African Elephant Biodiversity Narrative – Part 3 of 3
Elephant Management Conundrum

Deon Furstenburg, 2022 (Pr.Sci.Nat.115086)

Africa could ecologically never sustain more than 4-6 million elephants for longer than a 10-year period (PART 2 of this series). Since the 1980s elephant became endangered from exploitation and human conflict in most of Africa, yet in the SADC countries of southern Africa elephant became aggressively overpopulated as a result of over protection and ill governance enforced from international emotional sentiment and the neglection of applied science. Since c. early 1970s elephant are exponentially destroying Southern Africa's natural biodiversity, as per scientific evidence. The elephant management model of DFFE and its current 2023-11 reviewed version fails the permanent and irreversible biodiversity destruction created by this apex species. As existing elephant habitat is severely fragmented and the long-term resilience of the population depends on managing translocations between protected areas and developing "migratory corridors" across trans frontier conservation spaces, this species remains conservation dependent. Yet, "migratory corridors" for elephant are not feasible as practice already indicate for the Kavango Zambezian (KAZA) Transfrontier Conservation Area (TFCA), the Greater Limpopo (GLTFCA) and the Greater Mapungubwe (GMTFCA), all being overpopulated by 4-8-fold of the ecological capacity, and the biodiversity already destroyed (scientific evidence).

Retrospect

Elephants occurred in the past over most of South Africa, including the arid north-western parts (Boshoff et al., 2015). Pre-1400s elephant migrated frequently, and in low numbers (small groups), through the area of the present Kruger National Park (KNP) which acted as a "green corridor" between the Gorongoza marshes in Mozambique and the greater Okavango in Botswana. These migrating groups being extirpated by exploited hunting between c. 1400s and early 1800s (Carruthers, 2010). When the KNP were proclaimed in 1898 it had nil elephants – the 1st 3 elephants were recorded in 1903 near Shingwidzi entering the park from Mozambique.

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Updated from:
Part 1: Veteran SA 2023(Sep):21-27. https://veteraan.co.za/september-2023/ Focus on the political elephant conundrum.
Part 2: Veteran SA 2023(Nov). https://veteraan.co.za/november-2023/ (in progress)
Focus on the management of elephant.

