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Chapter

Application of Conservation and Veterinary Tools in the Management of Stray Wildlife in Zambia

Lackson Chama, Grant Simuchimba, Kampinda Luaba, Stephen Syampungani, Jackson Katampi, Darius Phiri and Benjamin Mubemba

Abstract

In recent years, Zambia has seen an increase in the incidences of conflicts involving stray wild animals with humans. Notable among these animals include the African elephants, buffalo and lion. Consequently, this triggers a response from law enforcement units of both government and the department of national parks to control the animals. Regrettably, most of their responses have involved the shooting down of these animals, rather than taking advantage of conservation and veterinary tools to relocate the animals back into protected areas, and this raises concerns about the welfare of these animals. Therefore, this chapter will bring to light some of the locally available tools that could be used to control stray wildlife in order to contribute towards both conservation and reducing human-wildlife conflicts in Zambia.

Keywords: stray wild animals, human-wildlife conflicts, conservation, law enforcement

1. Introduction

Encounters between humans and stray wild animals have increasingly become a common phenomenon across Zambia. Although most of these developments are largely driven by routine animal migrations [1, 2], humans have been quick to connote such wildlife as “stray animals”. Quite often, the presence of stray animals within the vicinity of human settlements triggers a response from government law enforcement units (that also include the department of national parks) to manage the situations. Depending on the reaction of the animals concerned, sometimes such responses (from law enforcement units) may involve the shooting down of these animals, rather than taking advantage of conservation and veterinary tools to give them space or relocate the animals back into protected areas. Consequently, this raises concerns about the conservation of these animals. In this chapter the authors discuss animal

migrations and some of the key reasons why they occur. Further, the authors discuss some conservation and veterinary measures that could be applied to address potential human conflicts with stray wildlife, which they believe are applicable to the Zambian situation.

2. Animal migrations: why do they occur?

Animal migration is an important ecological process that has, for thousands of years, been critical in shaping the fitness of organisms across the animal kingdom [2–5], from the tiniest insects to the gargantuan blue whale (*Balaenoptera musculus*). Animal migrations also contribute towards the recovery of ecosystems, i.e. as animals move to other areas, it reduces ecological impacts that could result from overgrazing in some ecosystems. Migrations occur seasonally and involve a return journey, making it different from other types of animal movement such as emigration when animals travel to find a new habitat to live permanently. Many animal species migrate, among which include species of fish, crustaceans, amphibians, reptiles, insects, and mammals. Animals can move either by land, sea, or air to reach their destination, sometimes crossing vast distances i.e. either in small or large numbers. The distances of migrations vary from species to species, i.e. from shortest (0.3 km) by the Blue grouse (*Dendragapus obscurus*), to the world's record longest (97,000 km) distance by the Arctic terns (*Sterna paradisaea*). Thus, animal migrations occur nearly across all countries on the planet, including Zambia, a landlocked country located on the northern franks of southern Africa. The country is endowed with a rich biological resource base, among which include 857 species of birds, 240 species of mammals, 153 species of reptiles, more than 90 species of amphibians. Some of these animals have been observed to migrate across regions and habitats from time to time. For example, several species of mammals in the country have been shown to exhibit a migratory behavior. Among these include elephant (*Loxodonta Africana*), lion (*Panthera leo*), hyena (*Crocuta crocuta*), wild dog (*Lycaon pictus*), cheetah (*Acinonyx jubatus*), lechwe (*Kobus leche*), tsessebe (*Damaliscus lunatus lunatus*), wildebeest (*Connochaetes taurinus*) and zebra (*Equus spp*). Animals migrate for several reasons, among which include the need to (1) search for food, (2) reproduce and gene transfer, (3) escape unfavorable weather conditions, (4) escape predation, and (5) find new territory.

2.1 Searching for food resources

Food is a very critical component of wildlife management as it defines the ultimate survival of animals across habitats. Animals need food to obtain the energy they need to perform various functions that define their fitness (e.g., reproduction, escaping predators, hunting, etc.) and also accrue nutrients such as vitamins and minerals that are important to maintain their health needs (e.g., disease resistance; [6]). Therefore, the need for food in animals is driven not only by the quantity, but also the quality of food available in their habitat throughout the year [7]. If the quantity of food is lacking, the animal may die of starvation, while a lack of quality may result in malnutrition. Generally, animal nutrition defines birth and death rates and is thus important in the overall survival of any wild animal population [8]. For example, animals that have adequate food and proper nutrition throughout their life cycle have been shown to grow larger whilst at the same time remaining healthier than animals that experience

