An Updated Overview of the Desert-Adapted Lion Population in Kunene, with an assessment of human-lion conflict challenges



Hobatere Breakaway Pride, 2024

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Summary

As of September 2025, the lion population of Namibia's Kunene Region is estimated at 60 adults and subadults (36♀; 24♂), plus 13 cubs (< 2 years). Using the 2022 Northwest Lion Population Survey (Heydinger et al. 2024a) as a benchmark, the population is considered stable. Lions in northwest Namibia display unique seasonal and year-to-year movement patterns adapted to arid environments, which may contribute to human-lion conflict (HLC). Lion mortalities stemming from HLC threaten the population. Since January 2023, no fewer than 23 adult and subadult lions (10♀; 13♂), plus two cubs, have died due to HLC – a further two were translocated from the region, four died of unknown or natural causes, and five are unaccounted for. During this time, an estimated 83% (19/23) of lion mortalities have been due to illegal killings – shooting or poisoning. These killings are concentrated in particular areas ("hotspots").

This report presents a pride-by-pride and demographic overview of the northwest (desert-adapted) lion population, along with information about lion movements, the available prey base, and HLC in the region. It draws upon field work, previous reports, and submitted peer-reviewed publications. Up-to-date information on the desert-adapted lions, HLC, and the work of the Lion Rangers, is available at lionrangers.org.

Key Findings

-The lion population is stable and self-sustaining at 60 adult/subadult individuals (36♀; 24♂) and 13 cubs.

-Three-to-four prides compose more than half (56%) the population. These prides primarily inhabit the greater Ombonde landscape. All other areas are considered marginal for lion survival.

-Since 2022, three prides have been extirpated (Uniab, Awaxas, Hoanib). Conflict and a limited prey base in these areas may limit lion recolonization of areas formerly inhabited by lions.

-The population is younger than during 2022 (2025 avg = 5.83 yrs; 2022 avg = 6.38 yrs, ($t(115) = 1.18$, $p = 0.24$). Historical high mortality rates for subadults suggests a coming population decline - though interventions may limit losses.

-Unique seasonal and year-to-year movement patterns create a changing geography of lion presence, and therefore HLC.

-Since the mid-2010s, the available prey base has declined by an estimated 72.5%. However, comparison with other areas indicates the prey base is sufficient to support a growing lion population.

-HLC mortalities are spatially concentrated in "hotspot" areas where lion monitoring and HLC interventions require strengthening.



Lions photographed by trail camera, Ehi-rovipuka Conservancy

Introduction

Northwest Namibia's Kunene Region is home to an iconic population of desert-adapted lions (*Panthera leo*). Historically, these lions have inhabited unfenced communal conservancy and tourism concession lands, with western prides ranging into Skeleton Coast National Park. From a low of ~20 individuals in the late 1990s, the population recovered to an estimated 122-139 individuals in the mid-2010s (Stander 2018). Since that time, the population has declined by approximately half. Throughout this range, human-lion conflict (HLC) has been the primary cause of lion deaths, since records were first kept in 1998 (Stander 2010; GRN 2017). During the past ten years, Namibia's Ministry of Environment, Forestry and Tourism (MEFT), has prioritized addressing HLC as an important part of securing a viable future for this lion population. Initiatives including the *Human-Lion Conflict Management Plan for North West Namibia* (GRN 2017), a community-based Lion Rangers Program, creation of an Early-Waring System, intensive collaring of nearly all adult lions in the population, and the 2022 Northwest Lion Population Survey (Heydinger et al. 2024a), are just a few examples of the considerable resources allocated to lion conservation in the region. Research and monitoring of the population is currently performed by the Lion Rangers (J. Heydinger), Namibian Lion Trust (T. Hoth-Hanssen), and Desert Lion Conservation (P. Stander).

The first-ever Northwest Lion Population Survey took place from 6 November 2022 to 6 January 2023. Led by MEFT and the Lion Rangers, this provided an estimate of 57-60 adult lions and 14 cubs west of Etosha National Park (Table 1). At an estimated density of 0.11 lion/100 km², the population is the least dense among self-sustaining free-ranging lion populations in Africa. This population estimate represented a 46-60% decrease over the most recent previous estimate in 2017 (Table 2).

Survey area	~ 40,000 km²
Approx. area inhabited by lions	36,390 km²
Lions found	57
Sex ratio	36♀ : 21♂ (1.0 : 0.58)
Cubs found	14
Lion density within conservancies	0.09/100 km²
Lion density within government areas	0.17/100 km²
Total lion density	0.11/100 km²
Population estimate	57-60

Table 1. Overview of results from the Northwest Lion Population Survey, 2022.

Findings from the 2022 survey also highlighted the challenge of a declining prey base, and HLC as the primary cause of lion mortalities (Muzuma and Heydinger 2024). Indicator prey species for desert-adapted lions include gemsbok (*Oryx gazella*), springbok (*Antidorcas marsupialis*), and mountain zebra (*Equus zebra*). According to Northwest Game Count data (NACSO 2023), across Kunene, indicator prey species have declined by as much as 85% since 2010 (Table 2). Recent assessments show HLC incidents have led to 83% (19/23) of lion mortalities since January 2023 (Lion Rangers, unpublished data).

Species	2010 Population Estimate	2015 Population Estimate	2017 Population Estimate	2022 Population Estimate
Gemsbok	25,152	12,970 (↓48%)	6,090 (↓53%)	899 (↓85%)
Springbok	104,920	59,940 (↓43%)	70,420 (↑17%)	33,422 (↓53%)
Mountain Zebra	20,460	17,910 (↓12%)	12,380 (↓31%)	5,083 (↓59%)
Lion	112-139 (0.28-0.35 lions/100km²)	180 (↑29-61%) (0.48-0.62 lions/100km²)	112-139 (↓22-37%) (0.31-0.37 lions/100km²)	57-60 (↓46-60%) (0.11-0.12 lions/100km²)

Table 2. Population estimates for indicator prey species and lions for 2010, 2015, 2017, and 2022 in northwest Namibia. Estimates are for the entire Kunene Region. Percentage increase or decrease compare yearly estimate with previous estimate (e.g. 2015 compared to 2010). (Sources: Stander 2010, 2018; GRN 2017; NACSO 2023.)

Desert-Adapted Lion Range Area

As of 2022, lion range in northwest Namibia (west of Etosha) covered approximately 36,000 km² (Fig. 1), encompassing seven communal conservancies (Anabeb, Ehi-rovipuka, #Khoadi-||Hôas, Omatendeka, Puros, Sesfontein, and Torra), three tourism concessions (Etendeka, Hobatere, and Palmwag), and portions of Skeleton Coast National Park. Lions also periodically range into four additional conservancies (Doro !Nawas, Orupupa, Sorris-Sorris, and Tsiseb) - these areas have no resident lions. Current lion range is home to approximately 13,200 people, primarily engaged in livestock farming for income, as well as landscapes of high tourism value (Heydinger et al. 2024b). Lion range is also home to other high value wildlife such as black rhino (*Diceros bicornis*), elephant (*Loxodonta Africana*), and southern giraffe (*Giraffa giraffa*).

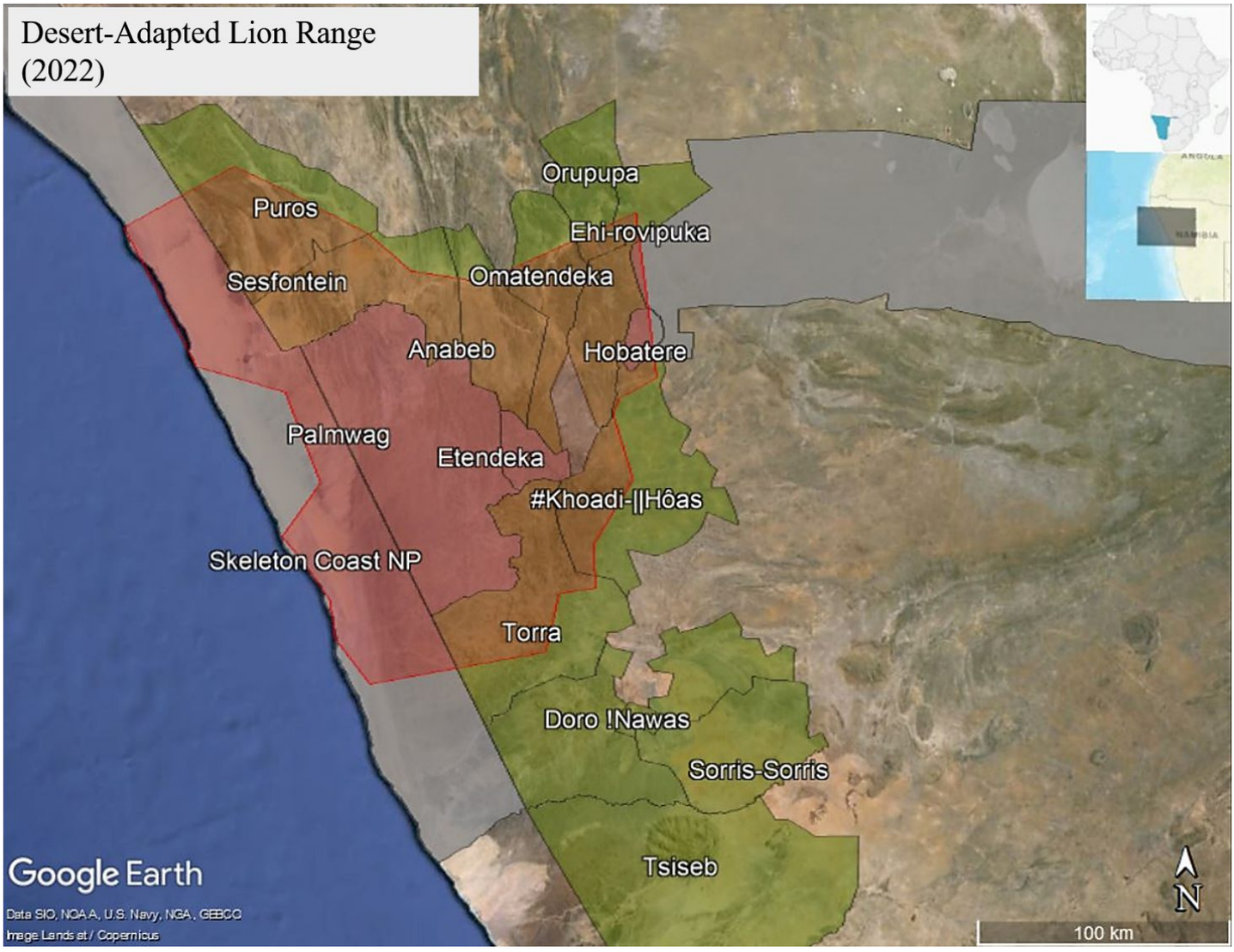

Figure 1. Desert-adapted lion range with conservancy, concession, and national park boundaries. As of the 2022 population survey, lion range encompassed the area outlined in red. (Adapted from Heydinger 2024.)