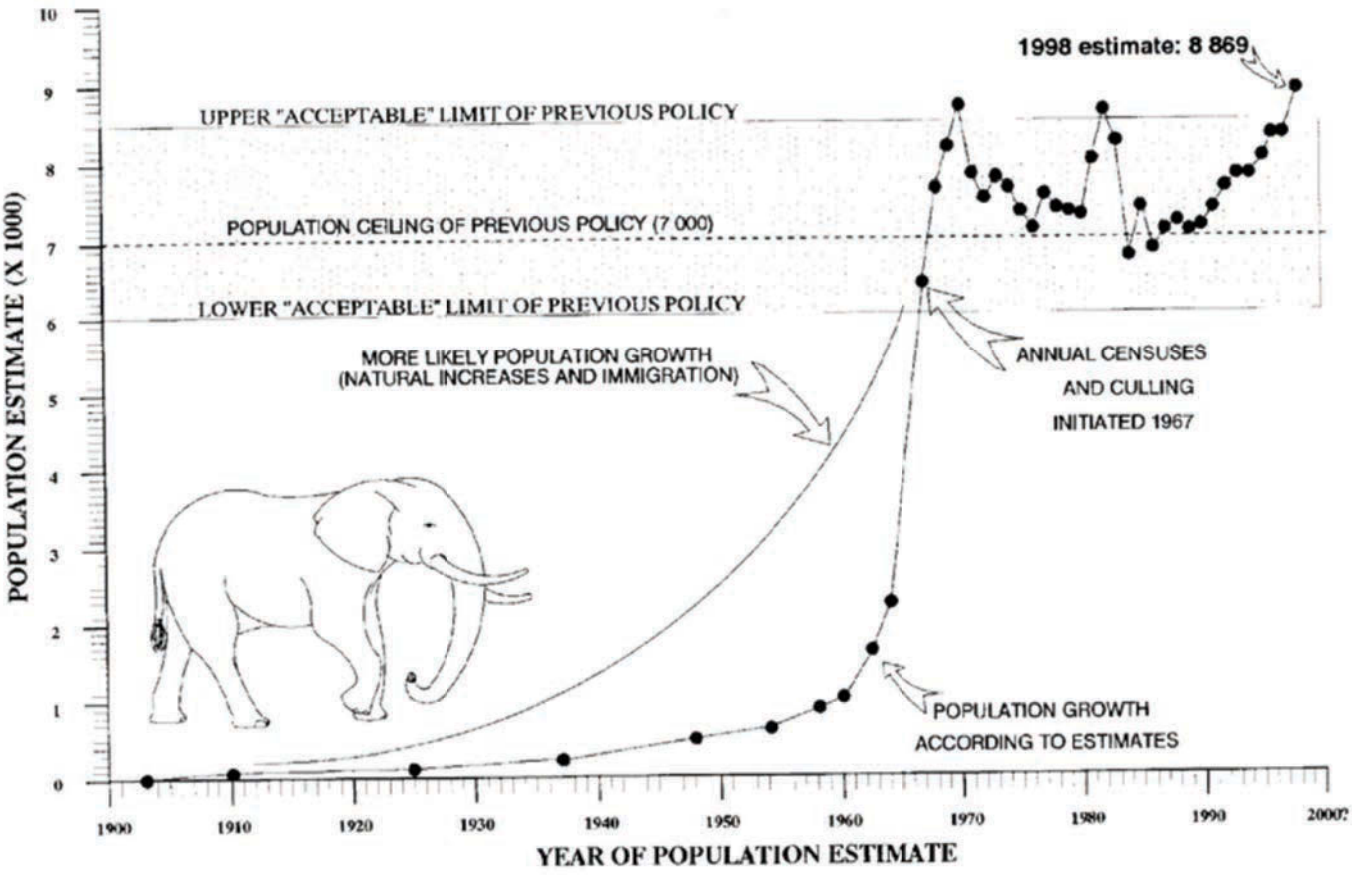

Figure 1: Kruger National Park elephant population history from 1889 to 1998 (Whyte et al., 1999), numbers in 2021 was 32 000 (Parliamentary notice), but estimated by modelling to be closer to 45 000.

Gradually elephant numbers increased to >6 000 (that is >3 elephant/1 000ha) in 1966. Experimental vegetation trials in the Satara region at the time already indicated a loss of large marula and knob-thorn trees from 15 trees per ha to 9. Sustainable ecological capacity for elephant habitats across Africa had been determined at 1-1,5 elephant/ 1 000 ha (PART 2 of this series). In 1967 a decision was taken to implement frequent culling to control the elephant density between 7 000 and 8 000 (whereas sustainable ecological capacity is only 4 000).

"Wild Disney" Bambi syndrome

The "Bambi Syndrome" created global emotional sentiment that every living animal is a teddy-bear and a pet that may only be cuddled in human's arms, not to be used, farmed, harvested, hunted, killed, neither its numbers be controlled for best practise biodiversity management on fenced-in land (Kruger Park is fenced-in land).

Elephant culling in KNP was most successful and maintained for 28 years until 1994, the meat being processed at the Skukuza abattoir and exported as tinned-meat. Also, the meat production from both elephant and buffalo economically sustained the KNP. Ecotourism has proved to be financially unable to support 94% of all Protected Parks across Africa (Nuwer, 2023). To the contrary, in 1994 the minister of DFFE, driven by international emotional sentiment "Bambi Syndrome" enforced a monotorium against culling and harvest of elephant, an annual deficit loss of more than 800 tonnes of meat.

During the next years until c. 1998 KNP translocated some surplus juvenile elephant to suitable other parks and private game reserves including Pilanesberg, Madikwe, Atherstone, Addo, Tembe, Pongola, and many more. Noteless to say, within less than <10 years all of these lands became overstocked with problem surplus elephant destroying the natural biodiversity (see PART 2 of this series). Elephant annual natural population growth rate being 6-10% depending. KNP became overpopulated within 3 years with >9 000 elephant (>4,5 elephant/ 1 000ha) by 2000 AD.

