CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA
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CITES

Thirty-third meeting of the Animals Committee
Geneva (Switzerland), 12 – 19 July 2024

BOTSWANA NATIONAL LEOPARD (*PANTHERA PARDUS*) MANAGEMENT AND ACTION PLAN 2024-2034

This document has been submitted by Botswana in relation to agenda item 38.[*]

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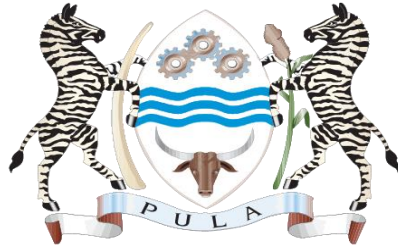
Republic of Botswana

Botswana National Leopard (*Panthera pardus*) Management and Action Plan 2024-2034
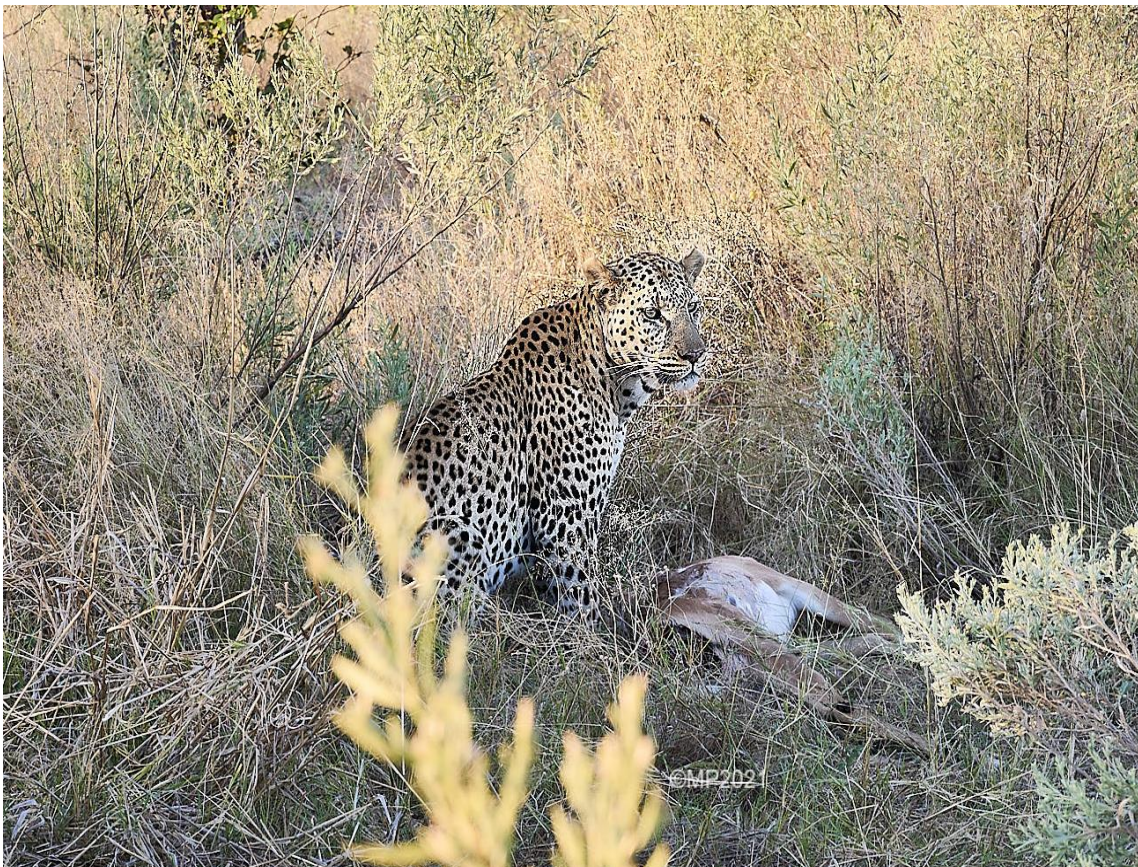
DEPARTMENT OF WILDLIFE & NATIONAL PARKS (DWNP)

Gaborone – July 2024

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Acronyms and Abbreviations

AZ	Agricultural Zone
BCF	Botswana Carnivore Forum
BDF	Botswana Defence Force
BIUST	Botswana International University of Science & Technology
BOGA	Botswana Guides Association
BPS	Botswana Police Service
BTO	Botswana Tourism Organisation
BUAN	Botswana University of Agriculture & Natural Resources
BURS	Botswana Unified Revenue Services
BWPA	Botswana Wildlife Producers Association
BWTI	Botswana Wildlife Training Institute
CBNRM	Community Based Natural Resource Management
CBO	Community Based Organization
CHA	Controlled Hunting Area
CITES	Convention on International Trade in Endangered Species of wild fauna and flora
CSO	Central Statistics Office
CTF	Conservation Trust Fund
CZ	Conservation Zone
DG	Director General of DWNP
DVS	Department of Veterinary Services
DIS	Department of Intelligence Services
DWNP	Department of Wildlife and National Parks
FAO	Food and Agricultural Organization of the United Nations
HATAB	Hospitality and Tourism Association of Botswana
HWC	Human Wildlife Conflict
IUCN	International Union Conservation for Nature
KAZA TFCA	Kavango Zambezi Transfrontier Conservation Area
KTP	Kalahari Transfrontier Park
MET	Ministry of Environment and Tourism
MLWS	Ministry of Land Management, Water and Sanitation Services
MOA	Ministry of Agriculture
NGO	Non-Government Organization
ORI	Okavango Research Institute
PA	Protected Areas
PAC	Problem Animal Control
SADC LEAP	Southern African Development Community Law Enforcement and Anti-Poaching Strategy
TAC	Technical Advisory Committee
TFCA	Transfrontier Conservation Area
UN	United Nations
WMA	Wildlife Management Area
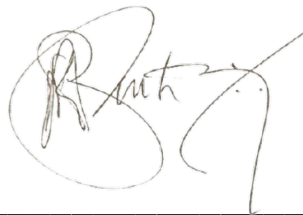
Acknowledgments

Approval

This plan has been reviewed by the Acting Director of the Department of Wildlife and National Parks under the Ministry of Environment and Tourism, Government of Botswana, and approved for implementation.

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Moemi R. Batshabang

Acting Director
Department of Wildlife and National Parks

10 July 2024
Date:_____

1. Introduction and background

1.1. Global Status of the Leopard

The Leopard (*Panthera pardus*) is the most widespread felid species on earth extending across much of Africa and Asia from the Middle East to the Pacific Ocean (Nowell and Jackson 1996).

The International Union for the Conservation of Nature (IUCN) classifies the Leopard as Vulnerable (Stein et al., 2024) indicating that the Leopard meets the A2cd criterion for Vulnerable, mainly due to habitat loss, conflict killing and depletion of their prey base. These causes or drivers of the suspected decline are not well understood. These drivers have not ceased, and are likely to continue, thus future decline is anticipated unless conservation and mitigation efforts are taken. However better knowledge of leopard population is needed before formulation conclusions on its status. Preliminary data suggest that 4,500 - 7,000 leopards are harvested annually as part of the illegal trade in leopard skins for cultural regalia, a practice that is extensive in some countries in Africa (Stein et al., 2016,2024).

The African leopard subspecies (*Panthera pardus pardus*) is the most secured population worldwide with large contiguous populations (Stein et al., 2024), however, even this subspecies appears to show increased population fragmentation (Stein et al.,2024). The up-listing from Near Threatened to Vulnerable (Stein et al., 2016) was due to this supposed increased fragmentation, specifically in West, Central and East Africa.

Due to their extensive geographical range, secretive nature and adaptability, leopards are often assumed to be present based on indirect measures (habitat structure, prey base, rainfall, etc.) but these metrics do not often account for persecution (Searle et al., 2020). It is therefore essential to evaluate leopard populations on a more fine-scale level to assess their status and manage them sustainably
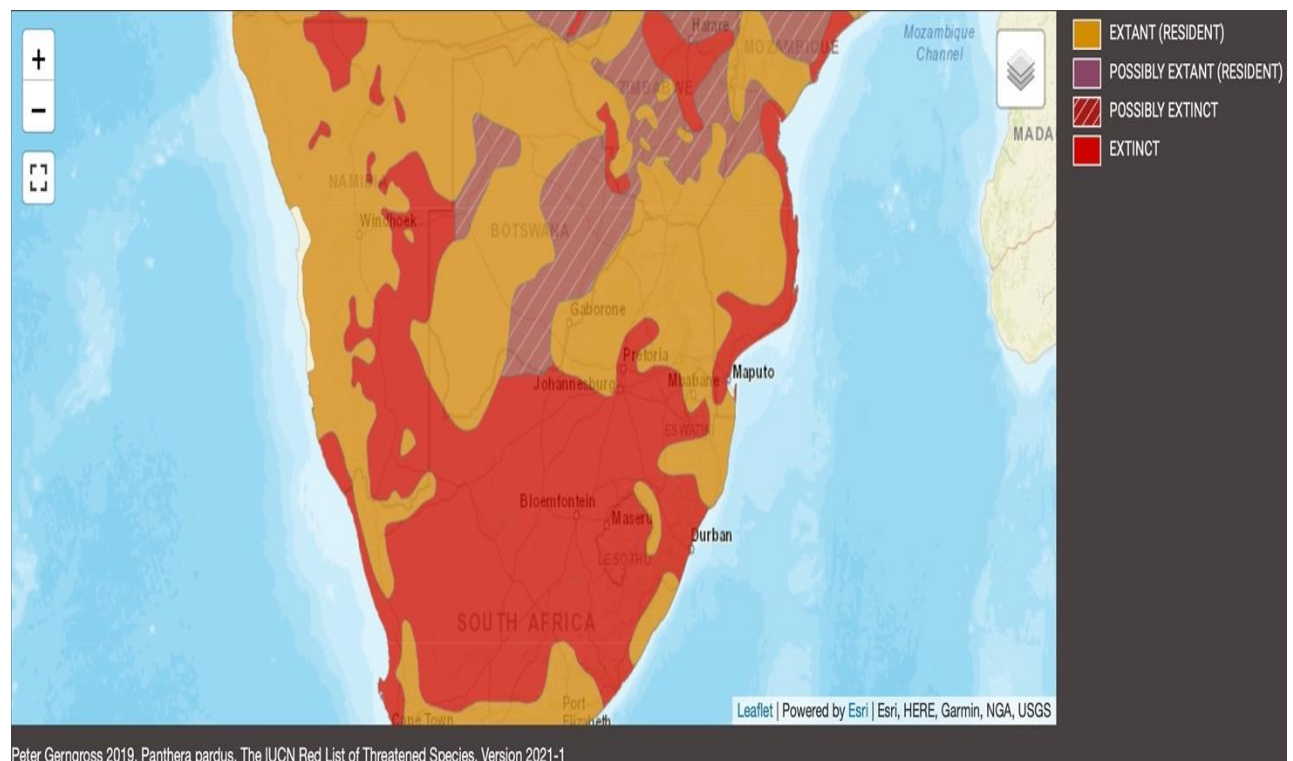

Peter Gerngross 2019. Panthera pardus. The IUCN Red List of Threatened Species. Version 2021-1

Figure 1. The distribution of leopard in part of Southern Africa (from Stein *et al*. 2020)

1.2. Leopard status and range in Botswana

Leopards are widespread throughout Botswana (Van der Weyde et al. 2021), likely covering more than 90% of the country, a far higher percentage than in any other country in the world (Stein et al., 2024; Winterbach et al., 2020).

The 2024 IUCN Red List assessment for leopard (Stein *et al* 2024) corrected in part the distribution of leopard presented in Jacobson *et al*. (2016), by placing "possibly extant" and "possibly extinct" in the same shaded area (Figure 1). However, that may reflect a lack of systematic surveys rather than the real absence of leopards. In fact, in those areas, there is evidence of leopard existence through sightings, camera trap photos, spoor and conflict animal records, although the paucity of data cannot yet ascertain the extent of the range of the species in the country.

Despite their widespread nature, it has been so far challenging to produce reliable country-wide population estimates for this species. This is not surprising due to the cryptical nature of the species, its rather solitary habit, the lack of funding for research and the vastness of its range in the country.

Although reaching substantial densities in areas with a substantial prey base (ex. Strampelli, 2015), leopard can survive even on small rodents and even insects, (Bailey, 1993, Hayward *et al*. 2006, Hunter, 2013) and has been caught on camera on several occasions predating fish in the Okavango Delta.

Taking into account that leopards appear to be very successful at adapting to altered natural habitat and settled environments (Nowell & Jackson 1996), we can conservatively estimate a precautionary leopard range in Botswana of approx. 90% of the 580,000 km^2 of the country, although in variable densities (Winterbach *et al*. 2020). To that extent, the country has leopards even in the outskirts of Gaborone, the capital city of Botswana.

In Botswana leopard estimates are based mainly on extrapolations. For example, in 2005, the Central Statistics Office (CSO 2005) estimated a national leopard population of 5,617 individuals. However, it is unclear what their estimate was based on since there are only 2 recorded wildlife surveys before 2005, both located in Kalahari Transfrontier Park (BCF Winterbach *et al*. 2020. Botswana Government – DWNP 2020).

In 2020, the Botswana Carnivore Forum produced a 'Status of the Leopard *Panthera pardus* in Botswana' report that reviewed data from 99 different wildlife surveys between the years 2000-2020 to generate an extrapolated national estimate of 4,295 (BCF Winterbach *et al*. 2020, Botswana Government – DWNP 2020). This population reduction of 23.5% (1,322 individuals) compared to the CSO 2005 data, is likely not a reflection of a dire population decline, but rather a more robust analysis, yet there is still room for improvement. Also, this estimate cannot be considered a baseline due to the limited coverage and accuracy. In fact, 98% of surveys were conducted with just one methodology without secondary validation. Spoor tracking represented 88% of all surveys, with 9% from camera trapping and 1% from citizen science (Table 1). Spoor tracking was considered a cost-effective method for doing quick population surveys but recent literature on lion and large carnivores in general (Braczkowski et al. 2020, Dröge et al. 2020) suggest that it is not useful to guide management although could be used to determine occupancy rather than density and it should be discarded for population estimates. However, it can be used to ascertain presence/absence. Chapter 4 will describe the monitoring tools that Botswana intends to use in the near future.

Table 1. Methodologies used so far for leopard surveys in Botswana from the year 2000 to 2020- (Winterbach *et al*. 2020)

Method	Number of Surveys	Percentage
Cameratrap	9	9.1
Cameratrap & Prey	2	2.0
Citizen Science	1	1.0
Spoor	87	87.9
Total	99	

The BCF Winterbach *et al*. 2020 report acknowledges that survey distribution was not uniform. In fact, 77.8% of all surveys occurred in the Northern or Southern Conservation Zones, yet the Central, Southern Ghanzi and Kgalagadi Agricultural Zones are large areas where surveys have rarely been conducted (Figure 2 and 3 from BCF Winterbach et al. 2020).
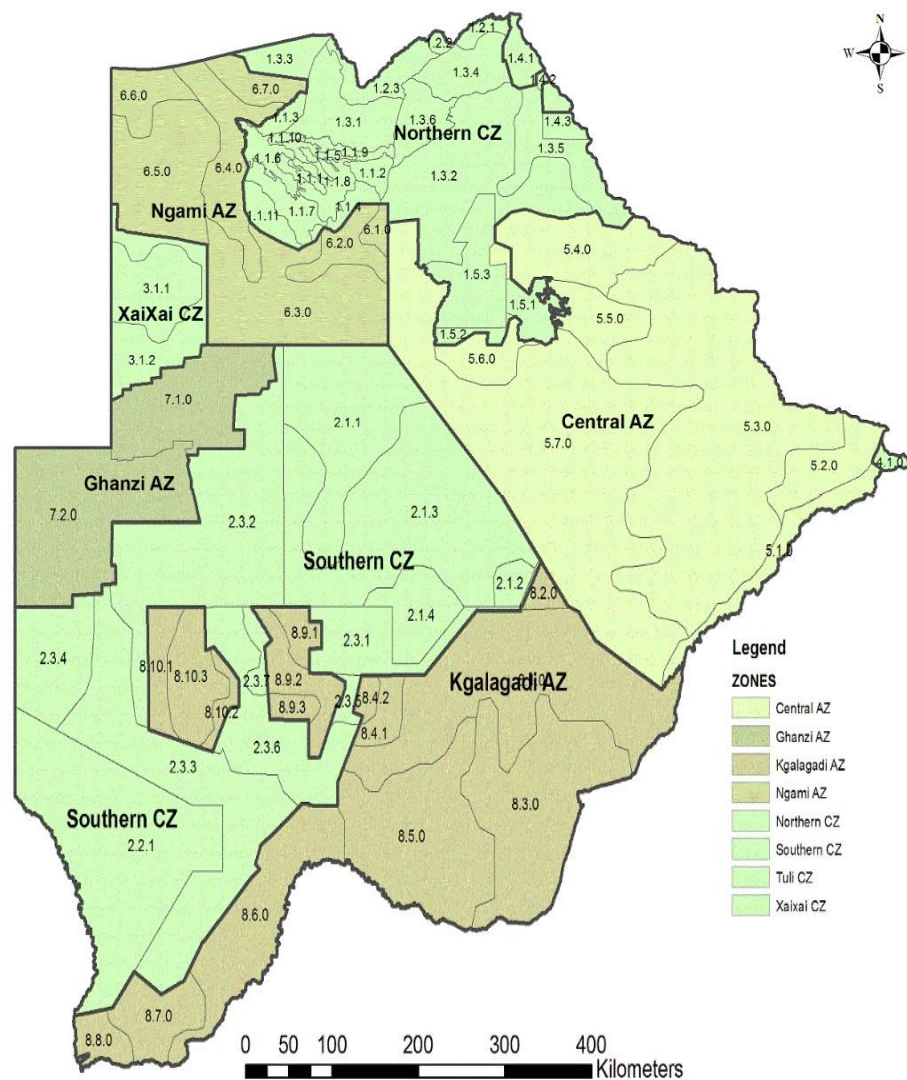
Figure 2. The carnivore stratum map, divides up the landscape by habitat and land-use (BCF Winterbach et al. 2020). Numbers within subzones indicate different habitat strata or 'sub-strata' within each zone. Please refer to BCF Winterbach et al. (2020) to link specific surveys in each sub-strata to the estimated density for that area.

