

MANAGEMENT

Advancing black rhino conservation in Kenya: milestones and the strategic outlook for sustaining population recovery

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Abstract

The black rhinoceros (*Diceros bicornis*) experienced precipitous declines across Africa during the 1970s and 1980s, primarily driven by poaching. The decline was particularly severe for the eastern subspecies (*D. b. michaeli*). Kenya's population, which once supported a significant proportion of the species, declined from approximately 20,000 to 370 individuals by 1989, at the time that the Kenya Wildlife Service (KWS) was established. Over the last three decades, considerable effort and resources have been deployed, and an enabling policy and legislative framework have been enacted to recover rhino populations. As a result, the declining trend has been reversed, and the number of indigenous black rhinos is increasing. Remarkable progress has been achieved through strategic interventions and population recovery initiatives, with Kenya's black rhinos reaching a confirmed total of 1,059 individuals in 2024—marking a historic milestone. We document Kenya's rhino conservation progression, including current population status, challenges and future strategies aimed at supporting the long-term vision of achieving 2,000 individuals, thereby securing the future of *D. b. michaeli*.

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Résumé

Le rhinocéros noir (*Diceros bicornis*) a connu un brusque déclin en Afrique au cours des années 1970 et 1980, principalement du fait du braconnage. Les sous-espèces de l'Est (*D. b. michaeli*) ont été particulièrement touchées. La population établie au Kenya, qui représentait une part significative de l'espèce avec près de 20 000 rhinocéros, a décliné jusqu'à atteindre 370 individus en 1989, période à laquelle le bureau kenyan en charge des espèces sauvages (Kenya Wildlife Service) a été créé. Des efforts et des ressources considérables ont été déployés ces trente dernières années, et un cadre politique et législatif favorable a été mis en place afin de permettre le rétablissement des populations de rhinocéros. Dès lors, la tendance s'est inversée et le nombre de rhinocéros noirs indigènes est actuellement en hausse. Des progrès remarquables ont été réalisés par le biais d'interventions stratégiques et d'initiatives de rétablissement des populations, et, en 2024, le nombre total de rhinocéros noirs au Kenya a été confirmé à 1 059 individus – une étape majeure dans l'histoire de cette espèce. Nous documentons ici l'évolution de la conservation du rhinocéros au Kenya, l'état actuel de la population ainsi que les défis et les futures stratégies visant à soutenir une vision à plus long terme, dans l'objectif d'atteindre les 2 000 individus et d'assurer l'avenir de *D. b. michaeli*.

Introduction

The five extant rhinoceros' species (hereafter referred to as rhinos) are the only relics of a once diverse family of odd-toed ungulates known as Rhinocerotidae. They are not only a continuation of a major evolutionary heritage but also symbols for the protection of African savannahs and Asian grasslands and forests (Somerville 2025). All five species are now threatened with extinction (Emslie 2020a; b; c; Ellis and Talukdar 2019; Ellis and Talukdar 2020a; b).

The black rhino's status as a conservation concern cannot be overstated. Kenya's black rhino (*Diceros bicornis michaeli*) is considered a local icon, and the future of the species is crucial both nationally and globally for several reasons. Rhinos were on the brink of extinction following a dramatic decline in their population. As a flagship species, they are a highly charismatic animal and capture the attention of people worldwide with a direct economic impact for Kenya through wildlife-based tourism. In addition to its role in conservation and tourism, the black rhino is considered an umbrella and keystone species, serving the objective of broader biodiversity priorities, as their conservation depends on extensive and intact ecosystems being conserved and protected, and they play a significant role in ecological dynamics.

Black rhino declines

Pre 1970s

Black rhinos once numbered several hundred thousand and were widespread across sub-Saharan Africa, where herb and woody browse occurred in sufficient amounts to support a population. In Kenya, they occurred in nearly all except for the very arid areas in the north and the humid lowland forest belt in the west (Kingdon 1982; Stewart and Stewart 1963). During British colonisation from 1890, large tracts of land were cleared for agriculture and settlement schemes. Because the favoured habitats of rhinos generally had available water and were reasonably fertile, a high number of rhinos were killed, being deemed incompatible with development. For example, approximately 1,000 animals were shot during the Makueni settlement scheme in 1946–1948 by the game control officer JA Hunter and his colleagues (Hunter 1952). They were precipitously eliminated from more than 75% of their range by early 1970s (Fig. 1).

