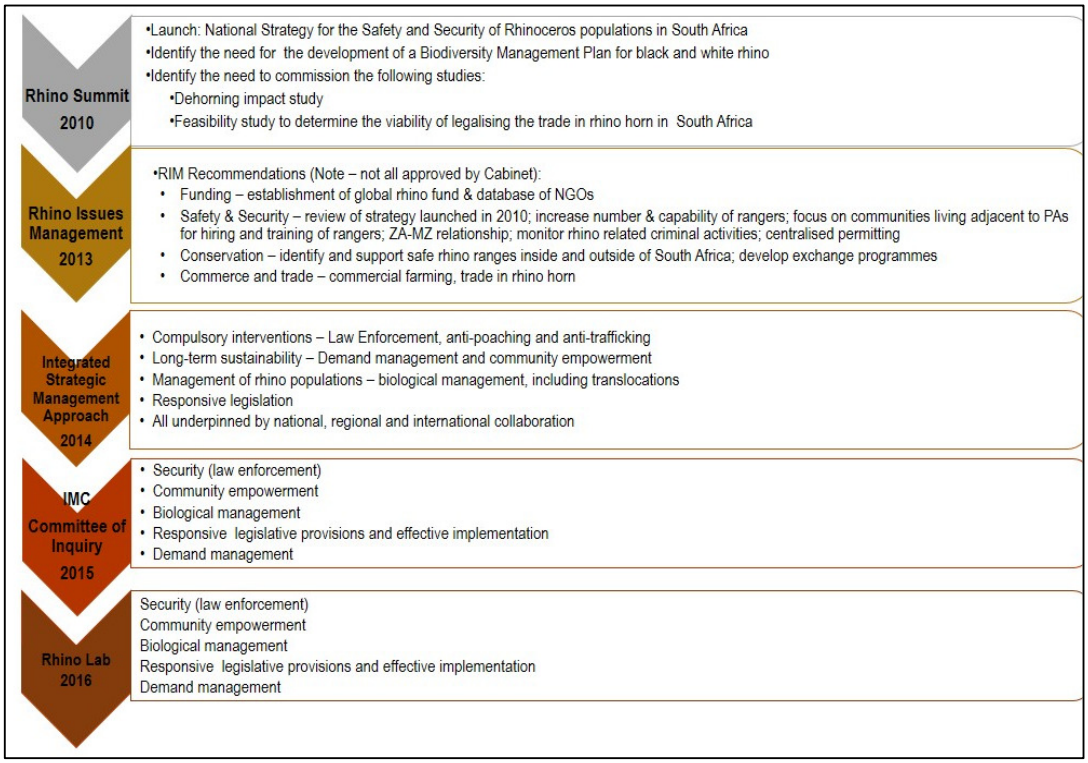

Figure 5: A flow diagram illustrating the timelines and main outcomes of initiatives taken by the South African government in collaboration with various stakeholders to address the poaching threat to rhinoceros and ensure the long-term conservation of the species (Source: presentation by T. Carroll (DEA), October 2017).

In March 2018, the Private Rhino Owners Association (PROA) launched Rhino Horn Trade Africa (RHTA), an initiative that aimed to facilitate the legal trade of rhinoceros horn via an online trade desk, and designed to provide a managed, efficient platform from which genuine buyers and sellers could trade in legal, humanely acquired rhinoceros horn. An online auction, however, was met with little interest. A recent private initiative, Rhinomics (https://Rhinomics.com/), aims to develop a legal rhinoceros horn trade that is regulated and traceable, and creates a self-sustaining finance mechanism for the long-term survival of rhinoceros, people and nature. A vault and software management system for all of South Africa's rhino horn, as well as a national network for logistics and storage have already been established under this private initiative.

A CITES CoP approved annual export quota for South Africa of five hunting trophies of adult male black rhinoceroses (Resolution Conf. 13.5 (Rev. CoP14)) has been in place since 2005. A total of 40 hunting trophies (approximately 0.2% per annum of the current national population and on average 75% of the annual export quota) have been exported from South Africa between 2005 and 2015. In 2019 South Africa submitted a request to the 18th Conference of the Parties to CITES to amend Resolution Conf. 13.5 (Rev. CoP14) on *Establishment of export quotas for black rhinoceros hunting trophies*. South Africa proposed a more scientifically based export quota of a total number of adult male black rhinoceroses not exceeding 0.5% of the total black rhinoceros population in South Africa in the year of export (equally applied to all three subspecies). Leader-Williams *et al*., (2005) recommend that a national quota should not exceed 1% of the national population of the relevant subspecies in the country. This cautious or conservative adjustment in the export quota was established to enable the following conservation outcomes: 1) continued expansion of the species' range in South Africa through incentivizing the keeping and protection of viable populations of black rhinoceroses; 2) maintenance of productive population growth rates through the effective management of surplus males and 3) full implementation of approved population management plans with the aim to promote sustainability and resilience in the national meta-population. The strict approval criteria and approval process as stipulated in the black rhinoceros BMP will ensure continued sustainable management of black rhinoceros trophy hunting. South Africa's proposal was

adopted by the Parties and the resolution revised accordingly (Conf. 13.5 (Rev. CoP18)). Due to court action from the Humane Society International (Humane Society International - Africa Trust and Others v Min of Forestry, Fisheries and the Environment and Another (6939/22) [2024] ZAWCHC (Unreported) (26 January 2024)), as well as drawn out public consultation processes, South Africa has been unable to implement the export quota and realize the anticipated conservation benefits.

