WILDLIFE CORRIDORS OF THE ZAMBEZI REGION

"A Strategy for their Maintenance, Conservation, Socio-Economic Development and Human Wildlife Conflict Management"

Ministry of Environment, Forestry and Tourism

Republic of Namibia


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ACKNOWLEDGEMENT

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Ministry of Environment, Forestry and Tourism
Troskie Building, Corner of Kenneth David Kaunda
and Robert Mugabe Avenue
P/Bag 13306, Windhoek
Tel: +264-(0)61-2842111

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FOREWORD

Wildlife corridors are linkages of wildlife habitat with generally native vegetation, which join two or more larger areas of similar wildlife habitat. Corridors are critical for the maintenance of ecological processes allowing for the movement of animals and the continuation of viable populations, providing landscape connections between larger areas of habitat, enabling migration and interbreeding of plants and animals. They play an extremely important role in the maintenance of biodiversity, but they can only partly compensate for the overall habitat loss caused by the fragmentation of the natural landscape.

The Zambezi Region falls within the heart of the Kavango Zambezi Transfrontier Conservation Area. The KAZA TFCA, established in 2011, is a SADC conservation and development programme of the governments of Angola, Botswana, Namibia, Zambia and Zimbabwe with the vision to establish a world class transfrontier conservation area and tourism destination in the Okavango and Zambezi River Basin regions to promote sustainable development. With nearly 520,000km^2, the KAZA TFCA is the largest transfrontier conservation area in the world. About two hundred and fifty thousand elephants are estimated to occur in the KAZA TFCA. One of the ecological objectives of the KAZA TFCA is to re-establish seasonal wildlife migration routes and improve the interconnectivity among protected areas in the TFCA.

This strategy provides an overview of the most critical corridors in the Zambezi Region and proposes approaches to securing wildlife movements, conservation, socio-economic development and human wildlife conflict management. Corridors have been identified and verified using several data sources: wildlife and track sightings, local knowledge of communities in and around the conservancies, wildlife movement data (of collared animals) and human wildlife conflict.

Pohamba Shifeta, MP
MINISTER

PREFACE

A strategy for the maintenance, conservation, socio-economic development and human wildlife conflict management was derived from consultative meetings and engagement involving different stakeholders including line Ministries, regional council, traditional leaders, conservancy representatives, wildlife experts, the tourism sector and NACSO partner organizations.

It gives a broad overview of the wildlife corridors, migratory routes and wildlife dispersal areas in the Zambezi Region, including wildlife population and movements, human population growth and settlement, human wildlife conflict management, and regional development plans, and describes the work currently being done by conservancies to secure wildlife corridors. It further sets out the strategic interventions to be undertaken in order maintain and manage corridors for the benefits of the communities, the region and country in general. It is important to point out that there are three main reasons why it is important to maintain wildlife corridors: to reduce HWC; to protect and increase the wildlife economy; and to maintain habitat connectivity and the existence of wildlife, which is especially important as communities are threatened by climate change that might reduce their ability to maintain traditional farming systems, making them more reliant on wildlife for their livelihoods.

We would like to express our deepest gratitude to all who contributed to the development of this strategy. We are grateful to our staff members, partners and stakeholders who provided essential information for the development of the strategy. We particularly thank the WWF, IRDNC, the Namibia Parks Programme Phase 4 which is co-funded by the German Government through KfW, and Independent Consultant Karine Nuulimba who provided the facilitation and financial support the compilation of this strategy.

Teofilus Nghitila
Executive Director

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ABBREVIATIONS

AGM	Annual General Meeting
BNP	Bwabwata National Park
CBNRM	Community Based Natural Resource Management
CGG	Community Game Guards
GMUP	Game Management and Utilization Plans
CGG	Community Game Guard
DA	Dispersal Area
HWC	Human Wildlife Conflict
IRDNC	Integrated Rural Development and Nature Conservation
IRLUP	Integrated Regional Land Use Plan
KAZA-TFCA	Kavango Zambezi Transfrontier Conservation Area
KA	Kyaramacan Association
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
NACSO	Namibian Association of CBNRM Support Organizations
NRWG	Natural Resources Working Group
PA	Protected Area
NP	National Park
NSA	Namibia Statistics Agency
PES	Payment for Ecosystem Services
TA	Traditional Authority
WWF	World Wildlife Fund in Namibia

GLOSSARY

For the purposes of this strategy, the words or phrases set out below have the following meanings:

"human-wildlife conflict" means any event in which wild animals threaten, harm, destroy or damage human life or property, including crops and livestock, or in which wild animals are injured, captured or destroyed as a result of a perceived threat to humans or their property;

"Induna" means area headman of a traditional authority.

"natural resources" means any component of nature, capable of being utilized by humans and include air, land, water, soils, minerals, energy, living organisms other than humans, and biological resources, including all parts and derivatives, as well as genetic resources;

"occupier of communal land" means a person to whom a customary land right has been granted under the Communal Land Reform Act, 2002 (Act No. 5 of 2002), and includes a lawful resident who holds customary land rights in a particular traditional community as contemplated in section 29 of that Act;

"state land" means land owned by the State;

"sustainable use" means the use of a component of the environment in a way and at a rate that does not lead to the decline of that component or the environment, thereby maintaining its potential to meet the needs and aspirations of present and future generations;

"traditional authority" means an authority established under customary law and recognized as a traditional authority under the Traditional Authorities Act, 2000 (Act No. 25 of 2000);

"traditional community" means a traditional community as defined in section 1 of the Traditional Authorities Act, 2000;

"wild animal" means any animal of a species belonging to a non-domesticated species, whether or not that animal has been bred, tamed or is kept in captivity;

"wildlife" means any animal or plant occurring ordinarily in a natural state, including its parts and derivatives;

"wildlife corridor" means an area of wildlife habitat connecting wildlife populations or an area of land over which wildlife regularly traverse between different parts of their distribution range;

"wildlife habitat" means the whole or any component of any ecosystem which sustains wildlife;

1. Introduction

The Zambezi Region, with its perennial rivers and relatively high rainfall, contains most of the riverine and woodland habitats of an otherwise arid to semi-arid country. Due to this environment and its proximity to large herds of free ranging wildlife species in Botswana, Zambia and Zimbabwe, the region supports the highest densities of elephant, buffalo and economically important antelope species in Namibia. The presence of the most valuable wildlife species in the country present a unique economic opportunity for the region, especially for fifteen communal conservancies, and for the Kyaramacan Association (KA) in Bwabwata National Park (BNP).

Notwithstanding the impending impacts of the coronavirus pandemic on the tourism industry, the wildlife economy has grown each year since the establishment of the first conservancy in the region in 1998. Today elephant hunting is the single most important source of income for conservancies in the Zambezi Region, and the region would be forfeiting an important land use if the hunting industry were to be threatened.

Historically, wildlife has always moved through the Zambezi Region. The erection of a border fence between Botswana and Namibia (apart from two disjointed sets of breaks in the fence) by the Botswana government and the expansion of settlements, livestock and crop fields have gradually eroded the routes available for wildlife. But despite these restrictions, many transboundary and in-country movement routes have been used by wildlife for hundreds of years, if not longer.

The establishment of conservancies, and subsequent development of Game Management Utilization Plans (GMUPs), which comprise zonation and land-use plans, identified areas used by wildlife and demarcated some of these areas as Exclusive Wildlife Zones in their zonation plans. National Parks of Bwabwata, Mudumu and Nkasa Rupara National Parks remains an intergral part and existence of wildlife corridors, while the establishment of the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) gives the larger landscape support to wildlife corridors of the Zambezi Region.

The Zambezi Integrated Regional Land Use Plan (IRLUP) was commissioned by the Ministry of Agriculture, Water and Land Reform (MAWLR) in 2014 as part of its mandate to undertake land use planning for the entire country, and conservancy zonation plans, as well as regional-level wildlife corridors were recorded in the plan.

More recently, in response to increasing reports of HWC in the region, the 2018 Second National Land Conference resolved to designate wildlife corridors and propose ways that they could be maintained in order to reduce the negative impacts of wildlife on communities in the country. This strategy outlines the most important wildlife corridors and has strategic interventions and an action plan to address ways on how corridors could be set aside and maintained in such a way that HWC would diminish.

2. Strategic direction

2.1 Vision

To sustainably manage and protect strategic wildlife movement routes or corridors that need to be kept open but limit direct contact between people and wildlife in order to reduce human wildlife conflict and promote biodiversity conservation and wildlife economy.

2.2 Goal

To maintain healthy wildlife corridors for biodiversity conservation, improved community livelihoods and economic development for the region and country in general.

2.3 Objectives

2.3.1 To identify and map wildlife corridors/dispersal areas for Namibia's Zambezi Region for biodiversity conservation and improved community livelihoods.

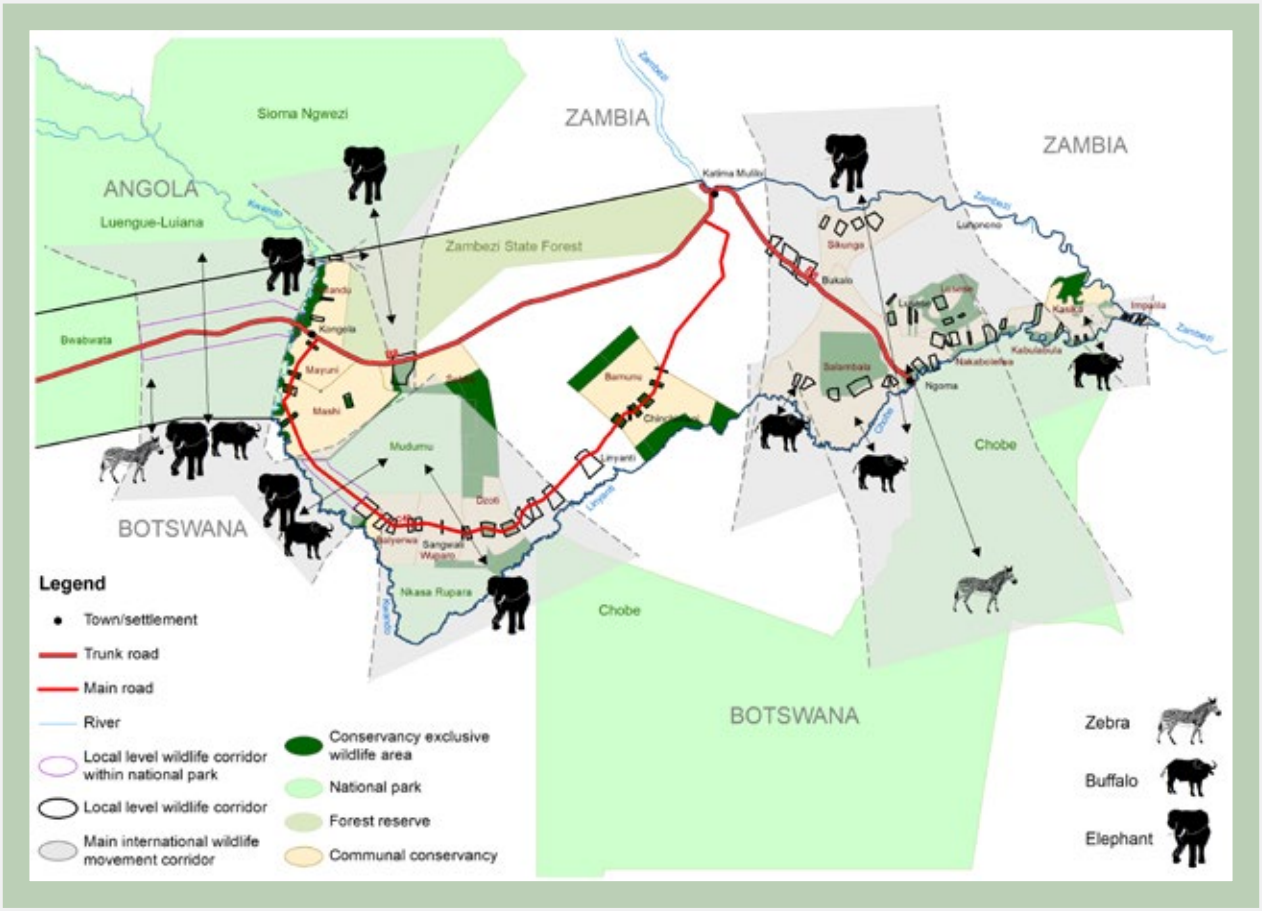
2.3.2 To provide detailed biophysical, biological and socio-economic description of each wildlife corridor, including actions and strategic measures/interventions for their protection and management.

2.3.3 To protect and manage wildlife corridors to ensure greater long term connectivity for populations of wildlife species to move through and/or disperse within the KAZA TFCA.

2.3.4 To manage human wildlife conflict in a way that recognizes the rights and development needs of local community, and recognizes the need to promote biodiversity conservation.

3. Overview of wildlife dispersal areas and migratory routes/ corridors in the Zambezi Region

Five separate wildlife corridors/WDAs are described – each of them is critical to the maintenance of wildlife as a land-use option not only in the Zambezi Region, but also beyond the Zambezi into the broader KAZA TFCA region.



Map 1: Most important wildlife corridors/dispersal areas of national and international importance and local level corridors

Whilst each of the corridors are described separately, many of them intersect and connect to each other, and are interdependent on each other (e.g. the corridor that connects Angola to Kwandu Conservancy, leads through Sobbe Conservancy to Mudumu National Park and onwards to Nkasa Rupara National Park and on to the Republic of Botswana. Some wildlife species in Botswana in turn, have been known to move from the Linyanti to the Chobe area, which also connect back to Namibia through the eastern floodplains of the Zambezi River).

3.1 Maintenance of wildlife corridors in conservancies

All conservancies that developed zonation plans identified wildlife corridors on their land and included them in the zonation plan. The work on securing wildlife corridors has built on the existence of the conservancy zonation plans. Importantly, the conservancies themselves have identified the corridors and exclusive wildlife zones with the aim to help the conservancies and traditional authorities identify the challenges in implementing their own zonation plans and the means to address the challenges. The issues regarding maintenance of corridors are similar to those involved in implementing the overall zonation plan.

A step-by-step approach has been taken in a process aimed at involving all stakeholders, particularly those at village level. This approach has evolved in response to information and data emerging from a series of meetings in the conservancies. The following points summarize the approach that has been taken, which was adapted to the needs of each conservancy:

1. Personnel identified the priority corridors based on their knowledge of the region, and information and data provided by conservancy game guards, managers, etc.
2. A field assessment and GPS mapping of corridors was carried out with conservancy staff in order to gain an initial impression of existing and potential threats to the corridors.
3. Meetings were held with conservancy management committees, game guards and indunas to identify challenges to maintaining corridors and means of addressing the challenges.
4. Indunas were provided with information and awareness of the importance of corridors in the conservancies, within the Zambezi Region and within KAZA TFCA, and the importance of the role of the indunas in helping to secure corridors.
5. Meetings were held in villages to inform residents of the conservancy zonation and verify with the villagers the provisions of the plan including the corridors.
6. Research was carried out on the number of people already settled in corridors, the number claiming customary land rights there, and on the conditions under which members would be willing not to settle in a corridor or to relocate from a corridor.
7. Feedback on the results of the research was provided to conservancy management committees and indunas who developed preliminary plans for securing the corridors.
8. Preliminary plans for securing the corridors were finalized, after which plans were presented for approval at Annual General Meetings (AGMs).
9. Consideration of possible ongoing PES to conservancies for successful maintenance of corridors.

This approach was taken in Dzoti, Sobbe, Salambala, Nakabolelwa and Lusese Conservancies. The approach was modified for work in Sikunga and Mashi Conservancies where no research was carried out and specific awareness meetings for indunas were not held.

This approach can be described as a bottom-up approach to securing wildlife corridors based on the following:

- √ Communities identifying the corridors themselves in the conservancy zonation plans
- √ Understanding the attitudes of residents to corridors and to wildlife
- √ Indunas, conservancy management committee members and personnel identifying the key challenges to maintaining conservancies and establishing their own solutions
- √ Enforcement of conservancy rules for managing corridors through game guards, indunas and management committees.

3.2 Wildlife populations and movements

The animals found in the Zambezi Region also occur in adjoining parts of Angola, Botswana, Zambia and Zimbabwe. This area contains Namibia's only tropical habitat, with wetland habitats and higher rainfall and humidity than the rest of the country. There are over one hundred (100) species of mammals in the region; representing the highest level of diversity in the country. Rare and endangered species such as red lechwe, sitatunga, roan, sable and wild dog are found. Eland, blue wildebeest and giraffe have been successfully reintroduced into the region. The area hosts a growing population of elephants that are found along watercourses mostly during the dry season.

Species	Conservation Status	Population estimate (2013)	Population estimate (2019)
Buffalo	Near threatened	1123	445
Elephant	Vulnerable	8401	7756
Impala	Stable	12676	14623
Red lechwe	Vulnerable	319	568
Puku	Endangered	10	15
Roan	Vulnerable	1,190	651
Sable	Vulnerable	1090	1200
Tsessebe	Vulnerable	287	300
Blue Wildebeest	Stable	1106	2420
Burchell's Zebra	Stable	5800	1535
Hippopotamus	Endangered	821 (2009)	3000
Cheetah	Vulnerable	20	30
Lion	Vulnerable	50	60
African Wild Dog	Endangered	50	70

Figure 1: Population estimates for wildlife species in Zambezi Region.
Sources: Zambezi IRLUP, Game Count (2019)

Most animals are concentrated in the Protected Areas (PAs) but over the past decade there has been an increase in distribution of wildlife in the conservancies and areas outside the parks. The State Forest supports a surprising diversity of wildlife and in numbers not previously recognized (Hanssen, 2017, camera traps). For instance, packs of African wild dog were identified that are more than previously realized, and also many eland, roan and sable have been recorded. These records underline the important conservation role played by the State Forest Reserve (Zambezi IRLUP, 2015).

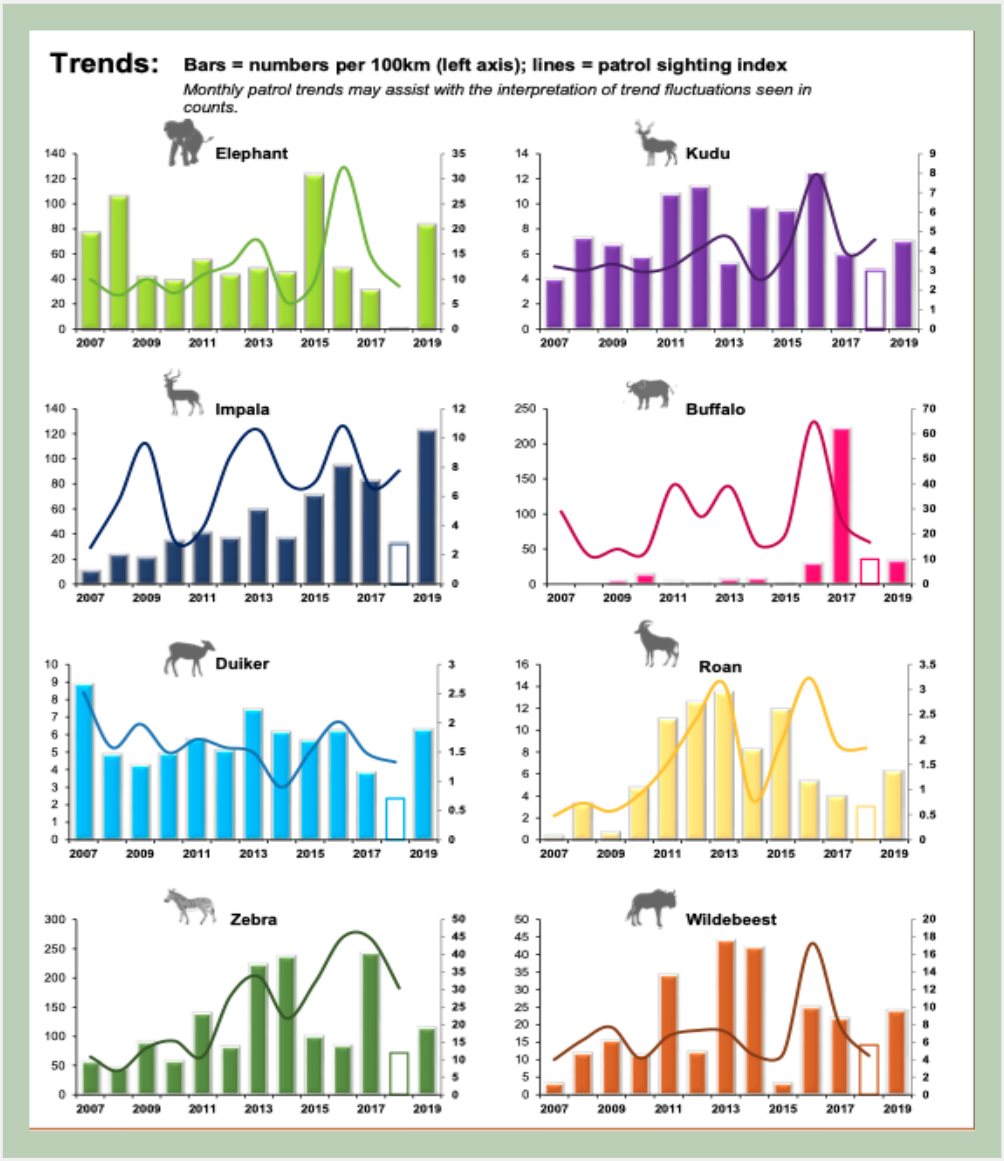


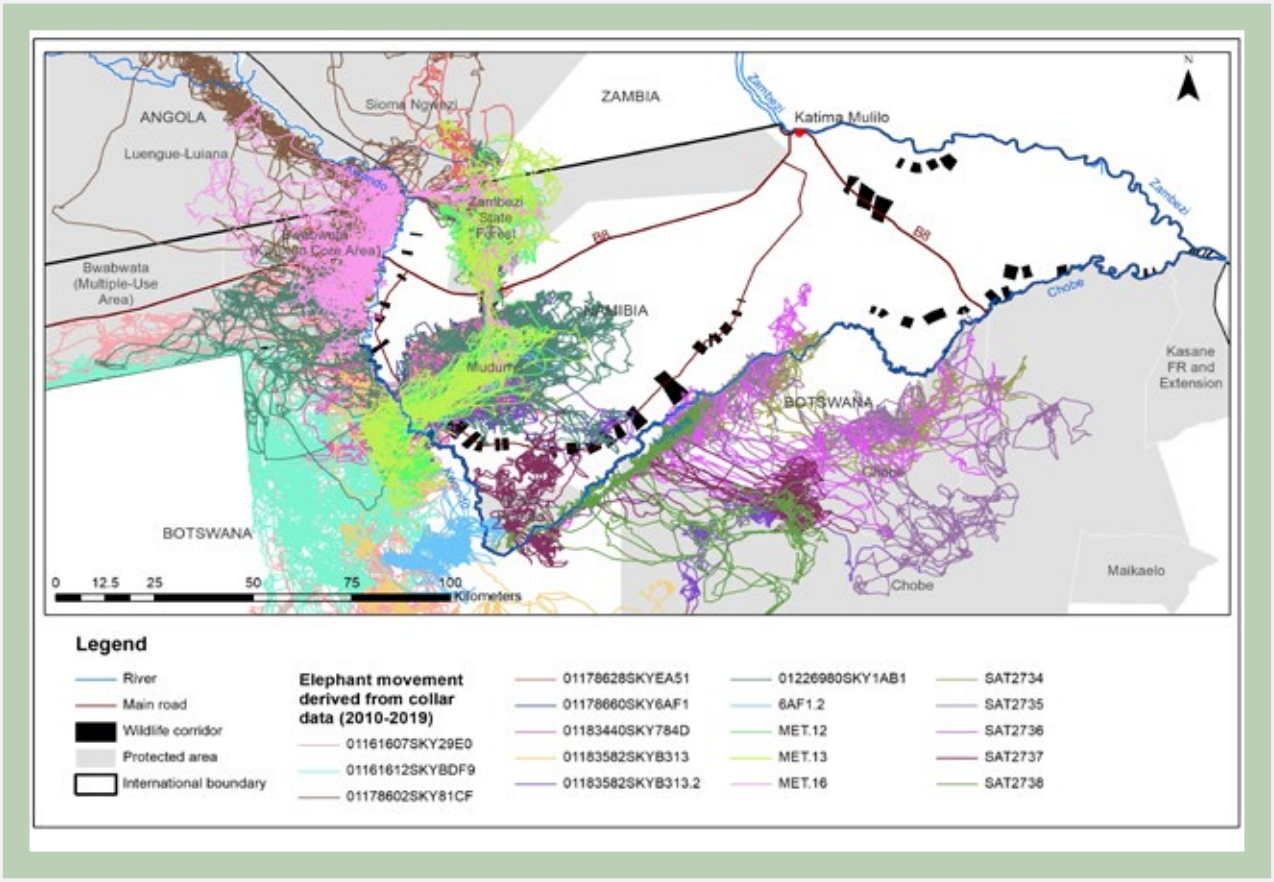
Figure 2: Wildlife Trends from 2007-2019 (NRWG, Game Count Poster, 2019)

MEFT in collaboration with communal conservancies and NACSO's Natural Resource Working Group (NRWG) has consistently monitored twenty eight (28) different species through annual wet season foot-based game counts since the mid-1990s. A further species was later included, bringing the total to twenty nine (29) species. A comparison of the data recorded in 2016 and 2019 finds that out of the 28 species that were consistently monitored, 75% (21 species) showed an increase in number of sightings, 18% (5 species) showed a reduction in number of sightings and 7% (2 species) remained the same.