1996 Management Policy

After the monotorium in 1994, a new "elephant management policy" the so called "spatial temporal landscape management model" (*meaning: manage the landscape over time, and leave the animals to manage themselves, die when the food and water resources become insufficient*) arose from a public debate in Midrand on 4 May 1995 and accepted by SANParks on 12 Nov 1996 as a mandate (Whyte et al., 1999. A narrative shift to "focus on the extent and intensity of elephants impacts on biodiversity rather than on elephant numbers per se" and based upon four fundamental principles:

1. Ecosystems are not static, and populations fluctuate in response to (*no scientific benchmarks were pre-defined*);
2. Elephants are important agents of habitat modification and contribute to biodiversity (*no indication at the time anticipated whether positive or negative*);
3. That elephant populations which are confined (*no parameters defined for the degree of confinement, KNP per se is a confined fence-in space*) will increase in number until negative impacts on the system's biodiversity will ultimately result (*exponential negative effects had been evident already since 2010, and yet to the present date no sufficient effective resurrection actions had been taken by DFFE*);
4. That elephants should not be viewed in isolation, but as one component of a broader integrated system, and their impacts should be managed in conjunction with other ecosystem process to promote biodiversity (*to the present date none of these impacts had been scientifically efficiently measured by DFFE, though other scientific evidence are overwhelming*).

A generalized opinion was accepted that "the consequences of unrestricted elephant population growth resulting in an ultimate self-induced population crash are not acceptable. Despite the permanent closing of more than >30% of the waterholes in KNP the elephant population has not yet crushed, still increasing at between 16-23 elephant/ 1 000ha currently.

Consequently, biodiversity is deteriorating at an alarming rate. Less than <1 large tree per 5 ha remains in the Satara region, and more than >30% of the total area of KNP has deteriorated from >50% woody tree canopy cover in 1989 (Kiker et al., 2014, Trollope et al., 1998) to less than <3% cover in 2019 and after (Furstenburg, 2023 report in progress). Similar demise of the vegetation in KNP are also noted by remote census studies by Robson & Van Aarde (2017) and Urban et al. (2020). Official elephant numbers for KNP as in 2021 (Parliamentary notice, 2022/03) was 32 000 elephants.

Scientific studies and physical environmental biodiversity change of KNP reveal that elephant behaviour and dynamics does not align with the anticipated pre-defined spatial movement and temporal habitat use proxy of the new "1996 elephant management policy". For example: the range expansion since 2001 into the Greater Limpopo TFCA (Peace Parks Foundation; AfESG) to approximately 4 million ha onto private game reserves to the West of KNP, and across the international border into Mozambique has over 22 years not yet resulted any positive ecological outcome – to the contrary, all indications are of still increasing biodiversity degradation of KNP. The elephant population became accustomed to the habitats

of KNP with up to 65 years of memory imprinted into each individual's brain. As a result of, other wildlife especially plains game, hippos, browser antelope, and all arboreal animals are suffering from the closing of the 30% of waterholes and the vegetative destruction of especially large trees, and overall habitat transformation into semi-arid grassland at an annual rainfall varying between 300 and 550 mm across habitats.

Other Elephant Indabas including the 2004 Berg-en-dal Indaba, and the 2008 Durban Indaba, failed to render alternative ecological secure management strategies for elephant population self-control without detrimental effect on macro biodiversity and function of eco-systems.

The concept of a "spatial temporal landscape management model" has never been practiced neither scientifically assessed for any terrestrial ecosystem, other than some agricultural production systems, and never with a superior apex species (as elephant) dominating all major eco-processes. The concept was developed and scientifically defined from studies on marine life on coral reefs.

"Green Corridor"

In addition to the so-called "spatial temporal landscape management model" thoughts had been engaged globally to establish "green corridors" for elephant where wild populations and/or migrating groups can roam and move freely by own choice. The idea is idealistic and not practical pertaining to the global loss and fragmentation of habitat due to human growth and combat against human poverty and food security. Currently there are less than <2 ha of land per person available in Africa to produce food and serve the needs of humanity. This same <2 ha also needs to support all the wildlife including the elephants in Africa.