poor nutrition [6]. Generally, animals with access to high quality diets are also expected to be more active than those on a low-quality diet [8]. However, the availability of food across animal habitats have been shown to vary either over time (e.g., due to changes in seasons or climate related stressors such as drought, floods and wildfires) or in space (largely associated with geographic location of certain habitats; [9]). In this case, some animal habitats can exhibit abundant food resources during one season, but less so in other seasons. Alternatively, while some habitats can be endowed with a diversity of food resources throughout the year, others could be in a critically short supply due to their geographical location. Such variations in food resources availability can drive the migration of resident animals from one habitat to another in search of food or limiting nutrients [7]. Consequently, such animals encounter human-dominated environments along the way, resulting into human-wildlife conflicts. For example, several heads of elephants have been observed migrating to search for food between Kafue-Mosi-Ou Tunya National Parks (in Zambia) and other national parks within four countries sharing borders with Zambia in the south-west, namely Angola, Botswana, Namibia and Zimbabwe [10]. The Blue Wildebeest (*Connochaetes taurinus*) which is found in Zambia's Liuwa Plains National Park is believed to migrate between the numerous pans following seasonal burns and flooding regimes within the broader Liuwa system in search of food resources. Beyond the borders of Zambia, several other animals (e.g., the Gray Whale, *Eschrichtius robustus* and the Great White Shark, *Carcharodon carcharias*) have been shown to migrate in search of food, suggesting the importance of food resources in shaping the survival of wild animals.

2.2 Reproduction and gene transfer

While some animals migrate to search for food, others migrate primarily to find safer habitats to reproduce. Reproduction is a particularly crucial component in the context of driving the fitness of animals, as it defines the multiplication and thus continuation of animal populations across ecosystems [11]. Inasmuch as reproduction can take place within the same population, some wild animals often prefer to breed with individuals from other populations. This process is important from the conservation perspective, as it prevents the incidences of genetic depression, resulting from possible inbreeding or breeding among animals that are closely related. A genetically deprived population is increasingly vulnerable to threats such as climate change, biological invasions and the spread of infectious diseases [12]. Consequently, this can undermine conservation efforts on such a population. In contrast, a genetically diverse population has enhanced fitness traits and will likely remain robust to extinction even in the face of such threats as highlighted above [13, 14]. Therefore, the need to maintain a genetically diverse population is what primarily drives some animal species to migrate in order to breed and thus exchange genes with individuals from other populations of similar species. Quite often however, animal populations that were once linked by a connected network of ecosystems, have over the years, been isolated due to the creation of protected areas that are predominantly isolated and the destruction of their migration corridors due to human land-use change. Therefore, as animals attempt to migrate from one protected area (PA) to another, they often encounter these human-dominated areas along the way, thereby resulting into human-wildlife conflicts. This is probably one of the major reasons as to why three lions were found within the human settlement area in the outskirts of Lusaka in May 2022, and were later gunned down. The local public media (ZNBC) reported that the lions were potentially attempting to migrate between Lower Zambezi and Kafue National Parks.

Generally, Zambia is believed to have a genetically diverse lion populations across the Kafue, Zambezi and Luangwa ecosystems [15]. This diversity has been largely linked to the fact that individuals from different protected areas do migrate seasonally for breeding purpose, consequently facilitating gene exchange across populations. Ultimately, this increases the fitness of these populations to environmental threats. Besides the need for gene exchange, other animals migrate to locate safer habitats for producing and raising their young. For example, several species of birds, including the endangered Wattled and Crowned Cranes migrate into Zambia's Kafue and Busanga plains for breeding purposes. It is highly likely that these two ecosystems provide a safer and suitable environment for them to lay and hatch their eggs. Thus, any disruption caused on these habitats could potentially impact negatively on the breeding and population viability of these already endangered species.

2.3 Escaping unfavorable weather conditions

Weather is an important driver of species assemblages across biomes. Some species only exist in certain habitats because weather conditions (e.g., temperature, rainfall, wind, humidity, etc.) are optimal in the context of performing their routine ecological functions. When these conditions change, animals must adapt in order to survive in such environments. In an event that they cannot adapt, they need to migrate or else face extinction. Changes in weather conditions can either be a result of climate change or routine changes in seasons across a year. For example, Zambia has arguably two main seasons, namely dry (April to October) and wet (November to March). Change in seasons is often associated with altering ecological conditions across habitats, thus making the environment unfavorable for some animals [9]. Consequently, affected species are triggered to move or migrate across landscapes or regions in search of ecosystems with favorable weather conditions and only return to their native areas when conditions are back to normal. Several species of animals have been shown to migrate across landscapes and continents in search of favorable weather conditions. For example, the Eurasian reed warblers (*Acrocephalus scirpaceus*) are believed to migrate into Sub-Saharan Africa to escape harsh winter conditions in Europe, albeit they return to Europe at the onset of spring. Another bird that displays a similar behavior is the Red-breasted nuthatch (*Sitta canadensis*), which is normally resident in the northernmost parts of North America. During winter, it ditches its native habitat and migrates to southern regions of northern America [16]. Animals such as the Monarch butterfly (*Danaus plexippus*) have been shown to fly for over 4000 km escaping harsh winters in the US and Canada, to central Mexico where they hibernate. They would be in hibernation from October to early March when they commence their journey back because it would have begun to get warm in the US and Canada [17]. Besides migrating in search of breeding waters, the Blue and Humpback whales are other animals that have been shown to escape extreme weather conditions in deep oceans during winter by migrating to warmer waters near the equator [18]. However, they migrate back to their original habitats (the poles) during summer to feed. These are just a few examples of several other species of animals that migrate to escape unfavorable weather conditions. Although very little is documented about the migrations of Zambia's wildlife, this does not necessarily mean that our animals do not exhibit similar behaviors, to a certain extent, to those described in the examples highlighted above. Therefore, some of the animals often classified as stray animals, could be essentially attempting to escape unfavorable season-driven changes in weather conditions in some protected areas. Such weather driven migrations are likely