The White Paper on the Conservation and the Sustainable Use of South Africa's Biodiversity was approved by Cabinet on 29 March 2023, and published in the Government Gazette (No. 48785) for implementation on 14 June 2023. The White Paper provides a foundation for conservation and sustainable use in South Africa in terms of four goals, namely: 1) Enhanced Biodiversity Conservation (All biological diversity and its components conserved); 2) Sustainable Use (The sustainable use of biodiversity enhances thriving living land- and seascapes and ecosystems, livelihoods, and human well-being, while a duty of care avoids, minimises, or remedies adverse impacts on biodiversity); 3) Equitable Access and Benefit Sharing (Benefits are derived and shared from the use and development of South Africa's genetic and biological resources, without compromising the national interests); and 4) Transformed Biodiversity Conservation and Sustainable Use (Effect is given to the environmental right as contained in Section 24 of the Constitution which facilitates redress, and promotes transformation). The White Paper sets out the vision: "An inclusive, transformed society living in harmony with nature, where biodiversity conservation and sustainable use ensure healthy ecosystems, with improved benefits that are fairly and equitably shared for present and future generations", with a mission: "To conserve and manage South Africa's biodiversity, and ensure healthy ecosystems, ecological integrity and connectivity, with transformative socio-economic benefits to society for current and future generations through ecologically sustainable, and socially equitable use of what people value from nature." Existing legislation, including the National Environmental Management Biodiversity Act (NEM: BA), National Environmental Protected Areas Act (NEM: PAA), and the Threatened or Protected Species Regulations (ToPS), amongst others, will be reviewed for alignment with the White Paper; as will biodiversity policies, strategies, plans, and guidelines. The White Paper places a duty of care on people to ensure that activities, methods and actions aimed at conservation and sustainable use of biodiversity are humane and ensure quality of life within the environment. Although the White Paper does not have direct implications for rhinoceros management, it broadly requires the incorporation of ethical practices and standards into the management and use of wildlife in South Africa, and further requires that threats to biodiversity, such as over-exploitation, be avoided or minimised, and mitigated.

The Policy Position on the Conservation and Sustainable Use of Elephant, Lion, Leopard and Rhinoceros, an outcome of the recommendations emanating from the High-Level Panel of experts for the review of policies, legislation and practices on matters of elephant, lion, leopard and rhinoceros management, breeding, hunting, trade and handling, was published for implementation on 24 April 2024. The Policy Position draws from the rhinoceros COI findings and the White Paper. The Policy Position contains three objectives pertinent to rhinoceros, largely white rhinoceros, including 1) phasing out the intensive management and captive breeding operations of rhinoceros for commercial purposes and enhance wild populations, 2) promoting live export of specimens of the five species (including rhinoceros) to range states or any appropriate and acceptable destinations with suitable habitats on the African continent and 3) South Africa working with range states and potential destination countries to support a proposal for international commercial trade in rhinoceros horn from protected wild rhinoceros, for conservation purposes, when conditions become favourable. Conditions to be met were established by the COI and are indicators of the five pillars; namely security (law enforcement); community empowerment; biological management; responsive legislative provisions and effective implementation, and demand management.

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**	**1**
	Approved national/state/provincial management plan(s)	2
	Approved local management plan	3
	No approved plan: informal unplanned management	4
	Uncertain	5

In January 2013 a Biodiversity Management Plan (BMP) for the Black Rhinoceros (*Diceros bicornis*) was gazetted for implementation (Government Gazette vol. 571 no. 36096) in terms of section 43 of NEMBA. This plan, which was developed by the SADC Rhino Management Group, is informed by the National Strategy for the Safety and Security of Rhino Populations in South Africa (DEA 2011) as well as the Rhinoceros Issues Management Report (DEA 2013) and was formulated for greater coordination between existing and future plans. The plan aimed for a South African black rhinoceros population growth rate of at least 5% per annum, with 2,800 south-central (*D. b. minor*) and 260 south-western black rhinoceros (*D. b. bicornis*) by the end of 2020. In addition, the BMP recommends an annual minimum offtake of 5% from established populations that are showing a zero growth rate due to high rhino densities. Harvesting is deemed beneficial to the species, because it maintains or enhances population vigour in the harvested population whilst also promoting overall meta-population growth through the establishment of new populations. The management of black rhinoceros populations, notably smaller ones, may result in the demographic skewing of the population sex ratio in favour of males. This can have a negative impact on the population's breeding performance and genetic status. The BMP suggests that these surplus males should either be translocated to establish male-only groups or be hunted. An RMG working group developed a set of assessment criteria to ensure that only hunts of benefit to population demographics and/or genetics be approved (see Knight *et al*., 2012) and these criteria are attached to the BMP (see

Appendix 4). A revised BMP for both black and white rhinoceros in South Africa, to be implemented over 2024-2034, aims to build on the outcomes of the previous version. The revised BMP will seek to progressively advance previous initiatives, in particular those of the COI which was operationalised through the Rhino Lab (Fig. 5). Whilst the number of rhinoceros poached has declined, new hotspots of poaching are developing, and this poses a risk to the viability of rhinoceros populations and fragmentation in management practices. Furthermore, many of the citizens in South Africa have been and continue to be excluded from participating in rhinoceros conservation and sustainable use, and the revised BMP will seek to address this and thereby contribute to the transformation (defined in the White Paper as the redress of discrimination and unfair disadvantage of previously disadvantaged individuals and communities through the promotion of inclusivity, empowerment, dignity, respect, ownership, and the equitable sharing of benefits) of the biodiversity sector.

In KZN, black rhinoceroses on state and private land are managed strictly according to the KZN Black Rhino Management Strategy (Cooke and Goodman, 2022), and a status reporting framework currently supports live harvest management for the species. Private properties in KZN and the Eastern Cape that form part of the BRREP are managed in accordance with site specific management plans, while in most provinces, all private properties with black rhinoceroses have management plans. ECPTA manages the black rhinoceros population in the Eastern Cape in accordance with the national BMP, and 15% of animals have been removed every 3rd year since 2011 to stimulate population growth and provide founder animals for range expansion.

A Regional Rhinoceros Conservation Strategy for both black and white rhinoceros was adopted by SADC in 2005. The strategy sets out a long-term goal of maintaining "Southern African rhinoceros … as flagship species for biodiversity conservation and wildlife-based economic development, within viable and well distributed populations" (Janssens & Trouwborst 2018). In addition to this the African Rhinoceros Conservation Plan (2016) was formulated and endorsed by most African rhinoceros range states, including South Africa (https://www.dffe.gov.za/sites/default/files/docs/african_rhinoconservation_plan.pdf).

13. Aim of harvest regime in management planning: What is harvest aiming to achieve?	**Generate conservation benefit**	**1**
	Population management/control	2
	Maximize economic yield	3
	Opportunistic, unselective harvest, or none	4
	Uncertain	5

The black rhinoceros population in South Africa is subjected to several types of legal offtake, including management removals of animals for ecological or biodiversity reasons, offtakes of live animals for revenue generation on sales, and trophy hunting. Most of these offtakes (excluding international exports of live animals and trophy hunts) do not result in the permanent removal of animals from the national population. Offtakes enhance conservation through enabling effective ecological management, ensuring rapid growth in numbers and expansion of the species' range, and generating conservation revenue. In some instances, there may be a financial transaction involved and there are periodic international exports to other African Range States of live animals for the purposes of establishing new populations.