Desert-Adapted Lion Population Overview, September 2025

PRIDES	Adults (4+ yrs)	Subadults (2–4 yrs)	Cubs (< 2 yrs)	Resident Areas
Floodplain	2 (2 ♀)	1 (1 ♀)	2 (2 ♂)	Skeleton Coast
Obab	1 (1 ♀)	0	0	Skeleton Coast
Okongwe	1 (1 ♀)	0	0	Puros; Skeleton Coast
Hoanib (Translocated Male)	1 (1 ♂)	0	0	Sesfontein; Puros
Omukutu	3 (3 ♀)	0	3	Anabeb; Omatendeka; Ehi-rovipuka
Mbakondja	4 (3 ♀; 1 ♂)	3	4	Anabeb; Etendeka
Southern Anabeb	4 (1 ♀; 3 ♂)	0	0	Anabeb; Omatendeka
Okavariona	4 (3 ♀; 1 ♂)	7 (3 ♀; 4 ♂)	0	Omatendeka; Ehi-rovipuka
Etendeka	3 (3 ♀)	1 (1 ♀)	2	#Khoadi-‖Höas; Etendeka; Palmwag
Klip	3 (2 ♀; 1 ♂)	3	0	#Khoadi-‖Höas
Omirembue	1 (1 ♀)	2 (1 ♀; 1 ♂)	0	Omatendeka; Ehi-rovipuka
Hobatere	4 (3 ♀; 1 ♂)	5	2	Hobatere; Ehi-rovipuka; #Khoadi-‖Höas
Hobatere Breakaway	2 (2 ♂)	5 (1 ♀; 4 ♂)	0	Hobatere; Ehi-rovipuka; #Khoadi-‖Höas
TOTALS	**33 (23 ♀; 10 ♂)**	**27 (~13 ♀; 14 ♂)**	**13**	

Table 3. Desert-adapted lion population estimate, pride-by-pride and age-structured. Prides are composed of resident adult females, plus pride males and non-dispersed subadult females and males. Adults are 4+ years old, subadults are 2-4 years old, and cubs are < 2 years old. Resident areas based on 95% kernel density estimate (KDE) since the deployment of GPS/satellite collars. Data based on whole count, performed during September 2025 field work, and reporting from Namibian Lion Trust and Desert Lion Conservation.

Currently estimated at 60 adult and subadult individuals (36♀; 24♂) and 13 cubs, the desert-adapted lion population is stable, relative to the 2022 estimate of 57-60 adults/subadults and 14 cubs (Heydinger et al. 2024a) - though for this survey cubs were defined as < 1 year. The population is self-sustaining: no lions originating in neighbouring Etosha National Park have emigrated to communal or concession lands in Kunene. Given historical records and genetic evidence (Stander 2018; Dasch et al. 2021), the population may periodically require influxes from Etosha to augment numbers and genetic diversity.

The population is increasingly concentrated in fewer prides. The Mbakondja, Okavariona, Hobatere, and Hobatere Breakaway prides contain ~56% (34/60) of all adults and subadults. Whereas in 2022 there were 17 separate prides (avg. size = 3.16 adults/subadults), there are currently 13 prides (avg. size = 4.62 ad/subad, ($t(29) = 1.6$, $p = 0.12$)). This is due to entire prides being extirpated and solitary individuals killed. Since 2022, the Uniab (4 ad/subad), Awaxas (5 ad/subad), and Hoanib (4 ad/subad) prides have been extirpated; three solitary individuals (2♀; 1♂) were killed as a result of HLC.

The population has moved eastwards: it is currently centred around the Ombonde river landscape, running from the Hobatere Concession, through the mountainous core wildlife areas of Ehi-rovipuka, Omatendeka, and Anabeb conservancies, to Etendeka Concession. This eastward shift reflects the extirpation of the three prides mentioned above. The Uniab pride primarily inhabited Torra Conservancy and Palmwag Concession - its members were killed in the Klip River area of #Khoadi-‖Höas Conservancy; the lone remaining male was translocated to the Hoanib in February 2024. The Awaxas pride primarily inhabited the Palmwag Concession - its members were killed following HLC in Anabeb; others died in Etendeka Concession. The Hoanib pride primarily inhabited the Hoanib riverbed and adjoining landscape of Sesfontein Conservancy - its members were killed following HLC in Puros Conservancy. Outside the core Ombonde corridor other areas in Kunene should be considered marginal for lions. While lions may recolonize areas such as Palmwag Concession and Torra Conservancy, a low prey base limits current recolonization prospects.

Desert-Adapted Lion Population Overview (cont.)

The population is younger than in 2022 (2025 avg = 5.83 yrs; 2022 avg = 6.38 yrs, (t(115) = 1.18, p = 0.24)). The relatively higher number of subadults, compared to 2022 (Fig. 2), combined with high subadult mortality rates (Fig. 3), bears attention. Mortality rates for desert-adapted lions peak during subadult and young adult years (ages 3-6, Stander 2018). The younger age structure may indicate a coming population decline - though HLC interventions could minimize losses.

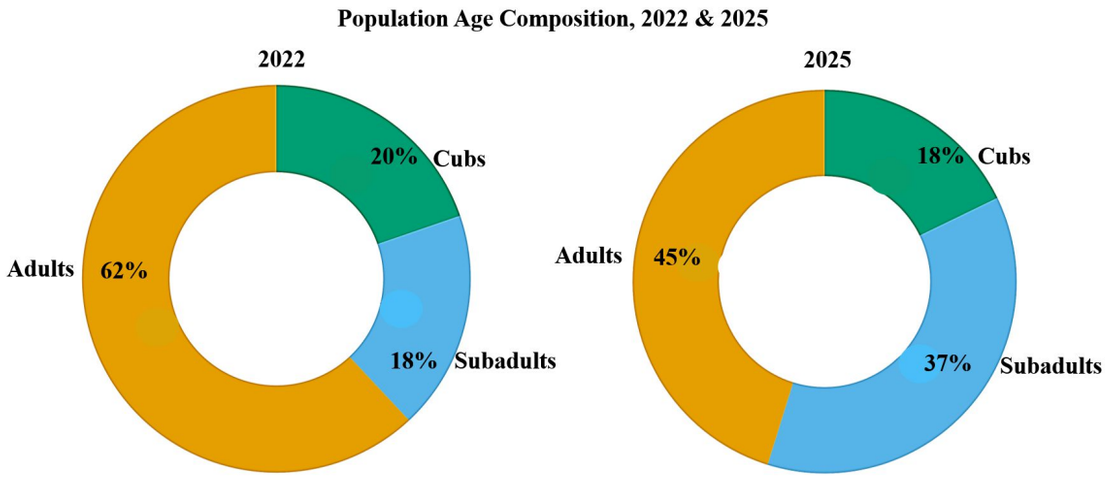

Figure 2. Desert-adapted lion population age-structure estimates, comparing 2022 and 2025. Adults are individuals 4+ years of age, subadults are 2-4 years old, and cubs are < 2 years old.

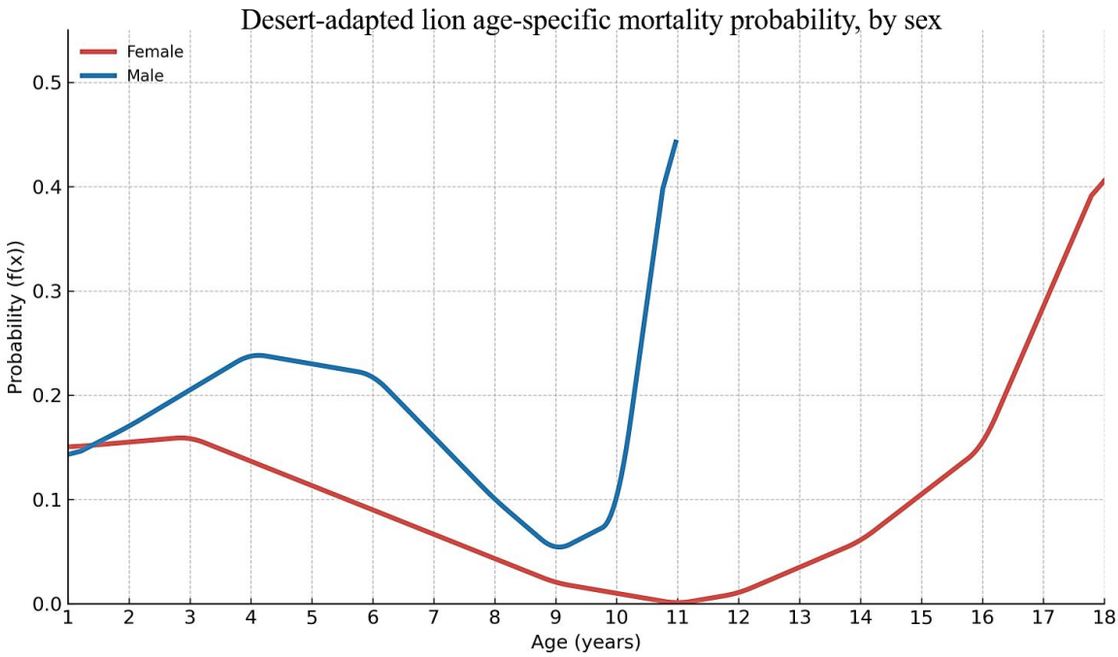

Figure 3. Desert-adapted lion population age-specific mortality, by sex. Mortality rates peak during subadult years, particularly for males. By age 11, 95% of males have died; by age 17, 95% of females have died. Beyond cub years, mortality rates are lower for females than males at all ages. (Adapted from Stander 2010.)

Desert-Adapted Lion Population Overview (cont.)

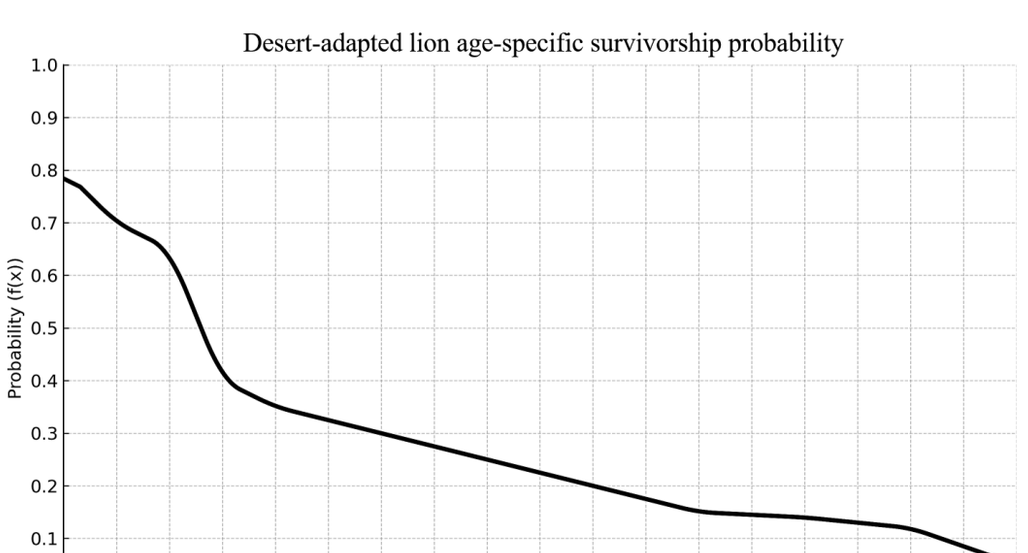

Figure 4. Desert-adapted lion population age-specific survivorship, for both sexes. Probability of survivorship declines dramatically between ages 3-4 before levelling-off - this is driven by low survival of males during subadult years. A gradual decrease in the slope of the curve around age 13 indicates a near-total absence of males surviving beyond this age. (Adapted from Stander 2010.)

