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and Wildlife**

NATIONAL HUMAN WILDLIFE COEXISTENCE STRATEGY AND ACTION PLAN — 2024–2033 —

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NATIONAL HUMAN WILDLIFE CO-EXISTENCE STRATEGY AND ACTION PLANS 2023–2032

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For further information, please contact:

Principal Secretary

State Department for Wildlife

Email: ps@tourism.go.ke

Website: www.tourism.go.ke

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Foreword



Hon. Dr. Alfred Mutua, EGH
**Cabinet Secretary, Ministry of
Tourism and Wildlife**

The Government of Kenya has prioritized the Wildlife conservation and Tourism Sectors as the primary pillars for the growth of the country's socio-economic development. For instance, the Tourism sector has the potential to propel and transform Kenya to a middle-income status because of its contribution of about 10% of the GDP and creating of employment under the five pillars of the Bottom-up Economic Transformation Agenda (BETA).

Despite, the importance of the tourism and wildlife sector, there is a bigger challenge of managing Human-Wildlife Conflicts (HWCs) that affects the attitudes and perceptions of the local communities and other stakeholders towards the growing wildlife populations. The livelihoods of the local communities is also negatively affected by the impacts of HWCs necessitating the need for a clear plan of action to address the problem. It is worth noting that the WCMA 2013 mandates the Kenya Wildlife Service as the custodian of the wildlife on behalf of the people of Kenya.

This 10-year Human-wildlife co-existence strategy 2023-2032 is the first of its kind in Kenya. The purpose of the plan is to enhance the human-wildlife co-existence in critical ecosystems outside the conservation protected areas. The plan also aims at putting in place strategies to support communities to benefit from the wildlife resources with minimized HWC incidents. The development of the strategy was guided by the WMCA 2013 and other international protocols. The Government of Kenya is confident that this strategy will chart the way forward for enhancing community participation and improving partners and collaborations in the management of HWCs for sustainable co-existence.

The strategy also provide an avenue for communities to benefits from conservation through entrenching the wildlife economy while effectively addressing the human-wildlife conflict issues. I therefore have a lot of hope that this human-wildlife co-existence strategy 2023-2032 will guide Government of Kenya in tackling the incessant problem of HWCs outside protected areas. I wish to pledge my total support and that of my Ministry towards the successful implementation of this strategy.

Preface



Ms. Silvia Museiya
Principal Secretary, State
Department for Wildlife

Wildlife resources are an essential natural resource that must be appropriately managed for current and future generations. Wildlife is the bedrock of Kenya's tourism industry, which accounts for more than 10% of the country's GDP and more than 18% of its foreign exchange earnings. Furthermore, taxes, duties, license fees, and park entry fees, among other things, account for around 11% of the sector's earnings.

Kenya's conservation areas also serve as important water catchment regions and biodiversity reservoirs, as well as being critical to our tourism industry and its growing contributions to our national economy. The interactions between people and wildlife outside of nominally protected areas, where communities experience significant negative effects on their livelihoods and security. Human-induced declines in wildlife populations have been related to over-exploitation, habitat degradation, pollution, and the introduction of non-native species and now HWCs.

We take cognizance that the drivers of human-wildlife conflicts (HWCs) are complex, and a holistic approach to the problem is therefore required. This strategy thus focuses on expanding space for conservation, empowering communities and providing a comprehensive overview of mitigation methods, funding opportunities and the policy, legal and regulatory frameworks that can be employed by all stakeholders to reduce negative impacts of wildlife on their livelihood and increase the social acceptability of wildlife conservation as an economically viable land use option. This strategy is a statement of government intent, which prescribes a broad range of principles, measures, and actions to be pursued to achieve a sustainable wildlife Coexistence in Kenya. It encourages collaboration among diverse stakeholders to drive change using the bottom-up approach as envisaged in the Kenya Kwanza manifesto.

I wish to thank my colleagues in government, the technical working group and all stakeholders who contributed to this comprehensive Human Wildlife Coexistence Strategy. I also wish to invite all Kenyans to take advantage of the opportunities that come with this strategy.

Acknowledgments

We acknowledge the Secretary Wildlife and the current Director General for Kenya Wildlife Service(KWS), Dr. Erastus Kanga for his personal support throughout the preparation of this strategy. We appreciate the financial support provided by the United States Agency for International Development through KWS during the data and information collection process of this assignment in all the conservation areas. We thank The Nature Conservancy, especially Loma Powrie, Munira Bashir, Anne Trainor, Irene Muthuka, Sheila Mulili, and Jackson Murubu for their financial and logistical support. We thank the officers who accompanied us during the field visits: Lucy Njage, Eric Mwenda, Daniel Satitoti, and Simon Agunja. We also thank the Kenya Wildlife Conservancies Association (KWCA) for the assistance provided while we put together this strategy.

Thanks to the former KWS Director General John Migui Waweru, Brigadier (retired), and his senior officers for their support and facilitation while undertaking this assignment. We especially thank Mr. Michael Wanjau and Mr. Edwin Wanyonyi, KWS heads of various directorates, who worked very closely with us and provided all the support we needed. We thank all the KWS personnel—Mr. Aggrey Maumo SAD, Dickson N. Ritan, Maurine Musimbi, and Ruth Mugun—who accompanied us in all the conservation areas while seeking stakeholders' views and input. Thanks also to the HWC database staff at KWS headquarters—Grace Nzale, Moses Maloba, and Adelide Nyongesa—for sharing their insights with us and for allowing us to evaluate the suitability of the national HWC database.

We thank all the participants and experts who attended the regional workshops for finding time to participate in this important national undertaking and for willingly sharing their views on different aspects of HWC. In the Southern conservation area, we thank the ranger representatives; International Fund for Animal Welfare; (IFAW); Amboseli Ecosystem Trust (AET); KWS; WRTI; World Wide Fund for Nature (WWF); Big Life; Nature Kenya; community leaders from Kimana, Mbirikani, Olgulului Olororashi, Kuku, and Eselengei; former warden Kennedy Nashuu; Dancan Ondila from Kajiado County; Shadrack Ngene of WRTI; Daniel Leturesh, and many others who participated in the workshop. We particularly thank James Kiparus for mobilising all the stakeholders in the Southern conservation area. In the Tsavo conservation area, we sincerely appreciate the participation of representatives from Save the Elephants (STE), African Wildlife Foundation (AWF), KWS, and WRTI. From the Coast conservation area in Kwale, a big thanks to representatives of STE, AWF, and WRTI; the many KWS wardens and community leaders from Kwale; KWS Senior Assistant Director Samwel Tokore; Shimba Hills CFA Chair Hamizi Nzila; Salim Mwayogue from Mwaluganje Elephant Sanctuary; and Chiyaya Chuphu from Dokata Ranch. We particularly thank Jacob Orhale for mobilising all the stakeholders in the coastal region.

We cannot forget to thank the many stakeholders in the Central Rift conservation area, especially in Narok, who participated in the workshops. These included members of the Nyagweri community; chiefs of various locations; local conservancies; Kenya Forest Service conservators; MEP, KWS Senior Assistant Director Abdi Doti; Narok county officials; Honorary Wardens Mark Karbolo and Samson Silantoi; and many KWS wardens and rangers. We particularly thank Ibrahim Osman for mobilising and facilitating the participants in the Central Rift conservation area. In the Western conservation area, particularly in Kisumu, we thank Honourable Shakeel Shabir, MP and honorary warden, for attending. We thank Christine Boit, who mobilised all participants and facilitated them. We thank community leaders and the following organisations for representation: WCK, Nature Kenya, WRTI, Yebo Africa, and National Museums of Kenya (NMK). We also thank Honorary Warden Rashid Hussein for attending. We thank the many KWS wardens, rangers, and other officers who attended the meetings. We thank Western conservation area Senior Assistant Director Catherine Wambani for participating fully in the workshops and in field visits while in Kisumu.

We are grateful for the participation and input of stakeholders in the Northern conservation area, especially in Marsabit, including KWS Senior Warden Collins Omondi for his assistance with facilitation and accommodations. Many thanks, too, to Honorary Wardens Tumal Orto, HSc, Juma Halaki, and Waqo Duba for attending and actively participating in the workshops. We also thank all community leaders' representatives from the National Environment Management Authority (NEMA), and Kenya Forest Service (KFS), as well as the game scouts and others who participated and shared their opinions. We also thank the many KWS wardens and rangers who attended the Northern conservation area workshops.

A big thanks to all the Eastern conservation areas participants, especially Warden Zainabu Salim, who mobilised participants and facilitated the workshops. We are also grateful for the many KWS wardens and rangers who participated, including representatives from Mount Kenya Trust, WRTI, and the county government, as well as Chief Executive Officer Gabriel Mithinka, Honorary Wardens John Muguka and Joseph Waweru, KWS Senior Assistant Director Robert Obrien, and City Commissioner Patrick Muriina.

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List of Acronyms

AET	Amboseli Ecosystem Trust
ASAL	Arid and Semi-Arid Lands
AWF	African Wildlife Foundation
CAK	Conservation Alliance of Kenya
CBO	Community-Based Organisation
CEE	Conservation Education and Extension
CHWCC	County Human Wildlife Coexistence Committee
CoG	Council of Governors
CSI	Corporate Social Investment
CSR	Corporate Social Responsibility
CWCC	Community Wildlife Conservation Committee
EMCA	Environmental Management and Coordination Act
ESIA	Environmental and Social Impact Assessment
FAO	Food and Agriculture Organisation of the United Nations
FGD	Focus Group Discussion
FY	Fiscal Year
GIS	Geographical Information System
GPS	Global Positioning System
HSc	Head of State Commendation
HWC	Human-Wildlife Conflict
IFAW	International Fund for Animal Welfare
IUCN	International Union for Conservation of Nature
IUCN-WCC	International Union for Conservation of Nature–World Conservation Congress
KFS	Kenya Forest Service
KICD	Kenya Institute of Curriculum Development
KNBS	Kenya National Bureau of Statistics
KWCA	Kenya Wildlife Conservancies Association
KWS	Kenya Wildlife Service
LWF	Laikipia Wildlife Forum
METT	Management Effectiveness Tracking Tool
MWCC	Ministerial Wildlife Conservation Committee
MWCT	Maasai Wilderness Conservation Trust
NEMA	National Environment Management Authority
NGO	Nongovernmental Organisation
NMK	National Museums of Kenya
NRT	Northern Rangelands Trust
PAC	Problem Animal Control
PAMU	Problem Animal Management Unit
PPP	Public-Private Partnership

List of Acronyms

REDD	Reducing Emissions from Deforestation and Forest Degradation
SAD	Senior Assistant Director
SDG	Sustainable Development Goal
SFS	School for Field Studies
STE	Save the Elephants
ToR	Terms of Reference
TNC	The Nature Conservancy
TSC	Teachers Service Commission
USSD	Unstructured Supplementary Service Data
WCK	Wildlife Clubs of Kenya
WCMA	Wildlife Conservation and Management Act
WIOMSA	Western Indian Ocean Marine Science Association
WRTI	Wildlife Research and Training Institute
WWF	World Wide Fund for Nature

Executive Summary

Numerous report recommendations on how to mitigate human-wildlife conflicts (HWCs) in Kenya have not successfully managed the problem in the country. Instead, wildlife has continued to destroy livelihoods and endanger human lives in all the conservation areas. Humans, meanwhile, have blocked wildlife movement and migration corridors, persecuted and displaced wildlife, and encroached on wildlife dispersal areas. Studies suggest that over 61% of wildlife in key landscapes in the country have declined since the 1970s (WWF, 2002; Ogutu et al., 2011; Ogutu et al., 2014). The status of wildlife is worrying given the key role it plays in the local and national economies through tourism and employment creation. It is as important a sector as agriculture, industry, and infrastructure development, but it’s not given the same level of attention, including funding, as for other key economic sectors.

The State Department for Wildlife in the Ministry of Tourism, and Wildlife, in collaboration with the Kenya Wildlife Service (KWS) and The Nature Conservancy (TNC) commissioned consultants to study human-wildlife conflict in Kenya, develop a national strategy and action plan for mitigating it, and share the findings in a report. Data and information were collected through focus group discussions and key informant interviews in workshops with stakeholders in the eight KWS conservation areas. Interviews were also conducted with top KWS managers and officers at the State Department for Wildlife, as well as with decision-makers of various non-state conservation agencies in Nairobi. HWC data for 2017–2021 from the KWS database was also synthesised to assess critical aspects based on consultancy tasks and terms of reference (ToRs). To gain a comprehensive understanding of the issue, consultants conducted an extensive review of related literature on various HWC aspects, including its mitigation and impacts to wildlife and local communities. This report contains (1) a detailed analysis of the nature, scope, and trends of HWCs, including their drivers and impacts, the species involved and their conservation status, mitigation strategies and their cost-effectiveness, the role of community enterprises and insurances in mitigating HWCs, and gaps and opportunities in law and policies; (2) HWC mitigation strategies and action plans, including how to harness knowledge and experiences in providing short- to long-term mitigation measures, and a fundraising mechanism to specifically support management of the conflicts; and (3) detailed action plans under various themes with the overall goal of providing a robust HWC mitigation framework for the country while safeguarding the livelihoods and socioeconomic needs of communities living with wildlife.

Based on the findings of the national HWC survey and opinions of people and stakeholders in the conservation areas, the HWC situation in the country is a major conservation challenge requiring urgent and decisive action. Many communities feel that wildlife impoverished them. The uncompensated livestock predation, crop raiding, property destruction, injury, and even death to people affects their economic

livelihoods and life aspirations. Many have not harvested reasonable quantities of food for years; hence, crop raiding and destruction has significantly reduced their food security and exposed them to perpetual hunger. Many are unable to do their daily economic activities due to fear of injury or death from wildlife or general insecurity because of wildlife presence. They are forced to return home early from work or social activities to minimise dangerous encounters with wildlife. In addition to actual economic costs that take a long time to be compensated, many have lost economic opportunities because of the long hours spent guarding crops and protecting livestock. Preventive measures—such as construction of predator-proof shelters for livestock, investment in large-predator deterrent lights, guard dogs, and other warning tools—cost money, reducing income meant for more important household needs, such as food, clothing, healthcare, and education. All these measures increase the cost and burden of communities living amongst wildlife, especially where elephants, lions, spotted hyena, and leopards freely roam. There are stories told of people losing their investments from banks and being left with loans to service. Others have lost donkeys they depended on to ferry goods such as water and other household goods, especially during pastoral movements. These conflicts impact people, households, and communities in personal ways that HWC compensation and consolation schemes cannot easily remedy.

Communities regard current benefits obtained from wildlife conservation to be too little to offset their costs of living alongside wildlife. This explains why welfare assistance and the many projects initiated through corporate social responsibility (CSR) have not significantly improved attitudes towards wildlife. Benefits must be significant, consistent, and given easily with community input, and more importantly they must offset the cost of coexisting with wildlife. Some common benefits received by communities include employment opportunities, revenue sharing, CSR projects, revenue from tourism investors, educational scholarships, and other welfare support. Overall, the benefits were scored as low to average across the conservation areas, suggesting that the benefits communities get from wildlife should be enhanced significantly. The southern conservation area was the only landscape that received a high score regarding benefits obtained from wildlife conservation, specifically from employment, revenue, CSR projects, and tourism investments. This issue needs urgent attention if there is to be sustainable and long-term human-wildlife coexistence. The benefits must move from merely providing tokens of assistance to actually empowering communities to generate their own wealth from the wildlife economy through activities such as conservancies, wildlife farming, wildlife ecotourism, and the like. This is consistent with the Wildlife Act (2018 revised), which is intended to allow landowners to directly benefit from wildlife conservation.

When you have high wildlife costs and few benefits, there cannot be positive attitudes towards wildlife nor support for its conservation. When high costs and few benefits are accompanied by lack of compensation for impacts arising from HWCs, the process of remuneration takes too long and is cumbersome for communities, and KWS officers lack critical skills in handling wildlife impacts to communities, community attitudes and perceptions of wildlife and conservation will remain negative. This was the situation in most conservation areas where communities’ perceptions and attitudes towards wildlife were in a few cases indifferent but mostly negative. When communities have negative perceptions for a long time with little to no effort to address their concerns, they cross a tolerance threshold and no longer accept living alongside wildlife. They will use all means to displace the wildlife from its habitats or even exterminate it through activities like poaching for bush meat, encroaching wildlife dispersal areas, spearing, poisoning, and snaring. Alternatively, they will seek mitigation strategies that permanently separate or establish barriers between them and wildlife such as blocking wildlife movement and migration corridors or using electric fences. It was therefore not surprising that electric fences were seen as the most desirable HWC mitigation strategy in the areas around the Aberdare Mountains, Tsavo National Park, Mount Kenya, and many conservancies in Laikipia since they completely separated wildlife and communities.

Key drivers of HWCs in the county are numerous and some are related. These include the blocking of wildlife movement and migration corridors, conversion of wildlife dispersal areas to other land uses, increase in human population, local increase in some wildlife species, and prevalence of land uses incompatible with wildlife conservation. Others are climate change, infrastructure development, depressed livelihoods and high poverty levels in the conservation areas, and rampant competition between wildlife and communities for natural resources (e.g., space, water, pasture, and salt licks). Blocking of wildlife movement and migration corridors and conversion of wildlife dispersal areas to other land uses were found to be high in the Southern, Mountain, and Central Rift conservation areas, but average in other landscapes. Land use changes and immigration of people to Kajiado County and Machakos County ranches have led to a high influx of people, resulting in new crops and a proliferation of settlements and associated infrastructure. This has negatively altered large tracks of former wildlife use areas and habitats. As the government delays in protecting, acquiring, and gazettement key wildlife corridors and dispersal areas across the country, most of the remaining spaces for wildlife outside protected areas will continue to diminish and escalate HWCs.

Communities advocated for long-term strategies in containing and managing HWCs, amongst other immediate actions. They noted that increasing wildlife space, habitats, and connectivity of protected areas, as well as encouraging wildlife conservation as a profitable land use and increasing funding for conflicts mitigation, would lead to better prospects for wildlife conservation and wildlife coexistence with locals. There was also a need to enhance KWS’s response KWS to HWCs and improve the perceptions of local communities

by ensuring benefits obtained from wildlife conservation offset their costs. These actions were scored from low to average in all the conservation areas. This implies that radical measures are needed to secure the future of wildlife outside protected areas and promote human-wildlife coexistence. This strategy proposes taking prompt action in gazettement key wildlife movement and migration corridors and dispersal areas, completing and implementing ecosystem and county spatial plans, and strengthening conservancy initiatives in order to expand wildlife space and generate revenue for landowners.

Establishment of the Wildlife Research and Training Institute (WRTI) is a major milestone in enhancing Kenya’s wildlife conservation, human-wildlife coexistence, and management of human-wildlife conflicts. Moreover, the National Wildlife Strategy 2030 and National Wildlife Policy 2020 have also acknowledged training and research as critical wildlife conservation and management pillars in the country. In this regard, WRTI will play a pivotal role in conducting research that will serve as a strong foundation for informed decisions on the effective and sustainable management of HWCs and promote coexistence between communities and wildlife as envisioned in this strategy and these action plans. However, this will only be achieved with adequate funding and availability of human and non-human resources. Stakeholders proposed several strategies for which conservation actions have been proposed in this strategy. These are categorised into four thematic areas and ordered according to priority.

- i. Land and space issues for sustainable wildlife conservation:** The government and stakeholders must strengthen the conservancies movement and provide funding to make them viable ecologically and economically. Conservancies contribute to local economies, provide employment, expand space for wildlife, and enhance connectivity to protected areas. In addition, the government and stakeholders should purchase land for use by wildlife (corridors and dispersal areas) when communities and other landowners put them up for sale, especially after dissolving communally owned land like group ranches. Spaces in Kitengela, Amboseli, and the Northern and Mountain (Laikipia) conservation areas—which were private ranches, commercial farms, real estate developments, and the like—should be bought to sustain wildlife movement and connectivity to other protected areas. The government should act on the recommendations of its 2017 wildlife corridors report and deal decisively with associated challenges since this is a big milestone in mitigating HWCs and connectivity of protected areas. Spatial plans, ecosystem/landscape management plans, and management plans for critical wildlife spaces should be completed and implemented to minimise human-wildlife interaction and the proliferation of land uses that are incompatible with wildlife conservation. There are national reserves and parks in the country that are moribund due to various challenges, such as human encroachment, rampant livestock incursion, and inadequate financial and human resources. These include the Sibiloï and Malka Mari national parks; and the Dodoi, Arawale,

Ngai Ndeithya, Losai, Boni, Rahole, Mwingi, and Bisanadi national reserves. Those areas collectively cover over 9,000km². The government should explore how to better utilise these conservation areas, with a view of expanding wildlife use areas.