to intensify in the face of changing climates and the projected alterations in temperature, precipitation and other climatic parameters. Thus, humans ought to be aware of the potential for climate change to escalate animal movements and this may involve crossing landscapes and anthropogenic barriers [15].

2.4 Escaping predation

The lifetime reproductive success of large ungulate herbivores and hence their life histories have been shown to be largely determined by predation risk [19–21]. Therefore, predation is an important ecological process, as it not only regulates the populations of prey, but also shapes the fitness of predatory animals across ecosystems. For prey animals, their goal is to avoid foraging or nesting in areas with high predator density and this could be achieved either at local, landscape or regional scales. Avoiding predation at local scale means prey animals adapt by developing fine-scale behavioral strategies to avoid or escape predation within, rather than outside the same ecosystem [22]. Escaping predation at landscape or regional scales implies that prey has to move outside their usual ecosystem and migrate for long-distances in search of areas that are safe, i.e. with little or no predators. This behavior involving long-distance, but temporal movement of animals to escape from predators is synonymous with migration [20, 23–25]. And research has shown that animals that migrate to avoid predation benefit by reducing predation risk and thereby allowing migratory populations to attain higher densities because of reduced mortality [20, 24]. The North American Elk (*Cervus elaphus*) has greatly benefited from migratory behavior that pushes it to areas that are near humans to escape predators such as gray wolves and bears [26, 27] that have often been shown to avoid human dominated areas. Similarly, some of the animals that have often found themselves in areas closer to humans in Zambia may have been driven to do so because of the need to find a new area for escaping predators in their native habitats. Therefore, instead of connoting them as stray animals and provoking them, humans should be trained to appreciate these ecological processes in order to help such animals find their way safely back into their designated habitats.

2.5 Finding new territory

Most animals often display a territoriality behavior where they constantly defend an area that is presumed to be their territory from intrusion. The defense of a territory could either be against conspecific or interspecific intruders. They often use agonistic behaviors or real physical aggression to defend their territories to ensure there is no competition for mating opportunities, access to limited resources and space for raising their young. Animals that fail to defend their territory can be dislodged, consequently losing their territory to competitors. Such animals could be forced to move in search of new sites to establish their territories. If the movement is permanent, then it is emigration, but if at some point (in the future) the animals decide to return to their old habitat to regain their territory, then it becomes a migration. This kind of behavior is common among several species of animals, notably among which include lions, leopard, cheetah, African wild dog and several species of ungulates. Lions have particularly been shown to be highly territorial, often occupying the same area for generations. Young male lions are forced to leave their mother pride by their fathers when they reach adult age to reduce competition for mating opportunities, and most importantly to avoid inbreeding as the young males can begin to mate their sisters if

left to live within the same population. Therefore, the chased young males are forced to move in order to find a territory and start a pride or family of their own. Out of fear and desperation to find a territory, such animals can sometimes move or go beyond the boundaries of protected areas and consequently find themselves at conflict with humans.

3. Conservation and veterinary tools for managing stray wildlife

Several conservation and veterinary tools can be used to manage stray animals. Notably among those include (i) Community sensitization; (ii) Identifying and opening migration corridors; (iii) Managing PAs at landscape level; and (iv) Wildlife capture and translocation:

3.1 Community sensitization

The reactions that humans display towards stray wild animals (e.g., poisoning or shooting them down) strongly suggests a considerable lack of knowledge on what could be the key drivers of such animal movements. Certainly, people are correct to feel threatened, as some of these animals (especially lions and elephants) could potentially be aggressive and consequently life threatening towards humans. Except for the big cats, generally most wild animals are naturally peaceful and would rarely attack humans, unless provoked. Thus, when humans see these animals in their