A total of 108 live black rhinoceroses were exported from South Africa between 2010 and 2022; this constituted more than 60% of the total exports of the species from South Africa during this time period (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). Live animals were exported primarily for re-introduction purposes (105 out of the 108 live exports). To date, South Africa has donated and sold founder black rhinoceroses to Botswana, Chad, Eswatini, Malawi, Mozambique, Rwanda, Tanzania, Zambia, and Zimbabwe (Emslie & Adcock, 2016; CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK) . Translocations within the national population are not considered as harvest from the national population.

Trophy hunting removed on average less than 0.2% per annum of the national population during the period 2010 to 2018 (no black rhinoceros have been trophy hunted since 2019) (Fig. 6). Trophy hunting removed 0.28% and 0.27% of the national population in 2012 and 2014 respectively (Fig. 6). A SADC RMG survey indicated that the private sector does not keep black rhinoceros for purely financial purposes. Nevertheless, legal hunting of black rhinoceros is primarily economically motivated but does provide significant positive conservation outcomes (demographic, genetic and security (income generated through trophy hunting contribute to security measures to protect rhinoceros)). Sustainable hunting generates a conservation benefit through incentivizing the private sector to keep rhinoceroses and to purchase land to stock rhinoceroses. Trophy hunting removes surplus adult males, whilst generating important revenue for private and state conservation. Poaching in contrast removes a wider range of ages and sexes and is therefore likely to have a negative impact on rhinoceros population growth rates. It has been demonstrated that trophy hunting can be sustainably managed in South Africa (see Figs 4 & 6) (Cooney *et al*., 2017; Emslie, *et al*., 2016). According to the DFFE Professional Hunter's Register, approximately 31 black rhinoceros males were hunted between 2010 and 2019 (Fig. 6). Since 2019 no black rhinoceros has been hunted in South Africa due to ongoing court procedures (Humane Society International - Africa Trust and Others v Min of Forestry, Fisheries and the Environment and Another (6939/22) [2024] ZAWCHC (Unreported) (26 January 2024). According to the CITES Trade Database, 39 black rhinoceros trophies were exported over the same time period (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). The main destination countries for the export of rhinoceros horn as part of a hunting trophy included Malaysia (24%), Australia (18%), Canada (18%), and Denmark (18%). The main destination countries for the export of hunting trophies included Mexico (18%), Malaysia (10%), Hungary (10%) United Arab Emirates (8%), Denmark (8%), France (8%), and Romania (8%). The discrepancy between the PH

Register and the CITES trade database is likely due to the time delay between the actual hunt and the export of the trophy. The PH Register reports the year of the actual hunt, while the CITES trade database reports the year of export.

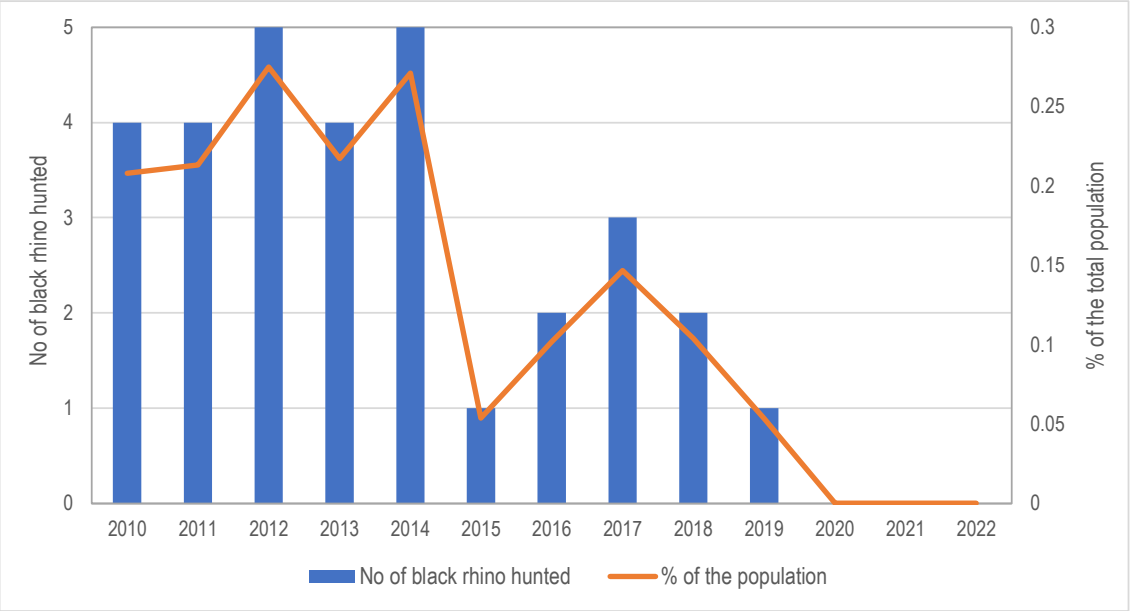

Figure 6: Number of black rhinoceros hunted and the percentage of the estimated population hunted from 2010 to 2022 (DFFE Professional Hunter's Register). Leader-Williams *et al*., (2005) suggested that a national quota of ≤1% of the national population of the relevant subspecies is sustainable.

14. Quotas: Is the harvest based on a system of quotas?	Ongoing national quota: based on biologically derived local quotas	1
	Ongoing quotas: "cautious" national or local	2
	Untried quota: recent and based on biologically derived local quotas	**3**
	Market-driven quota(s), arbitrary quota(s), or no quotas	4
	Uncertain	5

In 2019, the 18th Conference of the Parties to CITES approved a revision in the black rhinoceros hunting trophy export quota. In accordance with CITES Resolution Conf. 13.5 (Rev. CoP18) South Africa may now export a total number of hunting trophies of adult male black rhinoceros not exceeding 0.5% of the current total black rhinoceros populations in South Africa in the year of the export (equally applied to all three subspecies i.e. 0.5% of the total population of each of the three subspecies). In addition, South Africa should inform the CITES Secretariat of their export quota for black rhinoceros at least 30 days before the start of the period to which the export quota relates in order for this information to be published on the CITES website. This is an adaptive management approach, consistent with the precautionary principle (Trouwborst, 2009). A set of strict criteria have been established to ensure that only specific males are hunted to enhance demographic or genetic conservation (see Knight *et al*., 2012). Due to a legal challenge by Humane Society International (Humane Society International - Africa Trust and Others v Min of Forestry, Fisheries and the Environment and Another (6939/22) [2024] ZAWCHC (Unreported) (26 January 2024), South Africa has been unable to implement the export quota and realize the anticipated conservation benefits.

