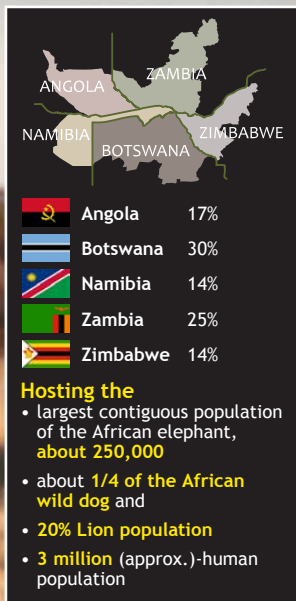




KAVANGO ZAMBEZI

TRANSFRONTIER CONSERVATION AREA (KAZA TFCA)

A MANUAL for REDUCING and MITIGATING HUMAN-LARGE PREDATOR CONFLICT (HLPC)



Lion (*Panthera leo*)

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Abbreviations

HACSIS	Human Animal Conflict Self-Insurance Scheme
HWC	Human Wildlife Conflict
KAZA TFCA	Kavango Zambezi Trans-Frontier Conservation Area
PA	Protected Areas

KAZA Mission



“To sustainably manage the Kavango Zambezi ecosystem, its heritage and cultural resources based on best conservation and tourism models for the socio-economic wellbeing of the communities and other stakeholders in and around the eco-region through harmonisation of policies, strategies and practices”

1. Introduction

Kavango-Zambezi Transfrontier Conservation Area (KAZA TFCA) is a transboundary collaborative initiative of five Partner States; Angola, Botswana, Namibia, Zambia and Zimbabwe in the conservation of shared natural resources and the development of the communities in and around the landscape. The TFCA is a mosaic of multiple land uses composed of:

- Protected areas (PAs) in the form of national parks; game reserves;
- wildlife/game management areas; forest reserves; and conservancies/ community concessions areas; and
- Communal areas (settlement, pastoral, and arable farming).

There are about 3 million people settled across the KAZA landscape. The human population is mainly rural communities that are largely dependent on subsistence pastoral and arable agriculture. The multiple land use status of the KAZA landscape present many development challenges and opportunities for the affected communities.

Human-Wildlife Conflict (HWC) is fast becoming a serious threat to the survival of carnivorous species that include large predators. In the KAZA TFCA, large predators, humans and their livestock have coexisted for millennia. Recent decades have seen a dramatic increase in the frequency of human/large predator conflict resulting mainly from ever-increasing human population's need for more land. The demographic and social changes have placed more people in direct contact with large predators as settlements expand into and around protected areas. Within the KAZA TFCA and surrounding areas, where many rural people live in close proximity to protected areas, a single incident of livestock or human life loss can impose severe economic and livelihood hardships on individuals and families. In retaliation, humans usually shoot, poison, capture, injure or kill the large predators.

KAZA TFCA, the world's largest transfrontier conservation area in the world, is an extremely important conservation landscape for large predators particularly the African lion (*Panthera leo*), cheetah (*Acinonyx jubatus*), leopard (*Panthera pardus*), African wild dog (*Lycaon pictus*) and spotted hyena (*Crocuta crocuta*). These predators are also a key attraction for the tourism industry in the KAZA landscape, therefore their persecution because of livestock depredation can have negative impacts not only on the ecological processes, but on the tourism industry as well. In order to reduce and mitigate the undesirable results of interactions between humans and large predators, there is need to provide information to all stakeholders in KAZA TFCA on various methods that may enable more harmonious coexistence of people and these animals.



Figure 1: A lioness can ruin a small farmer's livelihood by killing even a single cow, especially one that is pregnant or producing milk.

1.1 Goal of the manual

The overall goal of this manual is to:

- Improve the understanding of conflict between people and large predators, and
- Assist the affected communities in applying available best management practice to reduce and mitigate the conflicts.

1.2 Objectives of the manual

The objective of this Manual is to:

- Equip communities and government extension authorities with knowledge on human-large predators conflicts; and
- Assist relevant stakeholders to apply best management practices in reducing and mitigating human large predators conflicts.