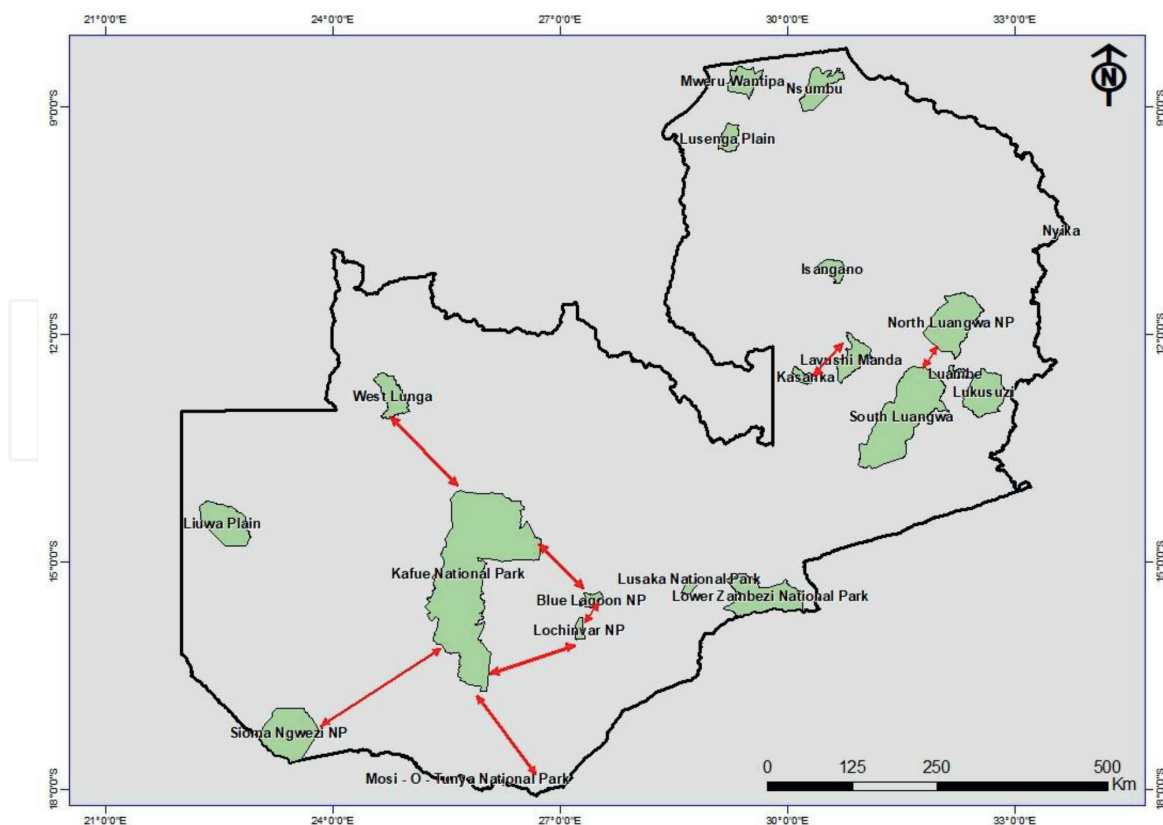


Figure 1. Map showing wildlife migration corridors that occur across national parks in Zambia. In the figure, national parks are highlighted in green while the wildlife migration corridors are represented by red arrows linking selected national parks.

vicinity, they should be sensitized to restrain from provoking them. Animals such as elephants are quite aggressive if provoked, especially during mating or when moving with their young. Therefore, when humans see these animals, they should avoid teasing or bothering them; avoid escalating the situations into attacks by not staring the animals down or having direct eye contacts, as this is often seen as a challenge (by animals). Instead, people should back off slowly with emphasis on doing so slowly and quietly. Unless it has a baby, giving an animal space will likely move it to leave humans alone. However, if animals such as lions or other big cats launch an attack and consequently makes contact with humans, it is helpful to drop to the ground and play dead by covering the back of the neck with hands and the face with elbows. It is critical to play dead longer than expected, as getting up too early will catch the animal's interest again. Even then, it is important to realize that not all animals are peaceful, and that their reactions towards humans depends on the species and their mood at the time. To meaningfully address such situations, humans should be encouraged to immediately contact the department of national parks to report the encounter to facilitate the safe removal of the animal from the area. Overall, humans should be educated about some of the drivers of animal movements (e.g., those explained above) so that they can appreciate the need to stay out of their way. In Zambia, lessons can also be drawn from the communities that live within or across wildlife migration corridors. Several wildlife migration corridors occur between and across national parks in the country (e.g., the Kasanka-Lavushi Manda national parks migration corridors, the Kafue-West Lunga elephant migration corridor, the Sioma ngwezi-Kafue-Mosi-ou-Tunya national parks wildlife migration corridors, etc.; **Figure 1**). The fact that humans have continued to exist in these areas despite continued seasonal encounters with migratory wildlife suggests that the route towards coexistence is possible provided humans are trained on aspects of the key drivers of animal migratory behavior and how to react towards animals when they see them in their vicinity. Of course, measures should be put in place to ensure that such animals do not threaten human life and livelihoods (e.g., destroying their crops and livestock).