There is currently no quota for the export of live animals. Exports of live rhinoceros are driven by conservation objectives in line with the longer term vision encapsulated in South Africa's black rhino BMP (facilitating range expansion and managing black rhinoceroses both within South Africa and regionally, as part of an expanding meta-population). The international live export of black rhinoceros to help found or boost wild populations in other African rhinoceros countries is also in line with the African Rhino Range States' African Rhino Conservation Plan. This calls for countries "to cooperatively manage and expand rhinoceros populations across the African landscape".

There is currently no quota for the export of rhinoceros horn for non-commercial purposes.

Control of harvest		
	High	1

15. Harvesting in Protected Areas: What percentage of the legal national harvest occurs in State-controlled Protected Areas?	**Medium**	**2**
	Low	3
	None	4
	Uncertain	5

From January 2012 to December 2014, annual translocations of black rhinoceroses averaged 2.7% of the national herd across state and private protected areas, with about 58% of those removals originating out of national or provincial protected areas (Adcock, 2016). However, translocations within the national population are not construed as harvest as these animals are not permanently removed. Individuals that are translocated from established populations that are approaching or exceed ecological carrying capacity are routinely being introduced into new areas with suitable habitat and adequate protection, where populations can grow rapidly. Biological management has played a significant role in the expansion of the range and numbers of black rhinoceros. Between 2011 and 2015, SANParks moved three south-western black rhinoceroses (*D. b. bicornis*) between four National Parks, placed five under custodianship and introduced an additional seven individuals from privately-owned populations into National Parks (Ferreira *et al*., 2017).

On average less than three black rhinoceroses are legally hunted annually between 2010 and 2023 (on average 0.12% per annum of the current national population) (Fig. 6). Of these almost all were hunted on private properties, thus providing an incentive to the private sector to conserve black rhinoceros.

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	1
	Medium	**2**
	Low	3
	None	4
	Uncertain	5

Forty-two percent of live removals and over 90% of trophy hunts take place on private land where there is strong local control over resource use. On average three black rhinoceroses have been hunted annually over the past 11 years, which is 0.12% per annum of the current national population. Since 2019, no black rhinoceros has been hunted in South Africa due to a legal challenge of the quota setting process (Humane Society International - Africa Trust and Others v Min of Forestry, Fisheries and the Environment and Another (6939/22) [2024] ZAWCHC (Unreported) (26 January 2024).

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**	**1**
	Low	2
	Medium	3
	High	4
	Uncertain	5

There are no open access areas for black rhinoceros in South Africa. All harvest of black rhinoceros are strictly regulated and controlled, whether on state, private or communal land.

18. Confidence in harvest management: Do budgetary and other factors allow effective implementation of management plan(s) and harvest controls?	**High confidence**	**1**
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5

A suite of decision-making mechanisms and a robust permitting system are currently in place to manage and monitor harvest of live animals and also rhino horn. In accordance with the amended Norms and Standards for the Marking of Rhinoceros and Rhinoceros Horn and for the Hunting of Rhinoceros for Trophy Hunting Purposes (Government Gazette No. 41913; September 2018), all rhinoceros hunts are attended by conservation officials. All dehorning activities (though limited for black rhinoceros) are also attended by conservation officials and rhinoceros horn stockpiles are regularly audited. In addition, animals are carefully selected for trophy hunting based upon a set of strict criteria (see Knight *et al*., 2012). Within the Eastern Cape, the BRREP program has been instrumental in facilitating the effective implementation of the black rhinoceros BMP. At present North West Parks and Tourism Board do not have sufficient resources and budget to implement the black rhinoceros BMP. Offtakes of rhinoceros in this province are however negligible.

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**	**1**
	Quantitative indices	2
	Qualitative indices	3
	National monitoring of exports	4

	No monitoring or uncertain	5

The size of many black rhinoceros populations, which are monitored using individual identification methods, is known exactly or to within a few individuals. In KNP, where black rhinoceros numbers are monitored using intensive helicopter block counts (and which then have wider confidence levels) (Ferreira, et al., 2017), individual identification methods are beginning to form part of the overall black rhinoceros monitoring as well.

Stringent policy and regulatory mechanisms require direct population estimates for any restricted activity. Monitoring data on the annual offtakes per property are generated through the permitting system. Thus offtakes are managed on a local scale by the national and provincial Management Authorities.

The annual hunting trophy quota of 0.5% per subspecies is calculated using direct population estimates for each subspecies.

The amended Norms and Standards for the Marking of Rhinoceros and Rhinoceros Horn and for the Hunting of Rhinoceros for Trophy Hunting Purposes (Government Gazette No. 41913; September 2018) require that all hunts are monitored by conservation officials. In addition, all dehorning activities are monitored by conservation officials and rhinoceros horn stockpiles are regularly audited. It has been reliably established that stockpiles of rhino horn in South Africa (predominantly from the white rhino) amount to around 65 tons (with 25 tons in private ownership).

20. Confidence in harvest monitoring: Do budgetary and other factors allow effective harvest monitoring?	**High confidence**	**1**
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5

Even though there has been a decline in the quality of monitoring information captured in recent years in some reserves due to the redeployment of rangers to anti-poaching activities as well as some concerns around adequate budgets to conduct regular counts and implement intensive monitoring on the ground, very good population estimates exist. There is a high confidence in the monitoring of the rates of harvest (both illegal and legal) of black rhinoceros in state protected areas, which constitute approximately 70% of the national herd. Detection rates of carcasses are well over 90%. KNP has achieved an approximate 80% detection rate for rhinoceros carcasses. The sizes of many black rhinoceros populations, which are monitored using individual identification methods, are also known exactly or to within a few individuals. Both Ezemvelo KZN Wildlife and ECPTA claim a less than 5% error around rhinoceros population estimates and a 100% confidence in the monitoring of legal offtake in the respective provinces of KZN and the Eastern Cape. In addition, most of the privately owned rhinoceros in the Eastern Cape are now fitted with the Rouxcell collars which use AI to detect and report abnormal behaviour. Rhinoceroses are individually known in smaller properties where there is also a high degree of confidence in carcass detection rates.