Potential for "green corridors" had been defined by some scientists as indicated in Figure 2.

Failure of the proposed "green corridors" are already evident from scientific studies and experience for all three of the already established TFCAs. The disastrous failure of the Greater Mapungubwe TFCA as described in PART 2 of this series, the overpopulated elephant being a major problem to agro-sustainable biodiversity business in the buffer areas surrounding the core zone of the TFCA. Also, scientifically monitored overpopulated elephant from the KAZA TFCA emigrating (leaving the most deteriorated and depleted environment, a 50% vegetation degradation already by 1973 [Mosugelo et al., 2023] of the KAZA) in search for food and roaming grounds. Many of these problems "boiling over of the cup" end up on the Limpopo River in the already overpopulated Greater Mapungubwe TFCA (Figure 3 & 4) and creating exponential destruction (PART 2 of series).

Conclusive

1. Sustainable maximum elephant density for suitable African habitats is 1-1,5 elephant per 1 000ha or 10 square km.
2. Elephant populations can double in number within 10 years, at a 6-10% growth rate.
3. Past annual mass elephant culling in KNP were in ecological equilibrium with the co-existence of optimal biodiversity.
4. The spatial temporal landscape management model applied since 1996 has failed the biodiversity and integrity of all protected areas inhabited by elephant.
5. The proposed green corridors are in conflict with human needs, poverty, food security, job-creation, and agro-sustainable biodiversity business.

