South African
NATIONAL PARKS

Elephant Management Plan

Mapungubwe National Park and World Heritage Site

2024-2028

Reference Number:

INFORMATION

Responsible Executive Manager:	Dr Howard Hendricks (CSD) Mr Property Mokoena (Parks)
Division/Unit Responsible for Formulation:	Scientific Services Division & Mapungubwe Park Management
Writer/s:	Sam Ferreira, Cathy Greaver, Mphadeni Nthangeni, Corli Wigley-Coetsee, Stefan Cilliers, Danny Govender, Letsie Coetzee, Reckson Mashaba, Mathokone Lebepe, Steven Khosa
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Pam Yako Chair of the SANParks Board Date: 30/09/2025	Nomfundo Tshabalala Director General, DFFE Date: 02/10/2025
Dr. Dion George Minister of the Department of Forestry, Fisheries and the Environment Date: 23/10/2025	

Note that the lifetime of the plan aligns with the Park Management Plan.

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Executive Summary

South African National Parks (SANParks) wish to manage elephant impacts on biological, cultural, human and stakeholder values. Mapungubwe National Park (Mapungubwe) is of cultural significance, has important biological assets and values, and is embedded in an international transboundary landscape of various land uses and stakeholder interests. This management plan, compiled in accordance and compliance with the National Norms and Standards for Elephant Management, is a supporting document to the Park Management Plan for Mapungubwe submitted to the Department of Environmental Affairs and Tourism in 2018. The elephant management plan describes the strategic context of elephant management within SANParks as well as key linkages to the vital attributes, management objectives and the contribution or impact of elephants on SANParks' ability to achieve the mission of Mapungubwe. Elephants may impact these attributes affecting achievement of objectives supporting the desired state of this National Park.

The objectives hierarchy of the Mapungubwe Management Plan guides the specific objectives for the Elephant Management Plan of Mapungubwe. Four key elephant management objectives have been developed for this park, with 10 associated strategic actions to address these. Within **Objective 1**, SANParks wish to contribute to cultural values and use, while providing equitable opportunities and benefits from elephants by mitigating and/ or managing elephant impact at identified rock art and archaeological sites, Baobabs and on Species of Special Concern. **Objective 2** focuses on SANParks seeking to manage the ecological role of elephants allowing for the dynamic functioning of them in the ecosystem, while reducing ecological risks. **Objective 3** focusses on ensuring a transparent and collaborative approach to long-term decision-making, with descendants and other stakeholders by appropriately involving directly impacted stakeholders in the decision-making processes for the future persistence of elephants. **Objective 4** aims to integrate Mapungubwe with the Greater Mapungubwe Transfrontier Conservation Area (GMTFCA) by involving directly impacted stakeholders in the decision-making processes for the future persistence of elephants.

Accountability for overall implementation of this plan lies with the Managing Executive: Parks while accountability for evaluation is with the Managing Executive: Conservation Services. The Mapungubwe Elephant Management Plan is an annexure of the broader Park Management Plan and will therefore be revised with the Park Management Plan in 2028.

1. Rationale

African elephants (*Loxodonta africana*) contribute to ecological features and the existence of biomes[1] while structuring the physical environment that benefits other fauna[2]. People value elephant for many reasons[3], the benefits provided to tourists[4] and rural communities[5]. Elephants, however, threaten biodiversity[6] and cause damages to property and come in conflict with people[7]. Making trade-offs between the positive effects of elephants and the various costs of living with them, both to people and other biodiversity, poses challenges to African-based conservation agencies[8]

South Africa embraced such challenges as opportunities for an inclusive, transformed society where biodiversity conservation and sustainable use ensure healthy ecosystems, with improved benefits that are fairly and equitably shared for present and future generations[9].

In this context, the management of elephants in Mapungubwe National Park (Mapungubwe) under the auspices of South African National Parks (SANParks) seeks to contribute to the national goals of transformed and enhanced biodiversity conservation, sustainable use, and equitable access and benefit sharing within the "*White Paper on Conservation and Sustainable Use of South Africa's Biodiversity*".

The management of elephants, their values and the costs and benefits that they have for people takes guidance from the National Elephant Heritage Strategy[10] that envisions thriving elephants contributing to equitable livelihoods, ensured dignity, and secured well-being for present and future generations of South Africans.

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[1] Skowno AL, Thompson MW, Hiestermann J, Ripley B, West AG, Bond WJ (2017) Woodland expansion in South African grassy biomes based on satellite observations (1990-2013): general patterns and potential drivers. Global Change Biology, 23, 2358–2369
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[3] van de Water, A., Henley, M., Bates, L. and Slotow, R. 2022. The value of elephants: A pluralist approach. *Ecosystem Services*, *58*, p.101488.

[4] Lindsey PA, Roulet, PA, and Romañach, SS. 2007. Economic and conservation significance of the trophy hunting industry in sub-Saharan Africa, Biological Conservation, 134(4): 455-469.

[5] Mafunzwaini, A.E. & Hugo, L. 2005. Unlocking the rural tourism potential of the Limpopo province of South Africa: Some strategic guidelines, Development Southern Africa, 22, (2), 251-265
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[7] Graham, M.D., Douglas-Hamilton, I., Adams, W.M. and Lee, P.C. 2009. The movement of African elephants in a human-dominated land-use mosaic. Animal Conservation, 12(5),445-455.
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[8]Holling, C.S. (2001). Understanding the Complexity of Economic, Ecological, and Social Systems. Ecosystems. 4, 390-405.
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[9] Publication of the white paper on Conservation and sustainable use of South Africa's Biodiversity. Department of Forestry, Fisheries, and the Environment. Government Gazette, No. 48785. 14 June 2023 https://www.gov.za/sites/default/files/gcis_document/202306/48785gon3537.pdf

[10] Developing National Elephant Heritage Strategy, Humbu Mafumo HMAFUMO@dffe.gov.za

On a regional scale, elephants in Mapungubwe form a key part of the shared elephant population living in the GMTFCA. Presently the core Transfrontier Conservation Area (TFCA) is 257,298 ha[11] and it includes various land uses (protected areas, private conservancies, hunting concessions, community areas, etc.) across South Africa, Botswana, and Zimbabwe. A resident population of elephants inhabit the Central Limpopo River Valley (CLRV) in a roughly 180 km long section of the Limpopo River between Zanzibar border post in the west and Beit Bridge in the east in a belt of approximately 20 km on either side of the river. An aerial survey of the CLRV in 2017 indicated that Mapungubwe had 211 elephants[12].

It is within this context, SANParks envision *"A free-roaming persistent elephant population, fulfilling a broader ecological role as a keystone species, with rare and sensitive species flourishing, while connecting Greater Mapungubwe Cultural landscape users, and leading to a broad suite of benefits to people in the region."*

Mapungubwe has a complexity, richness and diversity of socio-ecological systems and the promotion of conservation in all its complexities is fundamental to SANParks' core biodiversity conservation values. These complexities are addressed through a strategic adaptive management approach within which elephant management in Mapungubwe embeds.

This management plan provides the guidance for the management of elephants and embraces the key principles of transformation, sustainable use, good governance, evidence-based decisions, and a duty of care towards nature and people alike[13]. It aligns with Elephant Management Norms and Standards of South Africa[14].

2. Elephant contribution to Park objectives[15]

2.1 Key biological attributes

Mapungubwe forms part of a cultural world heritage site (Mapungubwe Cultural Landscape World Heritage Site or MCLWHS) and is also the South African core area for the GMTFCA. The GMTFCA covers 3,650 km^2 centred on the confluence of the Limpopo and Shashe rivers that straddle the international boundaries of Botswana, South Africa, and Zimbabwe[16]. The Limpopo-Shashe area is rich in biodiversity, has

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[11] Selier, S.A.J. 2015. The challenges and opportunities in conserving wide-ranging cross-border species: A case study of the Greater Mapungubwe Transfrontier Conservation Area elephant population. PhD thesis, University of KwaZulu/Natal

[12] Data provided by Jeanetta Selier (SANBI)

[13] Earl, G., Curtis, A. & Allan, C. (2010). Towards a Duty of Care for Biodiversity. Environmental management. 45, 682-96. 10.1007/s00267-010-9444-z.

[14] National Norms and Standards for the Management of Elephants in South Africa (GN 251/GG 30833/ 29 February 2008) and any updated versions thereafter.

[15] Extracted from Section 6, Paragraph 9 of the Elephant Norms and Standards of 2008.

(i) description of the elephant population.
(ii) the objectives of the property to which the management plan relates.
(iii) the contribution of the objectives referred to in subitem (ii) to the national conservation objectives.
(iv) risks or constraints to achieve the objectives referred to in subitem (ii).
(v) extent or success in achieving the objectives referred to in subitem (b)(ii).
(vi) maximising the contribution of the elephant population to the objectives referred to in item (b)(ii).
(vii) risks related to management interventions involving the elephant population; and
(viii) mitigation of the intervention risks referred to in subitem (vii).

[16] Data provided by Jeanetta Selier (SANBI)

high scenic beauty, and high cultural importance due to the archaeological treasures of Mapungubwe. The important biological assets and values of Mapungubwe is thus embedded in an international transboundary landscape of various land uses and stakeholder interests.

Mapungubwe lies in a semi-arid landscape with varied geology, including extremely old archean rocks, metamorphics of intermediate age, karoo sandstone/conglomerate uplands of 200 million years, and recent alluvium and sands. Kimberlites of about 100 million years old are found in the region, and a large diamond mine exists at Venetia, about 50 km south of the park boundary. The nearby Venetia Mine uses water that it draws from the Limpopo system inside the Park. The Limpopo and the Kolopi floodplain wetlands are the dominant wetland type and ultimately form one system towards the confluence of the Shashe and Limpopo Rivers. The Limpopo floodplain exhibits some classical floodplain features such as oxbow lakes, depressions (pans), and riparian forests. The Kolopi on the other hand, is a much drier system with strong alluvial fan features and a major depression wetland namely Leeupan.

Diverse plant communities on koppies rise above *Commiphora-Colophospermum* veld (Kanniedood and Mopane) on the surrounding undulating terrain. River and floodplain associated vegetation includes fever tree (*Vachellia xanthophloea*), African ivory nut palm (*Hyphaene petersiana*) palmveld, narrow-leaved mustard tree (*Salvadora australis*) shrubveld on the floodplains, and vlei thorn (*Vachellia stuhlmanni*) communities on old lands. Nationally, three main vegetation types were classified[17] for the area of Mapungubwe: Subtropical Alluvial Vegetation, Musina Mopane Bushveld and Limpopo Ridge Bushveld. The riparian forest on the Limpopo River is classified as Lowveld Riverine Forest[18] and is endangered because it has been largely removed outside of protected areas[19], particularly during the construction of border fences and during agricultural activities.

Mean annual rainfall ranges from 350 – 400 mm in this semi-arid region, with highly variable rainfall mainly occurring during the summer months, between October and March[20]. Due to its unpredictable climate, extended periods of below average rainfall can occur.

The variation in geology, soil composition, altitude, topography, and climate over a relatively short range within the park accounts for the diverse flora and several large mammal species. Visitors are attracted to the area not only to see the magnificent sandstone formations, the wide variety of trees, notably the enormous baobab (*Adansonia digitata*) and game and birdlife, but also to experience a kinship with past generations.

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[17] Mucina, L., & Rutherford, M.C. 2006. The vegetation of South Africa, Lesotho, and Swaziland. South African National Biodiversity Institute.
[18] Von Maltitz, G., Mucina, L., Geldenhuys, C., Lawes, M., Eeley, H., Adie, H., Vink, D., Fleming, G. and Bailey, C. 2003. Classification system for South African Indigenous Forests: An objective classification for the Department of Water Affairs and Forestry. Department of Water Affairs and Forestry, Pretoria, South Africa.
[19] Bezuidenhout, H. 2010. The importance of the Greefswald (Mapungubwe) Forest: Status (Mapungubwe National Park). Internal SANParks Scientific report, AERU office, Kimberley.
[20] Götze, A.R. 2002. The classification of plant communities and the evaluation of restoration technologies in different land-use areas in the Vhembe-Dongola National Park, Northern Province, South Africa. MSc thesis. Potchefstroom University for C.H.E., Potchefstroom.

2.2 The influence of elephants on objectives of the Mapungubwe Park Management Plan

The summarized key attributes direct the Park's mission through objectives focusing on cultural heritage, biodiversity, social aspects, responsible tourism, and effective park management[21]. Elephants contribute to or influence all these objectives.

2.2.1 Elephant influence on cultural objectives

For Mapungubwe, in contrast to most other Parks, cultural objectives carry as much weight as biodiversity objectives. Elephants are using landscapes intensely at some places which house significant cultural heritage assets, these include vegetation associated with this landscape, such as baobabs and riparian forests. Research was conducted on the potential intangible benefits that visits to Mapungubwe may hold for the individual visitor. Narratives from and interviews with participants revealed that visitors to Mapungubwe become aware of their surroundings through their senses - intentionally and unintentionally - and seem to be intensely aware of the environment. Verbal accounts of what they become aware of include "unique" baobabs, elephant connection at Maloutswa hide, concern for the elephant damage on the baobabs and the need to control elephants.

The intensified use of and impact in the Mapungubwe landscape by elephants thus influence the sense of place, both negative and positively, associated with the Mapungubwe ambience.

2.2.2 Elephant influence on stakeholder relationships objectives

Damage caused by elephants to humans and their livelihoods is a key consideration. In Africa, specifically southern Africa, local communities incur substantial costs when living near elephants. Within Mapungubwe, human-elephant conflict is relatively low (although management is aware of at least 3 elephant-associated deaths in the surrounding areas since 2016). These incidents are dealt with on a case-by-case basis according to SANParks standing operating procedures associated with the Norms and Standards for managing damaging causing animals.

2.2.3 Elephant influence on biodiversity objectives

Elephant effects on biodiversity other than vegetation are poorly researched or known in Mapungubwe. Elephants, sometimes in interactions with other factors, have significant effects on much of the vegetation types in Mapungubwe, including riparian forest, baobabs, and *Commiphora* spp.

Fencing, restricted size and fragmented nature of sections, addition of water, and/or missing species or processes influence the ecological systems of Mapungubwe. These constraints affect how elephants use landscapes over time that could be either too intensely or too sparsely, both potentially affecting other values and biodiversity

[21] SANParks. 2019. Mapungubwe National Park and World Heritage Site: Integrated Management Plan. SANParks, Groenkloof, South Africa. https://www.sanparks.org/assets/docs/conservation/park_man/mapungubwe_approved_plans.pdf

components. Spatial and temporal availability of water and food, as well as disturbance by people would have historically influenced elephant landscape use, while today management can directly (*e.g.*, water provision) or indirectly (*e.g.*, contraception) affect the intensity with which elephants use landscapes.

The ecological effects of elephants vary considerably depending on rainfall, plant community and landscape features. The interpretation of these ecological effects is confounded by length of studies, as well as synergistic effects of fire, other herbivores, drought, wind toppling, soil chemistry, the water table and management practices.

Elephants respond to spatial and temporal resource variation by short- to medium-term movements and/or dispersal and medium- to long-term changes in demography. In Mapungubwe, however, the constraints of fencing, water provision and the effect of missing species such as the presence of humans that influenced elephant movements, disrupt population regulating mechanisms and how elephants use landscapes. The implications are that resource manipulation will affect elephant impacts over time and across landscapes.

Restoring or mimicking processes that induce gradients and variability in resource distribution should address the spatial and temporal distribution of elephant impact. The limited spatial scale, however, may not induce natural population regulation through density-dependent mechanisms. In this case controlling populations may be a key requirement to mimic the outcomes.

2.2.4 Elephant influence on responsible tourism objectives

Assumptions that a key tourist draw-card is the "big five" experience, often drives tourism developments, including elephants as a key determinant of tourist expectations and experiences. Other key stakeholders such as rural communities, academic partners and institutions and non-government organizations are traditionally more affected by policies rather than actual elephant interactions.

To accommodate tourist expectations, management often focuses on bringing the elephant to the tourist. Management therefore maintains existing roads and improves sightings by providing additional critical water resources to attract elephants to existing infrastructure. Although these actions are economically cost-effective, the ecological trade-off can lead to undesirable consequences. Tourist interactions relate to how elephants and other animals use landscapes, which in turn is driven by the distribution of key resources and tourist infrastructure. Elephants respond to spatial and temporal resource variation through movements and/or dispersal and ultimately through changes in demography. Therefore, by restoring or mimicking natural resource distribution the behaviour (land use interactions) of the elephants can be manipulated. The restoration of spatial and demographic limitations for elephant populations carries immediate consequences for tourist experiences.

A study on intangible benefits for visitors to Mapungubwe mentions the presence of elephants, the baobab trees, and the variety of bird life in many quotes, interviews and during observations, as highlights of a visit.

2.2.5 Elephant influence on effective park management

Apart from the range of fences, Mapungubwe has vast infrastructure, and many associated with tourist facilities. Elephants can cause damage to several of these infrastructures, which usually associate with access to water. Sometimes the damage to infrastructure happens indirectly, *e.g.*, the treetop boardwalk was particularly mentioned by tourists as a reason for visiting the park. The treetop boardwalk, however, is now defunct as most of the large trees around the boardwalk have died and no canopy remains to make it a shaded treetop feature. Addressing damage to infrastructure (directly or indirectly) requires a case-by-case approach.

2.3 History of elephant management

2.3.1 Interventions

Information on elephant spatial use, population dynamics and impacts on biodiversity stem from published data, internal reports, unpublished data, and anecdotal observations. These suggest that elephants using the Mapungubwe landscape forms part of a regional GMTFCA population of 1224 ± 72.4 individuals[22]. The elephants are highly mobile within the total range and are subsequently exposed to different legislation and a range of management practices, which prevent them from completely using the landscape freely[23]. In addition, much of their landscape use seems to be associated with where water is, particularly in the dry season.

Management of the regional elephant population is also different in the three countries and numbers fluctuate markedly in any given area[24]. Furthermore, several patches of private land and mining activities fragment the Park with the result that fences divide Mapungubwe into patches. Together with fences associated with agricultural activities and disturbance by humans, elephants are left with relatively narrow channels of "save" (*i.e.*, where they will experience minimal disturbance or cause conflict with humans and their activities) habitat when moving among the countries.

In addition, the texturized topography and dramatic relief of Mapungubwe impose a great deal on how elephants can use landscapes – it generates natural corridors of preferred movements. In addition, Mapungubwe's shape and effective boundary fencing result in an accentuated edge effect. The consequence is that within Mapungubwe, elephants are now using landscapes more intensely at those places they have access to. Some of these places house significant cultural heritage assets – there are 76 documented sites in the Park. The intensified use of and impact on these places by elephants directly contrasts Park objectives and specifically may influence the sense of place associated with Mapungubwe's ambience.