The amended Norms and Standards for the Marking of Rhinoceros and Rhinoceros Horn and for the Hunting of Rhinoceros for Trophy Hunting Purposes require that all rhinoceros hunts and dehornings are attended by conservation officials. Provincial conservation agencies indicate that these legal requirements are being complied with in full. Reporting of rhinoceros horn stockpiles within the private sector continues to improve in part due to improved declaration and reporting. It has been reliably established that stockpiles of rhino horn in South Africa (predominantly from the white rhino) amount to around 65 tons (with 25 tons in private ownership).

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**	**1**
	Neutral	2
	Harmful	3
	Highly negative	4
	Uncertain	5

Legal hunting of black rhinoceros has been beneficial as it generates much needed funding for expensive conservation related activities. The removal of excess animals maintains productive population growth rates while also reducing browse pressure on the habitat, thereby helping to maintain the ecological integrity of the landscape.

Since the 1990s, in order to maintain high breeding rates, national and provincial conservation agencies have sold excess black rhinoceros to private landowners. This not only generates revenue for state conservation agencies, but also increases rhinoceros numbers and expands the black rhinoceros range within South Africa through the establishment of new populations. From 2004, the Black Rhinoceros Range Expansion Project (BRREP), which is managed by WWF in partnership with EKZN Wildlife and more recently the ECPTA, has helped create several new large conservation areas for black rhinoceros. Founder groups of rhinoceroses are translocated from KZN and Eastern Cape provincial reserves to private and communal land where they are managed on a custodianship basis, but progeny are shared between the provincial donor and the site owners. These management translocations are making a significant contribution to the

recovery of the species. Because of the BRREP, EKZN Wildlife are no longer selling black rhinoceroses, but contribute all excess individuals to this range expansion program. Thus, there is no longer an economic benefit for the provincial conservation agency. The ECPTA have sold black rhinoceroses to private reserves since 2017 and continues to contribute excess black rhinoceroses to BRREP. In 2017, ECPTA sold six black rhinoceroses to private reserves. This is an important source of income for the ECPTA.

There is currently no benefit derived from the sale of rhinoceros horn, which are maintained in stockpiles totalling 65 tons in all (inclusive of horn derived from both white and black rhinoceros).

Due to the significant economic benefits of hunting to game farmers, together with live sales and ecotourism, the private sector has increasingly stocked these animals. This has contributed to the expansion of the species' range and has maintained a rapid growth of the national population. However, the increase in poaching is starting to limit this positive impact as private sector interest in buying and keeping rhinoceroses continues to decline due to the rising costs of security. In addition, the current prohibition on the commercial international trade in rhinoceros horn can be viewed as a missed opportunity for beneficiation associated with owning and protecting rhinoceroses. Recent attempts to ban trophy hunting of black rhinoceros and other charismatic species, and increased restrictions on trophy imports to some countries, are likely to undermine South Africa's successful conservation model. There is already a perception among many South Africans that rhinoceros have limited value due to a lack of access to rhino-related benefits. Increased restrictions are likely to further reduce the value of rhinoceros for many stakeholders.

22. Incentives for species conservation: At the national level, how much conservation benefit to this species accrues from harvesting?		
	High	1
	Medium	2
	Low	**3**
	None	4
	Uncertain	5

Approximately 21.1% (434 of South Africa's 2,056 black rhinos) of the black rhino population in South Africa is privately owned (Ferreira *et al*., 2022), with another 5.8% (119 animals) under custodian and community ownership (Ferreira *et al*., 2022). Private and communal black rhinoceros owners are thus important stakeholders in black rhinoceros conservation and incentives are required to increase conservation friendly management and limit management activities that diminish the conservation status of the national herd. Black rhinoceros is not considered a highly viewable tourism animal. The sale of live black rhinoceros is currently limited and excess animals are donated towards range expansion. The export of live specimens for reintroduction purposes does however benefit regional and global conservation of the species.

Since the 1990s, national and provincial conservation agencies have sold excess black rhinoceros to private landowners in order to maintain high breeding rates, thereby generating conservation revenue and increasing rhinoceros numbers through the establishment of new populations and the expansion of black rhinoceros range within South Africa. From 2004, the Black Rhinoceros Range Expansion Project (BRREP), which is managed by WWF in partnership with EKZN Wildlife and more recently the ECPTA, has helped create several new large conservation areas for black rhinoceros. Founder groups of rhinoceroses are translocated from KZN and Eastern Cape provincial reserves to private and communal land where they are managed on a custodianship basis. These management translocations are making a significant contribution to the recovery of the species. Progeny are shared equally between the provincial donor and the custodian landowners, thereby creating some incentive for the keeping of black rhino. The majority of landowners participating in the BRREP program are motivated by a desire to contribute to the conservation of the species, but they also gain marketing benefits and are better able to raise funds. EKZN Wildlife no longer sell black rhinoceroses but contribute all excess individuals to BRREP, whereas ECPTA continue to sell black rhinoceroses to private reserves in addition to contributing excess animals to BRREP. In 2017, ECPTA sold six black rhinoceroses to private reserves, an important source of income for this conservation agency.

Due to the limited number of hunting trophies exported and the recent cessation of the trophy hunting of black rhinoceros due to a legal challenge (Humane Society International - Africa Trust and Others v Min. of Forestry, Fisheries and the Environment and Another (6939/22) [2024] ZAWCHC (Unreported) (26 January 2024), the current overall species conservation benefit associated with legal harvest is low. The trophy hunting that has taken place has nevertheless positively impacted on the population through incentivizing landowners to stock the species.

Poaching hampers several conservation objectives (Ferreira, Botha & Emmett, 2012). Population restoration opportunities as well revenue generating opportunities to enhance protected areas are lost when animals are poached. Rhinoceros horn profits are currently reaped largely by poachers and criminal traders on the black market, rather than by local communities or the public administrators or private owners of land hosting rhinoceroses all of whom currently bear the prohibitive financial and security costs of protecting and conserving rhinoceros (Rubino & Pienaar, 2017). At present, some private owners are selling their rhinoceros due to the prohibitive financial and security pressures resulting from the poaching, while others are moving their animals to neighbouring countries (Emslie *et al*., 2016; Knight, 2016; Rubino & Pienaar, 2017).