Surprisingly, numbers of wildlife assessed in the annual wet season game counts do not appear to have reduced overall despite the constriction in wildlife habitat caused by human encroachment, expansion of cleared fields and the Botswana border fence (which has visibly curtailed the movement of several wildlife species, especially elephants, buffalo and several predators).

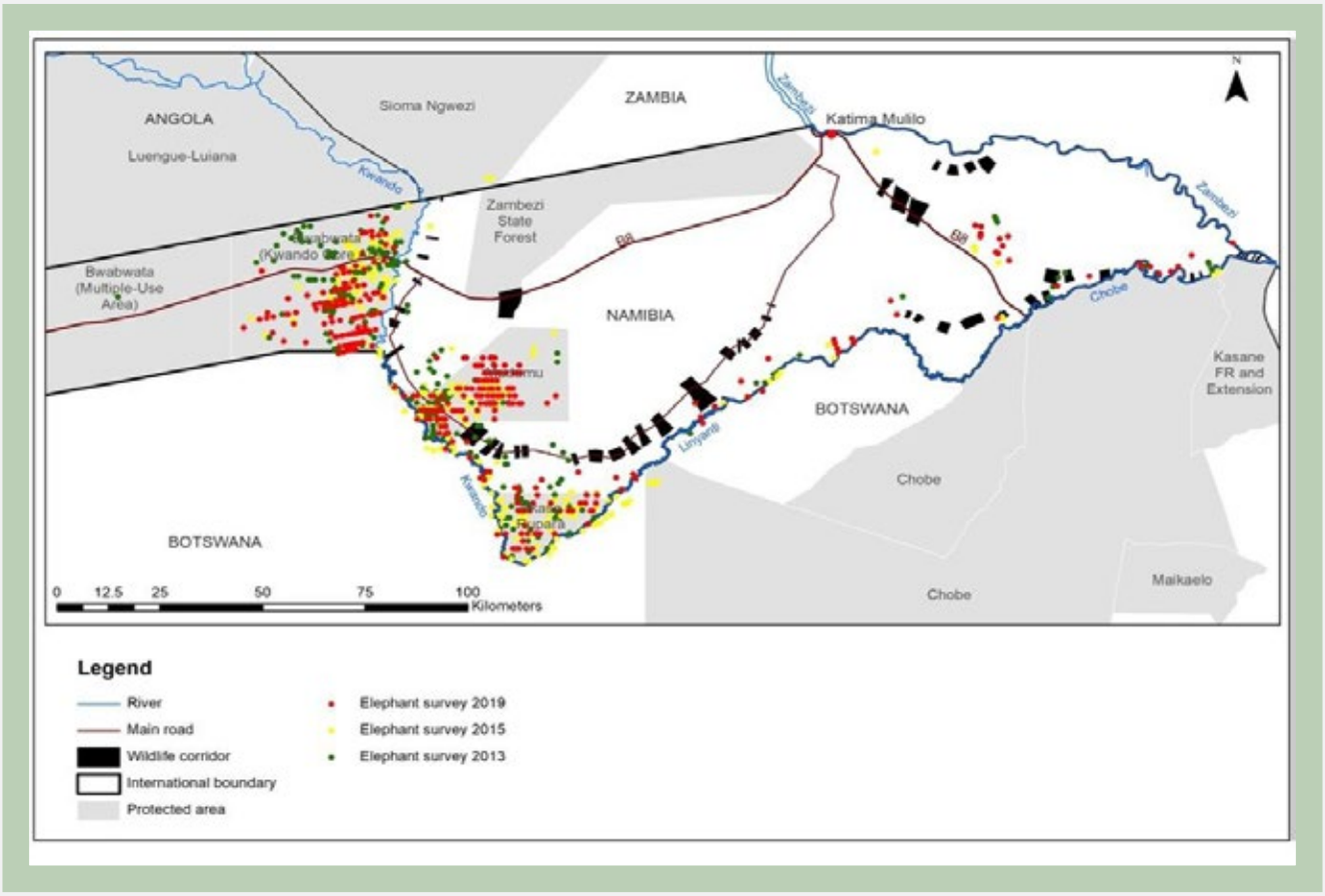
The Zambezi Region is strategically straddled between four other countries in the KAZA TFCA and many of the large mammals here (such as wild dog, zebra, elephant and lion) move widely within the region and across the international borders into neighbouring countries. The viability of the KAZA TFCA, particularly for parts of Botswana, Zambia and Angola adjoining Namibia, is conditional upon wildlife corridors being maintained in the Zambezi.

Satellite tracking of individual animals has given information on the extent of animal movement and helped to show where barriers to movements exist (Stuart-Hill, 2012). Some examples of movements are shown in maps 2 to 6 below. Each colour on the map denotes an individual animal, the maps do not give an accurate overview of movement patterns of that entire species (which may be far broader and further than shown in these maps) but only of the movement of the individual animals that were collared.



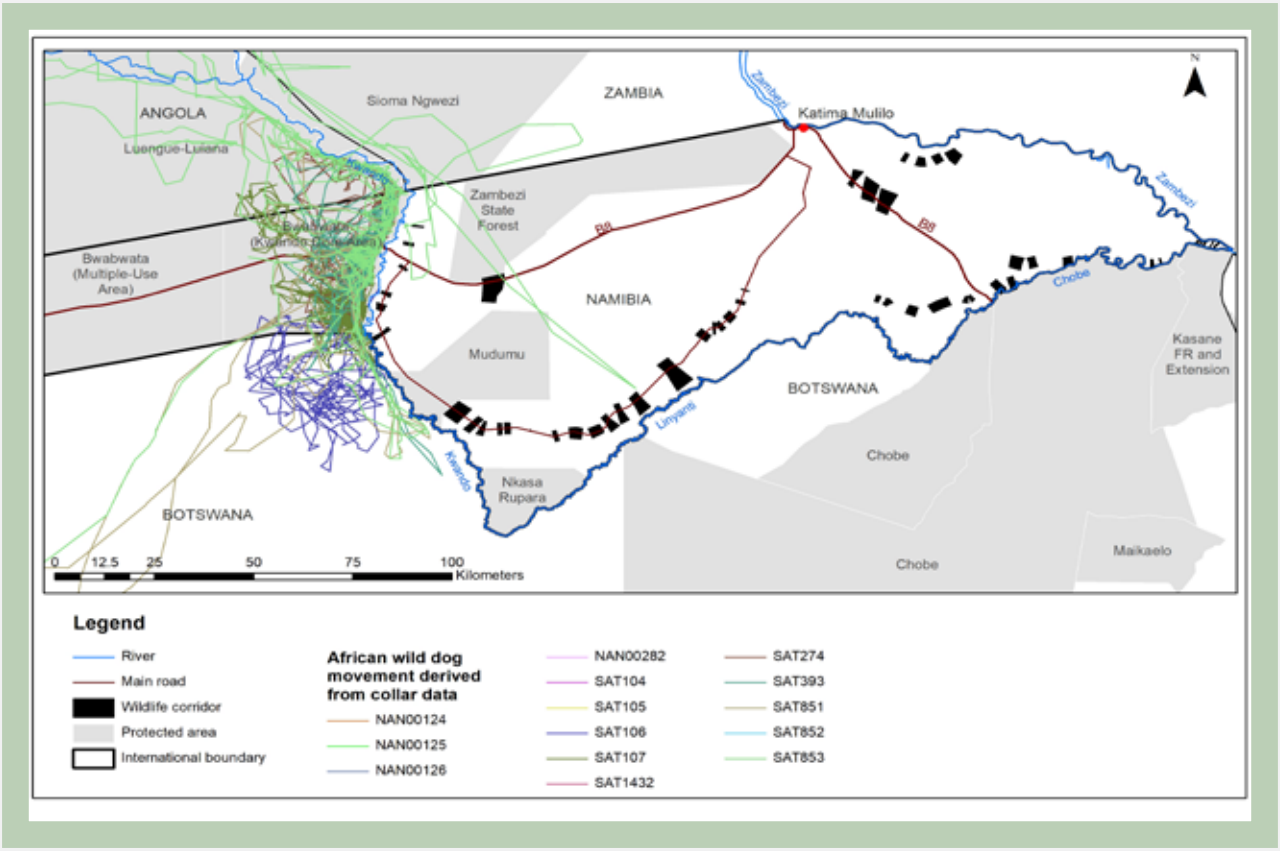
Map 2: Elephant movement derived from collar data (2010-2019)

Elephants have an expansive range that often transcends international boundaries. Each colour represents a different animal. Note the movements of the two green and light pink individuals, from Botswana west of the Kwando River, into Mudumu NP, following a narrow corridor into the State Forest, and moving northwards into Zambia. There is hardly any corridor that is not used by elephants. Only two out of sixty corridors identified by game guards did not mention elephants. Most elephants in the region are in Botswana, and then move back to the river and Namibia in the dry season. The same applies for zebra movement in the east.



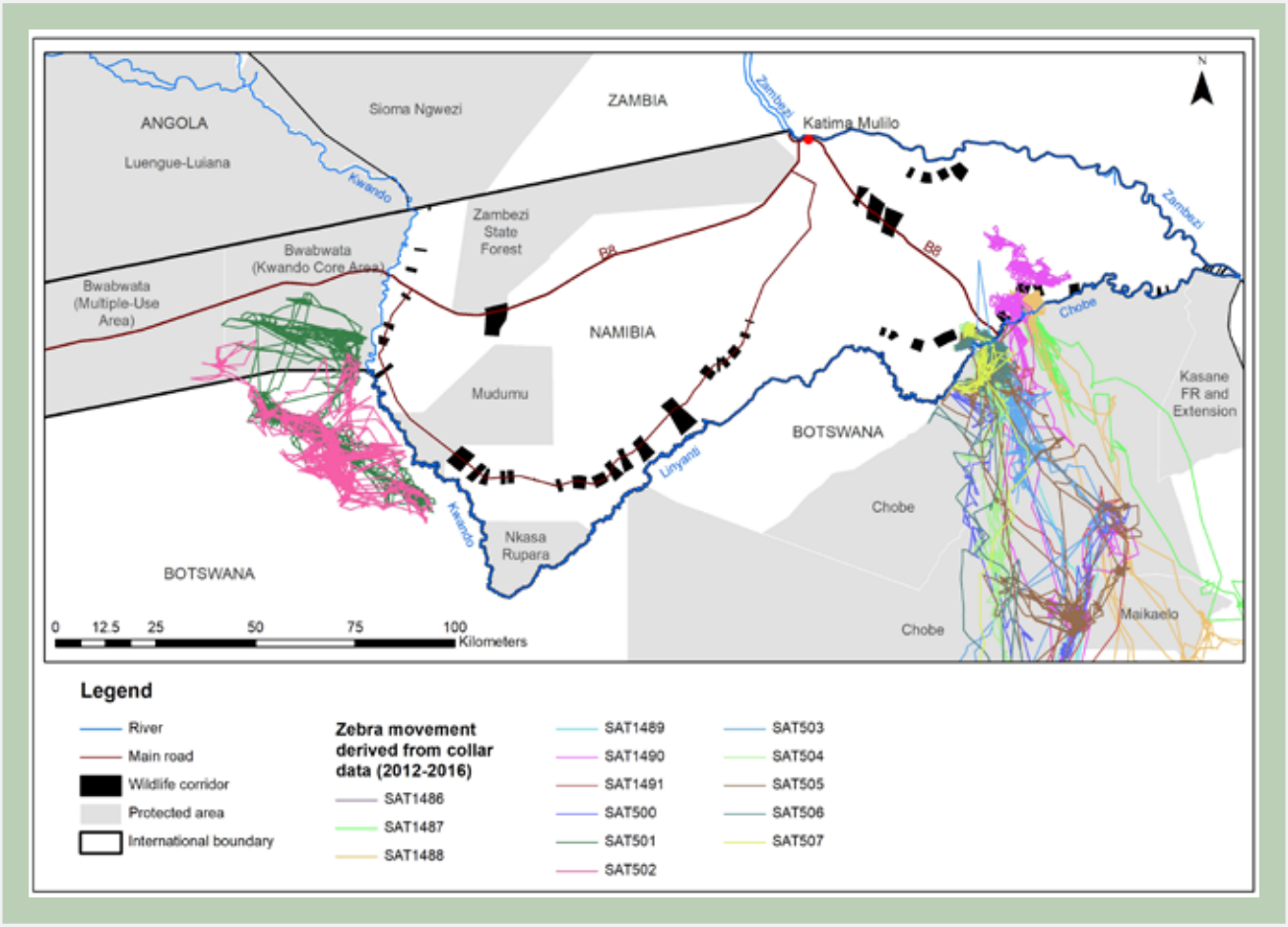
Map 3: Elephant sightings during aerial survey 2013, 2015 and 2019 (MEFT aerial surveys, 2013, 2015, 2019)

The map above, taken from aerial census data (MEFT aerial survey, 2019), shows that elephants have tended to remain in the same areas where they were seen back in 2013. Their range has not expanded much away from their traditional grazing and movement areas.



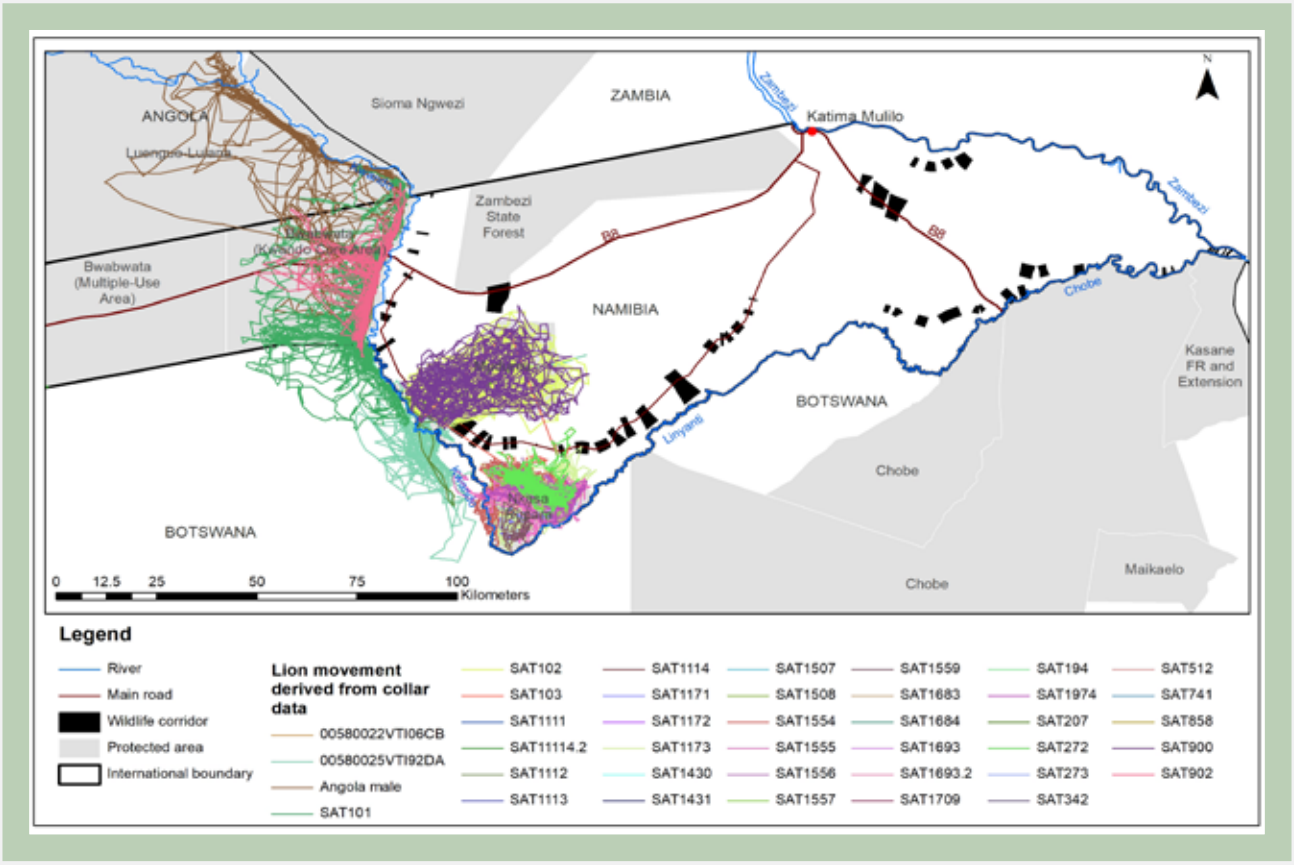
Map 4: Wild dog movement derived from collar data (2010–2019).

Namibia holds possibly 10% of the entire population of Namibia's most endangered large mammal; the African wild dog, mainly in Kavango East and Zambezi Regions (MEFT, 2004, taken from Zambezi IRLUP, 2015). The National Parks are important for providing protection for this species, but increasingly its survival will also depend on populations living outside of parks, such as conservancies and the State Forest Reserve (Zambezi IRLUP, 2015).



Map 5: Zebra movement derived from collar data (2010-2019)

The two collared zebras on the western side of the region show movements between Bwabwata NP and Botswana. Satellite tracking has also revealed an important route for this species, from Nxai Pan in northern Botswana to the Chobe River and into eastern Zambezi Region, covering over 200 km (Zambezi IRLUP, 2015).



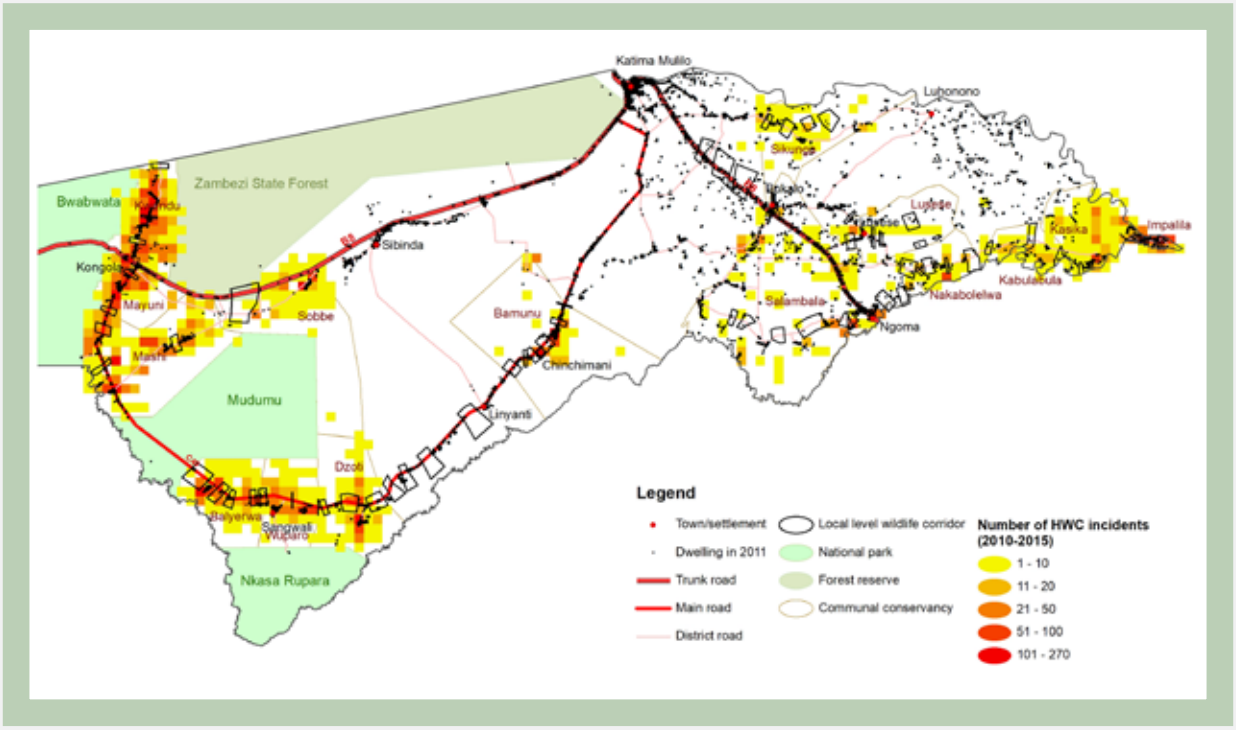
Map 6: Lion movement derived from collar data (2010-2019)

Wildlife movement in the Zambezi Region is largely seasonal - both tiers of wildlife corridors are mostly used in the dry season (April – November), with far less presence of wildlife in the corridors in the wet season. During the wet season, animals do not move around much; they stay in the grazing areas as there are enough seasonal water sources (rain-filled pans) and are therefore not forced to move over larger distances. But in the dry season they are dependent on the rivers and therefore need to constantly move from grazing areas to the rivers and back, meaning that animals start moving back and forth across the roads. Many small fences were observed during fieldwork, but they do not really block wildlife movement (though wildlife does sometimes destroy the fences).

Although some corridors were negatively affected by human encroachment, the majority remain used to varying degrees.

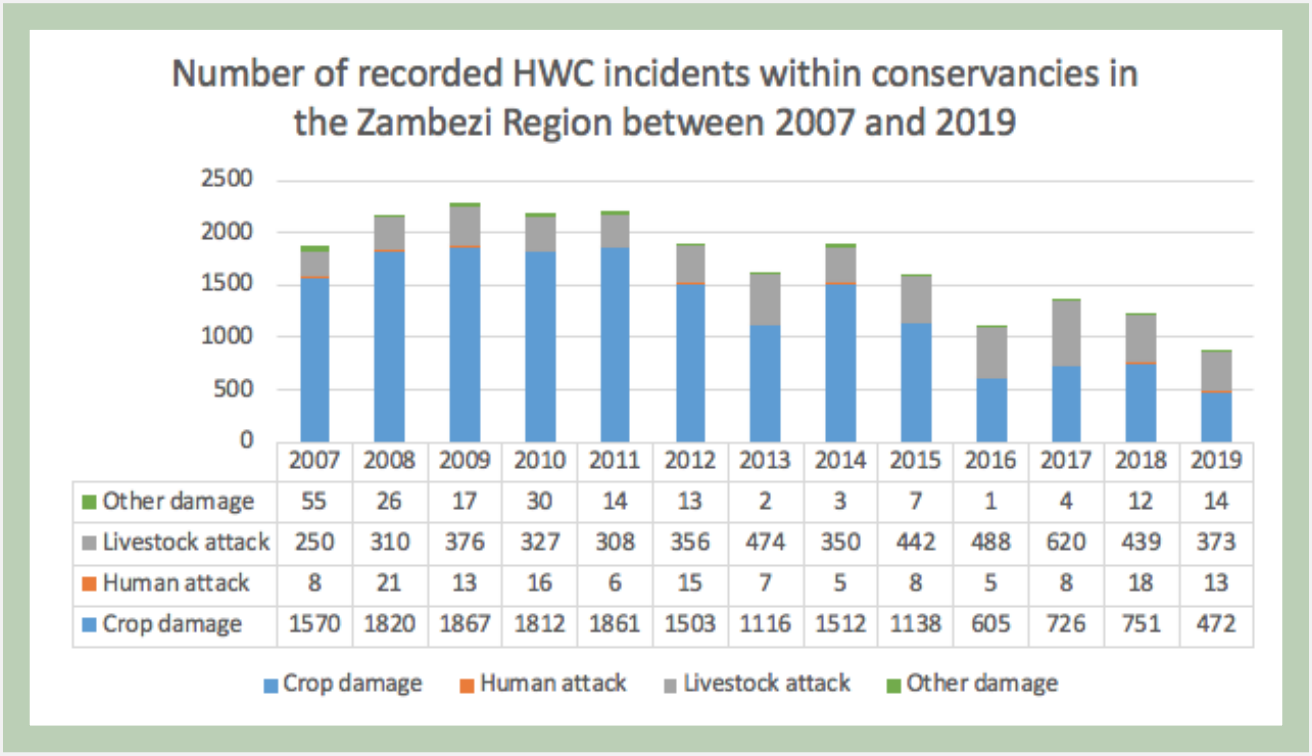
3.3 Human wildlife conflict trends

HWC has a high impact on rural households, especially in the Zambezi Region where elephant numbers have steadily grown over the past two decades. The success of conservancies in monitoring wildlife and improving people's attitudes towards wildlife has led to conservation success, but the gradual increase in wildlife has led to the perception that there has also been an increase in HWC.



Map 7: Number of HWC incidents in the Zambezi Region between 2010-2015

Overall, conservancies can be regarded as a mitigation strategy for HWC because the overall income they generate is worth more than the losses to HWC. However, the level of damage from HWC differs considerably between individual households and more needs to be done to ensure that those households that suffer the most receive appropriate benefits to offset these losses (Jones, B, and Barnes, J, 2006). The MEFT provides financial offsets for losses through its Human Wildlife Conflict Self-Reliance Scheme, topped up by conservancies, but community members have often complained that the amounts payed are insufficient, and that claims for offset payments are not followed through according to the prescribed process.