3.2 Identifying and opening migration corridors

Migration corridors serve as pathways for wildlife to move across habitats and landscapes in search of food, mating partners or escaping unfriendly weather. Well protected migration corridors provide wildlife with relatively safe access to a diversity of habitat resources, which are typically dispersed across the landscape, albeit they may change with shifts in climate and seasons. Before humans dominated the earth's landscape, the vast majority of protected areas we have today were well connected by undisturbed animal migratory corridors. As a result, the majority of wild animals safely used these routes to move between protected areas, and did not encounter any human interference along the way. However, the majority of these corridors have since been transformed by anthropogenic activities and are currently dominated by features such as human settlements and crop fields. Over the years, however, animals have already marked these routes with cues such as pheromones which they are able to smell to find their way. Other animals use internal compass, mental maps (e.g., landmarks, such as rivers, trees, and mountains), the magnetic field of the Earth, as well as the position of heavenly features (e.g., the sun, moon, or stars) to help them navigate their way from one protected area to another. In fact, some animals are believed to have genetically inherited the migratory routes from their parents [28]. Therefore, even though humans have encroached on these migratory corridors, in the

animals' mind, these routes still stand to-date (**Figure 1**). As a result, they will continue using them for generations to come. Consequently, human-wildlife encounters are unlikely to stop, unless humans identify these corridors and implement measures to either restore them or learn to temporarily coexist with wild animals during their annual or seasonal migrations. Therefore, research institutions and conservation agencies in Zambia should work in collaborations to identify potential migratory routes for wild animals across the country so that such areas could be considered for possible restoration to enhance for safe movement of animals. Besides, efforts should be made to tag some individuals among animals that exhibit a migratory behavior with trackers. Using trackers will be critical in helping to ascertain when these migrations commence and to therefore establish and mark the routes that animals take to move from one protected area to another. There is also need to establish if a wildlife migration corridor exists between Lower Zambezi and Kafue national parks (via Lusaka province), especially given the recent encounter between humans and lions in the area. Such information will be critical for designing monitoring and early warning systems to protect humans and wildlife, thereby averting human-wildlife conflicts.

3.3 Managing PAs at landscape level

Another way to address this problem is by managing protected areas using a landscape approach. Here, all protected areas (PAs) that share migratory animal routes should be managed as one block, rather than single and isolated ecosystems. Around the world, there has been an increasing shift from a PAs management system to the landscape approach in order to increase the resilience of populations of wild animals through the creation of transfrontier conservation areas (TFCAs). TFCAs increase opportunities for animals to not only find food resources and alternative mating partners, but also escape predation and harsh weather or climatic conditions. Effectively, this conservation approach gives animals uninterrupted access to migratory routes, consequently reducing the incidences of human-wildlife conflicts. Just within the SADC region, there are over 18 TFCAs that are in different stages of development. However, Zambia is only involved in two of these, namely the Zambia- Malawi TFCA and the Kavango-Zambezi (KAZA) TFCA (**Figure 2**). The Zambia Malawi TFCA includes Malawi's Nyika National Park, Vwaza Marsh Wildlife Reserve and Zambia's North Luangwa National Park, Nyika National Park, Lundazi Forest Reserve, Mitengi Forest Reserve, Mikuti Forest Reserve and the Musalangu Game Management Area. The KAZA-TFCA lies in the Kavango and Zambezi River basins where Angola, Botswana, Namibia, Zambia and Zimbabwe converge, covering 36 protected areas and several game reserves, forest reserves, game/wildlife management areas, and communal lands.

The establishment of these and many similar landscape protected areas are a major breakthrough in the context of promoting the conservation of migratory wildlife, whilst at the same time safeguarding livelihoods of people that live within these areas. For example, within the KAZA landscape, countries are promoting the establishment of community owned nature conservancies that have empowered communities with the opportunity to manage wildlife and wildlife-based enterprises (unpublished data). From these initiatives, communities can generate revenue to support their socio-economic well-being. Consequently, this increases people's appreciation and therefore participation in wildlife conservation. Countries should now begin to exploit opportunities for promoting the landscape approach for managing protected areas within rather than across borders, i.e. if doing so will contribute towards increased benefits for conservation and livelihoods for local communities.