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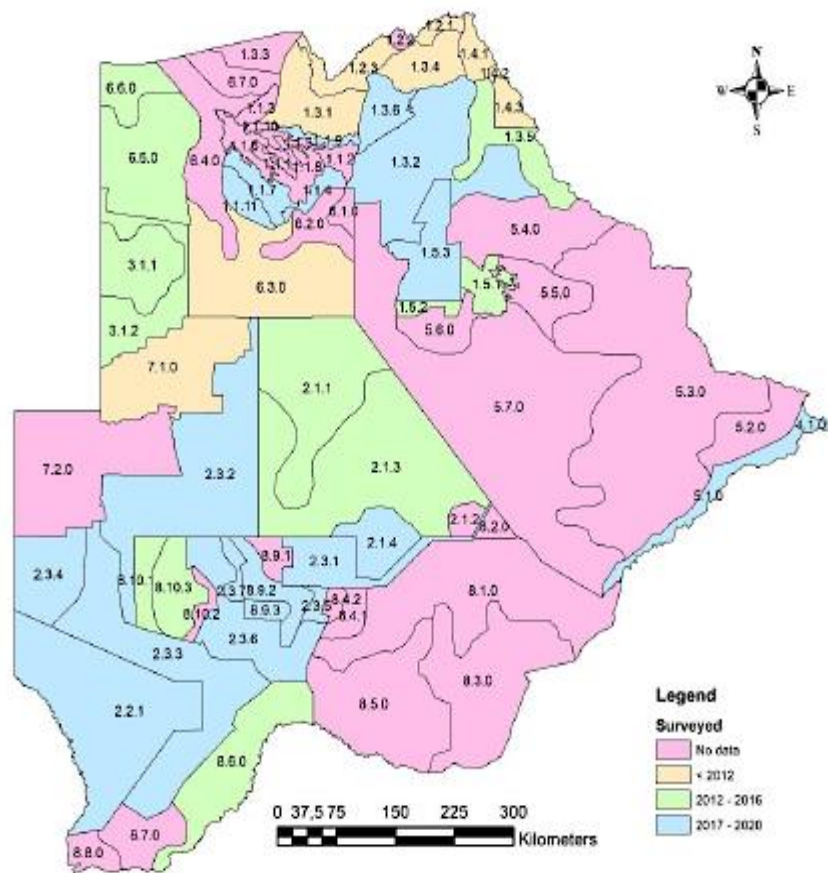
FIGURE 2: DATA COLLECTION HISTORY FOR STRATIFIED LAND USE AREAS.

Figure 3. Large Carnivore surveys, including those focused specifically on leopards, are not evenly distributed across Botswana, with large areas in the East and southern regions with few surveys conducted between 2000-2020. (BCF Winterbach et al. (2020)

Table 2 Large Carnivores survey efforts by District Zones (BCF Winterbach et al. 2020)

Zone	Number of Surveys	Percentage
Central AZ	1	1.0
Ghanzi AZ	7	7.1
Kgalagadi AZ	6	6.1
Ngami AZ	3	3.0
Northern CZ	32	32.3
Southern CZ	45	45.5
Tuli CZ	1	1.0
Xaixai CZ	4	4.0
Grand Total	99	

In October 2022, DWNP initiated in collaboration with Texas A&M University Caesar Kleberg Wildlife Research Institute and funding from Safari Club International Foundation (SCIF), a comprehensive survey of leopard in 20 sampling sites of the country representing 4 different land uses: communal areas, private game ranches, protected areas, and wildlife management areas (Figure 4) as the proposed areas to conduct the leopard surveys during the extent of the project.
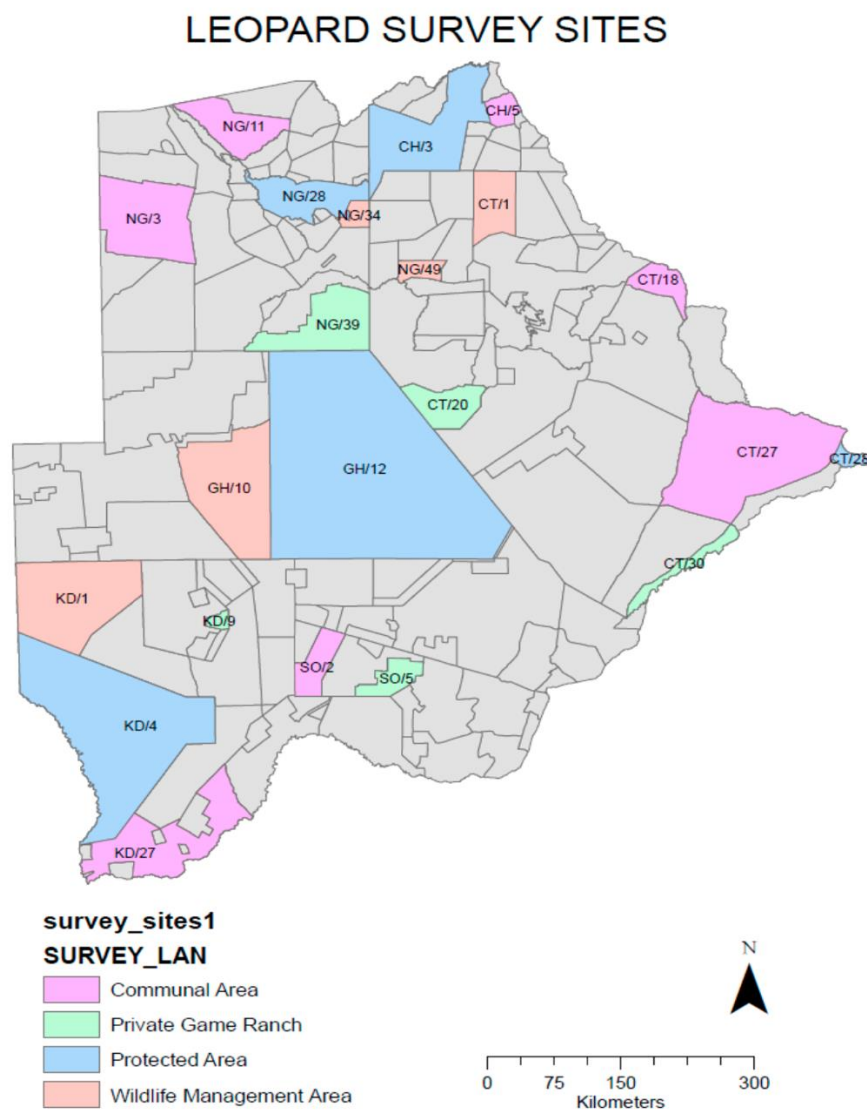
Figure 4. Study areas for leopard surveys categorized by land use type on the ongoing DWNP leopard survey

To estimate density in each study areas spatially explicit capture-recapture (SECR) models are considered more rigorous than non-spatial capture-recapture methods as they consider the locations where each individual was detected. By incorporating location of detections, SECR models remove the need to subjectively calculate the effective sampled area. SECR was implemented in the SECR package within the R statistical package most recent version (R Core Team).

With the purpose of collecting data to estimate leopard density using a SECR model, trail camera surveys were conducted in study sites with different land uses. In each site between 50 and 54 sampling stations were deployed, with 2 trail cameras per station. The location of each camera station was determined by overlaying a grid with 4km-by-4km cells and placed one station (2 cameras) per cell at a location believed to maximize probability of leopard detection but maintaining an average

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distance of 3.5 km between stations. The size of the cell is based on the average home range size of a female leopard from the Tuli Game Reserve (Snider et al. 2021). This indicates that 52 cells with sampling stations would cover approximately 832 km^2, an area equivalent to 13 non- overlapping female home ranges. Thus, an average female home range would contain 4 camera station. Individual leopards were identified by means of their pelage characteristics such as unique spot pattern, scarring, or other marking. The sex of each individual was established by the presence of external genitalia, the size of the dewlap, frontal bossing and the overall size of the individual (Swanepoel et al. 2015).

From the experience of conducting some pilot surveys in 3 study areas it was concluded that from the logistical standpoint, the results from CT/1, CT/20, and Bokamoso (a private reserve in the Ghanzi District) indicate that using a grid with 4km-by-4km cells and 52 station with 2 cameras each, with one station per cell, is a reasonable sampling design for a national leopard survey to estimate abundance of leopards by land use in Botswana. Preliminary results indicate that a sampling period of 8 weeks (56 days) produces detection histories for multiple individuals and several recaptures that are suitable for estimating leopard density using SECR models and that the number of camera stations (n=52), deployed in the
study area at an average distance of 3.5 km between stations, produces relatively precise estimates that could be used for the development of efficient management strategies for leopards in Botswana.

There are 4 surveys scheduled for 2024: April/May, June/July, August/September, and November/December. Figure 5 below shows the areas (red) already sampled since the beginning of the survey in 2022 and the areas (yellow) that will be sampled during 2024.
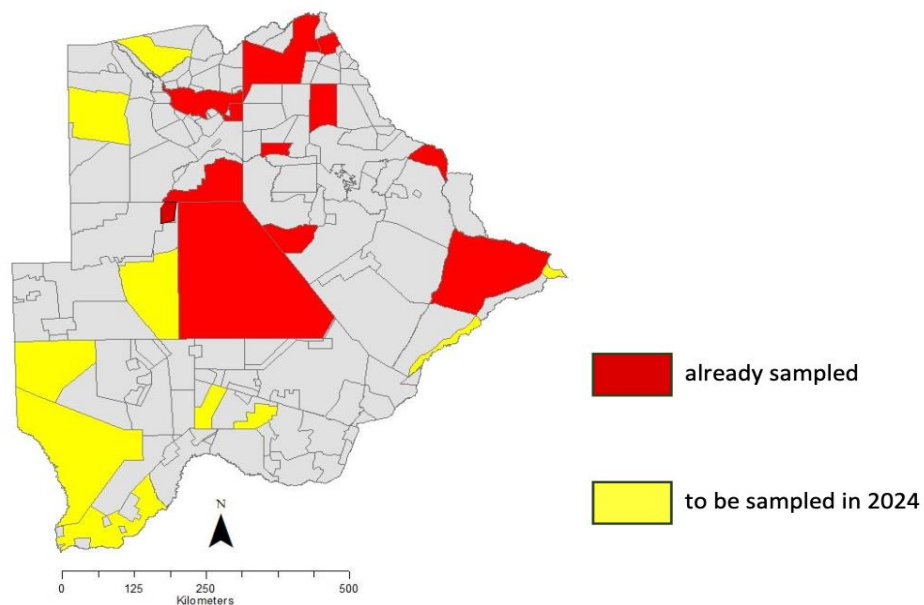

Figure 5: Areas (red) already sampled since the beginning of the survey in 2022 and the areas (yellow) that will be sampled during 2024 in the DWNP/ Texas A&M University/Caesar/SCIF survey.

1.3. Domestic Legislation, Policies and Land Uses related to Leopard Conservation

Wildlife Legislation

The Wildlife Conservation and National Parks Act, first enacted in 1992 (Chapter 38.01, amended in 1993 and revised in 1996, and amended in 2023) – This Act remains key in protecting Botswana's wildlife resources. The law provides for the conservation and management of wildlife through the establishment of protected areas and game farms, it includes schedules to differentiate between protected animals and partially protected animals, and it provides for control in hunting through the issuing of hunting quotas and licenses. The Act also domesticates provisions emanating from CITES. Enforcement of the implementation of the Wildlife Conservation and National Parks Act is achieved through two sets of regulations: (i) National Parks and Game Reserves Regulations of 2000 and (ii) Wildlife Conservation (Hunting and Licensing) Regulations of 2001.

The Wildlife Policy of 2013– This Policy amended the 1986 Wildlife Policy and, based on the Wildlife Conservation and National Parks Act, is intended to guide and support future wildlife conservation and utilization activities. The policy upholds wildlife as a valuable land-use option, confers better protection of wildlife resources, aims to reduce human wildlife conflict, upholds animal welfare and provides incentives for management of wildlife resources by the public.

The management of leopards will be carried out within the context of the Wildlife Policy of 2013 which emphasizes on the devolution of wildlife management to landowners and communities to instill greater accountability for the resource. The Wildlife Policy is a resource and development policy, and therefore needs to be consistent with policies and principles regarding environmental management, development and poverty eradication, decentralization of development efforts, as well as community based natural resource management. The Wildlife Policy contains several guiding principles of relevance to leopard and large carnivores' management, including decentralized and participatory wildlife management, equitable sharing of costs and benefits from wildlife utilization and management, and promotion of community well-being and empowerment, sustainable development based on wildlife resources, and the use of the ecosystem approach to conservation and development.

The management of leopards and large carnivores will also be aligned to national imperatives and priorities as outlined in Vision 2036 and, the National Development Plan 11. The focus will be on improving inventory, and intensifying knowledge by monitoring the status and diversity of species within the predetermined localities. Emphasis will also be placed on public education and awareness as well as on conflict mitigation.

Tourism policy

The Tourism Policy avails opportunities of residents generating income from wildlife tourism such as engaging in leopard tourism. Leopards, and Large Carnivores attract tourists to protected areas and game ranches, and hence are a means of providing income and employment.

Community Based Natural Resource Management (CBNRM) Policy.

The CBNRM policy empowers local communities through formation of Trusts to participate in wildlife tourism. For instance, community trusts may participate in leopard photographic and hunting tourism and generate income for local communities. CBRNM represent the community-based conservation system of Botswana and the (Community Based Organizations (CBOs) are seen as a key component of rural development and as one of the best weapons in the fight against illegal

utilization, provided they receive tangible benefits from wildlife. Community Based Organizations (CBOs) provide enhanced protection of critical habitats outside of protected areas and represent the best hope for conserving wildlife outside of Botswana protected areas while enhancing rural economic development through consumptive and non-consumptive use investments. These financial incentives foster some sense of ownership and reduces Human-Leopard Conflicts through non-invasive mechanisms and co-existence.

Tribal Grazing Land Policy (TGLP)

The TGLP allows residents to have communal grazing areas where many livestock subsistence farmers and majority of Batswana graze their cattle. However, as leopard and other large carnivores are free-ranging, livestock depredation causes conflict with farmers in communal grazing areas. While the Wildlife Conservation and National Parks act allows for the killing of leopards in response to livestock depredation, retaliatory killing of leopards in response to livestock loss can be reduced by providing incentives for communities to co-exist with leopards by allowing communities to benefit through sustainable non-consumptive and consumptive use of leopards.

Forestry Legislation

Forest Policy of 2011 – This Policy defines basic principles, objectives, strategies and action plans which provide guidance and facilitation in the management of forests and range resources, am important habitat for large carnivores and wildlife, through conservation, development and sustainable use to meet social, cultural, economic, environmental and ecological needs of present and future generations.

The Forest Act – This Act first enacted in 1968, is the principal legislation in Botswana to manage areas of forest and regulate the harvest and use of forest products. The Act provides better regulation and protection of forests and forest produce, but it only focuses on areas designated as forest reserves and state land. A revision of the Act will be merged with the Forest Act (1968), the Agricultural Resources Conservation Act (1974) and the Herbage Preservation (Fire Prevention) Act of 1977.

Customs Legislation

The Customs and Excise Duty Act of 1970 (Act No. 22 of 1970; Amended up to Act No. 31 of 2004) – This Act provides guidance for customs-related matters relating to all products, including wildlife.

Penal Code

The Penal Code, 1964 (Law No. 2 of 1964; amended up to Act. No. 14 of 2005) – This defines activities that are deemed as offences

Criminal Procedure and Evidence Act

This Law makes provisions with respect to procedure and evidence in all criminal cases in Botswana including wildlife crime cases.

International and Multi-Lateral Agreements

The management of leopards and large carnivores should also take into consideration the compliance with regional and international protocols and convention as well as multi-lateral agreements related to the wildlife sector.

The Convention on International Trade in Endangered Species of wild fauna and flora (CITES), for instance, lists leopard under CITES Appendix I with a quota regime for certain Parties (Resolution 10.14 Rev.CoP16) which are allowed to trade in leopard skins and hunting trophies in accordance with CITES provisions.

In addition, leopard management has to align with the Southern African Development Community (SADC) Protocol on Wildlife Conservation and Law Enforcement, United Nations (UN) Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the UN Convention to Combat Desertification and Drought amongst others.

Botswana is not a Party to the Convention on Conservation of Migratory Species of Wild Animals which have listed leopards in its Appendix II, a decision which has been opposed by some African Member States which have entered a reservation, contesting the migratory status of leopard.

Land use

The wildlife estate in Botswana makes up about 40% of the country's surface area, comprising of (i) National Parks and Game Reserves gazetted under the Wildlife Conservation and National Parks Act No.28 of 1992 as Protected Areas (115,819 km2 - 18% IUCN Category II) and (ii) Wildlife Management Areas (WMAs: 143,070 km2 22%, IUCN Category VI). Wildlife Management Areas (WMAs) are intended to act as buffers between Protected Areas and agriculture land, protecting human livelihoods from animals leaving Parks and Reserves, and protecting wildlife populations in Protected Areas from conflict killings and harvest. WMAs are mainly managed to promote social and economic benefits to local communities where relevant through sustainable use principles. WMA's may also act as corridors between protected areas.