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Other damage	55	26	17	30	14	13	2	3	7	1	4	12	14
Livestock attack	250	310	376	327	308	356	474	350	442	488	620	439	373
Human attack	8	21	13	16	6	15	7	5	8	5	8	18	13
Crop damage	1570	1820	1867	1812	1861	1503	1116	1512	1138	605	726	751	472

Figure 3: Number of recorded HWC incidents within conservancies in Zambezi between 2007 and 2019

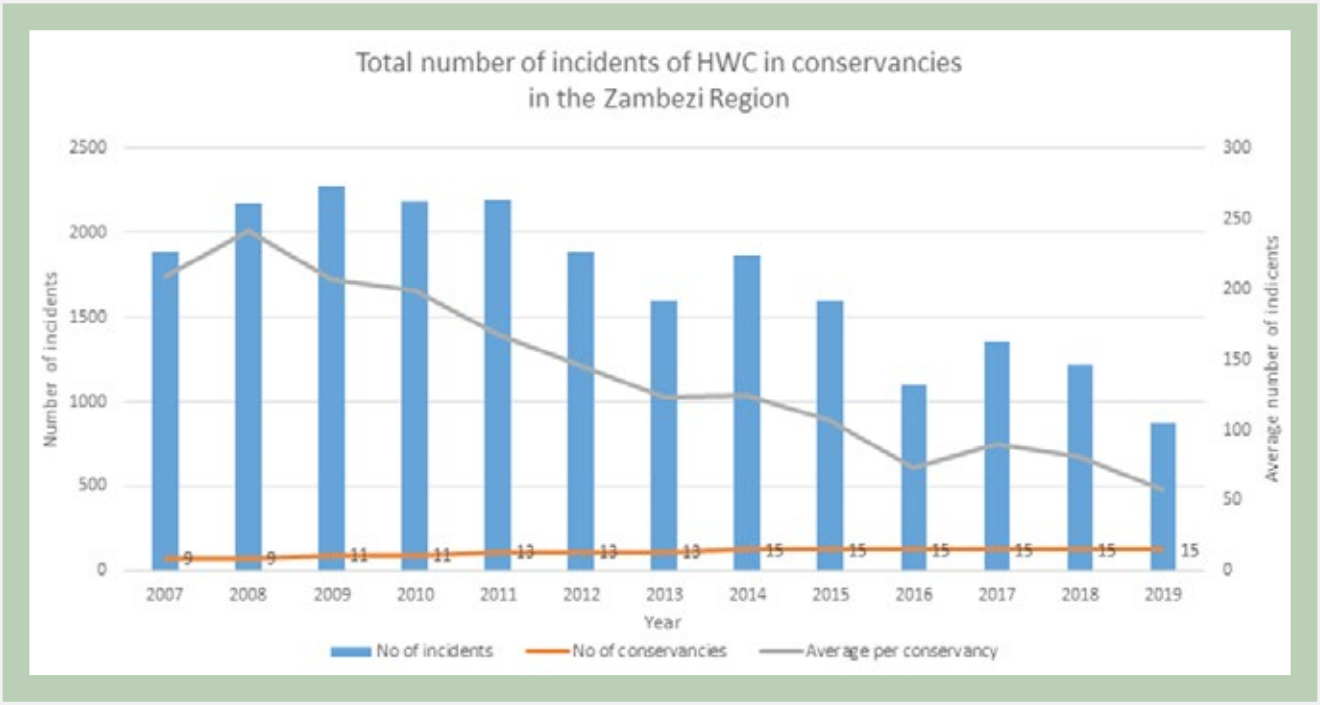
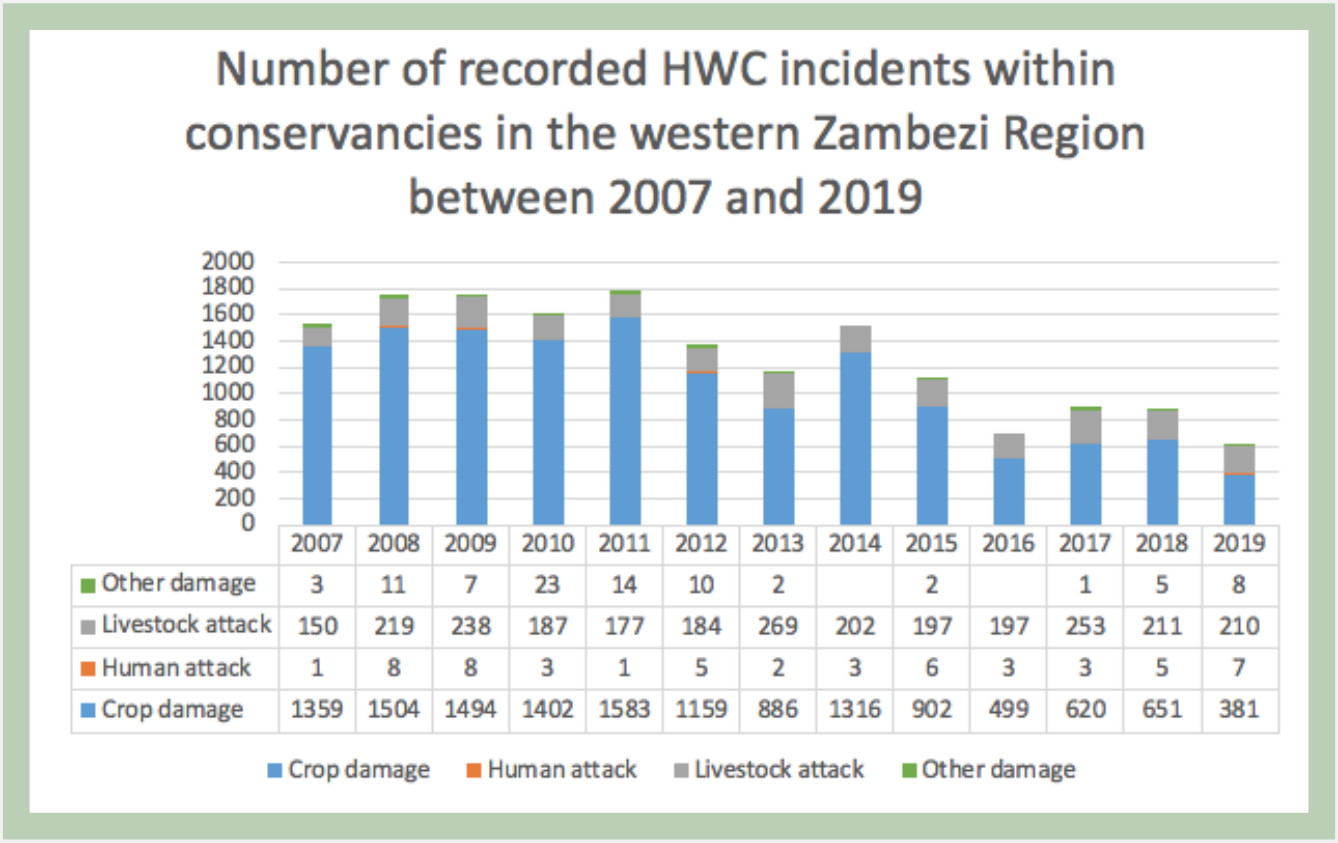


Figure 4: Total number of incidents of HWC in conservancies in the Zambezi Region

It is important to note that contrary to popular opinion, the number of HWC incidents has not increased dramatically over the past twenty years (Figure 4). In fact, the average number of incidents per conservancy has dropped.

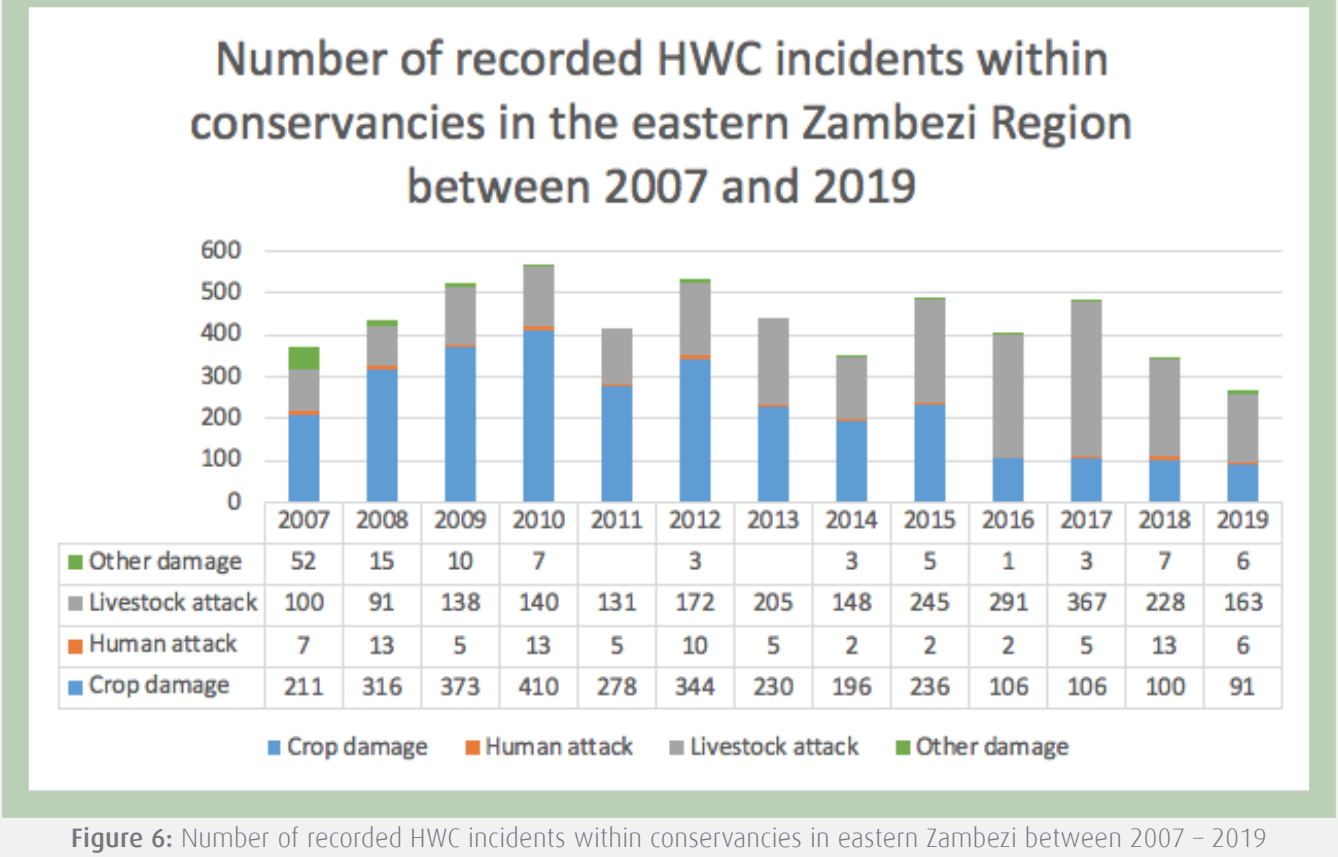
These graphs show overall trends of HWC incidents in conservancies between 2007 and 2019, though one must keep in mind that some years not all conservancies submitted their data, so the comparison between years might sometimes be a bit skewed.

In the graphs below, the data was separated between west and east. Most of the damage, especially crop damage, occurs in the western part of Zambezi. In recent years (particularly in 2017), there was some increase in livestock damage, mainly in the eastern part of Zambezi.



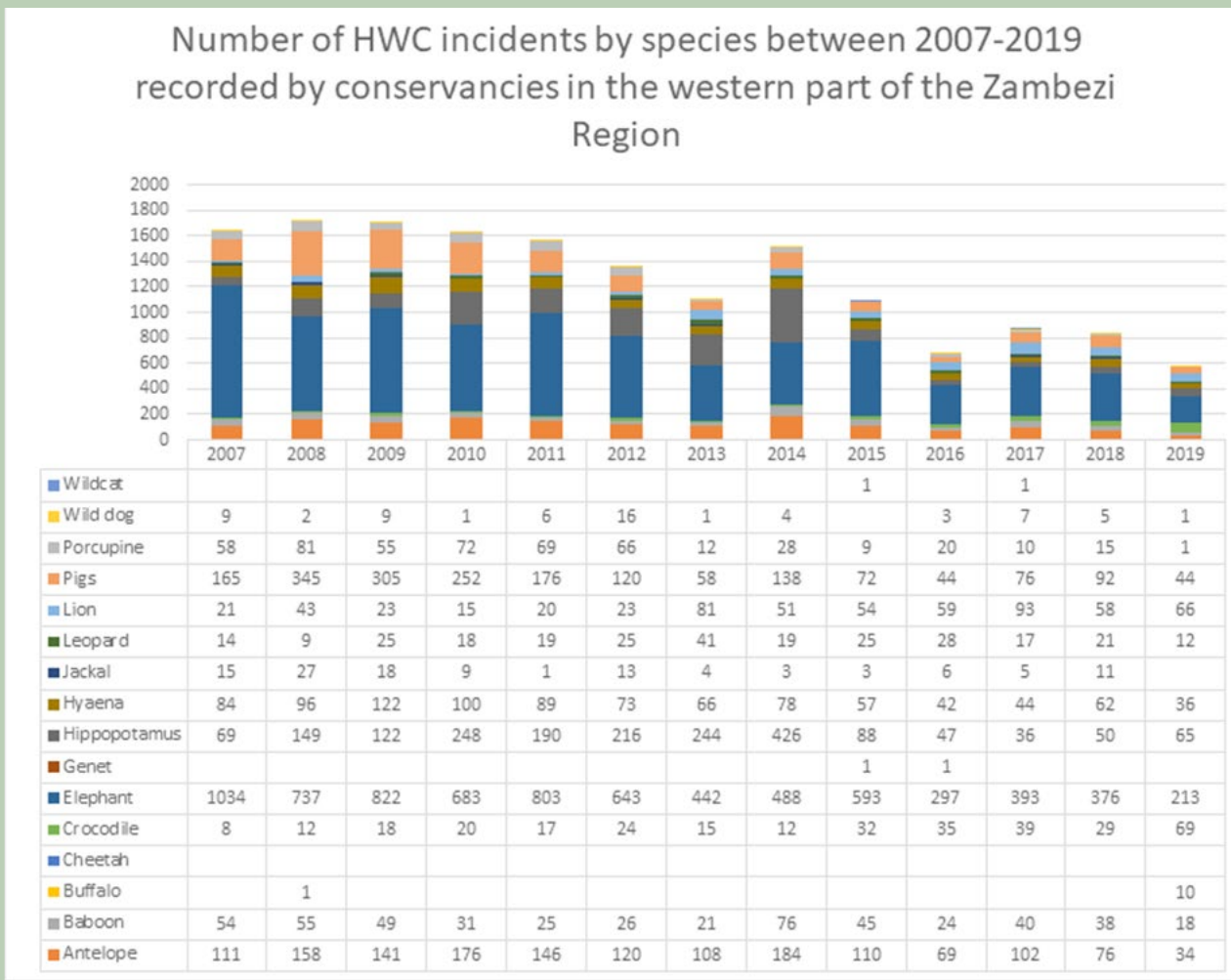
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Other damage	3	11	7	23	14	10	2		2		1	5	8
Livestock attack	150	219	238	187	177	184	269	202	197	197	253	211	210
Human attack	1	8	8	3	1	5	2	3	6	3	3	5	7
Crop damage	1359	1504	1494	1402	1583	1159	886	1316	902	499	620	651	381

Figure 5: Number of recorded HWC incidents within conservancies in western Zambezi between 2007 – 2019



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Other damage	52	15	10	7		3		3	5	1	3	7	6
Livestock attack	100	91	138	140	131	172	205	148	245	291	367	228	163
Human attack	7	13	5	13	5	10	5	2	2	2	5	13	6
Crop damage	211	316	373	410	278	344	230	196	236	106	106	100	91

Figure 6: Number of recorded HWC incidents within conservancies in eastern Zambezi between 2007 – 2019

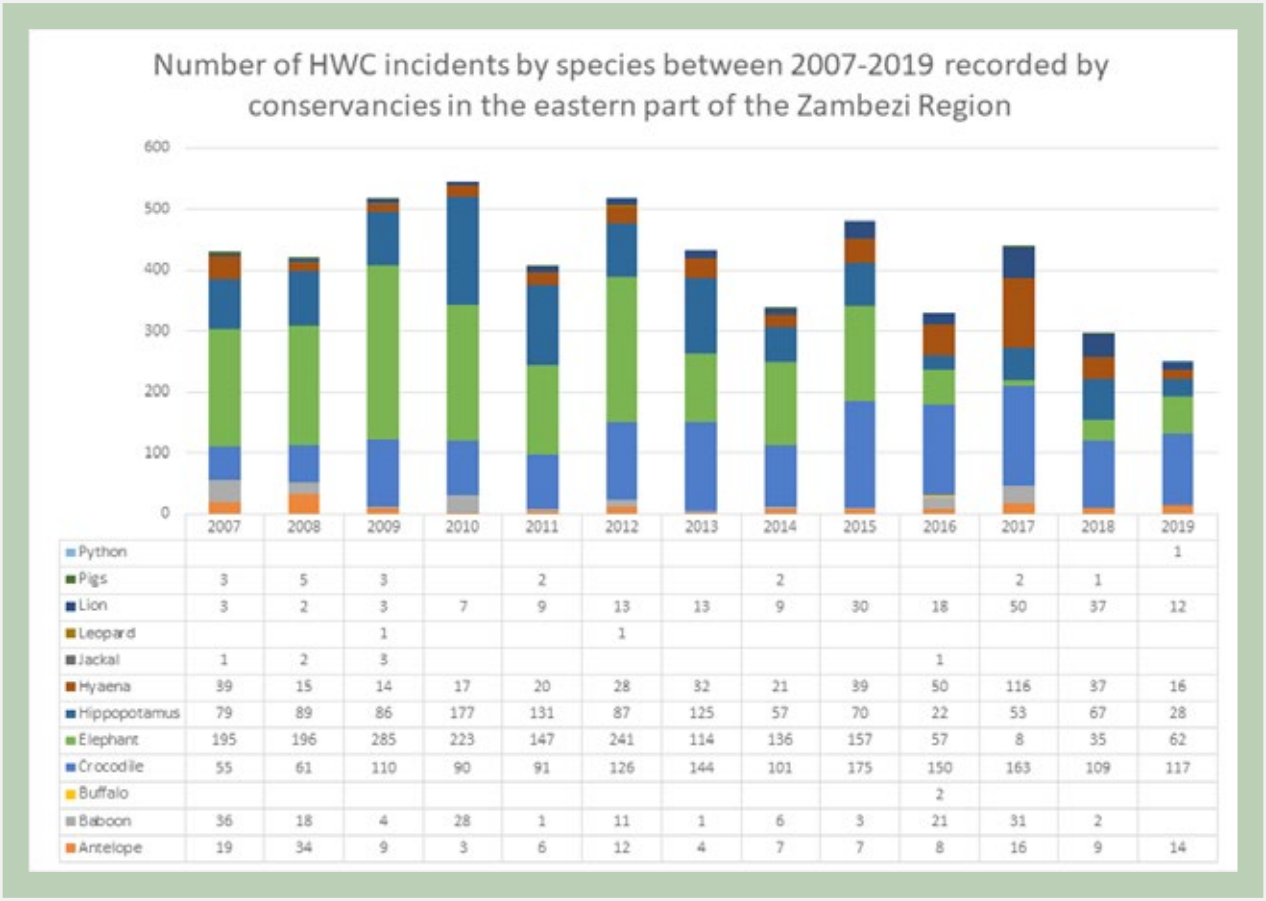


	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Wildcat									1		1		
Wild dog	9	2	9	1	6	16	1	4		3	7	5	1
Porcupine	58	81	55	72	69	66	12	28	9	20	10	15	1
Pigs	165	345	305	252	176	120	58	138	72	44	76	92	44
Lion	21	43	23	15	20	23	81	51	54	59	93	58	66
Leopard	14	9	25	18	19	25	41	19	25	28	17	21	12
Jackal	15	27	18	9	1	13	4	3	3	6	5	11	
Hyaena	84	96	122	100	89	73	66	78	57	42	44	62	36
Hippopotamus	69	149	122	248	190	216	244	426	88	47	36	50	65
Genet									1	1			
Elephant	1034	737	822	683	803	643	442	488	593	297	393	376	213
Crocodile	8	12	18	20	17	24	15	12	32	35	39	29	69
Cheetah													
Buffalo		1											10
Baboon	54	55	49	31	25	26	21	76	45	24	40	38	18
Antelope	111	158	141	176	146	120	108	184	110	69	102	76	34

Figure 7: Number of HWC incidents by species between 2007 – 2019 recorded by conservancies in the western part of the Zambezi Region

In the western part of the Zambezi, elephants are the main HWC culprit, but the number of recorded incidents of elephant damage peaked between 2007 and 2011, and then reduced back to prior levels after that.

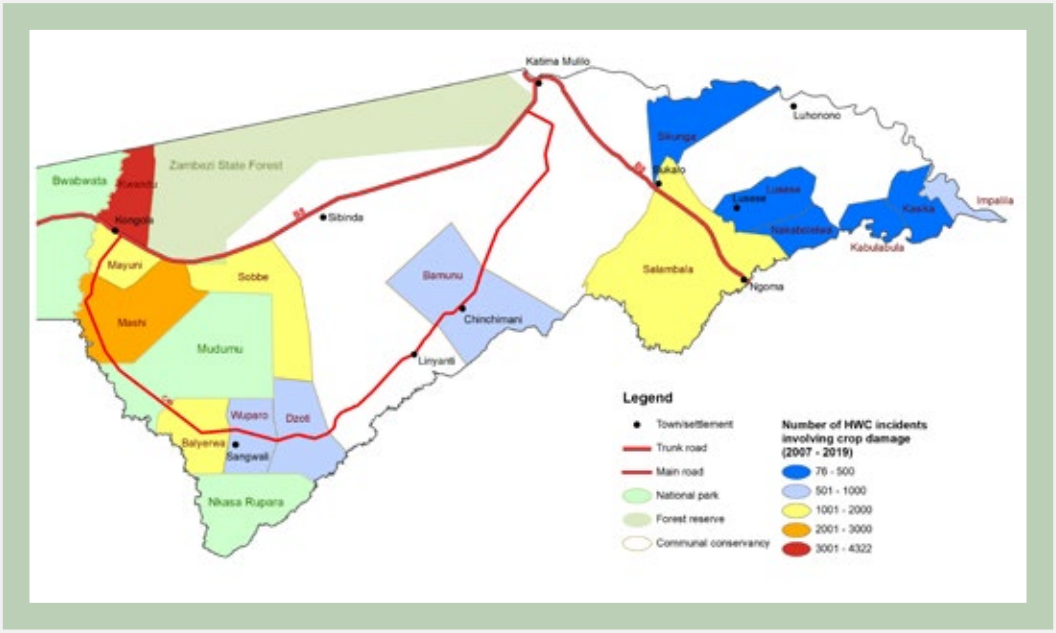
It has been estimated that there are about fifteen to twenty five spotted hyenas in Bwabwata NP, and about fifteen in the Mudumu North Complex. These are often accused of killing livestock, but research has shown that such cases are often unfounded (Zambezi IRLUP, 2015). Where it has been proven, it can be shown that cattle were left unattended close to or within protected areas (Hanssen, 2011). Similarly, lions do predate on livestock but this can be reduced by measures such as kraaling at night, herding of cattle by day, and by keeping cattle away from key lion areas e.g. the National Parks (Hanssen 2014). Lions are especially valuable for tourism in the region, and hyaenas (and their den sites) also have the potential to earn income for conservancies (Zambezi IRLUP, 2015).



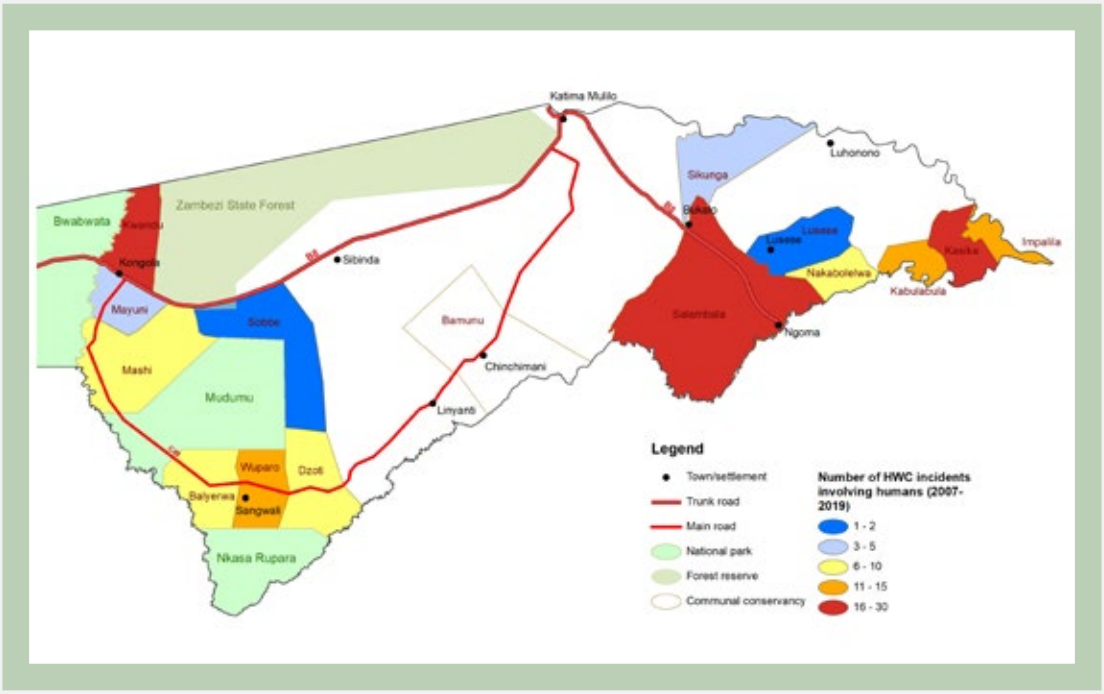
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Python													1
Pigs	3	5	3		2			2			2	1	
Lion	3	2	3	7	9	13	13	9	30	18	50	37	12
Leopard			1			1							
Jackal	1	2	3							1			
Hyaena	39	15	14	17	20	28	32	21	39	50	116	37	16
Hippopotamus	79	89	86	177	131	87	125	57	70	22	53	67	28
Elephant	195	196	285	223	147	241	114	136	157	57	8	35	62
Crocodile	55	61	110	90	91	126	144	101	175	150	163	109	117
Buffalo										2			
Baboon	36	18	4	28	1	11	1	6	3	21	31	2	
Antelope	19	34	9	3	6	12	4	7	7	8	16	9	14

Figure 8: Number of HWC incidents by species between 2007 – 2019 recorded by conservancies in the eastern part of the Zambezi Region

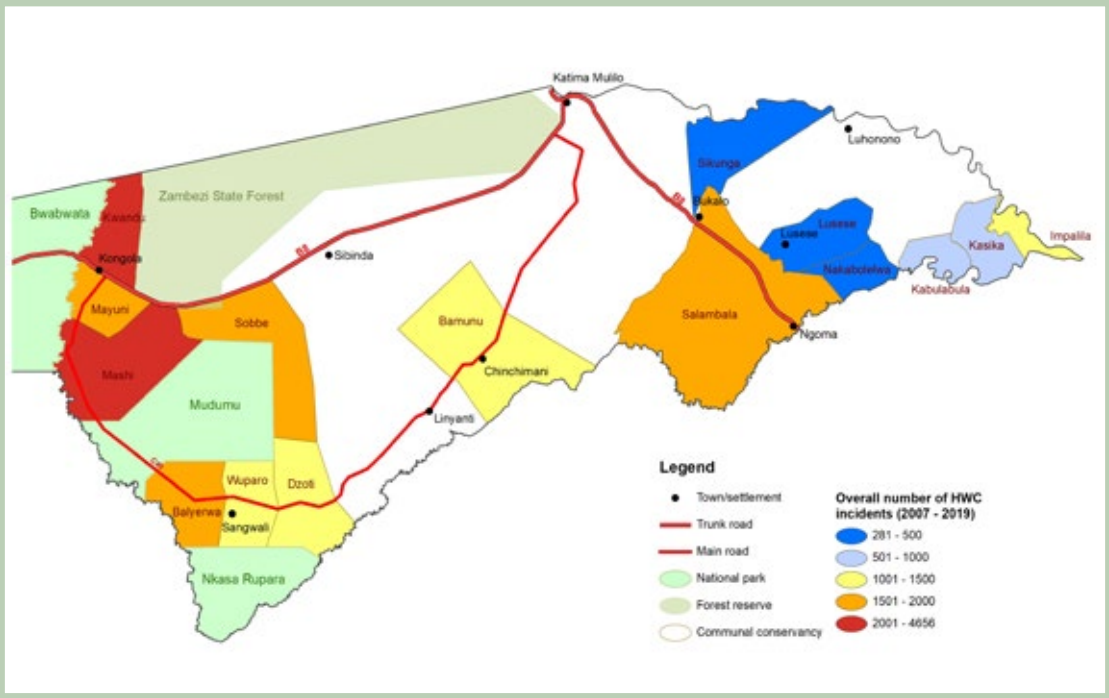
Similar to the west, there was a peak in elephant HWC between 2007 and 2012 in the eastern part of the Zambezi, which subsequently reduced.