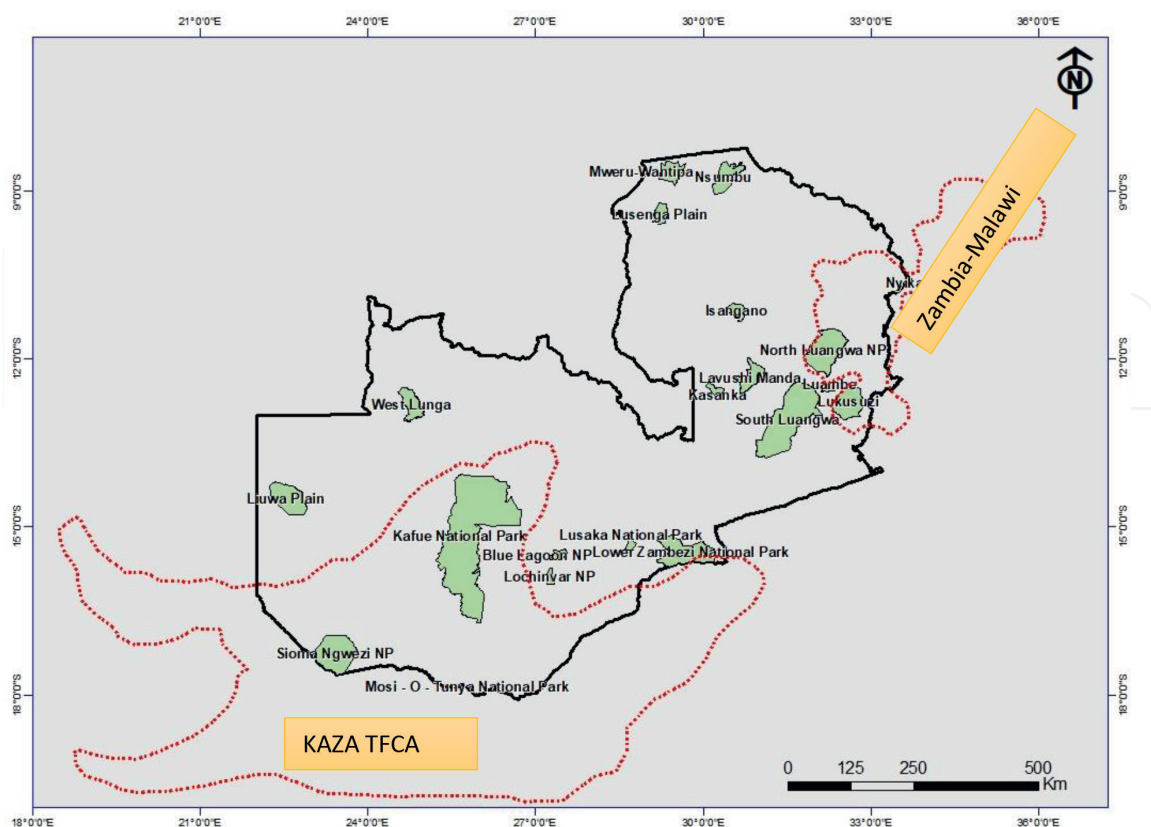


Figure 2.
On the map, highlighted in red dotted lines are national parks that are included in transfrontier conservation areas (TFCAs) to which Zambia is part, namely the Kavango-Zambezi (KAZA) and the Zambia-Malawi TFCAs. Please note that national parks from other countries, namely Angola, Botswana, Namibia and Zimbabwe as well as Malawi are not shown, but are all within the red-dotted line landscapes.

For example, Zambia has several national parks that exist in regional clusters, namely (1) Kasanka, Isangano and Lavushi manda national parks; (2) Blue lagoon, Kafue and Lochinvar national parks and (3) the Lusenga Plain, Mweru Wantipa and Nsumbu national parks (**Figure 3**). Clearly, these national parks are close to each other. Potentially, they used to be one ecosystem before humans established themselves across these lands. In this case, it is highly likely that animals still perceive them as one rather than isolated ecosystems. For this reason, migration and possible conflicts with humans is inevitable across these landscapes. Therefore, instead of managing them as single entities, conservation agencies should begin to advocate for the establishment of within-country models of TFCAs. The other parks that could be clustered include the Luambe, Lukusuzi and North Luangwa national parks. However, these are currently already part of the Zambia-Malawi TFCA (**Figure 2**).

3.4 Wildlife capture and translocation: taking advantage of veterinary principles

Translocation is a critical tool, often used in addressing challenges bordering not only on stray wildlife, but wildlife management in general. It is the deliberate capture, transporting and releasing of the captured wildlife into another ecological environment or back to their natural habitats in the case of stray wildlife [29]. Thus, it is a major wildlife management tool that can also be used in restocking or rewilding of depleted protected areas, including stocking of game ranches and zoos to assist in management of threatened native species [30].