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[22] Selier, S. A. J., B. R. Page, A. T. Vanak and R. Slotow. 2014. Sustainability of elephant hunting across international borders in Southern Africa: A case study of the Greater Mapungubwe Transfrontier Conservation Area. *Journal of Wildlife Management* 78:122-132.

[23] Selier, S.A.J. 2015. The challenges and opportunities in conserving wide-ranging cross-border species: A case study of the Greater Mapungubwe Transfrontier Conservation Area elephant population. PhD-Thesis, University of KwaZulu/Natal.

[24] Selier, S. A. J. 2007. The social structure, distribution, and demographic status of the African elephant population in the Central Limpopo River Valley of Botswana, Zimbabwe, and South Africa. MSc Dissertation. Center for Wildlife Management. Pretoria, South Africa: University of Pretoria.

High impacts of elephants on vegetation within Mapungubwe National Park remain a concern. For this reason, various research projects to monitor elephant impact on vegetation were initiated. The current park management plan explicitly deliberates the importance of excluding elephants from some areas in protecting the riverine forest, which is described as a unique vegetation type, Lowveld Riverine Forest[25] on the banks of the Limpopo River. Since the 1990's the Greefswald Forest (riparian forest within the park boundary) has transformed from riparian forest, with a near continuous layer of trees well over 20 m height, to open woodland[26,27]. As a result of the changes in the riparian forest, the park erected camps that excluded herbivores in 2010 following a proposal drafted in 2008[28].

Interventions were mainly earmarked towards protecting the existing gallery forest. Discussions during 2010 recognized gallery forests in the eastern section of Mapungubwe as the key focus of mimicking the exclusion effects that humans during historical civilization would have had on elephant use of the area, one of the mechanisms that have resulted in the gallery forest as a present sense of place associated with the cultural heritage. Three scenarios were proposed towards re-aligning the camps excluding elephants to safeguard the existing trees and allow forest regeneration to happen. It was also thought that it could create opportunities to enhance and improve the tourist experience. The initial approaches to excluding elephants failed because of a multitude of reasons, which included lack of maintenance due to low manpower and budget, the layout of the fences impaired elephant movement from the river and back, which created high damage rate of fences, and the fence design (single cable) made it easy for elephants to breach the fence.

Before the realignment of the fences could be concluded, a meeting was arranged in which all stakeholders that monitor vegetation impacts by elephants in Mapungubwe National Park (SANParks, South African Environmental Observation Network - SAEON, Organization of Tropical Studies – OTS, and De Beers) could meet and consolidate monitoring and key lessons learnt regarding elephant impacts on vegetation (2016). By the time this lengthy process concluded, funding that was available for the fences (through Biodiversity Social Projects - BSP) was no longer available. In the seven years between 2016 and 2022, most of the targeted riparian species were lost from the proposed footprint of excluding elephants, which made the fencing of the area obsolete. At the same time, it was realized that the area, particular at the Treetop boardwalk, was a poor choice to protect because the fast erosion of the riverbank resulted in large losses in area with every flood event. The area is on the southern river-bend with high erosion of banks during flood events. The experiment

[25] Mucina, L., & Rutherford, M.C. 2006. The vegetation of South Africa, Lesotho, and Swaziland. South African National Biodiversity Institute
[26] De Beer, G.C.O. 2006. The impact of elephants (Loxodonta africana) on the Limpopo riparian forest and associated plant communities in the semi-arid region of the Limpopo Province. Report 7/5/3/2/1/2. Department of Economic Development, Environment and Tourism. Limpopo Province. Polokwane.
[27] O'Connor, T. G. 2010. Transformation of riparian forest to woodland in Mapungubwe National Park, South Africa, between 1990 and 2007. Austral Ecology, 35(7), 778-786.
[28] Freitag, S., & Ferreira, S. 2008. Proposal for elephant exclusion in certain parts of Mapungubwe National Park. Note for submission to SANParks EXCO, Scientific Services.

mimicking exclusion effects of humans and allowing the evaluation of the importance of drivers essentially did not happen.

2.3.2 Consequences of interventions

Researchers tagged 428 riparian trees in 1990. At the time the most pressing concern was that over-abstraction of water for the Venetia mine was causing mortality of riparian trees. Researchers resampled the trees in 2005 and found that about 25% of trees died in the 15 years between the two surveys. Although elephants started frequenting the park from 2000, the first elephant impact was only recorded in 2007. The suggestion was that the high mortality was a result of the 1991/1992 drought (which accounted for about half of all mortality), the 2000 flood (eroding riverbanks, about 20%), and drought in combination with creepers (about 30%). At the time, elephants accounted for a very small additional mortality (of around 3%).

SANParks, OTS and SAEON have been actively monitoring elephant related mortality of large trees in the riparian zone of the park. SAEON took over the monitoring of the large canopy trees (428) that were tagged before. SANParks marked an additional 300 large canopy trees in the Samaria section during 2010 and with the help of SAEON has been monitoring these on a regular basis.

Monitoring between 2006 and 2015 highlighted several aspects[29]. None of the monitored *Commiphora mollis* survived (100% mortality, all elephant related), *C. glandulosa* and *C. neglecta* had about 40% survival (all mortality was elephant related), while *Kirkia acuminata* had 15% survival (all mortality elephant related). About 40% of the marked *Faidherbia albida* (ana tree) and *Acacia xanthophloea* (fever tree) died across five years (between 2007 and 2012). Mortality was considerably lower for fig trees (just below 20%). Elephants were the cause of approximately 80-90% of these mortalities.

OTS adopted a tree demographic monitoring approach to assess the resilience of the species which included looking at changes in demographic profile of species over time. They surveyed the same transects over time, assessing whether there are any additions to the population in the form of recruits (seedling or resprouts) *i.e.,* are the species recruiting? Ana tree and fever tree had limited recruitment with no trees in the smaller demographic classes. Changes over time in the percentage of ana trees and fever trees with greater than 50% of circumference bark-stripped in the riparian forest shows that about 80% of ana trees had >50% of their bark stripped by 2012, and about 40% of fever trees.

The monitoring done by SAEON and SANParks has shown very similar results; although the annual mortality varies hugely among years, species, and areas (Samaria had much higher mortality than Greefswald), cumulative mortality for fever and ana tree was substantial. For instance, the data suggest 23% mortality over four years for

[29] Coetsee,C., Greaver,C., Strauss,C.,Daemane,E., Smit,I., Engelbrecht,M., Cilliers,S., Khoza,S.,Swemmer, T.(SAEON Savanna Node)&Kruger, L.(Organisation for Tropical Studies). 2022. Elephant impact -a summary of vegetation monitoring findings for Mapungubwe National Park and proposed way forward with herbivore exclosure. SS Report 23/2022.

fever tree and 15% for ana tree (2011-2015). There were slightly lower levels of bark stripping between 2011 and 2015 – about 1/3 of ana trees and 20% of fever trees had substantial bark stripped. However, in trees that died between 2011 and 2015, half to 2/3 had no damage and it was suggested that other factors (other than elephants) were to blame for this mortality.

The current park management plan also highlights the protection of species of special concern[30]. Monitoring elephant impact on the structure and condition of iconic baobabs was conducted on 501 baobab trees by OTS between 2005 and 2009 and by SANParks in 2019. The monitoring results indicated a mortality rate of 8%, which is approximately 0.73% mortality per annum. This is perceived as quite a low mortality rate but will nonetheless result in baobab going locally extinct over the next century if no recruitment is taking place and mortality rates do not increase. Studies on the recruitment of new baobab was not included in the monitoring, although an earlier study found no recruitment, even in places inaccessible to elephant[31].

Information on elephant interaction with humans are sparse in Mapungubwe, however there is some evidence that the creation of the TFCA has resulted in increased human-elephant conflict and loss of livelihoods for people living in the region. These livelihoods include jobs provided by former agricultural land now incorporated into protected area as well as activities such as harvesting lala palm (for brooms and mats) being negatively affected by elephant presence and usage[32].

Unpublished data from collared individuals suggest that elephants move across the landscapes that span Botswana, Zimbabwe, and South Africa. Researchers made use of intermittent regional fixed-wing aerial surveys to obtain estimates and dry season distribution. An elephant population of approximately 1,224 ±72.4 was estimated from six aerial counts over a 10-year period across the three countries[33]. The time-series of estimates indicates that the GMTFCA population is stable[34]. In addition, human presence most likely reduced elephant presence in a landscape which may have facilitated the establishment of large trees and gallery forests[35].

The above discussion strongly indicates that spatial variability is most desirable. Mapungubwe's large mammal management in general follows approach of enhancing spatial variability. Elephants in Mapungubwe per se epitomizes challenges and in the modern-day paradigm of flux of conservation management, elephant densities are preferred to reflect a range of local densities, as an index of how intensely they use landscapes and potentially may impact values. Such densities may vary from

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[30] Khosa, S., Ramoelo, A., Coetsee, C., Vickers, K. & Coetzee, L. 2020. Assessment of Impact of African Elephant (Loxodonta africana) on African baobab trees (Adansonia digitata) in Mapungubwe National Park. SS report 30/6/2020

[31] Coetsee, C. & Wigley, B.J. 2016. "Browser impacts in Mapungubwe National Park, South Africa: should we be worried?" *Koedoe: African Protected Area Conservation and Science* 58.1: 1-10.

[32] Sinthumule, Ndidzulafhi Innocent. "Unfulfilled promises: An exposition of conservation in the Greater Mapungubwe Transfrontier." *Africa Today* 64.1 (2017): 55-73.

[33] Selier, S. A. J. 2010. Report on the aerial elephant census of the Central Limpopo River Valley, Southern Africa September 2010. Northern Tuli Game Reserve, http://www.notugre.com/downloads/category/8-game-and-elephant-census# accessed 16 November 2012.

[34] Selier, S. A. J. 2007. The social structure, distribution, and demographic status of the African elephant population in the Central Limpopo River Valley of Botswana, Zimbabwe and South Africa. MSc Dissertation. Center for Wildlife Management. Pretoria, South Africa: University of Pretoria.

[35] Forssman, T., Page, B., & Selier, J. 2014. How Important was the Presence of Elephants as a Determinant of the Zhizo Settlement of the Greater Mapungubwe Landscape. *Journal of African Archaeology*, *12*(1), 75-87. doi: https://doi.org/10.3213/2191-5784-10250

extremely low (<0.01 elephant.km^{-2}) to very high temporary and spatially (>3 elephants.km^{-2}) and can be achieved through the restoration of spatial limitations on population dynamics.

2.4 Operational reflection and lessons learned

Demographically the GMTFCA population from Tuli, is slow growing at <2% annually with a relatively low reproductive rate (calving interval of 4.3 years, n = 50 known females with age at first calving approximately 13-15 years). This is also evident in the population census data where, apart from one "low" count in June 2007, overall population size has remained relatively stable at ~1,200 animals over the past decade. Four and possibly as many as seven, sub-groups are recognized within this population [36,37].

Implementation of the actions from the previous Elephant Management Plan was evaluated, but the outcome of the actions or objectives, which were not achieved, were not determined. A fence excluding elephants was erected to protect the riparian forest against elephants, but this fence became dysfunctional after a few years due to various factors, which potentially resulted in the loss of the riparian forest. However, in addition to elephant impacts, adult trees in the riparian forest are also influenced by additional factors including water abstraction locally and, in the region, more broadly which results in altered flood regimes (previous large floods may have replenished floodplain water levels), water stress (which may be related to more frequent drought and abstraction) and creepers. Recruitment is further impacted by cattle and other meso-herbivores. Elephants have significant impacts, especially on certain species (ana tree, fever tree, *Commiphora* spp., baobab, vegetation types (*e.g.,* riparian forest), and localities in the landscape (*e.g.,* closer to water). Elephants and their influences on vegetation are interacting with other factors, which include water stress, creepers, wood borers, and other animals.

There is some indication that elephants may contribute to eroding cultural sites (through rubbing against rock paintings or causing erosion), although they are by no means the largest contributor (anecdotal local impacts).

Although elephants could potentially be kept out of small areas of specific interest using fences, challenges in the past include fence maintenance, theft of fence material and solar panels, and poor fence design.

Mapungubwe National Park is a small park with poor connectivity across the broader landscape due to fence effects, with some of the fencing related to veterinary restrictions (*e.g.*, control of foot-and-mouth disease). The southern boundary fence imposes further constrains on the system, because elephants cannot move far away from the Limpopo River to the south before encountering this fence. Other fences limit the places where elephants can move through the landscape (*e.g.*, crossing from one

[36] Selier, S. A. J. 2010. Report on the aerial elephant census of the Central Limpopo River Valley, Southern Africa September 2010. Northern Tuli Game Reserve, http://www.notugre.com/downloads/category/8-game-and-elephant-census# accessed 16 November 2012.
[37] Selier, S. A. J. 2007. The social structure, distribution, and demographic status of the African elephant population in the Central Limpopo River Valley of Botswana, Zimbabwe and South Africa. MSc Dissertation. Center for Wildlife Management. Pretoria, South Africa: University of Pretoria.

country to the other) with exacerbated effects in these corridors. Therefore, managing what elephants do and where they go becomes important. However, SANParks is managing a relatively small area of the entire region used by elephants, which equates to limited management options and outcomes.

Tourists enjoy seeing elephants, but do not enjoy seeing damaged trees, especially baobabs[38]. In all cases both physical (elephants, birds, baobabs, scenery) and non-physical features (silence) were highlighted as important aspects for visitors to Mapungubwe.

Historical information gathered during the stakeholder workshop held in February 2022 with various stakeholders, included the following: elephants benefit nature; have ecological values and some other animals are reliant on elephants; Elephants have a spiritual value for people; Elephants are our natural heritage and are important[39].

The above sections, outlining current understanding and knowledge, have implications for how SANParks can manage elephant impacts in future. Mapungubwe's elephants are part of a regional population and as a result, they are not spatially restricted to Mapungubwe in their land use. Much of their current patterns of landscape use seems to be associated with learnt routes around fences so that they can access food crops (farms such as Weipe and Welton). However, other farms report limited issues with elephants accessing orchards which probably is a result of effective fence maintenance.

2.5 Method of Revision

2.5.1 Stakeholder participation

SANParks interpret the Norms and Standards for Elephant Management as an outcome of extensive public participation embedded within the process for establishing a Park Management Plan (PMP). In addition, SANParks reconsidered the outcomes of the Collaborative Policy and Planning Framework for the management of elephant in the GMTFCA that was completed in 2011. It was the product of a collective effort by key stakeholders comprising managers, scientists, and policy makers from amongst the three participating countries of Botswana, South Africa, and Zimbabwe. Many aspects remain, but new aspects emerged from public engagements with regards to the Mapungubwe Elephant Management Plan focused on immediately affected stakeholders. The Limpopo River stakeholder workshop was held towards developing a National Elephant Conservation Strategy in January 2022. Participants included stakeholders from amongst others provincial conservation authorities (Limpopo Economic Development, Environment and Tourism - LEDET), SAPS (South African Police Service) Stock Theft Unit, nature reserves (e.g., Mapesu Nature Reserve), affected landowners, researchers, agricultural property representatives (*e.g.*, ZZ2), and communal property associations (e.g., Den Staat CPA) (Appendix A).

[38] de Crom, E.P., 2020. Draft Report on "Intangible benefits for visitors to South African National Parks".
[39] Elephant Historical Recollections, Dongola Ranch, Limpopo, 26 January 2022. Internal SANBI Report.

2.5.2 Adaptive management

The Elephant Management Plan for Mapungubwe was applicable for 2011-2020. The plan had 59 actions across five objectives as well as reporting and evaluation requirements. The formal assessment was done with contributions from Park Management and Scientific Services staff and each action was marked as achieved, partially achieved, or failed. SANParks assigned a score of 2 to an achieved action, 1 to a partially achieved action and zero (0) to a failed action. SANParks then expressed performance as the noted sum of scores to the expected sum if all were achieved and had a score of 2. Mapungubwe achieved an overall performance score of 49%. Although this is a very low score, the process enabled SANParks to collectively reflect on key lessons learned, to discuss the relevance of actions as it was felt that many actions listed in the Elephant Management Plan were outside of SANParks' direct control. Through these discussions, the team developed a vision statement for Mapungubwe Elephant Management and identified some strategic goals for the revised Elephant Management Plan. Then a process followed where key elements and how elephants would contribute to the mission of Mapungubwe National Park were identified, which in turn provided guidelines on how to structure the revised elephant management plan.

3. Elephant Management Objectives for Mapungubwe National Park

Mapungubwe epitomizes a rare case where the primary purpose of a protected area focuses on cultural and heritage attributes. As such, the Mapungubwe Elephant Management Plan explicitly considers how elephants may impose on SANParks achieving cultural and heritage objectives. At the same time, it is acknowledged that biodiversity is a critical component of cultural heritage with biodiversity attributes enriching heritage, e.g., importance of mopane worm to local people and the use of medicinal plants. Not to ignore the fact that rock art most often depicts animals with spiritual and cultural significance (e.g., aardvark, eland, giraffe) and the interaction between humans and these spiritual animals.

Four strategic elephant management objectives (Table 1) have been developed for Mapungubwe National Park, with 11 associated management actions to address these.

Table 1. Elephant management objectives for Mapungubwe National Park.

Objective 1 To allow elephants to contribute to cultural values and use thereof, while providing equitable opportunities and benefits to people. *Objective 2* To manage the ecological role of elephants by allowing them to fulfil their function in the ecosystem, while limiting ecological risks. *Objective 3* To ensure a transparent and collaborative approach to long-term decision-making, by involving descendants and other stakeholders. *Objective 4* To integrate with GMTFCA around elephants through fostering meaningful regional stakeholder relationships.

4. Management of wild elephants[40]

A. General information and inventory

4.1. General

4.1.1 Names of owner and manager Owner: South African National Parks Park Manager: Mphadeni Nthangeni	**4.1.2 Postal Address** P.O. Box 383 Musina 0900
4.1.3 Telephone and fax numbers +27(0)15 534 7924	

4.2 Farm name[41]

Mapungubwe National Park comprises several properties of various sizes of which 15,191 ha are declared while 4,505 ha are in the process of being declared. Table 2 below provides a summary of the privately-owned land that was contractually included into the park and private land still to be declared. The Limpopo River forms the northern border of the park (unfenced), whilst the east, west and southern parts of the park has a game proof fence.

[40] This section focuses on the compliance with the Elephant Norms and Standards.
[41] Farm Name (including all registered farm names, numbers, and portion numbers in the fenced area).

Table 2. Summary of the privately-owned land contractually included and not yet included into the park.