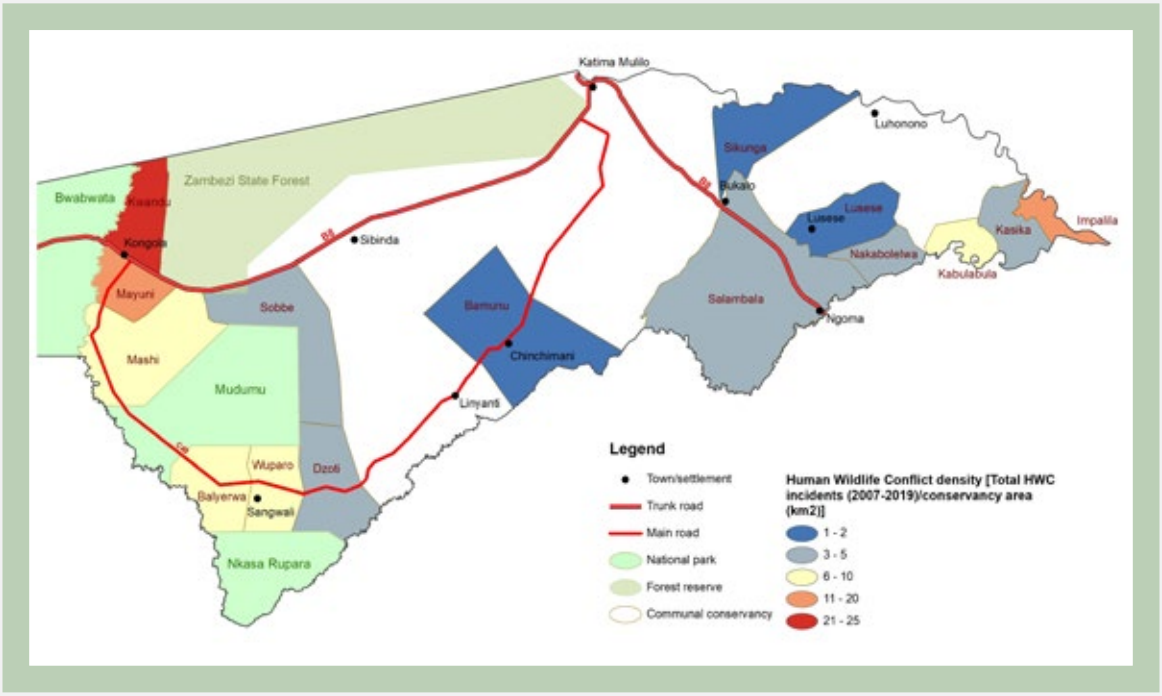
Map 8: Number of HWC incidents in the Zambezi Region involving crop damage (2007-2019)



Map 9: Number of HWC incidents in the Zambezi Region involving attacks on humans (2007-2019)

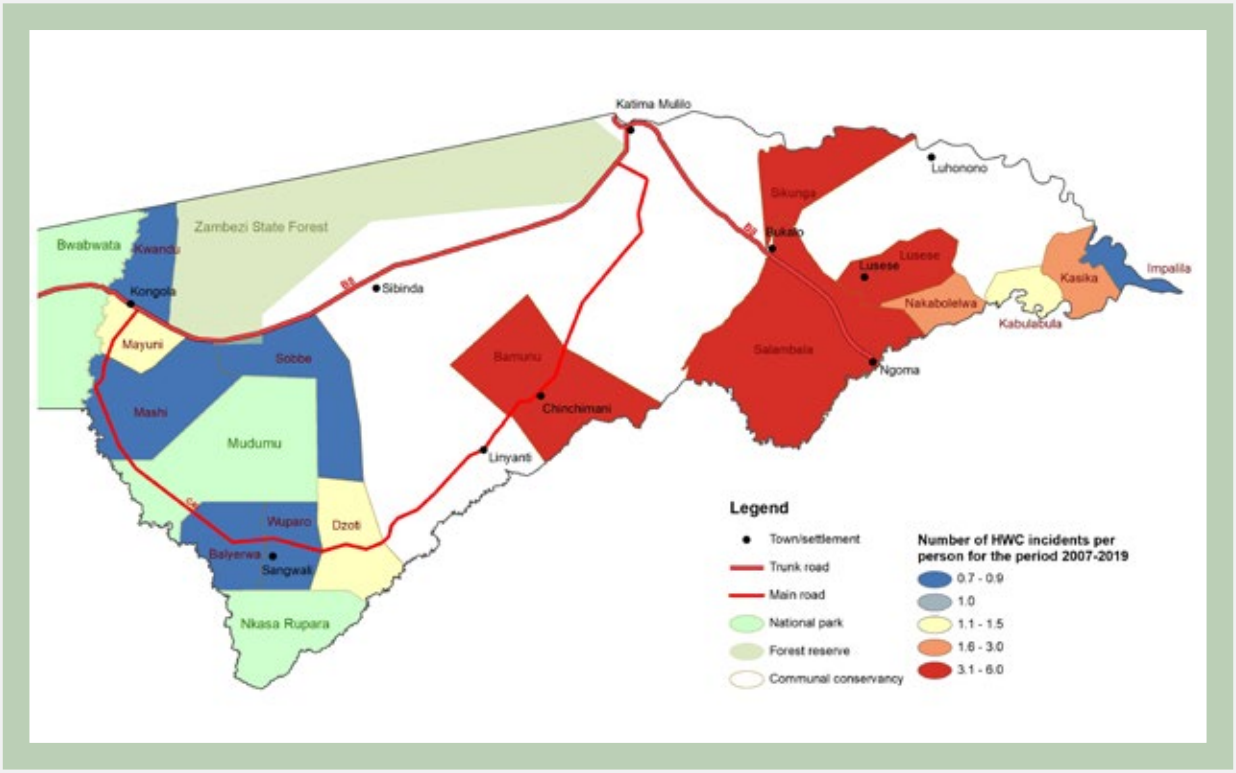


Map 10: Overall number of HWC incidents in the Zambezi Region (2007-2019)



Map 11: Human Wildlife Conflict Density in the Zambezi Region (HWC incidents by conservancy area between 2007-2019)

The density of HWC incidents is highest in the conservancies bordering on the Kwandu River, apart from Impalila and Kabulabula in the eastern Zambezi floodplains. Securing corridors between Nkasa Rupara and Mudumu National Parks, and between Dzoti and Sobbe Conservancies towards the State Forest Reserve are necessary to ease HWC in these west Zambezi conservancies. The need to maintain open land for corridors between Botswana and the eastern Zambezi floodplains is also evident.



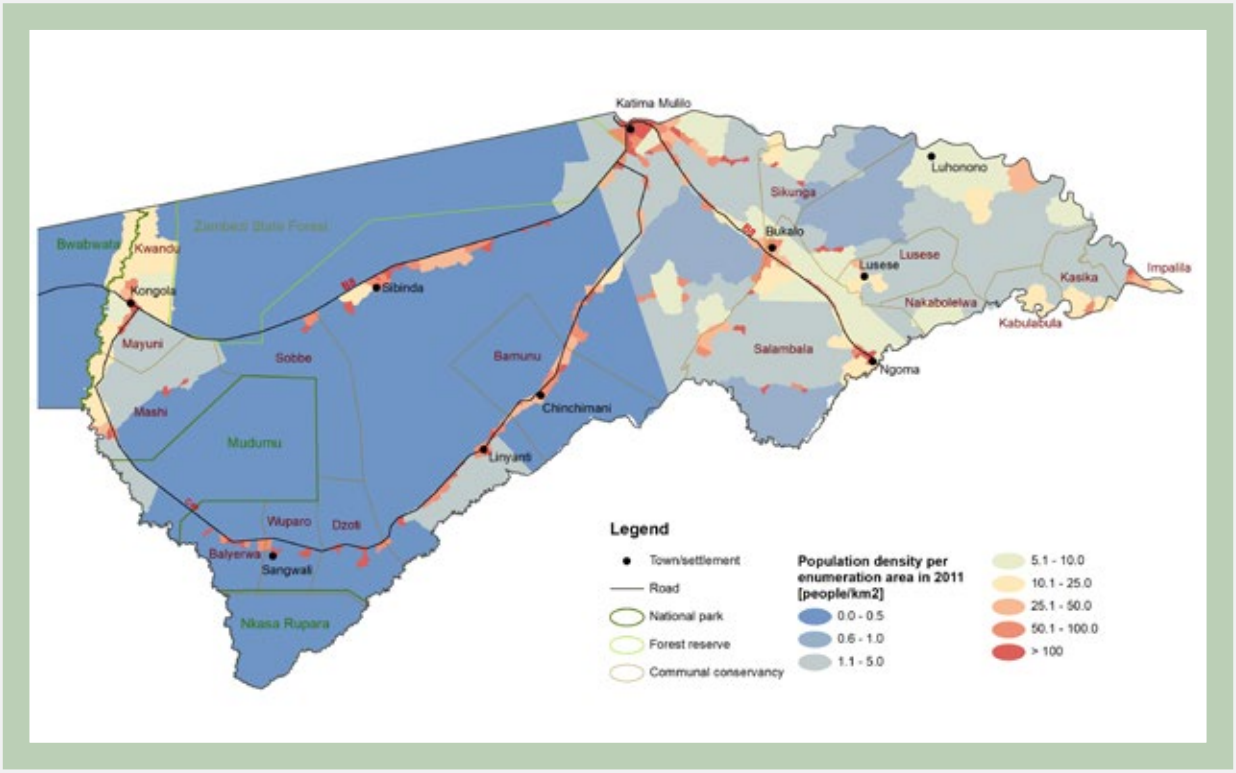
Map 12: Number of HWC incidents per person between 2007–2019 in the Zambezi Region

Map 12 points to the importance of corridors in the floodplains between Botswana in the south northwards towards the State Forest Reserve and Zambia, in order to curtail the high levels of HWC incidents per person, especially in Bamunu, Salambala, Sikunga and Lusese Conservancies.

Wildlife corridors create links between different PAs and connect rivers and floodplains with the hinterland. These corridors are critical to reduce HWC by creating gaps that allow wildlife to move away from floodplains into the hinterland where there is more likely to be conflict with people and tourism. The corridors thereby also provide an important service in preserving the trophy hunting industry, which would not be possible in floodplains where this would clash with tourism establishments and settlements.

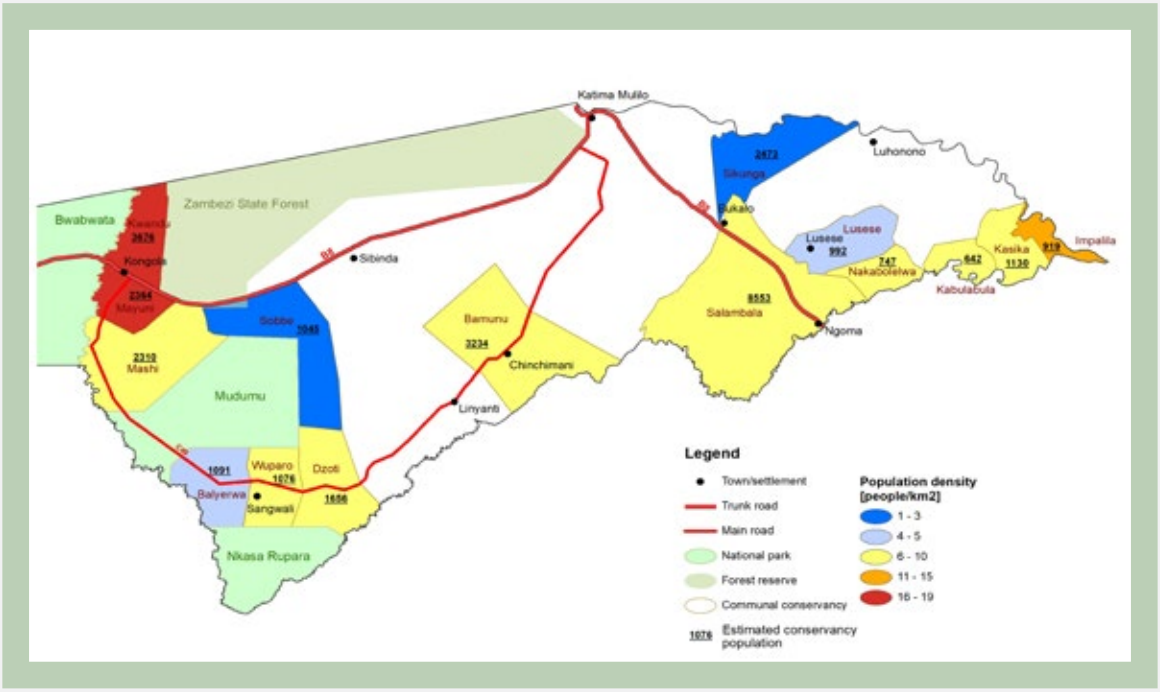
3.4 Human population growth and settlement

The population of the Zambezi Region is increasing – in 2001 the National Census counted 78,826 people and the subsequent census in 2011 found 90,596 people. There were some slight changes in the regions' boundaries that would have slightly affected the population count. Assuming that annual growth rate has continued at the 1.3% level reported during the last census, the population may well have reached close to 100,000 in 2020.



Map 13: Population density in the Zambezi Region (note settlement patterns along the roads)

In 2011, the area's population density was 6.1 persons per km² - higher than the national average of 2.6 persons per km² and pointing to land pressures.

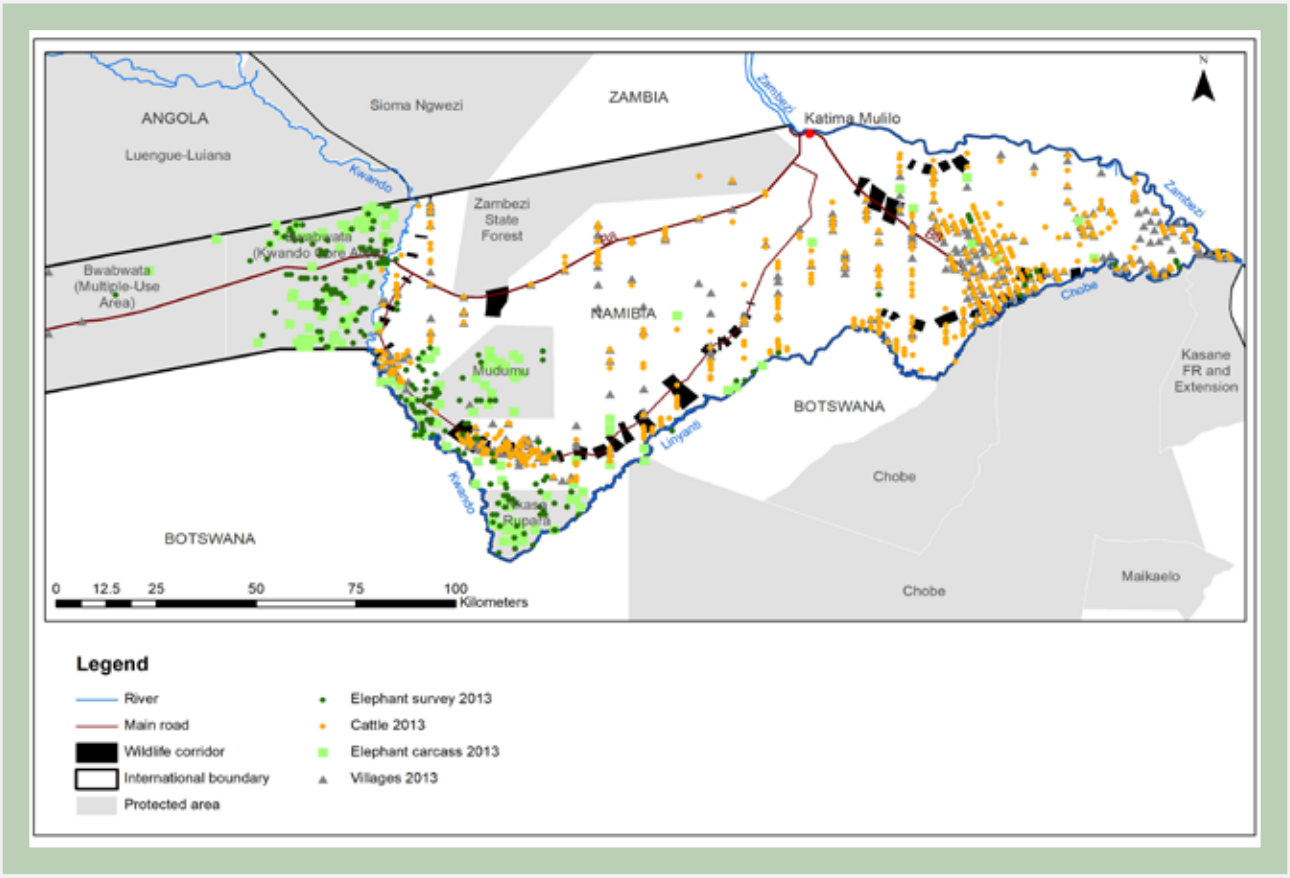


Map 14: Population density in Zambezi conservancies

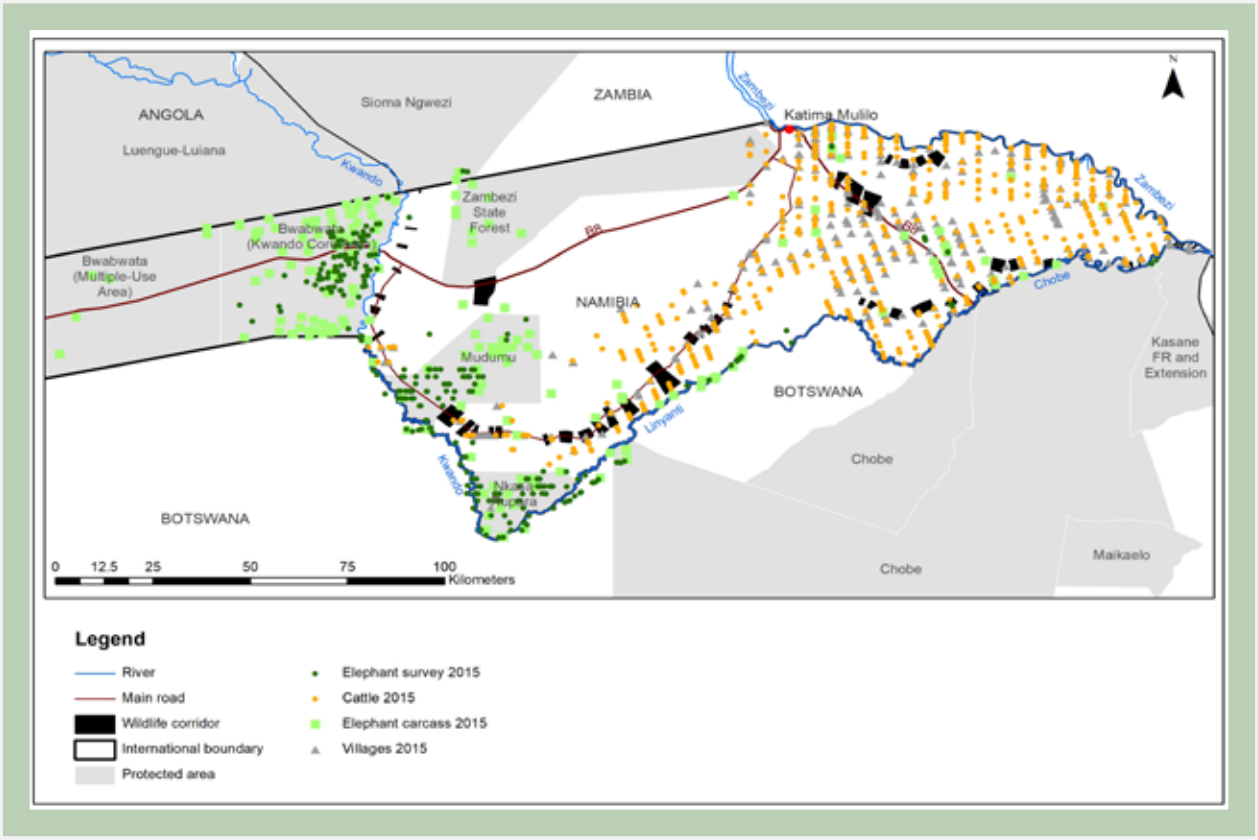
The majority of people live in rural areas (69%). Their main source of household income is from wages and salaries (30%), with 25% from non-farming activities, and 21% from farming activities (Zambezi IRLUP, 2015). Although farming represents just more than one fifth of average income, it is an activity that dominates people's time and is highly valued for its cultural and subsistence value, even though the livestock market has been mostly dormant due to Foot and Mouth Disease in recent years and erratic rainfall and pests have caused erratic crop yields. The most significant contributors to rural livelihoods are mixed subsistence dry crop farming of millet, sorghum and maize (with maize increasing in popularity in recent years), livestock and fishing. Livelihoods are supplemented by harvesting of natural products, the sale of crafts, reeds, thatch, traditional medicines, fruit, nuts, employment at lodges and benefits from conservancies. The growing tourism and conservation sector have created employment and spin-off benefits such as craft sales and guiding, e.g. in the niche birding sector.

Approximately 26.3% of the rural population depend on livestock farming whilst 52.9% rely on crop cultivation (NSA, 2012). Although livestock farming is dominated by cattle, close to half of households (42%) don't own cattle at all. A further 43% own between 1 – 30 head of cattle, and only 15% own more than 30 head of cattle (Mendelsohn, 2006), representing the more wealthy members of communities.