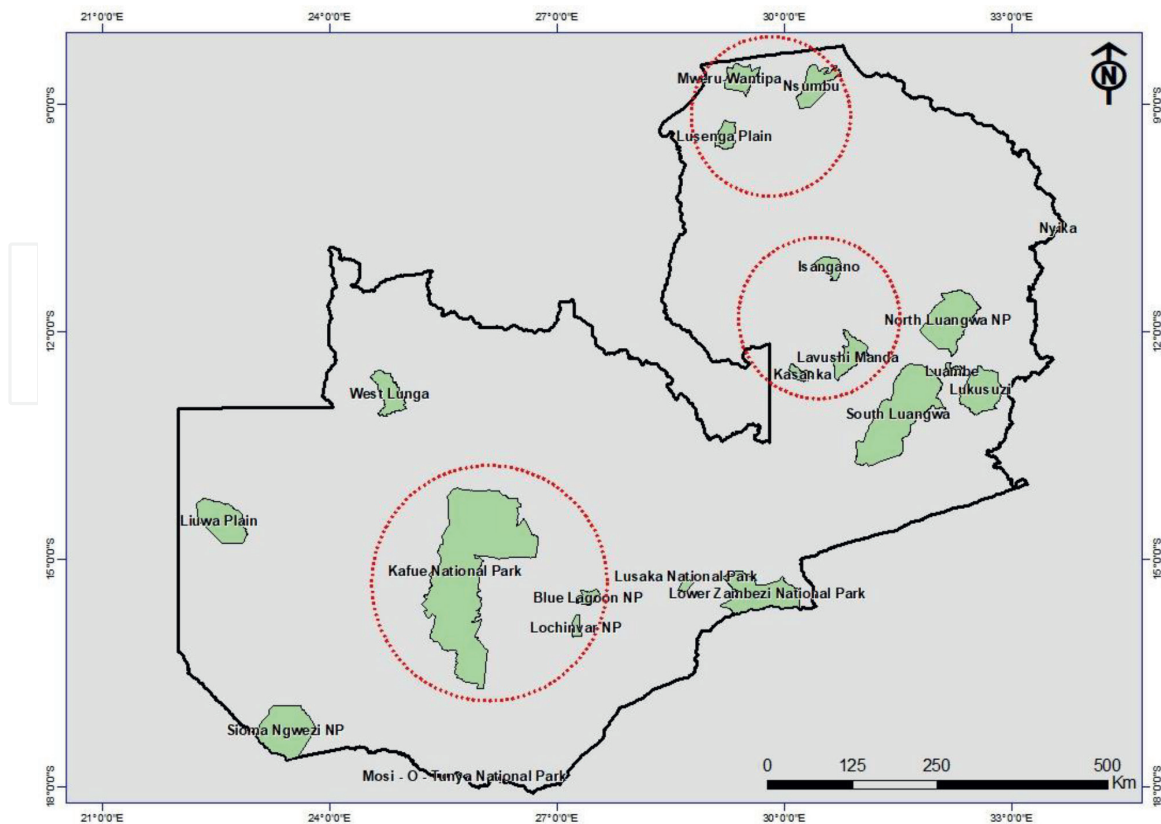


Figure 3.

Map showing protected areas that could potentially be clustered on one landscape within Zambia. Please note that the Kafue national park is currently part of the KAZA – TFCA. However, there is an option to also manage it on the same landscape as both blue lagoon and Lochinvar national parks given that the three parks are connected by the Kafue wetlands, a critically important wildlife migration corridor for animals such as lechwe, elephants and a diversity of waterfowl.

Capture and translocation of wildlife is a complex activity that involves a lot of planning by all participating staff, as the operation itself poses a high risk to both the animal and the personnel involved. A number of considerations have to be put in place before a decision to capture and translocate the animal is made. By Zambian law standard, at the center of these considerations is a competent and certified veterinarian who is to oversee the execution of the entire capture and translocation process [31]. In the case of stray wildlife, veterinarians are required to uphold and promote conservation values by capturing and translocating the animals to safety or their natural habitats. In Zambia, the wildlife management laws do not necessarily encourage a ‘shooting down’ approach for managing stray wildlife. Instead, conservation translocations are encouraged as an alternative mitigation measure to control the animals. However, capacity limitations often drive law enforcement units to resort to the ‘shoot down’ approach, especially where the animal involved threatens human life.

Capture and translocation of wildlife has a number of challenges which are unique depending on the species involved. To circumvent these challenges, adequate capacity, especially in the context of planning and assembling of expertise and equipment needed for the particular species is imperative to ensure rapid response and guarantee the safety of the animal or the local communities where the stray animal could be roaming. Thus, a decision would have to be made whether to control or translocate the animal depending on these circumstances. For instance, the team would require the services of a certified wildlife veterinarian, veterinary assistants, handling manpower and an appropriate transport vessel, large enough to move the immobilized animal.