- ii. Initiating innovative, effective, and affordable HWC mitigation strategies:** This is important to reduce wildlife impacts on communities and reduce retaliation against wildlife. Use of electric fences can help, but they need to be complemented by other strategies, practicing vigilance, avoiding human encroachment into wildlife habitats, allowing wildlife movement, maintaining migration corridors, and adhering to existing land use guidelines. To reduce livestock predation, employing predator-proof bomas and better herding practices should be adopted over using children, grazing in protected areas, or abandoning livestock in protected areas when there is no pasture outside. These measures are temporary but if adopted by communities, they can significantly reduce wildlife impacts on livestock. However, investment, training, and funding of these mitigation measures are important so that they can be adopted by locals. Use of predator-deterrent lights, alarms, early-warning measures, bees, and other strategies tried and tested in different parts of the country should be availed to communities to minimise wildlife learning and to help them get used to a few mitigation strategies.
- iii. Improving capacity to prevent wildlife damage before they happen:** KWS staff involved in HWC mitigation live in poor conditions, are poorly motivated, are uninsured, and lack training to deal with dangerous wild animals, and many are left traumatised because of encounters with wildlife. In addition, many rangers are not trained in HWC resolution, human behaviour, sociology, consensus building, and conflict handling. They therefore need further training beyond security, wilderness survival, and ammunitions handling. Further, they are poorly equipped. Inadequate vehicles, poor vehicle fuel supply, inadequate bullet blanks and thunder flushes, lack of powerful lighting especially at night, lack of wildlife trapping and translocation cages, and the like prevent them from adequately preventing wildlife damage before it happens. Recruiting enough KWS personnel for the HWC mitigation unit, funding them adequately, and improving their morale and motivation will go a long way in assisting them to act fast and effectively to prevent wildlife damage before it happens. The sector also needs a new directorate and adequate funding.
- iv. Institutional changes:** The KWS Community Relations and Education Service Division should be renamed and elevated to a Directorate of Human and Wildlife Coexistence. This directorate should be adequately funded, staffed, and well equipped to handle all wildlife issues outside of protected areas, including HWCs. The Wildlife Clubs of Kenya (WCK) also needs more funding to scale up its education activities and reach more areas in the country. The Wildlife Act (2018 revised) needs to be reviewed to scrap the Community Wildlife Conservation Committee (CWCC) and replace it with County Human-

Wildlife Coexistence Committees (CHWCCs). There is need to streamline compensation for HWC. This could be done through creating a new Human Wildlife Coexistence Fund (HWCFF) managed by a board (the Human Wildlife Coexistence Board, or HWCBB). The board will be responsible for raising capital, overseeing CHWCCs, and coordinating its activities with KWS. The Wildlife Act’s power should be elevated to the same level as the Environmental Management and Coordination Act (EMCA) so that they complement each other in demanding compliance and adherence to land use plans in the country. It should not be an implementing legal instrument for EMCA but a complementary act, especially on matters that affect wildlife conservation. There is also need for coordination and collaboration amongst conservation nongovernmental organisations (NGOs) around a targeted conservation action in landscapes or conservation areas to maximise their impacts rather than individual isolated initiatives that have only a brief implementation period. The Conservation Alliance of Kenya (CAK), KWS, and proposed HWCBB can assist in this coordination.

- v. Wildlife economy:** There have been many proposals to open wildlife to diverse economic activities, but they get bogged down with hunting or not hunting debates. It must be clear that as we discuss the blue economy, wildlife must also benefit communities outside protected areas for it to be accepted as a land use option. Utilisation debates must consider species’ behaviour, ecology/biology, and social organisation. But reasonable enterprises and an economy can be built around wildlife farming of plants, butterflies, game birds, snake farming for venom, and aesthetic birds that will bring money to landowners. This must be accepted and then piloted in HWC hotspots in the Southern, Western, Tsavo, Mountain, and Central Rift conservation areas and the lessons learnt will then be used to do a countrywide rollout of the strategy. In addition to the benefits accrued from conservancies, there’s an urgent need to increase and diversify benefits obtained from wildlife by landowners whilst reducing their costs of living with wildlife.

Although there’s a need to increase and diversify benefits from wildlife conservation, their equitable distribution must be equally emphasised. Therefore, government and conservation stakeholders should ensure that all community-based wildlife enterprises develop a benefit-sharing plan that complies with the principles of equity, fairness, and transparency. To cement transparency in the negotiation of investment partnerships, the proposed Human Wildlife Coexistence Board will play an advisory role and ensure that benefits to communities are meaningful and fairly derived.



Introduction



Kenya is one of the countries in Africa where great efforts have been made on biodiversity conservation. The country has established 23 terrestrial reserves, 29 terrestrial national reserves, 4 marine parks, 6 marine national reserves, 8 national wildlife sanctuaries and 234 forest reserves covering 12.34% of its land area (Ministry of Tourism and Wildlife, 2018). In addition, more than 160 private and community conservancies have been established covering an additional 11% of the country's land mass committed to wildlife conservation outside designated protected areas (KWCA, 2016). Despite these conservation efforts, wildlife populations in the country have declined significantly over the last four decades.

Several studies have assessed changes and trends in wildlife populations in the country inside and outside protected areas. Ogutu et al. (2016) did such an evaluation using aerial wildlife census data collected in the country's rangelands from 1977 and 2016, which cover approximately 88% of Kenya's land mass and where most of the protected areas (70%) and wildlife populations are found. The study revealed that the population of 18 wildlife species had declined by an average of 68.10% or a rate of 1.7% per year. The extent of decline varied amongst species, and the decline occurred and was especially rampant in most of the 21 rangeland counties. The most extreme decline of 72–88% affected 10 species: Grevy's zebra, Thomson's gazelle, eland, oryx, topi, hartebeest, waterbuck, warthog, lesser kudu, and impala. Four species—Grant's gazelle, gerenuk, Maasai giraffe, and wildebeest—were severely affected, declining by 60–70% in the same period, while another four species—Burchell's zebra, elephant, ostrich, and Cape buffalo—had a moderate decline of 30–50%. These declines significantly reduced the population of most of the affected species to levels that present a danger to their future population viability in the rangelands, and their risk of extinction in the coming decades is very high unless serious conservation and management interventions are put in place. However, the species which had notable decline in their population from 1977–1980 to 2011–2013 were: warthog, from 30,726 to 8,676; waterbuck, from 15,619 to 1,906; oryx, from 64,313 to 13,726; eland, from 44,7145 to 9,826; hartebeest; from 42,977 to 6,837; Grevy's zebra; from 14,447 to 1,874; impala, from 171,016 to 27,124; lesser kudu, from 17,023 to 4,699; and Thomson's gazelle, from 158,452 to 38,989. Overall, between 1977–1980 and 1994–1997, these wildlife declined by about 48.70% compared with a decline of 68.10% between 1977–1980 and 2011–2016. This indicates a loss of wildlife of about 20% between 1994–1997 and 2011–2016. Moreover, other than for elephants, rhino and the Cape buffalo, the rest of the wildlife populations had severely declined more so between 2011–2016 compared with 1994–1997. The study also showed that in Taita Taveta County, where Tsavo East National Park, is located, six wildlife species declined by 63–89% between 1977 and 2014. This is very disturbing considering that Tsavo West and Tsavo East are the biggest protected areas and landscapes in the country, and because of that and their high degree of vulnerability, they get tighter security.

The findings by Ogutu et al. (2016) show a very worrying state of wildlife population changes in most parts of the country, especially in 21 rangeland counties where consistent wildlife counts have been done since 1977. In particular, the decline severely threatens the population viability of 14 species: gerenuk, lesser kudu, Thomson's gazelle, hartebeest, impala, Grevy's zebra, waterbuck, Grant's gazelle, wildebeest, giraffe, eland, oryx, topi, and warthog. They are also worrisome given that by 2013, 37 species of mammals in the county were classified as vulnerable (Republic of Kenya, 2013), 19 were listed as endangered, and another seven were classified as critically endangered, including the Sable and Roan antelopes; the Hirola, or Hunter's, hartebeest; and Adder's duiker.

Nevertheless, the 2021 national wildlife census recorded an increase on some of the charismatic species such as: elephants, rhinos, lions, giraffe, Grevy's zebra, hirola among others (Waweru et al 2021). Some of the iconic species counted were elephants (n=36,280), black rhino (n=897), white rhino (n=842), northern rhino (n=2), lions (n=2,589), hyenas (n=5,189), Cheetahs (n=1,160), wild dogs (n=865), buffalo (n=41,659), Maasai giraffe (n=13,530), reticulated giraffe (n=19,725), Nubian's giraffe (n=938), common zebra (n=121,911), Grevy's zebra (n=2,649), eland (n=13,581), hartebeest (n=7,332), wildebeest (n=57,813), Grant's gazelle (n=66,709), Thomson's gazelle (n=18,277), hirola (n=497), topi (n=8,627), impala (n=25,541), oryx (n=11,765), kudu (n=2,524), gerenuk (n=13,400), waterbuck (n=1,071), warthog (n=8,013), hippo (n=1,788), Maasai Ostrich (n=2,354), Somali Ostrich (n=6,483), roan antelope (n=15), sable antelope (n=51), Mountain bongo (n=150), Sitatunga (n=473), Tana river Mangabey monkey (n=1,650) and Tana river red colobus monkey (n=1,219), among other terrestrial species.

Key marine species population status was also established. Some of these key species were sea turtle nests (n=340), dugong (n=2), whale shark (n=9), Humpback whales (n=63), Indo-Pacific bottlenose dolphin (n=354), Blue whale (n=2), Scalloped Hammerhead shark (n=222), Silky Shark (n=495), Giant Guitarfish (n=89), Bowmouth guitarfish (23), Mobula rays (n=11), Oceanic whitetip shark (n=358), Long comb sawfish, narrow snout sawfish or green sawfish (n=60), Great white shark (n=29) and Tiger shark (17)

Myriad of resources are used annually to enhance wildlife conservation and management in the country, yet the study

by Ogutu et al. (2016) shows a very disturbing situation regarding the status of wildlife populations in the country. These declines are attributed to several factors, including:

- Rapid human population growth and its attendant problems, which are not compatible with wildlife conservation.
- Rangeland degradation and fragmentation, which are largely attributed to anthropogenic activities like land tenure and land use and cover changes. These changes are precipitated by inappropriate rangeland management practices, uncontrolled charcoal burning, harvesting of firewood and woody vegetation, overgrazing due to unregulated livestock stocking levels, infrastructure development, sedentarisation, and unregulated proliferation human settlements, including urban centres (Ogutu et al., 2013 and 2014; Ottichilo et al., 2000a; Garedew et al., 2009; Omuto et al., 2009).
- Climate change and variability, which is characterised by the decline in precipitation and increase in ambient temperature and which accelerate land use and cover changes as well as range degradation.
- Market, policy, and institutional failures (Marshall, 1990; Norton-Griffiths, 2000). Historically, Kenya's rangelands were sparsely populated, and pastoral communities, responding to spatial-temporal availability of pasture and water resources, were highly mobile (Marshall, 1990). However, government land policies and rapid human population growth have continued to discourage pastoralism as the main land use. Instead it has encouraged land privatisation, subdivision, agriculture, and enhanced land use practices. This has led to rampant land use, wildlife habitat loss, fragmentation, and degradation (Little et al., 2001; Homewood, 2009; Ogutu et al., 2009 and 2014). Accordingly, key wildlife use areas and habitats have shrunk substantially, and wildlife has continued to be displaced from large swathes of land.
- Prevalence of HWC associated with rampant bush meat activities. These have been triggered by multiple factors, including increasing human population, land use changes (e.g., expansion of farming and settlements in rangelands (Muriuki et al., 2011; Maingi et al., 2012), reduction of wildlife range, blockage of wildlife movement corridors, and encroachment into wildlife areas (Norton-Griffiths, 1996; Homewood, 2009). As a result, the wildlife is usually harassed and displaced by livestock, human settlements, and infrastructure, and it has been subjected to all manner of retaliatory attacks, some of which directly or indirectly kill the wildlife.

Past studies have also reported decline in wildlife populations in the country's rangelands but were less severe compared with those documented by Ogutu et al. (2016). Grunblatt et al. (1996) found that there was a 33% decline between 1977 and 1994, while Ottichilo et al. (2002a) estimated a decline of all common wildlife species of 40–60% in the same period, except for ostrich and wildebeest. Western et al. (2009) showed that wildlife populations in unprotected areas, mainly in pastoral communities, declined by 37% between

1977 and 1997 in 17 range counties and by an average of 41% in key protected areas. Based on an analysis of the Department of Resource Surveys and Remote Sensing aerial count data, other severe rangeland contractions and wildlife population declines have also been recently reported in several rangeland counties: Kajiado (Ojwang' et al. 2006a); Tana River (Ojwang' et al. 2006b); Marsabit (Wargute et al. 2011); Lamu, Kwale, and Kilifi (Wargute et al. 2007); Laikipia (Butt et al. 2009); and Wargute and Garissa (Ojwang' et al. 2011). Other key conservation and protected areas where disturbing large-scale wildlife populations fluctuations and declines have been reported include the following: Kajiado county and Nairobi National Park (Western and Nightingale, 2003; Reid et al., 2012; Ogutu et al., 2013 and 2014); Lake Nakuru National Park (Ogutu et al., 2012a); Ruma National Park (Kimanzi and Wanyingi, 2014); and Kisumu Impala Sanctuary (Ogutu et al., 2012b). Specifically, Ottichilo et al. (2000b) found that in the Masai Mara National Reserve, the population of non-migratory wildlife species declined by 58% between 1977 and 1997. In the same protected area, Ottichilo et al. (2001) and Semeels and Lambin (2001) reported a decline of 75–81% of resident wildebeest between 1977 and 1997, while between 1977 and 2009, an average decline of all common wildlife species in the Maasai Mara was recorded by Ogutu et al. (2011). Western et al. (2009) also documented significant wildlife population declines between 1997 and 1997 of 63% in both Tsavo West and Tsavo East and an estimated 78% decline between 1997 and 2000 in Meru National Park.

Ultimately, the documented wildlife declines in the country both inside and outside protected areas highlight problems associated with wildlife conservation practices and management and conservation policies, including mitigation of HWCs. They emphasise the urgent and compelling reason and need for the country to make radical changes to wildlife conservation policies and how HWCs are managed. Since the country's national parks and reserves are unable to sustain on their own large and diverse wildlife populations, and in view of the tremendous changes that have occurred in all the conservation areas, it's not feasible to establish protected areas under the management of the national government. Therefore, the only realistic and practical approach is to mainstream policies and involve private and community landowners living contiguous to the current network of protected areas (Georgiadis et al., 2011). If this is not done, wildlife populations in the country's rangelands will continue to decline perhaps at a rate faster than what has already been reported. Accordingly, realistic and effective conservation approaches are urgently needed (Georgiadis et al., 2007). If not done, there will be a rapid increase in human population, rampant land use, land tenure and cover changes, and other deleterious anthropogenic pressures in the country's rangelands.

Human-wildlife conflicts are viewed in different ways but generally occur when the requirements of humans and wildlife, with financial and physical impact on wildlife and people (IUCN, 2003 and 2005; Messmer, 2009). According to KWS (1996), HWC is "any and all disagreements or contentions relating to destruction, loss of life or property and interference with

rights of individuals or groups that are attributable directly to wild animals". This definition distinguishes HWCs as pertaining to situations where costs are incurred by humans through negative interactions with wildlife". The Ministry of Tourism and Wildlife (2019) defined human-wildlife conflict similarly: the interaction between wildlife and human beings often leading to some form of loss. It's worth noting that HWCs are not a new problem in Kenya in the envisioned coexistence between humans and wildlife. Moreover, there's no country in the world that doesn't experience conflicts between people and wild animals, so the problem is not unique to Kenya. According to Berger and Clarke (1995) and Berger (2006), fossil records indicate that the first hominids experienced negative interactions with wild predators. Further, the Food and Agriculture Organisation of the United Nations (FAO; 2009) suggested that in Africa, crocodiles have attacked, killed, or injured humans and their predecessors for more than 4 million years.

Human-wildlife conflicts—whether in Kenya or other countries—is a human-created problem. In Kenya, it dates to the colonial era, but at that time, their occurrence and severity were significantly much lower than today. At that time, the human population and infrastructure development were low and so was the extent of land use changes. Unlike today, there was less human encroachment and damaging human activities in wildlife habitats and use areas, and as a result, human-wildlife interactions were extremely low, even nearly non-existent across most of the wildlife areas in the country. Hence, HWC occurrence was very low, less severe, and largely manageable. But since Kenya's independence, the human population in the country has increased rapidly and substantially, from nearly 8 million people in 1960 to 49 million people in 2019 (Kenya National Bureau of Statistics [KNBS], 2019). This has escalated the historically low occurrence of conflicts between wildlife and communities through widespread and unregulated encroachment into wildlife use areas and habitats. It should be expected that as the human population in the country and associated expansion of communities' socioeconomic systems continue to increase, so will the prevalence and severity of HWCs. These will be experienced more acutely in communities living outside protected areas.

Prevalence and manifestations of HWCs in Kenya has been studied and documented substantially. Research has included causal factors (i.e., key drivers for the conflicts), their impacts, mitigation, and management. Although HWCs occur across most parts of the country, they are more prevalent in the dry areas, or rangelands, where most wildlife populations are found (Ministry of Tourism and Wildlife, 2020). Many of the reported HWC incidences occur mainly in five counties: Laikipia, Lamu, Narok, Taita Taveta, and Kajiado (Ministry of Tourism and Wildlife, 2020). The 10 species responsible for most conflicts are the Cape buffaloes, hippopotamuses, snakes, leopards, crocodiles, spotted hyenas, elephants, monkeys, lions, and baboons (Ministry of Tourism and Wildlife, 2019 and 2020). Across the country, most of the crop damage and threats to humans that have been reported have been caused by elephants—apparently the most problematic species to manage with regards to mitigation

of HWCs. Overall, four categories of HWCs occur: human death and injury, livestock depredation, property damage, and crop destruction (Makindi et al., 2014; Kiringe et al., 2016; Mukeka et al., 2018 and 2019; Huaping et al., 2019; Ministry of Tourism and Wildlife, 2020). Their occurrence varies across the country, but crop damage is the most common and is done by a wide array of wildlife species. Despite this, human death and to some extent human injury have been found to cause the most unprecedented reaction and anger from communities wherever they occur. In some instances, they have led to serious wildlife retaliatory attacks and other actions directly and indirectly threatening wildlife survival and its conservation.

Various studies have revealed that HWCs in the country has been and continues to be driven by multiple factors mostly anthropogenic and in the recent past this has been worsened by environmental perturbation associated with climate change and variability (Kanga et al., 2012). In particular, the rapid expansion of human population, rampant land use and land tenure changes, and key accompanying changes like landscape fragmentation, encroachment into wildlife use areas, habitat loss, and degradation have individually and collectively contributed to an escalation of conflicts across all eight conservation areas (Hoare, 1999; Distefano, 2005; Woodroffe et al., 2005a). Usually, these changes alter the availability, quantity, and quality of key resources (e.g., water and forage) shared by communities, livestock, and wildlife outside protected areas, which then intensifies their competition. In addition, they reduce the space or landscape shared by humans, wildlife, and livestock, and in most cases, wildlife is edged out. It is worth noting that anthropogenic drivers and related changes are partly caused by government policies, for example, encouraging communities to increase crop production to enhance household- and national-level food security. In July 2023, the government gave a directive to dissolve and subdivide all communally owned land, especially group ranches, which are mainly owned by pastoral communities; yet they are critical wildlife use areas, corridors, and migration routes. While this is a major milestone in protecting land rights of such communities, it has serious and long-term ramifications regarding occurrence of HWCs and their management, the envisioned long-term coexistence of locals and wildlife, and ultimately the future survival and conservation of wildlife.