The estimated sex ratio among adults and subadults (1♀; 0.67♂) is within normal bounds for lions (Fig. 5, Schaller 1972; Ferreira & Funston. 2010; Becker et al. 2013). However, the sex ratio is heavily influenced by the low number of subadult females compared to subadult males (~13♀; ~14 ♂). By comparison, adult females outnumber adult males by more than two to one (23♀; 10 ♂). While high numbers of subadult males are not abnormal for lion populations, mortality rates in Kunene are highest among subadult males. (Demographic values are based on individual identification; where these were not available, e.g. for subadults in the Mbakondja, Klip, and Hobatere prides, a 1:1 sex ratio was assumed.)

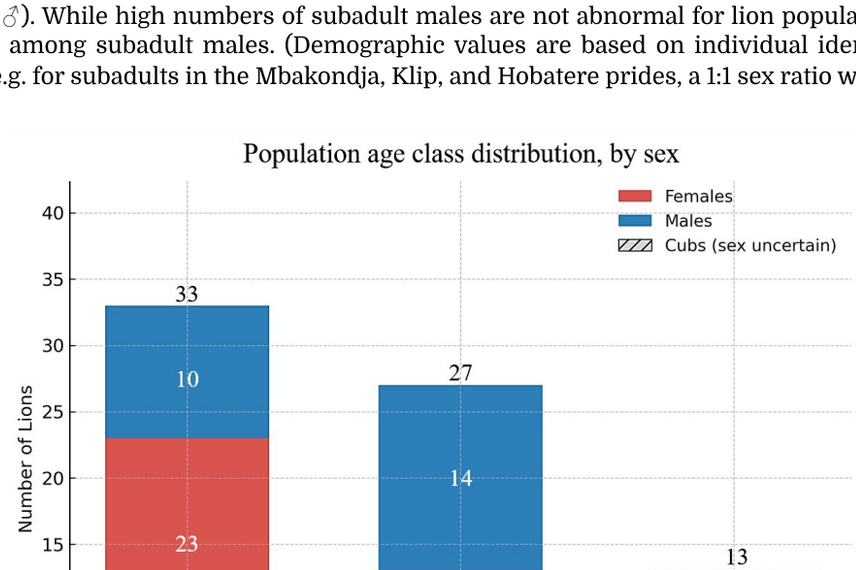

Figure 5. Desert-adapted lion population age class distribution, by sex, September 2025. Adults are lions 4+ years of age, subadults ages 2-4, cubs < 2 years old.

Desert-Adapted Lion Ranging Patterns

Lions in northwest Namibia exhibit some of the largest lifetime and annual home (95% kernel density estimator, KDE) **and total** (100% minimum convex polygon, MCP) **ranges for the species** (Table 4)**.** Year-to-year changes in ranging patterns inflate lifetime range estimates and help explain differences between lifetime and annual range sizes. For all three measurements (core (50% KDE), home, and total), for both female and male lions, lifetime ranges were 1.28 to 2.4 times larger than annual ranges. This occurs because desert-adapted lions change ranges each season, and year. However, because these lions inhabit an arid ecosystem defined by patchy and changing resource availability, individuals and prides may require access to their entire lifetime range to survive year-to-year environmental changes.

Desert-Adapted Lion Population Average Seasonal, Annual, and Lifetime Ranges

Sex		Wet	Cool Dry	Warm Dry	Annual	Lifetime
Male	50% KDE	146 (± 86)	231 (± 197)	139 (± 151)	220 (± 146)	319 (± 130)
	95% KDE	783 (± 365)	1124 (± 1014)	663 (± 666)	1192 (± 837)	1859 (± 861)
	100% MCP	734 (± 307)	1036 (± 849)	564 (± 472)	1373 (± 912)	3298 (± 3205)
	μ n (fixes)	1060 (± 446)	1089 (± 366)	703 (± 301)	2396 (± 877)	5925 (± 3639)
	n	28	33	29	36	15
Female	50% KDE	146 (± 138)	137 (± 115)	88 (± 94)	162 (± 142)	208 (± 136)
	95% KDE	710 (± 586)	613 (± 450)	407 (± 391)	761 (± 550)	1045 (± 591)
	100% MCP	647 (± 483)	563 (± 323)	339 (± 308)	881 (± 521)	1544 (± 763)
	μ n (fixes)	1269 (± 664)	1183 (± 394)	666 (± 345)	2626 (± 1232)	6541 (± 3675)
	n	44	47	48	54	22

Table 4. Mean seasonal, annual and lifetime core (50% KDE), home (95% KDE), and total (100% MCP) ranges (km^2) for male and female collared lions in northwest Namibia, 2022-2024. Includes mean number of GPS fixes (μ n) and total number of lion ranges (n) used in estimates.

Changes in seasonal and annual ranges may drive HLC challenges. Low inter-annual (year-to-year) home range overlap for prides (22% seasonal, 24% annual overlap, Table 5) and male coalitions (18% seasonal, 29% annual overlap) indicates lions do not inhabit the same ranges from one season (or one year) to the next. Therefore, areas of potential HLC may also change over time. Differentiating between seasonal, annual, and lifetime home ranges, and recognizing the geography of changing lion movements, is important for understanding lion ranging and HLC in northwest Namibia.

Home Range Overlap Index	**Season**			
	Annual	Wet	Cool Dry	Warm Dry
Coalitions/Males	0.24 ± 0.1 (12)	0.2 ± 0.11 (9)	0.19 ± 0.13 (13)	0.16 ± 0.12 (11)
Prides	0.29 ± 0.04 (16)	0.2 ± 0.1 (14)	0.25 ± 0.1 (15)	0.22 ± 0.13 (15)

Table 5. Average similarities in home ranges (95% KDE) between years, and between years for a given season, for coalition/males, and prides, in northwest Namibia, 2022-2024. Home range fidelity is scored on a 0 (no overlap) to 1 (perfect overlap) scale. Home range fidelity based on Chaverri et al. (2007, sensu Richard et al. 2014) approach.

Desert-Adapted Lion Ranging Patterns (cont.)

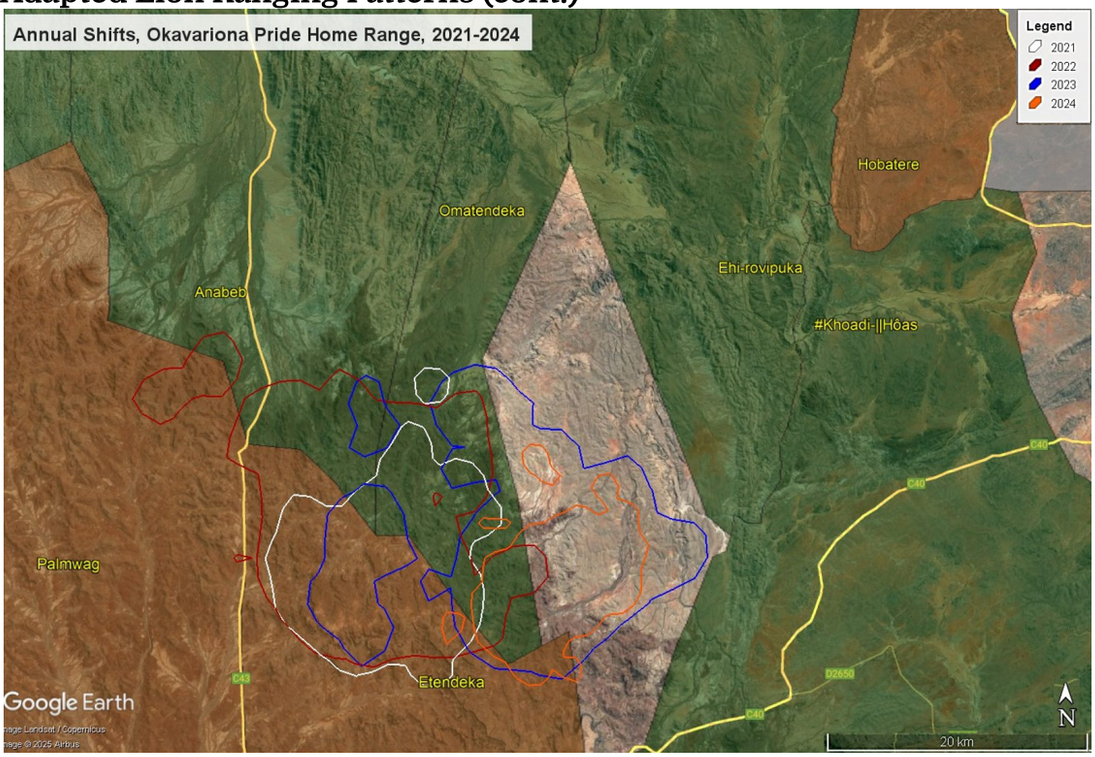

Figure 6. Map of annual home range (95% KDE) shifts of the Okavariona pride, 2021-2024, based on GPS/satellite collar data. Annual home ranges are separately indicated by respective color.

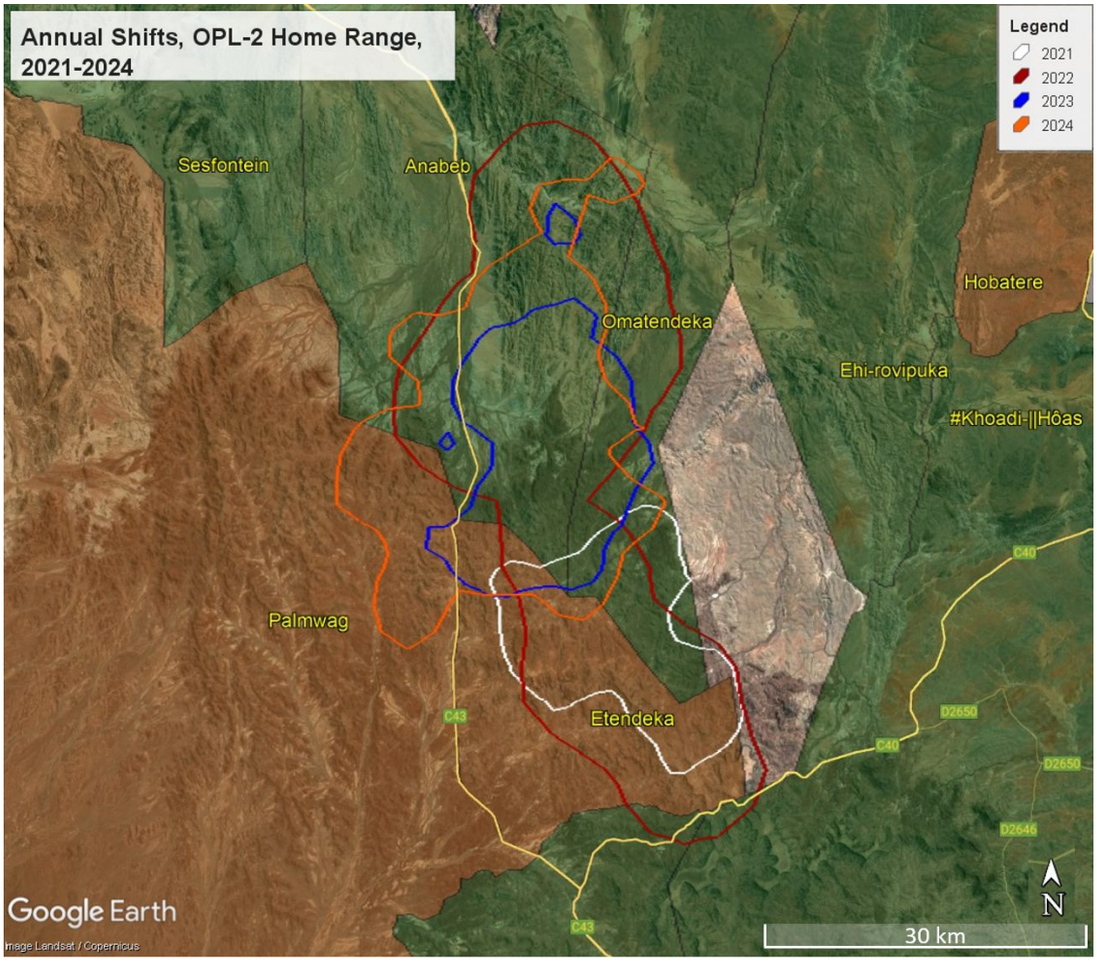

Figure 7. Map of annual home range (95% KDE) shifts of the the male lion OPL-2, 2021-2024, based on GPS/satellite collar data. Annual home ranges are separately indicated by respective color.