The direct utilization of the Forest Reserves is minimal since the 1992 suspension of timber logging; only subsistence uses by surrounding communities is permitted for firewood collection, thatching grass and fruit gathering (Forest Conservation Strategy 2013-2020). Land use over most of the remainder is extensive subsistence pastoralism and subsistence crop farming on communal land (Figure 6).

Protected Areas (PAs) generally have high abundance of low-density species such as leopard compared to WMAs and unprotected Areas (Senyatso 2011), Also, PA's have high abundance of large-bodied vertebrates than WMAs and unprotected areas (Senyatso, 2011). WMAs on the other hand have similar abundance of large bodied-grazers, medium sized browsers and carnivores as in PAs. In contrast, unprotected areas have larger abundance of Galliformes especially guinea fowls compared to WMAs and PAs (Senyatso 2011).

Leopard densities in photographic tourism areas (Rafiq et al., 2019; Rich et al., 2019) are probably at the maximum that prey populations can support. These saturated populations are expected to be sources of dispersing leopards that move into population sinks in livestock areas (both communal and privately owned) where conflict killings reduce leopard density, shifting the human-wildlife conflict interface out to the boundaries of the non-consumptive WMAs.
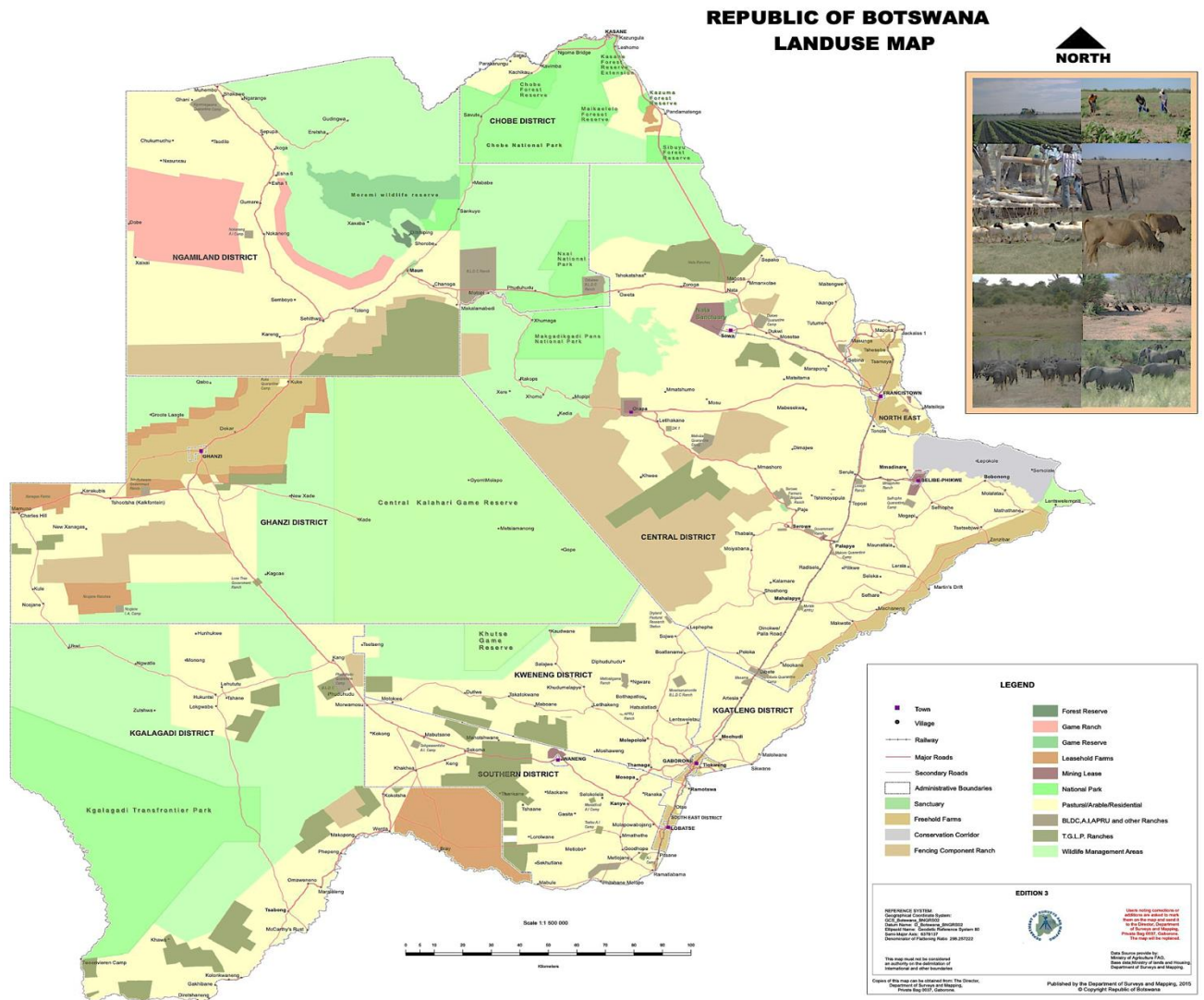
Figure 6. Land Uses in Botswana *(Source: Dept. of Surveys and Mapping)*

There are no data for the scale of these source–sink dynamics in Botswana, but livestock-predator conflict is independent of distance from a Protected Area, which suggests that conflict is with resident leopards. Considering these dynamics, sustainable, monitored legal offtakes of leopards in WMAs and livestock areas will not compromise core populations in Protected Areas or non-consumptive WMAs.

Leopard habitat in Botswana has remained approximately constant with no large-scale changes in land use that are likely to have affected the number of leopards in Botswana (Botswana Government – DWNP 2020).

In general habitat loss is not a severe threat in Botswana (Figure 7), although livestock expansion in recent years may have caused local habitat deterioration.
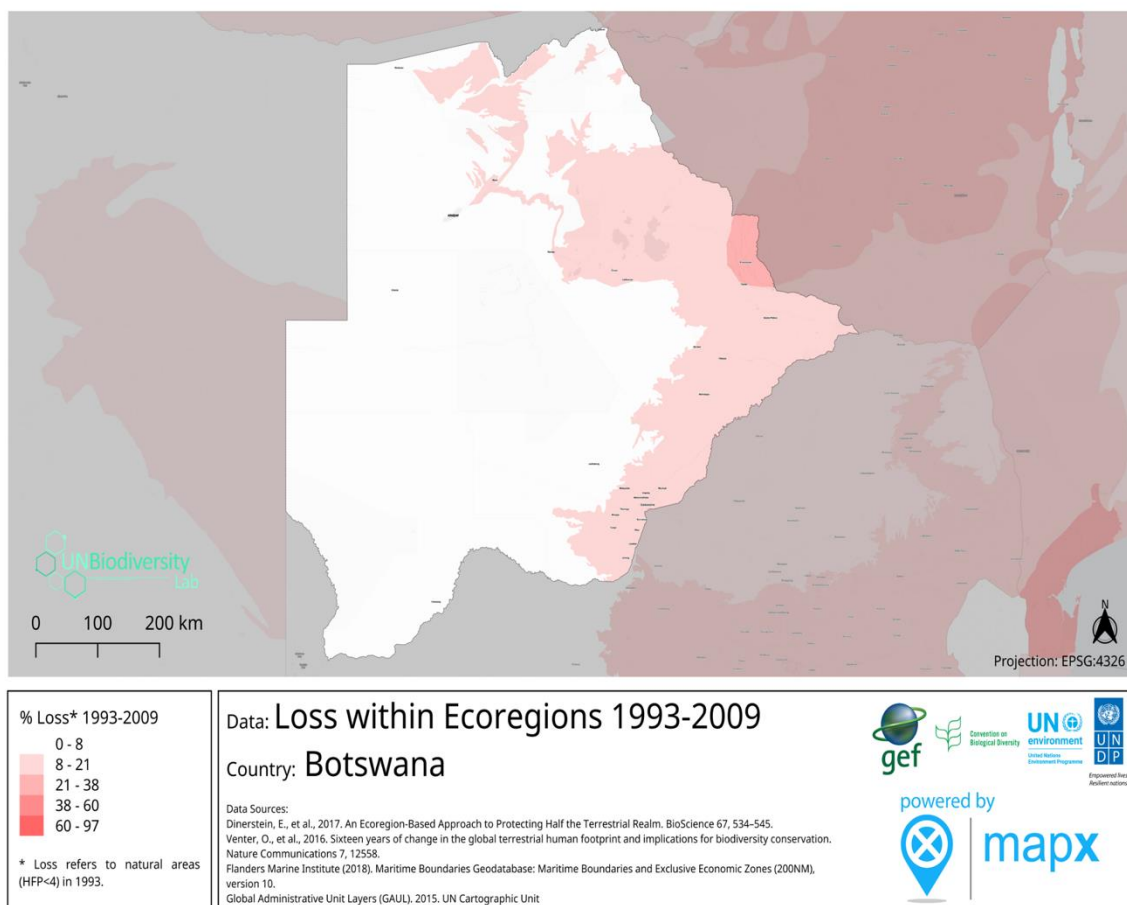
Figure 7. Habitat Loss 1993-2009 (Source: 6th National Report to the Convention on Biological   Diversity-2019)

2. Conservation Issues

2.1. Human- Leopard Conflict

At a global level (Seoraj-Pillai and Pillay, 2016) the leopard was the leading carnivore conflict species with a large number of human-carnivore conflict case studies. Leopard displays a range of biological and behavioral characters that render it a high-impact conflict species (Woodroffe et al. 2005, Kissui 2008, Marker & Dickman 2008). This highly adaptable species occupies the broadest geographic range (Stein et al. 2020) and is adapted to use human-dominated environments such as farms and cities more than any other large predators (Stein et al. 2020, Jacobson et al. 2016). As a result of its highly adaptableness and versatility the leopard occupies the broadest geographic range among wild felids. (Stein et al. 2020).

In Botswana, DWNP data shows that leopards, overall, caused the third highest amount of reported conflict after elephants and lions in the period 2018-2023 As such, it is imperative to consider and address where and to what level leopard conflict occurs to address this issue with minimal negative impacts on human activities and leopards. Approximately 46% of reported leopard conflicts occurred in the Central district alone. Ngamiland and Kweneng recorded respectively 18 and 10 **%** of reported conflicts and all the other districts less than 10%. (Table 3 and Figure 8).

Table 3. Reported leopard conflict in Botswana 2018-2023. (DWNP Unpublished Data).

INCIDENTS REPORTED REGARDING LEOPARDS PER DISTRICTS FROM 2018 TO 2023

DISTRICT	central	chobe	ghanzi	kgalagadi	kgatleng	kweneng	ngamiland	southern	totals
year									
2018	462	6	67	131	54	143	181	67	1111
2019	567	8	53	91	53	141	187	49	1149
2020	768	32	54	103	56	162	225	92	1492
2021	347	59	81	100	17	93	348	108	1153
2022	540	57	69	92	35	94	186	57	1130
2023	688	16	57	129	36	114	223	49	1312
totals	3372	178	381	646	251	747	1350	422	**7347**
%	45,93	2,42	5,18	8,79	3,41	10,16	18,37	5,74	**100**
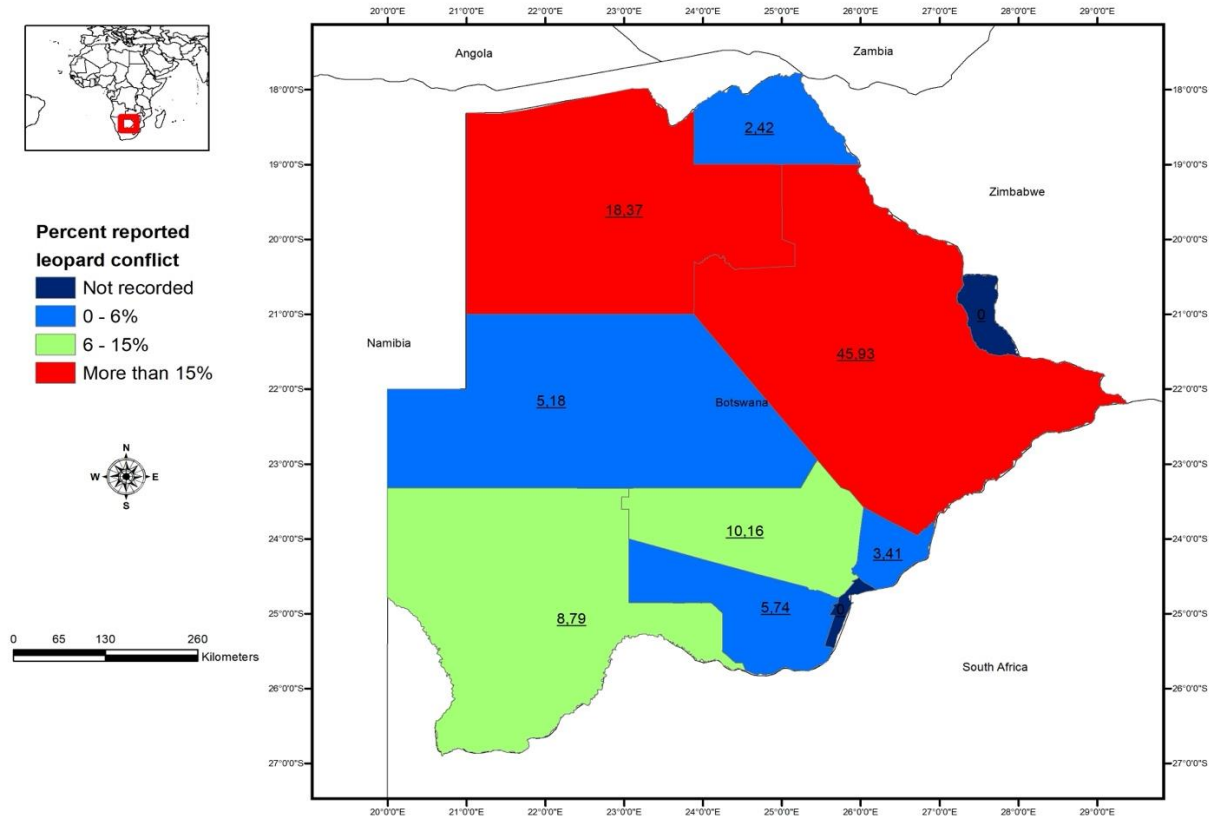
Figure 8. Map of the reported leopard conflict in Botswana 2018-2023 (n = 7,347). (DWNP Unpublished Data).

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Between 2015 and 2023, DWNP documented 329 leopard mortalities across the country, including 'problem animal control', roadkill, disease and natural causes (Table 4 and Figure 9). Central District recorded the majority of leopard mortalities compared to any other district followed by Ghanzi, Ngamiland, Kgalagadi. And Kweneng. Other districts had minimal mortalities recorded across the 9-year span. These recorded mortalities could probably represent an under estimation since many villagers do not report mortalities to the authorities.

Table 4. Recorded leopard mortality 2018-2023 is apparently decreasing in recent years across Districts aside from a significantly high number recorded in 2015 for Ngamiland

LEOPARDS MORTALITY PER DISTRICT FROM 2015 TO 2023

DISTRICT	Central	Chobe	Ghanzi	Kgalagadi	Kgatleng	Kweneng	Ngamiland	Southern	totals
year									
2015	4	0	6	14	2	9	25	0	60
2016	12	4	7	2	1	7	0	1	34
2017	21	2	3	0	2	3	3	2	36
2018	15	3	4	7	0	6	2	1	38
2019	19	0	5	2	3	2	3	0	34
2020	14	0	3	3	3	2	9	3	37
2021	8	0	20	5	1	5	5	0	44
2022	5	0	4	6	0	4	3	3	25
2023	2	1	2	10	0	5	1	0	21
totals	100	10	54	49	12	43	51	10	329
%	30,4	3,04	16,41	14,9	3,64	13,07	15,5	3,04	100

Figure 9. Map of the cumulative percentage of leopard mortality by District 2015-2023.