1.3 Targeted users of the manual

- Farmers (subsistence and commercial) experiencing and affected by human large predators conflicts;
- Wildlife managers and extension officers; and
- People interested in coexistence of people and large predators.

2. Human large-predator conflict

Large predators require vast areas in which to roam, but human expansion and subsequent harassment by people increasingly restricts large predators to PAs. In KAZA, interactions between humans and large predators are increasing as human occupation of land expands. Not all conflict is due to anthropogenic activities as life history strategies of large carnivores' plays a part, such as the expulsion of young adults from prides leading them to stray into grazing land in fear of territorial males. Most of this conflict takes place on the periphery of protected areas where cattle herders often trespass into PAs, and new settlement, most of which undesignated, tend to be established on the borders of PAs, increasing the risk of large predators' attacks on livestock and people.

All large predators; African lion, cheetah, leopard, African wild/painted dog and spotted hyena, hunt or prey on wild animals. With the increasing human-wildlife interface, and livestock's proximity to PAs and its inability to escape as fast as wild prey species, livestock become an easier prey for predators. This can, in many instances lead to development of habituated behaviour of predators switching from wild prey to livestock. This can be devastating on the small scale traditional farmers who depend on a few livestock and can thus become a significant problem at the local levels and induce drastic human retaliation, and negative implication on the predator population. In order to address the HWC and apply appropriate mitigation measures one must understand the behavioural characteristic of the predator.

Figure 2: A steer that survived mauling by predators.



2.1 Behavioral traits and instance of attack by large predators

Lions

- Lion attacks are numerous around most PAs in the KAZA region that are adjacent to the communal areas particularly where there are no buffer zones.
- Their attacks on livestock increase significantly where livestock is grazed or watered within the park boundary attracting them directly to the kraals at night.
- Lions are most active, mobile, and hunt during the night, but they can also hunt during the cool hours of the day. Livestock that lag behind and is not kraaled at night is at highest risk from depredation.
- Lions' behavior particularly towards humans changes at night where they become much bolder and take on more risks to obtain prey, or even attack humans.
- Lions depend on visual identification of their prey, thus targeting a specific individual before committing to an attack rather than blindly leaping in. To prevent this behavior, kraal design should serve to primarily prevent visual identification of the livestock, and secondarily to prevent access.
- Attacking lions generally approach from cover downwind so the kraal should be exposed in open ground as much as possible to discourage attack.

Figure 3: A pride of lions relaxing during the day. They hunt mostly at night or early morning.



Lion



Hyena



Leopard



Cheetah



*African
Wild Dog*

Figure 4: Identification of the most common large predators in the KAZA by foot prints.

2.1 Behavioral traits and instance of attack by large predators

Hyenas

- Hyenas tend to move in predictable patterns as they tend to prefer following established paths to and from places of refuge. When the movement patterns are known, attacks from hyenas can be successfully controlled.
- It is useful to locate these paths before control is attempted, to determine where they come from and to ascertain their hunting behavior.
- Hyenas quickly become wary and will not return to a carcass in the area they have been persecuted but appear to be less cautious away from it. Observations are that they associate the area with the problem rather than the tool or strategy used but if presented in a new area where they have not been persecuted, they are less wary of bait presented.
- Hyenas respond to clear, amplified tape reproductions of other hyena feeding. In the event where lethal removal is the only option, this method may be applied. The hyenas usually come running in, requiring quick action to accurately shoot them, because if this fails, they are less likely to be lured in a similar manner again.

Figure 5: Spotted Hyena
(*Crocuta crocuta*).