It has been suggested that a legal trade in rhinoceros horn would attract buyers away from the illegal market and provide much needed additional income to bolster security by investing a percentage of the revenue obtained from trade back into conservation (Biggs *et al*., 2013; Di Minin *et al*., 2015). However, horn from black rhinoceros would contribute a small amount to the total mass of horn produced per year due to the smaller size of the horn as well as the difficulties of regularly dehorning black rhinoceros. Approximately 120 kg (67-166 kg for the period 2012-2016, assuming an average horn weight of 2.68 kg per horn set) of horn from black rhinoceroses is lost to poachers per year based on population and poaching data until 2015 (Taylor, *et al*., 2017).

Several initiatives to find new funding streams for rhinoceros conservation and to increase incentives for the keeping and management of rhinoceros have been developed. However, none of these have had broad positive impacts on rhinoceros conservation to date. In March 2018, the Private Rhino Owners Association (PROA) launched Rhino Horn Trade Africa (RHTA), an initiative that aimed to facilitate the legal trade of rhinoceros horn via an online trade desk, and designed to provide a managed, efficient platform from which genuine buyers and sellers could trade in legal, humanely acquired rhinoceros horn. An online auction, however, was met with little interest. A recent private initiative, Rhinomics (https://Rhinomics.com/), aims to develop a legal rhinoceros horn trade that is regulated and traceable, and creates a self-sustaining finance mechanism for the long-term survival of rhinoceros, people and nature. A vault and software management system for all of South Africa's rhino horn, as well as a national network for logistics and storage have already been established under this private initiative. Section 37C (1) of the Income Tax Act No. 58 of 1962 (ITA) also provides for tax incentives through biodiversity management agreements that aim to unlock much needed sustainable finance for the conservation management of important species subject to BMPs such as rhinoceros and lions. This tax incentive has recently been developed and currently tested on several reserves that volunteered to be part of the process. The Wildlife Conservation Bond, also known as the Rhino Bond, includes a conservation success payment made by Global Environment Facility (GEF) to stakeholders, dependent on verified increases in rhinoceros numbers. It is the world's first financial instrument dedicated to protecting a species (https://www.greenfinanceinstitute.com/gfihive/case-studies/the-wildlife-conservation-bond-the-Rhinocerosceros-bond/) but is currently benefitting only two black rhinoceros populations in South Africa.

23. Incentives for habitat conservation: At the national level, how much habitat conservation benefit is derived from harvesting?		
	High	1
	Medium	2
	Low	3
	None	**4**
	Uncertain	5

Due to the very low number of black rhinoceros legally hunted per annum, and the recent cessation in trophy hunting due to a legal challenge (Humane Society International - Africa Trust and Others v Min of Forestry, Fisheries and the Environment and Another (6939/22) [2024] ZAWCHC (Unreported) (26 January 2024), there is currently no benefit derived for black rhinoceros habitat conservation through trophy hunting. Although landowner perceptions and commitment to black rhinoceros conservation remain strong, a few sites have disinvested in keeping black rhinoceros in the face of a 10-fold increase in poaching. The current model used for black rhinoceros conservation is quite prescriptive. There are very strict criteria (relating to fencing, security and habitat conditions) for the keeping of black rhinoceros. While some private black rhinoceros owners may therefore donate excess black rhinoceroses to the expansion program, no additional habitat is acquired through live sales.

Private game farms and reserves contribute significantly to the conservation estate in South Africa. It is estimated that the private game industry manages about 30% of the national black rhinoceros herd. Between 2003 and 2023, BRREP added 2,800 km^2 of habitat nationally and 252 individual black rhinoceros founders were translocated to new reserves (pers. comms. Dr J Flamand, Wildlife veterinarian WWF SA). ECPTA added approximately 15,000 ha and 20,000 ha of black rhino habitat in November 2023 and April 2024 respectively. Black rhino custodianship has been developed to incentivize the proclamation of protected areas and the creation of larger areas (through the removal of fences), as well as to support transformation in the sector.

Finding properties of a sufficient size (usually greater than 200 km^2 that have the capacity to host rhinoceros populations with a growth potential to become Key rated populations of over 50 black rhinoceroses) for BRREP is challenging. For this reason, areas outside of the country are now being considered for possible reintroduction of black rhinoceros within the species' former range. In other cases, while habitat may be available, there is insufficient infrastructure and resourcing to effectively protect the species, therefore rendering such areas unsuitable recipients of black rhinoceroses. Several South African national parks, such as Augrabies, Cambedoo, Kalahari, Karoo, Namaqua, Richtersveld, and Tankwa National Parks, as well as several ECPTA properties, may provide suitable habitat within the historical distribution of the south-western black rhinoceros (*D. b. bicornis*)(Skead 1980) but currently do not have adequate security measures in place or do not have adequate fencing. Finding potential animals for translocation is also being constrained by poaching pressure, and more recently, constraints on moving animals to prevent the spread of diseases from potential donor parks such as KNP have arisen.

Density-dependent social constraints of black rhinoceroses require interventions such as translocations. Translocations within the national population are however not considered as harvest from the national population as they do not result in the permanent removal of animals.

There is a potential for rhinoceros horn sales to increase incentives for the keeping of black rhinoceros and thus to promote increased habitat conservation.

Protection from harvest

24. Proportion strictly protected: What percentage of the species' natural range or population is legally excluded from harvest?	**>15%**	**1**
	5-15%	2
	<5%	3
	None	4
	Uncertain	5

For the purposes of this NDF, strict protection is considered to be provided by state-owned protected areas managed by provincial or national conservation agencies where legal hunting is negligible. Sixty nine percent of the national population (70%) is conserved within state protected areas (1,440 individuals). National parks, which are under the management of South African National Parks (SANParks), protect 31% of the country's black rhinoceroses.

The CITES Appendix I listing, which in effect translates into a prohibition on the international trade in rhinoceros horn for commercial purposes, and that has been in existence since 1977, is widely considered to be a mechanism affording strict protection to the species.

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	1
	Medium confidence	2
	Low confidence	**3**
	No confidence	4
	Uncertain	5

There is a low confidence in the long-term effectiveness of South Africa's state protected area system to protect the black rhinoceros. Poaching has occurred in most state-owned protected areas, and some protected areas are struggling to combat these illegal activities. For the KNP, this is primarily due to the long permeable border with Mozambique, and that country's inadequate legal and wildlife protection systems. Mozambique's legislation was however amended in May 2017 to criminalize wildlife poaching and trafficking thereby facilitating cross border cooperation. Budgets and resources are also constrained and the strong emphasis on rhinoceros protection detracts from other important conservation issues as funding and resources are redeployed to rhinoceros protection and management. In KZN, black rhinoceroses have been removed from three state reserves, because they cannot be adequately protected there.