The legal killing of any animal, including leopard, causing damage to property is permitted in Botswana. Article 46 of the Wildlife Conservation and National P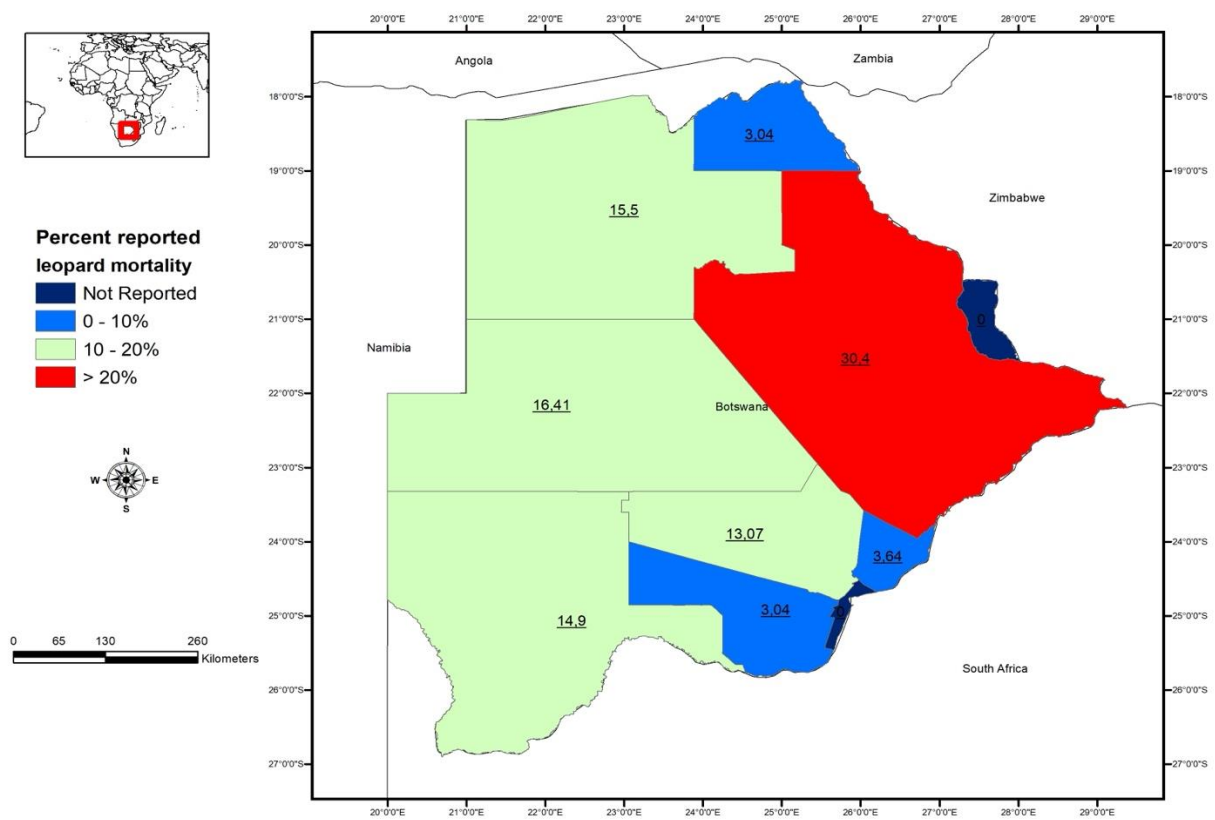arks Act, first enacted in 1992 (Chapter 38.01, as recently amended in 2023), states that " *The owner or occupier of land, or any agent of such owner or occupier may, **subject to the provisions of the Act**, kill any animal which caused, is causing or threatens to cause damage to any livestock, crops, water installation or fence on such land, provided that nothing shall authorize the killing of an animal which is in a national park or a game reserve, or the use of any poisoned weapon, pitfall or snare for the killing of any animal*".

Leopard mortality is a sensitive subject and therefore efforts must be undertaken to encourage reporting. Importantly some leopard mortality occurs in cattle or game ranches and innovative and creative conservation actions should be devised to increase tolerance by ranchers. These actions will be discussed in section 3.3. and developed in the Action Plans.

Conflict between humans and leopards most commonly revolves around the loss of livestock due to predation by leopards. Measures to effectively reduce such losses have been developed and include herding practices, the use of predator proof mobile bomas, the positioning of flashing lights to keep predators away, using trumpets to chase them away and recently the use of artificial equivalents of natural chemical signals to keep predators away from livestock as developed by the Botswana Predator Conservation's BioBoundary Project (Botswana Predator Conservation's BioBoundary Project).

However, attention also needs to be directed to issues relating to land use planning, competing claims and policies, and dealing with international pressures that bear on the conservation, management and sustainable hunting of leopard, the equitable distribution of benefits that may be derived from leopards through tourism.

A National Strategy on Human Wildlife Conflict Management is being developed in recognition of the fact that living with wildlife often carries a cost, with increased wildlife populations and expanded ranges into communal and farming areas resulting in more frequent conflicts between people and wild animals, particularly elephants and predators in many areas.

The Government also recognizes that such conflicts have always existed where people and wildlife live together and will continue to do so in the future. This means that it will not be possible to eradicate all conflict, but that conflict has to be managed in the most effective and efficient ways possible.

Priority should be given to the cross implementation of the species Management Plans with other National Strategies such as the one on Law Enforcement and the upcoming National Strategy on Human Wildlife Conflict Management.

2.2. Leopard Translocation

The possibility of translocating 'problem' leopards as an alternative to lethal control has been voiced by some stakeholders. However, unless there are suitable release points with space, adequate prey base and robust knowledge that they will not interfere with existing leopard populations, these translocations often have lethal consequences for the released animal (Weilenmann *et al*. 2010, Weise *et al*. 2015). Before translocations occur, there must be sufficient data on the source and receiver populations including occurring prey base, leopard density, livestock conflict and dominant competitors. If these steps are not taken, the translocation is likely to be costly and unsuccessful. Furthermore, the chances to capture the right problem leopard and no other individuals could be

challenging. In addition, all translocated animals must be monitored with tracking collars to assess the success of the translocation and improve future efforts. Therefore, although translocation could be an option it is considered not really viable and, in any case, it is advisable to make it subject to government scrutiny and authorization and to devise and implement Government guidelines on this topic.

2.3. Other issues

Availability of Prey base.

The 2014 hunting suspension has had negative consequences such an increase in poaching for meat due mainly to the lack of benefits accruing to rural communities (Mbaiwa 2017, Blackie 2019).

Illegal hunting for bushmeat is a widespread and growing threat to wildlife in savannah ecosystems across Africa, but its secretive and unregulated nature undermines efforts to mitigate its impacts on wildlife and wildlife-based economies (Lindsey *et al*. 2012).

A study implemented in the framework of a FAO technical cooperation program at the request of the Government of Botswana, in close collaboration with the DWNP (Rogan *et al*. 2015), found that illegal hunting was a widespread practice throughout the Okavango Delta, particularly in the western region. Results suggest that 1500 to 2000 illegal hunters operated in and around the delta during the study period (2014-2015), with a best estimate of 1775. Hunters' reports indicate that approximately 244,500 to 470,000 kilograms of bushmeat were harvested annually. The average hunter harvested illegal bushmeat worth 3260 to 4720 BWP (USD326–472) a year.

Importantly the study was conducted in photo-tourism concessions or in concessions abandoned by legal hunting operators due to the 2014 hunting suspension.

Bushmeat illegal hunting has the potential to decrease prey availability for large predators including the leopard and to contribute to direct and indirect leopard mortalities, as well as increase potential for human-leopard conflict as leopard seek out livestock as an alternative prey (Shehzad et al., 2015).

A holistic approach is necessary to address illegal bushmeat hunting and improve wildlife management. Strategies for expanding legal community benefits from wildlife, reforming wildlife management policies, improving enforcement, involving communities in wildlife monitoring efforts and raising public awareness about wildlife issues and health related risks around bushmeat poaching is key to addressing this issue.

In any case, trends of a key leopard prey species, such as impala, from estimates derived from aerial survey in the period 1996-2018 show an increase in the Ngamiland and Chobe Districts of northern Botswana (Figures 10 and 11) (Chase *et al*. 2015 & 2018) and a stable trend in south-east Botswana-Central District (DWNP 2018), although the species is less common there (Figure 12).

Illegal offtake and trade

The proximity with South Africa, where the world's largest unregulated market for illegal leopard skins exist (Naude, 2020), is a possible cause of concern for Botswana's leopard populations. However, a study that used a genetic reference database of leopards in Southern Africa (1,896 samples) to infer the geographic origins of illegally traded leopard skin trade (303 samples) for use

for traditional and religious purposes in Southern Africa (Naude, 2000) suggested that less than 1% of illegal leopard skins were supposedly originating from Botswana.
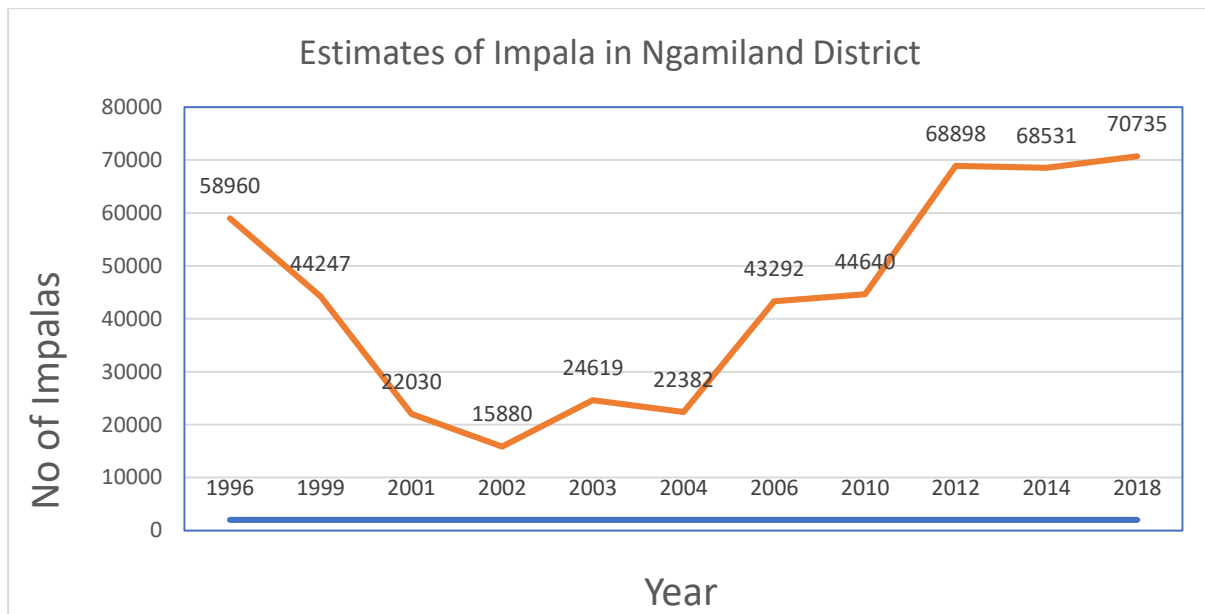

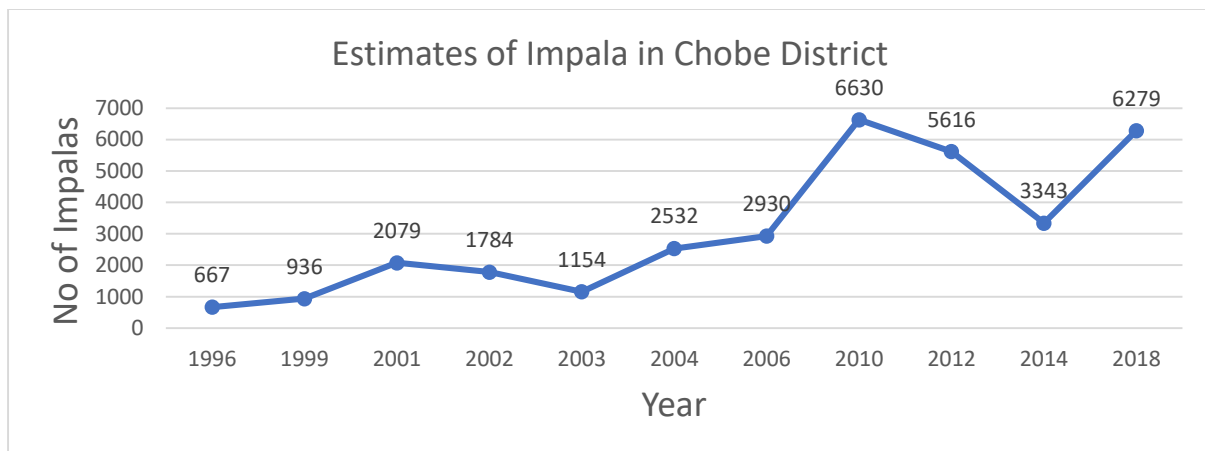**Figure 10: Trends of Impala population in Ngamiland District. (Chase *et al*. 2015 & 2018)**

Figure 11: Trends of Impala population in Chobe District (Chase *et al*. 2015 & 2018)
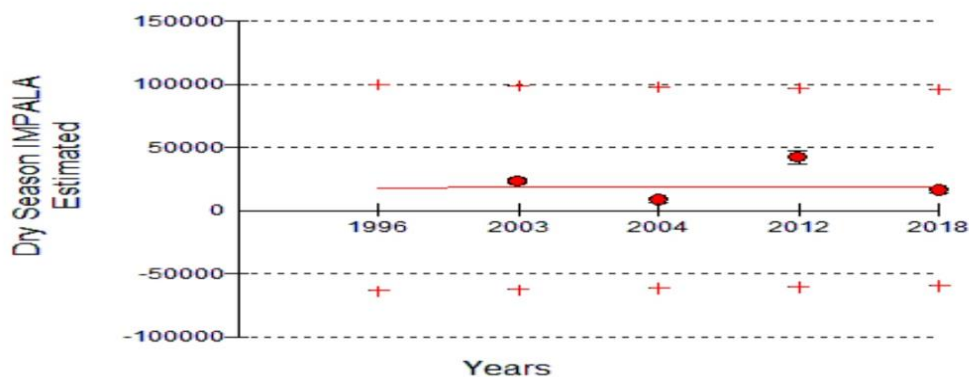

Figure 12: Trends of Impala population in South East (Central District) Botswana (DWNP 2018)

3. Conservation Opportunities

3.1. Photographic Tourism

In Botswana, tourism is based largely on wildlife and wilderness. The tourism industry is highly competitive but Botswana is fortunate to support a viable and visible population of leopard, which offers an added marketing opportunity.

Botswana tourism operators have shown a preference for "modified high volume/mixed price" options instead of the former "low volume/high price" policy. This is thought to be a better option for increasing numbers of visitors to the country.

The specific contribution of photographic tourism to leopard conservation is not known and in need of more detailed studies.

3.2. Controlled Hunting

Leopard Hunting occurs in some Controlled Hunting Areas (CHAs), i.e., Management Units designated in accordance with the Wildlife Conservation and National Parks Act, (Figure 13). See Table 4 in section 4.3 on 2020 hunting quotas for CHAs where leopard hunting occurs.

Controlled Hunting (also known as tourist safari hunting) is a tool for the management and conservation of species. Not only can controlled hunting provide funds to mitigate losses from livestock depredation to carnivores, but it can maintain economic viability for wildlife areas particularly those unsuitable for photographic tourism. These hunting areas could either fall to poaching pressure, development, or agriculture, significantly reducing wildlife range. Controlled hunting has the potential to bring in significant economic benefits for government, communities and farmers.

Controlled Hunting in Botswana was suspended in January 2014, based on Statutory Instrument No. 2 of 2014. Leopard hunting was de facto suspended in 2013 because a zero quota was allocated for that year.

The hunting moratorium resulted in ill-feeling in several rural communities and settlements, especially from members of the local population who regard hunting as a traditional way of life or communities where their sustenance was largely on hunting. Many local people were formerly reliant on controlled hunting for food, income and employment especially on marginal lands where leopard occur, but where land is not suitable and financially viable for photographic tourism. In 2019 the moratorium was lifted, and quotas allocated for hunting leopard in 2020, for international clients. No citizen hunting is allowed for leopard. Due to the COVID-19 pandemic the 2020 quota was rolled over to 2021 as no hunting took place in 2020.

The controlled hunting program is an important mechanism for safe-guarding and generating revenue from marginal lands set aside for conservation where leopards occur, and in land units where human/wildlife conflict is high. Economic modelling conducted in 2008 on Botswana's controlled hunting program estimated total economic value of Botswana's controlled hunting program to be ~$40,000,000 (Martin 2008).

The safari industry contributes to the national and local economies and to conservation through, among other activities, the hunting of leopards by foreign hunters. This type of hunting is, at present, the main type of consumptive utilization of leopards.

Data available before the hunting suspension of 2014 shows unequivocally that the impact of leopard hunting on the population was irrelevant in numerical terms and negligible in biological terms, and quotas have been set at conservative level to limit negative impacts on populations and ensure sustainable trophy sizes. Safari hunting had no effect on limiting population growth.

Package for leopard can range from US$30,000-45,000 depending on the operator, location, time of year and amenities (Peake pers. comm). These hunts range from 14-21 days and do not include ungulates in this stated price. Hunting operators pay farmers varying amounts to use their property as part of a hunt. In communal areas the professional hunter enters a Joint-Venture Partnership, providing employment, game meat and money for the opportunity to hunt in the CHAs based on DWNP permit allocation. Communities provide a community scout to document all hunts to ensure that regulations are followed.

3.3. Increasing the coexistence between leopard and people

The conservation of leopards will remain a challenge if they are continued to be considered as a nuisance and problem animal by livestock owners and game ranchers. This Plan calls for a robust, holistic, and collaborative processes with stakeholders (i.e., livestock owners, farmers associations and game ranchers) that will consider underlying social, cultural, and economic contexts towards practical methods for mitigating the impacts of conflicts and promote coexistence. In addition, it is necessary to inform rural communities on the positive role of leopards for the ecosystem. More efforts could be made towards improving the compensation schemes and or incentives through trophy hunting relating to leopard depredation to minimize the number of retaliatory killings and PAC mortalities (Stein et al., 2010).

There should be collaboration (e.g., approved guidelines) between stakeholders such as livestock owners, farmers and game ranchers as regards co-existence.