2.1 Behavioral traits and instance of attack by large predators (cont)

Leopards

- Leopards are the masters of stealth of all large predators, able to operate largely unnoticed even in urban areas. Their secretive nature and successful hunting techniques allow them to survive even in the most unlikely of places and are much more widespread.
- Leopards are almost exclusively nocturnal, only venturing out late afternoon or early morning where they feel secure.
- Leopards lie hidden during the day in a wide variety of habitat that best enables them to camouflage and possible attack from.
- Thick underbrush and bushes, and rocky outcrops are favored refuge spots. These are more inhospitable to move through but enable leopards to spot prey from a distance and approach undercover.
- In open savannah, grassland or riverine vegetation, they tend to occupy stands of denser trees, or even use large trees for ambushing and attacking from the treetop.
- Leopards are not thought to move great distances as do lions rather occupying smaller territories preying on smaller animals that are found in greater numbers.
- They are predominant prey depends largely on the species most common to the area they occupy.
- Small stock and young animals are predominantly targeted by leopards.
- Livestock not headed during the day by a heard boy of guard dog and kraaled at night is at higher risk.
- Often when leopards attack livestock in a confined space where livestock are unable to escape, like in a kraal, they will kill indiscriminately until all struggling ceases.
- Leopards, similarly, like lions, need to see the targeted prey for them to attack. To prevent this, kraal design should primarily prevent visualization of the prey, and secondarily prevent access into the Kraal.

**Figure 6: Leopard
(Panthera pardus).**



2.1 Behavioral traits and instance of attack by large predators (cont)

Cheetahs

- Cheetahs are opportunists, so ranching livestock, particularly breeding stock with calves and small stock, risk being targeted. The problem is worsened where livestock increases to the detriment of naturally occurring wildlife, thus cheetahs can be habituated to livestock depredation.
- Cheetahs generally do not scavenge but kill each time they need to feed. Their mode of attack is to panic and chase down their quarry, tripping it before pouncing on it then strangling by the throat;
- Cheetahs eat quickly as much as possible after a successful kill, quickly moving on to escape other predators, and consequently do not return to their kills.
- Cheetahs are not as bold or aggressive as lions or leopards; they avoid confrontation, killing only when they dictate the situation. Their lack of aggression is the reason livestock can be effectively protected by using minders in the form of people, dogs, donkeys and other animals to aggressively repel and chase them off rather than opting for translocation or lethal control;
- They are less attracted to bait, dead or alive a fact to consider when trapping them; and
- Cheetahs hunt almost exclusively during the day approaching quarry stealthily using anthills and bushes to approach close enough to facilitate the final rush no more than 100 meters away.

African Wild dogs (also known as painted dogs)

- Wild dogs are largely diurnal in habit often restricting their activities to the early mornings, late afternoons and on into the evenings on hot days;
- In most cases, livestock is taken early in the morning and the pack remains at the carcass until it is completely consumed, and if disturbed they will not return;
- Painted dogs are the most successful hunters of large predators rarely failing to effectively hunt even several times a day, capable of changing home ranges and pack formations frequently surviving major calamities, quickly responding by rapid population increase.



Figure 7: Cheetah (*Acinonyx jubatus*).



Figure 8: African wild dog also known as Painted wolf (*Lycaon pictus*).

2.2 Common problems caused by large predators

Predation on livestock

In KAZA TFCA, like in many regions of Africa where large predators occur, predation on livestock is the main form of conflict between predators and humans. The livestock depredation is often compounded by conflicting or incompatible land uses that bring wildlife, people and their livestock in contact.

Attacks on humans

Generally, all predators avoid interaction with people however; there are incidents of attack on humans by large predators mainly lions and leopards. These attacks are almost always a defense reaction as a result of either surprise provocation or during problem animal control, rather than the predators actively hunting humans. When walking or herding in areas with predators, surprise interactions or confrontations can be avoided by walking away silently.

Provoked attacks

A provoked attack is one in which a person approaches a large predator too closely or tries to touch, injure or kill it thus provoking an attack or in which food or waste attracts the animal and brings the animal and a person into close proximity. Such attacks can also be associated with poaching and trophy hunting.

Unprovoked attacks

Unprovoked attacks may be classified as natural risks associated with predators such as true predation on humans, especially on small children. These types of attack are also risks associated with humans' activities such as when people walking at night surprise lions that may attack them. Attacks on humans can also be done by old animals, particularly lions, which are weary, frail, and unable to catch wild prey.