1970s–1980s decline

The period between 1970 and 1989 saw intense poaching of rhinos in Kenya (and across its range in Africa) due to the demand for rhino horn. Kenya's black rhinos were poached nationwide, whether inside or outside Protected Areas (PA), due to inadequate controls and reactionary law enforcement. In addition to the killing of most of the animals from lowland areas (e.g. Tsavo National Park (NP), Meru NP) by well-organised poachers and criminal gangs

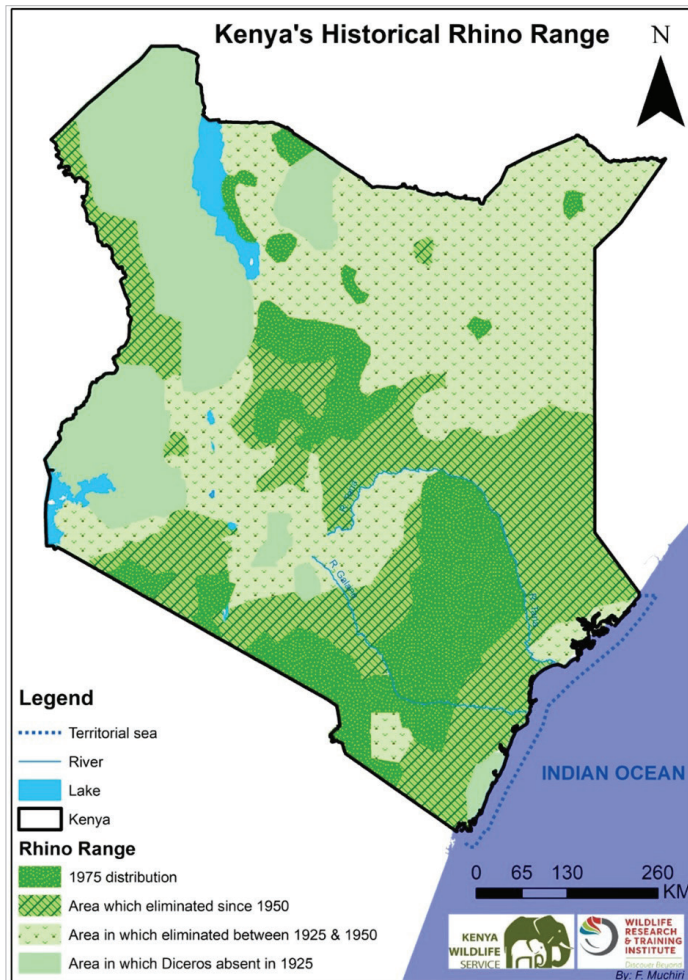


Figure 1. The distribution of black rhino in Kenya (1925–1975), Source: Kingdon 1982.

(including Shifta⁵ from the east of Kenya), many of the black rhinos from the highlands were slaughtered by poachers from local areas. This was often in collusion with officers within the government game department. By 1989, the Kenyan population had declined to 370 from an estimated 20,000 in 1970 (Hillman and Martin 1979; Brett 1993); (Fig. 2). The population of the Greater Tsavo ecosystem (6,150–9,220 animals) comprising over a third of Kenya's rhinos, was reduced to less than 50 individuals by 1984 (Goddard 1969; Brett 1993).

⁵"Shifta" is a term, primarily used in the Horn of Africa, associated with armed groups, sometimes operating in remote areas, who challenge authority or engage in acts of banditry.