The international ban on the commercial trade in rhinoceros horn, in place now for more than 40 years (Emslie, 2012), has apparently also failed to effectively provide adequate protection to the species over the last decade, despite the numerous anti-poaching measures implemented in South Africa (Emslie, 2013; Emslie *et al*., 2013; Knight, 2016; Rademeyer, 2016; Di Minin *et al*., 2022) and demand reduction campaigns by NGOs. It does appear from the latest poaching figures that the number of rhinoceros poached per annum is on the decline, though while the number of rhinoceros poached in KNP has decreased, there is evidence that poaching has increased in other hotspots, particularly in northern KwaZulu-Natal. Poaching in KwaZulu-Natal increased from approximately 102 rhinoceros in 2021 to 325 in 2023 (this includes both black and white rhinoceros. Current measures importantly fail to address the cause of the escalating poaching levels (high demand and high prices, i.e. the low supply to demand ratio, coupled with poverty and unemployment in rural communities). Since trade restrictions and demand reduction campaigns inhibit the potential for local people, who bear the cost of living alongside biodiversity, to benefit directly from nature conservation (Cooney *et al*., 2017), the CITES prohibition on rhino horn trade is inappropriate for a developing country with impoverished rural communities such as South Africa. Furthermore, Chen (2016) suggests that demand for rarity weakens the impact of anti-poaching policies. The reduction in the amount of poaching that can be achieved using supply-side anti-poaching policies may not be large when people are willing to pay more for rare wildlife goods (Chen, 2016), and rarity in fact increases demand (Hausmann *et al*., 2023).

Socioeconomic drivers of illegal wildlife trade influential at the local scale are rarely accounted for in multinational agreements aimed at curtailing international trade in threatened species (Liew *et al*., 2021). Poverty, and especially economic inequality in source countries such as South Africa, are central drivers of rhinoceros poaching. Local South African and Mozambican men are contracted by crime syndicates to poach rhinoceros (Lunstrum, 2021). These poachers usually receive 1000 to 9000 US$ per kg of horn (significant for people who are struggling economically), while end users pay an estimated 65 000 US$ per kg (Hübschle, 2016). Ground-level poachers are generally poor, and they rarely have access to job opportunities that provide comparable earnings (Lunstrum, 2014); understandably there are always local people willing to poach (Rubino & Pienaar, 2017). Poverty is a multifaceted problem encompassing more than just a lack of alternative economic opportunities, such as lack of power, prestige, voice and an inability to shape one's future (Duffy *et al*., 2014; Lunstrum, 2021). As such, poaching rhinoceros might not only be driven by the need for an income, but could also be a means of seeking and affirming identity, status, lifeways, custom, and local prestige (Duffy *et al*., 2016). Haas and Ferreira (2016) therefore suggest that a transnational policing effort aimed at dismantling criminal networks involved in rhinoceros horn trafficking, coupled with increases in legal economic opportunities for people living adjacent to protected areas, is required. Providing legal job opportunities for especially young

men in rural communities would further improve the protection of rhinoceros and reduce the poaching risk (Jewkes *et al*., 2012; Haas & Ferreira, 2017).

There is a concern that the current protection measures are financially unsustainable. Based on a recommended one ranger per 10 km^2 (at a cost of approximately R50,218 per km^2 (2015 costs)) for protected areas <100,000 ha, and a recommended one ranger per 15 – 30 km^2 (at a cost of approximately R16 739 – R33 479 per km^2 (2015 costs)) for protected areas >100,000 ha (Conway, Ezemvelo KZN Wildlife, pers. comm.), between R0.87 billion and R1.29 billon per annum would have been required in 2015 to secure rhinoceros in the state owned protected area system (due to inflation, this estimate would be higher today). To fulfil their stated objective of "Sustainable rhinoceros populations monitored and increased", SANParks spent R25.6 million (US$1.7 million) or R8,600 per rhinoceros (US$520 per rhinoceros) in 2020 (SANParks 2021). This is markedly less than the average spent by private properties on rhinoceros security of R28,600 per rhinoceros (US$2,200 per rhinoceros) in 2017 (Clements *et al*., 2020), highlighting the funding challenges for state-owned protected areas (Lindsey *et al*., 2021) and possibly a reason for the lower poaching rates on private land. It is also possible that the large size of KNP (20,000 km^2) makes rhinoceros security more challenging than in much smaller areas (Clements *et al*., 2020; Ferreira & Dziba, 2021). Between 2009 and 2017, private game farms and reserves have spent collectively approximately R2 billion on the management and specifically the protection of rhinoceros. In addition, the annual costs of rhinoceros security increased from approximately R1.5 million (US$116,000) per property on average in 2017 to R2.2 million (US$152,000) per property in 2021 (Jones, pers. comm. as quoted by Clements *et al*., 2023).

A large portion of the rhinoceros security and enforcement budgets in provincial state-owned reserves are funded by international donors, and are thus at risk of donor fatigue, while the majority of private reserves have to fund their own security measures (Rubino & Pienaar, 2017). It is unlikely that the current investment in the protection of rhinoceros from current sources (government and donors) can be sustained in the long term and it is important that alternative sources of revenue be explored. Income derived from the sale of rhinoceros horn could assist both government and the private sector to continue funding the current investment in rhinoceros protection. Di Minin *et al*., (2015) argue that there is a certain economic value that could be derived from rhinoceros horn that could be allocated to the protection of the species.

Behaviour change approaches, from environmental education to social marketing, have been widely advocated by academics, practitioners, and policy makers to reduce consumer's desire for, and purchase of rhino horn (Olmedo, Sharif & Milner-Gulland, 2017; Thomas-Walters *et al*., 2020). However, this is an emerging field, and the breadth of evidence needed to understand and predict the potential outcomes of demand reduction interventions is lacking (Olmedo, Sharif & Milner-Gulland, 2017). Olmedo, Sharif and Milner-Gulland, (2017) found that very few studies included all key components required to demonstrate success of a behavioural change intervention. These key components include 1) measurable objectives, 2) research to identify target group and motivations behind undesired behaviour; 3) strategy based on research or evidence of success; 4) theory of change; 5) record of indicators of success throughout project implementation and 6) evaluation to determine if goals have been achieved. In some cases, awareness raising is seen to be a way to change behaviour, but behaviours are not just influenced by awareness about a subject but also by the social context, political and cultural forces, and even the degree to which the source of information is trusted (Drury, 2009).