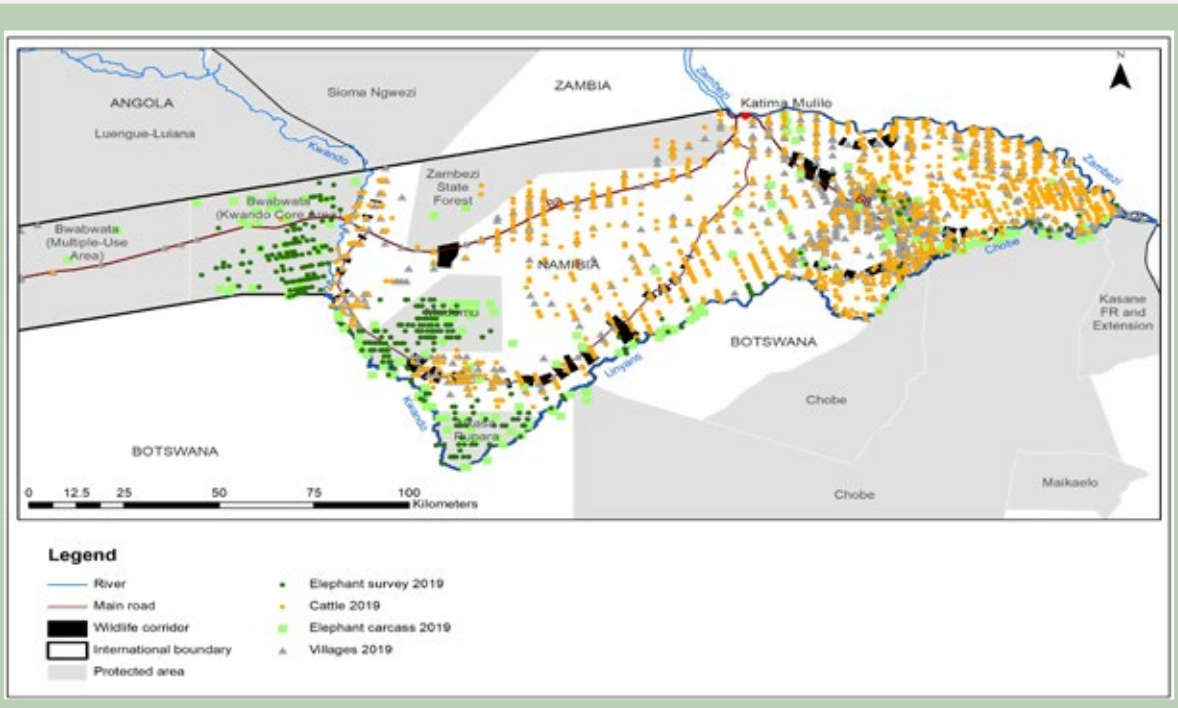
Below, a timeline aerial census of elephants (2013, 2015 and 2019) has been overlaid with villages and sightings of cattle and tells the story of the rapid expansion of villages and cattle in the past seven years. There are some limitations to the level of detailed accuracy using aerial photography, but the maps give an idea of the trend.



Map 15: Elephant, villages and cattle 2013 (MEFT aerial census, 2013)



Map 16: Elephant, villages and cattle 2015 (MEFT aerial census, 2015)



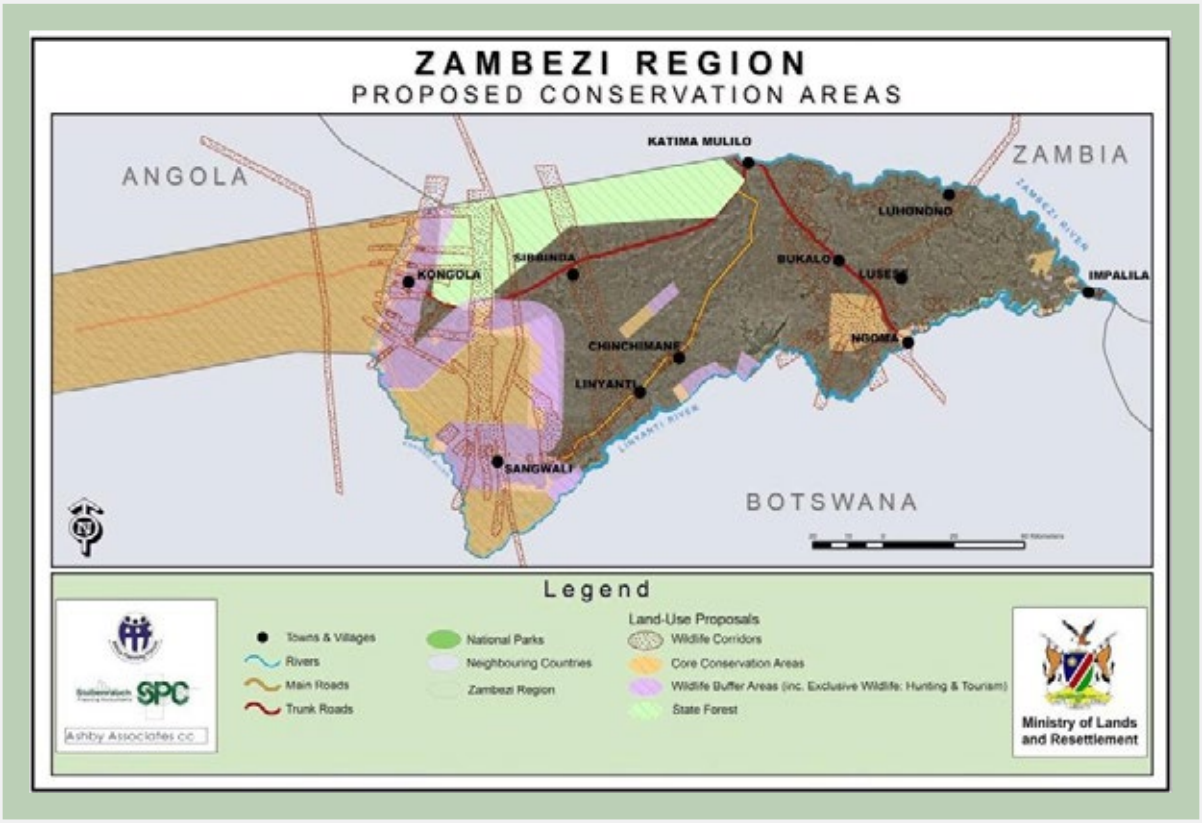
Map 17: Elephant, villages and cattle 2019 (MEFT aerial census, 2019)

It is evident that settlement patterns are changing, with new settlements being established alongside roads to ease access to transport and services. A further factor driving the increase in settlements could be that the opportunity to apply for customary land rights has driven a spread in the population. Historically, typical communal households would have been clustered in small villages with their dry "upland/ hinterland" fields and seasonal floodplain fields (where crops are planted in floodplains after the annual flood waters recede) some distance from the village. These maps show how people are now shifting to smaller and far more spread out villages, mostly along the tarred roads.

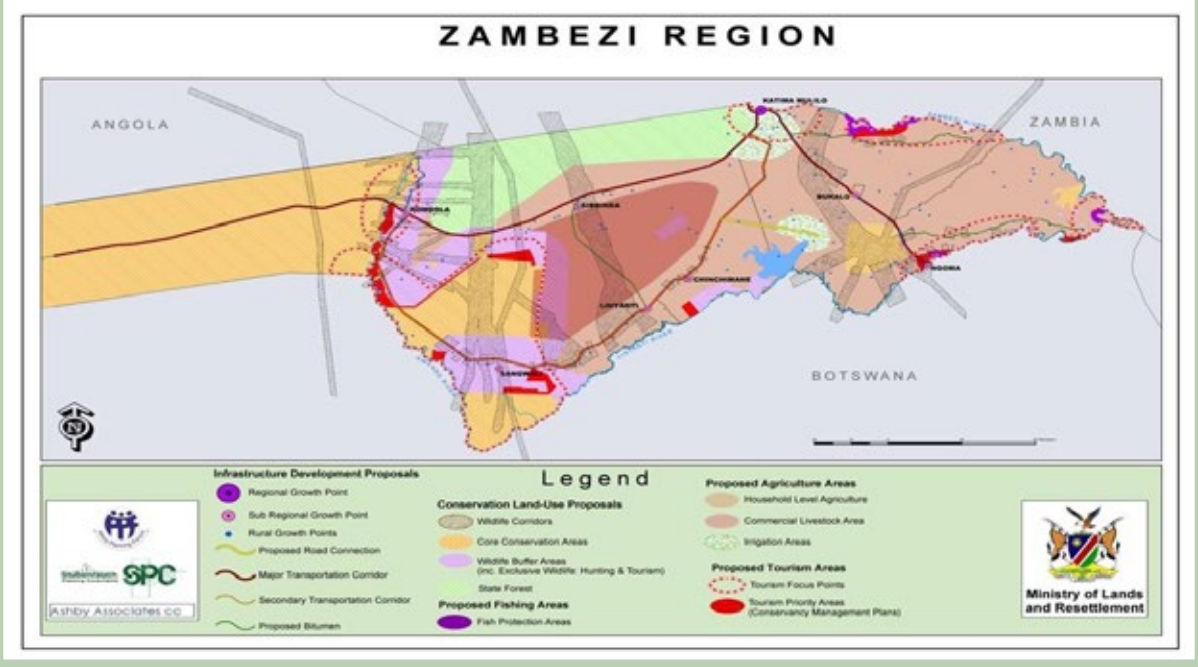
A 2013 study in Salambala Conservancy in the eastern floodplains, used historical aerial images to demonstrate the effects of increased settlement and clearing. By comparing images from 1970, 1996 and 2006, the study shows a sharp increase in the number of farms, cleared land and cattle kraals and concludes that this has led to local soil erosion and land degradation (Colpaert ***et al***, 2013).

3.5 Regional Development Plans

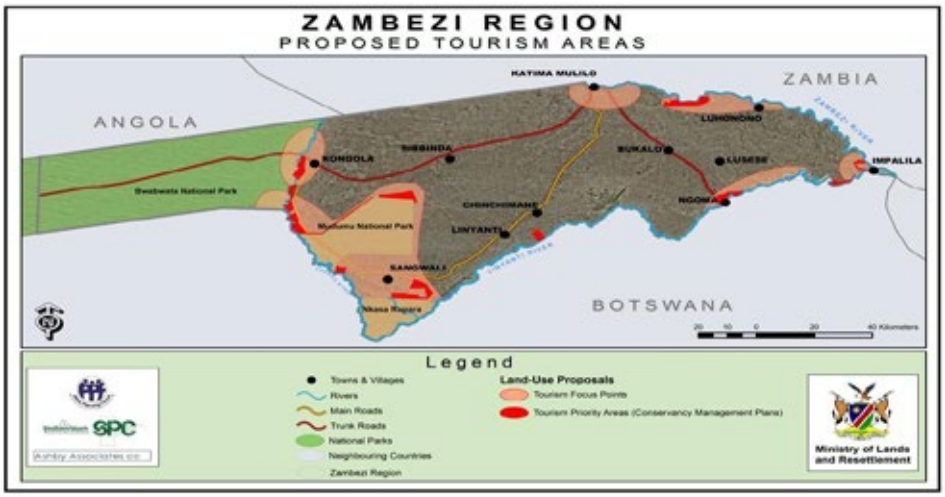
The Integrated Land Use Plan (IRLUP) for the Zambezi Region was completed in 2015. The plan is intended to guide development in the region. The value of wildlife corridors to connect habitats and promote tourism is acknowledged in the plan and several of the important wildlife corridors, as well as the Exclusive Wildlife Areas of the conservancies, are recorded.



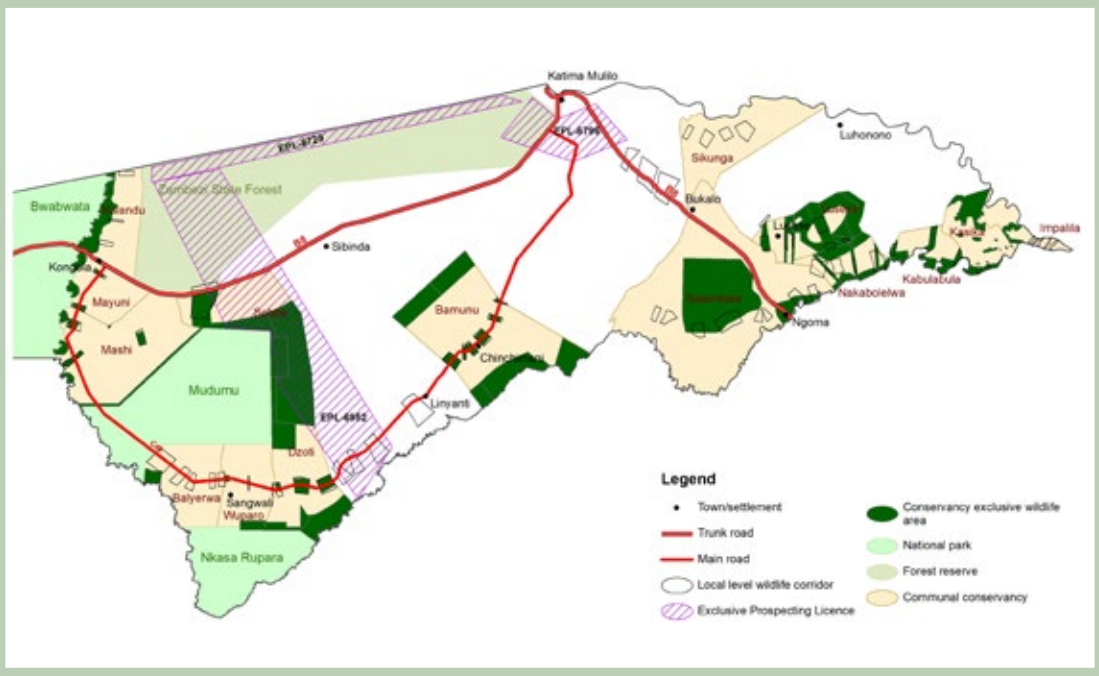
Map 18: Proposed conservation areas in Zambezi Region (IRLUP, 2015).
Note the wildlife corridors recorded with brown dots.



Map 19: Infrastructure development proposals overlaid with conservation, fishing, agricultural and tourism areas



Map 20: Proposed tourism areas in Zambezi Integrated Land Use Plan (2015)



Map 21: Exclusive Prospecting Licences, local level corridors and Exclusive Wildlife Areas

There are three active Exclusive Prospecting Licenses in the Zambezi (EPLs 6729, 6952 and 6796) that have been granted for a broad range of commodity exploration (base and rare metals, industrial minerals, non-nuclear fuel minerals, precious metals, precious stones and semi-precious stones) to three different companies in 2018. All three are due to expire between February and June 2021.

4. Wildlife corridors/dispersal areas of national and international importance

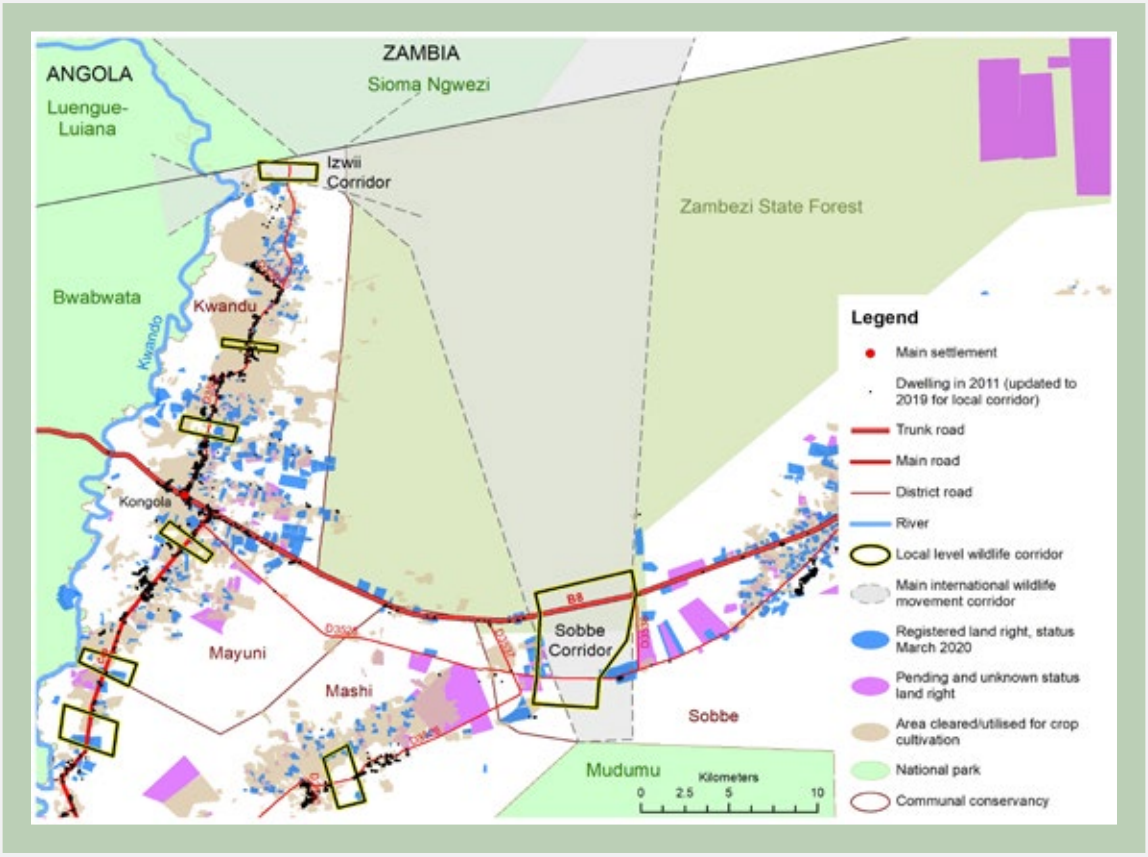
This strategy presents two categories or tiers of wildlife corridors – (1) wildlife corridors of national and international importance and (2) wildlife corridors that are important at conservancy level. Wildlife corridors of national and international importance are the most strategic wildlife movement areas (interchangeably termed wildlife corridors and Dispersal Areas) that are valuable both at national and international levels.

The corridors listed below are not all inclusive. There are further areas where wildlife is found (e.g. south of the State Forest near Sibinda) which have not been included. Only six corridors that were deemed to be the most important to secure wildlife populations were selected for inclusion as the most strategic wildlife corridors. The level of threat to the corridors' maintenance was a further factor taken into consideration when deciding which corridors to include; i.e. the most important and most threatened corridors are included. Selection of these six corridors was made based on telemetry data from wildlife collars, consultations and inputs from conservation experts and well-informed local stakeholders.

4.1 Izwii Wildlife Corridor/Dispersal Area

Izwii Corridor connects Kwandu Conservancy to Sioma Ngwezi NP in Zambia and Angola in the north, Bwabwta NP's Kwando Core Area in the west, and the State Forest in the east.

Izwii Corridor falls within the Kwando Wildlife Dispersal Area identified by KAZA TFCA. In Kwandu Conservancy, the Sikaunga local level corridor has been blocked by a village, the Singalamwe local level corridor maybe blocked by a green scheme (unless planned properly) and a border post (there is a fenced area at the border at Izwii corridor which is a proposed site for immigration and police staff), but the Kongola local level corridor is still being used by elephants even though a settlement has been established in the corridor.



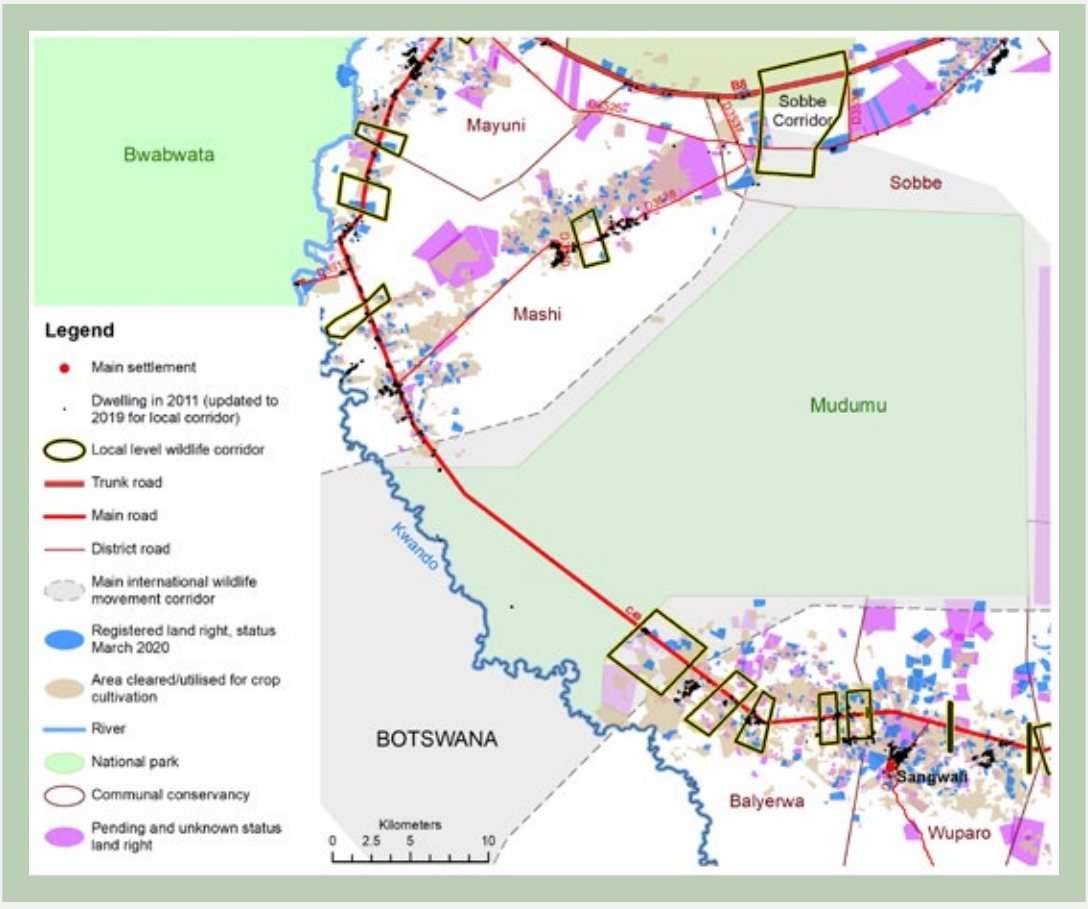
Map 22: Izwii and northern section of the Sobbe Wildlife Corridors/Dispersal Areas

4.2 Sobbe Wildlife Corridor/Dispersal Area

Sobbe Corridor connects Mudumu NP to Sioma Ngweze NP in Zambia - it connects Bwabwata NP to Mudumu NP, northwards through Sobbe Conservancy, into the State Forest Reserve north of the Kongola/Katima Mulilo main road (B8) and into Sioma Ngwezi NP in Zambia. The corridor transverses Sobbe and Mashi Conservancies in the west and south west.

Sobbe Corridor is part of the Kwando Wildlife Dispersal Area designated by KAZA TFCA. Satellite tracking of elephants indicates how elephants funnel through the Sobbe Corridor. There are clear elephant paths aligned north - south that cross the roads within the corridor. The corridor comprises a critical 'funnel' – a local level corridor in Sobbe Conservancy where there are no settlements or crop fields. Although some customary land rights have been registered just within the corridor, this corridor has the least number of customary land rights and pending applications for land rights and has hardly been cleared. There are villages and crop fields that form the eastern and western boundaries of the corridor. In 2016, Sobbe Conservancy approved a set of rules and guidelines for maintaining the corridor, and which are being enforced (see below).

The State Forest Reserve forms an important part of this corridor. Elephants move from Sobbe Conservancy into the State Forest Reserve north of the Kongola/Katima Mulilo main road (the B8) and continue into the Sioma Ngwezi National Park in Zambia.



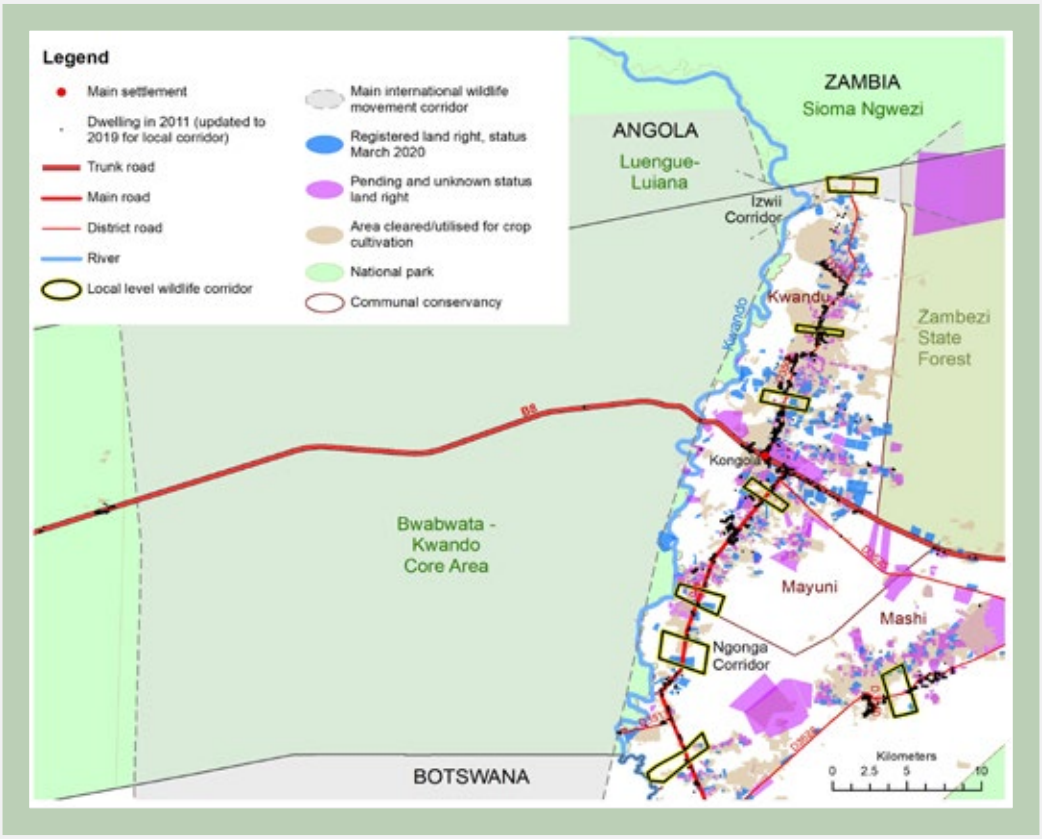
Map 23: Southern section of the Sobbe Corridor/Dispersal Area

4.3 Bwabwata-Luengue Liuiana Wildlife Corridor/Dispersal Area

Bwabwata-Luengue Liuiana Corridor provides a link between Botswana, Bwabwata NP and Luengue Liuiana NP in Angola. Nearby Ngonga Local Level Corridor in Mashi Conservancy provides a link between Bwabwata NP and Mudumu NP.