Coexistence tools and approaches should be developed and tested such as : non-lethal mitigation methods, sensitization of farmers, students, general public to the importance of wildlife, incentives such as the official labelling of conservation/predator-friendly meat, or incentives such as employment of wildlife monitoring scouts from the community for continuous research on wildlife (including leopard) to inform future conservation decisions and improving livestock and rangeland management and exploring innovative approaches such as conservation performance payments

Furthermore, there could be collaboration with professional hunters to remove habitual conflict leopards within a given area. The definition of a habitual livestock killer should be established by DWNP based on the number of livestock killed and frequency of attacks by a single individual. When local DWNP officials document cases of problem leopards and identify that individual via camera traps or other acceptable methods, the landowner should have the opportunity to contact safari hunting operators to remove this animal as a trophy, even if the size or sex is not within typical hunting parameters. This system should be tested and strictly monitored by only allocating a few permits on an experimental basis to discourage killing as a primary option for mitigating conflict.
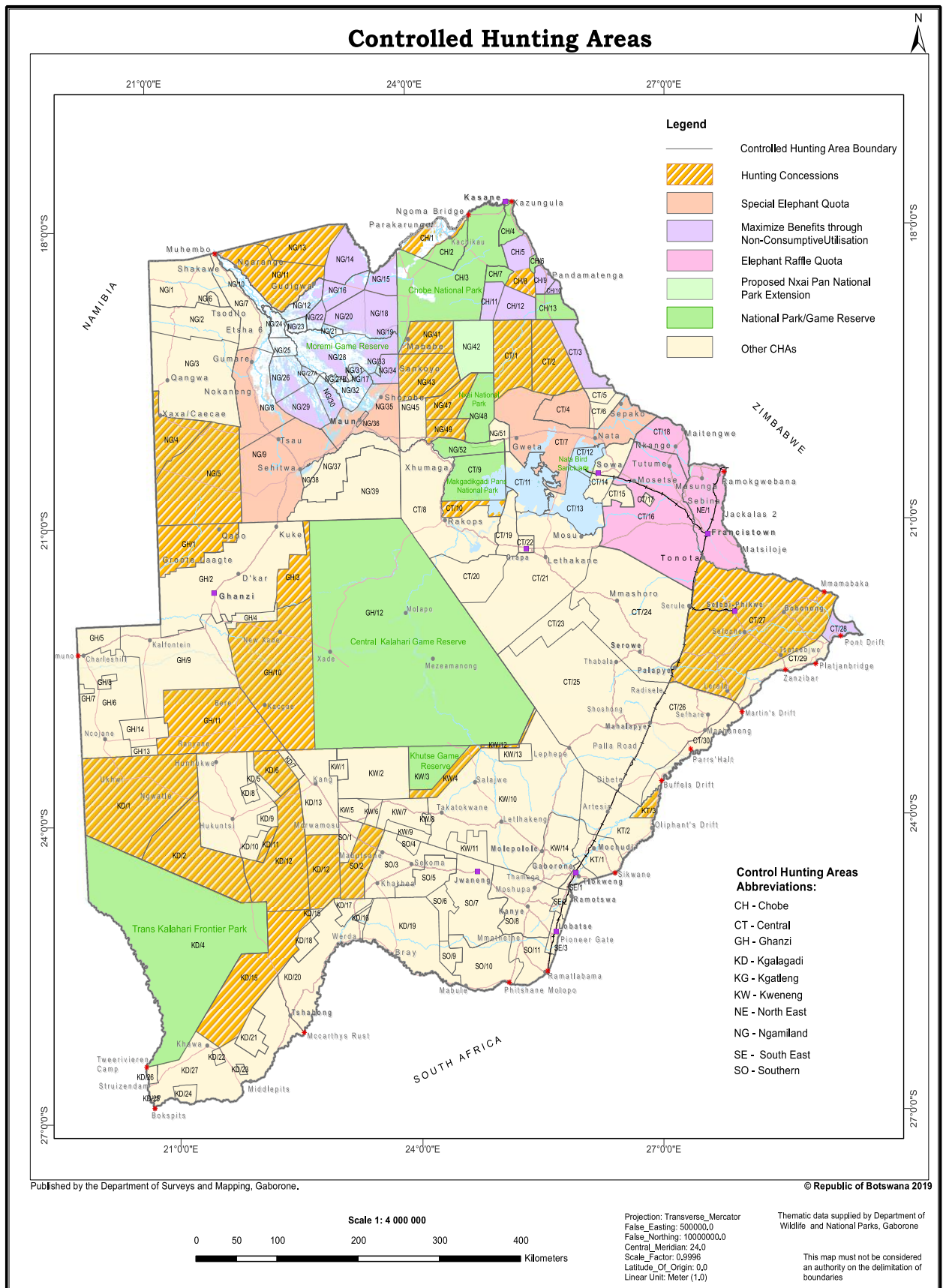
Controlled Hunting Areas

Figure 13: Controlled Hunting Areas (CHAs) in Botswana (Source: DWNP).

3.4. Community-based conservation

Several rural communities in Botswana have registered Trusts to access benefits from and to participate in natural resource management and conservation. Based on Community-Based Natural Resources Management (CBNRM) principles and strategies, Trusts are granted 'user rights' for the different areas and natural resources within specific WMAs, where they are able to enter joint venture agreements with tourism and safari operators.

Outside protected areas, when controlled tourism hunting was suspended in 2014, many community trusts in Botswana experienced large declines in income, especially those in WMAs with marginal photographic tourism potential, where some Trusts completely collapsed. Capacity building within community trusts will be key to the management of income generated from consumptive and non-consumptive use to ensure that benefits are distributed equitably and clearly linked back to the presence of wildlife.

4. Management framework and tools

4.1. Adaptive Management

Adaptive management is a goal-oriented management of a wildlife resource in an unpredictable complex natural system. Interventions are taken by management, for instance, the harvesting of leopards through hunting quota. The results of the interventions are monitored and the findings are then used to gauge whether the desired objectives/ goals are met. The findings then motivate decisions about the next management action. The cycle continues until the goal is reached. Adaptive management can therefore be used as a management and at the same time as a research tool to understand a resource, in this case leopard population and ecology, in a natural system being managed.

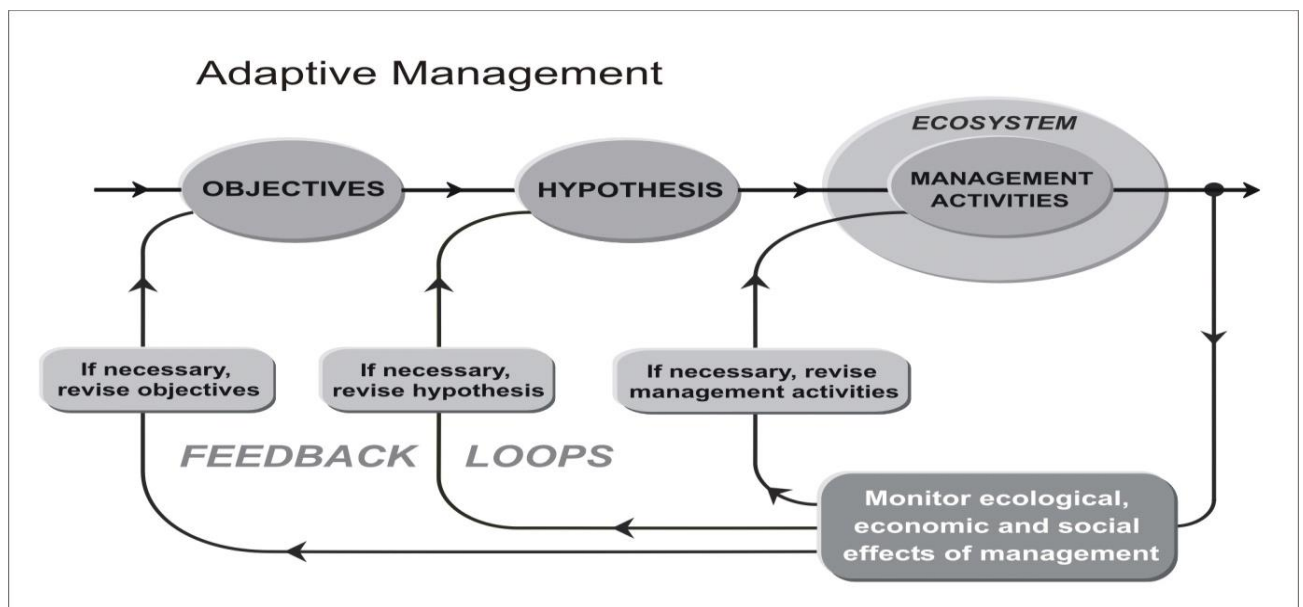The adaptive management process is summarized in the following flow chart (Figure 14):

Figure 14. Adaptive management process flow chart (from Martin RB, 2014)

4.2. Leopard Monitoring

According to the BCF leopard report (Winterbach et al., 2020), less than 30% of surveys reported in Table 2 were conducted in the period 2015-2020. With only 2 surveys occurring before 2005, each of the next 5-year blocks had a relatively even distribution of surveys around 33% or essentially 6 surveys per year. In addition, 78% of the "MAP CODED" areas had fewer than 5 total surveys conducted at that location in 20 years, so replication of surveys was minimal (BCF Winterbach et al., 2020). In reviewing areas of Leopard Hunting quota allocation and reported Human-Leopard Conflict, it appears there is a significant need to conduct intensive systematic surveys in areas previously minimally studied- specifically the Central, Kweneng and Ngamiland Districts away from the Okavango Delta. It is recommended that surveys should be conducted both in consumptive and non-consumptive CHAs to ensure distribution regardless of utilization and comparison of results in different land uses between potential high and low densities areas.

A combination of intensive and extensive monitoring may be the best approach to facilitate effective adaptive management (Westgate et al., 2013). Site-specific studies that use intensive monitoring techniques can generate robust estimates of population density, but they are typically too localized to achieve landscape-level inferences. In contrast, regional studies that employ extensive monitoring methods can provide indications of population trend, but often without the accuracy or precision required for management (Lindenmayer and Likens 2010).

Successful adaptive management of wildlife requires reliable long-term monitoring of population trends at the scale necessary to inform management decisions (Westgate et al., 2013). Rather than single estimate 'snapshots' of population status, which can be difficult to assess in isolation, data on population trends can provide information of the efficacy of current management as well as allowing assessment of specific management interventions over time. The accuracy of monitoring must be balanced against its costs (Lindenmayer and Likens 2010).

DWNP aims to facilitate widespread monitoring of leopard populations, for the purposes of both improving the understanding of the status of leopard populations in Botswana, and for monitoring population trends, thus evaluating the success of management and policy interventions.

Population density can be estimated reliably for individually distinguishable species such as leopards by integrating camera-trap data in a capture-recapture framework (Balme et al., 2009). Spatial capture-recapture models enable accurate estimation of population density from camera-trap surveys, and these surveys can be repeated over time to assess population trend (Borchers and Efford 2008; Royle et al., 2009). Density is a more useful metric of population health than abundance as it relates to a defined sampling area, which is not the case for abundance, which can be difficult to compare between sites (Royle et al., 2014). However, camera traps are expensive and they are usually deployed at scales of tens or hundreds of square kilometers (Foster and Harmsen 2012), limiting their usefulness in informing conservation policy decisions typically made at scales several orders of magnitude greater (Poiani *et al.*, 2000). Population density can vary at relatively fine-scales, depending on land-use, site security and management, and consequently population density estimates should not be extrapolated at a broad scale (Swanepoel et al., 2015; Miller et al., 2018). In contrast, abundance indices, such as change in species occupancy (Latham et al., 2014; Clare et al., 2015; Linden et al., 2017), can be collected cost-effectively across wide landscapes. While occupancy is a reliable method of assessing species use of a landscape, the relationship to abundance is less clear (but see Clare et al., 2015; Linden et al., 2017). Nevertheless, change in occupancy (e.g. through spoor surveys, see IUCN 2019) can be a valuable tool for monitoring a species at a broader scale than can be achieved through camera trap surveys (Pitman et al., 2017).

To overcome these challenges, in this Management Plan, a monitoring framework that combines six different types of complementary and combined information is recommended: **(1)** presence-only data that can be used to assess leopard distribution e.g. spoor surveys, **(2)** detection/non-detection data that can be used in an occupancy modelling framework to assess change in occupancy and drivers of change, **(3)** systematic and robust leopard population density estimate surveys at a local scale e.g. camera trap surveys (baited and un-baited to compare methodologies) (du Preez et al., 2014; Tarugara et al., 2019; Joubert et al., 2020), **(4)** analysis of data on problem animal incidents, controlled hunting (see Appendix X Hunting Return Form) including effort and harvest composition, **(5)** citizen science e.g., through tourist photographs and reported sightings (Rafiq et al., 2019) that can be collected in parallel with the other four data sources. Importantly, citizen science, through tourist photographs, offer a cost-effective opportunity to implement the long-term monitoring programs required for evidence-based management decisions within resource limited locations. There is an opportunity to create largely automated citizen-driven monitoring programs, with wildlife tour operators as well as hunting outfitters and game ranch owners, facilitating data collection and automated workflows processing images and yielding density metrics, with minimal researcher involvement (Rafiq et al., 2019; Rich et al., 2019) and **(6)** Management Oriented Monitoring Systems (MOMS) – see Box 1. These data can all be used to inform adaptive management of leopards in Botswana, i.e. a combination of questionnaires, camera-trapping, spoor tracking and evidence of leopard presence provided by multiple stakeholders.

In addition, genetic surveys hold promises of improving knowledge of leopard populations (Cho et al.2022, Spong, 2023). The collection of bio samples such as skin, hair, blood and scat from leopards throughout the country (darting, mortalities, hunting etc.) for genetic analysis to assess genetic diversity, genetic viability and genetic connectivity between subpopulations is foreseen and specific guidelines for researchers/stakeholders should be developed. A genetic survey could provide insight on the genetic structure of the Botswana population as well as provide a tool to identify and track skins and other material for law enforcement purposes.

The results of the current leopard survey will add to the national framework for leopard monitoring above by offering a more nuanced understanding of the species' population numbers and spatial distribution in relation to habitat, land use, and administrative areas in Botswana. In addition to identifying and filling in any gaps about leopard densities in these regions, it will match and compile data and records from earlier studies conducted in WMAs and PAs.

4.3. Quota setting

The leopard *Panthera pardus* was included in Appendix I at the Plenipotentiary Conference at which CITES was concluded (Washington, D.C., 1973). This listing was not based on any scientific data or listing criteria, as for most of the species included in Appendices I and II at that time. However, the massive spotted cats fur trade was one of the very reasons for devising and signature of CITES. At that time the leopard, like other spotted cats, was heavily harvested for the fur trade. In 1968 and 1969, at least 9,556 and 7,934 leopard skins respectively were imported into the United States of America alone (Paradiso 1972 quoted in Ethiopia Government 2020) and in the 1960's over 50,000 leopard skins were estimated to be exported annually from East Africa alone for the fur trade (Anonymous, 1964 quoted in Ethiopia Government 2020).

The CITES leopard quota system was introduced at the fourth meeting of the Conference of Parties (Gaborone 1983) with Resolution Conf. 4.13. A thorough history of the CITES leopard quota system in CITES can be found in a leopard proposal to CITES CoP 12. (CoP12 Doc. 23.1.2 https://www.cites.org/sites/default/files/eng/cop/12/doc/E12-23-1-2.pdf and in reviews made by Mozambique (Mozambique Leopard quota review, CITES 2018) and Ethiopia (Ethiopia Leopard quota review CITES 2021).

At the onset of the leopard CITES quota system, an annual export quota of 80 trophies was approved for Botswana, through Resolution Conf.4.13 (CoP4, Gaborone 1983) based on an amendment proposal. Subsequently the quota was raised to 100 at CoP7 (Lausanne 1989), through Resolution Conf. 7.7, and to 130 at CoP9 (Fort Lauderdale 1994) through Resolution Conf. 8.10 (Rev.).

Currently the quota of Botswana remains at 130 leopards as indicated in Resolution Conf 10.14 (Rev.CoP16). In accordance with the procedures outlined in a series of Decisions (*18.165 - 18.170 Quotas for leopard hunting trophies*) taken at CITES CoP18 (Geneva 2019),the leopard quota for Botswana (Botswana Government – DWNP 2020) was considered by CITES Animals Committee at its 3st meeting (Online, 31 May - 1, 4, 21 and 22 June 2021) to be set at levels which are non-detrimental to the survival of the species in the wild, informing of the above the Standing Committee, that agreed at its seventy-fourth meeting (Lyon (France), 7 - 11 March 2022) to inform the Conference of the Parties of the non-detrimental levels of the leopard quota of Botswana.

Botswana has used and it continues to use adaptive management with a precautionary approach to set leopard quotas in view of the paucity of data on the species. Therefore, the internal leopard quota was set at a conservative and precautionary level, well below the CITES allocated quota.

The following Table 5 shows quotas allocated before the 2014 hunting suspension.

Table 5. Quota allocation before the 2013 hunting suspension (Peake/Mochaba and DWNP data)

YEAR	CHA Quota	Game Ranch Quota
1996	83	n/a
1997	79	n/a
1998	83	n/a
1999	84	n/a
2000	94	n/a
2001	67	n/a
2002	65	n/a
2003	56	n/a
2004	56	n/a
2005	32	n/a
2006	32	n/a
2007	32	n/a
2008	29	16
2009	15	22
2010	5	18
2011	0	13
2012	7	15
2013	0	17 (recommended but not activated due to hunting suspension)

When hunting was reopened, quotas were allocated for the 2020 hunting season (rolled over to 2021 due to the COVID-19 pandemic) and 2022 hunting season and are shown in table 6 below together with the 2021 hunting offtake and average measurements (average skull size and average body length).

Table 6. Quota allocation in 2020 (rolled over to 2021) and 2022 and 2023 (and 2024) with offtake and measurements (source: DWNP and Peake/Mochaba).