Desert-Adapted Lion Ranging Patterns (cont.)

Lions in northwest Namibia adjust space use primarily in response to shifting prey distributions and the needs of prides raising cubs. Linear mixed-effects models revealed that prey availability drives male lion home range sizes (Int: 1980.11 ± 387.83, β = -3.47 ± 1.61, t = -2.16, p = 0.043), while cub presence was the most consistent predictor of female home range sizes (Int: 1696.71 ± 212.05, β = -352.14 ± 89.36, t = -3.94, p = 0.001). From a management perspective, variation in lion ranging undermines fixed-zone strategies, such as exclusive wildlife- and livestock-designated areas. Lion mortality in Kunene is often associated with lions moving into unfamiliar territories (Heydinger 2024). For example, all lion mortalities within the Ehi-rovipuka-#Khoadi-||Höas boundary landscape occurred when lions occupied farming areas they were previously unfamiliar with (see below, pg. 13).

Lion movements display clear seasonal structures (Fig. 8). An overall picture of lion movements has emerged from recent GPS/collar data and monitoring: cubs are primarily born from June to October, constraining female movements during the warm dry season when cubs are youngest. Female range sizes peak during the early wet season, coinciding with prey dispersion to areas of fresh grazing and increased cub mobility. Males follow female movements in subsequent weeks, to maintain pride tenure and find prey (Loveridge et al. 2009; Packer 2023). Males then dramatically increase their ranges during the cool dry season, likely driven by prey dispersion and territorial patrolling (Schaller 1972; Packer 2023). Movements contract for both sexes during the warm dry season - when daytime temperatures often exceed 40°C and prey are concentrated around available water (Heydinger unpublished data). These related, but sex-specific, movement strategies reflect the effects of changing rainfall, and resulting geography of prey availability, producing movement pulses and spatial reorganization among the lion population.

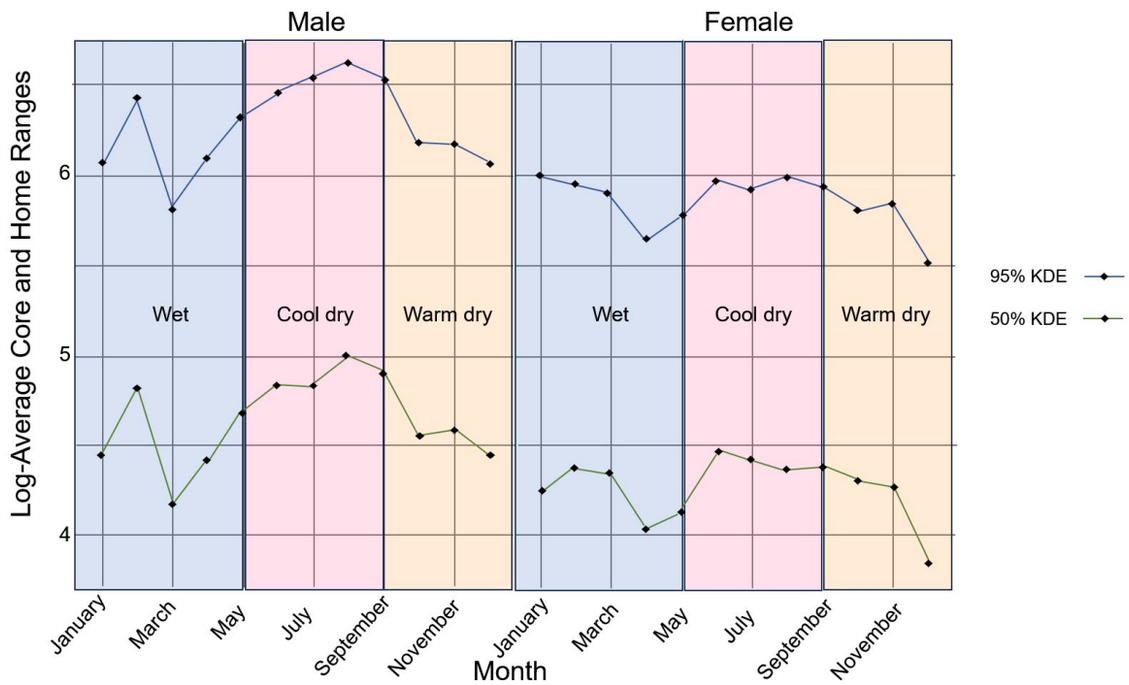

Figure 8. Monthly and seasonal core (50% KDE) and home range (95% KDE) estimates for male and female lions in northwest Namibia, 2022-2024. Range estimates have been log-transformed for visual comparison.

Northwest Namibia Prey Base

Since the mid-2010s, available biomass of desert-adapted lion focal prey species (gemsbok, southern giraffe, Hartmann's mountain zebra, kudu (*Tragelaphus strepsiceros*), ostrich (*Struthio camelis*), and springbok) has declined precipitously, based on data from Namibia's annual Northwest Game Count (NACSO 2024) (Fig. 9). Within core lion-range conservancies and concessions, prey biomass (kg/km) declined by 72.5% from 2016 to 2024 (Table 6).

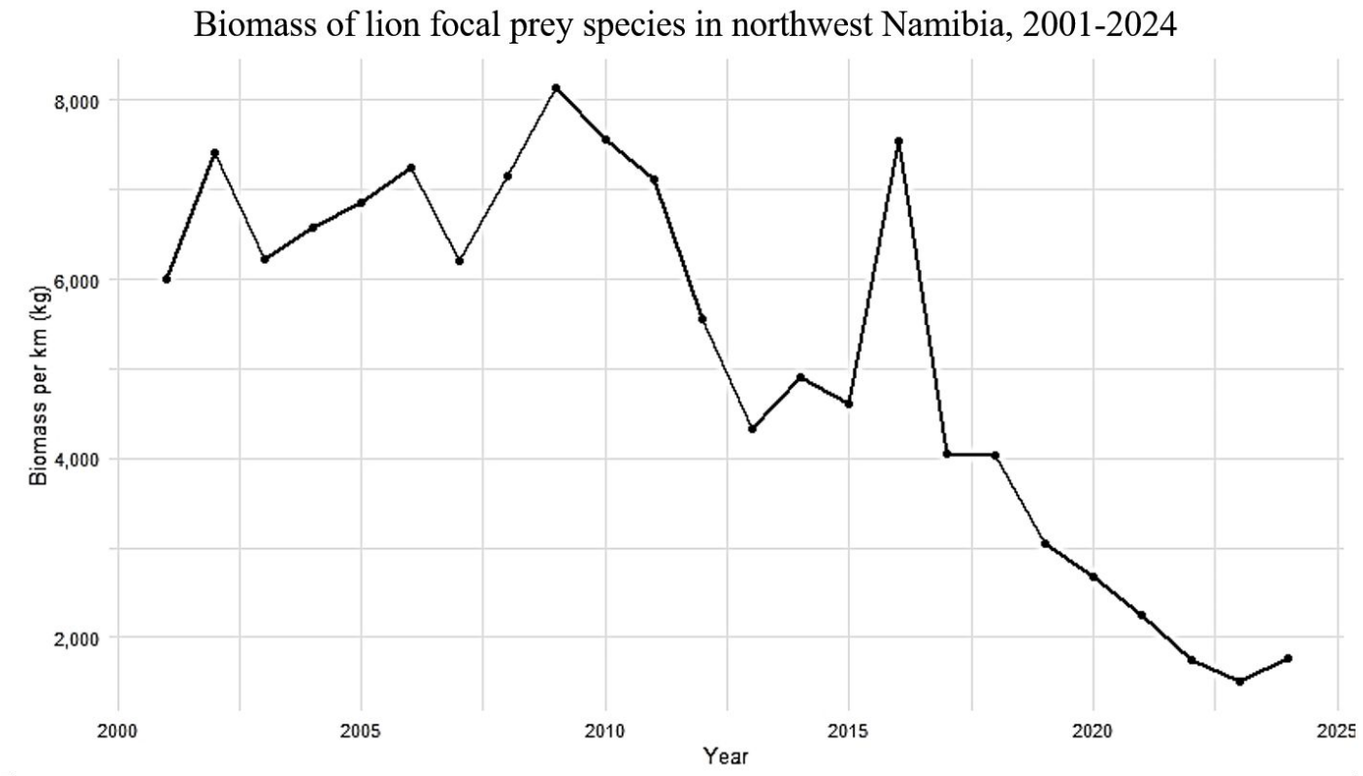

Figure 9. Plot of estimated available biomass (kg/km) of lion focal prey species within communal conservancies and tourism concessions in the Kunene Region, 2001 - 2024.

Estimated lion focal prey biomass in core lion-range conservancies and concessions, 2016-2024

Conservancy/ Concession	Area (km^2)	2016	2017	2018	2019	2020	2021	2022	2023	2024
#Khoadi-||Hôas	3364	185	109	144	143	102	94	67	41	51
Anabeb	1570	1145	622	654	196	384	89	452	128	168
Ehi-Rovipuka	1980	358	271	188	404	192	81	119	147	187
Etendeka	633	2756	903	1274	631	475	715	329	181	426
Hobatere	258	1138	562	453	364	743	444	171	223	68
Omatendeka	1619	534	495	519	522	135	359	209	358	274
Palmwag	5891	584	137	201	113	164	108	87	47	93
Sesfontein	2465	140	480	199	221	108	140	70	127	85
Torra	3493	107	107	95	162	101	72	41	87	91
Total yearly kms driven		2630	2717	2654	2780	2780	2850	2621	2789	3027
Area prey biomass/km		487	283	276	239	190	157	131	112	134

Table 6. Estimated lion focal prey biomass (kg/km) by conservancy and concession for core lion-range conservancies and concessions in northwest Namibia, 2016-2024. Area biomass calculated by dividing the total estimated prey biomass by the kilometres driven within each area. Based on Northwest Game Count data (NACSO 2024).

Northwest Namibia Prey Base (cont.)

Though lions in northwest Namibia rely on a dramatically diminished prey base, available prey biomass is sufficient to sustain a greater number of lions. Based on predator-prey ratios from other areas in Africa, the available prey base in core lion range conservancies and concessions in northwest Namibia (2024) could theoretically sustain a growing lion population. Figure 10 plots lion density (lions/100 km²) as a function of the available prey base (kg/km²) for 18 areas across Africa (see: Hemson 2003; Hayward et al. 2009). The solid line indicates the average estimated relationship between prey biomass and lion density across all areas. The triangle indicates the desert-adapted lion population. Though the prey base in northwest Namibia has declined dramatically since the mid-2010s, this alone is insufficient to explain current lion numbers.