Black rhino population recovery

It was eventually recognised that the only hope of protecting the remaining black rhinos in Kenya was to concentrate security within smaller areas by establishing Intensive Protection Zones (IPZs) for the species. Previously, resources, such as manpower and equipment had been spread too thinly over large areas to yield any meaningful benefit (Leader-Williams 1997). Since 1984, an active conservation programme devoted to the recovery of Kenya's black rhino populations has been pursued; and conservation policy has been centred on developing dedicated IPZs or Rhino Sanctuaries (RS) (Gakahu 1989; Brett 1990;1993; Okita-Ouma et al. 2007). Within these IPZs, many of which are entirely enclosed by specially designed and monitored electric fences, a

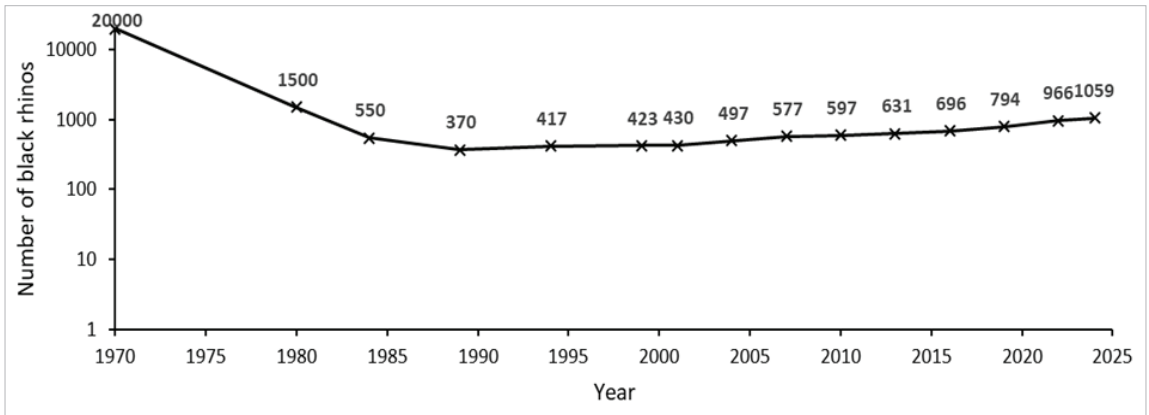


Figure 2. Black rhino numbers in Kenya from 1970 to 2024 on a logarithmic scale show a sharp decline in the 1970s and their recovery from 1990.

large proportion of the country's black rhinos have been protected from poaching. Initially, rhino sanctuaries were stocked primarily with unprotected rhinos, typically isolated and vulnerable animals living in areas outside national parks or protected areas. As numbers increased, surplus rhinos from overstocked sanctuaries have been used to supplement populations in understocked sanctuaries and to establish new rhino conservation areas.

Six ring-fenced rhino sanctuaries were established in the initial phase under the Kenya Rhino Project. These included Lake Nakuru NP, Ngulia RS in Tsavo West NP, Ngare Sergei RS in Lewa Ranch (now Lewa-Borana Conservancy with the original fenced sanctuary removed), Sweetwaters Game Reserve (GR), (now Ol Pejeta Conservancy), Solio GR and Ol Jogi Pyramid. The latter four sanctuaries were developed through effective cooperation between the national wildlife agency, private landowners and conservation NGOs.

In addition, other areas were upgraded to rhino sanctuary status with the construction of fencing and improved anti-poaching and surveillance (e.g. Nairobi NP, the Salient section of Aberdare NP). The sanctuary policy was successful as an emergency measure, firstly to protect black rhinos, and secondly to allow successful breeding, guided by the initial national rhino conservation plans (Jenkins 1983; Brett 1993; Okita-Ouma et al. 2007).

In recognition of the importance of rapid growth

after the intensive poaching period, Kenya's wildlife authorities placed a greater emphasis on biological management from the early 2000s. A national target of 5% growth per annum was set in the Strategic Plans (Okita-Ouma et al. 2007; KWS 2012; Amin et al. 2017; 2022), with the vision of at least 2,000 eastern black rhinos occurring in their natural habitat. To achieve this, specific capacity and systems were put in place for: 1) rhino capture and translocation; 2) monitoring and standardised field data collection; 3) data analysis and status reporting; 4) assessing ecological carrying capacity of rhino areas; and 5) population expansion (Amin et al. 2006).