Title deed	Farm name	Portion No	Extent (Ha)	Owner	Government Gazette	Proclamation Date	Period
T103911/1995	Riedel 48	1	2569.772	NPTSA	22231	26 April 2001	99 years
T37654/1990	Schroda 46	Remainder of	929.0942	De Beers	25562	17 October 2003	
T37654/1990	Schroda 46	4	929.0942				
T25629/1990	Schroda 46	7	1,295.4212				
T47452/1990	Schroda 46	8	419.9119				
T154756/2000	Tuscanen 17	3	1,301.038	WWF of SA	26615	30 July 2004	
T103662/1997 and T46309/1998	Welton No. 16	3	708.0486	NPTSA (0.6) and SANParks (0.3)	31461	03 October 2008	
	Mona 19	0	560.4003	Friends of Peace Parks	Not yet declared		
	Amenia 20	0	856.5320				
	Amenia 20	1	69.3806				
	Little Muck 26	0	2,1476169				
	Rhodes Drift 22	Remaining extent of	865.0285	Peace Parks Foundation			

4.3 Extent of the property and areas with elephants[42]

The park is currently 19,697 (Map 4.10.10 a). The core area of the Mapungubwe Cultural Landscape (MCL) comprises 30,000 ha. Various privately owned properties make up the MCL buffer zone, which comprises 104,800 ha (Map 4.10.10a). This reflects the MCL, and its buffer as adopted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) at the 38th session of the World Heritage Committee in Doha in 2014.Elephant enclosures are not applicable.

4.4 Land uses and activities on all neighbouring properties[43]

The area around the park is characterised by a sparse human population, and long distances for infrastructural lines of support. Land use and ownership within the park and the buffer are unusually diverse and include contractual partners, private landowners, land claimants, private tourism operations, game farms and local communities. There are two lease agreements with ZZ2 and Samaria farm. The leased land has been completely transformed for agricultural purposes namely, citrus and

[42] Precise extent of the property and the specific enclosure where the elephants will be kept.
[43] Description of the land uses and activities on all neighbouring properties. Description of land uses must be specific such as irrigation farming.

vegetable farming. The nearest larger populations of people are in the towns of All days and Musina.

4.5 Compilers[44]

Table 3. List of names, contact details, qualifications, and experience of the various compilers who contributes towards elephant management in Mapungubwe National Park.

Name	Designation	Contact Details	Qualification
Cathy Greaver	Regional Ecologist	Cathy.Greaver@sanparks.org	MSc
Corli Wigley-Coetsee	Scientist: Vegetation Dynamics	Corli.Wigley-Coetsee@sanparks.org	Phd
Danny Govender	General Manager: Savanna Research Unit	danny.govender@sanparks.org	Phd
Letsie Coetzee	Section Ranger: Planning & Development	letsie.coetzee@sanparks.org	
Mathokone Lebepe	Section Ranger: East	Mathokone.Lebepe@sanparks.org	
Mphadeni Nthangeni	Park Manager	mphadeni.nthangeni@sanparks.org	
Reckson Mashaba	Section Ranger: West	Reckson.Mashaba@sanparks.org	
Sam Ferreira	Large Mammal Ecologist	sam.ferreira@sanparks.org	Phd
Stefan Cilliers	Senior Section Ranger	stefan.cilliers@sanparks.org	MSc
Steven Khosa	Biotechnician	Steven.Khosa@sanparks.org	MSc

4.6 Proximity to settlements, rural communities, and tribal land

Sustainable human settlement in the MCL has a long history and extends beyond the boundaries of the park into Botswana and Zimbabwe.

4.7 Potential for enlarging the Park[45]

The expansion programme is informed by SANParks policy regarding land inclusion, the National Protected Areas Expansion Strategy (NPAES) (DEA, 2016) and the National Biodiversity Assessment[46]. It is proposed that the footprint of the park be expanded to cover an area of about 28,559 ha, centred on the Limpopo-Shashe River confluence and bordered by the Pontdrift - Musina regional road in the west and south, and reaching the extensive agriculture lands in the Weipe area in the east. This would increase the area in the park containing Subtropical Alluvial Vegetation by 50 % to 8,600 ha making a vital contribution to this ecologically important riverine vegetation type. The addition of a further 2,426 ha would add 21 % to the park and significantly contributes to the national target of this poorly protected Musina Mopane Bushveld vegetation type. The planned expansion will also treble the area of the Limpopo Ridge Bushveld vegetation type protected nationally. This would emphasise the importance of the park in contributing to national conservation targets.

[44] Name, contact details, qualifications, and experience in elephant management of a professional natural scientist or compiler of the plan or person who did the survey.
[45] Information as to whether there is potential for enlarging the property
[46] Driver, A., Sink, K.J., Nel, J.L., Holness, S., van Niekerk, L., Daniels, F., Jonas, Z., Mailedt, P.A., Harris, L., Maze, K. 2012. National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria

4.8 Specifications of the perimeter fence

The park has an open boundary with Zimbabwe and Botswana with only a boundary fence of 59 km along the eastern section and 29 km along the western section. The southern fence bordering the tar road is considered the disease boundary (red) line.

4.9 Financial plan and ability to manage elephants[47]

SANParks follow an annual budget planning process and allocates funding for the management of national parks. Elephant management embeds within the implementation of the Mapungubwe Park Management Plan[48]. Financing the implementation of this elephant management plan are thus provided through the SANParks annual budgeting process.

4.10 Ecological characteristics[49]

4.10.1 Climatic and hydrology[50]

The climate is semi-arid with an annual rainfall around 350mm. Rainfall is highly variable but falls mainly during the summer months from October to April.

4.10.2 Geology[51]

Granite forms the two cratons to the north and south, while millions of years of erosion are responsible for the sandstone currently present in the basin. Conglomerate ridges and koppies are visible south of the Limpopo River and are accompanied by flat sandstone fields. Closer to the river, the sandstone flats give way to a more rugged terrain with plenty of hills. Soils of the Limpopo valley are derived from the southern Archaean granite formations, and in general from the Karoo-system (Stormberg, Ecca and Beaufort Series)[52]. The park comprises of an attractive semi-arid landscape with varying geological structures and formations, including extremely old Archaean rocks, metamorphics of intermediate age, karoo sandstone / conglomerate uplands that are about 200 million years old, and recent alluvium and sands.

4.10.3 Soils[53]

The soils of the Limpopo Valley are derived from rocks of the Archaean granite formations in the south and, more generally, from the Karoo-system (Stormberg, Ecca and Beaufort Series). Large areas are characterised by sandy, lime-rich soils generally deeper than 750mm and other areas are characterised by brown to dark brown clays with high silt content[54,55]. Soils generally have a low agricultural potential, with the irrigated alluvial tending to become brackish because of the accumulation of salts due

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[47] Financial plan indicating the ability of the owner of the elephants to continuously manage the elephants.
[48] SANParks. 2019. Mapungubwe Nation Park and World Heritage Site: Integrated Management Plan. SANParks, Groenkloof, South Africa. https://www.sanparks.org/assets/docs/conservation/park_man/mapungubwe_approved_plans.pdf
[49] Ecological information should be collected and analysed by an ecologist. Methods used should be scientific and described in detail. The scale of the maps should be at least 1-50 000.
[50] General climatic and hydrological data
[51] General description of the geology
[52] Scholtz, T. 2007. The evaluation of the establishment and growth of indigenous trees to restore deforested riparian areas in the Mapungubwe National Park, South Africa. BSc. Honours, Potchefstroom University for C.H.E., Potchefstroom.
[53] General description of the soils
[54] Bezuidenhout, H. 2002. Generalized soil map for Dongola/Vhembe National Park. Internal report for SANParks, Scientific Services, Kimberley.
[55] Götze, A.R. 2002. The classification of plant communities and the evaluation of restoration technologies in different land-use areas in the Vhembe-Dongola National Park, Northern Province, South Africa. MSc thesis. Potchefstroom University for C.H.E., Potchefstroom.

to the strong evaporation. This poor agricultural soil is easily degraded by overgrazing[56].

4.10.4 Vegetation[57]

As can be expected from the varying substrates and topography, a variety of vegetation and animal habitats occur within the park. Diverse plant communities on koppies stand above *Commiphora-Colophospermum* veld (Kanniedood and Mopane) on the surrounding undulating terrain. River and floodplain associated vegetation includes fever tree *Vachellia xanthophloea*, African ivory nut palm *Hyphaene petersiana* palmveld, narrow-leaved mustard tree *Salvadora australis* shrubveld on the floodplains, and vlei thorn *Vachellia stuhlmanni* communities on old lands. The current vegetation map is based on the work done previously[58,59] (Map 4.10.10c).

Initially, before the park was proclaimed, plant communities were identified, classified, and described[60] to proposed land types that could be used to inform recommendations regarding restoration and rehabilitation. The initial 12 plant communities in five land types[61] were eventually simplified to eight vegetation types. Plant communities were published in two land types (*i.e.*, Ia and Ib)[62] and these are examples of the type of communities found in the different land types. The Ia land type includes the riverine and non-perennial wetland vegetation on deep to moderately deep soils with a high silt and clay content. The Ia land type was devided into four communities: *Salvadora australis – Cucumis zeyheri* community, *Hyphaene petersiana – Vachellia tortilis* community, *Croton megalobotrys – Combretum microphyllum* community and *Diplachne fusca – Vachellia xanthophloea* community. Many of the communities of the Ia land type had highly compacted surfaces created by previous and current overgrazing by cattle and game with a high degree of surface runoff and surface erosion in some cases. Land type Ib indicates land types with exposed rocks, stones or boulder outcrops covering 60 - 80 % of the area[63]. The Ib land type was devided into two communities: *Hexalobus monopetalus – Croton gratissimus var. subgratissimus* community and the *Terminalia prunioides – Grewia bicolor* community. The vegetation types and associated communities were used to create seven "ecologically sound" management types. These management types were based not only on vegetation types but also on environmental variables and anthropogenic influences.

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[56] Els, Y. 2010. The implementation of selected technologies to enhance the restoration of indigenous tree species in the deforested riparian areas in the Mapungubwe National Park, South Africa. BSc. Honours, Potchefstroom University for C.H.E., Potchefstroom.
[57] Detailed description of the vegetation
[58] Götze, A.R., Cilliers, S.S., Bezuidenhout, H. and Kellner, K. 2003. Analysis of the riparian vegetation (land type) of the proposed Vhembe-Dongola National Park, Limpopo Province, South Africa. Koedoe. 46:45–64.
[59] Bezuidenhout, H. 2002. Broad vegetation patterns for Dongola / Vhembe National Park. Internal SANParks Scientific report. AERU office, Kimberley.
[60] Götze, A.R. 2002. The classification of plant communities and the evaluation of restoration technologies in different land-use areas in the Vhembe-Dongola National Park, Northern Province, South Africa. MSc thesis. Potchefstroom University for C.H.E., Potchefstroom.
[61] Land type survey staff. 2004. Land types of the map 2230 Messina. Memoirs on the Agricultural Natural Resources of South Africa 37. ARC-Institute for Soil, Climate and Water, Pretoria.
[62] Götze, A.R., Cilliers, S.S. and Bezuidenhout, H. 2008. Analysis of the vegetation of the sandstone ridges (Ib land type) of the north-eastern parts of the Mapungubwe National Park, Limpopo Province, South Africa Koedoe: African Protected Area Conservation and Science 50: 72–81.
[63] Land type survey staff. 2000. Information on the land types of the map 2228-Alldays. Pretoria: Directorate of Agricultural Information.

Three main vegetation types were classified nationally[64] for the area of Mapungubwe: Subtropical Alluvial Vegetation, Musina Mopane Bushveld and Limpopo Ridge Bushveld. The riparian forest on the Limpopo River is classified as Lowveld Riverine Forest[65].

Table 4. Main South African vegetation (veld) types found in the park with characteristics[66] and overlap of specific management types[67].

National vegetation types	Landscape	Geology and soils	Characteristic vegetation	Management Types
SVmp1 Musina Mopane Bushveld	Undulating to very irregular plains, with some hills	Mostly underlain by Beit Bridge complex. Variable soils from deep red/brown clays to heavy clays to deep, freely drained sandy soils to shallower types. Land types mainly Ae, Ah, Fc and Db	*Colophospermum mopane* with various combinations of other dominant species (*e.g.*, *Combretum apiculatum* and *Terminalia prunioides*) depending on soils	*Colophospermum mopane - Brachiaria deflexa* closed Woodland (53%). *Salvidora australis - Acacia stuhlmannii* open shrubland (42%). *Commiphora species - Sesamothamnus lugardii - closed Shrubland (4%)*
SVmp2 Limpopo Ridge Bushveld	Extremely irregular plains with ridges and hills	Mostly rocks of the Beit Bridge complex, sediments (including sandstones of the Clarens formation) and basalt. Shallow gravel and sand to calcareous clayey soil, including land type Ib	*Kirkia acuminata* on ridges, *Adansonia digitata* on shallow calcareous gravel, *Catophractes alexandri* on calcsilicate soils	*Acacia senegal - Barleria sinensis* closed Shrubland (58%); *Hexalobus monopetalus - Bulbostylis hispidula* open Shrubland (19%); *Commiphora* species - *Sesamothamnus lugardii* - closed Shrubland (15%); *Colophospernum mopane - Brachiaria deflexa* closed Woodland (7%)
Subtropical alluvial vegetation	Flat alluvial riverine terraces supporting an intricate complex of macrophytic vegetation, marginal reed belts as well as extensive flooded grasslands, ephemeral herblands and riverine thickets	Recent alluvial deposits with deep, fine structured sandy to loamy soils, salt often accumulates in the soil. Land type Ia	*Croton megalobotrys* with various large riverine trees such as *Faidherbia albida* and *Vachellia xanthophloea*	*Croton megalobotrys - Combretum microphyllum* closed Woodland (55%). *Faidherbia albida - Panicum maximum* closed Woodland (26%). *Salvidora australis - Acacia stuhlmannii* open Shrubland (19%)

4.10.5 Preferred management density of elephants

Mapungubwe has an arid landscape with varying substrates and topography and a variety of vegetation and animal habitats. The park also has an open northern boundary with Botswana and Zimbabwe and therefore density of elephants in Mapungubwe is variable. The published literature suggests that elephant density will fluctuate between 0-2 elephants per km^2 across many habitats[68] and rainfall

[64] Mucina, L. and Rutherford, M.C. (eds). 2006. The vegetation of South Africa, Lesotho, and Swaziland. Strelitzia 19. South African National Biodiversity Institute. Pretoria. South Africa.
[65] Von Maltitz, G., Mucina, L., Geldenhuys, C., Lawes, M., Eeley, H., Adie, H., Vink, D., Fleming, G. and Bailey, C. 2003. Classification system for South African Indigenous Forests: An objective classification for the Department of Water Affairs and Forestry. Department of Water Affairs and Forestry, Pretoria, South Africa.
[66] Mucina, L. and Rutherford, M.C. (eds). 2006. The vegetation of South Africa, Lesotho, and Swaziland. Strelitzia 19. South African National Biodiversity Institute. Pretoria. South Africa.
[67] Götze, A.R. 2002. The classification of plant communities and the evaluation of restoration technologies in different land-use areas in the Vhembe-Dongola National Park, Northern Province, South Africa. MSc thesis. Potchefstroom University for C.H.E., Potchefstroom.
[68] Robson, A.S., Trimble, M.J., Purdon, A., Young-Overton, K.D., Pimm, S.L. and Van Aarde, R.J., 2017. Savanna elephant numbers are only a quarter of their expected values. *PloS one*, *12*(4), p.e0175942.

gradients[69]. SANParks acknowledges, however, that in some habitats, elephant density will be much higher than 2 elephants per km^2, and in other areas they will be much lower than 1 elephant 100 km^2. Note, however, that elephant impacts do not link clearly to elephant abundance [70].

4.10.6 Game species and numbers[71]

While the park forms part of a larger region over which species can roam, most of the animal populations have variable growth rates within the park, and resultantly, no immediate threats to the environment are foreseen except for localised elephant effects. Several species of game reside within Mapungubwe (Table 5). In this context, elephants are thus part of a suite of herbivores and thus contributing to the dynamics of the Mapungubwe ecosystem collectively. Within this context, systems approaches are key and provide reflection on the "*Preferred management density of elephants*"[72].

Table 5. Estimates for animal abundances in Parks in Mapungubwe National Park. Provided are the year of the last survey, 95% Confidence Interval ranges where available and indicate the method, 5-year trend and year of the last estimate. (-) species does not occur in the park, nc – not counted. Methods: t – total counts, r – registration studies, g – guestimate usually from ranger experience. Trends: u – unknown, i – increase, d – decrease, 0 – non-directional. Round values for those larger than 10 to the nearest 5, and larger than 50 to the nearest 10.

Mapungubwe National Park					
Species	**Number**	**Species**	**Number**	**Species**	**Number**
Blue wildebeest	247 (s,u,2014)	Leopard	Nc	Chacma baboon	Nc
Brown hyena		Nile crocodile	Nc	Bat-eared fox	Nc
Cattle		Lion	Nc	Black-back jackal	Nc
Common reedbuck	-	Nyala	-	Bushbuck	10 (t,u,2010)
Donkey	-	Plains zebra	161 (s,u,2014)	Bushpig	Nc
Eland	55 (s,u,2014)	Red hartebeest	3 (s,u,2014)	Common duiker	Nc
Elephant	344 (t,i,2014)	Spotted hyena	Nc	Klipspringer	Nc
Gemsbok	25 (s,d,2014)	Tsessebe	1 (t,u,2010)	Kori bustard	Nc
Giraffe	35 (s,u,2014)	Warthog	190 (t,u,2010)	Porcupine	Nc
Greater kudu	14 (s,u,2014)	Waterbuck	40 (t,u,2010)	Steenbok	15 (t,u,2010)
Hippopotamus	Nc	White rhinoceros	5 (t,0,2022)	Vervet monkey	Nc
Impala	426 (s,u,2014)	Aardwolf	Nc		

4.10.7 Sensitive habitats and species

The floodplain alluvial soils on which forests occur have the highest median tree height, canopy volume, basal area and most importantly, species diversity, of

[69] Sankaran, M., Hanan, N.P., Scholes, R.J., Ratnam, J., Augustine, D.J., Cade, B.S., Gignoux, J., Higgins, S.I., Le Roux, X., Ludwig, F. and Ardo, J., 2005. Determinants of woody cover in African savannas. *Nature*, *438*(7069), pp.846-849.

[70] Guldemond, R. & R.J. van Aarde. 2008. A meta-analysis of the impact of African elephants on savanna vegetation. Journal of Wildlife Management 72: 892-899.