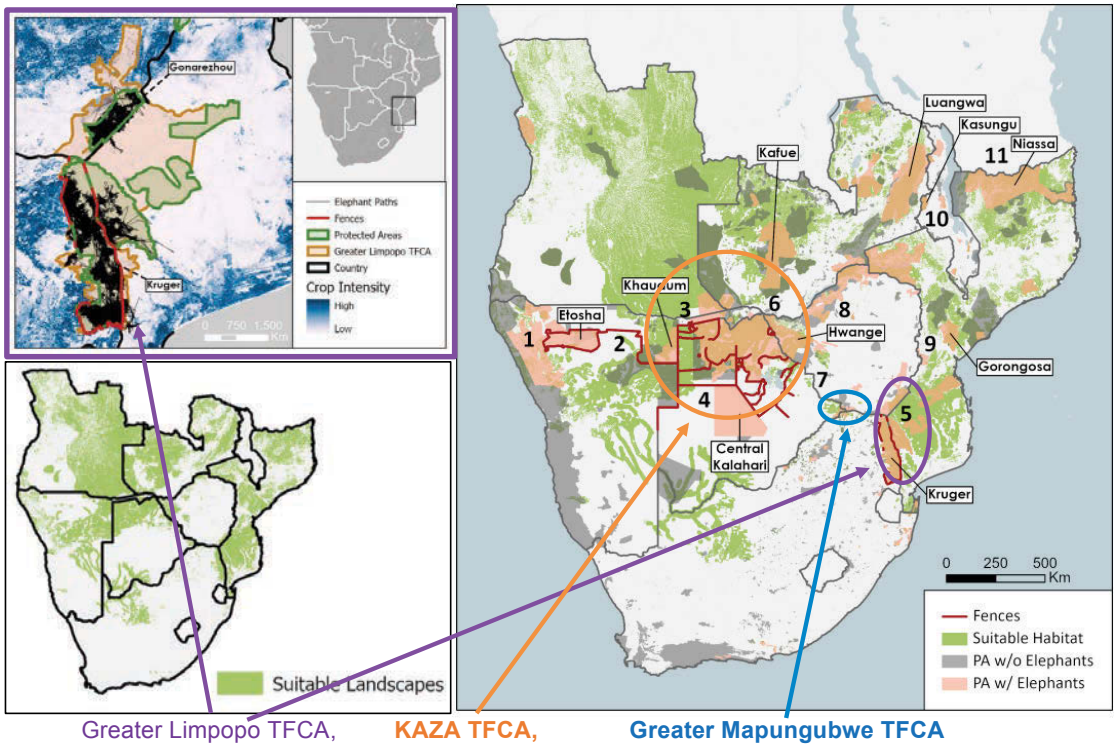

Figure 2: (a) elephant movements (black lines) in the Greater Limpopo TFCA [note the limited large-scale cross-migration 22 years after opening of international borders; it indicates failure of the management model. Some migration into the lower section of Mozambique, the 1st border to have opened in 2001, can be ascribed to the vast overpopulated density in the southern area of KNP moving across seeking for food that are already depleted inside KNP.]. (b&c) proposed potential green corridors for the management of free roaming wild elephant (Huang et al., 2022).

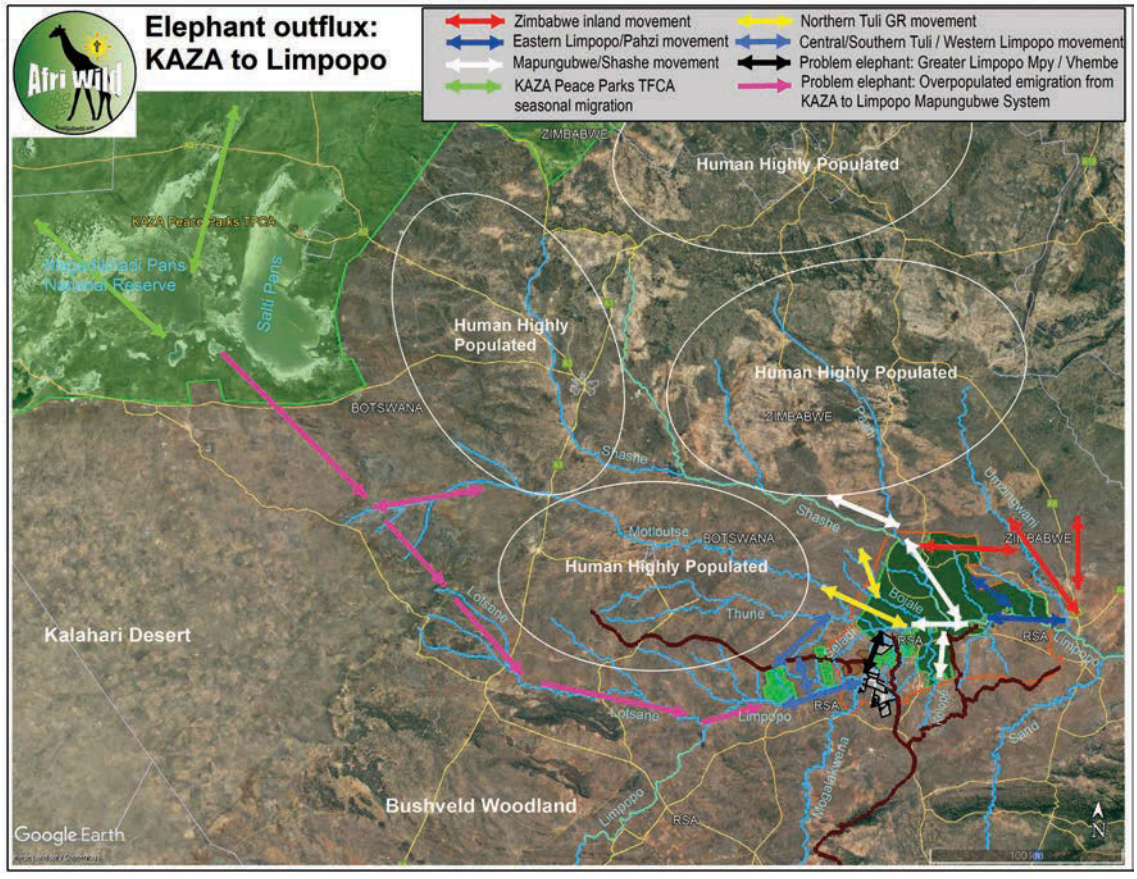

Figure 3: Overpopulated elephant emigration from KAZA TFCA to the Limpopo "green corridor" creating devastating destruction to the surroundings of the Greater Mapungubwe TFCA (Furstenburg, 2023).