A damaged buffalo fence in Botswana south of the Kwandu Core Area of Bwabwata NP allows wildlife to move from the north-west of Botswana through the open section of the border fence south of Bwabwata's Kwandu Core Area into Luengue Liuiana NP in south Angola. There is intense wildlife activity in this corridor, which forms a critical part of the KAZA Kwando Wildlife Dispersal Area.

Outside this corridor, to the east of the Kwando River, is an important local level corridor – the Ngonga Corridor in Mashi Conservancy. This corridor, which allows for some movement of wildlife between Mudumu NP and Mashi Conservancy, is under threat. In 2018 two fields were cleared in a critical portion of the corridor although they were not planted and there is no new settlement yet. The fields had been made by a person returning to the area and claiming his ancestral land, which had been occupied in the past. Traditional leaders report that in the past wild dog, hyena, and lion had used the corridor as well as elephant and buffalo. Wildlife using the corridor between the Kwando River and the main road these days includes impala, kudu, blue wildebeest, eland and giraffe which are all mainly resident, as well as elephants which move though seasonally. Mashi Conservancy originally demarcated six corridors but only three are still functioning as corridors. The conservancy fears that if the Ngonga corridor becomes blocked there would be no more wildlife in Mashi.



Map 24: Bwabwata-Luengue Liuiana Wildlife Corridor/Dispersal Area, with Ngonga Local Level Corridor east of the Kwando River

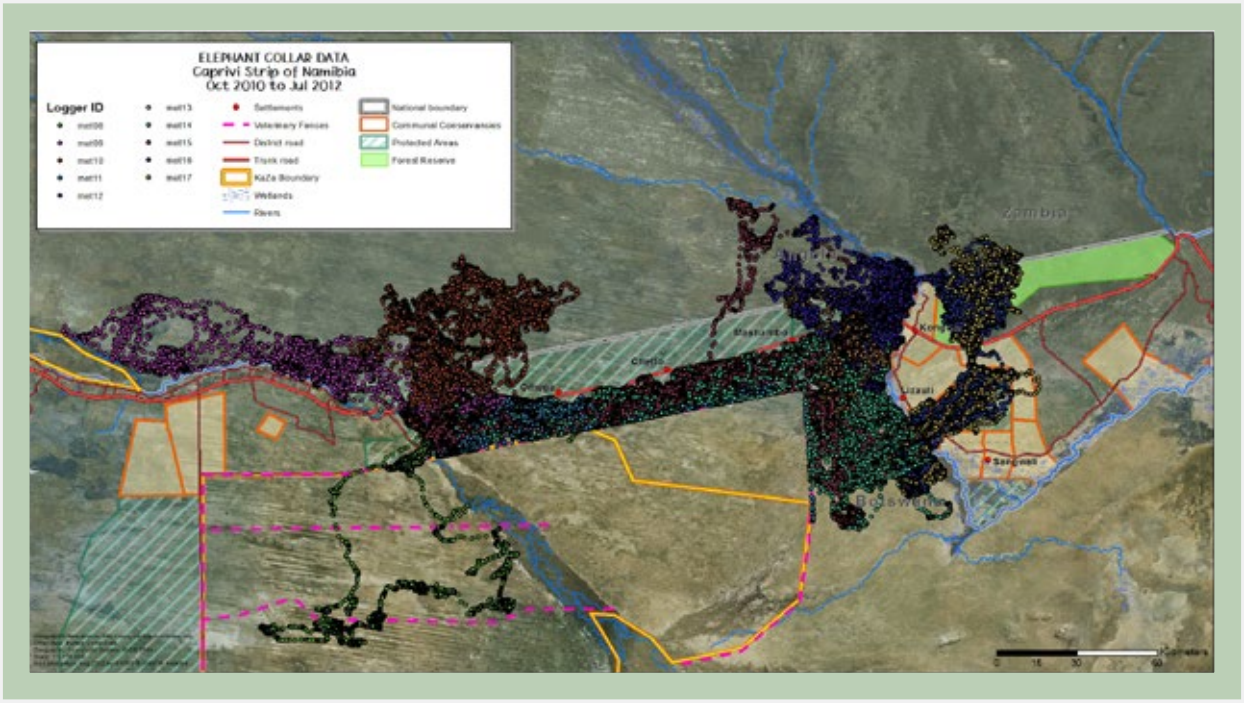


Figure 9: Collared elephant movement data centred on the Zambezi Region, Namibia. Note elephant movement from northern Botswana along the Kwando River into Angola and Zambia through the 30 km stretch of veterinary cordon fence taken down in 2001 (Chase (2015) in MEFT Bwabwata Management Plan (2019).

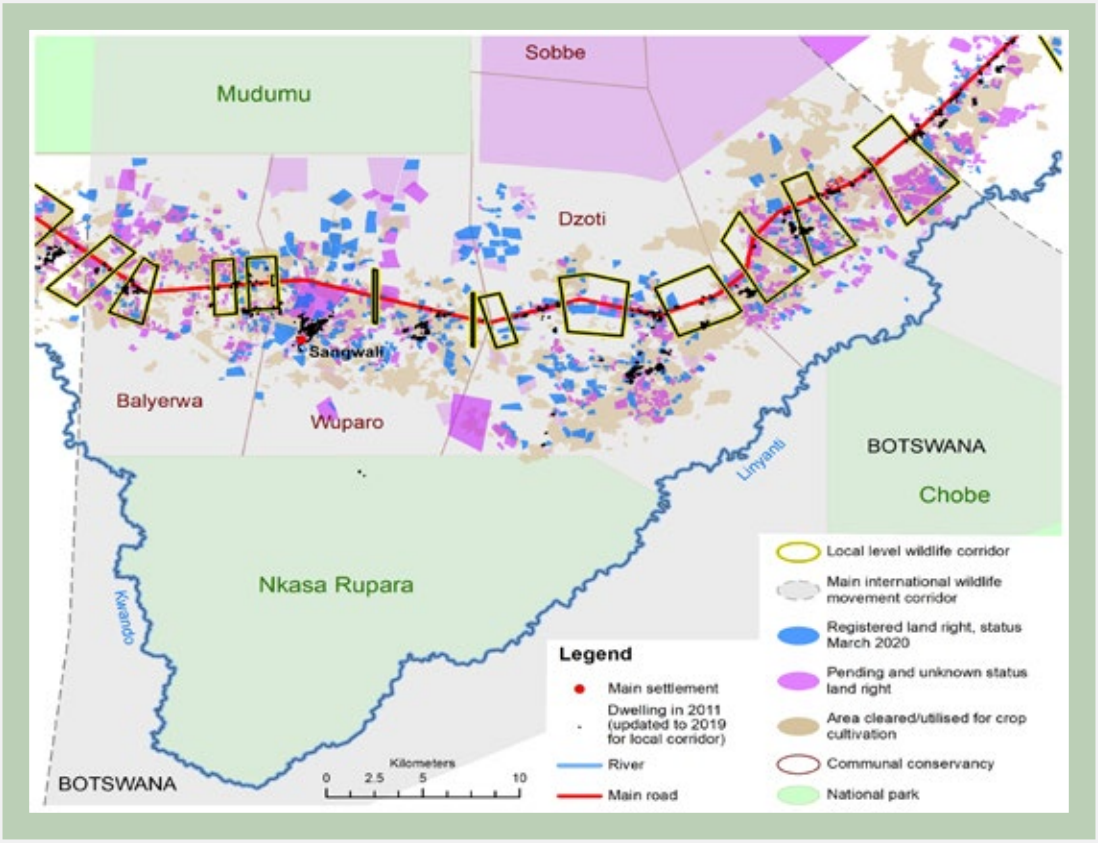
4.4 Nkasa Rupara-Mudumu Wildlife Corridor/Dispersal Area

Nkasa Rupara-Mudumu Corridor includes several local level corridors. It is part of a bigger area of wildlife movement from the Linyanti area of Botswana to Nkasa Rupara through Balyerwa, Wuparo and Dzoti Conservancies and then into Mudumu NP.

Nkasa Rupara-Mudumu Corridor also falls within KAZA TFCA's Kwando Wildlife Dispersal Area. Elephants are known to use this corridor extensively. There is also more localized movement of buffalo from the Nkasa Rupara NP and possibly also from Botswana through the conservancies towards the park. Elephants also move from the Mudumu NP northwards through the Sobbe Conservancy and the State Forest into the Sioma Ngwezi National Park in Zambia. There is thus the potential for elephants to move from Botswana through Namibia and into Zambia and Angola.

It is critical to secure an open area between Dzoti and Wuparo Conservancies to ensure that wildlife can move between Nkasa Rupara and Mudumu NPs to reduce the 'damming' up of wildlife in Nkasa Rupara which happens in years of severe flooding when there is a push of animals towards the road.

Three local level corridors have been identified in Wuparo Conservancy's zonation plan. There has been increasing cropping and settlements in the middle corridor and the one close to the boundary with Dzoti in the east as people were taking up their customary land rights. There has also been an increase in HWC in these corridors. Through the Wildlife Credit Scheme, the conservancy has helped people to build lion proof kraals for those in hot spot areas outside wildlife corridors.

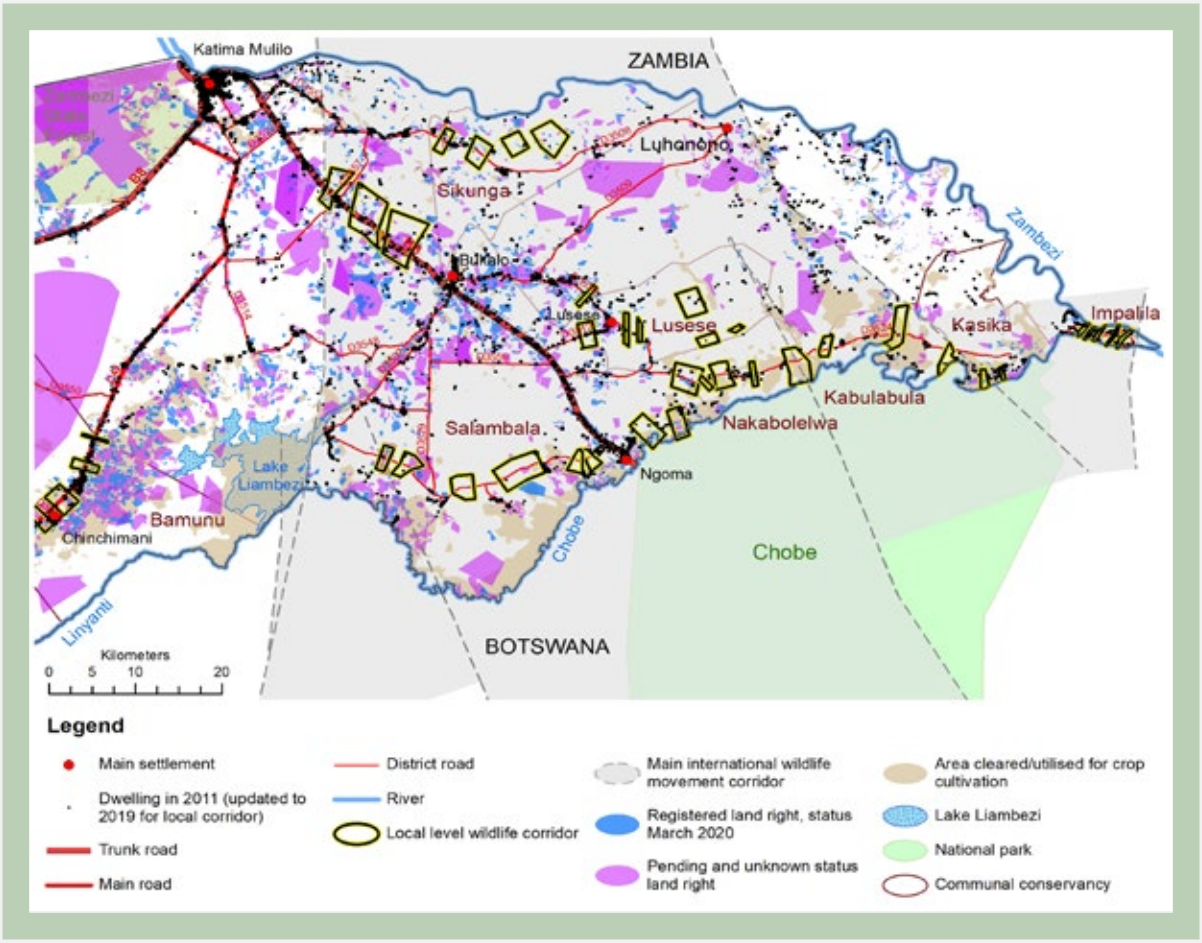


Map 25: Nkasa Rupara-Mudumu Wildlife Corridor/Dispersal Area

4.5 Chobe Wildlife Corridor/Dispersal Area

Chobe Corridor passes through the eastern Zambezi Floodplain and includes parts of Salambala, Nakabolelwa, Lusese, Kabulabula, Kasika, Impalila and Sikunga Conservancies, linking Botswana in the south and east to Zambia in the north. Lake Liambezi to the west provides a floodplain and wetland habitat important for zebra, elephant and buffalo.

Chobe Corridor is part of KAZA TFCA's Zambezi-Chobe Floodplain Wildlife Dispersal Area. Elephants cross from Botswana into Salambala Conservancy and move through several local level corridors in Salambala northwards partly across open communal land (i.e. not conservancy land) to Sikunga Conservancy and then also potentially into Zambia. Zebras migrate seasonally from the Magadikadi Pans in Botswana to move onto the floodplains in Namibia. The corridor is predominantly used by zebras, elephant and buffalo, while lion and hippo are also found here. Some animals go through the corridor as far as Zambia and others just go back and forth to Botswana. Lusese Conservancy forms an important link for elephant movement from Chobe National Park in Botswana to Sikunga and ultimately Zambia as well as through non-conservancy areas such as Luhonono (former Schuckmansberg), Nsundwa and Ikaba. Lake Liambezi is a large ephemeral lake that links up the Linyanti-Chobe-Zambezi River systems. Depending on inflows from either of these water systems, the area alternates between being completely dry and covered with open grasslands and fields to holding water up to several metres deep covering over 100 km². The lake supports a high diversity and abundance of aquatic flora and fauna, including a valuable fishing industry and dispersal area for wildlife.



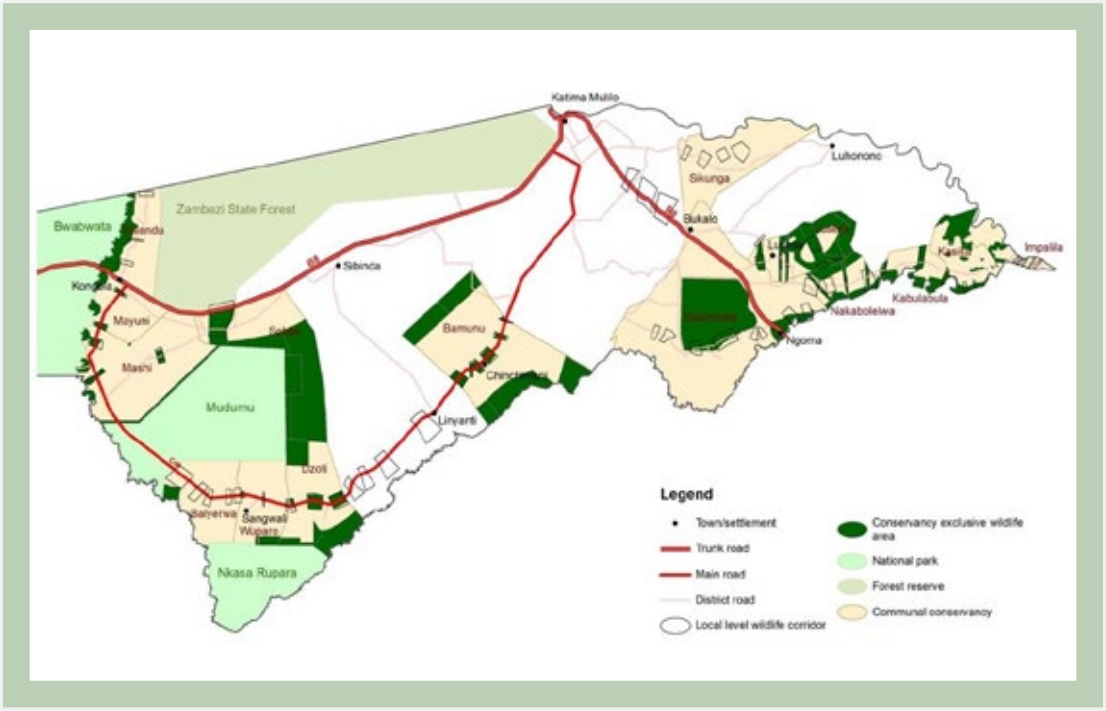
Map 26: Chobe Wildlife Corridor/Dispersal Area

5. Local level wildlife corridors

Local level wildlife corridors are corridors at conservancy level. Conservancies have demarcated land-use zones for the exclusive use of wildlife by conservancies in their Game Management and Utilization Plans, many of which overlap with local level corridors.

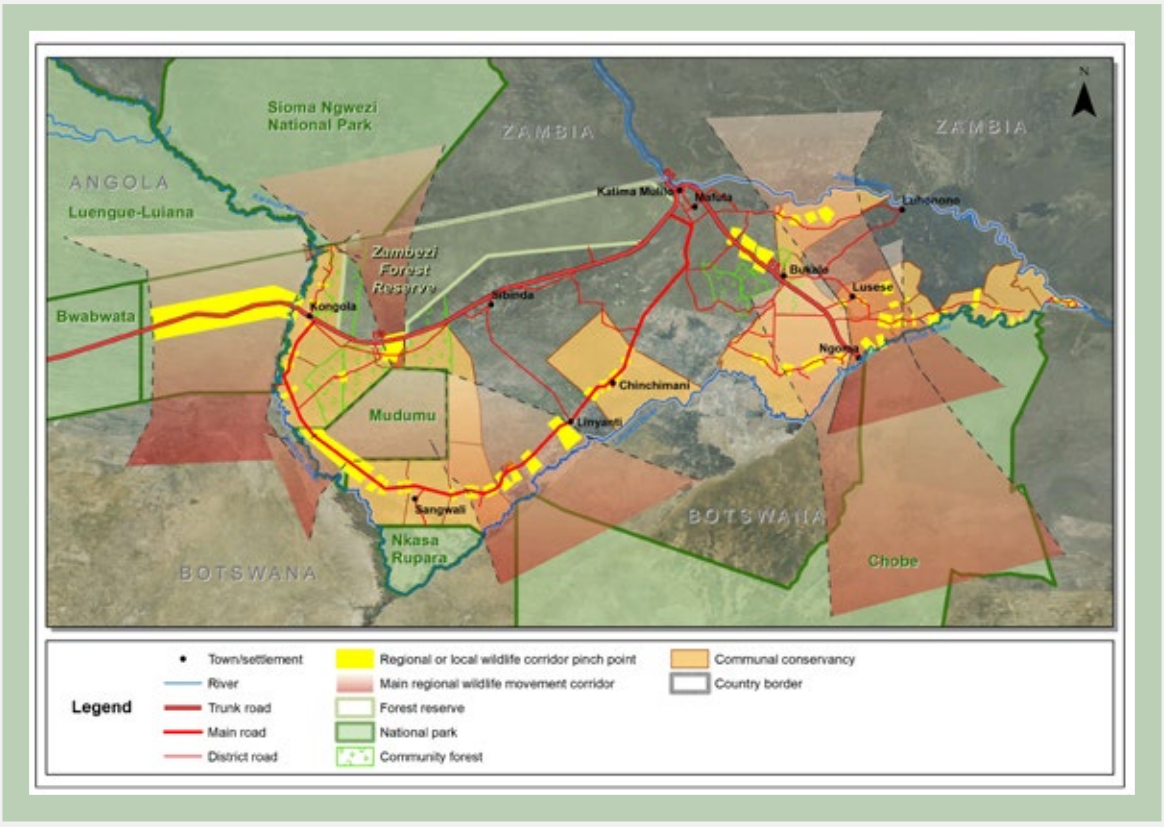
Mapping of wildlife corridors in Zambezi Region has taken place mainly through the development of conservancy zonation plans, each of which identifies wildlife corridors. The conservancies have identified exclusive wildlife zones where there should be no disturbance, these represent areas where residents say wildlife has always moved pre-dating the establishment of the conservancies.

Map 27 below shows all wildlife corridors in the Zambezi region that have been mapped through establishment of conservancy zonation plans or through taking coordinates of gaps in settlements along roads clearly used by wildlife. The corridors shown in the map below are in effect open areas across main and secondary roads. The map also shows all of the exclusive wildlife areas that have been designated in conservancy zonation plans that form part of their Game Management Utilization Plans.



Map 27: Conservancy exclusive wildlife areas and local level wildlife corridors

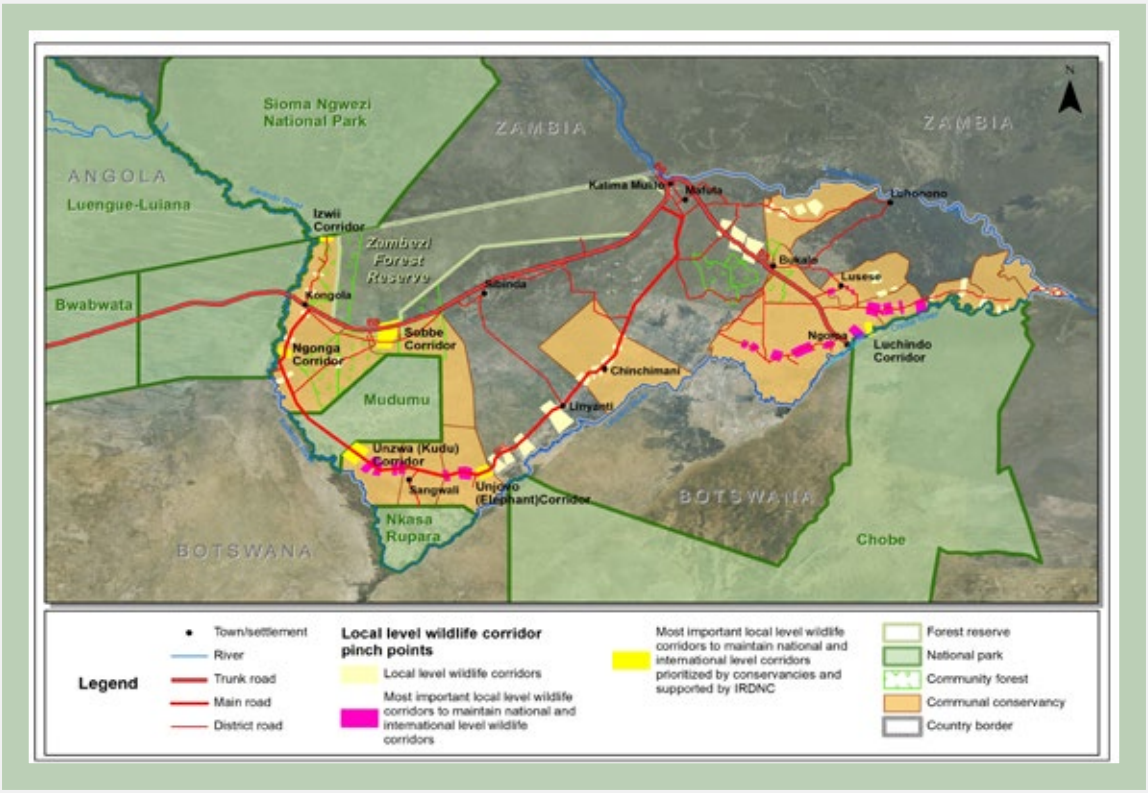
5.1 Local level wildlife corridors and conservancy exclusive wildlife areas



Map 28: Regional or local corridors (pinch points) showing how they are situated within main regional (national and international) corridors

Local level wildlife corridors are areas overlapping roads that were identified based on actual wildlife movement where animals cross these roads. They are all part of broader wildlife corridors but have been singled out because they are particularly vulnerable pinch or pressure points that could easily stop being used by animals due to increasing human encroachment.

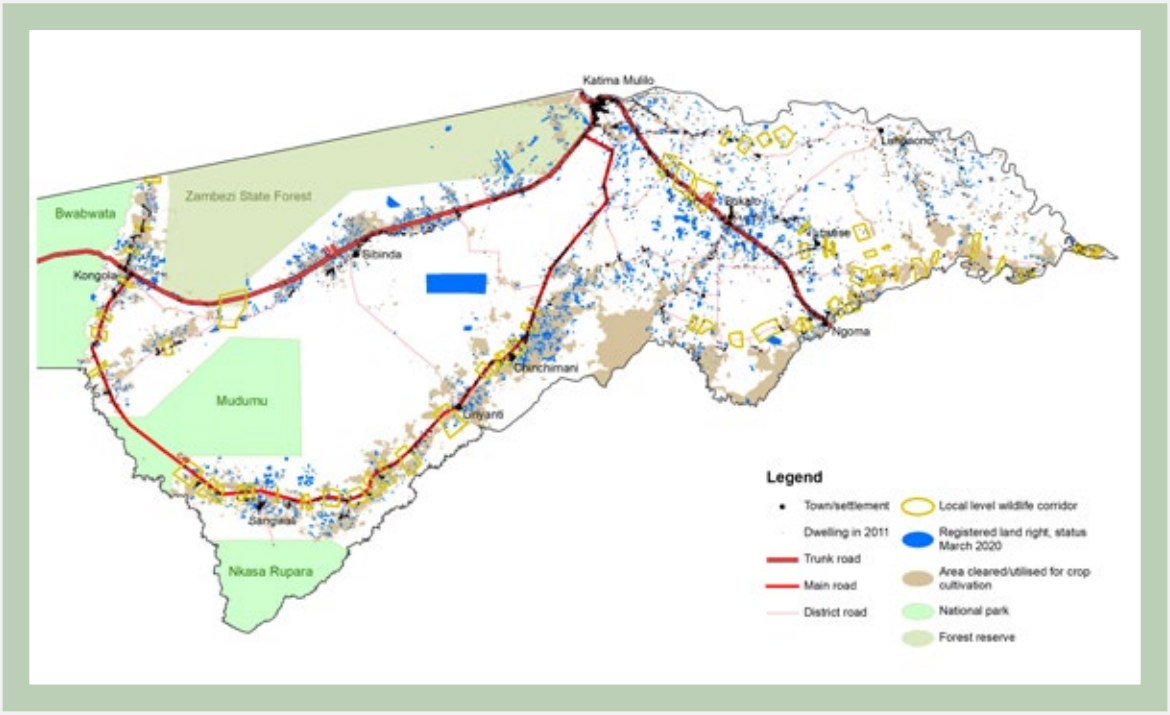
Exclusive wildlife areas are zones set aside for wildlife use by each of the conservancies in their zonation plans that form part of their Game Management Utilization Plans. These areas sometimes overlap with local level corridors.