[71] Game species and numbers present on property

[72] Preferred management density of elephants – refer to section 2.5 of this document.

vegetation communities in the Mapungubwe Cultural Landscapes[73]. These subtropical, riverine forest is a unique habitat with high biodiversity[74]. The Lowveld Riverine Forest is endangered because it has been largely removed outside of protected areas[75], particularly during the construction of border fences and during agricultural activities. Even within the park the forest is facing grave challenges and has mostly disappeared; in 1990 true riparian forest still existed in the Greefswald section, dominated by giant fever trees *Vachellia xanthophloea*, ana trees *Faidherbia albida*, sycamore figs *Ficus sycomorus*, apple-leaf *Philenoptera violacea* and nyala trees *Xanthocercis zambesiaca*. Independent research by Prof. Tim O'Connor revealed that 15 years later a quarter of these had been lost; despite little change in the forest for 35 years prior to 1990 (1991 was also coincidentally the first year ever that the Limpopo River stopped flowing seasonally). Ongoing monitoring of the riparian forests have shown further deceases in riparian trees. Many factors have been proposed: elephants, drought, floods, pumping of groundwater for a nearby diamond mine and extraction upstream. Although some of these factors can be responsible for mortality in some of tree species, elephant damage has been implicated in the mortality of fever tree, ana tree and *Schotia brachypetala*. Elephant impact may be unnaturally high due to extensive farmland on either side of the park, which forces large numbers of elephants to utilise relative short stretches of river during the dry season and elephants are usually blamed for the demise of the riparian trees. Long-term monitoring established that almost half of woody species on neighbouring Venetia Limpopo Private Reserve trends towards local extirpation due to elephant impact[76].

4.10.8 Disturbed or degraded areas[77]

Large tracts of land within the current core area of the park were cleared of their natural vegetation for agricultural purposes during the 1980s. These tracts were intensively farmed with various crop types, involving artificial fertilisation and irrigation. Years after the abandonment of these fields, the most visible impacts of the past practices are still the absence of most of the original vegetation, which characterised the different zones as inferred from historical aerial photographs. The hydrological system was also transformed due to past agricultural practices. The park's aquatic and / or wetland systems consist of the Limpopo and Shashe rivers, floodplains with riparian woodland and canopy forest, the Maloutswa Pan system that forms an integral part of the Limpopo Riverine Forest, and the Golope/Maloutswa wetland and pans. Many of these wetlands have been impacted by past agricultural activities. The current degradation plans for the park include mapping degraded areas including old lands, wetlands, and

[73] Gandiwa, P., Finch, J. and Hill, T. 2016. Vegetation structure and composition in the semi-arid Mapungubwe Cultural Landscape. Global Journal of Environmental Science and Management 2(3): 235-248

[74] Von Maltitz, G., Mucina, L., Geldenhuys, C., Lawes, M., Eeley, H., Adie, H., Vink, D., Fleming, G. and Bailey, C. 2003. Classification system for South African Indigenous Forests: An objective classification for the Department of Water Affairs and Forestry. Department of Water Affairs and Forestry, Pretoria, South Africa.

[75] Bezuidenhout, H. 2010. The importance of the Greefswald (Mapungubwe) Forest: Status (Mapungubwe National Park). Internal SANParks Scientific report, AERU office, Kimberley.

[76] O'Connor, T. G., & Page, B. R. (2014). Simplification of the composition, diversity, and structure of woody vegetation in a semi-arid African savanna reserve following the re-introduction of elephants. Biological conservation, 180, 122-133.

[77] Disturbed or degraded areas such as bush encroachment and soil erosion

cultural heritage sites in need of restoration by active measures; for wetlands these include removal of man-made barriers that keep water from moving freely.

4.10.9 Water bodies and distribution thereof[78]

The confluence of the seasonally flowing Shashe and Limpopo Rivers are the dominant hydrological feature. The Shashe River is a highly ephemeral river, with flow generally restricted to a few days of the year. The river contributes 12.2 % of the mean annual runoff of the Limpopo Basin. The lower Shashe is a sand filled channel, with extensive alluvial aquifers in the river channel and below the alluvial plains. Various other smaller seasonal tributaries, with steeper gradients, flowing north onto the Limpopo floodplain, occur in the park. The Limpopo and the Kolopi floodplain wetlands are the dominant wetland type. These two floodplains ultimately form one system towards the confluence (in the Samaria section of the park). There are eight wetland ecosystem system types in the Mapungubwe and World Heritage Site, of which 42% are in a "Good" condition, 9% "Moderately Modified" and 49 % "Heavily Modified" (Nel et al., 2011A).

The park is typically an arid environment where ecosystem functioning is largely driven by water in the landscape, especially aquifer dependent ecosystems (*i.e.*, Kolopi wetland and the Greefswald / gallery forest). The key groundwater issues in the park are related to the abstraction of water from the underlying aquifers, particularly the Greefswald and Shroda alluvial aquifers along the Limpopo River. Groundwater is abstracted from these aquifers for mining and agricultural purposes. SANParks also abstract water for tourism and staff purposes from the same aquifers. Abstraction from these aquifers may not only affect the base flow contribution to the Limpopo River during the dry season but may also apply stress on aquifer dependent ecosystems. Venetia, South Africa's largest diamond mine is situated in the central zone of the Limpopo Belt. To extend the life of the mine, De Beers is currently investing over $2 billion (US) in converting the Venetia open pit mine in South Africa into an underground operation. This will extend production at the site to 2043[79]. To sustain its current mining operations, the mine abstracts water from two independent local aquifers (Greefswald and Schroda), that lie close to the confluence of the Limpopo and Shashe rivers, within the park.

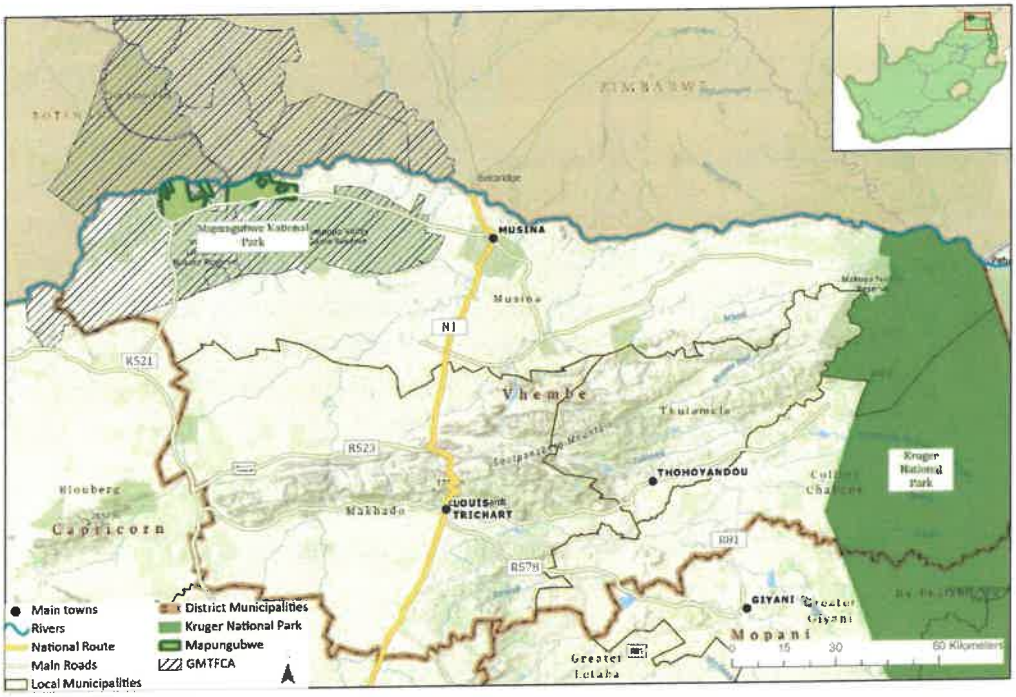
In 2009 SANParks in collaboration with the Department of Water Affairs office in Polokwane initiated a long-term groundwater monitoring project in the park. There are currently seven groundwater level-loggers installed in selected boreholes across the park. To establish long-term trends within different aquifer systems, additional loggers were placed in the hard rock aquifer (secondary aquifers) further inland / away from the Limpopo River. Analysis of the data indicates that groundwater / surface-water interactions play a vital role in groundwater recharge processes. The primary aquifer is recharged almost immediately during surplus flow conditions, and then gradually declines over the dry winter periods maintaining base flow conditions in the Limpopo

[78] Description of all available water bodies and distribution thereof described
[79] Kahinda, J.M., Meissner, R. and Engelbrecht, F.A. 2006. Implementing Integrated Catchment Management in the upper Limpopo River basin: A situational assessment *Physics and Chemistry of the Earth* 93:104-118

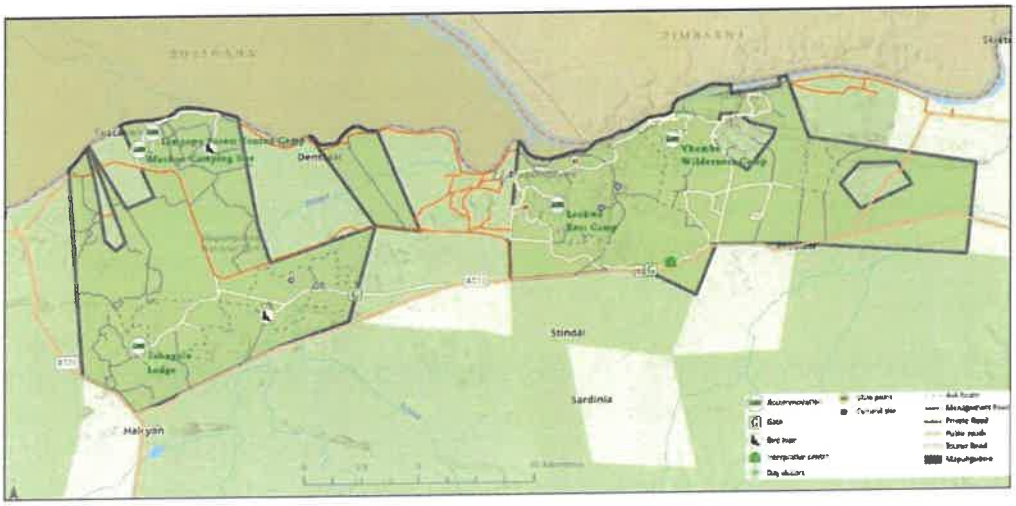
River. The general trend in the water levels indicates that groundwater abstraction particularly along the Greefswald section appears to be well managed as the water levels have not declined below the static water level since installing the loggers. The construction of dams or impoundments on the Limpopo and Shashe Rivers poses the greatest threat to the sustainability of the primary aquifer which will disrupt the recharge / flow processes of the system. We do not know what the abstraction is doing soil water and how this may affect riparian vegetation.

4.10.10 Maps

(a) Location



(b) Topography[80]



[80] Topographic map of property (boundary of farm(s) and camp(s), roads, water points, infrastructure, etc.)

(c) Vegetation communities

B. Management goals and objectives

The park envisages a *free-roaming persistent elephant population, fulfilling a broader ecological role as a keystone species, with rare and sensitive species flourishing, while connecting Greater Mapungubwe Cultural landscape users, and leading to a broad suite of benefits to people in the region."* Four strategic elephant management objectives (Table 6) have been developed for Mapungubwe National Park, with 11 associated management actions to address these. See Section 3 for details.

Table 6. Elephant management objectives for Mapungubwe National Park

Objective 1 To allow elephants to contribute to cultural values and use thereof, while providing equitable opportunities and benefits to people
Objective 2 To manage the ecological role of elephants by allowing them to fulfil their function in the ecosystem, while limiting ecological risks
Objective 3 To ensure a transparent and collaborative approach to long-term decision-making, by involving descendants and other stakeholders
Objective 4 To integrate with GMTFCA around elephants through fostering meaningful regional stakeholder relationships

4.11 Habitat

4.11.1 Veld condition[81]

Monitoring of riparian vegetation as well as upland vegetation has taken place over the past 20+ years in Mapungubwe. The monitoring of riparian trees has been discussed in Sensitive Habitat (section 2.7 of this document). Apart from riparian forest monitoring, transects away from the Limpopo River has found high impacts of *Commiphora* spp. and other sensitive palatable species[82]. Elephant are also increasingly damaging baobabs with a recent estimate of 8% mortality of baobab between 2009 and 2019 years[83].

4.11.2 Rehabilitation programme for degraded areas

SANParks continues to carry out rehabilitation and maintenance work in critical sites like K2. The sites are also monitored on a regular basis to ensure their continued preservation. Additional monitoring of sites is also carried out on an annual basis as part of the scheduled inspection of the South African Heritage Resources Agency (SAHRA) in terms of the National Heritage Resources Act (Act No. 25 of 1999).

4.11.3 Fire management plan.

Due to the aridity of the region, fires are not a very prominent occurrence in this park. Therefore, there are limited prescribed management fires applied and majority of fire ignitions are due to lightning. In areas of significant fuel load, firebreaks are maintained around infrastructure and other areas at risk.

4.11.4 Water provision

The park has little artificial water provision because of the many springs and wetlands away from the Limpopo River. Additionally, much of the park is within less than 10 km from the river where pools provide water, even in the dry season.

4.11.5 Population management of other wildlife species

Due to its variability in geology, topography and vegetation, the park represents a spectrum of habitat types that may carry diverse faunal assemblages. Abundant medium-sized herbivores include eland, impala, kudu, waterbuck, blue wildebeest, and zebra while mega-herbivores such as elephants and white rhinoceroses are also present. At times, domestic animals such as donkeys and cattle enter the park from Botswana and Zimbabwe. Although all the current animal species historically occurred in the area, the management of other species embeds within Wildlife Management programme of SANParks. The herbivory programme seeks to maintain herbivory as a key ecosystem process by managing for different herbivore impacts over space and time, where possible.

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[81] Veld condition monitoring methods and time schedules

[82] Coetsee, C., & Wigley, B. J. (2016). Browser impacts in Mapungubwe National Park, South Africa: should we be worried? Koedoe: African Protected Area Conservation and Science, 58(1), 1-10.

[83] Khoza, S., Ramoelo, A., Coetsee, C., Vickers, K. & Coetzee, L. 2020. Assessment of Impact of African Elephant (Loxodonta africana) on Baobab trees (Adansonia digitata) in Mapungubwe National Park. Scientific Services report 30/6.

The predation programme provides guidance on managing factors and drivers that can derail the benefits of predation.

SANParks anticipate variable densities of species across time and between different sections and thus do not have set "preferred management density" for a particular species.

4.11.7 Information pertaining to elephants

4.11.7.1 Purpose of introduced elephant

The process of recognising the Mapungubwe National Park area as a place of natural and cultural significance began in 1922 when nine farms were set aside as a botanical reserve and was declared as a wildlife sanctuary in 1947. The park was initially declared on 9 April 1998 (Government Notice (GN) 409 in Government Gazette (GG) 18814 dated 09April1998). The elephant population was already resident or free roaming within the region at the time of declaration.

4.11.7.2 Preferred population size[84]

The Mapungubwe elephant population forms part of the regional elephant population roaming freely between South Africa, Botswana, and Zimbabwe. Therefore, SANParks anticipate variable elephant density over time and between the three countries.

4.11.7.3 Public consultation[85]

Consultation with regards to the Mapungubwe Elephant Management Plan focused on immediately affected stakeholders. The Limpopo River stakeholder workshop was held towards developing the National Elephant Conservation Strategy in January 2022 (see Appendix A)

4.11.7.4 Specifications for the release camp

The Mapungubwe elephant population forms part of the regional elephant population roaming freely between South Africa, Botswana, and Zimbabwe. Therefore, release camps are not required.

4.11.7.5 Control of elephant population size[86]

Due to the free roaming nature of the regional Mapungubwe elephant population, SANParks focus on manipulating the spatial use of elephants rather than their numbers. Manipulation of spatial use of elephants are limited within the confines of the relatively small and fragmented Park and the short distances to and from the largely perennial water source of the Limpopo River. Limitation of spatial use will therefore be linked to specific outcomes such as protection of individual specimens or specific sites

[84] Number of elephants kept or to be introduced, and preferred population size to be maintained.
[85] Public participation reports, where there are contractual agreements between the management authority of a protected area and a private land owner(s).
[86] Interventions to manage elephant population size and elephant impact, and a culling plan if the management intervention involves culling.

with species of special concern, sites of cultural significance and the protection of human life and infrastructure.

A key aspect is identifying the key areas of concern, and more importantly defining the mechanisms of how elephants influence these areas. Interventions then focus on targeting the specific mechanism which involve disturbing and interrupting the mechanism e.g., closure of a bore hole. These activities do need to integrate with the GMTFCA Elephant Management.

Removal of individual elephants within the park will be based on damage causing and problem animal principles.

4.11.7.6 Sex and age ratios[87]

SANParks does not explicitly manipulate age and sex ratios. These indicators are outcomes of vital rates such as births, natural deaths, and movements in and out of the Park.

4.11.7.7 Measures to prevent poaching

Poaching, in the classical sense of illegal hunting, has not been documented from Mapungubwe. Elephant mortalities due to snaring occurs from time to time where snares are placed for other animals. Patrols and snare removal are ongoing.

Protecting elephants align strongly with the activities implemented to protect rhinos in the park. This focuses on maintaining ecological integrity as well as the safety and security of sections within the park through access control, particularly at entrance gates, and regular patrolling of boundary fences and section edges. A key element is staff integrity supported by an integrity management system aimed at establishing a proud and responsible compliment of staff. Key elements include processes that enhance a feeling of co-decision making and ownership of elephants, while also dealing swiftly and independently with breaches of integrity by staff.

A second element focuses on situational awareness making use of various sources of information obtained through regular monitoring of sections and enablers such as camera traps, vehicle number plate recognition systems, optimized ranger patrols, etc. Addressing potential poaching threats focuses on detecting and disrupting threats to elephants through detecting incursions using ranger patrols, specialized technology, and dedicated response procedures.

4.11.7.8 Provision for adequate insurance

Insurance embeds in the generalized insurance of SANParks.

[87] If and how sex and age ratios will be manipulated.

4.11.7.9 Contingency plans[88]

SANParks adhere to the Policies and Standard Operating Procedures for Damage Causing Animals. Even so the following contingencies:

(a) Elephant problems in the case of the fence being unable to contain the elephants, or in the case of an escaped elephant, SANParks' Veterinary Wildlife Services provide all the veterinary requirements for interventions. Assessment is on a case-by-case basis but does follow a generalized rule of translocating (through the means specified in the Norms and Standards) the elephant back to the park. Elephants that leave the Park because of social pressure from other elephants will be targeted for removal and integration into the South African developing meta-population of small, fenced elephant populations and/or support for conservation initiatives elsewhere in Africa. If all options are exhausted, such elephants will be euthanized. Elephants that pose threats to human life or have developed a habit or leaving the Park and regularly cause damage will also be euthanized.