Behaviour change is difficult to achieve, and interventions may have unintended and undesirable consequences because of unaddressed systemic, cultural and environmental drivers, and limited resourcing (Thomas-Walters *et al*., 2020). Several studies have highlighted the complexity of consumer preferences and behaviour regarding rhino horn in Vietnam and China (Truong *et al*., 2015; Margulies, Wong & Duffy, 2019; Dang Vu *et al*., 2022, Dang Vu & Nielsen, 2022). While demand reduction campaigns have seen some success in raising awareness, their influence on consumer behaviour is limited by cultural beliefs, distrust in campaign promoters, and the ineffective targeting of key social groups (Dang Vu *et al*., 2020; Dang Vu & Nielsen, 2021; Vu 2023).

Despite high exposure (Smith, 2018), demand reduction campaigns fail to significantly change consumer behaviour (Dang Vu *et al*., 2020). Many campaigns focus on scientific evidence debunking rhinoceros horn's medicinal properties, and have had little impact. Consumers distrust these campaigns, especially when framed in a paternalistic or oversimplified way, viewing them as profit-driven and scientifically lacking (Dang Vu *et al*., 2020; Dang Vu & Nielsen, 2021; Dang Vu *et al*., 2022; Vu, 2023). Simplistic messages, like comparing rhinoceros horn to fingernails, often backfire and only succeed in angering traditional medicine users and practitioners. Campaigns that oversimplify the science behind rhinoceros horn's inefficacy or fail to provide nuanced and reliable evidence struggle to change the deeply entrenched cultural beliefs of consumers. Traditional deliverers like celebrities, doctors, and government officials exert little influence compared to peers. This suggests that campaigns need to be more culturally sensitive and nuanced to effectively change behaviour (Vu, 2023).

As a result of the continuing illegal trade in rhinoceros horn, there have been calls from some segments of the conservation community to reconsider current policies, including the 40-year ban on the international trade in rhinoceros products, and to establish a legal, well-regulated international market for trading rhinoceros horn (Conrad, 2012; Biggs *et al*., 2013; Ferreira, Pfab & Knight, 2014; Di Minin *et al*., 2015; Di Minin *et al*., 2021). Ayling (2013) further argues that "where the knowledge base is poor and existing strategies seemingly ineffectual, one can certainly argue under a precautionary approach that any action that could reduce poaching and quash the illegal trade ought to be tried." Janssens and Trouwborst (2018) agree and recommend that the CITES CoP seriously explore the merits of alternative regimes for rhinoceros horn trade, which involve more scope for legal trade than allowed under the presently applicable regime. Current

consumer demand seems to stem from investors that are purchasing these products not because of their cultural value but rather because of their prospects for appreciation that stem from their cultural values (Mason *et al*., 2012; UNODC, 2016; Zhu, 2020). Because of this speculative demand for rhinoceros horn, legislative restrictions intended to counter the trade often have the opposite effect (Zhu, 2020). International trade prohibitions are ironically one of the primary drivers of market speculation (Zhu, 2020). By artificially inflating the scarcity of the resource, trade prohibitions drive subsequent price spikes. Market speculators may even face incentives to subsidise poaching until wild populations are extinct or nearly extinct to gain monopoly power (Mason *et al*., 2012).

There are several concerns relating to the potential effects of legalisation (Fischer, 2004):

(1) The potential to 'destigmatise' the perceived immorality among consumers of using rhinoceros horn. Moyle (2018) however argues that there is no strong empirical or theoretical evidence that stigmatising demand would be at a sufficient scale that it can compensate for the lack of legal competition. MacMillan *et al*., (2017), after interviewing 1,000 traditional medicine users in Vietnam, concluded that there is no evidence of social 'stigma' associated with rhinoceros horn consumption in Vietnam, and that the introduction of a legal supply of rhinoceros horn has the potential to 'crowd out' illegally sourced rhinoceros horns for two reasons, namely, consumers' strong preference for non-lethal harvesting, and an anticipated overall fall in price due to the loss of prestige and exclusivity of a rare product. The study also found that there is likely to be a small increase in the number of people who might consume rhinoceros horn after legalisation, and thus recommended that sufficient supplies of legal stock be available to meet demand. (At 65 tons, South Africa's current stockpiles are more than sufficient.) This is in line with the findings of Cheung *et al*., (2021) which found that only 10% of Traditional Chinese Medicine (TCM) practitioners in the Chinese province of Guangdong are likely to increase their prescription of rhinoceros horn if trade is legalised. This is probably because clinical cases in which rhinoceros horn is medically appropriate are uncommon.

(2) Illegally obtained rhinoceros horn will be laundered into a legal trade. But Moyle (2018) argues that where sales are occurring largely outside the legal market (i.e. illegally), trade bans have limited effect. He further argues that trade bans only achieve the objective of reducing laundering to zero at the cost of giving up all competition with illegal sellers and possibly increasing illegal sales to above acceptable levels. The ideal size of the legal market thus involves a trade-off between laundering and competition.

(3) Two further concerns around the potential effects of legalisation relate to whether legalised trade competes with existing illegal markets or simply creates new parallel ones, and whether legalised trade leads to reduced enforcement against illegal traders.

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**	**1**
	Effective	2
	Ineffective	3
	None	4
	Uncertain	5

The species is listed as endangered in terms of section 56 of NEMBA and various provincial ordinances and acts provide further legislative protection. Permits are therefore required to undertake a variety of activities, e.g. hunting, keeping, selling and other forms of direct use. Provinces have indicated that the amended Norms and Standards for the Marking of Rhinoceros and Rhinoceros Horn and for the Hunting of Rhinoceros for Trophy Hunting Purposes (published in April 201,2 Government Gazette No. 35248) are being implemented effectively. Trophy hunting of black rhinoceros is well-managed, it only affects a very small proportion (0.12%) of the national population, and is unlikely to have a deleterious effect on the population as a whole. Animals to be hunted are selected based upon a strict set of criteria (see Knight *et al*., 2012). Given the strict approval criteria and approval process, there is a high confidence in the measures applied to prevent overuse.

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