The impacts of HWCs on communities and wildlife have been evaluated in different parts of the country. All have consistently shown that they devastate the livelihoods and socioeconomic welfare of many communities, which must shoulder the burden of living with wildlife. Similarly, they have revealed that HWCs have increasingly become a major threat to the future of wildlife in the country, its long-term conservation, and the ability of communities to continue tolerating and cohabitating with wildlife. Since independence, multiple approaches have been used by the government, communities, and other stakeholders to reduce the damages and losses incurred by communities due to conflicts. But it's worrying that the problem has continued to persist and has escalated in occurrence and severity as time goes by. Key aspects emerging from this situation follow:

1. Annually, KWS and the government spend considerable financial and human resources to prevent and mitigate HWCs. These expenditures are augmented by input from donors, development partners, and stakeholders involved in wildlife conservation. This money could be used for other necessary short-, medium- and long-term socioeconomic development projects to enhance the livelihoods of the nation's citizens. Essentially, not only are HWCs a financial burden to the government, but their management has also become an endless financial sink, and still they have not been significantly ameliorated.
2. Notwithstanding the economics associated with wildlife in the tourism and service industry, the government has a national and international obligation to preserve and conserve wildlife resources and their habitats for posterity. Thus, it's obliged to use all manner of strategies, including mobilising financial and human resources to protect and conserve the country's wildlife resources against threats arising from HWCs and any other threats that have been identified to be of concern.
3. Persistence of HWCs is currently a big threat to many rural communities living with wildlife outside protected areas, with unintended negative socioeconomic consequences. The Country enacted Wildlife Conservation and Management Act 2013 (amendment 2019), and mandated KWS, as a lead agency in wildlife conservation, management and protection. Section 77 of WCMA, 2013 also mandates KWS to manage HWC in the Country.. The Country therefore needs to develop progressive conservation policies, laws, and regulations to ensure that communities living with wildlife receive tangible benefits from wildlife conservation.
4. The survival and future of many wildlife species involved in HWCs are greatly threatened by the conflicts. This is in addition to other numerous anthropogenic threats that continue to decimate the country's wildlife resources. Tourism is currently the third foreign income earner for the country, with wildlife playing a key role in the sector. Moreover, tourism has numerous direct and indirect job opportunities, and its full job-creating potential has yet to be achieved. Thus, the continued decline of wildlife due to HWCs, especially those species that attract tourists—like elephants and large carnivores—is a significant threat to the tourism industry and to local and national economies, including key players in wildlife conservation, tourism, and service industries.
5. While HWC is a trade-off between community needs and wildlife conservation, it has a profound effect on people's attitudes and their perceptions towards wildlife, decreasing both their tolerance levels and, ultimately, support for wildlife conservation. Such an attitude—one that is shared across all the conservation areas—might lead to retaliatory killing of wildlife by communities. .. Protected areas in the country under KWS cover nearly 8% of the country's land mass and represent a very small landscape that is used by wildlife. It has been demonstrated in many studies that >65% of the wildlife live outside of protected areas most of the time. The future of Kenya's wildlife conservation heavily depends on community support and involvement.

HWCs have tremendous impact on country's socio-economic development, and communities livelihoods. Given their complex nature, the country has developed a holistic Human Wildlife Co-existence Strategy to address the challenge.



Guiding Principles

2.1 Introduction

This national Human wildlife Co-existence strategy and its action plan aims to put in place an overarching framework that prioritises, coordinates, directs, recognises, and encourages the participation of communities, partners, and other stakeholders in enhancing sustainable wildlife conservation and harmonious human wildlife coexistence outside the country's protected areas considering the underlying drivers and human dimensions of HWCs. Additionally, it will serve as an overarching framework for multi-sectoral fundraising tool and as a mechanism for collaboration in mitigating HWCs. the strategy also recommends actions aimed at safeguarding communities and their properties.

2.2 Vision



We envision long-term viable wildlife population living harmoniously with communities with tangible benefits for sustainable livelihoods and posterity

2.3 Mission



Develop a framework for managing HWCs in a cost-effective and efficient manner using evidence-based short- and long-term solutions to meet the needs of both community welfare and biodiversity conservation.

2.4 Goal



To apply effective and sustainable approaches in mitigating human-wildlife conflicts and promoting human-wildlife coexistence in Kenya.

2.5 Guiding principles



1. HWC is a major conservation challenge.
2. HWC management is anchored in law (WCMA,2013) and endeavour to uphold the fundamental human rights and freedoms enshrined in the Constitution of Kenya.
3. There exist a multisector approach involving collaboration and co-creation between relevant national government ministries, and departments, and county governments in the management of HWC
4. The management of HWCs is among the core mandate of the government, that requires sufficient finance and human resources.
5. HWC management are guided by scientific factual and updated database to allocate resources and map out conflict hotspot areas HWC management focuses on enhancing community tolerance by increasing tangible and intangible benefits from wildlife and increasing communities' resilience to HWC impacts.
6. HWC management focuses on empowering communities to be self-reliant in the establishment of community conservancies thereby managing and protecting themselves and property against problem animals.
7. Human-wildlife coexistence is mainstreamed in the long term by developing the country's conservation policy taking cognizance of issues such as participatory land use planning , county spatial plan and Community land act 2016 therefore ensuring a healthy population in diversity of wildlife. Management of HWCs will integrate climate change mitigation and adaptation strategies and processes.
8. HWC management will encourage use of relevant indigenous knowledge and consider use of cost-effective and ecologically sensitive technology.
9. Continuous research should promote Progressive HWC management to inform policy and strategic direction.
10. Continuous education and awareness-raising programmes recognises the important role for fostering community tolerance of wildlife and human-wildlife coexistence for the long-term.
11. Gender mainstreaming is anchored in developing action plans to address human wildlife conflict





03

Approach and Methodology

This national HWC mitigation strategy and its action plans aim to put in place an overarching framework that prioritises, coordinates, directs, recognises, and encourages participation of communities, partners, and other stakeholders in enhancing sustainable and long-term coexistence of people and wildlife outside the country's protected areas. Additionally, it will serve as a framework for multi-sector fundraising and as a collaboration mechanism or tool to manage and mitigate HWCs. It will also act as a critical pathway for safeguarding communities' property and lives whilst significantly reducing costs arising from their coexistence with wildlife in the short term. At the same time, it will play a critical role in addressing the underlying drivers and human dimensions of HWCs, as well as lay strong foundations for the sustainable long-term coexistence of communities and wildlife throughout Kenya.

The strategy was guided by data and information from the following fundamental pillars that are critical for effective and sustainable management of HWCs:

1. Empowering communities to initiate, manage, and mitigate HCW
2. Protecting citizens in responding to emergency situations concerning lives and livelihoods
3. Conserving declining wildlife species involved in HWCs and increasing their coexistence value
4. Identifying mitigation strategies that can be deployed by KWS, stakeholders, and communities to reduce negative impacts associated with HWCs
5. Identifying and documenting HWC hotspots in the country to prioritise resource allocation for better conflict management
6. Identifying opportunities and gaps in legal, regulatory, policy, and institutional frameworks for the effective and sustainable mitigation of HWCs
7. Wise land use planning to safeguard long-term and sustainable coexistence of wildlife and communities
8. Establishing benefits obtained by communities for coexisting with wildlife and providing incentives for land uses that foster human-wildlife coexistence
9. Scaling up education and awareness amongst the public (children and adults) across the country on managing and mitigating HWCs
10. Creating a fundraising framework and strategy for mitigating HWCs in collaboration with communities in wildlife areas
11. Designing a suitable database for documenting, reporting, and monitoring HWCs for effective and efficient decision-making in managing and mitigating conflicts
12. Analysing annual costs of prevention and mitigation of HWCs in the country
13. Ensuring that communities benefit from coexisting with wildlife using innovative business principles and approaches

Data and information on the 13 pillars were gathered from (a) desk review of relevant literature, (b) key informant interviews with various stakeholders who were identified and mapped prior to commencement of the interviews, and (c) expert workshops held in all eight of the KWS conservation areas. Literature used for research was gathered from the KWS head office in Nairobi; the KWS website; and Ministry of Tourism and Wildlife in Nairobi. The literature consisted of published reports and journal articles; county spatial plans; species conservation action plans (for elephants, lions, spotted hyenas, cheetahs, and wild dogs); and management plans for protected areas and ecosystems. These were comprehensively reviewed, and relevant data and information was obtained from them, collated, and summarised.

An evaluation of the KWS national HWC database in Nairobi was undertaken to understand its nature, degree of comprehensiveness, relevance, and suitability in documenting the true situation of conflicts in the country. Also undertaken was an assessment of how the data was stored, its protection, how it is accessed and by whom. The types of outputs derived from the data were also examined for relevance and application in understanding and mitigating conflicts. The review also examined the level of uniformity in data collection across the country, the kind of data collected, and whether uniform data collection protocols were used. It also identified data gaps. Long-term HWC data was used to identify conflict hotspots in the country, as well as their prevalence, magnitude, and major wildlife species included.

Key informant interviews were held with numerous stakeholders, including personnel from KWS and the Ministry of Tourism and Wildlife in Nairobi; relevant private sector conservation practitioners; and nongovernmental conservation organisations working in the country. These sessions were guided by a comprehensive, semi-structured questionnaire with both qualitative and quantitative questions. Workshop meetings with relevant experts were held in all the country's eight conservation areas between August and October 2022 to augment the key informant interviews and the data and information gathered from the literature review. Participants were carefully and purposively selected in order to obtain a diverse and knowledgeable group of experts. These included KWS park wardens, rangers, researchers, community representatives, county government officials, community-based organisations (CBOs), conservancies management, and key NGOs in each region involved in wildlife conservation and HWC mitigation. Participants were split into groups and assigned themes to deliberate on. That was followed by a plenary session. For some survey questions, participants were requested to rate appropriately some aspects of HWC issues using a five-point Likert scale (1 = Very low/Very poor; 2 = Low/Poor; 3 = Medium/Average; 4 = Good/High; and 5 = Very good/Very high.) Information from the workshops and key informant interviews were then synthesised, collated, and summarised. A stakeholders' validation workshop was held in Nairobi to deliberate on the findings of the HWC situation in the country and seek concurrence on the best and most effective strategies and actions that should be used to manage and mitigate the conflicts nationally.

Overall, the following steps were used to undertake this

assignment.

1. Preparation of an inception report: The report provided a clear and comprehensive road map on how the tasks and ToRs were used to develop the national strategy and action plan. This included tasks that were to be undertaken by the consultants, the approach and methods that would be used, the work plan or schedule and associated timelines, deliverables, and final outputs. The report was submitted to TNC, the State Department for Wildlife, and KWS for review and input prior to commencement of consultancy tasks.
 2. Acquisition of secondary data and information: The consultants collected a variety of literature from the clients, including published journal articles, published reports, and any other relevant data and information based on the ToRs. The information came from diverse sources, most of which were government departments, KWS, conservation NGOs, county governments, and community grassroot organisations. The literature were subjected to detailed desktop review, synthesis, and collation based on the ToRs and associated outputs so that relevant information and data that would inform this assignment would be referenced.
 3. Field-based data and information collection: Primary data and information based on the ToRs and tasks of the consultancy was gathered using key informant interviews and focus group discussions (FGDs) in regional workshops held in August and October 2022 with relevant stakeholders in eight KWS conservation areas. Appropriate data collection instruments/tools were developed and used to conduct the interviews. Development of the data collection instruments/tools were guided and based on the ToRs, tasks, and outputs of the consultancy. Further, a special plenary session was held in the workshops to assess key issues associated with HWCs (e.g., impacts of wildlife to people and vice versa, benefits obtained from living with wildlife, effectiveness and HWC mitigation approaches, views on the future of wildlife and its conservation in each region, and so forth.). The data and information gathered was synthesised to meet the expected outputs and deliverables for the consultancy.
- a. Informant interviews:** Interviews were conducted with key informants (e.g., government state departments, KWS, WCK, KWCA, managers of conservancies, and conservation NGOs). Information collected through data tools were synthesised, collated, and analysed. Purposive sampling of key informants was used to select participants who were knowledgeable and involved in HWC and wildlife conservation issues in the country and in the KWS conservation areas. The data collection instruments/tools were organised in a semi-structured questionnaire with both qualitative and quantitative questions, and use of an appropriate 5-point Likert scale approach was used where necessary (e.g., 1 = Very low/Very poor; 2 = Low/Poor; 3 = Medium/Average; 4 = Good/High; and 5

= Very good/Very high.

- b. Focus group discussions:** These were used to collect data and information relevant to the ToRs and tasks in the eight KWS conservation areas. FGDs targeted KWS officials, communities and their leadership, government officials, researchers, NGOs, county government officers, investors in wildlife, and relevant persons involved in promoting human community coexistence initiatives. Purposive selection (maximum variance method) was used to get FGD participants to ensure data and information was collected from a relevant mix of people based on diversity in gender, education level, status in the society, location, and livelihood options practiced. Participants were grouped in homogenous groups of experience, with discussions focused on impacts of wildlife on people, impacts of people on wildlife, benefits of coexisting with wildlife, and suggestions on what can be done to improve human-wildlife coexistence in the country. The data collection instruments/tools were organised in a semi-structured questionnaire with both qualitative and quantitative questions and use of a five-point Likert scale.
- c. Expert workshops:** Workshop meetings with relevant experts were conducted in the country's eight conservation areas to augment the key informant interviews and FGDs. Participants were purposively selected to obtain a diverse and knowledgeable group of experts. The focus of these workshop discussions was guided by data and information gathered, literature, and other groups interviewed.
- 4. Development of a national HWC database:** KWS has a database on different aspects of HWCs in the country. The consultants requested information on this data, including the structure and requirements of forms used for data collection and sharing, and had discussions with critical KWS personnel that receive, archive, and interact with HWC data from the field. An assessment was done on how the data is collected, stored, protected, and accessed by stakeholders. Challenges to reliable data collection and sharing were also noted with a view to providing solutions.
- 5. Field observations and photography:** Observations and photos were conducted in selected sites in different conservation areas in the country that were visited to ascertain HWC incidences, gather community views, observe impacts of HWCs on both wildlife and people, etc. While in the field, HWC mitigation strategies used were also observed, and the socioeconomic impacts of conflicts on communities due to wildlife were also noted and evaluated.
- 6. Write-up of a zero draft HWC mitigation strategy with action plans:** This was based on the findings of the various tasks done during desk work studies, key informant interviews, FGDs, field visits, and expert workshops. Maps showing the HWC hotspots in the country and specific HWC maps of the eight conservation areas were prepared and included in the report. The

draft was then shared with the clients for review.

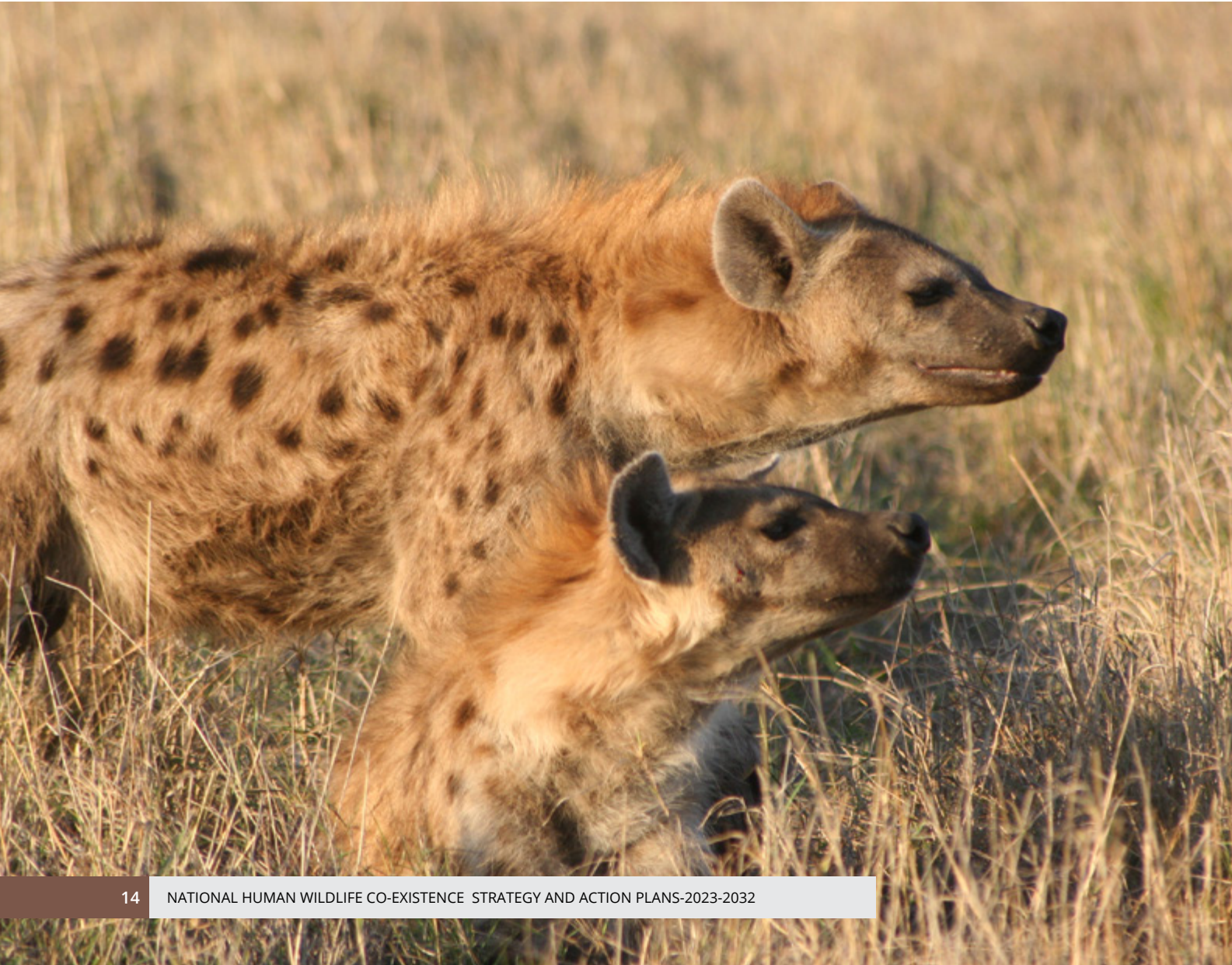
- 7. National validation workshop:** Diverse stakeholders were invited to a national validation workshop in Nairobi to discuss the zero draft strategy and produce a collectively agreed national HWC mitigation strategy and action plans report.
- 8. Draft national HWC mitigation strategy with action plans:** Feedback and comments from the clients and validation workshop participants were used to draft a national HWC mitigation strategy with action plans for review.
- 9. Final national HWC mitigation strategy with action plans:** Comments and input provided by the clients on the draft national HWC mitigation strategy and action plans were considered and used to produce a final document for submission to the clients.

The eight KWS conservation areas that were visited during the consultancy fieldwork, especially in HWC hotspot locations provided by KWS, were as follows (they are listed in the order in which they were visited from August to October 2022)

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in which they were visited from August to October 2022):

- 10. KWS headquarters**
- 11. Southern conservation area:** Nairobi, Kajiado, Amboseli, Namanga
- 12. Tsavo conservation area:** Tsavo East, Tsavo West, Chyulu Hills, Voi, Taveta, Wundanyi, Mwatate
- 13. Coast conservation area:** Mombasa, Malindi, Lamu, Shimba Hills
- 14. Central Rift conservation area:** Maasai Mara, Nairobi, Lake Nakuru, Longonot, Naivasha, Hellsgate
- 15. Western conservation area:** Kakamega Forest, Mount Elgon, Saiwa Swamp, Nasalot, Ruma, Ndeere
- 16. Northern conservation area:** Laisamis, Marsabit, Sibilo
- 17. Eastern conservation area:** Meru, Kora, Bisanadi
- 18. Mountain conservation area:** Aberdare Range, Mount Kenya, Laikipia, Samburu, Isiolo.