(b) Elephant problems in the case of the alteration of the habitat beyond acceptable limits; Similar to above, SANParks Veterinary Wildlife Services provide all the veterinary requirements. Removal of elephants to mitigate undesirable local influences on habitat will follow a similar decision tree as above. The first is integrating elephants into the South African developing meta-population of small, fenced elephant populations and/or support for conservation initiatives elsewhere in Africa. If all options are exhausted, such elephants will be culled following the approval of a culling plan.

(c) The management of problem animals at local level involves a 3-man local team (consisting of the camp management, Section Ranger, and camp maintenance) addressing all issues locally. The Section Ranger / Biodiversity Conservation Manager then responds to other interventions e.g., lethal strategies (if needed). The camp maintenance staff repair damages immediately after detection. Ultimately, the Conservation Manager collates information from monthly reports and other stakeholders for record and future management actions and gives feedback on outcomes and management actions to the local task team and relevant committees.

4.11.7.10 Feeding[89]

SANParks adopted a systems-based approach and do not feed elephants. The large open system ensures sufficient food gradients for elephants.

4.11.7.11 Threat analysis and security plan

The Safety and Security Plan comprehensively addresses both the strategic and operational aspects of visitor and staff safety, as well as environmental / cultural heritage asset protection and area integrity. An analysis of issues affecting safety and

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[88] Contingency plans to (a) elephant problems in the case of the fence being unable to contain the elephants, or in the case of an escaped elephant.
(b) elephant problems in the case of the alteration of the habitat beyond acceptable limits; or
(c) the fate of an elephant in the event of the death, insolvency or any other event that impairs the ability of the responsible person to care for the elephant.
[89] Feeding scheme in case of a natural food supply shortfall

security in the park has been developed and the resulting strengths, weaknesses, opportunities, and threats have been converted into achievable objectives and actions i.e., to conduct regular proactive and reactive interventions *i.e.*, patrols and surveillance operations to ensure that area integrity is maintained and to engage in joint cross border operations according to agreements.

4.11.7.12 The long-term population structure[90]

Elephants in Mapungubwe are part of a transboundary free-ranging population. SANParks will allow sex and age structures to develop in response to various natural constraints.

C: Information after approval for introductions of elephants[91]

4.12.8 Details of the elephants

4.12.8.1 The complete translocation history of each individual:

(a) Origin of the elephants[92]

The elephant population of Mapungubwe National Park grew from a small population that historically occurred within the regional landscape.

(b) The age of elephants and selection of elephants to be translocated[93].

Not applicable to Mapungubwe National Park

4.12.8.2 Serial numbers of transponders (microchips) to be inserted where appropriate.

Not applicable to Mapungubwe National Park.

4.12.8.3 The management of the capture, transport and keeping in boma[94]

Not applicable to Mapungubwe National Park.

5. Elephants in the legal context

The natural resources in South Africa are conserved and managed within the context of a comprehensive legal framework which is guided at a high level in accordance with the country's constitution. Within the overall framework of the Constitution, there are various sections of legislation, which govern elephant management. Specific management plans are compiled for individual elephant populations in line with the Park Management Plan, but as a separate document. The purpose and content of the elephant management plan is guided by the overarching legislation.

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[90] Identification of the long-term population structure in view of the management objectives of the population
[91] Section C: Information to be provided after approval for the introduction of elephants, but before a permit may be issued
[92] (e.g., location, habitat, fencing and size of reserve/farm)
[93] (e.g., exposure to tourists, fences and boma).
[94] (Including sedation) of elephants, as well as the name of the acting veterinary practitioner

These are listed below to indicate their relevance to the preparation of elephant management plans.

5.1 National Norms and Standards for the Management of Elephants in South Africa (GN 251/GG 30833/ 29 February 2008)

Of direct relevance are the National Norms and Standards for the Management of Elephants in South Africa which were developed in terms of section 9 of the National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) and came into effect on 1 May 2008. The Norms and Standards for the Management of Elephants in South Africa has been in review since 2018.

5.2 The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA)

Of relevance is Section 39 of NEMPAA which deals with the preparation of management plans for protected areas. It specifically provides that a management plan for a protected are should at least contain a coordinated policy framework, planning measures, controls and performance criteria, a program for its implementation and its costing, procedures for public participation, and the implementation of community-based natural resource management as well as a zoning of the area indicating what activities may take place in different sections of the protected area (as set out in Section 41(2) of NEMPAA).

5.3 The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA)

NEMBA came into operation on 01 September 2004 and provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998 (Act No.107 of 1998; NEMA). In 2013, amendments to the NEMBA were gazetted (Section 57 of Act No. 10 of 2004 and Section 35 of 2009; NEMBA). Section 43 of NEMBA provides that any person, organisation, or organ of state desiring to contribute to biodiversity management may submit to the Minister for his or her approval, a draft management plan for an indigenous species listed in section 56 of the NEMBA or an indigenous species not listed, but that warrant special conservation attention. The biodiversity management plan must be aimed at ensuring the long-term survival in nature of the species or ecosystem to which the plan relates, must indicate who will be responsible to implement this, and must be consistent with the NEMBA, all national environmental management principles, the national biodiversity framework, any applicable bioregional framework, any environmental implementation plans and management plans referred to in Chapter 3 of NEMA, any municipal integrated development plan, any other plans prepared in terms of national or provincial legislation that is affected and any relevant international agreement binding on the Republic of South Africa.

5.4 Threatened and Protected Species Regulations (GN 152/ GG 29657/ 23 February 2007)

The African elephant is listed as a Protected species in the list of Threatened or Protected Species (GN No R151/GG 29657/ 23 February 2007). In terms of section 56(1)(d) of NEMBA this means a species which is of such high conservation value or national importance that it requires national protection. The Threatened or Protected Species regulations (GN No R152/GG 29657/ 23 February 2007) restricts activities involving the African elephant and permits are required to carry out these activities.

5.5 Critically Endangered, Endangered, Vulnerable or Protected Species

Notwithstanding the provisions as indicated in section 45 of NEMBA, these requirements are also highly relevant to matters connected therewith in the publication of lists of critically endangered, endangered, vulnerable, and protected species (GN 151/GG 29657/ 23 February 2007) to avoid the management of elephants in isolation of South Africa's biodiversity that warrants national protection.

6. Implementation in support of elephant management objectives

6.1 Management Actions

Mapungubwe National Park epitomizes a rare case where the primary purpose of a protected area focuses on cultural and heritage attributes. As such, the Mapungubwe Elephant Management Plan explicitly considers how elephants may impose on SANParks achieving cultural and heritage objectives. At the same time, it is acknowledged that biodiversity is a critical component of cultural heritage with biodiversity attributes enriching heritage, *e.g.*, importance of mopane worm to local people and the use of medicinal plants. Not to ignore the fact that rock art most often depicts animals with spiritual and cultural significance (*e.g.*, aardvark, eland, giraffe) and the interaction between humans and these spiritual animals.

Four key elephant management objectives have been developed for Mapungubwe National Park, with 10 associated management actions to address these (Figure 1).

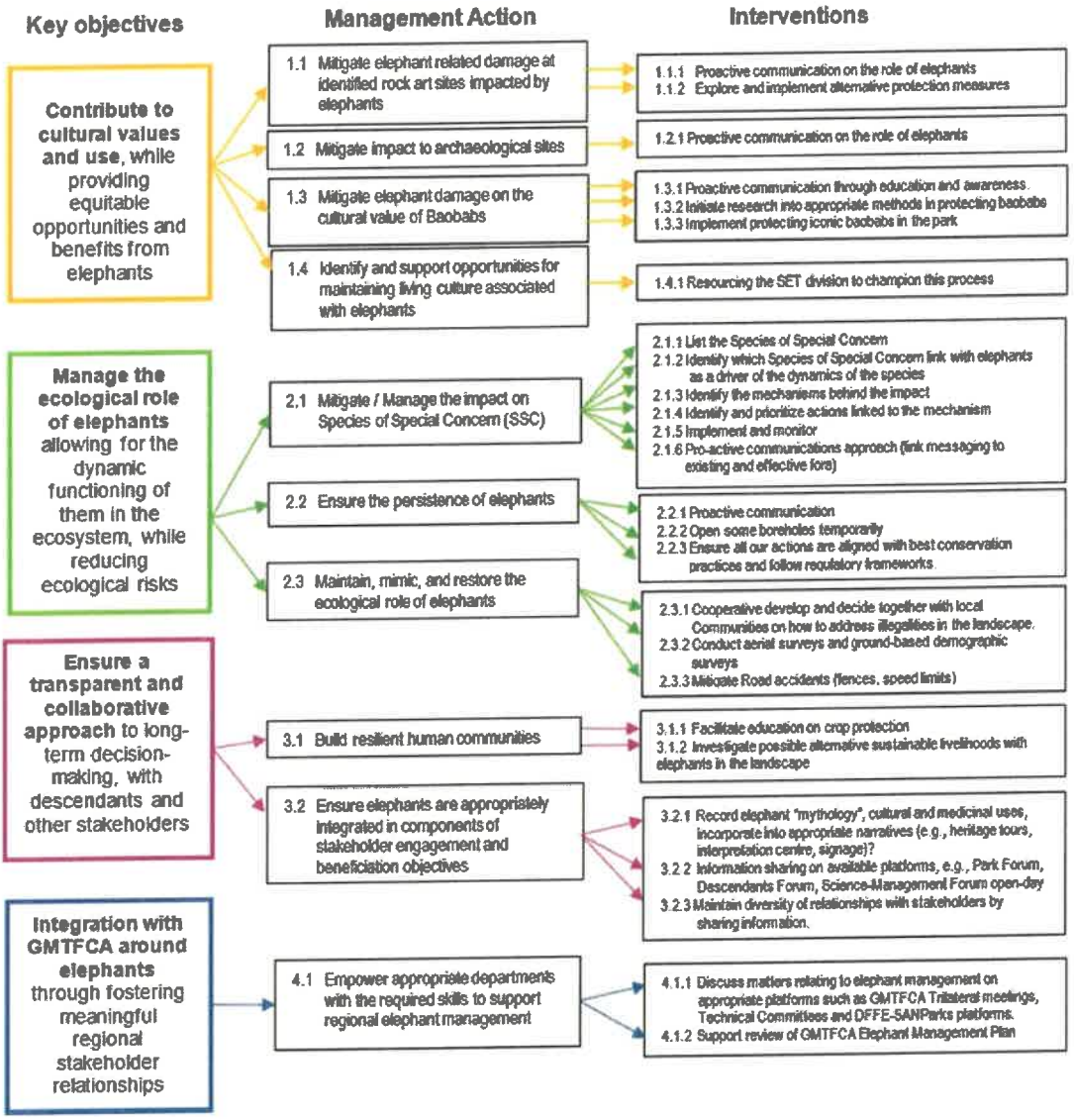

Figure 1. Elephant management objectives for Mapungubwe National Park linked to strategic actions. Note that several key activities support achieving these objectives through supporting the achievement of strategic actions.

6.1.1 Achieving Objective 1

To allow elephants to contribute to cultural values and use thereof, while providing equitable opportunities and benefits to people

Focuses on strategic actions to firstly manage elephant impacts at cultural and archaeological sites. We recognize that these impacts are incidental, probably because of the proximity of these sites to water, shade, or pathways near the sites which the elephants intend to use. Localized rock-packing can offer the benefit of protecting rock art sites from elephants but consequently the public perception towards the intervention could be seen in a negative light and the South African Heritage Resources Agency (SAHRA) may not allow such interventions. Wooden structures or

tree trunk barriers may be more ascetically acceptable. Good public relations through proactive communication with our stakeholders (tourists) could enhance public awareness of the management intervention. In addition, consultation with SAHRA should take place to find realistic and implementable measures to protect sites (of which there are 76 documented).

A key strategic action is to mitigate elephant damage on Baobabs, an iconic tree species with both cultural and tourism value within a unique geological landscape. This could lead to better outcomes for this culturally important species or individuals of this species. The challenge of a species-based versus systems-based focus may generate unrealistic expectations on SANParks. The final focus is on identifying and supporting opportunities for maintaining living culture associated with elephants. SANParks could promote conservation constituency and benefits to local people which could be beneficial but may have to overcome the regulatory hurdles to champion this process.

No.	Strategic Actions	Responsible Division/Unit*	Reporting / Evaluation	Mapungubwe Park Management Plan Reference
1.1	Mitigate elephant related damage at identified rock art sites impacted by elephants	CH	Cultural Heritage Status Reports	Damage Causing and Problem Elephants
1.2	Mitigate impact to archaeological sites	CH	Cultural Heritage Status Reports	Damage Causing and Problem Elephants
1.3	Mitigate elephant related damage and death on Baobabs	PM	Incidences of individual protection of baobab trees	Damage Causing and Problem Elephants
1.4	Identify and support opportunities for maintaining living culture associated with elephants e.g., elephant mythology incorporated into interpretation, collecting elephant dung	SET	Educational and awareness events linked to elephants as part of cultural history	Socio-economic

* CH-Cultural Heritage; PM-Park Manager; SET- Socio-economic Transformation

6.1.2 Achieving Objective 2

To manage the ecological role of elephants by allowing them to fulfil their function in the ecosystem, while limiting ecological risks

Focuses on managing the ecological impact to species of special concern. This should also lead to increased and maintained biodiversity and, in specific, the persistence of sensitive species and with some positive feedback from the public. A challenge is that species-based versus systems-based focus may generate unrealistic expectations. Focal interventions such as excluding elephants, may be seen in a negative light by some members of the public.

A second strategic action to ensure the persistence of elephants, may contribute to conservation of elephants and gain international kudos. This is also an opportunity to leverage social security through elephants. Again, species-based versus systems-based focus may provide unrealistic expectations.

The final strategic action focuses on maintaining, mimicking, and restoring the ecological role of elephants through establishing gradients of water, food, comfort and

safety resources across landscapes and habitats. The variable intensity of use by elephants in space and time results in the role of elephants as a disturbance agent maximizing biodiversity in space and time e.g., across Transfrontier space. However, these interventions may have unintended consequences *i.e.*, responses by elephants may amplify impacts in specific areas and some members of the public may see management interventions such as the closure of water holes in a negative light. Also, the proximity of the river (with pools that have water all year round) from most areas in Mapungubwe may limit the effectiveness of the closing of artificial water.

No.	Strategic Actions	Responsible Division/Unit	Reporting / Evaluation	Mapungubwe Park Management Plan Reference
2.1	Mitigate / Manage the impact on Species of Special Concern (SSC)	PM	Status of species of concern linked to elephants	Ecological Management
2.2	Maintain, mimic, and restore the ecological role of elephants.	PM	Trends in the ecological features of areas of concern	Ecological Management
2.3	Ensure the persistence of elephants	PM	Incidences of illegal killing of elephants	Elephant Protection Regional Integration

* PM-Park Manager

6.1.3 Achieving Objective 3

To ensure a transparent and collaborative approach to long-term decision-making, by involving descendants and other stakeholders

The key focus in achieving Objective 3 is on strengthening good co-operative governance arrangements with critical south African stakeholders. This will provide substantive opportunities to influence responsive and transparent policies that can help build trust across a range of stakeholders. This approach could result in contented stakeholders with a good understanding of system drivers. Challenges are the lack of Socio-Economic Transformation (SET) capacity and the expectations of descendants and other stakeholders that may not match or align with the expectations of park management.

No.	Strategic Actions	Responsible Division/Unit	Reporting / Evaluation	Mapungubwe Park Management Plan Reference
3.1	Build resilient human communities	SET	Incidences of human elephant conflict	Socio-economic Engaging with people
3.2	Ensure elephants are appropriately integrated in components of stakeholder engagement and beneficiation objectives	SET	Educational and awareness events linked to elephants as part of cultural history	Engaging with people

*SET- Socio-economic Transformation

6.1.4 Achieving Objective 4

To integrate with GMTFCA around elephants through fostering meaningful regional stakeholder relationships

The elephant population roams far beyond Mapungubwe National Park. This objective thus focusses on implementable strategies that respect the sovereign status of the

three countries and therefore potentially contradictory elephant management policy. This should provide improved relationships, regional cohesion and positive conservation outcomes that benefit people across three countries. At the same time, it is acknowledged that a lack of legitimacy (*i.e.*, no TFCA treaty) complicates the way that managers interact across borders. Intangible Proof of Evidence that does not meet auditing requirements does pose a risk and the park has limited capacity to contribute to management issues in the broader region.

No.	Strategic Actions	Responsible Division/Unit	Reporting / Evaluation	Mapungubwe Park Management Plan Reference
4.1	Empower appropriate departments with the required skills to support regional elephant management	SET	Educational and awareness events linked to elephants as part of cultural history	Engaging with people

*SET- Socio-economic Transformation

6.2 Damage causing and problem elephants

A key aspect is responding to elephants that impact on rock art, archaeological sites, and iconic baobab individual trees. A key requirement, to keep the public informed, is pro-active communications (see below). Even so, identifying the need to develop additional management plans for identified species of special concern like Baobabs that dictates the ambience of Mapungubwe. It focuses on baobab monitoring and exploring various ways to protect specific trees, assess the need and implement appropriate mitigation measures.

Generally, response to damage causing (individuals causing damage outside the park) and problem (individuals causing damage inside the park) elephants abides by the Norms and Standards for the Management of Damage-Causing Animals (DCA) in South Africa[95]. The SANParks Integrated Wildlife Management Policy guides the decision procedures applied to managing damage causing and problem elephants[96].

The procedure requires reporting of incidents of elephants that left the Park or cause damage within the park. The relevant Section Ranger will investigate and assess the case and conditions. If human life is immediately in danger, the individual elephants will be euthanized following the legal standards as specified in the National Norms and Standards for the Management of Elephants in South Africa[97]. If no human life is in danger, the response in collaboration with LEDET focuses on potential options of moving elephants away from the area of damage or potential damage (often physically chasing through various means). If barriers impose on encouraging elephants to move themselves, an assessment in discussion with Park Management, LEDET advises on capture and translocation. Translocation should focus on taking elephants to areas in the region that minimize subsequent transgressions by those habitual elephants, i.e., those that transgressed more than three times, and who poses increasing threat to

[95] DFFE. 2016. Norms and Standards for the Management of Damage Causing Animals in South Africa. National Biodiversity Management: Biodiversity Act, 2004 (Act No. 10 of 2004). https://www.dffe.gov.za/sites/default/files/gazetted_notices/nemba10of2004_managementofdamagecausinganimalsinsa_gn40412_0.pdf
[96] SANParks. 2020. Integrated Wildlife Management Policy. 17/P-CSD/pol/Wildlife Management v2 (09-20). Groenkloof, SANParks, South Africa. Section 5.8.
[97] DEAT. 2008. National Norms and Standards for the Management of Elephants in South Africa. National Biodiversity Management: Biodiversity Act, 2004 (Act No. 10 of 2004). http://extwpriegs1.fao.org/docs/pdf/saf85897.pdf

human life will be euthanized following the legal standards. If translocation is not feasible, then those elephants will be euthanized following the legal standards.