Between 2000 and 2025, nine populations have been established, bringing the total to 18 rhino populations (Fig. 3). The Borana Conservancy was the first to be established in 2013 and later merged with the adjacent population in Lewa Wildlife Conservancy, creating a continental Key 1 population (numbering more than 100 rhinos). Similarly, the former Sweetwaters GR was expanded in 2007 to establish the Ol Pejeta Conservancy, where additional rhinos from Solio GR were introduced, creating another continental Key 1 population. Black rhinos were also introduced into community lands, starting with Il Ngwesi Community Conservancy in early 2000 with one rhino, followed by Sera Wildlife Conservancy in 2015 with a founder population of 13 rhinos, (the first community conservancy in East Africa to operate a sanctuary for the critically endangered species), and most recently Loisaba and Segera Conservancies, which hold 26 and 19 rhinos respectively.

A 3,000 km² IPZ, which can support hundreds of

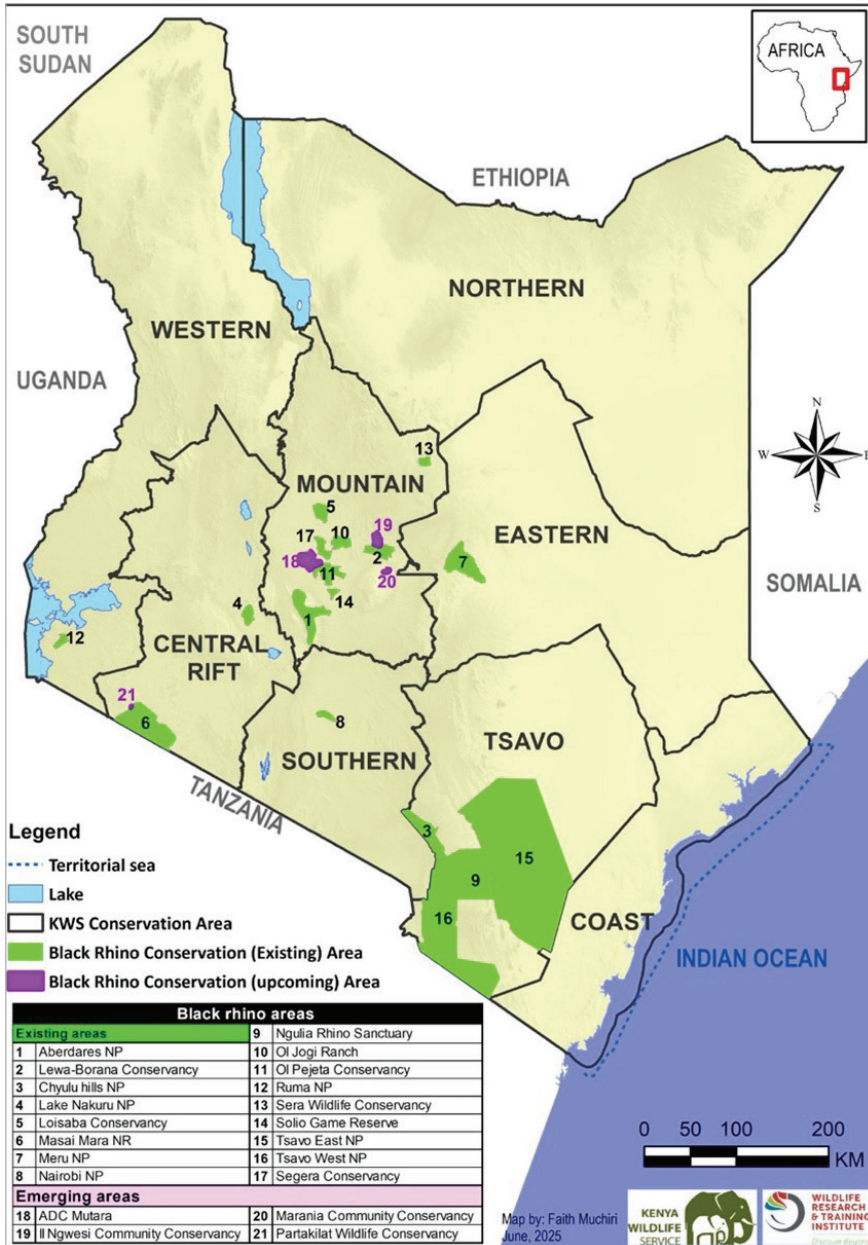


Figure 3. Kenya's black rhino conservation areas, March 2025. Note: Ol Jogi Ranch consists of two separate populations, Ol Jogi Pyramid and Ol Jogi Ranch.