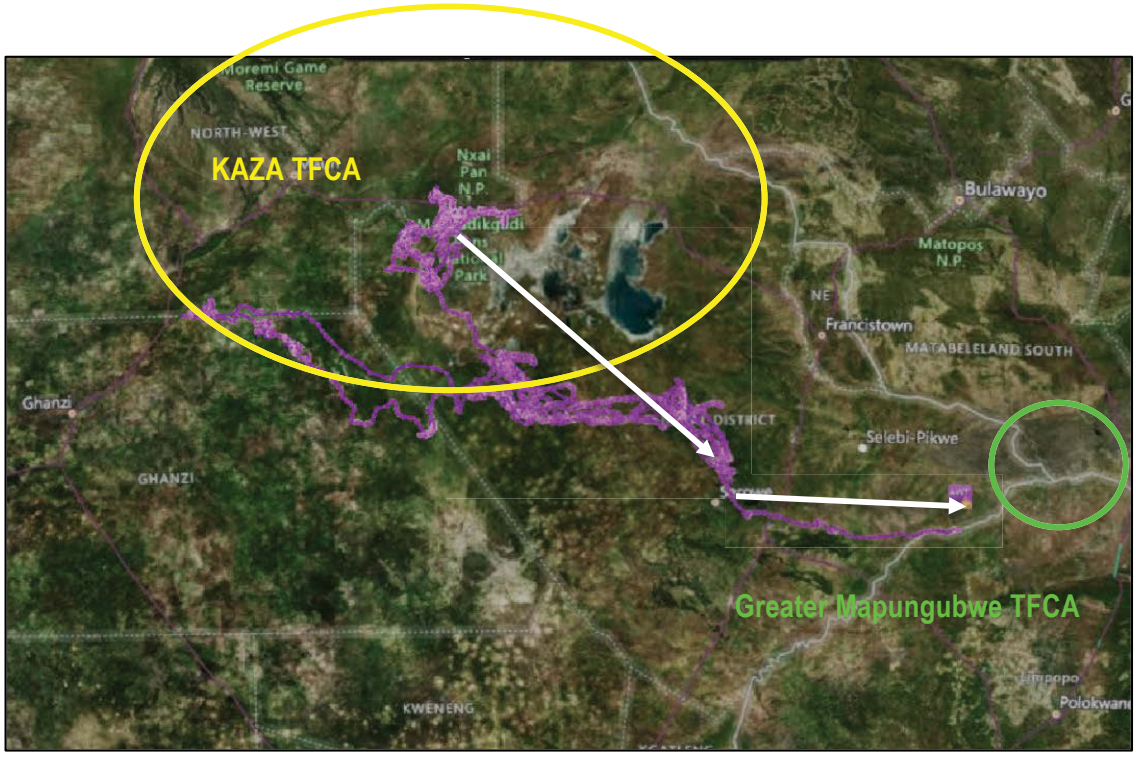

Figure 4: Satellite tracking records (African Elephant Specialist Group, AfESG, 2021/2022) of overpopulated elephant emigration from KAZA TFCA following the Tsende drainage system south to the Limpopo "green corridor" creating devastating destruction to the surroundings of the Greater Mapungubwe TFCA (Furstenburg, 2023).