Map 29: Location of regional or local corridors (pinch points) in conservancies and neighbouring communal land

Although most of the local level corridors fall within conservancies, there are seven that fall outside of conservancies.

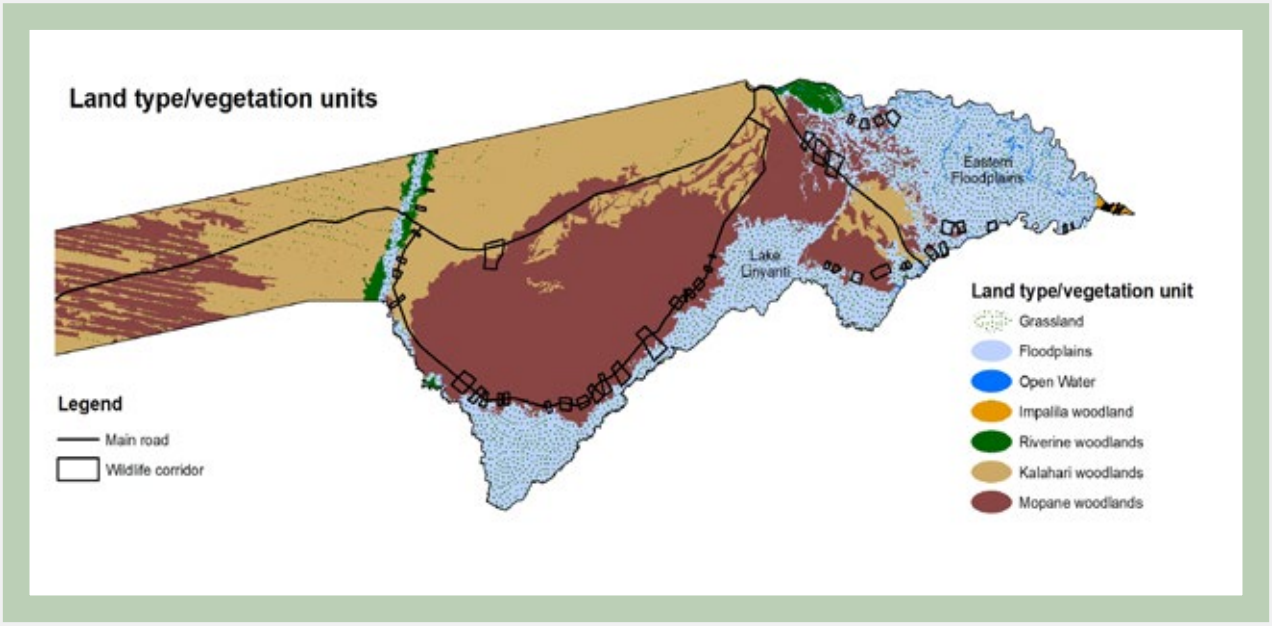
The focus of mapping has been on the local level corridors that interlink PAs and that connect rivers and floodplains with the hinterland. The mapping of corridors has not identified where wildlife moves between pinch points and whether these pinch-points are directly linked. It is very likely that if land is kept free from settlement and cropping, it would eventually become used by wildlife more broadly.



Map 30: Dwellings in Zambezi Region showing linear development along roads

The most significant challenge to local corridors is linear settlements along roads that will eventually block access for wildlife to cross the roads. Town planning of clustered settlements may reduce the huge inefficiencies in water and service provision to the highly dispersed settlements along roads.

5.2 Biophysical, biological and socio-economic description

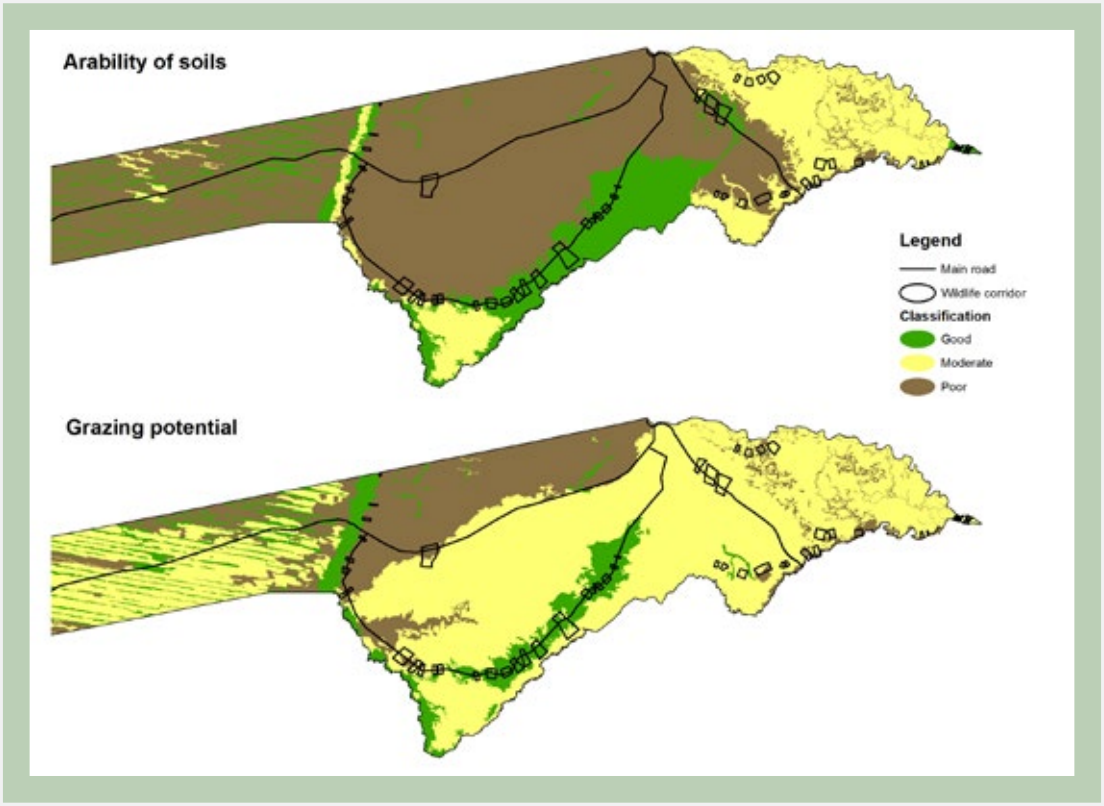


Map 31: Land type/vegetation units and local level wildlife corridors in the Zambezi Region

The Zambezi Region is characterized by the sand dunes of the Kalahari Basin. Soils consist of varying amounts of sand and clay having different textures ranging from heavy soils with a high content of clay in areas which regularly flood, and which hold water for long periods, to pure sands that do not hold moisture for long. The areas that flood seasonally are shown in blue in the map above and give an idea of the scale of land that becomes unavailable for cropping and settlement for large parts of the year.

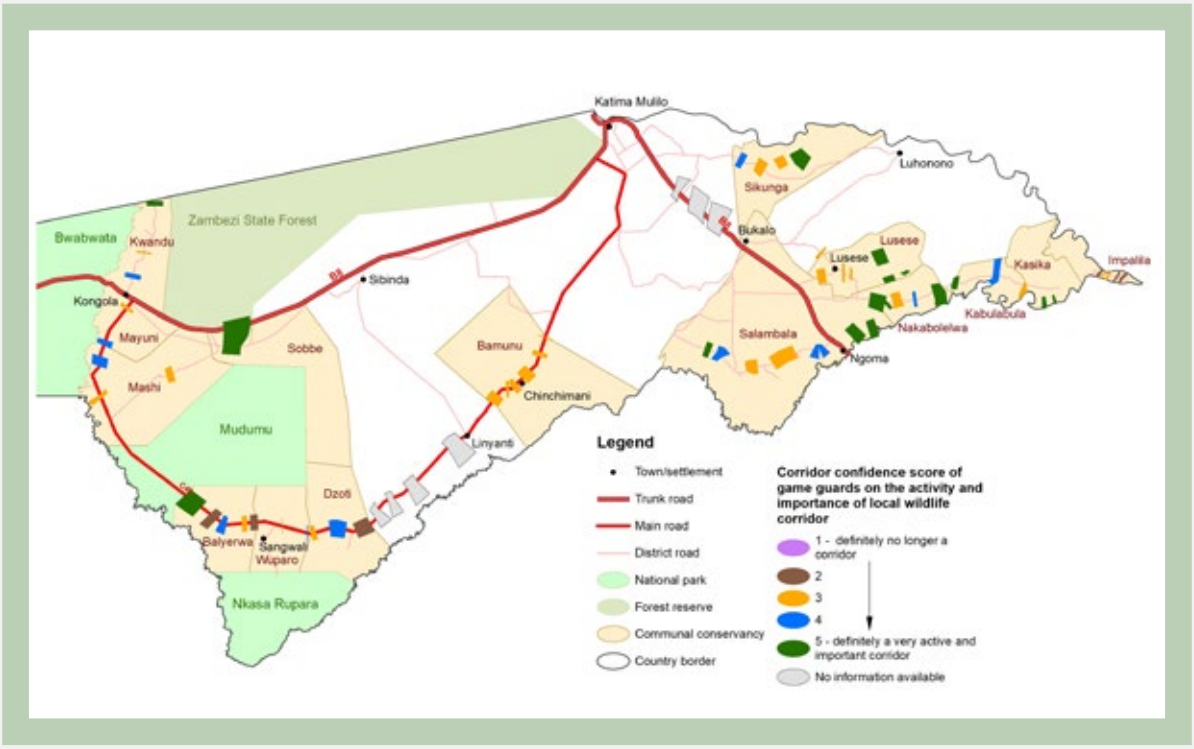
Most of the corridors in the eastern floodplain are predominantly in grasslands that flood annually, whilst the ones along the Kongola-Linyanti road adjoin or partly overlap with floodplains.

Between these two extremes of sand and clay soils are a range of intermediate soils (loams, clay-loams, sandy clays) that are best suited to cultivating crops as they retain water to some degree and have fairly high levels of nutrients (Mendelsohn & Roberts, 1997). The Zambezi Region is mainly dominated by clay-loam soils and Kalahari Sands. These soils are called arenosols and are extremely poor in nutrients as water drains through the sandy texture easily and little water is held in the surface layers where most plants have their roots. Fluvisols are found along the larger river courses and have relatively nutrient-rich soils for crop cultivation (Mendelsohn, 2006). Regrettably, this is also the low-lying areas, which flood annually, leaving areas flooded for up to 6 months.



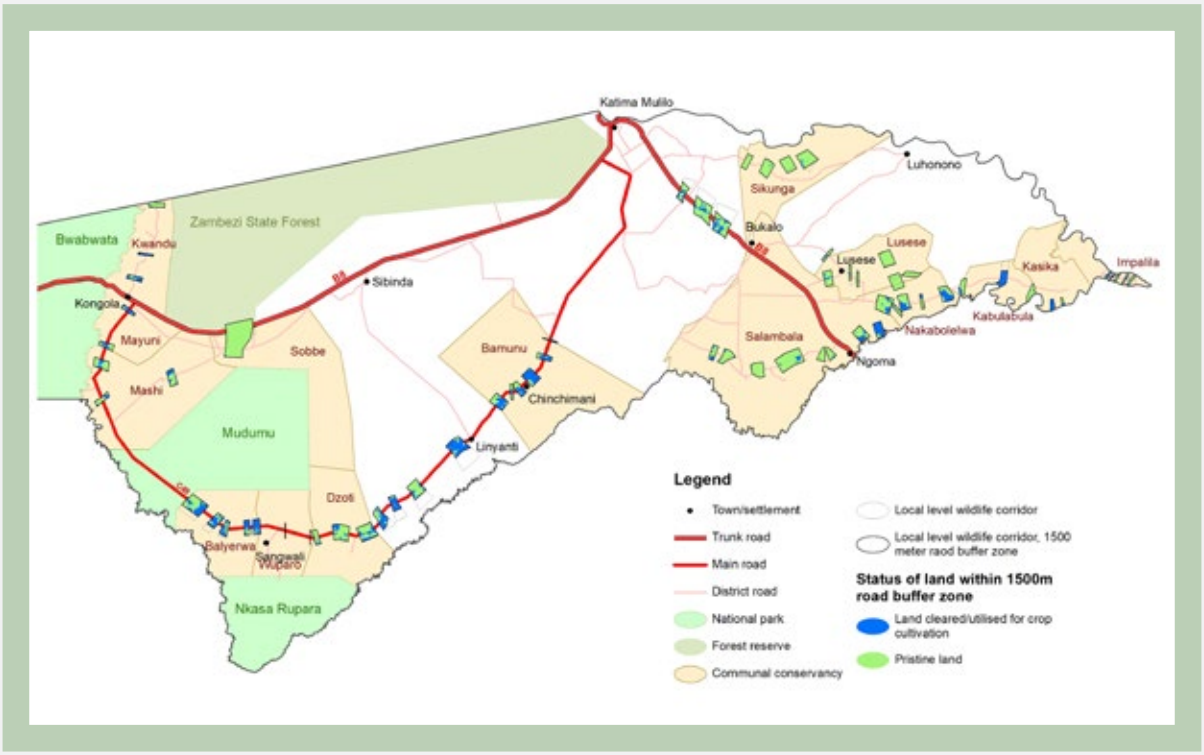
Map 32: Level of soil arability and grazing potential in local level wildlife corridors and the broader Zambezi Region

Most of the soils in the region are considered to be poor, leaving small tracts of arable land. In turn, despite the immense expansion of cattle numbers, especially along the Kwando and Zambezi-Chobe Rivers and their floodplains, the grazing potential in the region is mostly poor. With close to one third of the region being flooded for part of the year, and low soil arability and grazing potential, despite many references to Zambezi as the potential "bread basket" of Namibia, commercial agriculture if considered, need to be properly planned in with the existing wildlife corridors and suitability of the soil. Wildlife, on the other hand, presents an economic opportunity for the region.



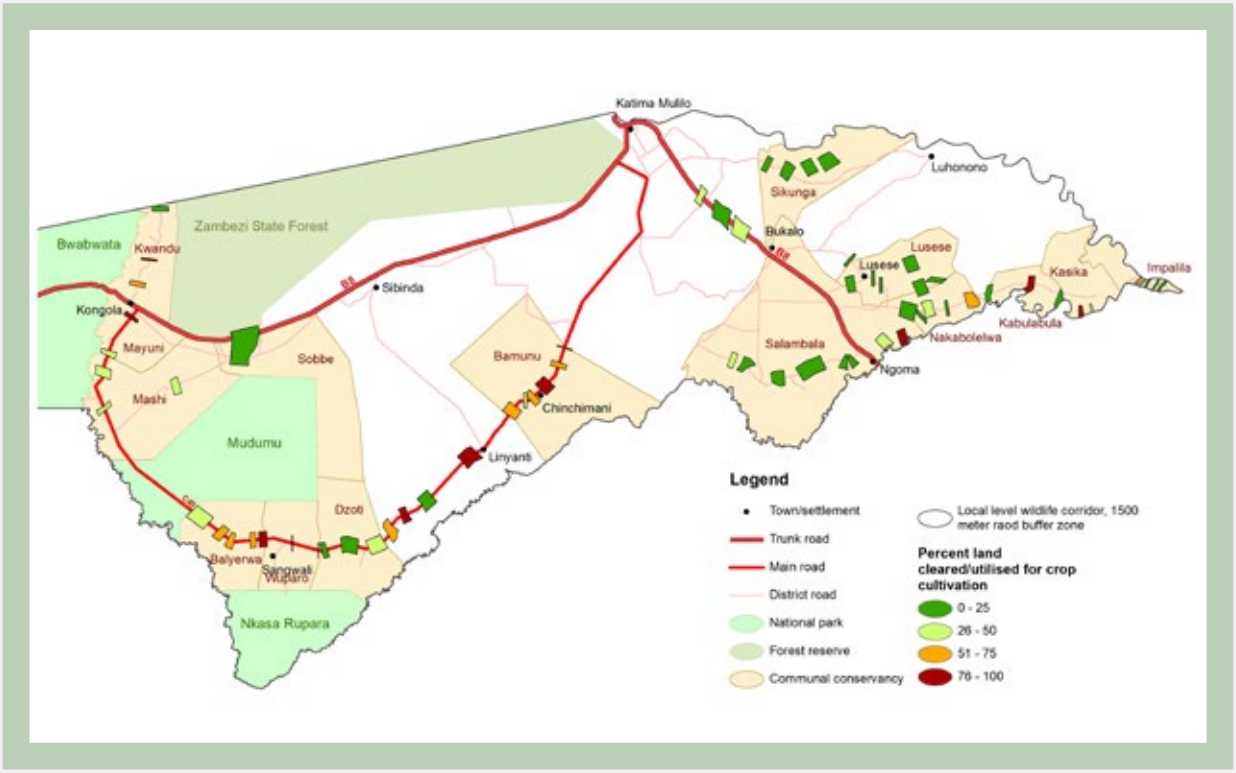
Map 33: Corridor confidence score of game guards on the activity and importance of local corridors

The set of maps below were developed by digitising all of the converted land in the corridors (comparing a dataset of topographical maps of cleared land from 1996 overlaid and compared with the most current google map images of these corridors. The first map shows land that has been cleared for cropping and pristine land inside local level corridors. It is evident that there has been an extensive level of land cleared in corridors along the "ribbon development" that straddles the tar roads.



Map 34: Land cleared for cropping and pristine land inside local level corridors

The map below shows the percentage of land in local level corridors that has been cleared or utilized for crop cultivation. The land along the eastern portion of the Kongola-Linyanti tar road has the highest percentage level of land cleared or utilized for cropping, along with some smaller corridors in the eastern floodplain.

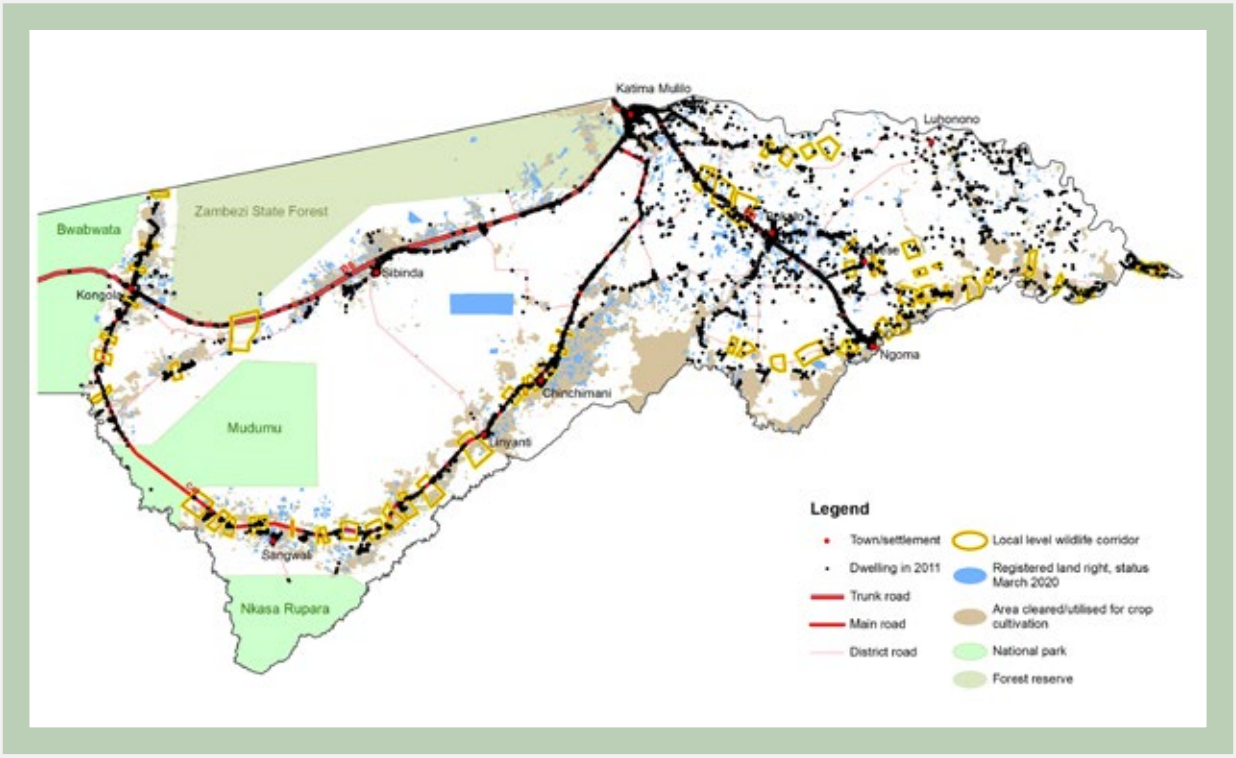


Map 35: Percentage of land cleared/utilized for crop cultivation in local level corridors

Altogether, the maps indicate that there is a moderate level of encroachment in corridors, with varying levels of fields being cleared and corridors being used for cropping.

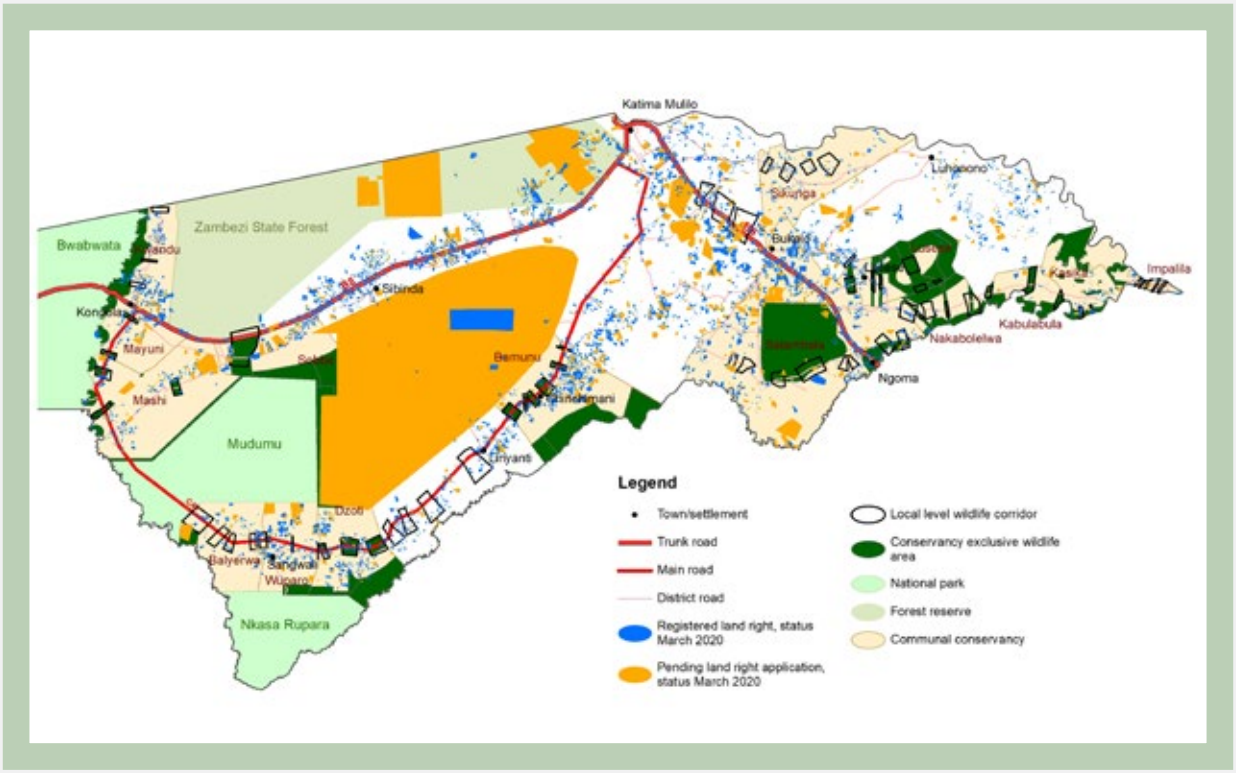
5.3 Status of land

The three maps below show land allocations together with the corridors. The maps describe three categories: Approved rights, pending applications, and "no entry" in the records. The land parcels for which there is no information on the status are labelled "no entry" by the MAWLR Land Cadastre.