Table 1. Milestones in black rhino recovery efforts.

Year	Milestones
Before 1960's	Controlled protection in parks and reserves, and legal hunting.
1977	Hunting ban came into effect for all wildlife, including the indigenous Eastern black rhino.
1979	Presidential Decree on special protection for rhino; conservation strategy developed; consolidation of non-viable fragmented populations into sanctuaries; and enhanced anti-poaching efforts.
1980–1981	Sanctuary development concept refined.
1983	First edition of the Black Rhino Management Plan officially ratified.
1985	Presidential Decree on rhino as a unique species requiring special protection. Further refinement of the 1983 Black Rhino Management Plan. Fund raising document produced, donor support invited.
1989	KWS established.
1990	APLRS established.
1993	The second edition of the Black Rhino Conservation Policy and Management Plan ratified.
2000	Third edition of the Black Rhino Conservation and Management Strategy (2001–2005) ratified.
2007	Fourth edition of the Conservation and Management Strategy for the Black Rhino and Management Guidelines for White Rhino (2007–2011) ratified.
2009	East African Community Rhino Management Group inaugurated and ratified by directors of wildlife authorities of Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda.
2012	The fifth edition of the Black Rhino Conservation and Management Strategy (2012–2016) ratified.
2014	Wildlife Conservation and Management Act, 2013, with enhanced penalties, enacted.
2014	The development of recovery and action plans for endangered species became a legal requirement as provided for in Section 49 of the Wildlife Conservation and Management Act, Cap 376.
2015	The first community black rhino sanctuary established in Sera Conservancy.
2017	The sixth edition of the Black Rhino Action Plan (2017–2021) ratified.
2018	National Wildlife Strategy 2030 launched.
2019	New rhino immobilization and translocation protocols for black and white rhinos developed.
2019	Amendment to the Wildlife Conservation and Management Act, Cap 376 (Amendment 2019) providing clarity on penalties related to endangered species.
2020	Zero poaching for black rhino achieved for the first time in over twenty years.
2020	Sessional paper number 01 of 2020 on National Wildlife Policy ratified.
2022	Donation of three black rhinos to the United Republic of Tanzania (Ngorongoro Conservation Area).
2022	The seventh edition of the Recovery and Action Plan for the Black Rhino in Kenya (2022–2026) ratified.
2023	The concept of Kenya Rhino Range Expansion initiated.
2024	Kenya for the first time in over three decades surpasses 1,000 indigenous black rhinos.

black rhinos, was created in 2008 in Tsavo West NP for destocking fenced sanctuaries (Okita-Ouma et al. 2006). Black rhinos were reintroduced to Meru (in 2006, 21 animals) and Ruma NP (in 2012, 22 animals) following the effective control of tsetse flies at these sites (KWS 2012). Ngulia RS was expanded from 62 km² to 92 km², and competing browsers were significantly reduced in 2007 (Brett and Adcock 2002; Okita-Ouma et al. 2008). Ol Jogi Ranch expanded its rhino habitat in 2005 from the 50 km² Ol Jogi Pyramid into the 235 km² ranch where 34 rhinos were also introduced from Solio GR, Nairobi NP, Nakuru NP and Mugie RS. The establishment of a fenced rhino sanctuary in the Aberdare Salient is expected to be completed later in 2025, supplementing and re-establishing a viable population in a montane forest ecosystem.

Establishing, protecting, and maintaining rhino sanctuaries requires significant resources. Although the population in Mugie's private rhino sanctuary had settled with 19 births, a decision was made to translocate the remaining 24 black rhinos to safer areas following an escalation of poaching in 2011–2012. Similarly, the last two remaining rhinos from the Laikipia Nature Conservancy—where eight rhinos had been relocated in 2005 to boost the population—were translocated to Meru NP (Amin et al. 2017).