YEAR	CITES Quota	CHA quota	Game Ranch Quota	Off-take	Average skull size	Average body length
2020(2021)	130	46	n/a	31	39,2 cm. (15 7/16 inch.)	152 cm
2022	130	70	13	46	37,30cm (14 11/16 inch.)	150 cm
2023	130	74	13	46	38,1cm (15 inch.)	149,30 cm
2024	130	75	15	n/a	n/a	n/a

Allocated quotas have always been lower than the CITES quota because it has always been the understanding of Botswana that annual export quota is not a target and there is no need for a CITES quota to be fully used (Resolution Conf. 14.7 (Rev. CoP15). Internal quotas are set at a very low, conservative and precautionary level and future quotas will be also informed by the upcoming leopard survey (See chapter 1.2 above) and the proposed monitoring framework.

Booth and Chardonnet (2015), recommended a quota percentage for leopard varying from a maximum of 4% of the estimated population (similar to Caro et al., 2009) in Safari Areas to a minimum of 2% in Communal Areas. The CITES export quota of Botswana is within these recommended thresholds, although the estimates provided in chapter 1.2 above are far from being considered a baseline due to large extrapolations and limited coverage and accuracy.

It has to be noted that starting from 2008 to 2012, DWNP introduced an allocation process developed by a BWPA consultant (Funston 2008, 2012, 2013; Table 6). to give leopard quotas to Game Ranches with the aim to reduce human leopard conflict, increase coexistence and compensate cattle ranch owners for the livestock losses. Permission to hunt these leopards are granted in terms of section 39(1)(b) of the Wildlife Conservation and National Parks Act of 1992 and through the publication of the Game Ranch quota in the Government Gazette.

Game ranch owners from five regions participated in the pilot study that took place between 2008 and 2013 (Funston 2011, 2012; Table 7). Each year a special leopard was allocated for each region in addition to the DWNP CHA quota. The number of successful leopard hunts was documented with the number of adult male leopards recorded. Since leopards are notoriously difficult to age in the field and there was limited data on the best age for hunting, the minimum age for a hunted male leopard was voluntarily set at 4 years (Funston pers. comm). The first year of allocation the quota was set high with 22 total permits provided with only 64% hunted and 57% identified as above 4 years old (adult males). In 2010, the overall permit allocation declined 18% with only 61% hunted and 64% of hunted leopards exceeding the minimum age. In 2011, the total allocated permits dropped again by nearly 28%. The hunters met 69% of the allocated permits with 89% exceeding the minimum age. With better precision, the number of allocated permits increased by 15% in 2012. Hunters filled 87% of the tags with 77% meeting the voluntary minimum age. In 2013 the recommended number of permits increased by 13% but the hunting ban was enforced so these tags were not activated and used.

Table 7. The results of a pilot hunting system that adaptively manages annual leopard hunting permits on a point system for trophy quality (Funston 2012, 2013).

Region	2009			2010			2011			2012			2013
	Allocated	Hunted	Adult Male	Allocated	Hunted	Adult Male	Allocated	Hunted	Adult Male	Allocated	Hunted	Adult Male	Recommended
Ghanzi	6	6	6	8	8	5	5	5	4	5	5	4	5
Tuli	11	5	1	7	3	2	5	3	3	6	5	3	6
Ngamiland	2	2	1	1	0	0	1	1	1	2	2	2	3
Northeast	1	0	0	1	0	0	1	0	0	1	0	0	1
Southern	2	1	0	1	0	0	1	0	0	1	1	1	2
Total	22	14	8	18	11	7	13	9	8	15	13	10	17

The leopard Game Ranch quota has been a useful tool to improve human-leopard coexistence in Game Ranches and in general in some livestock areas. This quota was not allocated when the hunting reopened in 2020 (2021) but it has been allocated for 2022, 2023 (13 leopards in six regions and 13 Game Ranches) and 2024 (15 leopards in six regions and 15 Game Ranches) through a raffle conducted at DWNP Headquarters (Table 6).

In conclusion, given the limited, although increasing, amount of data on the species, Botswana intends to continue its adaptive management with a precautionary approach to allocating leopard quotas that are far lower than the CITES approved limit, combined with an enhanced monitoring system to guide management decisions.

4.4. Hunting Monitoring

When hunting resumed in 2019 (although it effectively started only in 2021 due to the COVID-19 pandemic that curtailed hunting in 2020), DWNP adopted the Hunting and Escort Guidelines which were amended in 2021 and regularly thereafter.

The resumption of hunting, done after wide country-wide public consultations, was restricted to areas where:
- Problem Animal Control (PAC) and Human Wildlife Conflict (HWC) is high
- Community Based Organizations (CBO's) have lost significant revenue due to the hunting moratorium, provision of employment and protein
- Poaching incidents have been consistently reported
- There will be no adverse effects on photographic tourism
- Any proposed off take will not be detrimental to the population
- There are opportunities to improve citizen empowerment and involvement in the sector.

The Guidelines adopted by DWNP contains additional provisions to those included in the 2001 Hunting and Licensing regulation and are focused mainly on elephant and leopard hunting.

On leopard, the guidelines provide indications on baiting and prescribes that a hunting report shall be completed by the Safari operator/professional hunter and Escort Guides before and after each hunt. All DWNP Escorting Officers, whose presence is mandatory for each hunt, are required to observe the hunt, record the observations, detach, and collect returns and compile reports of the hunt, which shall be submitted to the Regional Wildlife Officer on the first day of work after the escorting process ended. Where the hunt was not successful and the hunter has an intention to re-book and re-hunt, the Escort Officer shall not detach the return. Where the hunt was not successful and the hunting period

has elapsed or the hunter has no intention of rebooking the area, the escort guide shall detach and collect the returns.

All DWNP Escorting Officers are empowered by the Wildlife Conservation and National Parks Act of 1992 (Section 73) to act on any contravention observed.

All skulls from hunted leopards shall be provided for inspection and are measured in accordance with the SCI Official Measurer's Manual i.e., skull width + skull length (in inches).

Skull measurements from reported hunting data showed consistent leopard size between 1997 to 2009 (Table 8 D.Peake/BWPA Unpublished Data).

Table 8. The combined skull length and width frequency of leopard skulls measured between 1997 and 2009 (Total size in inches) D.Peake/Mochaba Unpublished Data).

Width + Length	1997	1998	1999	2000	2001	2002	Year 2003	2004	2005	2006	2007	2008	2009	Total
4-6"	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-8"	0	1	0	0	0	0	0	0	0	0	0	0	0	1
8-10"	0	0	0	0	0	0	0	0	0	4	0	0	0	4
10-12"	1	10	0	3	0	1	0	1	1	3	1	2	0	23
12-14"	7	12	13	17	7	7	6	15	6	9	17	7	1	124
14-16"	7	5	24	31	19	16	10	24	12	21	30	24	15	238
16-18"	2	0	5	6	5	0	3	4	3	5	2	3	3	41
18-20"	0	0	0	0	0	0	0	0	1	0	0	0	0	1
20-22"	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	17	28	42	57	31	24	19	44	23	42	50	36	19	432

From the 2021 hunting season BWPA and its members are also measuring body length of all harvested leopards (see Table 6).

This management plan requires the adoption by DWNP of a dedicated and mandatory report form for leopard hunting which is shown in Annex C and which will contribute to the monitoring framework illustrated in section 4.2 above.

Furthermore, it requires the adoption, through an amendment of the 2001 Hunting and Licensing Regulation, of a mandatory minimum length for hunting leopard, a measure already implemented with success in several African Countries such as Tanzania, Mozambique and, in the near future, Zambia based on a landmark study conducted in Tanzania (Games and Severre 2002) that analyzed the measurements of nearly one hundred leopard trophies to ascertain that a minimum body length around 130 centimeters (from tip of the nose to the base of the tail) correlated with the SCI measurement (Skull length + width) result in an adult male (Figure 15). To date, the Games and Severre (2002) report is one of the most comprehensive studies on the species in Africa.
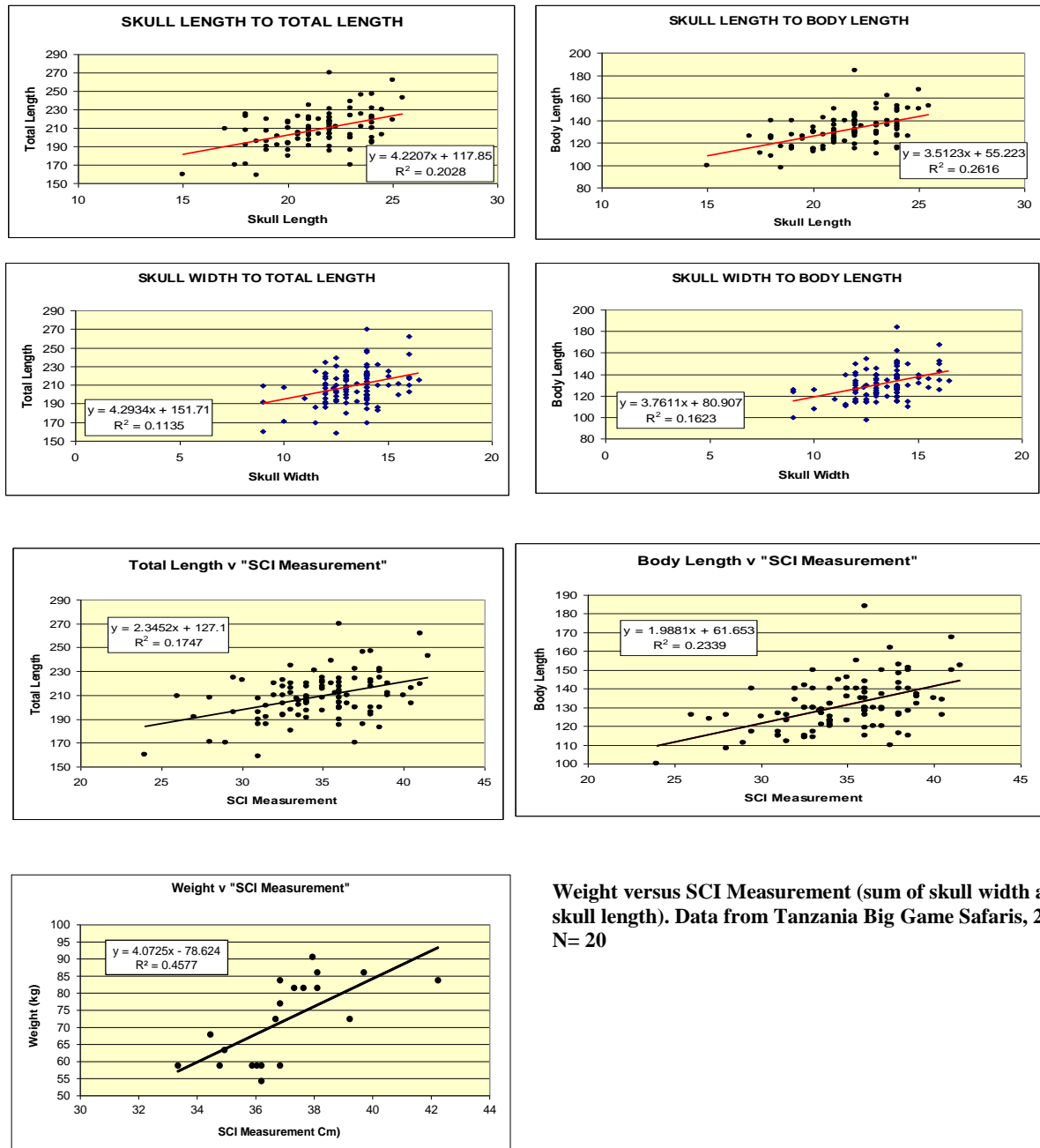
Figure 15: Relationships between skull dimensions and leopard lengths (from Games and Severre 2002. Data from TZ Wildlife Division; N=99)

The skin can be manipulated and stretched so some skins may exceed 130 cm minimum length. Body length (snout (tip of the nose) to base of tail) averages 1.32 meters and it is this measurement that is used to restrict the take-off of smaller males by hunters in Tanzania. By Regulation, hunters have to take males in excess of 1.3 meters (130 centimeters) in body length which represents a full adult male. Balme et al (2012) found dewlap development to be the most reliable indicator of leopard age. However, anecdotal information reports that dewlap is not a constant physical characteristic of all males. Considering that leopard size is extremely variable across Africa the regulated body length could include a tolerance. A methodology to ascertain leopard size in the field is described in Joubert et al (2020).

The Leopard Hunting Return Form in Annex C can also be digitalized to ease the analysis of data on hunting permit allocation, trophy quality and adaptive management to ensure long-term sustainability of the hunt in each area. It is suggested that BWPA provide an online, secure platform where Operators and PHs can fill the form populating a database useful for management purposes.

5. Implementation of the Management and Action Plan

5.1. Institutions and Roles

i. Department of Wildlife and National Parks

DWNP through the Wildlife Conservation and National Parks Act has a national mandate to manage wildlife in the country. By the same instrument it is appointed the lead agency in the conservation and management of wildlife including leopards, i.e. protection, monitoring, research, and sustainable use. It is also responsible for establishing collaborative arrangements with other governmental and non-governmental organizations to conserve and manage leopard in the country.

ii. Intra-governmental collaboration

DWNP has a specific Law Enforcement Division with an Intelligence and Investigation branch, as well as Anti-Poaching Units. All DWNP enforcement staff work closely with Botswana Police Service, the Botswana Defense Force (BDF), the Directorate of Intelligence Services (DIS) and the Botswana Revenue Service (BURS) to protect wildlife, curb illegal killing, and control trade in wildlife products. Inter-governmental organizations.

iii. Inter-governmental organizations

DWNP works closely with sister organizations from neighboring countries such as Namibia, South Africa, Zambia and Zimbabwe, in wildlife protection, information sharing and wildlife monitoring through bilateral and regional arrangements (SADC). At international levels, DWNP is both the CITES Management Authority and CITES Scientific Authority and works with other countries through CITES and other inter-governmental agreements to control trade in leopards and to promote leopard conservation. Non-governmental organizations

iv. Non-governmental organizations

Both local and international non-governmental organizations partner with DWNP in wildlife management. They mobilize resources for protection, research and monitoring, and assist directly with leopard monitoring and research programs, information sharing, and advocacy.

v. Private sector

The private sector community participates in managing leopard mainly through resource mobilization, key information sharing and advocacy. The Botswana Wildlife Producers Association (BWPA) and its members (Game Ranches, Safari hunting operators and professional hunters) is a key partner in wildlife conservation, producing key revenues for wildlife conservation in Botswana. The Farmer's Association is another important partner organization that promote co-existence with leopards and reduction of leopard-human conflict both in communal areas and commercial farms including revenge mortality, poaching and poisoning. Community Based Organizations (CBO's) are

important for proper managing and benefiting from natural resources in their concession areas including leopards.

vi. Research, Private Researchers and academic institutions

Researchers and academia are important in participating in ecological studies of leopard and in participating in the National Leopard Survey. The Botswana Carnivore Forum (BCF), for instance, is the umbrella organization on carnivore research in Botswana. BCF works with private researchers and collates carnivore research data and information (including leopards). Botswana Carnivore Forum, Leopard Ecology Conservation, private researchers and academic institutions such as the ORI, Botswana University of Agriculture and Natural Resources (BUAN) and Botswana International University of Science and Technology (BIUST) may assist in the implementation of the leopard management plan through conducting ecological studies which assist in estimating leopard population size, leopard range. They may also participate in the National Leopard Survey. The ORI, BUAN and BIUST may contribute to the implementation of the leopard management plan through conducting studies on leopards as institutions or through supervision of students on specific research areas.

5.2. Funding and resource mobilization

Adequate and sustainable funding and provision of other resources are important to effective conservation of leopard. Resources are mobilized from within DWNP, through, where possible, the private sector, intergovernmental and non-governmental organizations. The resources may be organized through hunting tax and other means. Partnerships between DWNP and other stakeholders are some of the innovative measures being developed to secure funding for leopard conservation.

5.3. Coordination

i) DWNP

Large Carnivores Conservation Committee

DWNP takes the lead in coordinating other institutions in Large Carnivores (Lion, Leopard, Cheetah, Wild Dog, Brown and Spotted Hyena) conservation activities in the country. It will convene and chair a proposed Large Carnivores Conservation Committee whose functions are: a) to review the Action Plan for Leopard Management and Conservation in Botswana and other Plans on Large Carnivores species and progress in implementing the Action Plan; b) to review budget and policy decisions by the Large Carnivores Coordinator; and c) to guide the Ministry of Environment and Tourism and its Department of Wildlife and National Parks to assume overall executive responsibility for Large Carnivores conservation and management in Botswana. The draft Terms of Reference for the Large Carnivores Conservation Committee are provided in Annex A.

Large Carnivores Coordinator

This Action Plan provides for the appointment of a Large Carnivores Coordinator within DWNP who will be responsible for coordinating Large Carnivores (Lion, Leopard, Cheetah, Wild Dog, Brown and Spotted Hyena) conservation and management activities in the country. The Large Carnivores Coordinator will liaise with the CITES Office in DWNP on international matters affecting Large Carnivores conservation and liaise with the CBRNM office for matters affecting the conservation of

Large Carnivores in communal areas. The draft Terms of Reference for the Large Carnivores Coordinator are provided in Annex B.

5.4. Monitoring and evaluation of the Action Plans

Monitoring the implementation of the Action Plan will be done using the Key Performance Indicators contained in Section 8. Monitoring the implementation will be done and reported on by the Large Carnivores Coordinator on a quarterly and annual basis with an annual report. A major evaluation of progress will be done every two years and at the end of the Plan period in 2027. Monitoring and evaluation will be done at District level and at the National level.