04

Human-Wildlife Co-existence Status, Hotspots, Drivers, And Impacts

4.1 Introduction

HWCs have contributed significantly to the population decline of wildlife species across Kenya's conservation areas. HWCs have implications on both ecological sustainability and socioeconomic development of both the affected areas and the country. In terms of ecological integrity, species most exposed to HWCs have been shown to be more prone to extinction (Ogada, Woodroffe, Oguge, and Frank, 2003) because of injuries or death caused by humans (Ogutu, et al., 2016). These can be consequences of road or rail accidents caused to animals or by deliberate actions, for example, as retaliatory attacks through poisoning, spearing, and snaring. The result not only compromises the population viability of wildlife, including some of the most endangered species,

but also disrupts ecosystem equilibrium and biodiversity conservation (Distefano, 2005). In terms of socioeconomic development, HWCs destabilise the livelihoods and safety of human communities living around protected/conservation areas (Muriuki, Ipara, and Kiringe, 2017). For example, the crop destruction, depredation, property destruction, injuries, and fatalities to humans directly affect food security and enhance poverty amongst affected communities (Barua, Bhagwat, and Jadhav, 2013; Dickman, Macdonald, and Macdonald, 2011). As a result, communities develop a negative attitude towards species involved in conflicts, their conservation, and conservation agencies (Fernández-Llamazares, Western, Galvin, McElwee, and Cabeza, 2020).

4.2 National HWCs status summary

Kenya is divided into eight KWS conservation areas, namely Coast conservation area, Tsavo conservation area, Southern conservation area, Eastern conservation area, Mountain conservation area, Northern conservation area, Central Rift conservation area, and Western conservation area (Figure 1). HWC occurrence varies considerably throughout the eight conservation areas but is higher in areas closer to large, protected areas. Figure 2 shows the different HWC

hotspots across Kenya. High incidences are reported around northwestern parts of Tsavo National Park, conservancies around Masai Mara National Reserve, around Lake Nakuru National Park, Tana Delta in Lamu County, the Aberdares, Mount Kenya, and Ol Donyo Sabuk. In promoting peaceful coexistence between humans and wildlife in Kenya, these areas will require more strategic attention, including resource allocation and incentivising community tolerance.

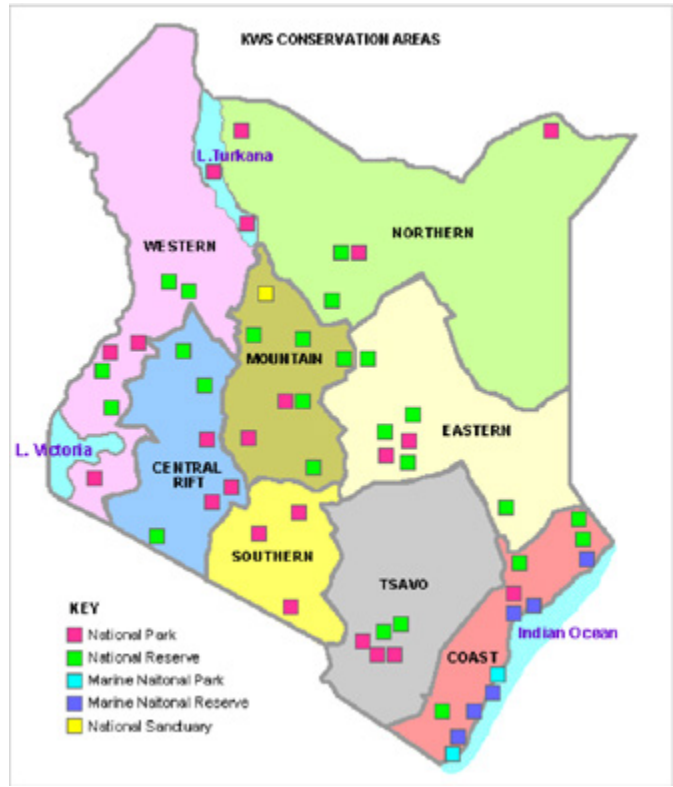


Figure 1: KWS conservation areas (Source: KWS)

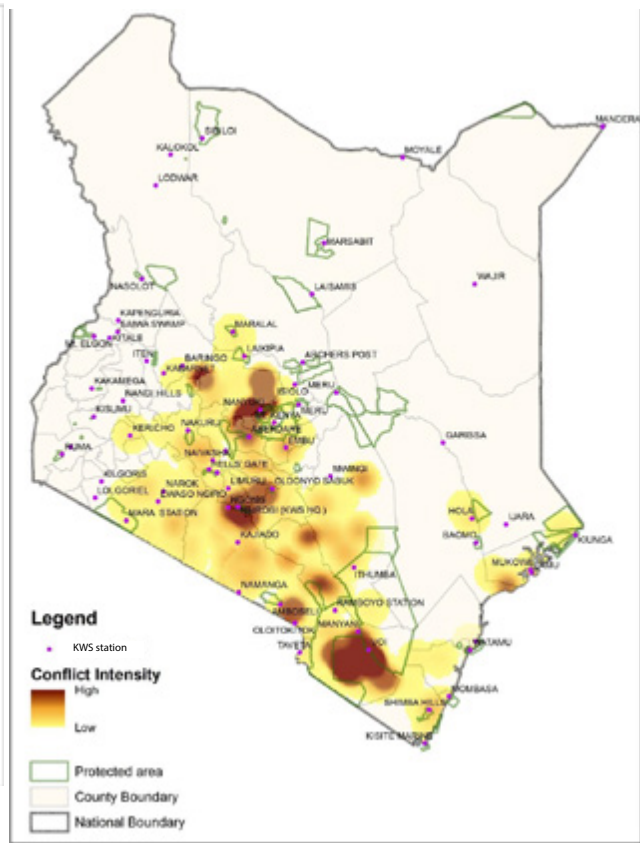


Figure 2: Human wildlife conflicts hot spots in Kenya (Source: KWS)

KWS records reported HWC data across its eight conservation areas. From the incidences reported to KWS between 2017 and 2021 (Figure 3), the Tsavo conservation area accounts for the highest (25%) number of HWC cases overall, followed by Southern conservation area (24%), Mountain conservation area (18%), Central Rift conservation area (14%), Coast conservation area (9%), Western conservation area (4%), Eastern conservation area (3%), and Northern conservation area (3%). Variations in HWC prevalence also occur within conservation areas. KWS does not aggregate

data according to counties. Nevertheless, some independent research attempts this approach. For example, Long et al. (2020) reported that Taita Taveta (Tsavo conservation area), Narok (Central Rift conservation area), and Lamu (Coast conservation area) experience the largest number of HWCs and account for at least 66% of the incidences reported. This is not surprising, as these counties constitute large, protected areas, specifically Tsavo National Park and Masai Mara National Reserve.

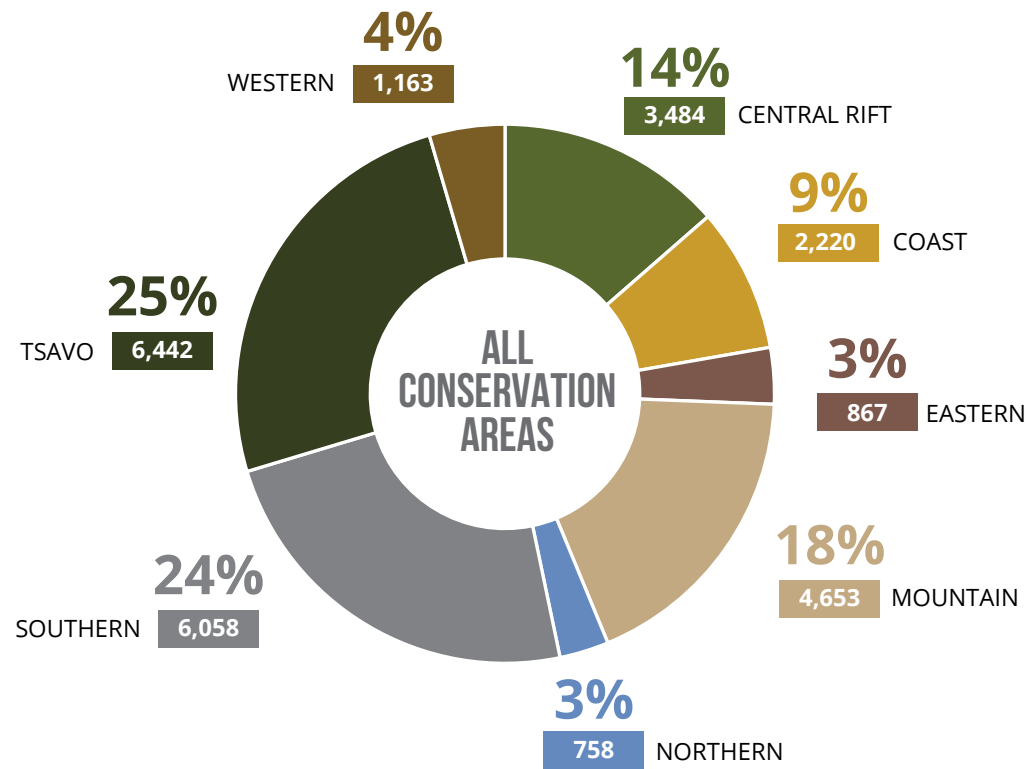


Figure 3: HWCs cases reported to KWS between 2017 and 2021 in all the conservation areas.

The types of HWCs that are prevalent in these hotspot areas also differ, and the variation can be attributed to different dominant land uses in the conservation areas. Generally, the threat from wild animals is highest in Tsavo conservation area, with an annual average of 677.20 reported cases. This is followed by Southern conservation area (552), Mountain conservation area (406), Central Rift conservation area (241.60), and Coast conservation area (251) (Figure 3). Crop damage is most prevalent in the Mountain conservation area, with an annual average of 320.40 reported cases, followed by Southern conservation area (245.80), Tsavo conservation area (234.20), and Central Rift conservation area (191.20) (Figure 3). Other areas, although falling below an annual average of 180.35 cases, also experience problems of crop damage. For example, Western conservation area has an annual average of 141.25 cases; Eastern conservation area, 113.20 cases; and Coast conservation area, 110.40 cases. Where

agriculture is a dominant land use, higher incidences of crop damage by wildlife is experienced. Areas experiencing aridity and poor underground water resources and consequently low agricultural potential, such as Northern conservation area, experience far fewer problems with crop damage. Although dry in the Southern area, crop raiding would be expected, especially in the Amboseli ecosystem, where irrigated agriculture has increasingly become a significant land use since the beginning of subdivision of Maasai group ranches (Okello, 2005). Livestock depredation is more pronounced in the Southern conservation area, with an annual average of 313.60 reported cases; Tsavo conservation area, 221 cases; Central Rift conservation area, 176.40 cases; and the Mountain conservation area, 122 cases. These areas are characterised by pastoralism as a land use preferred by native communities (Long et al., 2020). Northern conservation area, although

predominantly a pastoral area, experiences fewer reported cases of predation probably because of its sparse population. Property damage cases, although far less reported compared with other HWC types, are most pronounced in the Northern conservation area, with an annual average of 83.50. This is

followed by the Tsavo conservation area (69) (Figure 4). This observation can be explained by the higher populations of African elephants in the Northern and Tsavo conservation areas.

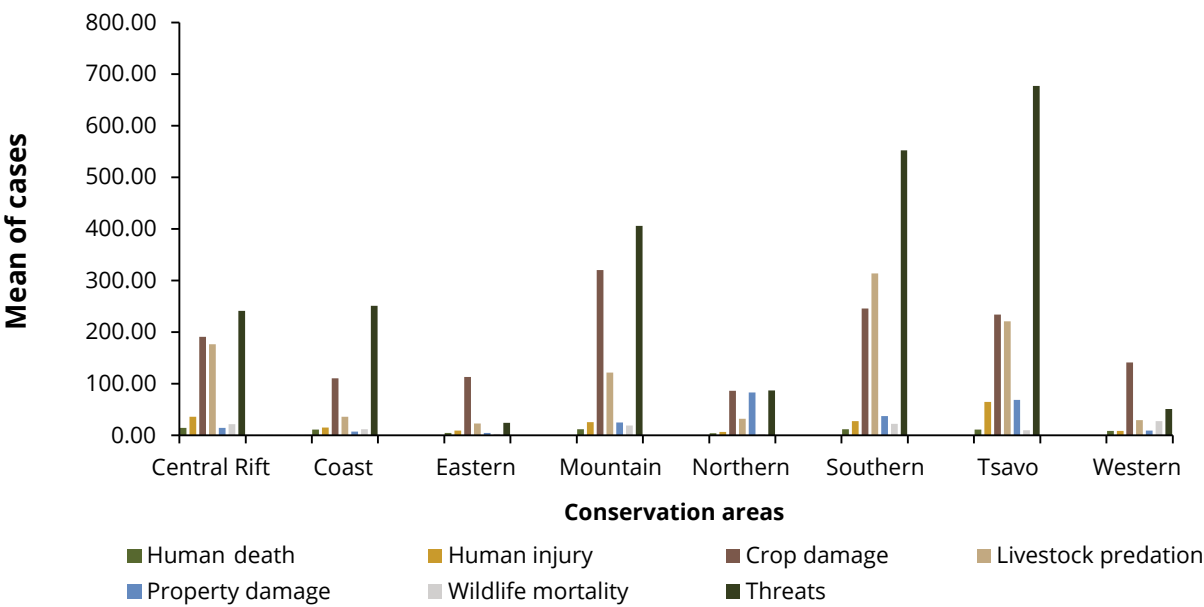


Figure 4: HWC types across conservation areas recorded by KWS from 2017 to 2024

For county-level HWC scenarios, Long et al. (2020) reported that Taita Taveta, Lamu, Narok, Laikipia, and Meru counties, in that order, were the worst hit by crop damage (Figure 5). Livestock depredations were more frequent in Taita Taveta, Narok, and Laikipia counties in that order. For a more detailed analysis of how HWC cases can be disaggregated according

to counties, see Long et al. (2020). Generally, counties where agriculture is a dominant economic activity will experience more crop damage (Annex 1), while counties where pastoralism is a dominant economic activity will experience more livestock predation (Annex 1).

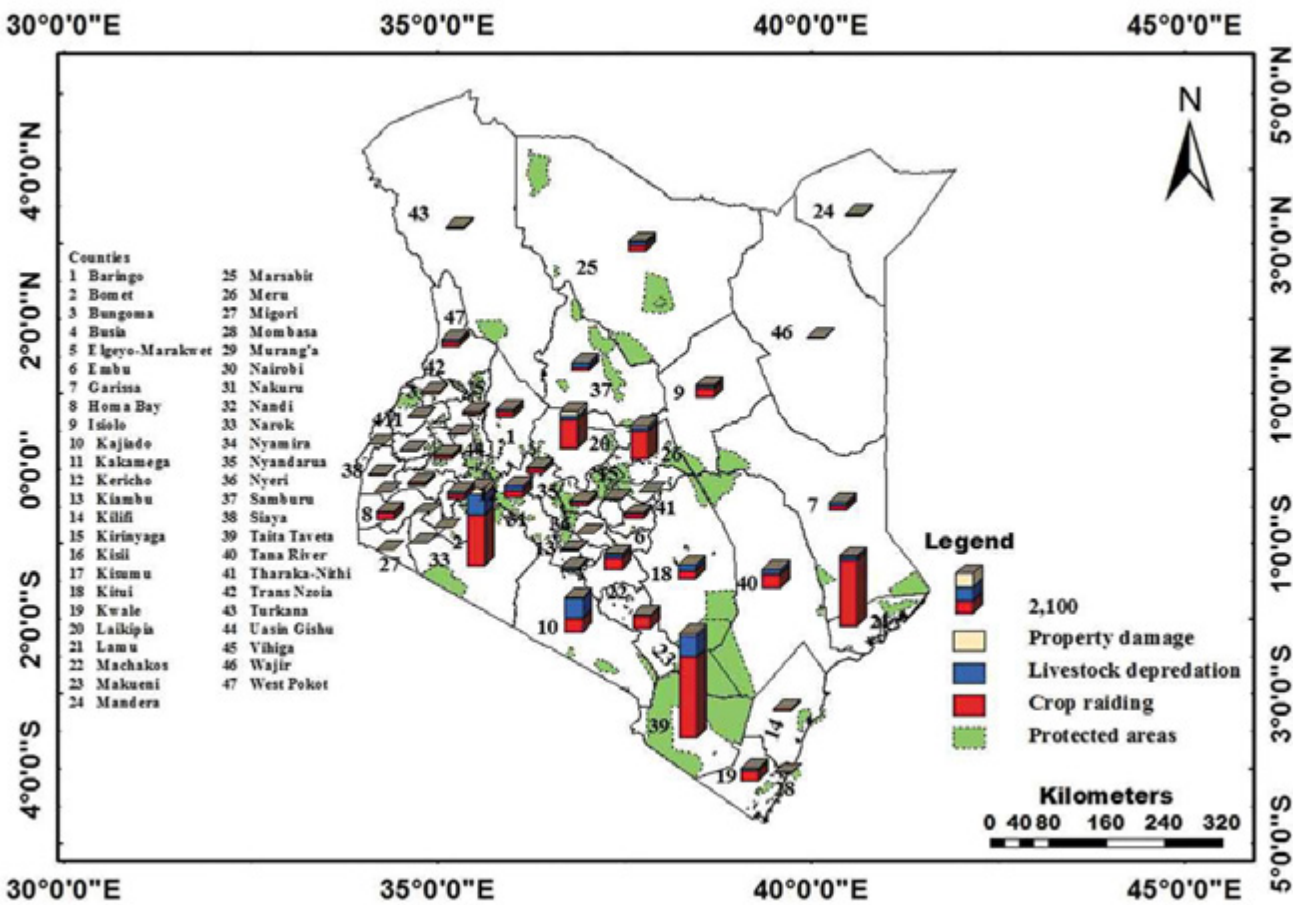


Figure 5: Distribution of HWC cases across counties (Source, Long et al. 2020)

Wildlife mortalities as a result of retaliatory attacks are low across the eight conservation areas, with an annual average of 14.76. Data from KWS shows that between 2017 and 2021, Western conservation area reported more cases of wildlife mortalities associated with HWCs, with an annual average of 27.67, than any other region. Other regions that reported wildlife mortalities above the national average include Southern conservation area (22.40), Central Rift conservation area (21.80), and Mountain conservation area (19.00). Human death and injury were reported in all conservation areas (Table 1). For human injury, Tsavo conservation area reported 33.31%, followed by Central Rift conservation

area (18.22%), Southern conservation area (14.20%), and Mountain conservation area (13.08%). In terms of human death, Central Rift conservation area was most affected, with at least 14 cases reported annually, accounting for 18.22% of all the death cases across all conservation areas. Southern and Mountain conservation areas reported at least 12 human deaths from HWCs, accounting for 15.22% of the cases reported across the eight conservation areas. Tsavo conservation area also experienced cases of human injury of at least 11.60 annually, accounting for 14.47% of all human death cases reported per year (Table 1).

Table 1: Percentage distribution of types of HWCs across conservation areas (2017-2021)

Regional	Human Death	Human injury	Crop damage	Livestock predation	Property damage	Wildlife mortality	Threats
Central Rift	18.22	18.49	13.25	18.48	5.93	18.46	10.55
Coast	14.47	7.87	7.65	3.77	3.01	10.16	10.96
Eastern	5.93	4.98	7.85	2.45	1.98	2.54	1.08
Mountain	15.22	13.08	22.21	12.78	10.05	16.09	17.72
Northern	5.24	3.47	5.98	3.39	33.03	1.69	3.80
Sothern	15.22	14.20	17.04	32.85	14.95	18.97	24.10
Tsavo	14.47	33.31	16.23	23.15	27.29	8.64	29.56
Western	11.23	4.60	9.79	3.14	3.76	23.43	2.24
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

While species involved in conflicts differed from one hotspot to another (Table 2), problems with elephants tended to cut across most of the conservation areas. Tsavo conservation area led with conflicts with elephants accounting for 38% of all the cases reported annually. The Mountain and Southern conservation areas also reported higher annual incidences of human-elephant conflicts, accounting for 23% and 17% of annual reported cases, respectively (Figure 6). Conflicts with non-human primates, especially monkeys, were reported to be prevalent in Southern conservation area, accounting for 32% of all the cases reported annually, followed by the Central Rift conservation area with 18%; Western conservation area, 17%;

Mountain conservation area, 15%; and Eastern conservation area, 15%. HWCs with buffaloes were prominently reported in the Central Rift conservation area, with at least 29% of all annual cases, followed by Southern conservation area, with 20%; Coast conservation area, 17%; and Mountain conservation area, 14%. Hippos caused problems the most in Southern conservation area, with over 473 cases per year, or 28.21% of the reported cases. That was followed by the Mountain conservation area with 26.12%, and Western conservation area with 20.63%. Zebras are more problematic in the Central Rift and Mountain conservation areas (Figure 6).