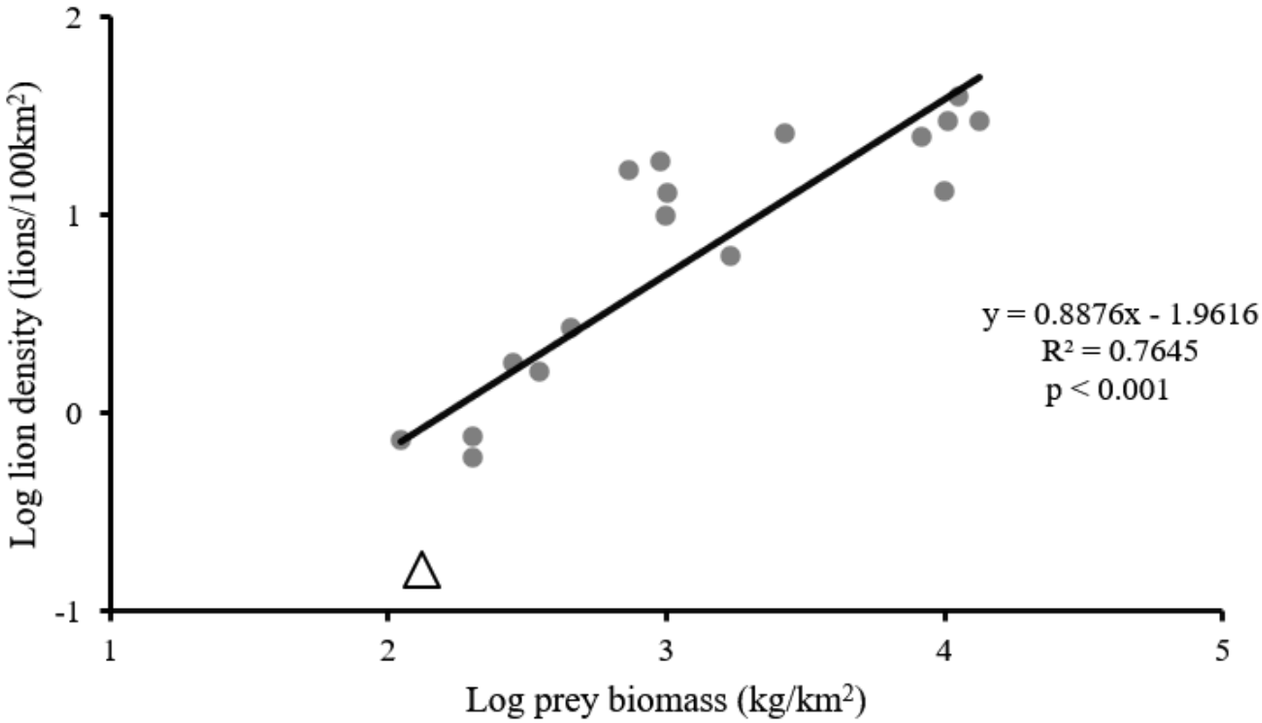

Figure. 10. Relationship between lion density (lions/100 km²) and prey biomass (kg/km²) in lion range areas across Africa (log-transformed). Grey circles indicate other areas (Hemson 2003; Hayward et al. 2009); △, core desert-adapted lion range (Heydinger et al. 2024a).

Overview of Desert-Adapted Lion Mortalities, Jan. 2023 - Oct. 2025

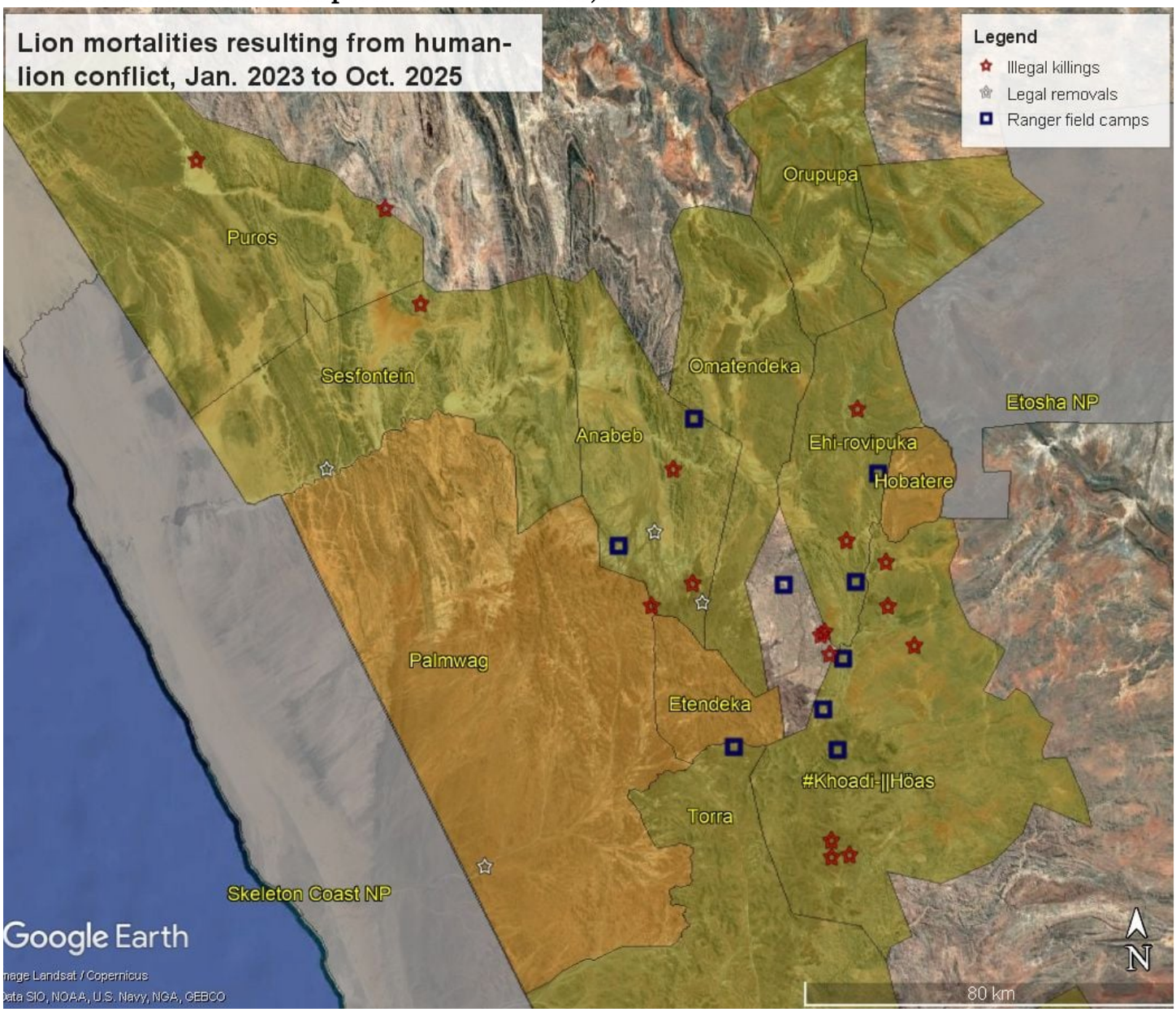

Figure. 11. Map displaying lion mortality locations and Lion Rangers field camps, January 2023 to October 2025. Red stars indicate locations of illegal lion killings; white stars indicate MEFT-approved removals. Blue squares are Lion Rangers joint-patrol field camps.

Landscape Challenges - "Hotspots"

From January 2023 to October 2025, 23 adult and subadult lions (10♀; 13♂), plus two cubs were killed due to HLC (Fig. 11) - this represents approximately 85% (23/27) of lion mortalities during this period. A further two lions were translocated from the region by MEFT, four died of unknown or natural causes, and five are presently unaccounted for. Overwhelmingly (21/24), lion mortalities during this period occurred in four areas: (i) near the Palmfontein and Dorsland farming areas along the southeastern Ehi-rovipuka/northwestern #Khoadi-||Höas boundary (8 lions); (ii) within the Klip River landscape of southern #Khoadi-||Höas and neighbouring Torra conservancies (5 lions); (iii) in the farming area of the Gamatum riverbed in Puros and neighbouring Otjikondavirongo conservancies (4 lions); and, (iv) at farms near the C-43 road in Anabeb Conservancy (4 lions). Additionally, lion mortalities have been recorded along the western Etosha fence in Ehi-rovipuka Conservancy; though these mortalities were of lions dispersing from Etosha and are considered separately.

Overview of Desert-Adapted Lion Mortalities, Jan. 2023 - Oct. 2025 (cont.)

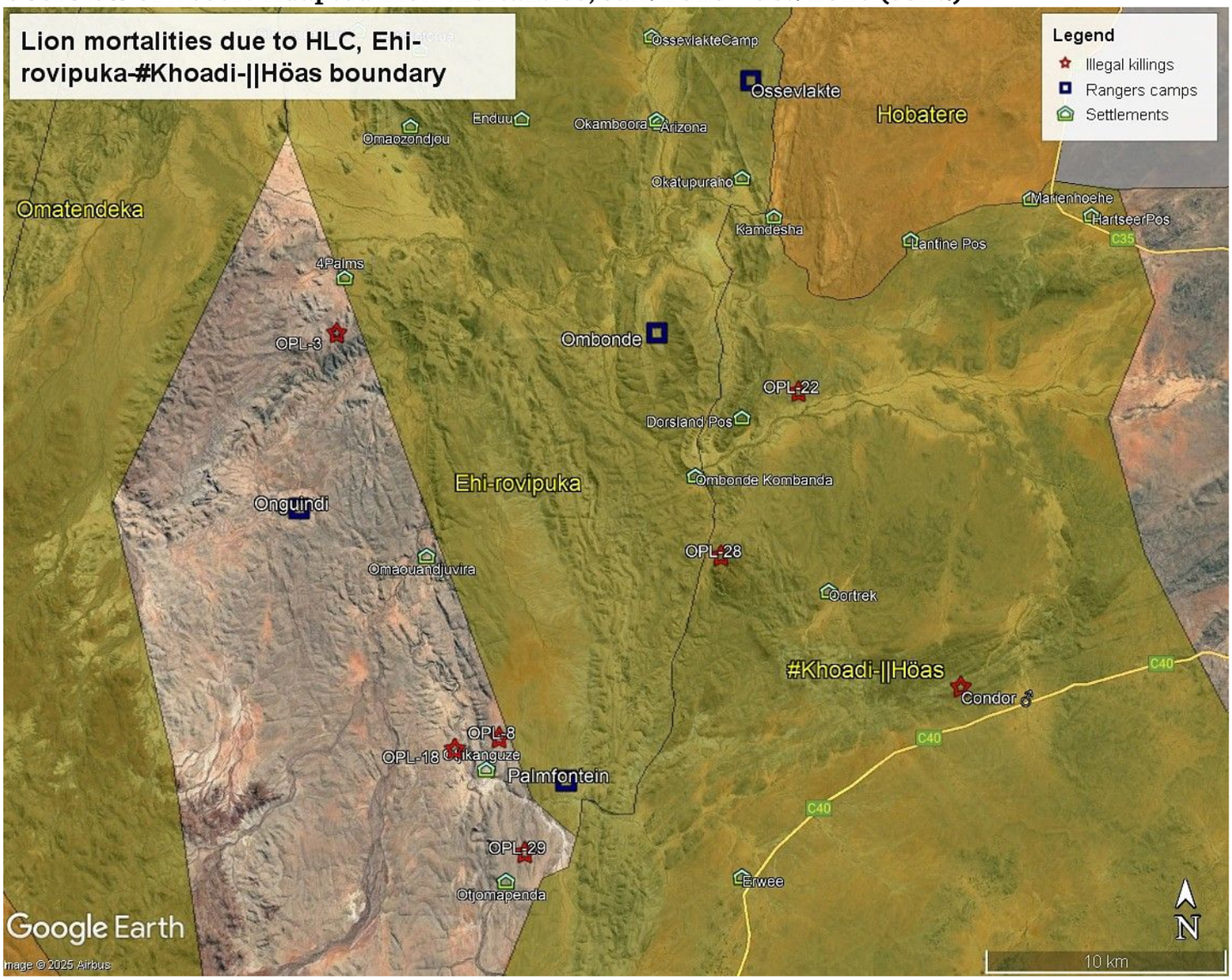

Figure. 12. Map of lion mortality locations and Lion Rangers field camps in southern Ehi-rovipuka and northern #Khoadi-||Höas. Red stars indicate locations of illegal lion killings; blue squares indicate Lion Rangers joint-patrol field camps. Green houses are settlements.