5.5. Links with continental and regional initiatives

This Action Plan recognizes the existence of the Kavango-Zambezi TFCA (KAZA) Carnivore Conservation Strategy and its KAZA Carnivore Conservation Coalition (KCCC) (that includes most of Northern Botswana), and initiatives that are currently taking place at a continental level, including by the African Union. These include the development of the Common Strategy on Combating Illegal Exploitation and Illegal Trade in Wild Fauna and Flora in Africa. At the SADC level initiatives involve developing a Plan of Action and implementing the SADC Protocol on Wildlife Conservation and Law Enforcement. This Action Plan will be reviewed periodically in the light of developments that are taking place in the SADC Region, Africa and beyond. In other TFCAs, specifically Kalahari Transfrontier Park (KTP) and Greater Mapungubwe Transfrontier Conservation Area, work is in progress to devise and implement Large Carnivores conservation strategies.

6. Logic and structure of the plan

This plan is based on a Logical Framework format (Table 9).

To achieve the targets set for managing Botswana's Leopards, five key components have been identified, following other species plans in the region and general guidelines on species conservation planning (IUCN-SSC, 2017):

- Biological monitoring and management
- Protection and Law Enforcement
- Social, economic and cultural framework
- Building conservation capacity
- Coordination, collaboration and program management

Table 9. Structure of the Action Plan for Leopard Conservation and Management in Botswana

Long-term Vision	The Long-term Vision applicable to the period of this plan.
Targets	These are the Targets included in the current Plan.
Key Components	The five Key Components are the primary themes or headings of the strategy under which the framework is organized.
Strategic Objectives	The Strategic Objectives reflect briefly but more explicitly the policy intention for the respective components.
Outputs (expected outcomes)	The Outputs are statements that reflect the expected results that will be realized during the time frame of the Action Plan. Outputs are therefore expressed in the past tense.
Key Activities (actions)	Key Activities represent the necessary and sufficient actions that need to be completed to achieve the Outputs. They are the actions on which the major emphasis should be placed.
Performance Indicators (PIs)	The PIs provide a basis on which to measure and monitor the success or otherwise of the Strategic Objectives, Outputs and Activities.
Means of Verification of the KPIs	It is clearly necessary for the verification and monitoring of PIs in a way they can be tracked and verified. Equally important is the need for monitoring protocols to be standardized across local (and regional levels e.g. SADC or Africa-wide) so that national and regional level PIs and statistics can be compiled. This will then allow valid comparisons of performance across regions and local areas to be made.
Implementation Strategy	DWNP, the National Large Carnivores Coordinator and the National Large Carnivores Management Committee will interact and collaborate with a wide range of agencies and stakeholders in the implementation of this Action Plan.

7. Vision, Targets, and Key Components

> **VISION:**
> *Leopards conserved and managed sustainably for their aesthetic, cultural and ecological values and the socio-economic development of Botswana*

> *Goal: (Immediate objective or purpose):*
>
> *To secure viable Leopard populations across different land uses, whilst mitigating their negative impacts and enhancing their value for the benefit of people through sustainable use.*
>
> <u>***Targets***</u>:
>
>   a. *To generate an accurate range map and best possible population estimates for Botswana*
>   b. *To introduce and assess the implementation of various conflict mitigation strategies*
>   c. *To implement a hunting program that uses best practices for minimal population disruption and best population management practices for Leopard conservation*
>   d. *To build capacity for Batswana in the study, management and conservation of Leopards*
>   e. *To share current Leopard status to stakeholders, specifically commercial livestock farms, farms and cattle posts, about Leopard ecology, management and conservation*
>   f. *To implement the Leopard Management Plan with feedback on set benchmarks for adaptive management*
>   g. *To be a model for responsible Leopard management and utilization through tourism, controlled hunting and coexistence*

Key Components	1. Biological monitoring and management	2. Social and Economic Framework	3. Protection & Law Enforcement	4. Conservation Capacity	5. Coordination, Collaboration and program management
Strategic Objectives	**Objective 1.** Implement effective biological, ecological and management monitoring in support of viable Leopard populations.	**Objective 2.** Implement strategies that enhances the contribution of Leopards to livelihoods, protected area management and national development	**Objective 3.** Ensure effective protection of all Leopard populations in Botswana	**Objective 4.** Ensure that sufficient and trained personnel, equipment, infrastructure and financing are mobilized, available and used efficiently and effectively for Leopard conservation	**Objective 5.** Ensure effective coordination and collaboration with local, national and international stakeholders to implement these strategic objectives
Outputs	**1**. Adaptive, science-based management to achieve viable populations and acceptable habitat condition implemented	**2.** Participatory mechanisms improved, and the fair distribution of financial benefits from Leopards improved and tolerance for those living with Leopards increased.	**3.**. Management, security and law enforcement actions to minimize retaliatory/ illegal losses of Leopards, their prey and their habitats, implemented	**4.** Sufficient numbers of trained, equipped, motivated and effective personnel are deployed and operational.	**5.** Coordination mechanisms to assess and review adaptive Leopard population management and strategic planning established and operating.

8. Action Plans

8.1. Biological monitoring and management

Objective: Implement effective biological, ecological and management monitoring in support of viable Leopard populations.
Output: Research, monitoring and adaptive, evidence-based management to maintain viability of all Leopard sub-populations implemented
KPIs: Leopard populations are genetically and demographically viable
MV: Results on population trends from agreed national monitoring plan and analyses of changes in population structure and viability,

Key Activities/Actions	Performance Indicators	Means of Verification	Time Frame	Responsibility
1.Develop & implement a monitoring framework that combines six complementary types of information: **(a)** presence-only data (e.g. spoor surveys), **(b)** detection/non-detection data for occupancy modelling, **(c)** systematic and robust Leopard population density estimate surveys at a local scale e.g. camera trap surveys (baited and un-baited to compare methodologies) **(d)** analysis of data on problem animal incidents, controlled hunting (see Annex C Leopard Hunting Return Form) including effort and harvest composition, **(e)** citizen science e.g., through tourist photographs and reported sightings, and **(f)** Management Oriented Monitoring Systems (MOMS). Refer to section 4.2 of the Plan.	Document outlining the standard monitoring framework drafted Structured databases established	Document outlining the standard monitoring framework approved. Data sheets completed & uploaded to database	Document on standard monitoring framework by January 2025 Database establishment by January 2025	DWNP, Large Carnivore Management Committee, Large Carnivore Coordinator
2.Set up and conduct population surveys with multiple methodologies (spoor, camera traps, scat detection dogs, questionnaires, citizen science) and variable intensities to improve knowledge on the species.	1.Number of Leopard surveys categorized by methodology and outputs *For density estimates the half reference confidence interval width should be set to 30% according to IUCN Guidelines (minimum standard)* 2.Percentage of land area surveyed for Leopard.	Leopard population estimates, density and spatial distribution maps (categorized by methodology and outputs) Standardized survey reports from stakeholders that briefly outline methodology, define sampling effort, and provide the estimate with calculated HRCIW (half relative confidence interval width) Maps showing percentage of the	First set of results coming from camera traps – December 2024 Results coming from other methodologies December 2024 and then on a yearly basis	DWNP, BWPA, Private Researchers, Academic Institutions.

	3. Percentage of different strata (habitats and land uses) covered by surveys	surveyed areas compared to country area. Maps indicating percentage of different strata (habitats and land uses) covered by surveys.		
3. Establish a National Leopard Research Programme (LNRP) to be run in synergy with the population monitoring activities.	Concept paper drafted by DWNP and selected stakeholders devising components and actions of the LNRP. Paper submitted for approval	Concept paper approved LNRP Fledging	By April 2025	DWNP in conjunction with Research and Academic Institutions
4. Establish current Leopard distribution.	1. Map of current Leopard distribution based on results from the monitoring framework 2.Estimates every two years of distribution expansion / contraction based on all available information	Current estimate of Leopard distribution and subsequent bi-annual estimates and associated maps Reports on Leopard locations from sightings and surveys.	Map produced on a yearly basis summarizing the monitoring results Immediate and at biennial intervals	DWNP in conjunction with BWPA, Private Researchers and Academic Institutions
5. Collect bio-samples such as skin, hair, blood and scat from Leopards throughout the country (darting, mortalities, hunting etc.) for genetic analysis to assess genetic diversity, genetic viability and genetic connectivity between subpopulations.	Establish guidelines and S.O.Ps. on collection, use and analysis of Leopard and other wildlife bio-samples for conservation and law enforcement purposes including, but not limited to, the establishment of a national repository for wildlife genetic samples and a genetic database sequencing information. Number of Leopard genetics research. Number of Analysis of genetic diversity, viability and connectivity performed	Guidelines approved. Reports and published articles on Leopard genetic diversity, viability and connectivity	Guidelines published by June 2026 Reports and published articles December 2026.	DWNP, Department of Veterinary Services , Private Researchers and Academic Institutions, Law Enforcement Authorities, Health Authorities. Private Sector.

6.Monitor trophy quality and adjust quotas	a) Database, field recording protocols and data collection forms established b) Annual analysis of trophies taken as % of quota, and trend in trophy quality	Database on trophy quality Consolidated annual records of trophies taken. Annual report of trophy quality by quota-bearing CHA for quota setting workshop	Database on trophy quality created by December 2025. Annual report on trophy quality	DWNP, BWPA
7.Monitor effects of management activities & revise or continue as appropriate	Suitability & effectiveness of management inputs determined Subsequent management activity selected & implemented	1.PAC Reports 2.MOMS modules monthly & annual summaries 3. Citizen science and photo tourism reports	Ongoing and on a quarterly and annual basis.	DWNP, Large Carnivore Management Committee, Large Carnivore Coordinator

8.2. Social, economic and cultural framework

Objective: Implementing strategies that enhance the contribution of Leopards to livelihoods, protected area management and national development

Output: Fair distribution of financial benefits from Leopards improved and tolerance for those living with Leopards increased

PIs: 1. Annual assessment of Leopard derived benefits reveals that they are increasingly being dispersed more equitably between deserving stakeholders and the contribution to national development is assessed. 2. Trends in number of incidents of human-Leopard conflict decline annually

MV: Report on the annual assessment of the distribution of revenues from consumptive and non-consumptive use of Leopards and record and annual analyses of Human-Leopard Conflict incidents.

Key Activities/Actions	Performance Indicators	Means of Verification	Time Frames	Responsibility
1. Provide incentives and promote partnerships and joint venture opportunities to strengthen Leopard conservation, across all land uses.	1. Policy instruments that demonstrate and establish incentives to conserve Leopard/Large Carnivores 2. Improved levels and growing trends of private and community investment in Large Carnivores conservation measures 3. Number of poaching incidents/numbers of arrests based on prior information and leads from communities / land holders 4. Number of Legal killings of Large Carnivores reduced through incentive schemes.	1. Documented policies approved/implemented containing, inter alia, incentives for Leopard/Large Carnivores conservation. 2. Formed/approved operating private-community partnerships/joint ventures that promote Leopard/Large Carnivores conservation and management. 3. Regular (monthly) reports that includes number of Large Carnivores poaching incidents and/or arrests generated from community intelligence. 4. Experimenting which incentive schemes that lead to a reduction in number of mortalities of large carnivores due to legal removal (killing of problem animals according to the law).	Documented policies December 2025. Joint venture partnerships formed by June 2026. Incentive Schemes by December 2025	DWNP, Community Trusts, Large Carnivore Management Committee, Large Carnivore Coordinator
2.Implement existing measures and develop and implement new measures to protect subsistence (communal) and commercial livestock from predators.	1) Predator attacks on livestock reduced to a level that farmers can tolerate. 2) No. of tested predator proof kraals installed and in use including strengthening of existing kraals to cover all husbandry. 3) No. of deterrents (flashing lights,	Quarterly reports produced from implementing partners Reduction of livestock losses in %.	Annually and starting from 2nd quarter of 2025.	DWNP, MOA (Department of Animal Production), MLWS Ministry of Land and Water Affairs, BWPA, Private Researchers, Academic institutions,

	movement activated sirens, fladry, etc.) installed and in use 4) No. of livestock guarding dogs deployed and in use 5) No. of chemical repellents deployed and in use			
3. Explore full range of Public-Private-Community Partnership to enhance Leopard management of both public, communal and private protected areas	Formation of PP-Community Partnership	Reports on Leopard management in public, communal and private protected areas enhanced by PP-Community Partnership	Ongoing	DWNP, Community Trusts, NGO's, Protected Areas, Private sector Large Carnivore Management Committee, Large Carnivore Coordinator
4. Facilitate the transparent distribution of the benefits and costs of Leopard/ Large Carnivore conservation and management.	Policy instruments adopted that result in more transparent and equitable benefit distribution.	Policy approved Detailed annual record of extent and distribution of Leopard derived benefits by sectors (photo tourism, hunting, livestock farming, handcrafts) and beneficiaries (revenue, development projects, products) and costs of Leopard conservation	Annually and ongoing	DWNP, Community Trusts, BWPA, Ministry of Finance, NGOs, Private Researchers and Academic institutions
5. Develop and implement effective techniques and land use strategies and protocols to mitigate human-Leopard conflict: - Integrated land use planning - Education and awareness - Accountable incident reporting, data collection and analysis - Community driven tactical interventions. Social security, tolerance funds, payments for Ecosystem Services	National Human Wildlife Conflict (HWC) Policy that harmonize actions and protocols for land use and human-Leopard/Large Carnivores conflicts developed and implemented by June 2024 Declining trends in incidents of human-Leopard/Large Carnivores conflict Research report on strategies and protocols to develop wildlife-based land use system and mitigate HLC.	Approved National Policy on HWC Records of human-Leopard conflict incidents reported in a proper Database Records of Leopard distribution Research Report published	Policy approved by 2025 Database running by 2025	DWNP, Min of Agriculture, Department of Animal Production, Ministry of Land, BWPA, BCF, Private Researchers, Academic institutions

6. Include information on Leopard/Large Carnivores and their conservation in school curricula and promote environmental education in particular in rural areas adjacent to key Leopard/Large Carnivores populations.	1. Leopard/Large Carnivores information packages developed and delivered to primary, secondary and tertiary institutions. 2. Proportion of schools receiving and using information on Leopard/Large Carnivores	1. Information packages/modules developed on Leopard / Large Carnivores conservation 2. Reports of delivery and number of schools using Leopard/Large Carnivores conservation information packages	December 2027	DWNP, BWPA, Private Researchers, Academic institutions
7. Engage Farmer Associations, Game Ranches and other local organization to devise and implement a carnivore coexistence strategy meant to reduce retaliatory killings.	Develop a document that outlines a carnivore coexistence strategy program for Farmers and Game Ranchers	Document approved between DWNP and Farmers Association and Game ranchers in a National Workshop.	October 2026	DWNP, BWPA, Farmers Associations.
8.Assess the impact of legislation (Article 46 Wildlife Act) and compensation policy which may provide perverse incentives on the conservation of wildlife/large carnivores and their contribution to national development.	Drafting group formed by DWNP with multidisciplinary stakeholders Impact of legislation (Article 46 Wildlife Act) and compensation policy assessment completed.	Nomination of multidisciplinary drafting group Assessment report completed.	December 2026 October 2025	DWNP, MET, Ministry of Finance, MOA (Department of Animal Production), Ministry of Land, BWPA, Private Researchers, Academic institutions
9. Develop and implement an effective awareness raising and communication strategy for local, regional and international audiences which includes positive examples of best practices in Leopard/Large Carnivores conservation and management taking into account target audiences and their needs.	Communication strategy developed and launched by December 2024 No. of outreach events No. of documentation (media, etc)	Relevant documentation prepared	December 2026	DWNP, MET, BWPA, Private Researchers, Academic institutions, Media specialists.
10. Draft a wildlife-based economy framework concept paper for Botswana based on the *State of the Wildlife Economy in Africa*. Report (Snyman et al 2021).	1.Concept framework paper drafted by a Working group established by DWNP	Paper on wildlife economy ready for presentation at National Level	February 2026	DWNP, Academic Institutions.

8.3. Protection and Law Enforcement

Objective: Ensuring effective protection of all Leopard/Large Carnivores populations in Botswana

Output: Management, security and law enforcement actions to minimize retaliatory/ illegal losses of Leopards/Large Carnivores, their prey and their habitats, implemented

PIs: Retaliatory/poaching of Leopard reduced progressively by at least 5% annually based on improved records of reported HWC.

MV: National level monitoring data on illegal activity, successful convictions, status and trends of all Leopard/Large Carnivores populations, verified data on extent of available habitat.

Key Activities/Actions	Performance Indicators	Means of Verification	Time Frame	Responsibility
1. Establish & support anti-poaching teams, intelligence, crime investigation systems & infrastructure for Leopard and Large Carnivores.	Anti-poaching teams, intelligence & crime investigators trained Informer systems operating at all levels of a poaching syndicate. Number of arrests resulting from intelligence.	Anti-poaching, intelligence, investigation training reports Reports, records of arrests & successful prosecutions from informer reports Records of payments for information	December 2025	DWNP, BDF, BPS, DIS.
2. Promote inter-agency law enforcement cooperation on Leopard and Large Carnivores	Joint operations Coordination of national & international agencies	Joint operations reports National and interaction joint operation	Ongoing August 2025	DWNP, BDF, DIS, BPS
3. Promote rural community involvement in law enforcement using incentive schemes & reporting hotlines	Incentives & hotlines established & used Community contribution to law enforcement increased Publicity drives.	Records & reports of cases emanating from public action.	July 2025	DWNP, BPS, DIS, CBOs and Community Trusts.
4. Enhance international and transboundary collaboration in law enforcement to improve security of Botswana's borders & combat illegal offtake on Leopard and Large Carnivores.	Regular meetings on law enforcement collaboration and activities between law enforcement agencies of neighboring countries established at regional / transboundary park level Joint border surveillance. 2. Broader collaboration with INTERPOL and other international law enforcement entities.	Proceedings of meetings & workshops Reports of joint border patrol activities & outcomes Reports of actions undertaken	August 2026	DWNP, BPS, DIS, BDF.
5. Policing hunting regulations – checking licenses etc.	Number of staff deployed Incidents recorded	Records; fines	Ongoing	DWNP

8.4. Building conservation capacity

Objective: Ensuring that sufficient and appropriately trained personnel, equipment, infrastructure and financing are mobilized, available and used efficiently and effectively for Leopard/Large Carnivores conservation

Output: Sufficient numbers of trained, equipped, motivated and effective personnel are deployed and operational

PI: Law enforcement, monitoring and research staff are trained ,equipped and deployed at levels that enable them to implement this action plan as specified in the previous three components

MV: KPIs for Components 1, 2, 3, and 5 are being met, individual staff training records, equipment registers, vehicle and staff deployments for Leopard/Large Carnivores conservation.