Kenya's black rhino programme has grown from strength to strength, and by December 2024, the population had surpassed the major milestone of a thousand rhinos (1,059 rhinos: 31 Dec 2024). This success has been driven by an enabling environment that includes firm policy and a legislative framework, as well as sustained government support providing a solid foundation for rhino conservation efforts (Table 1). The adoption of IUCN–SSC African Rhino Specialist Group's standardised monitoring protocols, ensuring high-quality data for an informed decision-making process, was critical to the success. The partnership between the Kenyan Government (GoK), non-governmental conservation agencies, private landowners and local communities continues to support rhino conservation efforts. The Association of Private and Community Land Rhino Sanctuaries (APLRS), formed in 1990 has also provided an interface between government and the private and community rhino sanctuaries. This association

persists and is entrenched in the KWS decision-making framework through the National Rhino Action Plans. This "partnership approach" to rhino conservation has been a significant contributing factor to Kenya's success.

In addition, to field rangers, who continue to be recruited, equipped and deployed, the adoption of technologies for enhanced monitoring and surveillance has been critical. Veterinary capture and translocation capacity is also continually being tailored and refined to support a healthy growing population of rhinos guided by the national immobilization and translocation protocol. As can be expected, there have been some challenges along the way with valuable lessons learned, in particular the need for effective monitoring, the dangers of not managing the numbers of rhinos and other competing browsers in fenced sanctuaries, and the necessity of using recommended translocation and veterinary procedures. Kenya's Black Rhino Action Plan is on track to achieve its long-term vision of having 2,000 black rhinos in the wild (Fig. 4).

Future for rhinos in Kenya

Poaching

Poaching was the primary cause of the population decline in the 1970s and 1980s, and its resurgence in 2009 has been largely managed over the last five years. Within this period, eight black rhino mortalities attributed to poaching accounted for less than 1% mortality over the five years, and there were zero poaching incidents in 2020. This is primarily attributed to the efforts by the GoK in collaboration with conservation stakeholders and a rallying call by the international community to stop poaching and trafficking of the rhino horn. Among the key interventions implemented were rigorous vetting systems for rhino monitoring and security teams, enhanced cross-border collaboration through joint anti-poaching patrols and strengthened multi-agency cooperation at strategic entry and exit points. To address unpredictable threats, comprehensive security contingency plans were implemented to rapidly respond to emerging rhino security challenges across all rhino sites. Central to these efforts was the adoption of a zero-poaching framework, which provided structured tools for monitoring poaching activities, tactical planning and implementation of

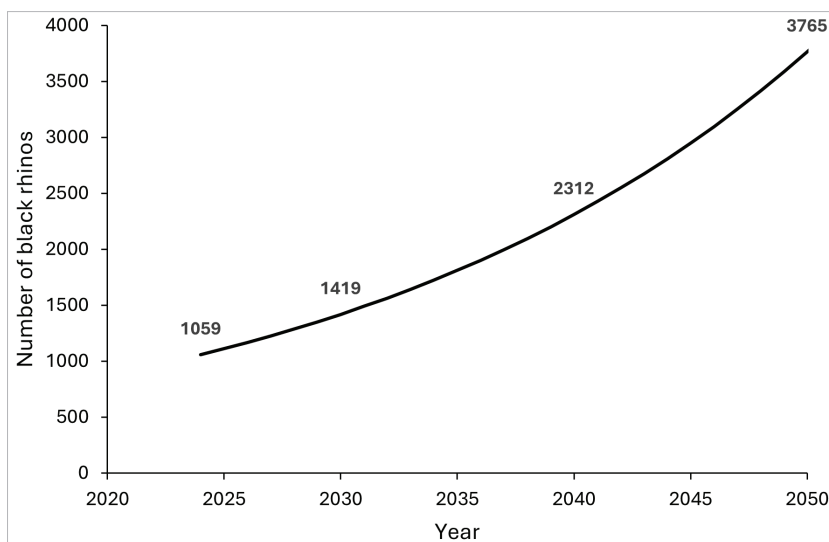


Figure 4. With a projected 5% annual increase in black rhino numbers (from 1,059 in December 2024) continuing, the estimated numbers of rhinos would be 1,419 by 2030, 2,312 by 2040, and 3,765 by 2050.

countermeasures, and systematic evaluation of anti-poaching performance.