Table 2: HWCs types across conservation areas

Conservation area	Human death Mean ± SE	Human Injury Mean ± SE	Crop damage Mean ± SE	Livestock depredation Mean ± SE	Property damage Mean ± SE	Wildlife mortality Mean ± SE	Threats Mean ± SE
Central Rift	14.60 ± 53.20	36.20 ± 2.65	191.20 ± 19.44	176.40 ± 23.75	15.00 ± 3.00	21.80 ± 8.25	241.60 ± 29.31
Coast	11.60 ± 15.40	15.40 ± 6.80	110.40 ± 18.33	36.00 ± 5.82	7.60 ± 1.81	12.00 ± 5.77	251.00 ± 43.22
Eastern	4.75 ± 0.76	9.75 ± 1.23	113.2 ± 27.80	23.40 ± 12.53	5.00 ± 1.61	3.00 ± 1.34	24.75 ± 11.67
Mountain	12.20 ± 2.92	25.60 ± 7.77	320.40 ± 75.10	122.00 ± 41.18	25.40 ± 11.10	19.00 ± 11.13	406.00 ± 106.14
Northern	4.20 ± 0.86	6.80 ± 2.54	86.33 ± 34.24	32.33 ± 12.34	83.50 ± 14.86	2.00 ± 0.77	87.00 ± 1.90
Sothern	12.20 ± 1.83	27.80 ± 4.10	245.80 ± 29.±76	313.60 ± 37.01	37.80 ± 9.15	22.40 ± 7.63	552.00 ± 81.36
Tsavo	11.60 ± 2.27	65.20 ± 22.52	234.20 ± 39.04	221.00 ± 50.08	69.00 ± 14.50	10.20 ± 3.18	677.20 ± 76.62
Western	9.00 ± 3.29	9.00 ± 3.10	141.25 ± 70.98	30.00 ± 15.25	9.50 ± 2.21	27.67 ± 19.89	51.20 ± 34.60

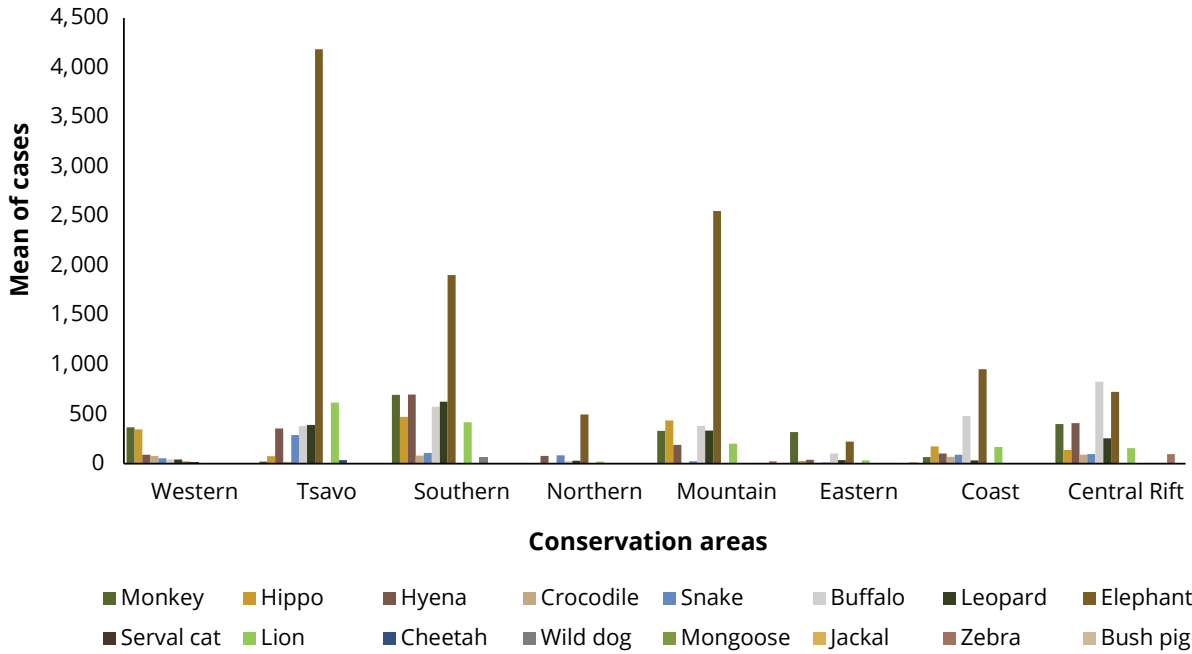


Figure 6: Species involved in HWCs across conservation areas recorded by KWS between 2017-2021

Amongst the carnivores, hyenas cause most of the problems, with an annual average of 1,968 cases, followed by leopards (1,751), lions (1,621), wild dogs (68), and cheetahs (37) (see Figure 7). Conservation areas where pastoralism is a significant land use practice experience frequent conflicts with carnivores. Southern conservation area suffered the most from conflicts with hyenas, accounting for 35% of the cases reported per year, followed by the Central Rift conservation area (21%), Tsavo conservation area (18%), and Mountain conservation area (10%) (see Figure 7). Conflicts with leopards were most prevalent in Southern conservation area, accounting for 35.75% of all the cases reported annually, followed by Tsavo

conservation area (22.39%), Mountain conservation area (19.19%), and the Central Rift conservation area (14.62%). Nearly all the cases reported for conflicts with cheetahs occurred in Tsavo conservation area, while those with wild dogs occurred in the Southern conservation area. Amongst reptiles, snakes caused more conflicts (765 cases) annually, followed by crocodiles (353 cases). Snakes caused more conflicts in the Central Rift conservation area, with 25% of all the cases reported, followed by Southern conservation area (23%), Western conservation area (22%), and Coast conservation area (20%).

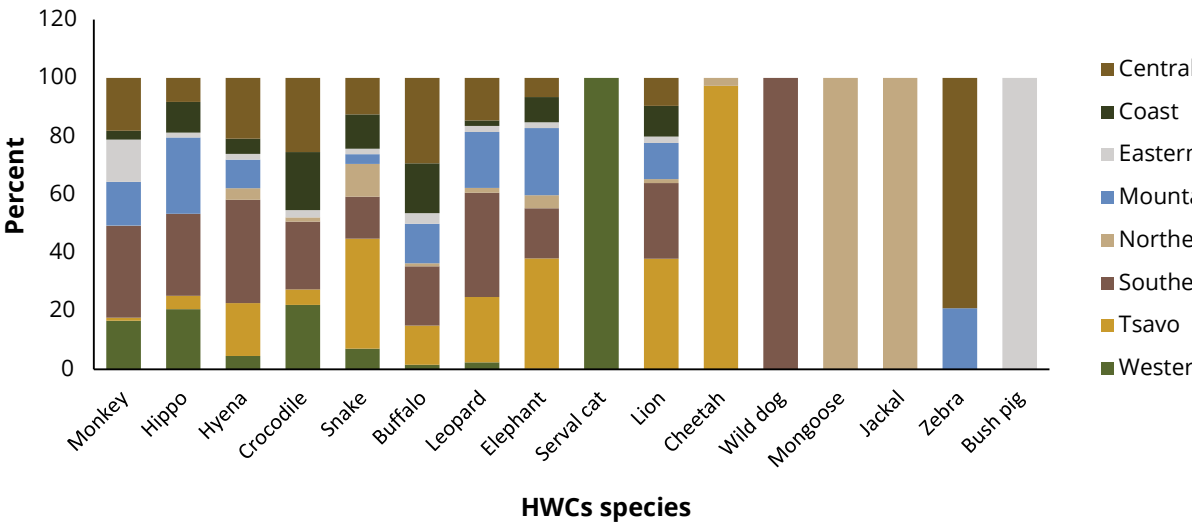


Figure 7: HWCs species per conservation areas recorded by KWS between 2017 -2021

4.3 Drivers of HWCs in Kenya

Human–wildlife conflicts are enhanced by a number of factors. Generally, the factors that lead HWCs are largely anthropogenic.

01 Human population increase and encroachment of wildlife habitats

Kenya's human population has grown from 8.93 million at independence to an estimated 54.99 million in 2021. This growth and its accompanying demographic and social changes has contributed more interactions between humans and wildlife (Lewa, Maluki, Vindevov, and Farah, 2017). As the human population increases, human settlements stretch into and near protected areas (IUCN, 2003). This trend is not only experienced in rural areas but also in cities and other cosmopolitan areas, as can be illustrated by the effects of the burgeoning human population of Nairobi on Nairobi National Park. In Kenya, population growth and corresponding needs for agriculture, settlements, and infrastructure have resulted in human encroachment into wildlife habitats, dispersal areas, and migratory corridors. For example, between 1962 and 2009, Kenya's rangeland population grew nearly fivefold, from about 2.6 million to over 12.5 million (Ogutu et al., 2016). Correspondingly, Kenya's rangelands, where pastoralism is a dominant livelihood practice, has seen the number of sheep and goats increase by 76%, while the number of wildlife has decreased by an average of 68% (Ogutu et al., 2016). The result is an escalation of direct competition between wildlife and humans for essential resources, including water and grazing and breeding areas.

02 Land use changes and associated tenure reforms

Rangelands in Kenya are increasingly seeing land use transformation, especially the growth of agriculture, which is incompatible with wildlife conservation. Both internal and external forces drive this land use change. The collapse of the beef industry in Kenya has led to the decline of pastoralism as a means of economic livelihood for many pastoral communities. The rise of agriculture in rangelands, especially the southern rangelands, has also been made possible by land tenure transformation. The subdivision of group ranches into individual titles has made it possible for easy sale and lease of the land for agriculture (Western, Groom, and Worden, 2009), which is largely incompatible with wildlife conservation. Yet land subdivision was, and still is, a government policy that aims to empower citizens through secure individual titles.

03 Economic crisis, unemployment, poverty and impoverishment

The impoverishment and struggle of daily life, together with the land subdivision, have led to a rise in agriculture in marginal rangelands and to the conversion of wetlands and riverine habitats into farmlands. The rivers, lake shores, and their scarce water resources are frequently diverted to irrigate vegetable farms that are providing greater direct and significant household income than pastoralism (Hemingway et al., 2022), fishing, and rain-fed agriculture (Danga, 2016; Hebinck, Bosma and Veldwisch, 2019). Economic crises, unemployment, and associated poverty thus lead to land use practices that increase the likelihood for HWCs in all conservation areas in the country.

04 Urbanization and infrastructure development block wildlife corridors and dispersal areas

The growth and spread of urban centres and associated infrastructure lead to loss of habitats and corridors for wildlife. Expansion of urban centres leads to loss of natural vegetation and hence forage for wildlife, destruction of water points and blockage of wildlife migratory corridors. Competition of resources between wildlife and humans thus leads to conflicts. Large-scale infrastructure development such as roads and the standard gauge railway often divert wildlife movement to people's farms and settlements, causing conflicts. Road networks have increased in Kenya since 2005 in order to connect places and markets under the grand plans for enhancing national development and economic growth. As good as they are, government policies on infrastructure development have come at a cost of negative interaction between wildlife and communities.

05 Climate change and extreme environmental factors

Global climate change and extreme environmental factors aggravate HWCs. Prolonged droughts such as that experienced between 2021 and 2022 reduce standing biomass and water. When this happens in protected areas, large herbivores, in response to this changing environment, leave the protected areas to human-settled areas in search of forage. In the process, they break into crop farms, causing damage and attracting community response—typically retaliation. When herbivores leave the parks and other protected areas, carnivores often follow, coming into contact with livestock that are less adapted to escape predators. Livestock is therefore easy prey for predators..

06 Wildlife population increase

Kenya has experienced an increase in its wildlife population thanks to the impressive effort that the government and other stakeholders have put forth, especially since 1989. The 2021 Wildlife Population Census (Republic of Kenya, 2021) reports a general increase in various species. The population of elephants, for example, has more than doubled from the 1998 statistics. The Elephant Conservation Report of 2022 by Africa Wildlife Foundation estimates that Kenya's elephant population is increasing by a factor of 5% annually (AWF, 2022). While this is a commendable outcome in terms of biodiversity gains, it has increased close interaction between humans and wild animals, especially as humans encroach into wildlife habitats, leading to negative outcomes of conflicts.

4.4 Impacts of HWCs to communities in Kenya

01 Enhanced poverty and impoverishment

Communities and households are subjected to serious economic losses due to damages caused by wildlife. Crops, livestock, and property worth millions of Kenya shillings are lost every year due to HWCs. Unfortunately, HWCs are most intense in areas already facing significant challenges. Also, those affected often have as their only assets the livestock and crops that wildlife destroy. Time spent dealing with HWCs—for example, through guarding farms and livestock at night—could be better spent in other constructive activities. Furthermore, when human injuries or death occur, significant amounts of financial resources and time is consumed to treat the injury or deal with the fatal loss. This is felt more acutely when death befalls the breadwinner. The household often plunges into poverty, which takes time and resources to overcome.

02 Slowed national development and unequal economic growth

HWCs discourage investment in hotspots. Investors fear losing their investment to possible damages. Therefore, while the government has opened many parts of the country through roads and rail networks in order to spur economic development growth, HWCs derail any intended benefits. While HWCs increase the cost of investment in hotspots, elsewhere in the country similar investments are cheap. The areas prone to HWCs are thus less competitive economically and will continue to remain behind in business opportunity and growth, enhancing economic inequalities in the country.

03 Psychological trauma

Human death, permanent disability, and property damage during an economic crisis—for example, post-COVID—can lead to post-traumatic stress disorder (PTSD). This creates a less productive workforce and citizenry. Such trauma can lead to such self-destructive behaviours as alcoholism and suicide.

04 Reduced population of wildlife and loss of biodiversity

Retaliatory attacks on problem-causing animals leads to increased wildlife mortalities such as Elephants and lions which are classified as endangered by IUCN and listed under schedule vi of WCMA, 2016 Data suggest HWCs have bypassed other forms of security related wildlife mortalities such as poaching,. Retaliatory attacks are largely in the form of spearing, snaring, and poisoning. Retaliatory attacks also threaten biodiversity because non-targeted species such as some avian species die in many of the incidences. For example, poisoning lions or other predators leads to the death of vultures and other scavenging species, such as hyenas, thus affecting more members on the food chain.

05 Negative attitude towards wildlife and loss of trust in conservation agencies

Economic loss and PTSD as a result of HWCs yield negative attitudes against the wild animals causing damage, injury, or death. That attitude promotes retaliatory attacks, compromising conservation efforts. In addition, communities affected by HWCs thus develop negative attitudes towards conservation agencies who they often see to be protecting the lives of animals over those of humans.

4.5 Some Case Study Landscapes

4.5.1 Tsavo conservation area

Characteristics

Tsavo conservation area is a significant HWC hotspot in Kenya (Figure 8), likely due to the presence of Tsavo West and Tsavo East national parks. More HWCs are reported in group ranches that border the protected areas. Between 2017 and 2021, there were 6,442 conflict cases reported in Tsavo conservation area. This translates into an average of 1,288 cases per year. For spatial understanding of HWCs in the conservation area, we rely on an analysis undertaken by Mukeka and colleagues using data from 1995 to 2017

(Mukeka et al., 2020). They identified six HWC hotspots in Tsavo conservation area, namely Taita Taveta, Rombo, Buchuma, Mutomo, Kibwezi, and Galana. Taita Taveta and Rombo reported higher HWC cases than the remaining regions, with an average of 647 and 549 cases per year (Table 3), and accounting for 36% and 31% of all cases reported, respectively. The two hotspots border Tsavo West National Park, which adjoins Mkomazi National Park in Tanzania.

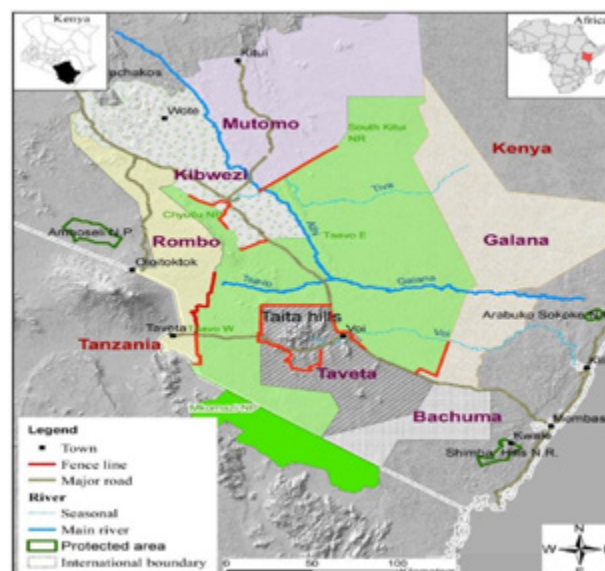


Figure 8: HWCs hotspots in Tsavo conservation area
(Source: Mukeka et al, 2020)

Table 3: Spatial distribution of HWCs cases in Tsavo conservation area between 1995- 2017
(Source: Mukeka et al. 2020)

Region	Totals	Mean	Percent
Taita-Taveta	14,240	647.27	36%
Rombo	12,079	549.05	31%
Bachuma	2,944	133.82	8%
Mutomo	2,725	123.86	7%
Galana	411	18.68	1%
Kibwezi	6,623	301.05	17%
Total	39,022	1773.73	100%

KWS data from 2017 to 2021 shows 6 types of conflicts that are common in the Tsavo conservation area. General threats are the most frequent conflicts type (53%), followed by crop damage (18%), livestock predation (17%), property destruction (5%), human injury (5%), and wildlife mortality (1%) (Figure 9). Every year, there is an

average of 677 general threats, 234 cases of crop damage, 221 incidences of livestock depredation, 69 cases of property damage, 65 reports of human injury, 11 cases of human death and 10 cases of wildlife death (Table 4). The low frequency of wildlife mortality could be attributed to law enforcement and higher legal fines.