Treatment of carcasses is case specific and follows three guidelines: (1) When outside the Park, the use of carcasses by local people falls under the jurisdiction of LEDET and relevant Departments in Botswana and Zimbabwe, guided by national health and veterinary regulations. SANParks will support these departments on request for oversight and the safe use of elephant carcasses. (2) Within the park, SANParks will leave elephant carcasses to natural decomposition in the field. (3) In all cases, ivory will be collected following the ivory procedures (see Handling of Ivory Procedures).

Note that an incident is formally recorded in the DCA register of LEDET or SANParks and an incident report is completed and forwarded to other relevant parties.

6.3 Socio-economic development

The unique combination of environmental and cultural aspects within Mapungubwe have provided a vital catalyst for eco-based socio-economic development. The establishment of tourism facilities and an interpretation centre provided access to international and local visitors, which in turn contributes to the sustainable livelihoods of several local businesses. Future developments such as a Youth Overnight Facility and orientation centres at two main archaeological sites, will further enhance the potential for socio-economic development.

A key opportunity links to cultural heritage. One aspect will focus on gathering folktales, anecdotes *etc.* relating to elephant and distribute these on appropriate platforms (*e.g.*, posters, articles, interpretation boards). This would help investigate possible elephant products resource use (*e.g.*, elephant dung for medicinal purposes or paper making) that can link to GMTFCA tourism initiatives.

6.4 Regional integration

Regional integration of elephant management embeds in the GMTFCA, Contractual and Co-operative conservation arrangements programme of the Mapungubwe Park Management Plan[98]. A key aspect is that legislative requirements in Zimbabwe, Botswana and South Africa differ. Hence, a specific focus is on the GMTFCA working groups to strengthen cross-border initiatives and working relationships. This includes: support to identify and formally establish wildlife corridors that enable the movement of elephants between protected and conservation areas; empowering communities to make decisions about access to and the use of natural resources, including elephants; develop and implement consistent measures and approaches to offset and mitigate the impacts of human-elephant conflict; Improve communication and cooperation to effectively combat illegal wildlife trade and undertake law enforcement; and contribute to coordinated monitoring and research related to elephant conservation and

[98] Section 10.6.1, Mapungubwe National Park and World Heritage Site Integrated Management Plan 2019 – 2029. https://www.sanparks.org/assets/docs/conservation/park_man/mapungubwe-approved-plan.pdf

management. SANParks is a member of the task team coordinating and facilitating implementation.

At a local scale within South Africa, elephant management focuses on various aspects including conservation management support; human-wildlife conflict management; fire management; research; eco-tourism promotion; and support to the wildlife economy. In addition, the Park will motivate and prioritise contractual inclusions and acquisitions targeting the incorporation of 10,000ha over 5 years.

6.5 Engaging with People

Engaging with people seek to enhance the way local communities can cope with challenges and opportunities linked to elephants. This is embedded within the Stakeholder Engagement Programme of the Park[99].

6.5.1 Mitigating elephant conflict

Mitigating human-elephant conflict focuses on two aspects – the first is building trusting relationships through having focal discussions on how to respond to elephants. This focuses on co-decisions on activities and approaches in how to deal with elephants that do leave the Park and potentially could cause damage.

A second key element is sharing best practices in responsible land-use practices to help reduce potential for human elephant conflict. Information will focus on a range of tools[100] including night guarding, noise deterrents, fire deterrents, buffer zones, bio-fences, chilly-smoke, chilly-fences, trenches, trip-alarms, beehive fences, solar electric fences, and intelligent farms. An additional focus is also on guiding people on elephant behaviour and the best ways to respond when encountering an elephant, whether on foot or in a vehicle.

6.5.2 Mitigating elephant damage

Mitigating elephant damage once it has taken place focuses on acknowledging the loss of property. SANParks do not have a monetary compensation scheme for damages caused by elephants to property but will participate in the development of a National Policy as part of pro-active management of wildlife conflict including elephants. Even so, a key element is to regularly engage with local people acknowledging the losses caused by elephants. A key aspect is to use such incidences to collectively discuss improvements and responses that can prevent future losses.

In additional to these, there is some conflict with motorists when elephants are caught between fences on the R572 which has caused some near collisions (in fact the road is notorious for high roadkill levels[101]). Park management has proposed that the dropping of fences be investigated between Mapungubwe and Venetia. Barriers to this

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[99] Section 10.6.1, Mapungubwe National Park and World Heritage Site Integrated Management Plan 2019 – 2029. https://www.sanparks.org/assets/docs/conservation/park_man/mapungubwe-approved-plan.pdf

[100] King, L., Oldenburg, C. & Cookson, L. 2018. Twelve tools to live in harmony with elephants. https://elephantsandbees.com/wp-content/uploads/2019/07/King-2018-HEC-Toolbox.pdf

[101] Collinson, Wendy J., et al. "Factors influencing the spatial patterns of vertebrate roadkill in South Africa: The Greater Mapungubwe Transfrontier Conservation Area as a case study." *African Journal of Ecology* 57.4 (2019): 552-564.

happening are veterinary control measures and the public road that will dissect the land. Some suggestions were: that the possibility of moving the veterinary fence to the southern boundary of Venetia is investigated; that boom gates with security cameras are erected on either end of the park's boundary and that traffic calming measures are implemented. By allowing elephants to move more freely to the south and reducing the chance that they can potentially be trapped between fences on the main road (with the additional benefits of calmed traffic), may decrease some of the potential conflict. When elephants cause the loss of a human life, SANParks engage in collaboration with LEDET, with the relevant family and find agreed ways to support the family's grief process.

6.5.3 Community safety and security

A key element integrating with the Stakeholder Engagement High-level Objective (comprising Stakeholder Structures- and Human-Wildlife Conflict programmes) of the park is collective discussions with local communities on safety and security. Although this is a broader context, SANParks will facilitate discussions inclusive of criminal activities regarding elephants between law enforcement agencies, SANParks and local communities. This seeks to develop a common understanding of factors threatening community safety and security that could impact on elephants. Importantly it seeks to co-develop responses with local people that can enhance trust as well as community safety and security.

6.5.4 Awareness

Engaging with people on ecological management is required at various levels. This includes environmental education interventions for children and adults, neighbouring landowners and communities as well as visitors to the park. Various programmes within the park management plan have linkages to creation of awareness, with the Communication Programme having the potential to reach a wider audience. A key aspect is support and participation in potential future cross-border tourism opportunities that incorporate broader resource-use issues and individual species being used into communication plan for both internal and external stakeholders. Implement campaigns could enhance environmental awareness amongst local communities and stakeholder groups.

7. Reporting and reflection

To ensure coherent and integrated evaluation of implementation and learning, an annual reflective report will be compiled for Mapungubwe. This will reflect on all the relevant elephant management actions undertaken and/or reasons for not undertaking certain actions. The report is anticipated to be compiled through a reflective science-management forum / engagement.

8. Management plan review

The Norms and Standards for Elephant Management in South Africa published by the Minister of Fisheries, Forestry, and the Environment (DFFE) require an Elephant Management Plan for each Park to be prepared by an elephant ecologist. This Elephant Management Plan has been developed as a collaborative effort inclusive of reflections on the lessons learnt from the previous Mapungubwe Elephant Management Plan. The Norms and Standards are currently still under review (August 2023). Once gazetted, SANParks will ensure alignment of this elephant management plan with any changed prescripts. Furthermore, the elephant management plan will be reviewed in conjunction with the revision of the Mapungubwe National Park management plan.

Appendix A

Records of stakeholder meetings inclusive of those with interests in Mapungubwe National Park as part of the stakeholder consultation in the development of a National Elephant Heritage Strategy.

Limpopo Regional Elephant Strategy Meeting, 19 March 2019

Summary of Key points that emerged:

Benefits:

1. Elephants are important at the local, national, and international level
2. Iconic species that underpins the wildlife economy, and not enough is made of this. It is essential for big 5 reserve, and "regional" tourism development. Perception is very important – the thrill of being in a reserve with elephant. Concept of elephants as an umbrella for the national wildlife economy.
3. Locally opens up huge opportunity in terms of hunting and ecotourism, dung, job creation, skills development, education, community development; also for the country as a whole in terms of attracting tourism, and associated infrastructure and jobs. Sustainable harvesting use – can be seen by people in the city as a reason why elephants are replacing cattle.
4. Becoming more important as direct driver of economic development for rural communities as direct owners through land with elephants and also regional enhancements.
5. Biophysically they are very important in terms of habitat engineers – where there are elephant there is more space and food for other species.
6. Elephants are valued culturally and spiritually; Psychological value; they are a national heritage; totem value in communities.
7. There is some sense nationally of "our" elephants – potential for building consensus behind a national herd.
8. Assist us in achieving our national goals in terms of conservation. Private (and community) and state partnerships enhance opportunities.
9. Conservation potential as a source of elephants for rest of the continent.

Risks:

1. At reserve and national level there is a major reputational risk. Managers are viewed as conservators of elephants on behalf of society, and interventions are scrutinized. Marketing and social media risk if you don't get it right. Especially risk in terms of consumptive use.
2. Elephants are incorrectly perceived by people as having no value; Disconnection from nature is a risk – people are disconnected from nature. We don't acknowledge the cultural and spiritual value of elephants enough. Poor perception of sustainable use.
3. Lack of communication with stakeholders nationally and locally. Poor marketing of direct and indirect benefits of elephants.
4. Lack of investment by government in the costs of owning elephants, while benefits flow.
5. Ownership of elephants vs custodianship – challenge of individual ownership (economic ownership) under the concept of a national herd (spiritual ownership) or approach.
6. Growing populations and lack of ability to move them elsewhere and mitigate risks.
7. One shoe does not fit all – need specific solutions for particular issues at local scale.
8. Conservation fatigue is a concern. It is difficult to manage in the face of legislative and regulatory implementation challenges. The broader community is not getting what they perceive they need from conservation, and conservation people are fatigued with needing to respond ad hoc for every aspect.
9. In the case of potential direct benefit around meat provision, need to be careful it does not become an expectation.
10. Manage reserves as silos; detached from society around them – fall alone rather than stand together.
11. Difficulty and high costs of entry for rural community into ownership is not well understood and planned for, or supported.
12. Sense that legislation is sound, but major challenge with implementation of legislation.
13. Social media is a major concern and risk when management takes place, and negative aspects are quickly emphasized by NGOs with agendas. Emotions are a big risk – linked to perceptions, and exploitation of perceptions (see social media above).
14. Lack of information flow from the conservation community to broader stakeholders.
15. This is seen as a consequence of not having a national strategy, and so a national strategy becomes important.
16. Research is needed, but managers don't have time for research, and the research does not necessarily give voice to the managers concerns or perspectives.

Costs:

1. Major costs to infrastructure and security (which will increase), HEC, retrieval costs. Ecological costs (genetics, vultures in trees).
2. Administrative and management costs (transactional costs for compliance with legislation) are way too high.
3. High direct and transactional costs are barrier to entry, especially for community owned areas.
4. Costs are relatively higher in small vs large reserve.
5. Cost to marketing direct benefits of elephants.

Key approaches/actions:

1. There is a strong emotional attachment to elephants; they are intelligent; cultural value; spiritual value; existence value (even if you are not seeing them). This attachment is there even if you have not seen them, but when you do see them it is awesome. Cannot put a monetary value on this, but need to understand the socio-economic-political-societal value of this.
2. We need to stop treating elephants as individuals, and start thinking of them as a species. Elephants are part of a system, ecologically and socially/societally.
3. There is a major issue of lack of trust in the system of and by all stakeholders; of managers and management; of authorities and permitting; of national strategy and approaches; communities and local stakeholders; NGOs; broader society.
4. The point was made that there is a "trade-war" between animal rights NGOs stealing a commodity to the detriment of the people who own and manage that commodity. This imbalance needs to be corrected.

5. Information flow from reserves to local and broader community. This would help to correct the imbalance of social pressures (e.g. from social media issues above). There is a lot happening in terms of good conservation, and also beneficiation for local communities and broader economy, and national and international conservation agenda, but this information is not flowing in an integrated and coherent way. We need to find a way of understanding the different cultures and working together.
6. The conservation community is not social media savvy, and is not proactive, or even properly reactive. Conservation supportive community does not "like: good aspects of conservation in competition with NGOs that garner support for bad aspects.
7. Legislation and implementation is a problem. Can we have simple rules for a complex problem? People are afraid to make decisions because of the rules, delays in permissions, and elephants are under such scrutiny
8. Research must be designed to improve management, and include participation and influence of managers. Needs to draw on their knowledge and experience. However, mitigate fatigue from repeat surveys, and make sure existing information is used for improvement in practice, which needs to be captured (managers don't share knowledge of what they know on reserves).
9. Need better understanding and communication around conflicting management approaches: the need to understand before you do something (precautionary) versus adaptive management (learn from doing).
10. There is a strong need for a national strategy, coherent message, which will allow the conservation community to be proactive and not so reactive, and that carries strongly the voice and perspective of managers. Overarching is good, but shy away from complexity, and needs to be flexible and must facilitate good management of elephants and not restrict; it needs to recognize good governance and discourage unethical practice. Must be simple – detail captured in N&S and individual management plans. Must allow for adaptive management.
11. Need to increase how much a manager (and collectively managers) can influence the system, and exert that influence on the system. Need better coordination and thus collective influence – managers are acting individually and are being targeted individually. Correct the imbalance of influence from global detached people towards local invested people.
12. Knowledge and toolbox of managers needs to be emphasized, and flexibility enhanced; Complexity comes from dealing with people and society, and need to understand how to deal with this (see trust issue).
13. Need to clarify uncertainty in the space on who owns elephants. Individual vs collective; the concept or user rights and contribution to the wildlife economy. Who gets user rights and benefits, but also then have accountability responsibility, and bear costs.
14. Further develop the understanding around concept of costs and who bears those costs – there are direct and indirect costs to owning and managing elephants, and "if you want to make decisions on my land, you must also carry the costs of managing". The responsibility comes from both the landowner and broader "users/beneficiaries". There are direct broad economic linkages to tourism and hunting; key costs need to be put on the table, direct management costs, HEC, fences, ecological costs/risks, but also consider the direct benefits to biodiversity that are also an offset.
15. We need to expand the thinking about elephants as a species – spiritual and cultural importance; importance to country as a whole – as a flagship species. There are jobs and benefits away from land where the elephants live, but are directly linked to elephants. Ownership in the broad sense, and access to elephants – needs to be clarified. We need to consider more strongly the reputational perspective; and scaling from local to national to global; our responsibility to the world – we and our neighbours may be the only ones with elephants in the future – this changes SA's responsibility.

Towards a National Elephant Conservation Strategy

Vision elements of a strategy:
1. Happy people benefiting from happy elephants;
2. 20 years' time: sustainable healthy elephant populations and habitats and improving the wellbeing of people.
3. See elephants in years to come playing a key role in improving the wellbeing of South Africans and society in general (beyond SA).
4. Recognising the value of elephants to people and the environment.
5. Frame the conservation status and define the management actions to enable the stability and numbers of elephant populations through best practice active management.
6. Strategic and precise and concise document to frame the national standing of elephants and give guidance as to how to manage elephants.
7. Build trust that elephants are managed for the benefits of the community;

Attributes of strategy:
1. Evidence based framework to support managers – to validate decisions to boards and others; improving understanding.
2. A bottom-up approach, and recognition of individuals running reserves, but as a collective; Need to give more strength to the managers in controlling the conservation space.
3. Solidified collective vision; Promote working with all stakeholders; Common and collaborative approach.
4. Acknowledge diversity; Improve trust and accountability and transparency, through increased participation and feedback, and consensus from communities and neighbours, and including international stakeholders. Reach out and include more communities into the conservation decisions.
5. Platform for communication. Recognition of what has been achieved so far (enhances credibility of the reserve/conservation community). Enhance communication between stakeholders, shared learning and feedback loop.
6. Accommodate conflicting objectives.
7. Increase benefits and reduce costs.
8. Being proactive and enabling, rather than reactive or defensive.
9. Simplified decision-making, but must be robust and defensible.
10. Must be enabling as the context can change very quickly, and need to be responsive to this. Must enable all approaches to management.
11. Mitigation involving collaboration. Work together as to how it is used (dynamic and living document).
12. Ethical management – acknowledging the species and as a sentient being. Needs to deal with Ethical vs Unethical practice – can't be one or other's view – have to be a collective view.
13. Guiding management requirements; Roadmap for the N&S. The strategy needs to be principles rather than details – leave that to the N&S and management plans. Consideration that if there is a national strategy, and N&S, and we are taking more of a collective approach, may not need the emphasis on individual management plans, or this can be reduced to implementation plans.

Risks to mitigate in the strategy:
1. Expectations at various levels by stakeholders who "need" to be included in elephant management. Need to acknowledge the "gradient of importance" which is the opposite of the "gradient of influence" we see at the moment. Should be landowner, communities, regional, national, international.
2. Pull the greenies in and make them part of the solution. What is their argument against the consensus conservation argument – incorporate into the strategy how to counter extreme arguments. Think from their side of the box. Especially include the moderate NGOs that are also strong.

3. Reduce/buffer risks, especially reputational risks (social media impacts, wrong decision-making)
4. Need to consider political issues, and land restitution – broader beneficiation.
5. Beneficiation needs to be emphasized; the right hand side of the socio-ecological framing; should improve and foster relationships with communities. Needs to give clear guidance on sustainable use.
6. Dealing with administration and management of elephants across cadastral/international boundaries.
7. When are we doing too much to elephants, when is intervention too much.
8. Legislation – what is the strategy to be for legislative issues in the future, simplify it, make it more effective, and improve implementation.