This framework was built upon six fundamental pillars 1) conducting regular threat assessments; 2) deploying cutting-edge technology; 3) building adequate field staff capacity; 4) embracing meaningful community engagement; 5) improving prosecution methodologies and facilitating regional and national information exchange. Lastly, 6) operational capabilities were further reinforced through the standardization of field equipment across sites and professional training for field personnel. While these pillars are essential and each plays a role in reducing poaching, the key enabling factor is the political will to combat rhino poaching. The GoK has drawn a firm line and is committed to taking the necessary actions to stop the poaching of rhinos.

A wider impactful measure has been the coordinated management and analysis of rhino horn and tissue samples across the continent through the Rhino DNA Indexing System (RhODIS), which has played a pivotal role in identifying the geographic origins of confiscated rhino products and generating forensic evidence to strengthen legal prosecution cases. Security threat to rhinos continues to remain high and is cyclical, therefore these efforts will need to be sustained.

Rhino landscapes

Recent calculations show Kenya has a space capacity deficit of approximately 500 rhinos (Amin et al. 2022). Over 80% of Kenya's rhinos reside in sanctuaries that have exceeded their ecological carrying capacity, requiring relocation of over 300 rhinos. The Kenya Rhino Action Plan along with the Kenya Rhino Range Expansion initiative (KRRE) aims to address this. Kenya still has large tracts of suitable black rhino habitat, such as the Tsavo landscape and Meru conservation area. Notably, the Tsavo West IPZ (a partially fenced, intensively protected landscape of 3,000 km² home to 42 rhinos as of December 2024) has the ecological conditions to accommodate high stocking densities. Similarly, Tsavo East NP is vast, but security remains challenging with remote open areas to the north, and with perennial water sources only in specific locations.

There are considerable opportunities to establish new private and community sanctuaries in the Laikipia region, some of which are at an advanced stage of planning, with Loisaba Conservancy commissioned in 2024 and Segera Conservancy scheduled for 2025. There is also a longer-term aim of merging the private, community and government sanctuaries to form a contiguous rhino landscape with the support of the KRRE initiative in partnership with the KWS, Wildlife Research Training Institute (WRTI) and other

stakeholders. The forested areas of Chyulu Hills and Aberdare NPs contain habitats suitable for rhinos, although their populations are currently non-viable.

Conclusion

The eastern black rhino is the least numerous subspecies of Rhinocerotidae, with ~1,474 individuals in three range states within its natural distribution (Kenya, Tanzania and Rwanda). Kenya remains the stronghold of *D. b. michaeli*, with a population slightly over 70% as of the end of 2024. Having surpassed the milestone of 1,000 individuals by the end of 2024, Kenya has learned lessons and gained the required momentum to achieve its vision of 2,000 black rhinos by 2037, with a sustained average annual net growth of at least 5% (Fig. 4), thus ensuring as much genetic diversity is preserved as possible. High rhino numbers combined with growth will also minimize the impact of poaching on Kenya's populations.

A high metapopulation growth rate will be sustained through maintaining sanctuary rhino densities at productive levels, thereby leading to population expansion. Established populations will continue to serve as a 'breeding bank' providing a continuous supply of rhinos to expand into new secure and large areas with a carrying capacity of hundreds of rhinos. The KRRE, launched in 2024, aims to continue the incredible revival of the eastern black rhino in Kenya. Starting with Tsavo and Central Kenya, the initiative aims to expand Kenya's rhino habitats to become one of the largest in the world. Additionally, it will bring improved management and long-term stewardship to approximately 6% of Kenya's land and contribute to Kenya's 30 by 30 commitment (Kunming-Montreal Global Biodiversity Framework 2022).

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