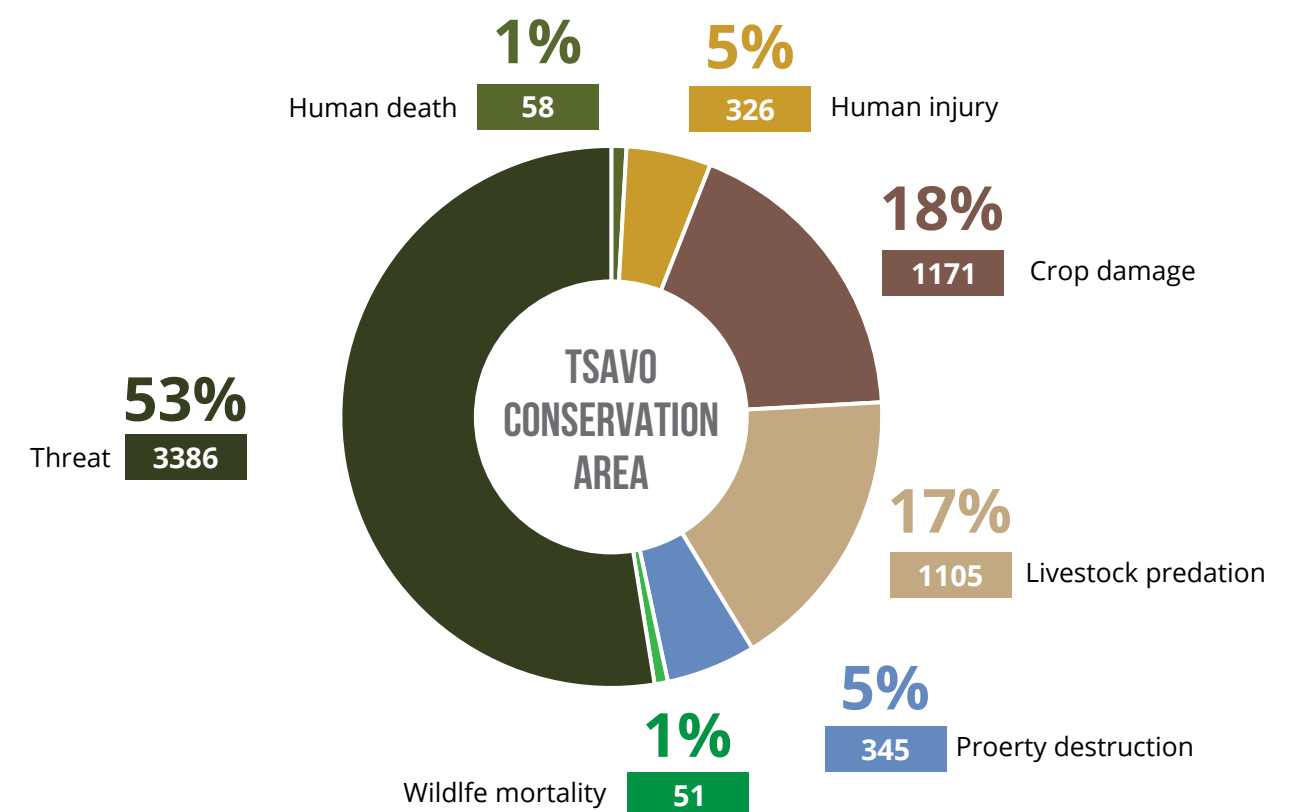


Figure 9: Types of HWCs prevalent in Tsavo conservation area recorded by KWS from 2017 – 2021

Table 4: Average reported cases of HWCs in Tsavo conservation area annually between 2017 – 2021

Type of conflict	Average	Std. Deviation	Std. Error
Human death	11.6	5.08	2.27
Human injury	65.2	50.35	22.52
Crop damage	234.2	87.29	39.04
Livestock predation	221	111.99	50.08
Property destruction	69	32.42	14.5
Wildlife mortality	10.2	7.12	3.18
Threats	677.2	171.33	76.62
Total	1288		

Data from KWS from 2017 to 2021 show that there are 10 animal species that are most often involved in HWCs in Tsavo conservation area (Table 5). By far, elephants are responsible for most conflicts, with an annual average of 836.40 cases reported. Buffaloes follow, with an annual average of 123.20 cases reported (Figure 10). Carnivores made a minor contribution to the conflicts relative to the

large herbivores. Lions were responsible for most cases reported, with an annual average of 123.20, followed by leopards (78.40) and then hyenas (71.40). Reptile attacks are also reported, though not as significant as other animals. Snake bites lead at an annual average of 57, while cases involving crocodiles are reported at an annual average of 3.80 (Figure 10).

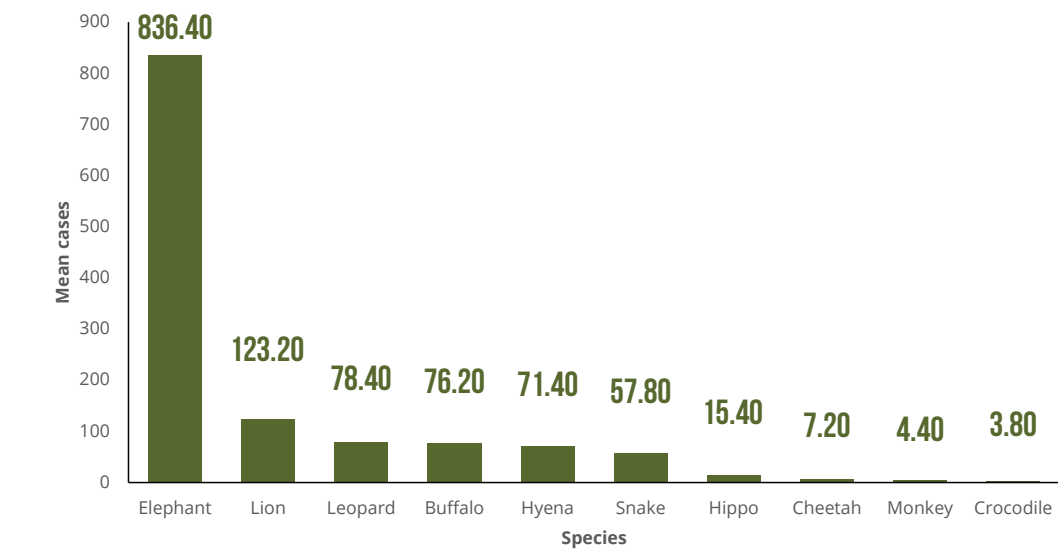


Figure 10: Species involved in HWCs in Tsavo conservation area

In terms of spatial distribution, Mukeka et al. (2020) report that crop damages are more likely to occur in Rombo than in Taita Taveta, Kibwezi, Buchuma, Mutomo, and Galana because of the expansiveness of irrigation agriculture, as well as its proximity to Tsavo West National Park. Taita Taveta reports more cases of livestock predation, followed

by Rombo, Kibwezi, Buchuma, Mutomo, and Galana in that order. This is because husbandry is a significant livelihood for Maasai communities living in group ranches around those areas. A similar pattern is observed for attacks on humans (Figure 11). Property damage is predominant in Taita Taveta.

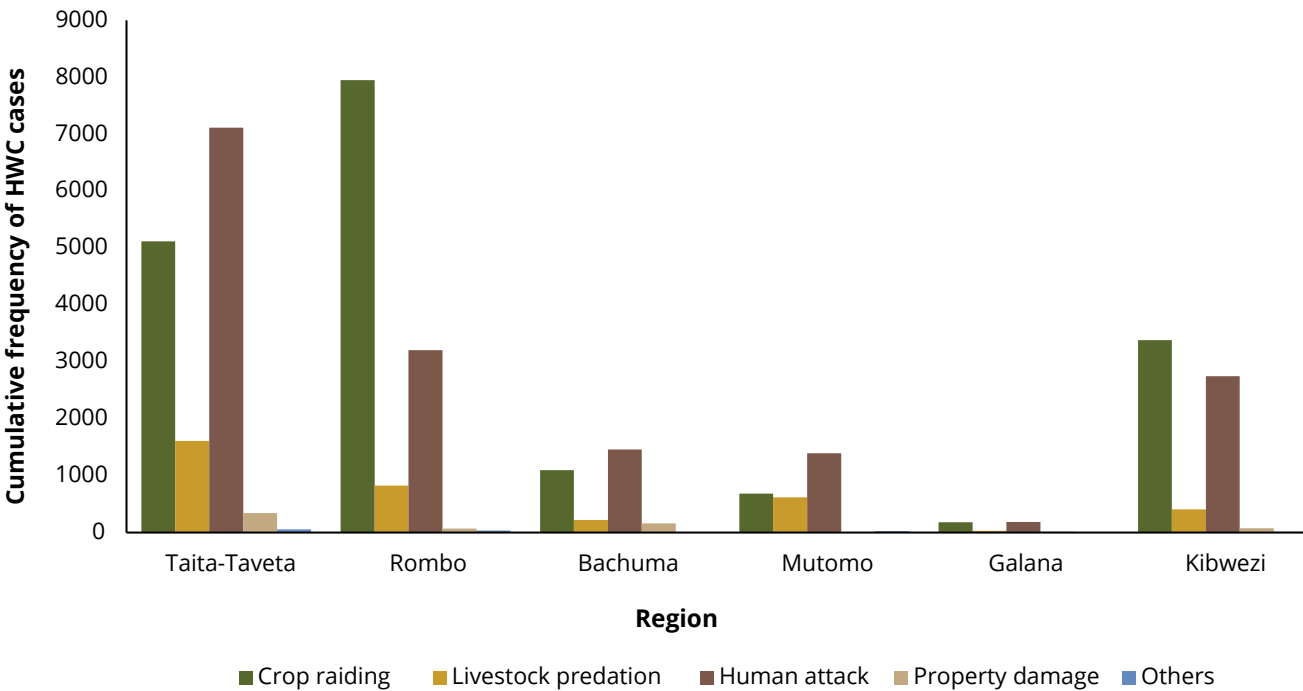


Figure 11: Spatial distribution of HWCs types in Tsavo from 1995 - 2017 (Source, Mukeka et al 2020)

In terms of temporal variation, there has been an increase in cases of HWCs in Tsavo conservation area in the last two decades (Mukeka et al., 2018 and 2020). KWS data from 2017 to 2021 show that the annual average number of HWCs in Tsavo is 1,288. Data analysed by Mukeka et al. (2020) show that reported conflicts were the fewest (724) in 1998 and the highest (2,541) in 2008. Crop raiding, the most prevalent HWC type, has declined over time, whereas attacks on humans, the second most frequent HWC type, have increased in all regions (Mukeka et al., 2020). HWC trends mirror rainfall seasonality, which affects the availability of water and food

for herbivores in Tsavo (Mukeka et al., 2018). Generally, there are two peaks of crop raiding in the Tsavo: January to February and May to July (Makindi et al., 2014). These are the seasons for crop maturity and the end of rainy seasons in the region (Mukeka et al., 2020). Attacks on humans also increase during the wet season, from March to April and October to December (Mukeka et al., 2020). Generally, HWCs are more likely to increase during dry seasons, as wildlife tend to leave the protected areas in search of water and food (Makindi et al., 2014).

4.5.2 Southern conservation area

The Southern conservation area includes Nairobi National Park and surrounding rangelands, Ol Donyo Sabuk National Park and surrounding rangelands, and the Amboseli ecosystem, which includes the Amboseli National Park and surrounding rangelands and conservancies.

Data from KWS (2017–2021) show that general threats from wildlife are the most frequent type of conflict reported in Southern conservation area, with a mean case report of 552 (Figure 12). This accounts for 45.56% of all HWC cases reported in that time period. Livestock predation is the second most prevalent type of conflict, followed by crop damage (Figure 12 and Figure 13). Threats from wildlife also include fears of attacks on children as they go to school. Livestock predation is the second most prevalent, with a mean of 313.60, representing 25% of all the HWC cases reported. The third most prevalent type of conflicts in Southern conservation area is crop damage. Crop raiding has been a major problem in the Southern conservation area, especially the Amboseli

ecosystem where agricultural expansion has been witnessed since the subdivision of Maasai group ranches into individual titles (Okello and D'Amour, 2008; Okello, 2005). A recent study on household economics in the Amboseli ecosystem has shown that agriculture contributes more to household budgets than even the traditional pastoralism that has dominated the area for centuries (Hemingway et al., 2022). Unless viable interventions are done, agriculture, which is less compatible with conservation, will dominate the area; hence, more crop damage will be incurred from HWCs. Human injury and death, although representing a smaller proportion of reported cases, occur at a significant rate. They average 27 and 12 cases, respectively (Figure 13). Wildlife mortality have also been reported, although there have been only a few cases over the five-year period (2017–2021). Recent studies show that all HWC types increased from 2010 to 2018 in the Southern conservation area (Manoa et al., 2020).

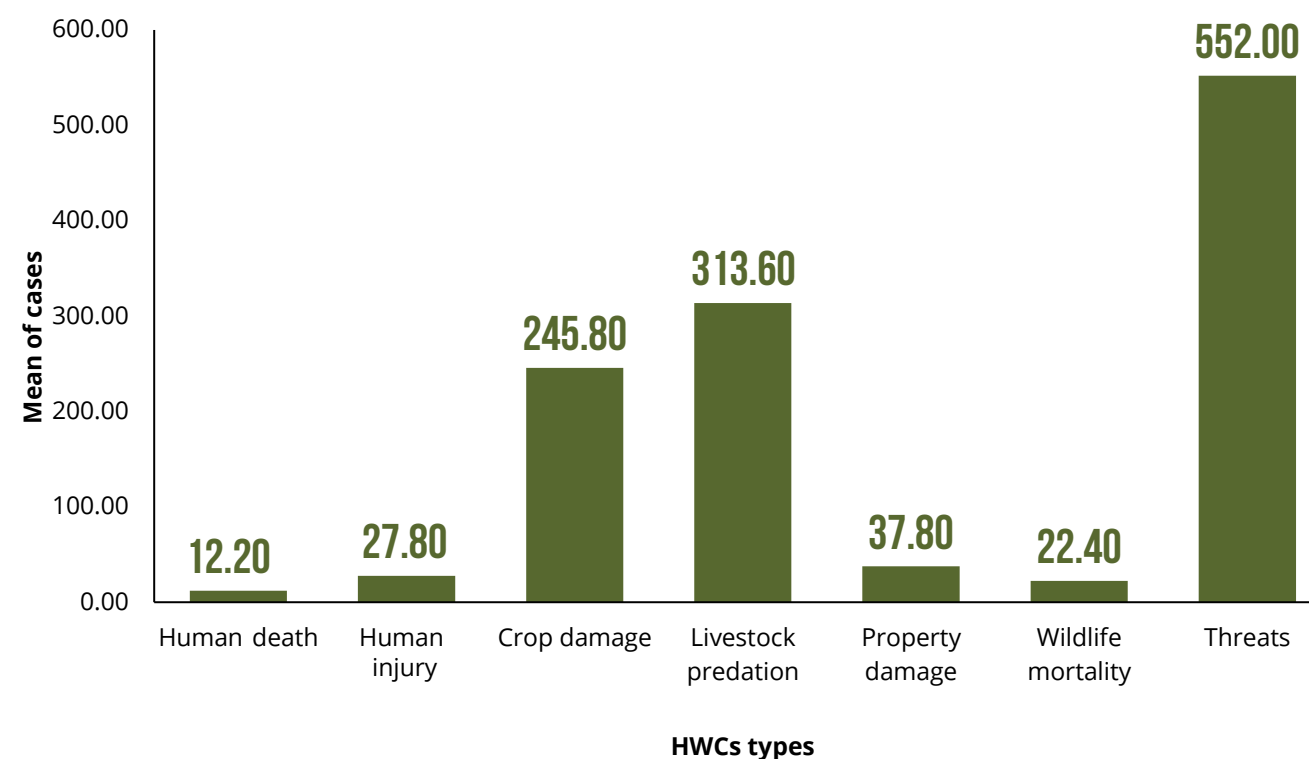


Figure 12: HWC types in Southern conservation area (2017 to 2021)

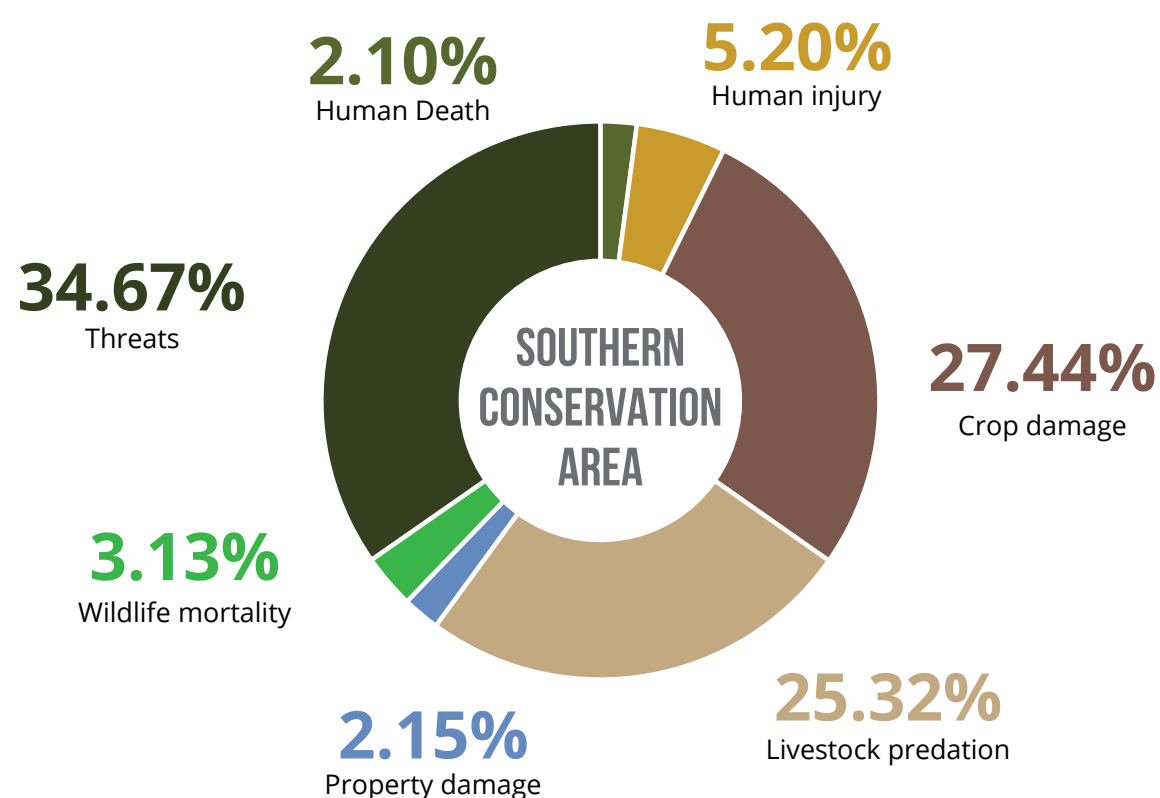


Figure 13: Proportions of HWC types in Southern conservation area (2017–2021)

Between 2017 and 2021, ten animal species were reported to be involved in HWCs in the Southern conservation area (Table 5). Overall, elephants were involved in the most reported conflicts with humans, followed by hyenas and monkeys. Analysis of earlier years (2015–2018) show similar results (Manoa et al., 2020). Elephants have been reported to have increased in the area (Ogutu et al., 2014), and given the encroachment of people in wildlife habitats (Groom and Western, 2013; Western, Groom and Worden, 2009), higher

conflicts are thus expected. Wild dogs caused the least conflicts with an average of 13.60 cases reported over the five-year period (Table 5). Amongst the herbivores, elephants, monkeys, buffaloes and hippos are responsible for HWCs in that order (Figure 14). For carnivores, which are largely responsible for loss of livestock, conflicts with hyenas are most prevalent followed by leopards and then lions. Snakes and crocodiles are least problematic only accounting for less than 2% of all the cases reported (Figure 14).

Table 5: Species involved in HWCs in Southern conservation area (2017 to 2021)

Species	Mean ±Std. Error	Percentage
Elephant	380.80±66.07	33.69%
Hyena	139.60±14.99	12.35%
Monkey	139.40±19.29	12.33%
Leopard	125.20±15.49	11.08%
Buffalo	114.80±24.07	10.16%
Hippo	94.60±11.44	8.37%
Lion	84.00±17.33	7.43%
Snake	22.00±5.43	1.95%
Crocodile	16.40±5.10	1.45%
Wild dog	13.60±5.59	1.20%

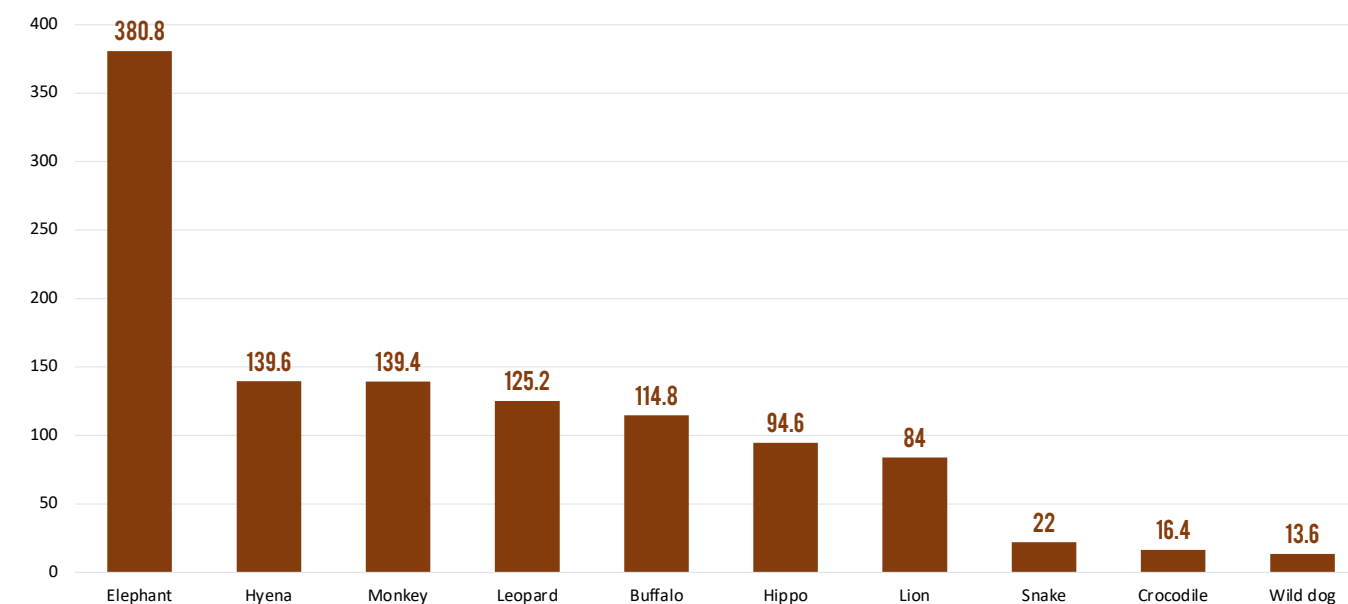


Figure 14: Species involved in HWCs in Southern conservation area (2017 to 2021)

Seasonal variation in HWCs in Southern conservation area has been reported. For example, Manoa and colleagues report that in Kajiado County, between 2010 and 2018, HWCs were more prevalent in drier months than in wet months (Manoa et al., 2020). Consequently, HWCs were highest

in July, followed by January and then October. November experienced the least reported cases (Manoa et al., 2020). In terms of species, the same study reports that elephants are the most troublesome animals in the months of July, January and October (Manoa et al., 2020).