Key considerations for the strategy to address:
1. There is a responsibility to do this for the conservation of the species as whole, and, when we think of a national elephant herd, we need to consider broader issues such as linkages to other countries (transfrontier parks), and corridors.
2. Conservation goals: Biodiversity conservation and ecosystem functioning needs to be a core element, but with socio-economic as well as socio-ecological framing.
3. Improving lives of elephants;
4. Promote cultural/aesthetic/spiritual/existence values – a big part, which needs to be emphasized.
5. Maintaining viable populations – metapopulation approach to elephant management.
6. Expanding the range and natural range of the species – look at areas where they can be introduced and used as a flagship species for expanding the conservation estate.
7. Deal with issues of ownership of wildlife, address user rights, and equitable and broader beneficiation.
8. Proper land use, creating corridors for elephants and tap into metapopulation management – reduce silos. Collaboration and consolidation of resources to reduce/mitigate costs.
9. Beneficiation: Improved economic contribution from elephants; Guidance to sustainable use (consumptive and non-consumptive use of elephants). Maximised and sustainable responsible ecotourism associated with elephants; sustainable community involvement; Increase economic value for elephants and elephant products. Morals, ethics, and sustainability of the ventures on the land.
10. Address the legislative/permitting/implementation constraints with a legislation/policy review.
11. Identify incentives and incentivise private landuse models. Incentives to landowners to share space and share elephants. Potential for tax beneficiation, including conservation credits like carbon credits, and accreditation approaches.
12. Minimise risks and costs to reserves;
13. Strategy would need to be defined under certain headings: research and education (educating everybody); legislation, ownership, user rights well defined, sustainable use of the animals; communication
14. Concerns over reintroductions in terms of marginal habitat and size
15. Work on our communication, education, public awareness, educate the public to get the right facts out there, maximize benefits to society in terms of elephants
16. Need to strongly consider the wellbeing of elephants, and has to consider their welfare. Needs to contribute to improve the lives of elephants.
17. Need to consider orphanages and rehabilitation as integral components of a national strategy, in terms of both poaching and beneficiation.
18. Need a more holistic approach to Human-Elephant conflict, and clarity on strategy and approach to Damage Causing Animals.
19. Move the guiding principles from the Norms and Standards to the National Elephant Conservation Strategy.

Elephant Wellbeing emerged as a key concern from managers, and these were discussed further in groups to identify key elements for elephant wellbeing to take forward into the strategy:

Key elements of elephant wellbeing
1. A life worth living – provide an environment that allows elephants to deal with stress naturally, or mimic what happens in natural environment, and minimize conflict with humans.
2. Size of area – elephants need sufficient space, according to their needs;
3. Social wellbeing; Social requirements of elephants as a species need to be provided for; Keep the social structure intact. As far as possible maintaining natural herd structures and viable populations; Social structure and family units, size, social dependence.
4. Physical security;
5. Abundant resources in well managed habitats; Food, space, shelter, habitat, water.
6. Minimal human interference. As soon as we interfere with the population, because they are sentient, we need to be concerned, if we contracept, or collar, is it for scientific purposes? Allow for responsible management interventions, but not for unnecessary disruptions in the populations.

Elephant Wellbeing issues that need consideration in the strategy
1. Elephant wellbeing is a critical issue of concern to managers and broader society, and needs to be at the forefront of the strategy.
2. The existing principles in the norms and standards capture the elements of elephant wellbeing, and need to be taken forward and incorporated into the strategy as guiding principles. They were seen as balanced, and not prescriptive to management.
3. Emergency issues that need to be addressed immediately – needs to be possible to do it immediately as this is in the best interest of the elephants to get it done quickly.

Additional Mechanisms to take forward:
1. Strategy is a relatively long-term plan – there needs to be periods (every 5 years) it should be reviewed and amended. There needs to be a process for this.
2. Wider community involvement, look at alternative approaches to what we have been doing up to now, and take these up.
3. Continue with all stakeholders – the more people involved the more likely to succeed.
4. Capacity building – build it within the people with influence, and that will influence the process going forward. Educate the younger generation, especially in the communities.
5. Communication strategy: Communication is key at all different levels, including on the own reserves, especially with the activist groups. A lot of visitors to reserves are greenies, just as passionate about wildlife, if we can change the way that they see how we operate that would help a lot. Improve social media engagement – need a common strategy as to how we deal with it.
6. Create incentives to having elephants, and for the right environment for elephants to live in.

7. Adaptive management and innovative management – create the space to do this right, think outside the box. Address adaptive management issues in terms of practical application.
8. Shared learning experience and collaboration, with collective empowerment. Consider a forum for elephant management, like with LIMF, that empowers managers, and forefronts management issues; maybe combine with LIMF, and with Rhino issues, for efficiency;
9. Reserve representation at fora to ensure the views of managers are carried forward. Need to engage with DEA and SANBI about opportunities for this.
10. Address research for purpose. Also, need to engage managers in the research process, and capture the experience and knowledge of managers, who don't have time to write this up.

Details of Discussions:

Group Discussion 1:
Participants issues about: Natural capital of Elephants: What use are elephants for reserves; What use are elephants more broadly for the region, country, society – why should we house, own or conserve elephants? Whose elephant are they? Consider benefits, costs, and risks. May be some discussion about management of elephants, including responses or unintended consequences.

Group 1:
Considered local, national, international levels
Important for all three, elephants underpin the wildlife economy, locally, opens up huge market in terms of hunting and ecotourism, and job creation, skills development, community development.
Iconic species is essential for big 5 reserve in terms of tourism attraction. For both small and big reserves.
Habitat engineers, facilitate conservation – where there are elephants there is more food for other species.
Perception is very important – the thrill because the reserve has an elephant – because of perception of danger where elephants are.
National – reputational risk – viewed as conservators of elephants – impact on ecotourism, education, and benefit the wellbeing to people. Assist us in achieving our national goals in terms of conservation.
Costs and Risks – small reserve vs big reserve – cost higher in small reserves than big reserves. Infrastructure risks, breakout (reputational risk in terms of social media).
Disconnection from nature is a risk – people are disconnected from nature.
Costs – security costs and infrastructure, huge regulatory, admin and management costs which are way too high for small reserve.
Cost to biodiversity, especially small reserves – e.g. elephants breaking vulture nesting trees.
Risk of poaching – poisoning elephants so there are non-target species also lost in the system.
Ecological risk of keeping elephants.
International, local and national – elephants are valued culturally.

Group 2:
Benefits – tourism, - economic benefits in terms of job creation, that goes with employment, both for adjacent community, but also to the country as a whole in attracting tourists.
Conservation, biodiversity, ecosystem services – elephants play a role.
Sustainable harvesting use – can be seen by people in the city as a reason why elephants are replacing cattle.
Cultural benefits.
Social media can be a benefit if you are proactive about it.
Costs/Risk – direct management costs, fences, pipes, HEC, Ecological system costs (other species do it as well – enclosed area and reduced natural movement, genetic population risk).
Perceived no value risk – people see elephants as not having value.
Social media risk if you don't get it right, and are not proactive.
Public perceptions of damage that elephants cause.
Lack of communication with stakeholders nationally, or locally.
Perceptions about usage.

Group 3;
Same points as both groups above.
Benefits: National heritage benefit – totem value in communities.
Education opportunities.
Benefits that flow from the management of the elephants (protein use).
Costs/Risks: Overpopulation and biodiversity risks
Infrastructure costs and retrieval costs (from breakouts).
Reputational damage risks – management procedures and utilization.
Risk of genetics in small populations.

Group 4:
Same as the groups above
Benefits:
Umbrella concept of the wildlife economy.
Direct benefit of revenue – community owned protected areas – drivers of direct benefit to communal owners.
Private state partnerships to enlarge areas.
Add value to tourism and revenue benefit.
Still a source of elephants for the rest of the continent, as their elephants are poached
Ownership – national strategy and national herd – concept of private ownership – investments into the elephants, which are privately owned. What will happen if this changes?
National perspective of "their" elephants.
Management costs – lack of government funding, private state partnership may become more necessary.
Costs for marketing elephants – market direct benefit from elephants, not doing it well, but there is a cost to it.

Costs of moving elephants.
Costs of private ownership.
Risks – what happens when there is a breakdown in partnerships?
Poaching risk increasing.
Growing elephant numbers, and is there an ability to move them elsewhere
Collective ownership – potential unconsidered risks.
One shoe does not fit all – where there are solutions in specific areas, where that solution works, does not mean it will work elsewhere.
In the case of potential direct benefit around meat provision, need to be careful it does not become an expectation.

Group 5:
Benefits:
Direct benefits of diversity in the landscape. Income generator, tourism, jobs, use of elephants, culture use, dung use. Products that can be used with elephants.
Broader society – elephants have become a brand – broader income generator than just a reserve – products use elephants (branding) as a means of generating income.
Awareness information.
Sites with elephants could create a marketing edge.
Psychological value – good feeling.
Cost of management, fencing, but with this also comes job creation.
Legislation is a cost.
Risks – currently – we manage reserves as islands/silos – a risk that it is detached and isolated from society around them.
Ownership – what is constituted around ownerships – common-law, various acts. Variety of ideas about private exclusive use, animals belong to the state with user rights.
Risk for entry into the wildlife economy in terms of legislation. Communities that are potentially acquiring land with elephants do not understand the burden of admin and bureaucracy that comes with owning elephants. There should be a support system as it is complex for implementation.
Funding for research is biased to specific components, and not much research being done on the space we are working in.
Implementation – general feeling that SA legislation is good, but we fail with the implementation of the legislation, and differences in how legislation is implemented.

General discussion on these points also pointed out:
Social media is a major concern and risk when management takes place, and negative aspects are quickly emphasized by NGOs with agendas. The conservation community is not social media savvy, and is not
proactive, or even properly reactive. Conservation supportive community does not like good aspects of conservation in competition with NGOs that garner support for bad aspects.
Conservation fatigue is a concern. It is difficult to manage in the face of legislative and regulatory implementation challenges. The broader community is not getting what they perceive they need from conservation, and conservation people are fatigued with needing to respond ad hoc for every aspect.
Emotions are a big risk – linked to perceptions, and exploitation of perceptions (see social media above).
A key point that was made was the lack of information flow from the conservation community to broader stakeholders. This would help to correct the imbalance of social pressures (e.g. from social media issues above). There is a lot happening in terms of good conservation, and also beneficiation for local communities and broader economy, and national and international conservation agenda, but this information is not flowing in an integrated and coherent way. We need to find a way of understanding the different cultures and working together.
This is seen as a consequence of not having a national strategy, and so a national strategy becomes important. There is a strong need for a strategy, coherent message, which will allow the conservation community to be proactive and not so reactive.
Legislation and implementation is a problem. Can we have simple rules for a complex problem? People are afraid to make decisions because of the rules, delays in permissions, and elephants are under such scrutiny.
Research is important, and we need to learn from research on elephants in order to improve systems. Managers don't have time for research, and the research does not necessarily give voice to the managers concerns or perspectives. However, managers have a lot of knowledge and experience which needs to be captured (managers don't share knowledge of what they know on reserves). Managers need to be more involved in the research agenda and process. There is a lot of information (elephants are well studied), but not necessarily the right information. There is a concern about over-research of some elements, especially surveys of managers – same things over again. There is a need to use the results in practice. There needs to be some philosophical thinking around research – there are conflicting approaches: the need to understand before you do something (precautionary) versus adaptive management (learn from doing). However, there needs to be better communication around this.
There is a strong emotional attachment to elephants; they are intelligent. This attachment is there even if you have not seen them, but when you do see them it is awesome.
We need to stop treating elephants as individuals, and start thinking of them as a species. Elephants are part of a system.
There is a strong non-monetary value to elephants. There is a strong value of being in a country with wild elephants – a spiritual value; amazing experience walking in a place where elephant roam free. Cannot put a monetary value on this.
There is a major issue of lack of trust. Emphasis that managers also love elephants (and are greenies themselves – they love nature and want to conserve it) – this is often lost when people scrutinize management. There are greenies that make a strong contribution. However, there are NGOs who make money from the elephants in the system, and the issues of management of elephants. These are businesses, and the money does not flow to reserves for management of conservation, and they are in competition with the reserves. The point was made that there is a "trade-war" between animal rights NGOs stealing a commodity to the detriment of the people who own and manage that commodity.
From this there is a concern over how much a manager can influence the system, and exert that influence on the system. The suggestion is that there needs to be better coordination and thus collective influence – managers are acting individually and are being targeted individually. Collectively think of a way we can influence and how.
There is a lot of knowledge of managers, and a toolbox that they use, but this is constrained by the implementation challenges of the norms and standards. Need to also think about the how to in addition to the what to. Complexity comes from dealing with people and society – managing elephants themselves can be quite simple.
There is a need for an overall strategy (that carries strongly the voice and perspective of managers); overarching is good, but this needs to be flexible and must facilitate good management of elephants and not restrict – it needs to recognize good governance and discourage unethical practice. It must be firm

and practical – it is not happening enough in this industry. Scale must be taken into account – should be at a higher level and shy away from complexity – must be simple – detail captured in N&S and individual management plans. Must allow for adaptive management.
Ownership of elephants vs custodianship – we are not necessarily owners of the species but custodians – look after it, but do have some owner benefits. The species is owned by no-one, individual elephants are owned via economic ownership; there is uncertainty in the space on who owns elephants. There are few countries where you can own wildlife, and international community does not necessarily understand this. In terms of sustainable use, both non-consumptive and consumptive; what will the strategy say about sustainable use? There is the concept or user rights and contribution to the wildlife economy. Who gets user rights, but also then have accountability responsibility – must look after it, and who benefits from those rights – we have not unpacked these issues enough.
The concept of costs and who bears those costs – there are direct and indirect costs to owning and managing elephants, and if you want to make decisions on my land, you must also carry the costs of managing. The responsibility comes from both the landowner and broader "users/beneficiaries". There are direct broad economic linkages to tourism and hunting; key costs need to be put in the table, direct management costs, HEC, fences, ecological costs/risks, but also consider the direct benefits to biodiversity that are also an offset.
We need to expand the thinking – spiritual and cultural importance; importance to country as a whole – as a flagship species. There are jobs and benefits away from land where the elephants live, but are directly linked to elephants. Ownership in the broad sense, and access to elephants – needs to be clarified.
We need to consider more strongly the reputational perspective; and scaling from local to national to global; our responsibility to the world – we and our neighbours may be the only ones with elephants in the future – this changes SA's responsibility.

What should be part of a vision/mission/goals for national elephant herd that would assist owners, and deliver for the people of South Africa?

Group 5
Strategy should speak to:
Roadmap for the N&S.
Acknowledge ownership of wildlife in some form.
Address equal user rights.
Speak to or address biodiversity and ecosystem functioning.
Individual rights of people with wildlife, and land under wildlife.
Conservation goals, morals, ethics, and sustainability of the ventures on the land.
Expectations at various levels, stakeholders expectations need to be included in elephant management.
Speak to communication between stakeholders, shared learning and feedback loop. Serve as a platform for communication.
Identify incentives and incentivize private landuse models.
Accommodate conflicting objectives.

Group 4:
Purpose – common approach to frame the conservation status and define the management actions to enable the stability and numbers of elephant populations through best practice active management.
Recognising the value of elephants to people and the environment.
Crafting – would have to be a bottom-up approach, gradient of importance which is the opposite of the gradient of influence we see at the moment. Landowner, communities, region, national.
Strategy would need to be defined under certain headings: research and education (educating everybody); legislation, ownership, user rights well defined, sustainable use of the animals; communication – and recognition of what has been achieved so far – helps with credibility of the reserve community.
Recognition of individuals running reserves, but as a collective – work together as to how it is used.
Beneficiation.
Placate the greenies – what is their argument against us – incorporate into the strategy how we would counter their arguments. Think from their side of the box.

Group 3:
Increase benefits and reduce risks and costs.
Guidance to sustainable use.
Maintaining viable populations – metapopulaton approach to elephant management.
Expanding the range and natural range of the species – look at areas where they can be introduced and used as a flagship species.
Socio-economic as well as socio-ecology.
Research objective and consultation.
Recognize the value of what has been achieved. In fragmented conservation management.
Decreasing risks – reputational risks (social media impacts, wrong decision-making) being proactive rather than reactive
Buffering risks.
More participation at international level.
Costs – collaboration and consolidation of resources.
Flexible ethical management – acknowledging the species and a sentient being.
Concerns over reintroductions in terms of marginal habitat and size
Trust and accountability, participation and feedback, and consensus to from communities and neighbours
Transparency.
Mitigation involving collaboration.

Group 2:
20 years time: sustainable healthy elephant populations and habitats and improving the wellbeing of people.
Objectives:
Simplified decision-making; solidified collective vision; guiding direction; acknowledge diversity and management requirements; promote working with all stakeholders; improving lives of elephants; evidence based framework to support mangers – to validate decisions to boards and others; improving understanding and trust that elephants are managed for the benefits of the community; sustainable responsible tourism; sustainable community involvement; improved economic contribution from elephants; minimise risks and costs to reserves; promote cultural values – a big part which need to be emphasized.

Group 1:
Strategy and precise and concise document to frame the national standing of elephants and give guidance as to how to manage elephants.
See elephants in years to come playing a key role in improving the wellbeing of South Africans and society in general (beyond SA).
Work on our communication, education, public awareness, educate the public get the right facts out there, maximize benefits to society in terms of elephants
Address consumptive and non-consumptive use of elephants.
Proper land use, creating corridors for elephants and tap into metapopulation management – reduce silos.
Maximise ecotourism associated with elephants.
Increase economic value for elephants and elephant products.

General discussion (includes some elements from additional mechanisms below to avoid repetition):
There is a responsibility to do this for the conservation of the species as whole, and, when we think of a national elephant herd, we need to consider broader issues such as linkages to other countries (transfrontier parks), and corridors. Needs to consider metapopulation approach.
Needs to capture the vision Elephants playing a key role in improving and benefiting South Africans and society in general. Sustainable, healthy elephant population and habitats improving the wellbeing of people; Happy people benefiting from happy elephants;
Bottom up approach is sound, and needs to be enhanced; Need to give more strength to the managers in controlling the conservation space. Include more communities into the conservation decisions. Reach out and include. Pull the greenies in and make them part of the solution. Especially the moderate NGOs that are also strong. Actions needs to be devolved and left to the people on the ground to decide.
Must be robust and defensible, but need to simplify.
The strategy needs to be principles rather than details – leave that to the N&S and management plans. Consideration that if there is a national strategy, and N&S, and we are taking more of a collective approach, may not need the emphasis on individual management plans, or this can be reduced to implementation plans.
Must be enabling as the context can change very quickly, and need to be responsive to this. Must enable all approaches to management.
Proactive and enabling rather than defensive. Need to better understand any counterarguments and deal with those proactively, to mitigate complex wicked problems.
Beneficiation needs to be emphasized; the right hand side of the socio-ecological framing; should improve and foster relationships with communities. Needs to give clear guidance on sustainable use.
Incentive and tax beneficiation - Can consider wildlife credits like carbon credits.
Define under certain headings: Research and Education, Legislation, Ownership & user rights (Recognition that there are individuals and a collective), Sustainable utilization, Beneficiation, Communication – recognition on what we have achieved so far which is substantial
Need to consider political issues, and land restitution – broader beneficiation.
Legislation – what is the strategy to be for legislative issues in the future, simplify it, make it more effective. Address this with a policy review.
Need to strongly consider the wellbeing of elephants, and has to consider their welfare. Needs to contribute to improve the lives of elephants.
Are we doing too much for or too elephants, when is intervention too much.
Needs to deal with Ethical vs Unethical practice – can't be one or other's view – have to be a collective view.
Need to consider orphanages and rehabilitation as part of the strategy.
The strategy must deal with DCA animals and HEC.
Move the guiding principles from the Norms and Standards to the National Elephant Conservation Strategy.