Key Activities/Actions	Performance Indicators	Means of Verification	Time Frames	Responsibility
1. Analyze current Leopard/Large Carnivores conservation capacity/capability in DWNP, NGOs, CBOs and Private Sector, and identify needs in relation to overall plan objectives and targets (section 7)	Capacity assessment and needs report completed by December 2025	Capacity assessment report	December 2025	DWNP, NGOs, CBOs and Private Sector,
2. Secure funding to support the implementation of the current Leopard management & action Plan and other Large Carnivores similar plans by expanding the income stream from both consumptive and non-consumptive utilization.	1. Funds and allocated budget for Leopard/Large Carnivores conservation meet annual requirements for effective conservation. 2. Proof of revenues and targeted expenditures at DWNP level for Leopard conservation deriving from both consumptive and non-consumptive utilization 3. Reform the current Conservation Trust Fund (CTF) to include revenues from carnivore's utilization.	Record of funds available (USD) and investment by DWNP, Private sector, NGOS, and CBOs in Leopard/Large Carnivores conservation measures (Compiled annually by Large Carnivores Coordinator)	Immediate and in accordance with 8.5 (6).	DWNP,
3. Establish sustainable funding programs to build and maintain necessary human resources to meet Leopard/Large Carnivores	1. Manpower density for protection of Leopard/Large Carnivores (No. of km²/operational field person) 2. Level of effective deployment of field staff	Consolidated record of number of field personnel and days operational (law enforcement, research and monitoring, Carnivores management) for each area in the Leopard/Large Carnivores range	Immediate and in accordance with 8.5 (6).	DWNP,

conservation objectives	(e.g., record % of available man days spent on patrol in the field)	compiled and reported on at annual planning meetings. Records of vehicle months, VHF radio operation, fully functional stations, operating research facilities, compiled and consolidated at station, area and regional levels and reported on to the Large Carnivores Management Committees bi-annually		
4. Initiate and/or maintain continuity in research and monitoring necessary for the conservation and adaptive management of Leopard/Large Carnivores and their prey	1. Number of research programs 2. Research-person days spent on monitoring / assessing Leopard/Large Carnivores populations 3. Research person days spent on monitoring Leopard/Large Carnivores population parameters in each population/region. 4. Duration of research/monitoring programs 5. Number of long term (more than 10 years) research/monitoring programs per different habitats/land uses	Research reports and papers on Leopard/Large Carnivores conservation and management No. of Long-term permits issued. (renewals included)	December 2026	DWNP, Private Researchers, Academic institutions, CBOs and Private Sector
5. Strengthen research capacity in DWNP and collaborate with other research institutions	1. Number of researchers (internal and external), budgets, equipment, vehicles, and active research programs increased by more than 25% by July 2025 and 50% by July 2026	Staff register, budget allocations, Asset register, research permits issued, MOUs with collaborators, reports and published papers on Leopard/Large Carnivores conservation and management.	March 2026	DWNP, Private Researchers, Academic institutions.
6. Establish training and in-service retraining of personnel in law enforcement, research and monitoring, education, public awareness and community-based organizations on Leopard/Large Carnivores management, etc.	Increased levels (10% annually) compared to June 2024 levels in: 1. Number of training days and programs initiated 2. Number of staff trained (rangers, ecologists, extension officers) 3. Number of communities trained and implementing Leopard/Large Carnivores management programs 4. Number of Leopard/Large Carnivores conservation campaigns conducted	Record of staff training and re-training in staff files and annual summary report of training Record of communities trained Record of training programmes	Ongoing and on annual basis	DWNP, Private Researchers, Academic institutions.

7. Establish effective reporting procedures that enable capture/consolidation of data from field to Headquarters levels.	Implement SMART and/ equivalent effective data capture and management systems	No. of areas implementing SMART Data base	Ongoing and on an annual basis	DWNP
	Data management integrated with the SMARTBOTS national program when free broadband available	MOMS database operational		
	MOMS data capture and reporting database			

8.5. Coordination, collaboration and program management

Objective: Ensuring effective coordination and collaboration with local, national, and international stakeholders to implement the strategic objectives of the Action Plan

Output: Coordination mechanisms to assess and review adaptive Leopard/Large Carnivores population management and strategic planning established and operating

PI: National Large Carnivores Coordinator appointed, national Large Carnivores Working Group established and active, and an information dissemination program operational

MV: Large Carnivores Coordinator's quarterly reports, minutes of meetings, and records of completed planned actions/activities, record of Large Carnivores Working Group meetings and activities.

Key Activities/Actions	Performance Indicators	Means of Verification	Time Frames	Responsibility
1. Establish a national Large Carnivores (Lion, Leopard, Cheetah, Wild Dog, Brown and Spotted Hyena) conservation & management steering/implementing committee that includes stakeholder meetings at least bi-annually to review progress and to develop an annual implementation plan	1. National committee functional and meeting once a year (or more if required) 2. Committee meeting minutes, with actionable points approved, circulated within one month of meetings 3. Number of resolutions/action points, acted upon	Record of meetings, minutes, actions approved and completed	Immediate at the approval of this plan	DWNP
2. Strengthen links with neighboring States to confer on the management of shared Large Carnivores populations, particularly, but not limited to, in relation to TFCA populations.	1. Consultative meetings held with neighboring States on shared Large Carnivores populations at least twice each year 2. Joint cross border projects initiated and completed	1. Record of attendance at and reporting to regional and international Large Carnivores conservation bodies of which Botswana is a member 2. Record of project initiated/completed	Ongoing	DWNP
3. Nominate/Confirm a full-time Large Carnivores Coordinator position to be responsible for coordinating the implementation of the Leopard and other large carnivores Management & Action Plans or conservation strategies.	1. Large Carnivores Coordinator appointed with full terms of reference 2. Monthly reports from Large Carnivores Coordinator on implementation	1. Large Carnivores Coordinator contract and date of appointment 2. Record of reports by the person in the Large Carnivores management position	Immediate at the approval of this plan	DWNP

4. Strengthen coordination between the hunting industry and the Leopard Management & Action plan	1. Regular meetings and workshops convened with the hunting industry on hunting and Leopard management issues	1. Record of meeting and workshop proceedings	Ongoing	DWNP, BWPA.
5. Establish and implement an effective information dissemination and communication strategy, including regular progress reports on its implementation	1. Outreach programs conducted 2. Information packages produced on Large Carnivores conservation Research papers published	Reports, brochures, flyers, web site Published papers	December 2025	DWNP, Large Carnivore Committee.
6. a) Develop Priorities and Budget for the implementation of the plan and relevant progress reports. b) Based on the Priorities and Budget document develop a fundraising strategy for the implementation of the plan	Priorities and budget documents prepared Fundraising strategy developed	Priorities and budget documents approved. Fundraising strategy approved	Immediate and at the same time of the approval of the plan and on a yearly basis thereafter	DWNP, Large Carnivores coordinator

9. Concluding comments

This is one of the first management action plans on leopards ever created at the continental level, and it focuses on a species that is extremely challenging to study. Since all of these action plans entail overlapping actions, notably in the areas of capacity building, social, economic, and cultural frameworks, and law enforcement, many of the components that make up the Elephant Management Plan are also featured here.

Finding strategies to coordinate these efforts so that they can function at all levels, from the national to the local, is crucial.

A Large Carnivore Management Committee may be established and kept up to date, providing DWNP with access to a greater pool of scientific and technical knowledge to help with implementation of this action and other action plans and it will be important to pave the way for future conservation developments.

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11. ANNEXES

Annex A. Draft Terms of Reference for the Large Carnivore Conservation Committee

Function: To review the Action Plan for Leopard Management and Conservation in Botswana and other Plans on Large Carnivores species (Lion, Leopard, Cheetah, Wild Dog, Brown and Spotted Hyena) and progress in implementing the Action Plan; to review budget and policy decisions by the Large Carnivores Coordinator; to guide the Ministry of Environment and Tourism and its Department of Wildlife and National Parks to assume overall executive responsibility for Large Carnivores conservation and management in Botswana.

Role of Individual Committee Members: The role of the individual members includes:
- Understanding the strategic implications and outcomes of initiatives being pursued through the Action Plan Outputs;
- Appreciating the significance of the Action Plan's implementation for major stakeholders and for the future of Large Carnivores conservation;
- Being committed to and actively involved in, implementing the most efficient and effective Action Plan;
- Being willing to suggest changes to the Action Plan to achieve efficiency and effectiveness.

Duties: The Committee's primary responsibilities include:
- Ratifying major technical decisions concerned with Large Carnivores conservation and management;
- Developing and implementing Large Carnivores policy;
- Ensuring the successful implementation of all required actions;
- Advising the Large Carnivores Coordinator and DWNP on sourcing of funds;
- Monitoring funding, expenditure and effectiveness.

Composition: The members of the National Large Carnivores Management Committee include:
- Director DWNP (Chair);
- Large Carnivores Coordinator (Secretary);
- Representatives of DWNP, MET, CBOs, Botswana Police, Botswana Defence Force, DIS, Ministry of Agriculture and Food Security, Ministry of Land Management, Water and Sanitation Services, HATAB, BOGA, Academic Institutions, NGOs, Independent researchers and BWPA.

Time Frame: The Committee will meet at least twice a year, and can be called upon to meet more frequently as the need arises.

Minutes and Meeting Papers: Minutes will be kept by the Large Carnivores Coordinator. Minutes will be circulated within one month of Committee meetings. Resolutions and action points will be kept by the Large Carnivores Coordinator. Actions may be taken without a meeting by a signed unanimous consent circulated, compiled, and maintained by the Large Carnivores Coordinator.

Quorum Requirements: A quorum exists when [75%] of the Committee members are present.

Annex B. Draft Terms of Reference for the Large Carnivores Coordinator

The role of the Large Carnivores Coordinator is to:

- Coordinate the implementation of the leopard and other Large Carnivores management and Action Plans or conservation strategies

- Produce quarterly reports on the implementation of the leopard management plan

- Produce records of completed planned actions/ activities of the leopard management plan

- Perform Secretariat assistance to the Large Carnivore Conservation Committee

- Strengthen links with neighboring states to confer on the management of shared Large Carnivores populations

- Attend consultation meetings held with neighboring states on shared Large Carnivores populations

- Participate in cross-border projects

- Attend regular meetings and workshops with the hunting industry on hunting and leopard management issues

- Produce information packages on Large Carnivores conservation.

- Conduct outreach programs on Large Carnivores.

- Establish communication platform to achieve communication between all stakeholders.

MONITORING OF LEOPARD HUNTING
LEOPARD HUNTING RETURN FORM (3 PAGES)
PLEASE FILL OUT ONE FORM FOR EACH LEOPARD HUNT

LEOPARD HUNT RETURN FORM

GENERAL DATA ON THE HUNT

HUNTING AREA		DATE OF HARVEST:	
HUNTING OPERATOR		CLIENT NAME AND SURNAME:	
HUNTING LICENSE NO:		NATIONALITY:	
PROFESSIONAL HUNTER		**CELLULAR NUMBER**	
EMAIL ADDRESS		**SIGNATURE:**	

1. HUNT START DATE:

2. MINIMUM NUMBER OF DAYS BOOKED BY CLIENT FOR LEOPARD HUNT:

3. WAS THE HUNT SUCCESSFUL?
    IF NOT, WHY NOT?

4. PRE-BAITING (were baits deployed before the hunt started with the client):

5. NUMBER OF BAIT SITES USED DURING HUNT (including pre-baiting if applicable):

6. NUMBER OF BAIT SITES FED ON BY LEOPARD (including pre-baiting if applicable):

7. TOTAL NUMBER OF BAIT NIGHTS (including pre-baiting if applicable): The total number of nights that all bait sites were open (e.g. if 6 bait sites were open for 1 night = 6 bait nights)

8. TOTAL NUMBER OF BAITS USED (including pre-baiting if applicable): The total number of times that bait sites were 'freshened' with new bait

9. SEX & AGE OF LEOPARD FEEDING ON BAITS DURING HUNT:

SEX & AGE OF LEOPARD FEEDING ON BAITS DURING HUNT:	NUMBER:	EVIDENCE (SIGHTING, TRACKS, TRAIL CAMERA):
Adult male		
Adult female		
Sub-adult male		
Sub-adult female		
Juvenile		
Unknown		

| Insert a picture with the measurement of the width of the back pad of the front foot taken around the bait area.	NOTES:

IF A TROPHY WAS TAKEN:

10. NUMBER OF DAYS INTO HUNT BEFORE TROPHY IS TAKEN:
11. GPS LOCATION OF HUNT:
12. SEX:

MEASUREMENTS (in Centimeters =cm): FILL TABLE BELOW – SHALL BE DONE BEFORE SKINNING:

13. Total length (cm, tip of nose to tip of tail; Measurement A–B):
14. Body length (cm, tip of nose to base of tail: Measurement A-E)
15. Shoulder height (cm, tip of scapula to back of plantar pad; Measurement C):
16. Neck circumference (cm, immediately behind the ear; Measurement D):
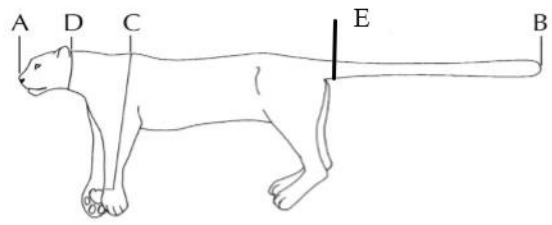
17. Skull length (in centimeters = cm, and inches=in., greatest length of skull, measured as a straight line between pegs):
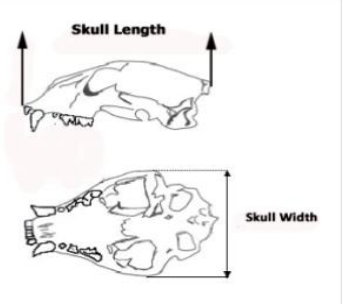
18. Skull width (cm and in., greatest width of skull, measured across zygomatic arches)

19: Total skull size length + width (cm and inches)

20. Weight (kg, weight of leopard)

MEASUREMENTS TABLE

13. Total length (cm, tip of nose to tip of tail; Measurement A–B)	
14. Body length (cm, tip of nose to base of tail: Measurement A-E)	
15. Shoulder height (cm, tip of scapula to back of plantar pad; Measurement C)	
16. Neck circumference (cm, immediately behind the ear; Measurement D)	
17. Skull length (in centimeters = cm and inches=in., greatest length of skull, measured as a straight line between pegs)	
18 Skull width (cm and in., greatest width of skull, measured across zygomatic arches)	
19. Total skull size length + width (cm and in.)	
20. Weight (kg, weight of leopard)	

Ensure all data are accurate and no blank spaces are left. Page 1 and 2 must be completed even if a leopard hunt was unsuccessful. Ensure GPS coordinates are provided throughout.

SAMPLE COLOUR PHOTOGRAPHS

A. **High quality color photographs required before the trophy is skinned:**

1. Side view showing the entire body with the hunter positioned directly behind for scale. Useful for assessing body size and condition.
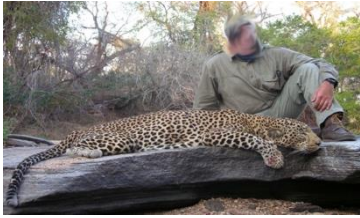
SAMPLE

2. Side view of the head (which must be lifted) and shoulders, showing neck circumference.

SAMPLE

3. Frontal view of the face showing the condition and position of the ears, and facial scarring.

SAMPLE

SAMPLE.

4. Close up of the nose clearly showing the pigmentation.

5. Frontal view of the teeth showing coloration and wear on the canines and incisors.

SAMPLE

6. Hindquarters clearly showing the presence or absence of a scrotum.

SAMPLE

B. **High quality color photographs required from the cleaned skull:**

7. Lower jaw showing all the teeth and chipping of the enamel ridge on the back of the canines.

.

SAMPLE

8. Upper jaw showing all the teeth and chipping of the enamel ridge on the back of the canines.

SAMPLE

9: Side view of the lower jaw (either side) showing the canine and wear on the cusps of molars and premolars.

SAMPLE

10. Wide shot of all the teeth showing wear, broken teeth, and teeth coloration. **SAMPLE**

Ensure all data are accurate and no blank spaces are left. <u>Page 1 and 2 must be completed even if a leopard hunt was unsuccessful.</u> Ensure GPS coordinates are provided throughout. RETURN THE FORM TO DWNP AND BWPA [EMAIL ADDRESSES] VIA EMAIL AS SOON AS THE HUNTING IS COMPLETED AND MAINTAIN THE PRINTED AND SIGNED ORIGINAL IN A SAFE PLACE.

-x-

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