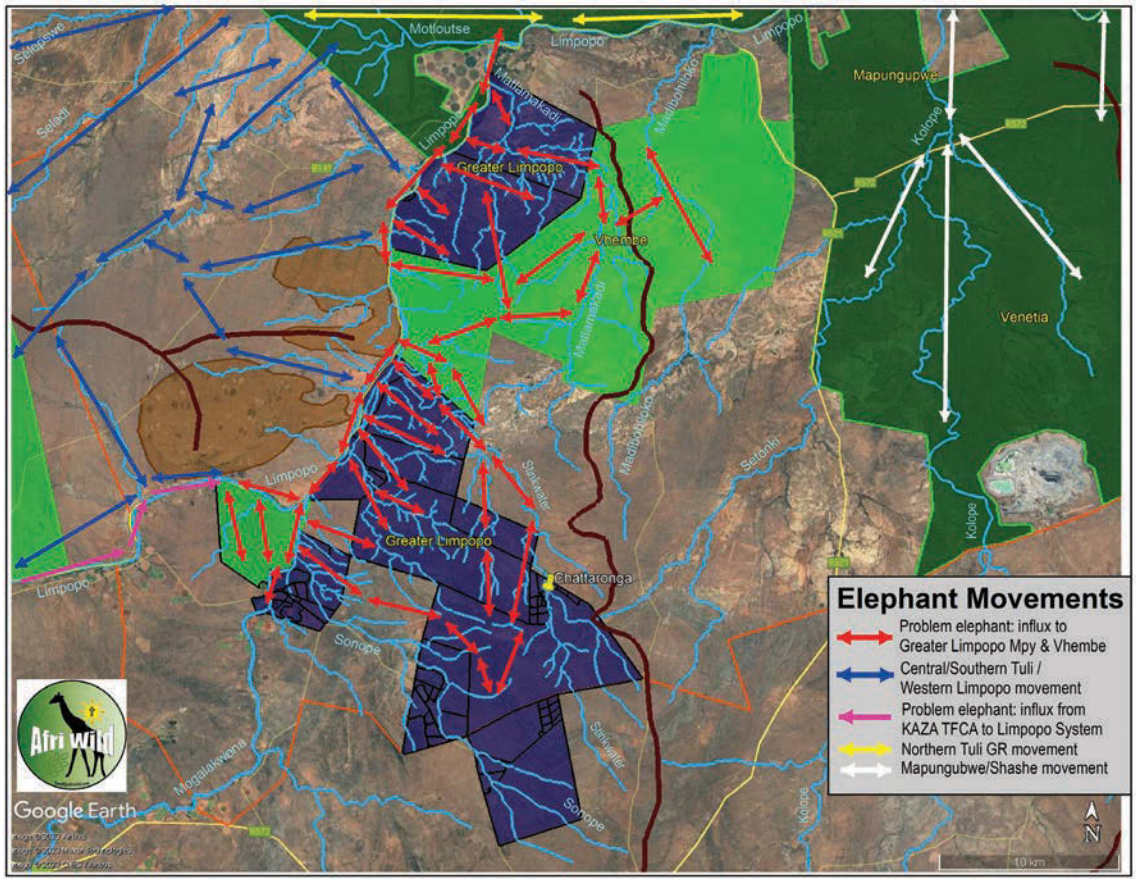

Figure 4: Defined movements of overpopulated problem elephant in the Limpopo "green corridor" onto private land creating devastating destruction and permanent financial biodiversity loss (Furstenburg, 2023).

6. Elephant is a superior apex species overpowering and dominating all biodiversity to the deficit of SA's GDP, peoples, and natural resources.
7. urplus problem elephant from present overpopulated populations has an annual growth potential of more than >12 000 tonnes of meat.
8. In alignment with the minister's "Game Meat Scheme" (Gazetted 11 Nov 2023), surplus elephant needs to be included as key sustainable production species – yet the 1994 monotorium preventing the culling of elephant seriously need to be revised.
9. Due to the monotorium elephant currently has no market neither financial sustainable agro-biodiversity business value, thus no incentive for landowners other than killing elephant for its destructive deficit loss and problem creation.
10. The use of chemical contraceptives to limit elephant progeny is extremely expensive and not financially viable. Some eco-tourism reserves hosting a single small herd of less than <20 elephant may apply this method, though it is not sustainable.
11. Current elephant numbers in all SA's protected areas are overpopulated and need be reduced drastically.
12. Botswana is the 1st of the SADC countries to have opened its elephant hunting quotas in 2022/2023.

NB! Most important scientific documentary video: Dr Ian Whyte, KNP Scientist (Feb 2022), watch link: https://www.youtube.com/watch?v=ZsrP1q4XHig

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