Figure 9: Adult male lion killed on Problem Animal Control.



Figure 10: Nets are also used in trapping problem large predators.

3. Methods of reducing and mitigating human-large predators' conflict

In addition to some of the mitigation measures already outlined in the species behavior, section 3.1, below are some of the interventions and mitigation measures that can be implemented or explored to reduce human predator conflict. It should be noted that there is no single panacea to HWC, as such several methods and/or interventions must be implemented concurrently to achieve positive results. This section therefore outlines various interventions and methodologies of HWC mitigation which have been found to be effective across the KAZA landscape.

3.1 Awareness and prevention

The first step is to raise people's awareness that they live close to a wildlife area where large predators move around and make the potential consequences well known to the locals. Awareness should include large predators' behavior, risk factors and managing activities to reduce human vulnerability.

HWC Prevention

Preventive action is essential because once a large predator has obtained meat from a settled area; it may develop a habit and possibly return to the area. The prevention entails:

- Being alert and having sound knowledge of the environment and the particular predator habits and behavior; and using strategies to decrease the likelihood of predator attraction to, and/or interaction with livestock and humans. Eliminate attractants, such as open-air butcheries, avoiding keeping pets, and unguarded and un-kraaled livestock.
- Human activity can also act as a repellent to large predators particularly lions. Attacks on livestock that is headed and kraaled in predator proof kraals are fewer.
- Movements at night should be avoided to minimize human- predator interaction and possible stimulation of the predator's hunting and defense instincts by any surprise predator encounter.
- Those who work in the wildlife areas should wear bright colored clothes. This will alert the predators from a distance allowing them to move away and avoid any surprise interaction, which can be confrontational.
- Reduce vulnerability to attack by clearing bush cover near homes and kraals is important especially when there are small children.
- Flickering lighting is important as it deters large carnivore's movements near human settlements.
- Latrines should not be built too far away from houses.

3.2 Compensation and insurance schemes

Various schemes to offset the impact of loss on livestock have been implemented across that KAZA landscape and their success has been variable dependent on the availability of resources and necessary policies and legislative support. It is always important to consider the advantages, disadvantages, effectiveness and sustainability of any kind of scheme before it is taken on board. Below is a summary overview of the lessons learnt on the various schemes applied across the KAZA Landscape:

3.2 Compensation and insurance schemes (cont)

- HWC compensation schemes are intended to assist people who bear the costs of living with wildlife when they have lost livestock due to depredation. The compensation mechanism in many cases does not amount to the costs of damage incurred by victims, but it is only supposed to cushion the impact of the loss.
- This is not in any way expected to remove the farmers' responsibility of tending their livestock.
- A system of compensation requires substantial financial resources which are never available for any given time. Due to the huge financial burden in many instances, compensation schemes have been found to be ineffective and are not recommended to be started in areas where it has never been applied before.
- Human Animal Conflict Self-Insurance Scheme (HACSIS) in Namibia encourages people to invest in the protection and good husbandry as the basis for which compensation is to be paid in case of livestock predation.
- HACSIS is primarily financed by proceeds from wildlife utilization as such it promotes equitable distribution of the benefits earned as a result of living with wildlife through hunting and photographic tourism.
- It is important to have a conducive policy and legislative environment that can support the sustainable implementation of HACSIS.
- The scheme focuses on claims related to species that are financially beneficial to the conservancies. It does not try to cover the value of the losses which are contentious and unaffordable. Instead, it pays out what the members think is fair compensation for the loss incurred.

3.3 Livestock Management

The solution to Human Predator Conflict is anchored on effective animal husbandry which calls for pro-active measures and effective implementation of suitable mitigation measures. The following intervention and mitigations measure are recommended for livestock management:

Intensifying human vigilance has been found to be very effective if reducing HWC.