The area recording the highest number of lion mortalities is the Ehi-rovipuka-#Khoadi-||Höas boundary landscape, centred around the Palmfontein and Dorsland farming areas (Fig. 12). Since the beginning of 2023, at least seven lions (4♀; 2♂; 1 cub) have been killed in this landscape – an additional male lion was removed due to conflict which occurred in this area.

- OPL-3 (♂), poisoned, April 2023 (Omatendeka-Ehi-rovipuka bounadry).
- XPL-107 (♂), removed following conflict, October 2023.
- OPL-18 (♀), poisoned, August 2024.
- OPL-8 (♂), likely poisoned, October 2024.
- OPL-29 (♀), poisoned, April 2025.
- OPL-22 (♀), shot, August 2025.
- Condor subadult (♂), shot, August 2025.
- OPL-28 (♀), plus one cub, poisoned, October 2025.

Since September 2024, Lion Rangers joint-patrols have been permanently based in the Palmfontein hotspot area. While this has had a limited positive effect, both the size of the landscape and the number of resident lions (17 adults/subadults; 3 cubs) present challenges. Such challenges are exacerbated by residents of the Palmfontein/Otjikanguze area, considered “illegal settlers” – neither conservancy members, nor beneficiaries. While the Ehi-rovipuka Conservancy has frequently assisted with monitoring in the form of availing Game Guards and assisting with transport, the #Khoadi-||Höas Conservancy has not assisted with Lion Ranger or Rapid Response activities. Seasonal shortfalls in available prey and pastoralists leaving livestock unattended are an ongoing challenge to lion survival.

Overview of Desert-Adapted Lion Mortalities, Jan. 2023 - Oct. 2025 (cont.)

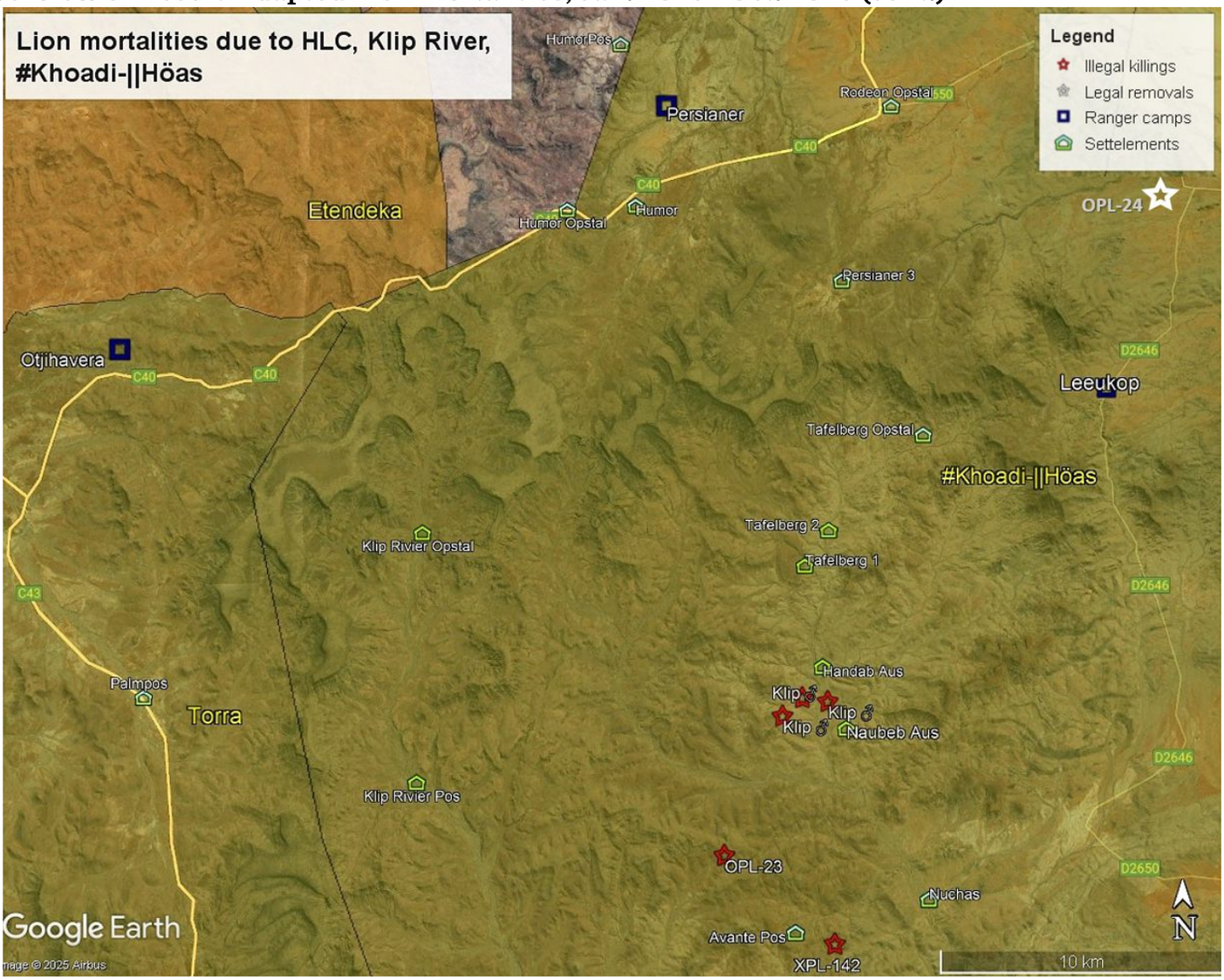

Figure. 13. Map of lion mortality locations, Lion Rangers field camps, and settlements in central #Khoadi-||Höas and northern Torra. Red stars indicate locations of illegal lion killings; white stars indicate MEFT-approved removals. Blue squares indicate Lion Rangers joint-patrol field camps. Green houses are settlements.

The Klip River landscape of #Khoadi-||Höas, bordering eastern Torra Conservancy (Fig. 13), presents challenges to lion survival and Lion Rangers monitoring. Since the beginning of 2023, at least five lions (2♀; 3♂) have been killed in this landscape – one male lion was also translocated to the Hoanib due to conflict, and an additional female is unaccounted for and presumed dead.

- Klip subadults (3♂), disappeared approximately mid-March 2023 (uncollared).
- XPL-142 (♀), shot, July 2023.
- XPL-102 (♀), disappeared, January 2024 (uncollared).
- OPL-23 (♀), poisoned, February 2024.
- OPL-24 (♂), translocated, February 2024.

HLC has been a historical challenge in the southern Klip River hotspot; which has only declined due to a lack of lions. Since 2022, two lions (2♀) are confirmed to have been killed in the area, while a further four (3♂; 1♀) disappeared. Three subadult males disappeared in early 2023 – the preponderance of evidence indicates they were killed in mid-March 2023. The uncollared lioness XPL-102 has not been seen since January 2024, though, given her advanced age, natural mortality is possible. The Klip River pride (3♀; 1♂; 3 cubs) currently ranges near Tafelberg and Leeukop. No other lions in Kunene currently range south of Klip River. While the area is notoriously rugged and difficult to access, Lion Rangers patrols have been lacking – though teams are currently based at Leeukop. There has been no Rapid Response Team assigned to conservancies south of the Veterinary Control Fence since the end of 2024, due to lack of man-power and vehicle. While Torra Conservancy has routinely assisted with Rangers' deployment, #Khoadi-||Höas has not assisted with Lion Ranger or Rapid Response activities.

Overview of Desert-Adapted Lion Mortalities, Jan. 2023 - Oct. 2025 (cont.)

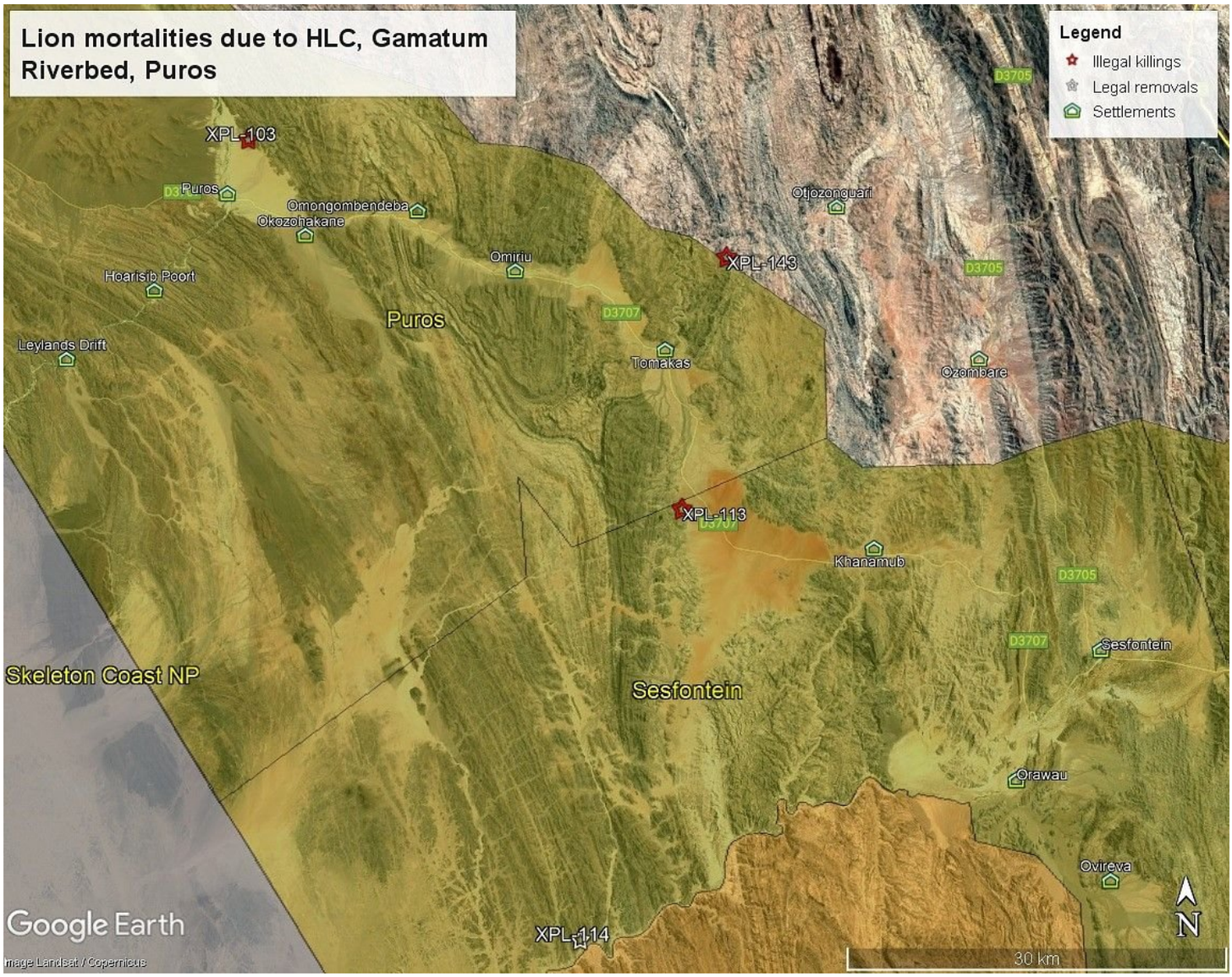

Figure 14. Map of lion mortality locations and settlements in the Gamatum landscape of Puros. Red stars indicate locations of illegal lion killings; white stars indicate MEFT-approved removals. Green houses are settlements.