However, the units responsible for managing these situations are poorly funded and this is a catalyst for ill preparedness. Consequently, this is what often leaves them with no option, but to control the animal as the only quickest and most feasible action, especially when lives of local communities are threatened. However, it is important to note that if the required skills and manpower are in place, the aspect of control is never an option.

3.4.1 Precaution during animal capture and translocation

During capture and translocations, different animal species require different equipment. For example, in cases of stray crocodiles, some of the required equipment include a well-designed trapping cage which has a bait inside. The bait will lure the crocodile and eventually have it trapped. For Lions, the bait is used to lure the animal to a place where the attending veterinarian can easily dart it, while in the case of elephants, buffaloes, rhino, etc., heavy duty craned trucks are needed for loading and transporting these animals.

For species that require darting as a way of immobilizing the animal prior to translocation (**Figure 4**), the operations are often conducted in accordance with the approved and conventional drug protocols. The execution of the operation is dependent on the terrain and proximity of the animal involved. Sometimes, however,



Figure 4.
A darted male lion being prepared for translocation.

it can be a challenge to execute this action, as some animals are aggressive and might not even come closer to a darting distance range. In this case, a helicopter could be employed especially for large herbivores. Once darted, it will take between 3 min to 15 min before the animal can be completely immobilized. During this period, the animal can run into any direction and might end up injuring itself and even die if the terrain is bad due to the effect of the immobilizing drugs. Hence, this makes planning as far as the choice of a darting and capturing site very critical.

In any case, capture and translocation is a traumatic experience that can cause stress on the animal. Common stressors include strange environments or habitats, sounds, smells which are usually not in their natural environment as well as high ambient temperatures. Due to stress and fear, the animal may attempt to escape. Effectively, this means that the carrying crate or container or trailer must be designed in such a way that it allows for good ventilation, but at the same time strong enough to comfortably hold the animal. Therefore, it is important that stresses are well managed throughout to ensure a smooth operation devoid of casualties.

4. Conclusions

Clearly, the incidences of human encounters with stray wildlife have increasingly become a common phenomenon across Zambia. And quite often, such encounters could result into the loss of human life or destruction of livelihoods. Alternatively, this could lead towards gunning the animals down, raising concerns for conservation. However, it is possible to address these human-wildlife conflicts provided appropriate measures are put in place especially to reduce human fatalities. The first step is to educate the public to appreciate some of the factors that drives animals to escape their natural habitats (e.g., protected areas) and move into human dominated areas. The public should appreciate that some animal species exhibit a migratory behavior, mainly propelled by several factors, among which include lack of food resources, the need to escape predation, the need to reproduce, escaping unfriendly weather, etc. Therefore, when they see them, they do not need to provoke, set traps or poison them. Instead, they should give them space to find their way. Most importantly, the public should report the sighting of such animals to the nearest office of the department of national parks and wildlife in their area so that experts can be mobilized to quickly address the situation.

We implore conservation and research institutions in the country to work in synergy to identify and undertake appropriate conservation measures that would help to significantly reduce the incidences of human encounters with stray wildlife. Actions such as the restoration of wildlife migration corridors, together with using a landscape conservation approach to manage animal ecosystems can contribute towards giving enough opportunities for animals to traverse across and potentially build a spirit of coexistence between humans and wildlife in the long-term. Further, it is critical for everyone involved to acknowledge that the department of national parks is better placed to help neutralize these situations, especially if the animal involved is in danger or threatens human life. In such situations, the department can help the animal through to the next destination either by directing it or taking advantage of veterinary tools to perform the capture and translocation procedures. This will keep the animals away from people.

In fact, it is important to note that if we are going to save human lives and conserve wildlife, capture and translocation still remains the best conservational tool

in managing stray animals. This is especially critical today, given that cases of stray wildlife are on the rise. However, there is need to enhance the capacity of wildlife management units in the context of human resource and equipment or infrastructure to support the capture and translocation response activities. One approach to achieve this is to establish a task force on human-wildlife conflict mitigation within the government department responsible for wildlife management in the country. This taskforce should include the following personnel; personnel: a certified wildlife veterinarian, a wildlife police officer, a community representative, a honorary wildlife police officer, among others. Further, the taskforce should be equipped or have access to the following equipment: a darting helicopter, crane truck, a reliable off-road vehicle, dart gun, hunting rifle, veterinary drugs and accessories, night spotlights, camping gears, different crates of different sizes, trailers and cages that are species specific among others. Such an arrangement will allow for easy and efficient deployment of the unit as and when their services are required. And because the incidences of human-wildlife conflicts are widespread across the country, it is cardinal that the operations of such a task force are decentralized so that each region or area is serviced accordingly.

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