Elephant Wellbeing emerged as a key concern from managers, and these were discussed further in groups to identify key elements for elephant wellbeing to take forward into the strategy:

Group 1:
A life worth living – provide an environment that allows elephants to deal with stress naturally, or mimic what happens in natural environment, and minimize conflict with humans.
Size of area – elephants need sufficient space, and keep the social structure intact.

Group 2:
Where possible, in an ideal world, to be able to give them abundant resources and space they would like, according to their needs;
As far as possible maintaining natural herd structures and viable populations;
Minimal human interference. As soon as we interfere with the population, because they are sentient, we need to be concerned, if we contracept, or collar, is it for scientific purposes.

Group 3:
Social structure and family units, size, social dependence – social well-being; Enough space and habitat; Need the right resources

Group 4:
Secure and well managed habitats;
Functional; Food, Space; Physical security;
Social requirements of elephants as a species need to be provided for.

Group 5:
Basic needs, shelter, habitat, space, security, food, water, social/structural needs.
Allow for responsible management interventions.
Emergency issues that need to be addressed immediately – needs to be possible to do it immediately as this is in the best interest of the elephants to get it done quickly.
Cater for unnecessary disruptions in the populations.

Additional discussion
Elephant wellbeing is a critical issue of concern to managers and broader society, and needs to be at the forefront of the strategy.
The existing principles in the norms and standards capture the elements of elephant wellbeing, and need to be taken forward and incorporated into the strategy as guiding principles. They were seen as balanced, and not prescriptive to management.

Emergency issues that need to be addressed immediately – needs to be possible to do it immediately as this is in the best interest of the elephants to get it done quickly.

Mechanisms to take forward:

Group 2:
Wider community involvement, alternative approaches to what we have been doing up to now.
Educate the younger generation, especially in the communities.
Improve social media.
A lot of visitors to reserves are greenies, just as passionate about wildlife, if we can change the way that they see how we operate that would help a lot.

Group 3:
Communication is key at all different levels, including on the own reserve, especially with the activist groups.
Capacity building – build it within the people with influence, and that will influence the process going forward.
Create incentives to having elephants. And the right environment with them.
Continue with all stakeholders – the more people involved the more likely to succeed.
Adaptive management and innovative management – create the space to do this right, think outside the box.

Group 4:
Strategy is a relatively long-term plan – there needs to be periods (every 5 years) it should be reviewed and amended.
Guiding principles in the norms and standards would be better placed in a strategy document, so they can be pulled through.
Come up with different headings of what should be in a strategy, and the words that the strategy should include.
Communication Social media – a common strategy as to how we deal with it.
Legislation – what is the strategy to be for legislative issues in the future, simplify it, make it more effective.
Sustainable use; Ownership; User rights; Research; Education; Beneficiation; Habitat expansion.
Need a common understanding and agreement (consensus) and what the strategy statement should be for each of these.

Group 5:
Simple and implementable, inclusive of all stakeholders, appropriate to the purpose, address policy review and adaptive management issues. Address research for purpose. Communication strategy, shared learning experience and collaboration, along the lines of getting a forum set up where elephant management, like with LIMF; maybe combine with LIMF, and with Rhino issues;
Reserve representation at fora to ensure the views are carried forward.

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Elephant regional meeting
Mongena Lodge, Dinokeng
19-Mar-19

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Limpopo River stakeholder workshop for Elephant Strategy, 26 January 2022, Dongola Lodge

Introductions + history

1. My family has been in the area since 1938. I have been in the area since 1957. First saw elephants in 1975. I believe the foot and mouth disease veterinary fence played a big role in keeping elephants out.
2. Family has been in the area since 1926. I am a 3rd generation and first saw elephant as a young boy. They were not permanently in the area like now. Last time I personally saw elephant was in 2018.
3. I worked in the area as an ecologist since 1981. Riverine vegetation damage definitely intensified over the years especially after destruction of the foot and mouth disease fence.
4. I worked in the area as a Nature Conservator since 1989. I agree with the other delegates regarding the Riverine vegetation damage that intensified over the years especially after destruction of the foot and mouth disease fence.
5. For the last 15 years the elephants have become a real problem.
6. I saw my first elephant in the area in 1968. Since 2005 elephant have become a permanent threat within our area. Before that they were occasional visitors.
7. Elephants started coming in during 2001 after the 2000 floods. The floods severely damaged the foot and mouth disease fence. The group sizes increased dramatically with more than 100 elephants now moving in a group.
8. The last 15 years elephant have become permanent residents to our area.
9. The elephants became a problem after 2000.
10. We are relatively new to the area so we have no historical recollections.
11. I represent ZZ2 and we farm in the area. We have particular problems with elephants and feel that conservation and agriculture creates particular problems.
12. Have been in the area for 32 years SAPS.
13. Have been in the area as a ranger for 22 years.
14. Have been in the area as Park Manager for 7 years.
15. Have been in the area since 1963. There was a fence and not many elephants maybe 1 or 2 in the river. Now there are plenty of elephants.
16. I have been in the area since being a school boy. First saw elephants as a school boy.
17. Have been in the area since 1989. Elephants used to only visit us during the winter. When the rains started the elephants would move away until next winter.
18. In 1977 there were 900 elephants moving up and down the Shase. In 1983 elephants started moving across the Limpopo river into our area.

Introduction:
This area:

- Most elephants are not within fenced areas (Kruger + Mapungubwe)
- Continuum in size available to elephants and management intensity
- Management plans are required
- Unique and diverse landscape where people have to live with elephants.
- Elephants for most part not confined by fences
- One of the big transfrontier populations
    - Cross boundary/jurisdictional challenges. Elephants don't belong to anyone, res nilum.

What are the benefits (or value) of elephants

Group 1:
Elephants benefit nature; God didn't create elephants if they didn't have benefits
Tourist attractions
Hunting value
Benefits to biodiversity
Spiritual value
Social upliftment – captured and translocated;
Translocate to areas where there are too little elephants

Group 2
Tourism
Ecological values – animals reliant on elephant – umbrella species – dung (dung beetle), breaking of trees to create microhabitats and food for other animals
Generate income – photographic and hunting
Traditional uses – dung
Food source for people
Ivory by-product that can bring an income

Group 3:
Tourism attraction – seeing elephant
Ecosystem benefits – branches for small animals provide food
Totem animal for people – cultural value
Existence value: people are related to elephants
Elephants have a spiritual value for people
History and stories
Elephant dung for medicine – traditional uses – cure headaches; mozzies
Bushmeat – tinned meat
Elephant dig for water – make water available for other animals
Roots for other species by pushing trees over / uprooting
Food for other species
Improved environmental quality

Bush encroachment
Create pans – temporary waterholes - mud bath, that become bigger until it become a natural pan. Good for other animals
Trophy hunting – generate income

Group 4:
Part of nature
Tourism – hunting, food, photographic
Black culture value dung: medicinal values are mixed, elephants eat different vegetation, mix the herbs, smoke it. Piece of Elephant dung traded for chicken etc. Noose bleeds, drop of blood on the dung, burn it and the bleeding stops
No need for security needed or anti-poaching
Trained to do work, like in India
Reputational benefits around translocation, pride of stocking elephants to deficit areas
Share the product for our conservation benefit as a source for other countries, all of us lot of experience managing elephant – share our experiences
Social & educational benefit – money generated from hunting/culling placed in a school trust – education in nature conservation
Charismatic species

What are the risks or costs of elephants

Group 1:
Intensity of the utilisation of areas where elephants currently occur
Loss of iconic and certain species within biodiversity
Loss of human lives – road accidents;
Restricts peoples movements – movement on properties – some of farms elephants are semi-permanent. Because of elephant people / children can't move freely on property
Transboundary elephants break fences – spreading of diseases such as foot and mouth
No cohesiveness between the three countries' with regards to the elephant legislation & management
Costs involved of having elephants on property – fences, waterlines dams etc.

Group 2:
Danger to human live
Dangerous animal
Damage to infrastructure – costs to landowner
Damage to plant live and species
Need a big area for food and water
Difficult to restrict elephant movement
And expensive
Restrict service delivery – ambulance scared to come out after hours and in dark because scared of elephants on the road

Group 3
Removal of plants important for medicine – damaging the plants
Threat to human live
Elephants are cheeky – breeding season – bulls in musth – chasing people
Damage infrastructure – boreholes, crops pipelines, electric fences, pillars

Group 4:
Fenced them in – fences within area restrict movement –
Damage to trees (baobab)
Impact on biodiversity – vulture numbers due to declining large trees
Invasive plant species – elephants do not eat Croton – other trees disappear

Trade of between risks and benefits – if no value just a cost – people don't want something that doesn't have value
Risks because we treat species very differently – just need to be managed.
Emotional attachment
Charismatic species – risk when comes to management
Should we be concerned about how we management the landscape? Creation of permanent water now creates an issue of having elephants permanent – how have that changed over time – is that perhaps an issue – are there any land management actions that we do that potentially create a higher risk
Good conservation outcomes are degraded because of values people have somewhere else and imposes on our ability to minimize other risks – i.e. dealing with conflict
Marketing strategy – marketing the Big 5
Donations from outside and different value systems
Not much we can do as a country on how other countries and people see elephant, if we look at the regulatory framework should it treat species different and be affected by values and perceptions.
If fences are removed this whole area falls into the Red area, if foot and mouth outbreak export of oranges will not be allowed. Outbreak of foot and mouth stop all exports of all products
Veterinary fences impact the expansion and consolidation of the area (Chance of it happening may be low but if it does happen a major risk)
Management in neighbouring countries specifically related to disease management

Who owns elephants

Group 1:
Re nullius – don't belong to any person in particular, on your property yours if not on your property not yours
Cannot do with it as you like – need permits etc.
Public good

Group 2:
The person on who's land it is

Person who bought the elephant and obtained the necessary permits
Belong to everyone – state and person on the ground
If think it is yours responsibility for damage
Transboundary makes it more difficutl difficult to say who is the owner
Ownership goes with value – if there is a value to having an elephant want an elephant if no value do not want it anymore

Group 3
Everyone in the world – even though we got boundary issues
Fenced areas – owner owns elephant – Addo elephant National Park restricted by fences
State cannot decide just to take elephants to Botswana, consultation discussions
No control or guided decision making

Group 4:
Don't know who really – the State but who is the state all citizens, but foreigners think they own them

Res nullius – belongs to State – permits issue
Difference between ownership and user rights and responsibilities
If common good – access to benefits and management of risks
People in fenced areas, as they need to manage fences etc.
No control or guide decision making
Difference ownership and use right, under various rules. Are use rights equal?
Ownership comes with responsibility.

Opportunities

Group 1
Range expansion – but very limited in this area – Red line issue Foot and mouth issue
Job creation – have elephants on the property
Translocate elephants to other areas
Hunting: controversial but provides many benefits – create jobs, generate foreign currency; generate local currency, meat and skins can be sold
Culling processing the meat and donate meat to needy communities
Controlled legal ivory sales can generate currency

Group 2:
Training on elephant behaviour and how to behave around them
Bush clearing
Security on a farm – restricts the movement of criminals when there are elephants on the property
Prevent poaching before excellent trackers

Group 3:
Untapped opportunities – trophy hunting
Trade of between costs and benefits
Fenced areas can benefit from trophy hunting, but areas outside not benefitting from hunting but carry cost – damage crops
Local uses from dung – access to resource opportunity not realised at present
Numbers may be important for tourism
Research opportunities – books published on elephant
Pay money to sleep close to elephant closure
Long term research on elephants' not short term
Monitor elephant behaviour

Group 4:
If easier to move elephants, shoot elephants – market for elephants will reduce the costs – want elephants but not so many
Difficult to get permits
Financially difficult and costly to move elephants
No market for selling ivory locally
Erect fence along border again – need to work as a collective to manage elephants all three countries
Not yet an international destination for tourism
Who was here first? We can't just take away from elephants without giving something back?
Opportunities for more coexistence? Socio-economic profile far down the horizon, more pressing issues at the moment. Benefits need to reach these communities
Diverse type of landscape: marketing the uniqueness of the landscape, very special place, cultural and wildlife perspectives. People can live with elephants, use it as an opportunity.

What are key issues that we need to address/ consider about the future of elephants within the Limpopo River landscape and in South Africa generally?

Group 4:
Initiate a committee across all three countries to discuss elephants.
People across must benefit from hunting. Equal allocation
Develop a trust where a percentage of money goes to
Carrying capacity for area as a whole for elephants and per property.
Potential role that the community plays in how the landscape is managed on whether elephants stay longer or shorter – i.e. waterholes.
Funding: NGO's values and viewing elephants as part of the continent, can be in conflict with how we want to do things

Group 3:
Issue of separate management
Address collectively the range expansion of elephants
Address the CITES challenges
A proper metapopulation management plan
Effective marketing strategy
Funding – different organisations / NGO different perceptions / values
Range expansion not easy – open more corridors elephants can move around
Issue of permits – fast approval of permits – permits take long to process – issues caused by elephants
Population management – how to manage growth as well as corridor expansion.
Jurisdictional issues
Compensation for elephant damage – trade of building relationship, see it as a monetary issue.

Group 2:
Competition for space – humans vs elephants
Min requirement for the keeping of elephants on a property – space requirement
Transboundary areas must be promoted more effectively so that there are more space in which elephant can roam
Overgrazing over years, availability of water – elephants move around
Time elephants are spending on a property to manage so that do not stay too long
Manipulate the matriarch's behaviour and decision-making
Damage to infrastructure
Type of fencing where elephants can move across without damaging fence and not allowing other species to escape
Be able to contact DFFE/LEDET on a more regular basis
Bees can be used as a deterrent
Compensation for biodiversity goals, unified agreement, align goals of all stakeholders. Increase value of conservation land use
Is there space for elephants outside of protected areas? Management costs will be high.
Range expansion is needed. Transfrontier park, fences down, elephants need more space, damage will be spread.
Unified system, economic and ecological outcomes
Population has quadrupled. Elephants cross the river even when the river is high, more food in SA. Overgrazing in Botswana.
Dispersal events, changes in environment increases the population
Doesn't help to control the numbers, but the time spend in certain areas
One area had 40 waterholes, the further the elephants walk, the harder it is for calves to survive. With lots of water the population increases. Long distance between waterholes ensures food in between.
Make sure elephants don't stay too long at waterholes. Think about the behaviour of elephants, and who leads the herd (matriarch)
Small reserves will need to force elephants to use certain areas less. Fencing out, think out of the box,
Elephants used to live here, but they are living in a hostile environment, we need to be careful to chase away in a violent way
Elephants target certain trees, eg baobab, but in the whole region baobab may not be threatened.
What are unintended consequences of range expansion? How do we get the trade-offs rights? Reduce costs, maximise benefits
How do we deal with poachers that will come from Zim if it is an open system? Poaching is result of broader social issue. Use elephants to increase security and broader benefits.
Coexistence: only possible if there is spatial difference, compensation. If rules are in place, for elephants and people.

Group 1:

Biggest problem there are too many elephants within the area (not on a specific property)
Elephant population must be addressed within the area as a collective
Elephants must have a monitory value – if it pays it stays – whether spiritual or monetary
CITES – Pain in the ass, SA must resign from convention
Not too many shortcomings in the legislation – however process is too long
Different farming communities, elephants in conflict with some – if population are managed in the area damage will also decrease

Drafting a collective vision

Why do we need a National Elephant Conservation Strategy (Enabling a different future, innovations)

Group 1:
Address previous shortcomings and mistakes that were made in the past
Ensure future effective sustainable population management
Give guidance to proper effective management plans
Create a basis for future management discussions with neighbouring countries

Group 2:
Elephants are our natural heritage and are important
Strategy can help to align everything – local and international
Elephant strategy cant afford working in silos, by having elephant strategy will make elephant conservation more meaningful and impactful
Tool for collaboration to work together to realise the goals

Group 3:
All work in the same direction
Serve as a guideline
Help improving conservation of elephants

Group 4:
Manage the effectiveness of the elephants

Must be a goal for the future – where do we want to go
Bruikbaar and implementable strategy

For this area:
Consolidation of the parks and other conservation areas
Different options available to become part of the bigger area – more flexible

What should be part of a vision/mission/goals for national elephant herd that would assist owners, and deliver for the people of South Africa?

Group 1:
Vision:
To have a healthy managed elephant population in the area which is not detrimental to the environment and to protect and promote the cultural heritage and world heritage sites
Mission: To manage the elephant population in a sustainable manner to the benefit of the environment and all peoples in South Africa.
Goals:

1. To responsibly manage the elephant population
2. Support communities by donating meat or monetary value
3. Provide skills and capacity to people to implement strategy
4. To facilitate ministerial support

Group 2:
Vision: No fences, one connected conservation landscape where wildlife can be viewed as natural as possible.
Commercial farms, mines other human areas separated or fenced out
Promote area as tourist destination as an alternative to KNP which will increase funding for conservation.
Maximize the value of elephants for people and the environment includes monetary and non
Strategy should fit into the African context
Should be practical
Should be user friendly
Mission: Understanding the behaviour of elephants, study the landscape why is this area unique
How should we have a specific elephant conservation strategy for this area
Understand why elephants spending more time in certain areas – drivers of movements
Develop mitigation measures based on that understanding
Support group would be needed for manager and farmers can go to for advice as well as a local forum for elephant managers
Strategy can help stakeholders get agreement and move forward this will result in improved management and conservation

Group 3:
Everybody understanding the importance of elephants
Sustainable national elephant herd – elephants effects that maintain the ecosystem.
Better understanding of elephant conservation from both local and global communities
See compassion towards elephants
Elephants move freely
See fair benefits for humans from elephants
Enhancing the wellbeing of elephants and people
Elephants as our national pride
Transformation in conservation – different cultural backgrounds should be involved.

Group 4:
Nature must return to what it was 40 years ago
Plans must be implemented through good management
One big area that is managed collectively taking the landowners into consideration

Mission: Reduction in the number of elephants
Aanplant van natuurlike gewasse that was impacted/destroyed by elephants
Permits to hunt DCAs must be easier to obtain.

Participants

See next pages.

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South African
NATIONAL PARKS

Elephant Management Plan
Kruger National Park
2023-2028

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INFORMATION

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Note that the lifetime of the plan aligns with the Park Management Plan.