- Effective livestock husbandry can mitigate human-large predators' conflict by deterring predator contact with livestock, thus reducing incidents of depredation.
- Livestock herds that are herded by day and kept in bomas (kraals) at night with guard dogs and a high level of human activity are less likely to be killed by large predators. When herdsman are present, the rate of killing of livestock by large predators is lower than for free ranging herds.
- Additional deterrents such as weapons and donkeys can help human guards. Firearms can also be used to scare large predators away if they approach bomas too closely.
- The use of watch towers helps to alert farmers to the presence of large carnivores. Farmers must cooperate in managing the watchtowers and setting up duty rosters.
- Use of community kraals to house stray/unclaimed or free ranging livestock.

3.3 Livestock Management (cont)

Use of livestock guarding animals

- Domestic dogs reduce the risk of attack of a herd when they accompany a herd. The dogs should be raised with the sheep or cattle living with the herd or flock respectively. They detect large predators and raise an alarm which enables the herders to chase away the predators.
- However, it should be noted that in some instance leopards can actively hunt dogs; as such dogs may attract the leopards to livestock, especially in the kraals.
- Donkeys reduce the risk of attack of cattle by large predators. Donkeys in a herd of cattle can guard against large predators because they have a more developed instinct for defense than cattle. They are also more aware of large predators and the bold ones are less afraid of them. They can chase them away, biting and kicking and are formidable opponents.

Using kraals/enclosures (bomas)

- Construction of lion-proof kraals/enclosures (bomas) that are sufficiently high and strong to prevent cattle from breaking out of them and large predators jumping in is a useful traditional mitigation measure
- Live thorn hedges or Acacia bushes are more durable than bomas made of dead materials which require more maintenance.
- As for goats and sheep, the walls of the bomas should not be transparent. Dense walls reduce the risk of attack for herds in enclosures
- Herdsmen should bring the animals into a single boma at night. Lion proof bomas, provided they are practical and affordable, reduce the loss of strays and prevent stock from roaming at night.
- If traditional bomas are not used, fences can be erected to deter large predators and allow livestock to graze freely in paddocks.

Grazing and herd management

- Animals can be protected through seasonal management of reproduction especially in areas that practice seasonal movements of livestock in grazing areas.
- Young animals attracts predators therefore no calving or lambing should be allowed during movements or during times when cows and calves are most vulnerable. Managing movements of the bulls will determine when calving and lambing can occur.
- Creating buffer zones in grazing areas by clearing woodland along pasture boundaries makes it easier to detect approaching large predators and may act as a deterrent. Having vulnerable animals in pasture with high visibility and close to villages is the best option.

3.4 Large predators general mitigation measures

Deterrent methods

- Light or fire can be kept burning at night in areas where large predators make regular raids.
- Human activity and settlements act as deterrents.

3.4 Large predators general mitigation measures (cont)

- Scarecrows can have a deterrent effect, but they are less successful against lions than against leopards.
- Most common deterrents are dogs and human guards with guns, firecrackers and other explosion sound making devices.
- Other deterrent devices that may be used include the use of carcasses laced with lithium chloride which induces nausea in the large predators that eat them.
- No single deterrent will be permanently effective but using several of them in combination will reduce and mitigate humans-large predators' conflict.

Capture and translocation of large predators

- A non-lethal method of moving large predators to other areas requires making assessments of the destination to ensure that there are no other large predators of the same species and also to avoid creating conflict with livestock herds.
- The method is only viable when large predators are moved into vacant unoccupied habitat with no resident predators of the same species and where they are welcome.
- Whenever translocation is carried out, follow-up monitoring to assess the outcome and subsequent long-term monitoring are essential.

Off takes

- These include methods used to kill problem predators by wildlife authorities, affected communities and trophy hunters.
- Two commonly used techniques are shooting, trapping to prevent further damage.
- Legal trophy hunting helps to mitigate conflicts with problem predators as it helps to control recurrent stock -raiders or man eaters. It also provides victims and wildlife authorities with income to compensate for casualties.
- However, the use of trophy hunting to mitigate conflicts has difficulties of efficiency as trophy hunters are interested in old males (which may not be necessarily the problem animal). It is also difficult to identify the specific and genuine problem animal.