The Gamatum riverbed corridor in Puros Conservancy (Fig. 14) has long been an HLC hotspot (Stander 2018). Since 2022, the entire Hoanib pride (2♀; 1♀; 1 cub) has been killed in this landscape. These mortalities occurred during periods when the pride periodically departed the Hoanib – its primary range.

- XPL-113 (♀), shot, January 2024.
- XPL-103 (♀), plus one cub, shot, June 2024.
- XPL-143 (♂), poisoned, June 2025.
- XPL-114 (♀), removed, June 2025.

Historically, HLC in Puros and Sesfontein has centred around the Tomakas farming area. GPS/satellite collar data indicate the female XPL-113 was shot near Tomakas and then died in the mountains of Sesfontein. The male XPL-143 was poisoned NE of Tomakas while livestock were present. The shooting of XPL-103 also resulted in the starvation of her last surviving cub (< 6 months). The large distances, extremely limited prey base, and poor performance of field personnel all contribute to inadequate HLC mitigation. Sesfontein Conservancy has at times assisted with Lion Rangers transport and Rapid Response work; Puros has not. Currently, Puros and Sesfontein are occupied by only two lions (1♀; 1♂); one of which was translocated into the area.

Overview of Desert-Adapted Lion Mortalities, Jan. 2023 - Oct. 2025 (cont.)

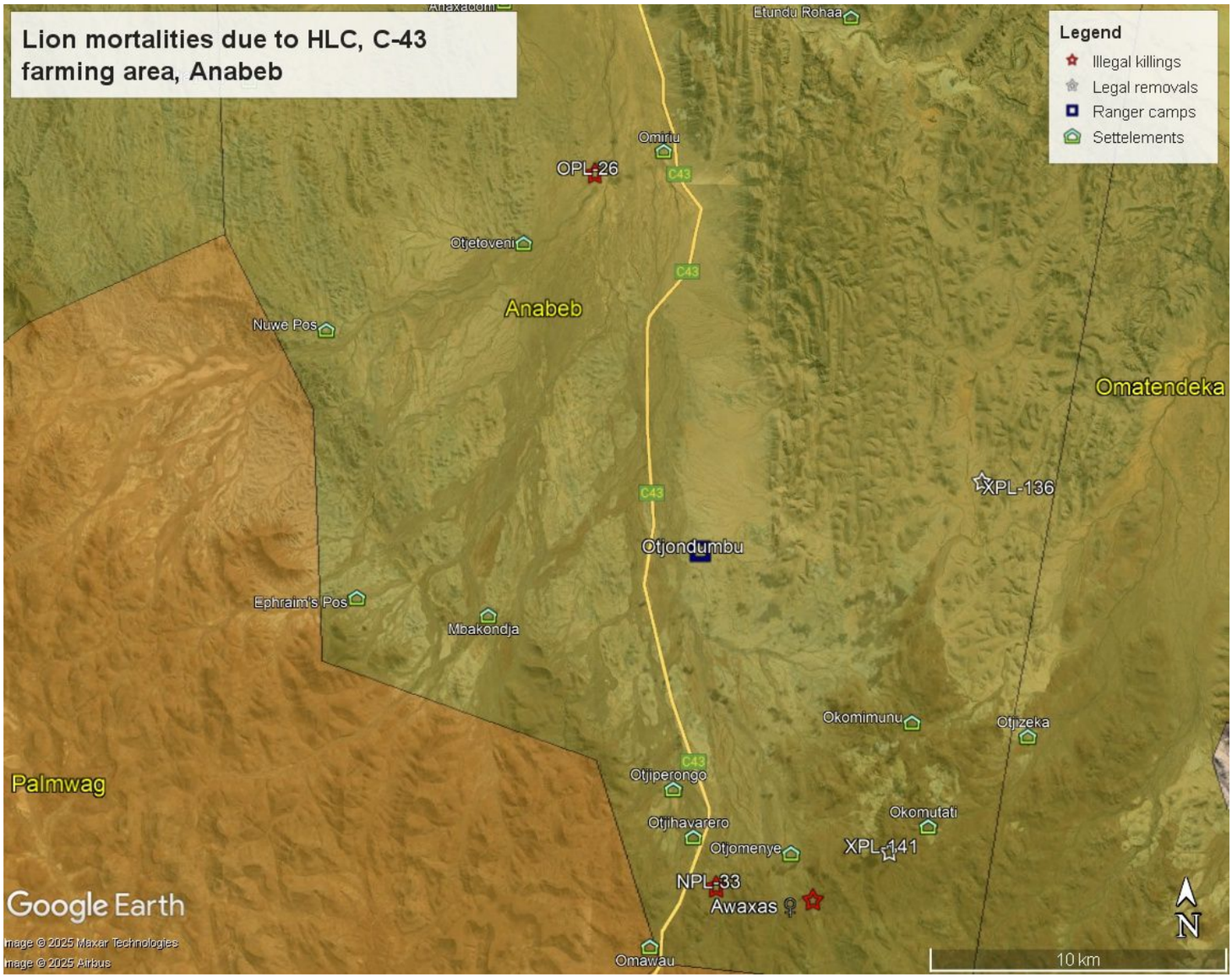

Figure 15. Map of lion mortality locations, Lion Ranger field camps, and settlements in the farming areas along the C-43 road, Anabeb Conservancy. Red stars indicate locations of illegal lion killings; white stars indicate MEFT-approved removals. Blue squares indicate Lion Rangers joint-patrol camps. Green houses are settlements.

Lions frequently visit farms along the C-43 (Palmwag-Sesfontein) road in Anabeb Conservancy (Fig. 15). While numerous lion mortalities have taken place, conflict reports are relatively high, particularly around the Otjondumbu and Otjimenye farms. The area is currently home to fifteen lions (11 adults/subadults; 4 cubs) in two prides.

- NPL-33 (♂), shot, February 2023.
- Awaxas (♀), shot, April 2023 (uncollared).
- OPL-26 (♂), shot, February 2024.
- XPL-141 (♂), removed, May 2024.
- XPL-136 (♂), removed, May 2024.

HLC is a consistent challenge in this hotspot area. Still, farmers demonstrate considerable tolerance of resident lions. As noted in earlier reports (Heydinger 2024), lion mortalities occur when lions not normally occupying this area move in – this was the case for all mortalities listed above. HLC in this area contributed to the extirpation of the Awaxas pride, including the shooting of the uncollared Awaxas female, and XPL-141 and XPL-136 being removed following conflict. While the area is adequately covered by Lion Rangers and Rapid Response Teams, field personnel are over-reliant on lion GPS/satellite collar updates. Field visits indicate lions are infrequently tracked to their location during the day, leaving farmers' livestock susceptible to nighttime attacks. Farmers in the area consistently kraal livestock at night. Conservancy assistance to the Lion Rangers and Rapid Response teams is lacking.

Additional Lion Mortalities, Jan. 2023 - Oct. 2025

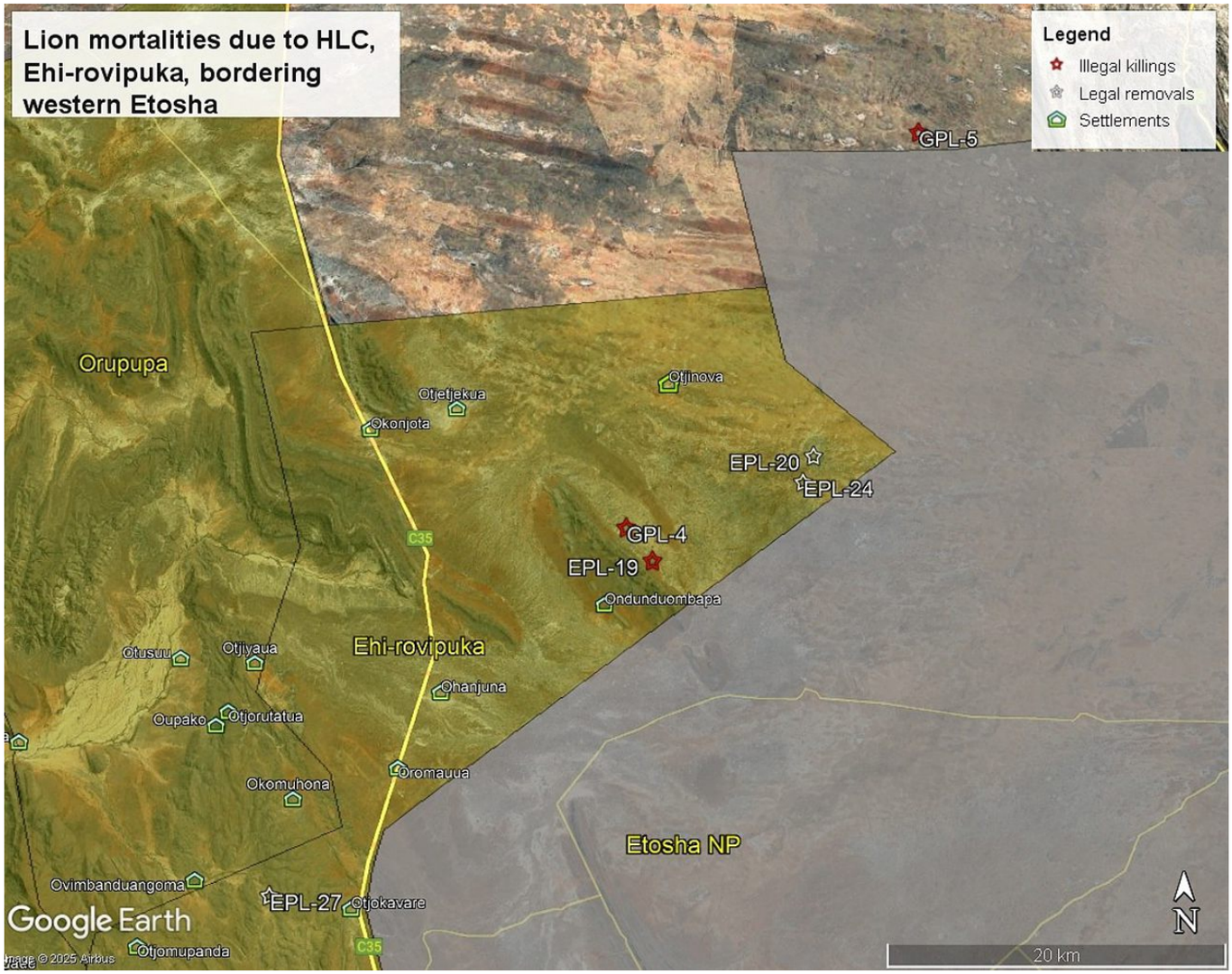

Figure 16. Map of lion mortality locations and settlements in Ehi-rovipuka Conservancy, along the northwestern border of Etosha National Park. Red stars indicate locations of illegal lion killings; green houses are settlements.