4.5.3 Central Rift conservation area

Of the six types of HWCs recorded by KWS, threats from wildlife, crop damage, and livestock predation are the most prevalent reported in Central Rift conservation area, accounting for 34%, 25% and 24%, respectively (Figure 15).

At least 21 wild animals and 14 people died because of HWCs, while 36 people were reported injured every year for the period 2017–2021.

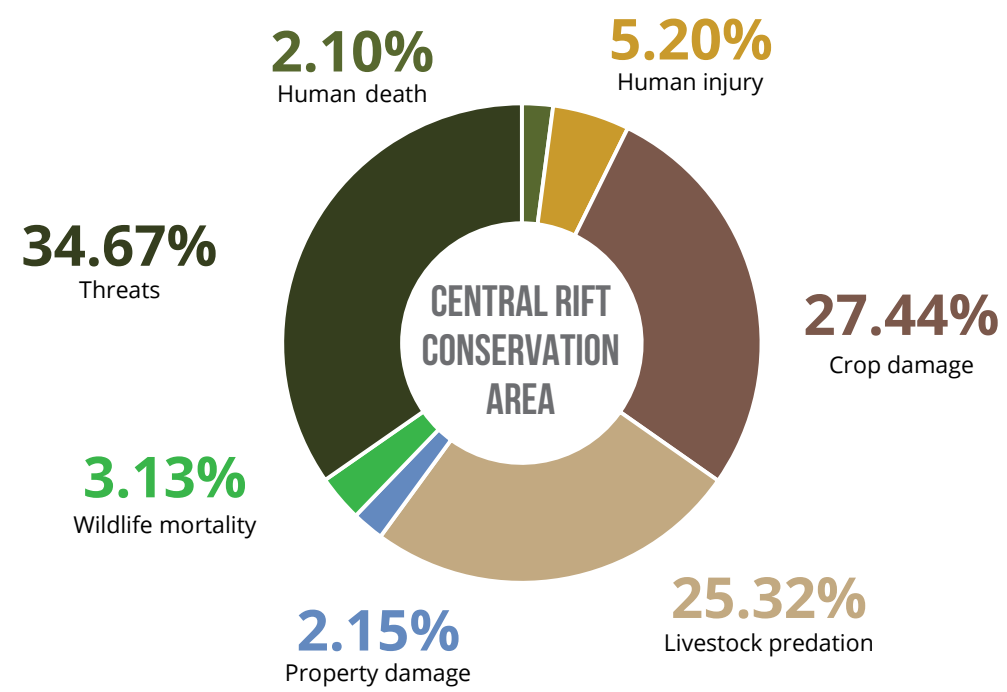


Figure 15: Percent of HWCs in Central Rift conservation area recorded by KWS (2017 to 2021)

In the years 2017–2021, buffaloes were the most problematic species amongst the top 10 involved in HWCs in the Central Rift conservation area, with a yearly average of 165.40 cases (Table 6), accounting for 25.85% (Figure 16) of the reported cases. Elephants also accounted for significant incidences, with a yearly average of 145 cases, accounting for 22.66%

(Figure 16). Amongst carnivores, hyenas were responsible for most problems reported, with a yearly average of 82 cases, followed by leopards. Lions were the least problematic amongst the large cats reported (Table 6). Crocodiles and snakes caused the least problems amongst all the reported animals, accounting for 3% and 2.81%, respectively (Figure 16).

Table 6: Species in HWCs in Central Rift conservation area (2017 - 2021)

Species	Mean ±Std. Error	Percentage
Buffalo	165.40 ±17.54	25.85%
Elephant	145.00 ±11.92	22.66%
Hyena	82.00 ±11.07	12.82%
Monkey	80.40 ±15.65	12.57%
Leopard	51.20 ±7.26	8.00%
Lion	31.20 ±8.82	4.88%
Hippo	27.80 ±7.00	4.35%
Zebra	19.60 ±5.78	3.06%
Snake	19.20 ±3.99	3.00%
Crocodile	18.00 ±4.70	2.81%
Total	639.8	100.00%

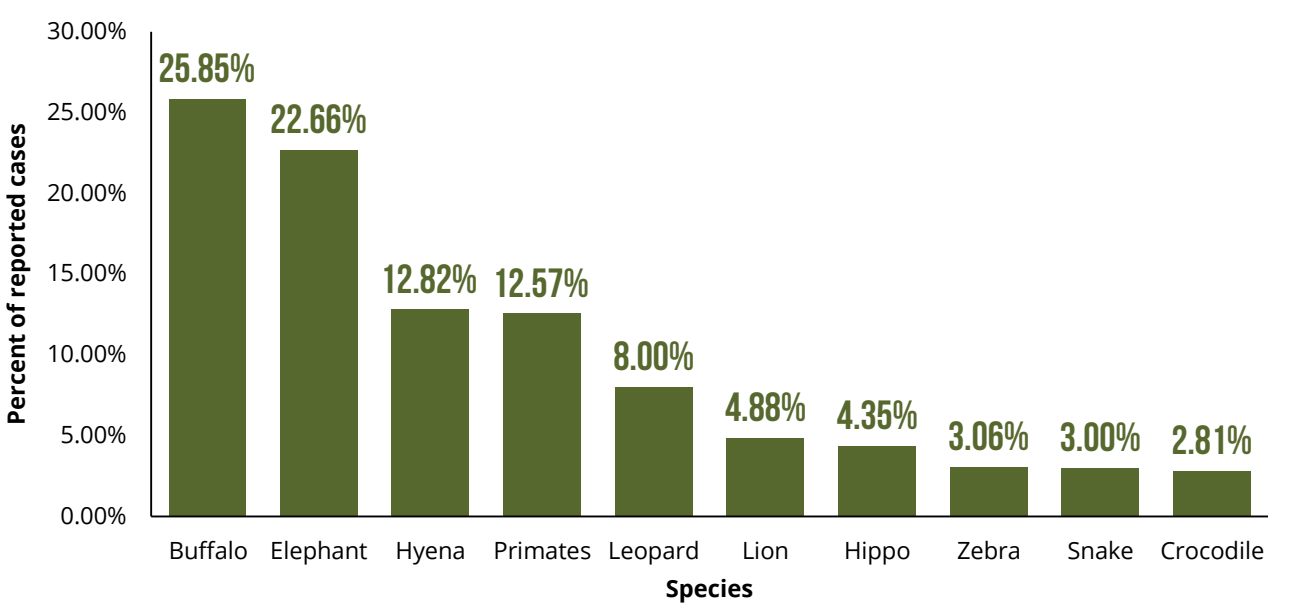


Figure 16: Species in HWCs recorded by KWS in Central Rift conservation area (2017 - 2021)

Overall, the Maasai Mara ecosystem in Narok County and areas around the Lake Nakuru ecosystem are HWC hotspots. A recent study analysing HWC data from 2001 to 2017 in the Maasai Mara ecosystem reports a total of 13,848 HWC cases involving 13 wildlife species (Mukeka et al., 2019). Elephants contributed to most conflict incidents (46.22%), followed by non-human primates (11.73%). Contributions of two large herbivores, buffaloes (10.58%) and zebras (7.59%), ranked third and fourth, respectively. Giraffes (0.09%) caused the

fewest conflicts. The three most common large carnivores were leopards (7.3%), spotted hyenas (5.8%), and lions (3.3%), jointly contributed a mere 16.4% (Figure 16). Generally, depredation in the Maasai Mara ecosystem tends to be most in areas with closed habitats—that is, places with dense vegetation (Figure 17, in Broekhuis, Cushman, and Elliot, 2017). Additionally, areas characterised by weaker livestock enclosures experienced higher incidences of depredation (Broekhuis, Cushman, and Elliot, 2017).

Table 7: Species involved in HCWs in Narok county
(Source: Mukeka et al. 2019)

Species	Reported cases	Average	Percent
Elephant	6401	376.53	46.22%
Nonhuman primate	1625	95.59	11.73%
Buffalo	1465	86.18	10.58%
Zebra	1051	61.82	7.59%
Leopard	1004	59.06	7.25%
Spotted hyena	806	47.41	5.82%
Lion	458	26.94	3.31%
Antelope	268	15.76	1.94%
Snake	167	9.82	1.21%
Other	129	7.59	0.93%
Wild dog	105	6.18	0.76%
Wild pig	104	6.12	0.75%
Hippo	83	4.88	0.60%
Wildebeest	73	4.29	0.53%
Crocodile	42	2.47	0.30%
Eland	40	2.35	0.29%
Cheetah	14	0.82	0.10%
Giraffe	13	0.76	0.09%
Total	13848	814.59	100.00%

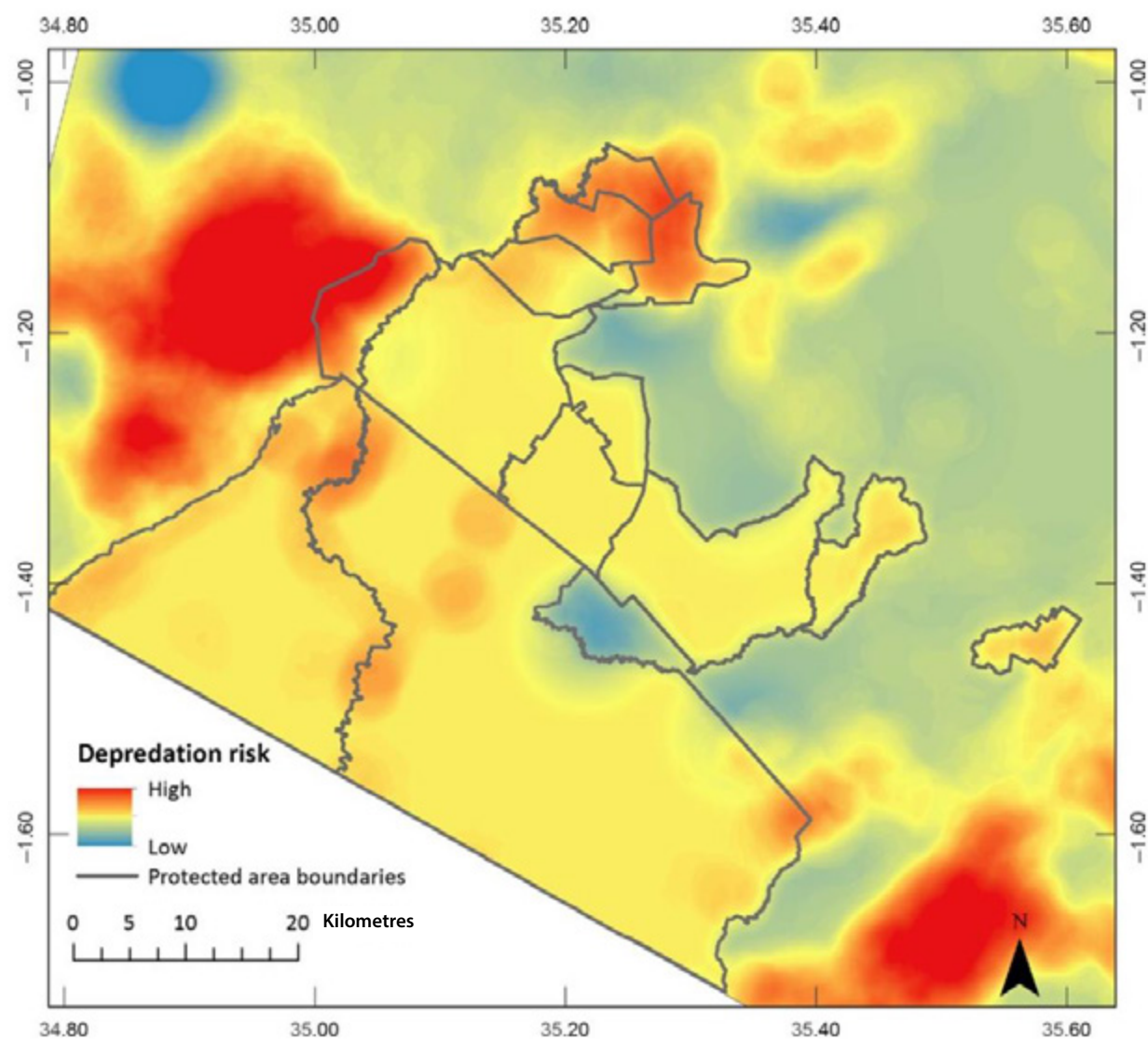


Figure 17: Map depicting the risks of depredation inside a livestock enclosure in Maasai Mara ecosystem (Source: Broekhuis et al. (2017))

HWC incidents in the Maasai Mara ecosystem vary significantly across years and months (Mukenka et al., 2019). Data from 2001 to 2017 indicate that the number of conflicts in the ecosystem averaged 814.6 ± 459.1 (Mukenka et al., 2019). Years that experienced droughts had higher incidences of HWC, including 2005–2006, 2008–2009, and 2015–2016. Years with high rainfall—e.g. 2001–2002 and 2013—experienced low HWC incidence (Mukenka et al., 2019).

The total monthly HWC incidences in Maasai Mara ecosystem during 2001–2017 averaged 1153.7 ± 75.14 and was lowest in November (830) and highest in July (1,583) (Mukenka et al., 2019). Rainfall patterns between months is found to highly

influence HWC occurrence (Mukenka et al., 2019). However, seasonality in HWCs is reported to vary across HWC types (Figure 18). For example, crop damages are at peak levels in dry months—that is, June and July. These are generally the months when crops are mature for harvesting. Attacks on humans and livestock depredation increase during the early wet season from December to a peak in February (Mukenka et al., 2019). During the wet seasons, most prey leave the bushy park into less vegetated conservancies and community settlements. As they disperse, predators follow them and eventually come into contact with humans and livestock.

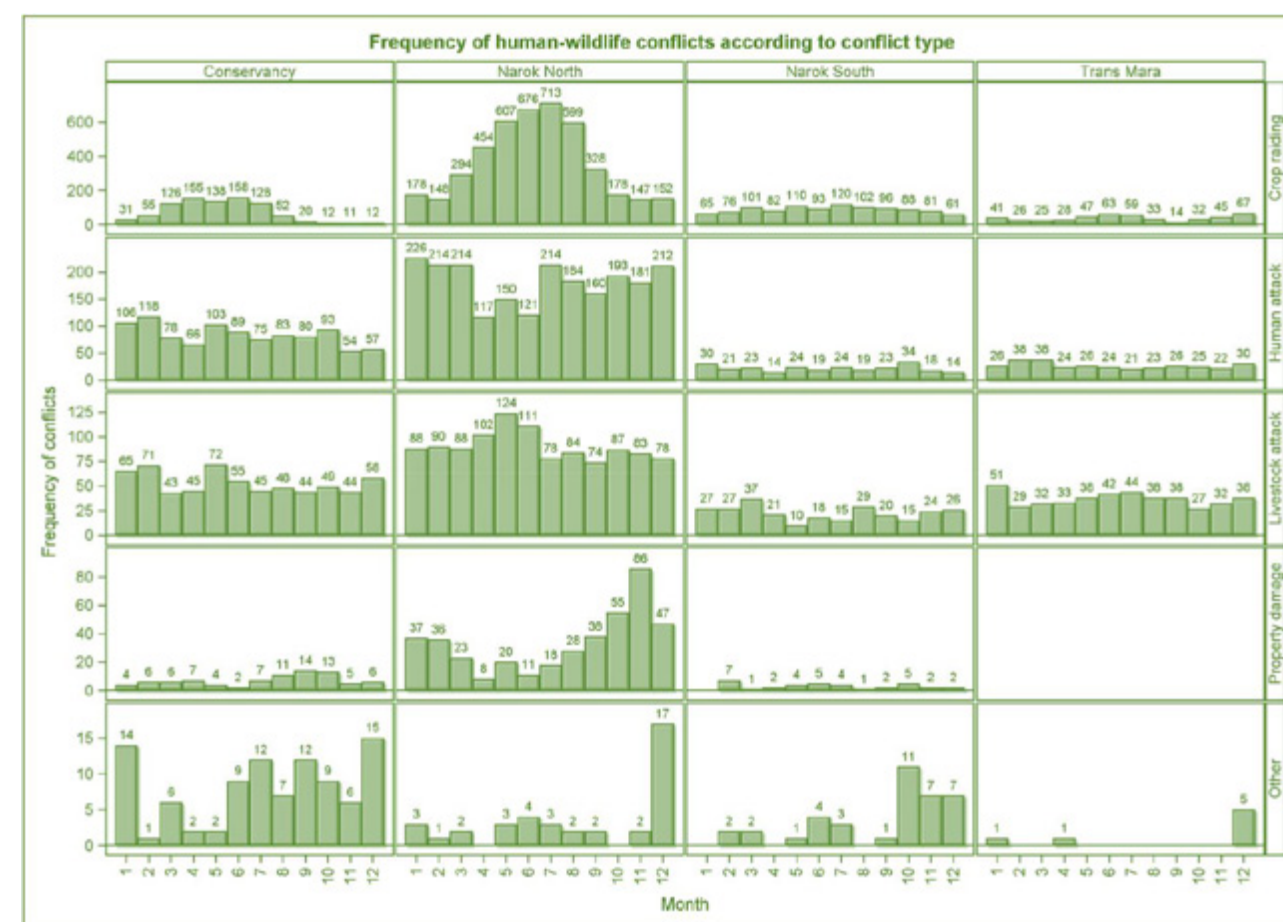


Figure 18: Seasonal patterns in HWC for each of the four regions of Narok County during 2001–2017 Source (Mukenka et al. 2019)



4.5.4 The Mountain conservation area

After general threats to humans, the most prevalent HWC type reported in the Mountain conservation area is crop damage, accounting for 34.43% of all the cases reported. According to KWS data from 2017–2021, at least 320 cases of crop damage are reported every year. The prevalence of crop damage is influenced by agriculture, the dominant land use in the area, but it is also attributed to the high number of large herbivores. Areas dominated by livestock keeping as a significant land use also report incidences of depredation. Overall, depredation accounts for 13.11% of all the cases reported, with an annual average of 122 reported incidences. The incidence of human mortality came last, but with an average of 12 people per year, there is some need to worry that HWCs might be putting households at risk of extreme loss (Figure 19 and Figure 20). With the exception of disease transmission from wildlife to livestock, all the other HWC types are perceived to be on the increase. This upward trend is associated with many factors, including habitat encroachment and climate change (prolonged drought). Land tenure changes, characterised by the subdivision of group ranches in rangelands, enhance the encroachment and

fragmentation of wildlife habitats, thereby increasing human-wildlife interaction and competition over such resources as water. The increase in the general population puts pressure on land and other resources and encroaches into wildlife habitats—for example, people cultivating on riparian land along riverbanks increases conflicts with riverine species such as hippos, primates, and elephants. Government policies addressing food security have seen an increase in agriculture in the Mountain conservation area. During prolonged droughts, these farms become easy targets for elephants and other large herbivores.