3.5 Environmental management

Increasing alternative prey

- Increasing the availability of wild prey may reduce the number of livestock lost to large predators.
- Effective conservation of habitats and control of poaching should maintain sufficient wildlife densities but in areas where wild prey has been decimated, drastic protection measures are needed to build up numbers.
- If some of the prey species have been extinct, re-introduction should be considered if the expected benefits cover operational costs.



Figure 11: Cattle kraaled in a mobile enclosure (boma).



Figure 12: Mobile bomas implemented on fallow fields improve soil fertility and improved crop yields.



Figure 13: Livestock that is not kraaled at night is at risk from depredation.

3.5 Environmental management (cont)

Land use planning

- In order to have an effective land use plan, a participatory planning system that restricts migration of people into protected areas and encourages compatible land uses.
- Integrated land use planning is a long-term effective method for preventing human/large predators' conflicts that aims to create space for people and large predators' harmonious coexistence.
- The development and implementation of land use plans is a high priority to mitigate human large predators' conflict.
- Success of the method to mitigate conflicts is strongly related to uptake of other livelihood options by locals to reduce dependence on livestock as the only source of income.

4. Training

Training should be a continuous process for all stakeholders. Various programs of training targeting farmers and extension officers should be executed periodically to improve the technical capacity of the various stakeholders that are responsible to respond to HWC. The understanding of animal behavior and wildlife management, as well as the general awareness programs should be part and parcel of the authorities responsible for wildlife management.

5. Conclusion

It is essential to have accurate spatial and temporal geo-referenced information about when and where the conflict is occurring. This understanding, together with implementation of appropriate mitigation measures, should lead to a better focus on target areas and the most relevant species. Wildlife management and conservation authorities need to understand the HWC hotspots in their respective components and design robust programs for support to the communities against wildlife damages. The support programs should be accompanied by effective support on implementation of mitigation measures, and Monitoring and Evaluation tools. In order to realize positive result in dealing with HWC all stakeholders are requested to ensure that:

- The above interventions are constantly implemented and supported, and not just as occasional campaigns;
- There is greater active participation in the strategic activities by the various parties responsible HWC mitigation;
- There are opportunities to introduce other innovative mechanisms and approaches on dealing with any type of HWC; and
- Adequate capacity in terms of equipment, skills set, technology, and financial resources are in place to effectively support HWC mitigation.

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KAVANGO ZAMBEZI

TRANSFRONTIER CONSERVATION AREA (KAZA TFCA)



Angola

Ministério da Cultura, Turismo e Ambiente
Rua do MAT - Complexo
Administrativo
Clássico to Talatona
Edifício N° 4, 7°, Andar, Luanda, Angola
Tel: (244) 918458421



Botswana

Department of Wildlife and National Parks
Plot 50380 Moedi House, Fairgrounds
Gaborone, Botswana
Tel: (267) 3971405 • Fax: (267) 3180775



Namibia

Ministry of Environment, Forestry and Tourism
Trotskie Building, 1st Floor
Private Bag 13306, Windhoek
Phillip Troskie Building, Windhoek, Namibia
Tel: (264)-61 2842335 • Fax: (264)-61 229936



Zambia

Department of National Parks and Wildlife
Conservation Division
Private Bag1, Kafue Road, Chilanga, Zambia
Tel: (260) 211 278 129 / 278 482/279 080
Fax: (260) 211 278 524/278 299



Zimbabwe

Zimbabwe Parks and Wildlife Management Authority
The Conservation Division
Conner Sandringham and Borrowdale Roads
Botanical Gardens
P. O. Box CY140 Causeway, Harare, Zimbabwe
Tel: (263) 4 707624-8 • Fax: (263) 04 726 089

Enquiries

KAZA TFCA Secretariat
P. O. Box 821 Kasane, Botswana
Tel: +267 625 1332/1269
Fax: +267 625 1400
Email: info@kavangozambezi.org
www.kavangozambezi.org



Implemented by



Compiled by
Connected Conservation
and KAZA TFCA Secretariat



info@connectedconservation.com
www.connectedconservation.com