Though lions inhabiting Etosha National Park are considered separately from the desert-adapted lion population, HLC incidents stemming from lions dispersing from Etosha are relevant to the population's viability, as well as local perspectives of lions. HLC-related lion mortalities have been a long-standing issue along Etosha's northwestern boundary (Naha et al. 2025). Since January 2023, at least six lion mortalities due to HLC have occurred in this hotspot area (others, involving uncollared lions, are highly likely) (Fig. 16). A further two lions were trophy hunted.

- GPL-5 (♂), shot, January 2025 (Sheya Shushona Conservancy).
- GPL-4 (♂), shot, July 2025.
- EPL-19 (♂), shot, July 2025.
- EPL-27 (♂), removed, July 2025.
- EPL-20 (♂), removed, September 2025.
- EPL-20 (♂), removed, September 2025..

Lions have historically dispersed from Etosha National Park onto communal and commercial lands – each year ~22 lions are killed along Etosha's borders, with most mortalities occurring on commercial farms south of the park (Stander 2004; Naha et al. 2025). These estimates are relevant to this report because Etosha lions have historically augmented the desert-adapted lion population (Stander 2018), though to what extent has not been measured. Since 2022, no Etosha lions have emigrated to permanently reside within Kunene communal lands. Greater coordination is needed to address HLC when lions depart Etosha.

Human-lion conflict (HLC)

HLC is the primary driver of desert-adapted lion mortalities and remains a pressing problem for Kunene communal farmers. From January 2021-September 2025 lions were responsible for 774 recorded livestock deaths in communal areas (Fig. 17, Lion Rangers, unpublished data). Due to improved reporting of HLC by the Lion Rangers, extrapolating trends from these numbers is challenging.

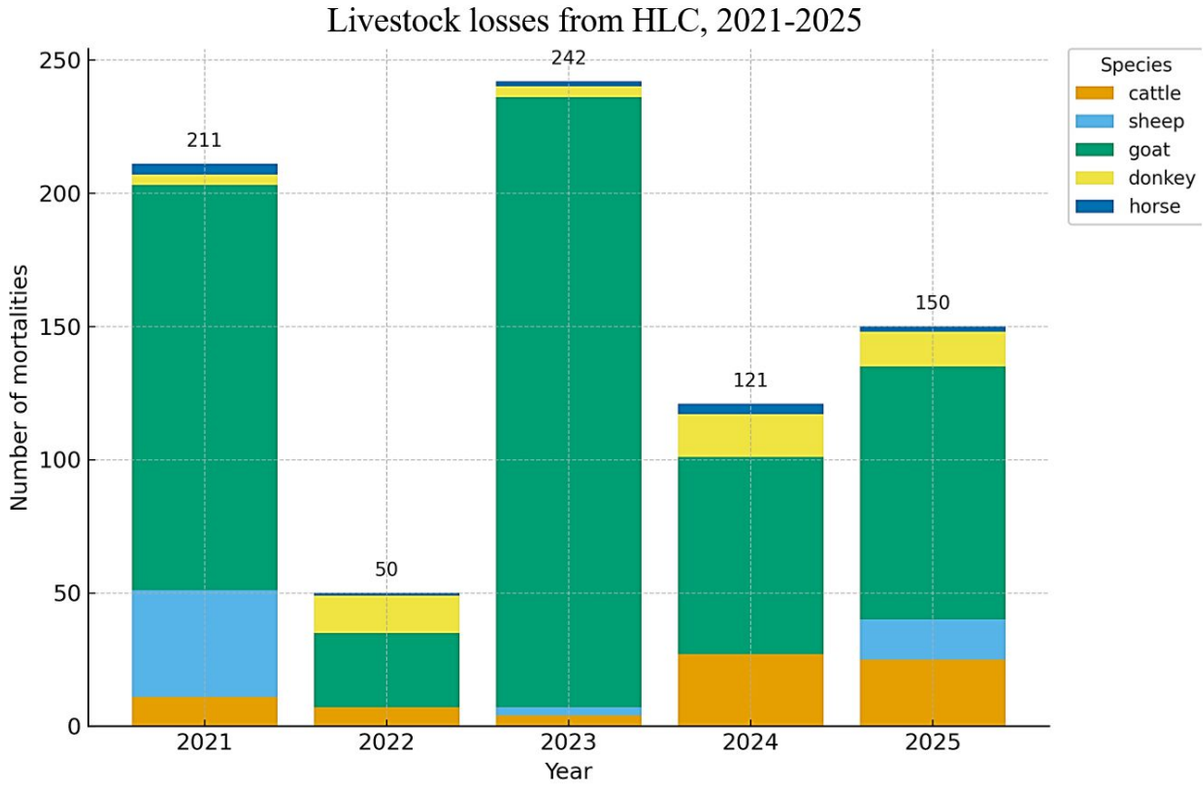

Figure 17. Livestock deaths to lions, all lion range conservancies, 2021-2025 (Lion Rangers, unpublished data).

Social surveys of area farmers (n = 323) from across all eleven lion range conservancies were completed in early 2022 (Heydinger et al. 2024b). Emphasizing challenges from living with lions and the effectiveness of HLC interventions, these surveys provide a picture of HLC effects and farmers' attitudes towards lions.

Social Survey Results

HLC lowers farmer tolerance for living with lions. Surveys reveal 57% of conservancy farmers have negative attitudes towards lions, while 84% say they do not benefit from having lions in their conservancy. Lions are considered the single *most* problematic predator species: 38% (n = 123) of respondents identified lions first when discussing problematic species, followed by spotted hyena (*Crocuta crocuta* 26%; n = 82) and black-backed jackal (*Lupulella mesomelas* 26%; n = 82). Which predators were considered most problematic varied on a conservancy-by-conservancy basis (X^2 (df 10; n 323) = 38.44, p < 0.001). There was a moderate positive correlation between a respondent's attitude towards lions, and whether or not they report benefitting from lions (r (n 312) = 0.44, p <0.001). When asked, "how serious a problem are lions in your conservancy" 54% (n = 175) considered lions to be a serious problem, 14% (n = 44) consider lions a moderate problem, and 30% (n = 98) considered lion problems to be low, or stated there were no lions in their conservancy. Responses differed significantly by conservancy (X^2 (df 10, 3; n 317) = 223.8, p < 0.001).

The extent of HLC interventions varies by conservancy. There was a strong correlation between positive attitudes towards the Lion Rangers and whether Lion Rangers had visited a respondent's farm (r (n 320) = 0.59, p <0.001). There was a moderate correlation between positive attitudes towards the Rapid Response Teams and whether Rapid Response Teams had visited a respondent's farm (r(n 317) = 0.39, p <0.001). Of particular note are the high number of respondents who were unsure or unaware of the Lion Rangers or Rapid Response Teams.

Human-lion conflict (HLC) (cont.)

A dramatic decline in livestock numbers mirrors a disappearing prey base. Surveyed farmers were asked to estimate changes in their livestock herds and the monetary value of livestock. In Anabeb, Puros, and Sesfontein conservancies, farmers have lost an estimated N$ 64.9 million in livestock value since the early 2010s and N$ 16.2 million since 2017 - though these values measure losses from all sources, not just lions. Scaled up across all eleven conservancies, the magnitude of livestock losses has undoubtedly transformed both the economy and ecology of communal lands.

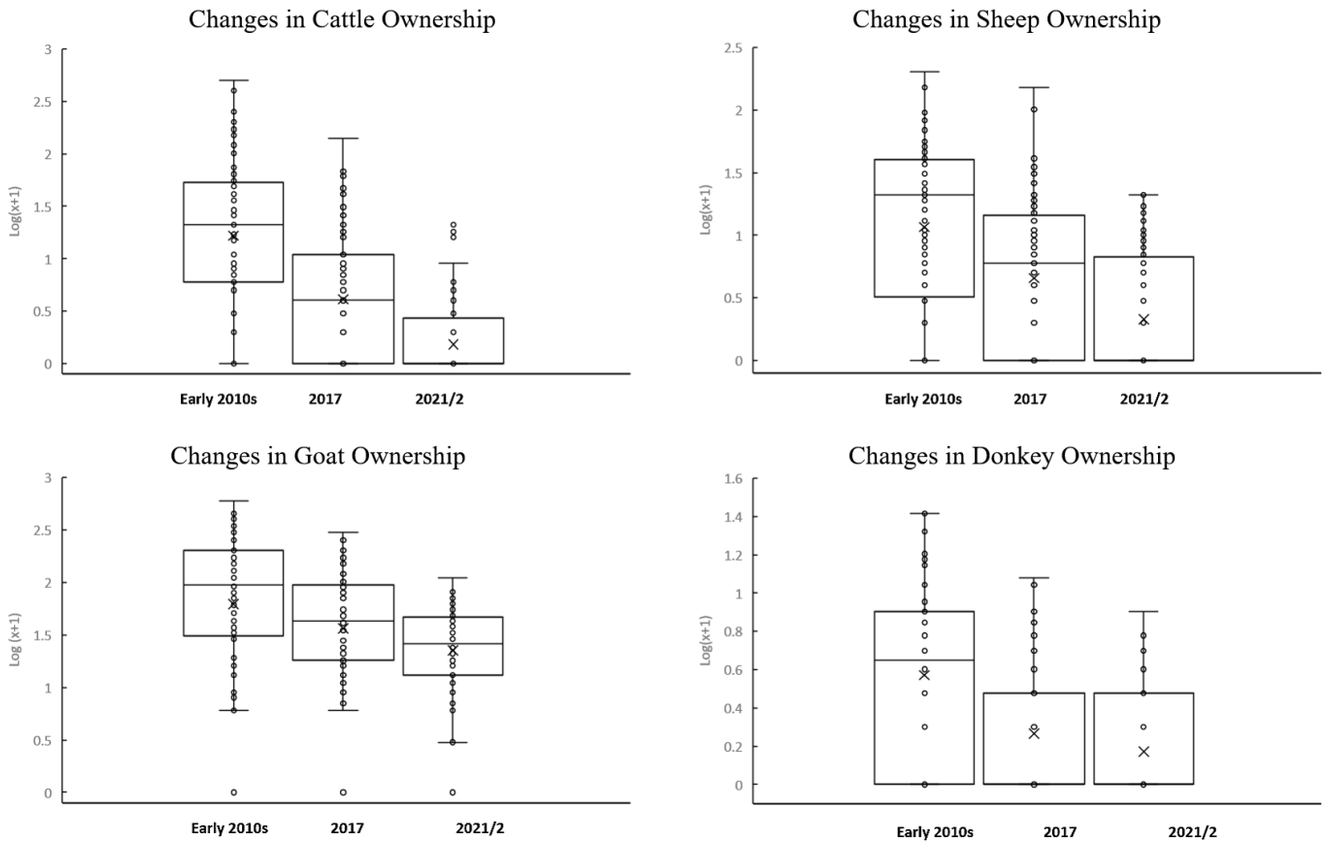

Figure 18. Changes in household-level ownership of livestock species for Anabeb, Puros, and Sesfontein conservancies, comparing 2021/2 with previous survey results (Heydinger et al. 2019). Responses have been log+1-transformed for visualisation. Boxes indicate interquartile range, solid horizontal lines within boxes indicate median response, 'x' is mean response. (Adapted from Heydinger et al. 2024b.)

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MEFT and Lion Rangers tracking lions in the mountains, Omatendeka Conservancy