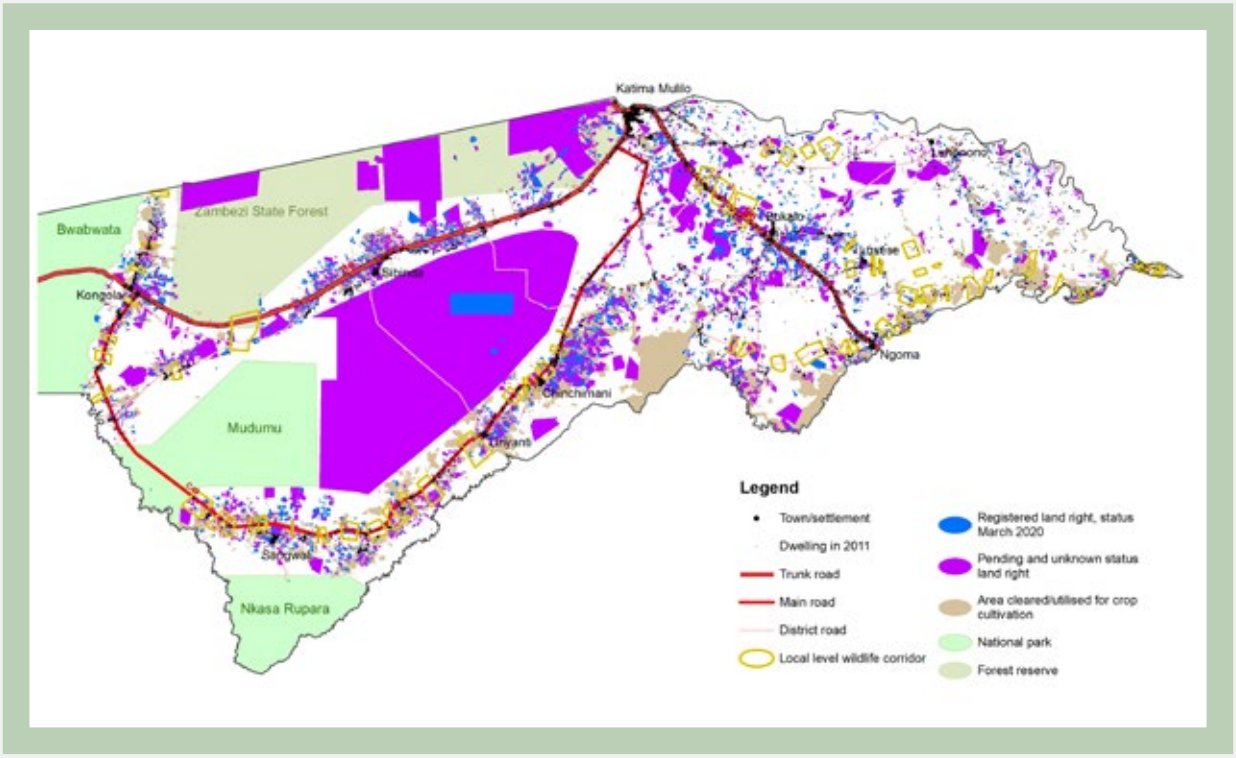


Map 36: Registered land rights (status March 2020), areas cleared for cropping and local level corridors

Most corridors contain areas that have been cleared or utilized for crop cultivation. It might be that these include fields that are no longer in permanent use. There are registered land rights in most of the corridors.



Map 37: Registered and pending land right applications (status March 2020) and local level corridors



Map 38: Registered and pending/unknown status land rights, areas cleared for cropping and local level corridors (Note the high number of parcels for which there is no available information on the status)

6. Threats and opportunities

6.1 Threats and challenges

Registration of Customary Land Rights and Rights of Leasehold

Registration of Customary Land Rights is likely to pose an increasing threat to wildlife corridors and Exclusive Wildlife Zones. The mapping of existing Customary Land Rights in Dzoti Conservancy in the past indicates the extent to which Customary Land Rights have been registered in the conservancy's three corridors and how further allocation of land could close these corridors to wildlife. The registration of customary rights also potentially threatens community grazing areas. Rights provided under customary rights are exclusive and allow the customary land right holder to exclude other persons or land uses – including traversing, tourism and hunting, which could have a major impact on wildlife related activities. Compounding this is the Rights of Leasehold applications (many still pending approval) that have been applied for in the region, presumably for agricultural purposes.

The extent of registration of customary rights in conservancies should be monitored and grazing commonage identified and recorded in the GMUPs for each conservancy. It is also important to seek other opportunities for securing the livestock/wildlife commonage.

Essentially there is very little land in the Zambezi region that does not belong to someone, even if it is not always utilized and settled. The situation is complicated by the flood regime in the region which leads to people having floodplain land and upper land. In prolonged dry periods people may stay for several years on the lower land, but when the flood comes, they will retreat to the upper land. Further the government is encouraging people to move away from the floodplains permanently.

In Salambala Conservancy, people are clustered in villages but they have one commonage where no-one can build a farm or have a home. However, the grazing area is also someone's land, so it is not that land is set aside for grazing, but people allow others to graze on an agreed area.

In Dzoti most people have registered customary rights north of the tarred road. If the land is not fenced, then people allow someone else to graze there. But residents are starting to prevent others from grazing on their land.

In Kwando there are areas specifically set aside for grazing which apparently do not belong to anyone.

There are therefore different circumstances in different parts of the region so any attempts to keep grazing areas and land for wildlife available need to be tailored to the local "ownership" and grazing systems. It does seem that in some areas there is not an area specifically set aside as "commonage" as envisaged by the Communal Land Reform Act.

The extent to which registration of Customary Land Rights affects corridors depends to a large extent on how TAs and Communal Land Board react to land applications in corridors.

Linear development

"Ribbon" or linear development along roads is another challenge for maintaining wildlife corridors. The corridors identified by conservancies in their zonation plans are often "pinch points" along roads where wildlife moves through gaps in settlement. However, people are moving to the roads for better access to transport, communications and water, particularly where there are pipelines which tend to follow the road system. Schools, clinics, shops and shebeens all tend to be built close to the roads. Suggestions have been made in the past to encourage "cluster" development rather than "ribbon" development in the region. However, this requires coordination with other ministries, the regional council and agencies such as NamWater.

Few benefits to members

The lack of benefits reaching conservancy members is increasingly leading to negative attitudes towards conservancies and wildlife corridors. The lack of benefits to members is partly because most conservancies do not allocate sufficient funds for benefits and most income is swallowed by operational costs. This has been an ongoing issue over several years and methodologies for improved benefit distribution are being worked on. MEFT has issued guidelines that conservancies should use at least 50% of their income for benefits.

In addition to this, a decline in trophy size and reduced trophy hunting quotas, particularly of elephants has been experienced. This reduces income to conservancies, and particularly affects those with little tourism income. The declining income from trophy hunting indicates a need for further diversification of conservancy income, particularly from other forms of tourism. There is potential for this particularly along the eastern floodplains.

The following steps have been identified to address the issues regarding benefits:

1. Improve member engagement through awareness creation, women and youth programmes
2. Encourage conservancies to improve the ratio of benefit spending to operational costs
3. Diversify conservancy tourism income
4. Identify those conservancies that can increase tourism income and support them to develop tourism products in order to increase benefits as incentives for members to support conservation including the maintenance of corridors (e.g. there are three lodge sites identified in Nakobolelwa, Salambala has potential for further lodge development, Lusese is reported to have tourism potential in some areas, and although Sobbe does not have river frontage there could be the possibility of tourism based on game viewing at wildlife water points).
5. Expand the Wildlife Credits Scheme to other conservancies, linked to corridor maintenance.

6.2 Opportunities

Reduction of HWC

The location of the Zambezi Region with PAs both inside and around the region means that there will inevitably be wildlife moving through the region. The maintenance of wildlife corridors allows the wildlife to move undisturbed between PAs and areas that are more densely populated and where there are crop fields. This helps to reduce HWC.

Integrated Natural Resource Management

The nature of corridor issues requires a holistic approach at conservancy level, addressing governance, benefits, HWC, and appropriate cropping and range management methods. This has been achieved to some extent in Dzoti Conservancy, but not really to the same level elsewhere. There are opportunities to carry out a similar approach in other conservancies, but this will require more funding and the requisite human resources.

Building the wildlife economy; tourism, hunting, PES/Wildlife credits

Hunting and tourism underpin the Zambezi Region's economy and bring in income and jobs. However, for the Zambezi to remain a competitive tourism destination, and indeed to expand and diversify its natural economy, it needs to maintain its tourism product, i.e. wildlife and open landscapes (and not linear towns along roads).

Although the PES/wildlife credits approach can help to reinforce the commitment of people to maintaining wildlife corridors, the following concerns can be identified:

1. The wildlife credits payments should not become the driver of corridor maintenance, particularly if sustained payments over a long period of time cannot be secured.
2. There are examples of PES schemes where funding was obtained for a few years only and when payments stopped the associated conservation activities stopped.
3. The monitoring of performance needs to be kept as simple and low cost as possible.

Support game guards in key non-conservancy wildlife movement areas

Game guards have been established in non-conservancy areas important for wildlife movements such as around Lake Liambezi and in the State Forest Reserve. This programme should be continued and expanded as appropriate, (e.g. potentially in the non-conservancy areas between Lusese and Sikunga Conservancies).

National Parks and Wildlife Conservation

National Parks continue to play an important role in conserving our wildlife, important habitats and landscapes, and they are visited by large numbers of tourists each year. There are three National Parks in the Zambezi Region, namely: Bwabwata, Mudumu and Nkasa Rupara National Parks. These renowned national parks are key tourism draw cards in Namibia. Tourists are keen to discover best kept secrets, which include National Parks. These parks have continue to bring in maximum yields for the country as they offer new areas and routes for tourists to explore, generating new tourism product packages. Such tourism opportunities are linked to community tourism concessions in National Parks.

7. Strategies and Key Interventions

7.1 Designation of corridors

Provide support to communities to analyze game count and telemetry data to provide more data points to guide the delineation of corridors. Subsequently, further support would be required to facilitate meetings to review corridor designation with a broader set of local stakeholders, and if there is buy in, to develop a set of rules and guidelines for the corridor and consider options to secure the land.

7.2 Approach to incorporate corridors in conservancy GMUPs and zonation plans

GMUPs are an important process that can help to improve conservancy zonation in a bottom up way with community and traditional authority involvement. GMUPs including the zonation plans are to be reviewed after five years and corridor issues to be addressed through a locally consultative process.

Reviewing and revising GMUPs provides a chance to review the changed situation regarding corridors in the conservancies and carry out new zonation reflecting changes on the ground. It presents an opportunity for management committees, Ministries, TAs and conservancy members to revisit the need for corridors, as well as commonage, and to discuss how to maintain them. There is a need to revise corridor boundaries and exclude areas that no longer function as corridors and ensure zonation by neighbouring conservancies is appropriately congruent.

The GMUPs promote the use of a CGG local wildlife monitoring system (known as the Event Book) which has been adapted and developed specially for corridors. Corridor guidelines and rules to be included in the system. The system makes provision for insertion of information by CGGs about their patrols in the corridors, wildlife introductions, monitoring of re-introduced wildlife, game viewing and poaching, etc. For the longer term, a monthly game guard monitoring system will be required to assess the state of each of the corridors. This would mean that the game guards would visit each corridor and make an assessment by filling in an event card in their Event Book.

Conservancy constitutions should therefore include the governance and management of wildlife corridors, if wildlife corridors occur in that conservancy.

7.3 Awareness, visibility and marking of corridors

In order to maintain and manage wildlife corridors efficiently and effectively, there is a need to conduct awareness and educate the communities, farmers and the general public on the existence of such wildlife corridors. It is also necessary to provide information on species movement routes in order to help the public understand how best to avoid encroachment and human wildlife conflict.

There is also a need to engage other stakeholders such as the traditional authorities, NGOs, and line Ministries on how best to maintain and manage wildlife corridors. Traditional authorities should provide the knowledge to communities on the existence, management and maintenance of wildlife corridors. A forum for traditional authorities on the maintenance and management of wildlife corridors could be established.

All wildlife corridors to be marked and sign boards provided at boundaries and other parts of the corridors. Sign boards should give more information to local community and travelers and set the radius (distance) to the wildlife corridor, and describe which activities are permissible in the corridor. This would help to raise awareness of the people who are already living close to the corridor.

Speed limit sign boards and speed bumps in the corridors would encourage drivers to reduce speed and would reduce the risk of animals being hit by vehicles (applicable particularly to wild dogs, buffaloes and elephants in the Kwandu Core Area of Bwabwata NP).

7.4 Guidelines and rules for corridors

Guidelines and rules for corridors can vary from area to area. Annex 1 provides the general guidelines and rules for wildlife corridors that can be implemented through conservancy by laws and/or wildlife legislation.

7.5 Legal options for securing corridors

Communal land rights in Namibia are a relatively recent development. There is a need in deciding which approach to take for different corridors, and then taking immediate actions to test ways that land could be secured for corridors.

Below is a description of the different land tenure options relevant to wildlife corridors:

- **Reserving land for commonage**
  Section 24 (4) (c) (iii) of the Communal Land Reform Act of 2002 provides that the Communal Land Board must veto an application for a Customary Land Right if "the right has been allocated in respect of land which is reserved for common usage or any other purpose in the public interest". It is possible that a wildlife core area or corridor zoned by conservancies could be deemed to be reserved for common usage or in the public interest.

In order to make use of this provision a conservancy and TA would need to identify areas reserved for common usage or for the public interest, including wildlife corridors, and inform the land board of this in writing. This is also a way of protecting grazing land. There is no legal framework to declare commonage – but it would be a way of recognizing that an area is set aside for a specific use.

- **Occupational Land Right**
  Section 36 A of the Communal Land Reform Amendment Act, 2013 (Act No. 13 of 2013) provides that Occupational Land Rights may be granted to government ministries, churches or other institutions for the "provision of public services" for non-profit making activities and "community projects", as long as the TA has given consent, and that it doesn't interfere with, or curtail access to the commonage by members of the community. Occupational Land Rights cannot be granted on a portion of land already classified as a Customary Land Right unless the holder of the Customary Land Right is willing to relinquish such rights.

  The Occupational Land Rights that are situated partly or wholly in a conservancy must consider, and may not defeat, the conservancy's management and utilization plans. Occupational Land Rights may be granted for any period as agreed by the Minister responsible for Land Reform and the Communal Land Board though the Minister's direct approval is required for Occupational Land Rights granted for a period exceeding ten years. There appears to be no limit on the size of land under an Occupational Land Right.

  The only conceptual difference between a Right of Leasehold and Occupational Land Right is that the intent of leaseholds is for commercial purposes (though legally it could also be for non-commercial purpose) whereas occupational land rights are intended for non-commercial use.

  Occupational Land Rights appear to be the most secure mechanism among the options currently available to conservancies to maintain local-level wildlife corridors.

- **Right of Leasehold**
  Section 5. of the Communal Land Reform Amendment Act, 2013 (Act No. 13 of 2013), provides that "a right of leasehold may be granted to a community-based organization and such organization may sublease to an investor". The Amendment Act states that "'community-based organization" means an organization, group, trust, foundation or a body established by or for a community and having its aims and objectives to serve and benefit the community." Although this amendment was intended mainly to allow conservancies to obtain leases over the land used for tourism lodges, it is possible for a conservancy to apply for a lease hold over a core wildlife area or corridor. The conservancy would need to specify that the lease would be for wildlife management and/or tourism. The Communal Land Board would set a leasehold fee (which technically could be zero N$). As with Occupational Land Rights, a Right of Leasehold situated partly or wholly in a conservancy must consider, and may not defeat, the conservancy's management and utilization plans.

  It should be noted that under the Communal Land Reform Act, rights may not overlap. This means that a Right of Leasehold (or Occupational Land Right) will not be approved for land that is already held under a customary right or a pre-existing lease. However, customary rights can be "nested" within a lease or Occupational Land Right.

- **Group rights**
  The need for **group tenure** is described in the **National Land Policy (1998)** and the **National Land Tenure Policy (2008)**, and intentions to increase *de jure* land rights over commonages is further expressed in **Section 17 (1) of the Communal Land Reform Act of 2002**. "Group land holdings" titled Rural Land Management Areas (RLMA) were proposed in a policy review by the Communal Land Support sub-activity of the Millenium Challenge Account in 2011 as a mechanism for conservancies or community forests to legally hold land rights to commonage areas, though there was sensitivity to establish new institutions with powers over land. The recommendations from this report were not implemented, but have somewhat been revived with some work underway in the MAWLR currently to develop a simple approach for communities in Kavango East and West, Omaheke and Kunene Regions to secure land rights (communities in these four regions refused to apply for customary land rights as they feared that this would lead to the loss of their "commonage"). It will take some time but eventually regulations will be drafted for the Communal Land Reform Act of 2002 which will be taken over by the Land Act and tested, with the aim that these regulations would make it easier for groups to register land (Piers Vigne, pers. comm. 11.03.2020).

- **New Wildlife and Protected Area Management legislation**
  New legislation for Wildlife and Protected Areas Management legislation is being developed. The legislation contains a section enabling the Minister to declare a protected area as a site or landscape of special conservation or scientific importance with the following objectives:

  > to conserve a site or landscape which contains one or more specific natural features or species which are of outstanding or unique value because of their inherent rarity, representative or aesthetic qualities;
  >
  > to protect a site or landscape where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological or cultural values.

Another provision of the legislation provides for a protected area to be managed by the Minister on behalf of the State *or by a suitable entity contracted by the Minister to manage the area* in terms of the prescribed management requirements and conditions and management agreement entered into by the parties.

If these provisions are retained in the Act that is approved, then they could be used to enable the declaration of corridors in conservancies as sites or landscapes of special conservation or scientific importance. Any such approach would depend on the consent of the relevant communities and TAs. It would also require a guarantee that the land in question would not remove existing rights to the land.

7.6 Human Wildlife Conflict Management

Addressing human-wildlife conflict requires striking a balance between conservation priorities and the needs of people who live with wildlife. In order to provide a win-win situation for the maintence of corridors and mitigating human wildlife conflict for communities neighbouring these corridors, it is necessary that a variety of approaches are implemented in order to manage the conflict efficiently and effectively, in line with the strategies set out in the Revised National Policy on Human Wildlife Conflict Management. These include prevention strategies which endeavor to avoid the conflict occurring in the first place and take action towards addressing its roots causes, and protection strategies that are implemented when

the conflict is certain to happen or has already occurred, as well as mitigation strategies that attempt to reduce the level of impact and lessen the problem.

The following technical solutions for mitigating human wildlife conflict should be implemented in affected areas:

- Lion proof kraals used at night
- Mobile kraals
- Herding of cattle
- Early warning system
- Rapid response unit
- Crocodile fences
- Guarding fields
- Elephant proof walls around water installations
- Trenches around water installations
- Elephant block barriers
- Alternative water for elephants at a distance from homesteads
- Wire with tins around crop fields
- Use of chili
- Any other mitigation measure that may be applicable.

External support to communities should be provided, and a specific human wildlife conflict action plan should be developed for Zambezi Region or specific species for easy implementation.

7.6 Wildlife economy, benefits and support to communities

Wildlife corridors represent engines for economic development and business opportunities for communities. Payments for Ecosystem Services or Wildlife Credits provide opportunities to boost conservancy income directly related to conservation effort. There are two such schemes currently in Zambezi Region - payment to Sobbe Conservancy linked to the corridor and payment to Wuparo linked to addressing HWC. There are several different options for such payments including payments to individuals or payments to communities through the conservancies. Payments could go to individuals that have registered customary rights over a piece of land if he/she sets aside the land, i.e. does not use it for settlement, farming or commercial use. Payments could also go to the conservancy which could use the income to specifically benefit people affected by the corridors or all conservancy members or for its own conservation costs of maintaining corridors or a combination of these.

With regard to corridors where people have customary rights within the corridor, a one-off payment could be made to people willing to move out of the corridor in order to cover their relocation costs (housing, fencing, etc.) along with a PES payment to the conservancy which would be used to benefit all members. The PES payment to the conservancy should be ring-fenced for community benefit. This approach has the advantage of simplicity, of not treating some conservancy members differently to others, and it removes the need to specifically identify which individuals qualify for payments.

In order to have improved livelihood for people within wildlife corridors, the following are some of the income generating projects that should be established and implemented in wildlife corridors or for communities that have relocated from wildlife corridors:

- Establishment of fish reserve
- Establishment of community aquaculture / fishpond projects
- Establishment of aqua feed project
- Establishment of skin tanning project (use of vegetable products)
- Establishment of leatherwork project
- Establishment of Community Based Value addition and processing of agropastoral and wildlife products – Processing of beef and venison (yields from rangeland and legal wildlife offtake)
- Establishment of bakery
- Establishment of crocodile farm(s)
- Production, sale and distribution of tree seedlings

MEFT to raise funds and have an action plan for each wildlife corridor, for implementation of community benefits in conjunction with line Ministries, conservancies, Regional Council and traditional authorities.

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Annex 1: General guidelines and rules for wildlife corridors that can be implemented in specific wildlife corridors

1. No new settlement or villages allowed
2. No new crop fields allowed or an extension of a crop field towards the corridor
3. No hunting in wildlife corridors or hunting should be under the supervision of the conservancy game guards or a staff member of the MEFT
4. No livestock grazing in the wildlife corridor and if any livestock is killed in this area there will be no form of offset to the affected farmer or community member
5. No offset payment to crop fields that are not protected by the owner
6. No harvesting of poles in the wildlife corridors
7. No fencing in wildlife corridors
8. No disturbance of wildlife in corridors
9. Fishing is allowed in corridors, but no fishing camps may be erected
10. No dogs allowed in wildlife corridors
11. Only controlled burning allowed in corridors at designated burning time
12. No harvesting of reeds and grass is allowed in corridors without permit from the relevant authority

Annex 2: Implementation Action Plan (2021 to 2025)

	Strategies and Key Interventions	Activities/Tasks	Baseline	Possible Indicator(s)	Lead Agency	Supporting Partners	Timeframe	Cost N$
1.	**Designation of corridors in conservancies**	Support delineation of corridors	Game counts and telemetry data conducted and available	Clear map with GPS coordinates and size	MEFT Conservancies	IRDNC WWF Regional Council Traditional Authority	Y1 Y2	5,000,000
		Hold stakeholder meetings to review corridor designation	Community structures exist	Set of rules and guidelines for corridor developed and agreed	MEFT Conservancies	IRDNC WWF Regional Council Traditional Authority	Y1 Y2	500,000
2.	**Approach to incorporate corridors in conservancy GMUPs and zonation plans**	Review and revise GMUPs	GMUPs exists	New zonation of corridors incorporated in revised GMUPs	MEFT Conservancies	IRDNC WWF Regional Council Traditional Authority	Y1	2,000,000
		Promote the use of the local wildlife monitoring system (Event Book System)	Local monitoring system exists	Information gathered through patrols in corridors entered in Event Book System	Conservancies	MEFT IRDNC WWF	Y1 Y2 Y3 Y4 Y5	5,000,000
3.	**Visibility and marking of corridors**	Develop awareness materials of the corridors	Information on each corridor exists	Brochures and booklets produced and translated in local language	MEFT	IRDNC WWF KAZA TFCA Secretariat	Y1	10,000,000
		Provide sign boards, speed bumps and marking of corridors	Rough boundaries are known	Sign boards erected	MEFT	Roads Authority IRDNC WWF KAZA TFCA Secretariat	Y1 Y2	5,000,000
4.	**Guidelines and rules for corridors**	Develop Regulations for wildlife corridors as part of the Regulations to the Wildlife and Protected Areas Management Bill	Wildlife corridors provided for in the new wildlife legislation (Wildlife and Protected Areas Management Bill)	Regulations gazetted	MEFT	MoJ AG NACSO partners	Y1	50,000
5.	**Legal options for securing corridors**	Promulgate the Wildlife and Protected Areas Management Bill	Bill approved by Cabinet and with Cabinet Committee on Legislation	Bill enacted	MEFT	MoJ AG	Y1	-

	Strategies and Key Interventions	Activities/Tasks	Baseline	Possible Indicator(s)	Lead Agency	Supporting Partners	Timeframe	Cost N$
		Identify wildlife corridors to be registered and gazetted, and begin process to register	All wildlife corridors are known	At least three wildlife corridors registered in year two	MEFT	Regional Council Traditional Authorities Conservancies IRDNC WWF	Y1 Y2 Y3	2,000,000
6.	**Maintenance of corridors and Human wildlife conflict management**	Ensure viable wildlife populations move freely between protected areas through secure corridors that are managed and appreciated by local communities	Wildlife corridors are known	• Community rights to natural resource assessed • Cattle removed from BNP • Veterinary fence removed • Climate change mitigation activities implemented • Etc.	MEFT KAZA TFCA	WWF	Y1 Y2 Y3 Y4	10,000,000
		Ensure that HWC mitigation measures are implemented in affected areas through a plan action	Mitigation measures identified in the Guidelines to implement the Revised National Policy on Human Wildlife Conflict Management	HWC incidents reduced and mitigation measures put in place	MEFT Conservancies	IRDNC WWF	Y1 Y2 Y3 Y4 Y5	50,000,000
7.	**Wildlife economy, benefits and support to communities**	Fully implement the Payment for Ecosystem Services or Wildlife Credits in all conservancies	System implement in Wuparo and Sobbe Conservancies	Payments done to communities through PES/Wildlife Credits	Conservancies	WWF IRDNC MEFT	Y1 Y2 Y3 Y4 Y5	5,000,000
		Conduct hunting and tourism activities in conservancies	Activities already being undertaken in conservancies	Income generated by conservancies from hunting and tourism	Conservancies	MEFT IRDNC WWF	Y1 Y2 Y3 Y4 Y5	1,000,000
		Improve livelihood for people within wildlife corridors, and surrounding areas through establishing income generating projects	None	Atleast ten income generating projects established	MEFT MFMR MAWLR UNAM Conservancies KAZA TFCA	WWF IRDNC	Y1 Y2 Y3 Y4 Y5	20,000,000

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