HWCs lead to many socioeconomic and ecological consequences in the mountain areas, including loss of livelihoods when crop damage and depredation occur, as well as due to the destruction of property, including water infrastructure. Insecurity caused by wildlife also leads to psychological stress and loss of investment opportunity, and it limits freedom of movement. These all lead to a negative attitude towards wildlife and conservation, not to mention toward general poverty induced by HWCs.

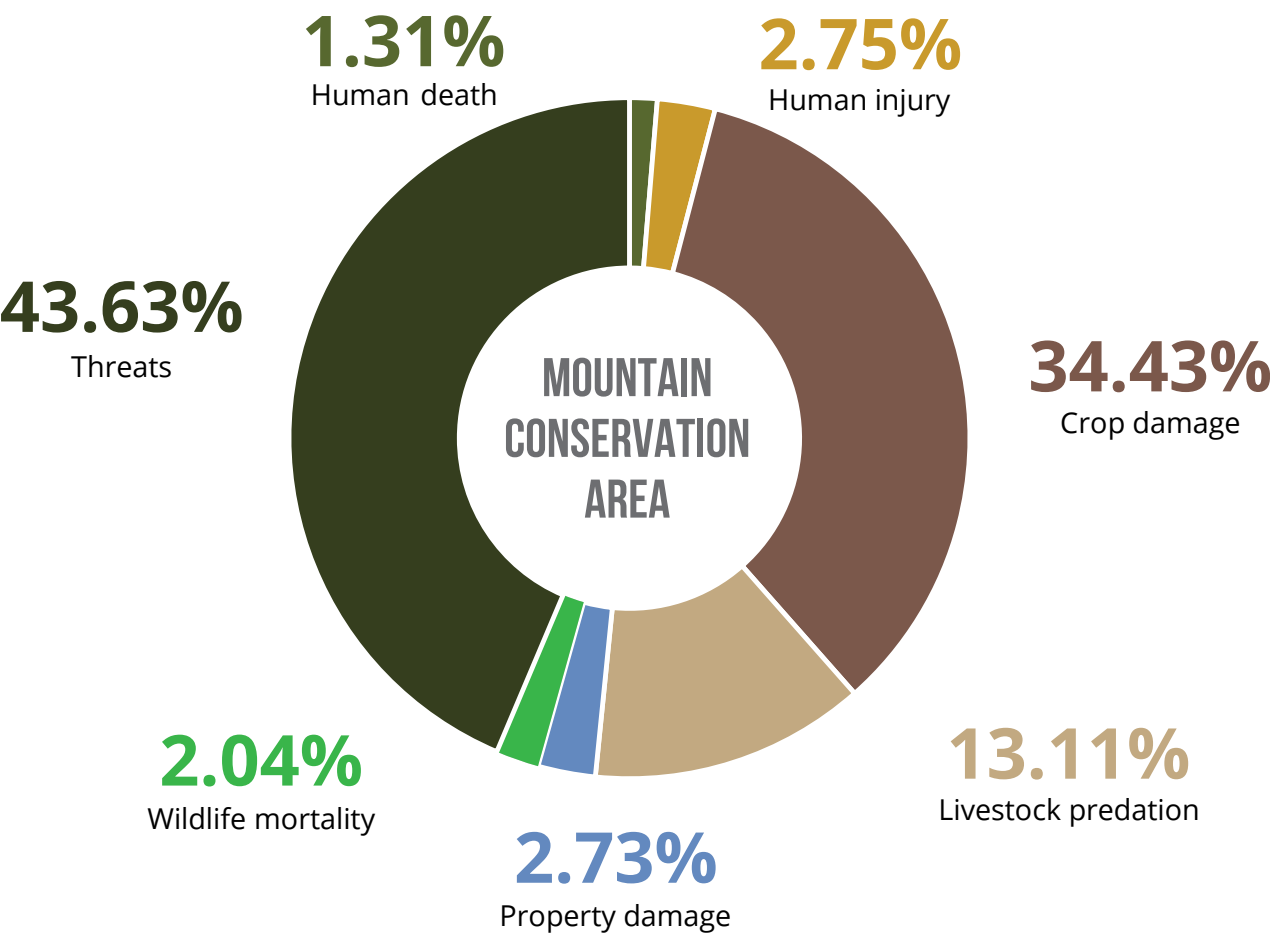


Figure 19: Types of HWCs recorded by KWS in the Mountain conservation area (2017 - 2021)

When disaggregated according to animals involved in conflicts, elephants are the most problematic in the Mountain conservation area. They are responsible for more than half (Figure 20) of the HWC cases reported, with an annual incidence mean of 510. Elephants are mostly from forested areas and conservancies. Amongst the predators, leopards are responsible for most conflicts, with an annual average of 67, which is less than 10% of the HWCs reported (Table 8). We can conclude that for the Mountain conservation area, conflicts with large herbivores, especially elephants, require more strategic efforts than for other species.

HWC occurrence in the Mountain conservation area varies according to season. Most of the stakeholders (44%) indicate that HWCs tend to be more prevalent during long dry seasons. The problem might have been exacerbated in 2021–2022 when Kenya experienced one of its worst droughts in 40 years. Therefore, in addition to developing mitigation strategies specific to species and HWC type, there is need to consider seasonal variation in planning and allocating resources.

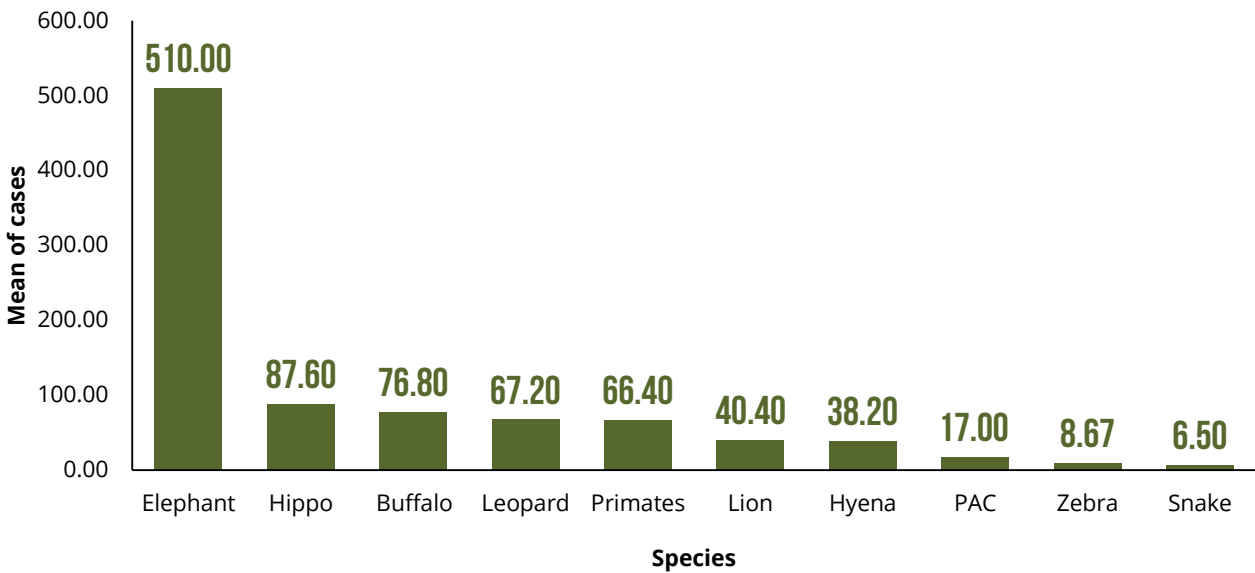


Figure 20: Species in HWCs reported in the Mountain conservation area by KWS (2017 - 2021)

Table 8: Species involved in HWCs reported by KWS in the Mountain conservation area between 2017 - 2021

Species	Mean ± Std. Error	Percentage
Elephant	510.00±129.38	55.51%
Hippo	87.60±27.26	9.53%
Buffalo	76.80±24.89	8.36%
Leopard	67.20±12.35	7.31%
Monkey	66.40±22.07	7.23%
Lion	40.40±19.87	4.40%
Hyena	38.20±17.92	4.16%
PAC	17.00±11.63	1.85%
Zebra	8.67±5.18	0.94%
Snake	6.50±2.44	0.71%
Total		100%

4.5.5 Eastern conservation area

In the Eastern conservation area, crop damage attributable to HWCs accounts for 62% (Figure 21) of the incidences reported, with an annual average of 113.20 cases over a span of five years (2017–2021). The high rate of crop damage is associated with agriculture, which is the dominant land use in the area. Nonhuman primates are responsible for most (35.2%) of the HWC cases reported in the Eastern conservation area, followed by elephants (24.40%). With only few incidences reported, leopards and lions are amongst the

carnivores that are most problematic in the area. Animals at the root of most conflicts come from Mount Kenya Forest Reserve; the Kora–Mwingi–Rahole wildlife migration corridors; Mueheune Forest; and conservancies. Overall, HWCs in the Eastern conservation area are perceived by stakeholders as frequent. According to stakeholders, most HWCs seem to occur during long wet seasons and long dry seasons.

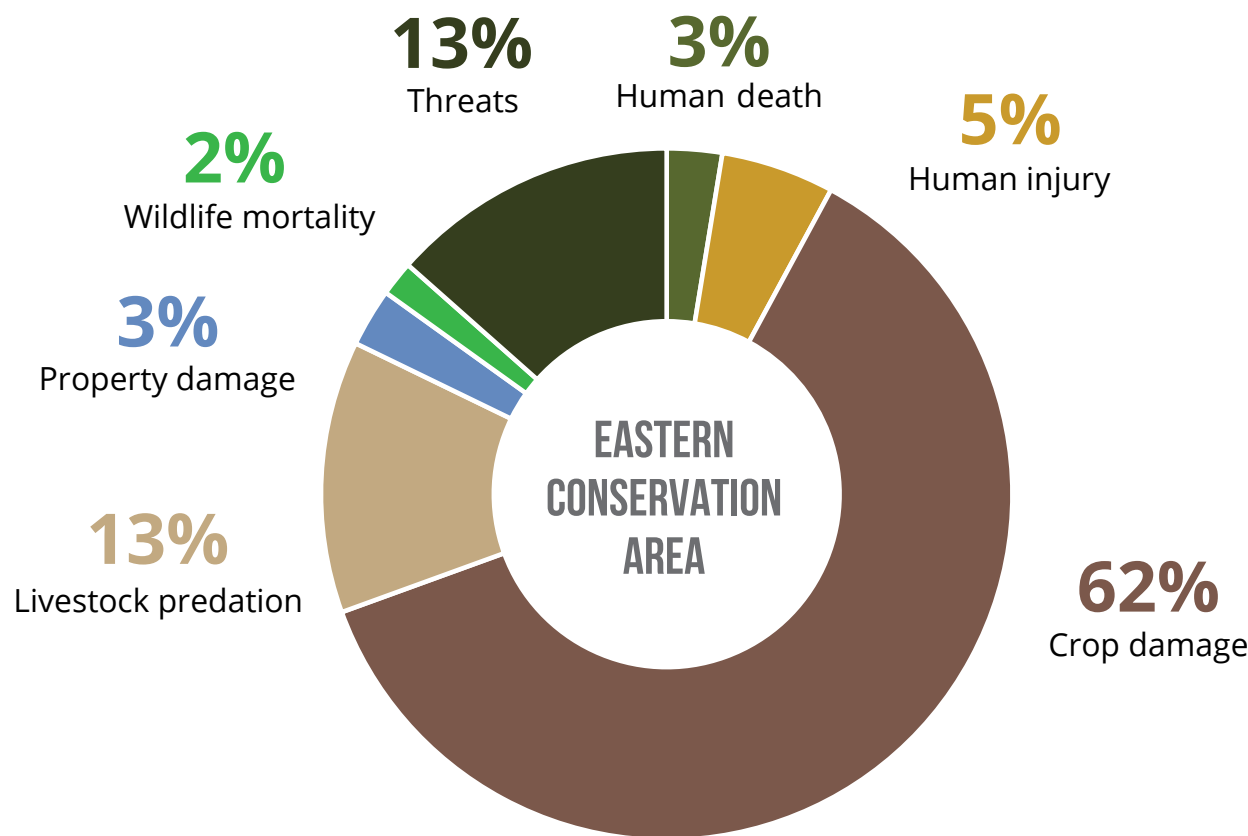


Figure 21: HWC types in Eastern conservation area (2017 -2021)

Table 9: Species involved in HWCs in Eastern conservation area reported by KWS between 2017 -2021

Species	Mean ±St. Error	Percentage
Primates	64.20±13.18	35.12%
Elephant	44.60±27.72	24.40%
Buffalo	20.40±5.90	11.16%
Hyena	13.33±4.91	7.29%
Leopard	9.00±3.92	4.92%
Lion	8.75±4.64	4.79%
Hippo	5.80±1.77	3.17%
Bush Pig	8.00±0.00	4.38%
Snake	4.67±1.44	2.55%
Unidentified	1.80±0.49	0.98%
Crocodile	2.25±0.56	1.23%
Total		100%

Overall, crop damage was the HWC perceived by area stakeholders to be increasing the most. This was largely associated with the 2021–2022 drought, one of the worst droughts Kenya has seen in 40 years. Livestock predation, human injury, human death, and wildlife mortality were perceived to have declined because of the fence erected in the area. Key HWC drivers in the area include high population growth, which has led to urban expansion and higher demand for crop land to meet food security needs, not only within the area but also countrywide. These factors led to the blocking of wildlife migratory corridors, forcing wildlife to move to settlements or crop farms. Individual property rights over land having granted people the power to put their land under

uses that might be incompatible with conservation. As a result, animals diverted from migratory corridors are then forced into other areas where humans dwell, increasing the potential for HWCs. Large-scale development such as roads interfere with habitats and animal migration, often resulting in roadkill. Climate change has resulted in prolonged droughts or unpredictable rainfall, greatly influencing the incidence of HWCs in the Eastern conservation area. During long dry seasons, more conflicts are reported, as forage availability and water abundance reduce and become inadequate, leading to more resource competition between wildlife and humans.



4.5.6 Coast conservation area

Coast conservation areas has three major HWCs hotspots, namely Tana Delta in Lamu County, Ganze in Kilifi County and Shimba Hills in Kwale County. Tana Delta experiences the most conflicts in this conservation area because of human settlements created in the previous elephant migratory corridor between Tsavo East and Arabuko Sokoke Forest. After general threats to humans, crop damage is the most

prevalent HWCs type experienced in the Coast conservation area (Figure 22), with an annual mean of 110 incidences reported between 2017 and 2021. Human injury and death are low relative to other HWCs types but still significant at 15 and 11 cases per year over the 5-year period, respectively.

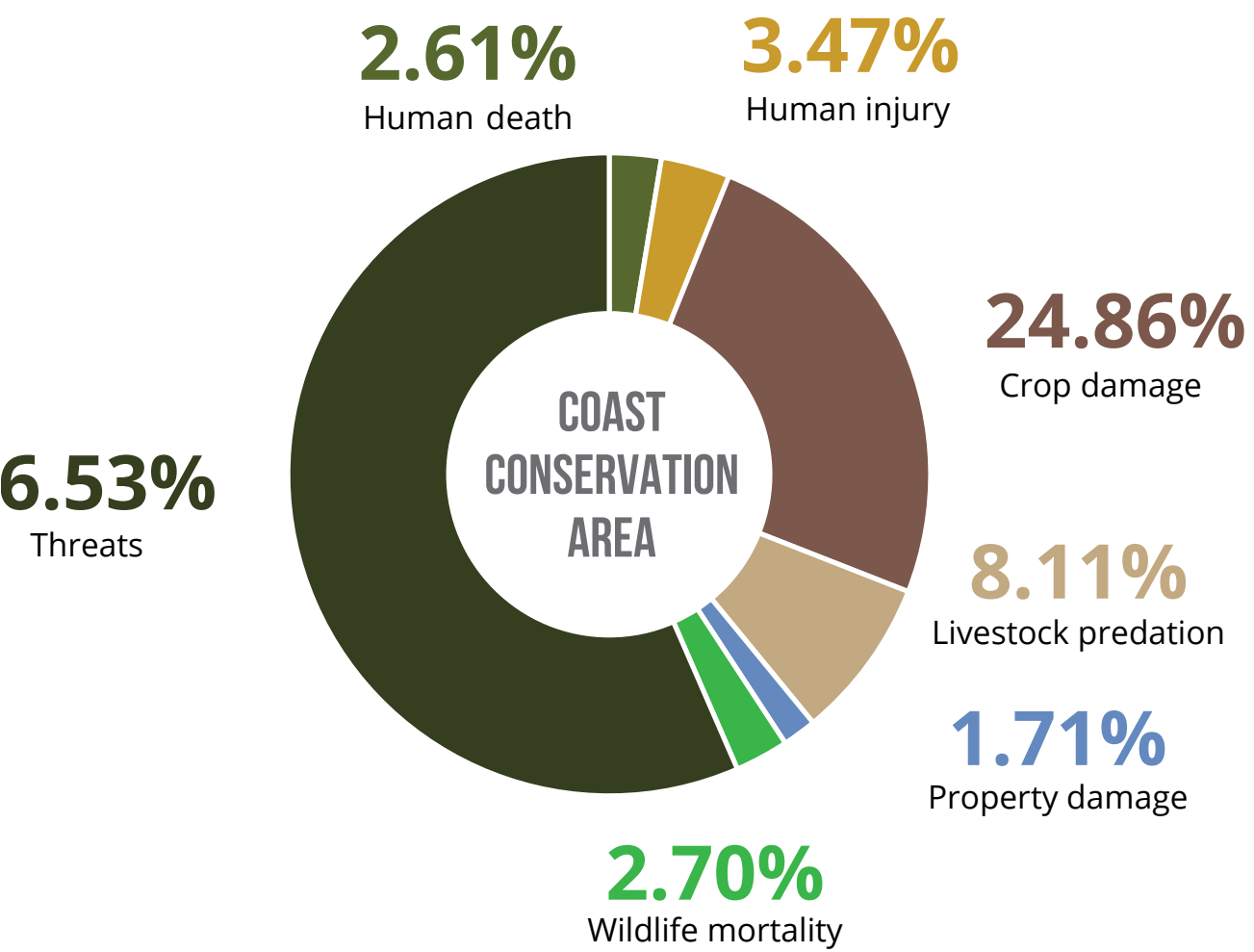


Figure 22: HWCs types reported by KWS in Coast conservation (2017-2021)

Elephants remain the animal species that most frequently causes conflicts in the area, accounting for 42.97% of all incidences reported between 2017 and 2021, with a mean of 190 cases per year. Conflicts with buffaloes are also prevalent,

with a mean of 96 cases per year (Table 11), accounting for 21.78% of cases reported (Figure 29). Elephants and buffaloes causing conflicts come from parks, reserves, conservancies, wildlife migration corridors, and forests.

Table 10: Species in HWCs recorded by KWS in Coast conservation area 2017-2021

Species	Mean ± Std. Error	Percentage
Elephant	190.60 ± 24.71	42.97%
Buffalo	96.60 ± 30.22	21.78%
Hippo	35.00 ± 8.86	7.89%
Lion	34.00 ± 6.36	7.66%
Hyena	20.60 ± 4.06	4.64%
Snake	18.00 ± 3.21	4.06%
Crocodile	14.00 ± 1.41	3.16%
Primates	13.20 ± 4.60	2.98%
Leopard	6.60 ± 2.06	1.49%
PAC	15.00 ± 7.59	3.38%
Total		100%

Seasonal variations

Generally, HWCs prevalence in the Coast conservation area is average in frequency of occurrences. However, seasonally, HWCs increase during dry seasons, with a peak during the

long dry seasons. Therefore, considering the occurrences of droughts, induced by climate change, it can be expected that HWCs will increase in frequency and prevalence.

Drivers and impacts

HWCs in the Coast conservation area are driven by factors that are similar in other conservation areas. Human population increase leads to encroachment into wildlife habitats, blocking of wildlife corridors and dispersal areas. In Kilifi for example, where human population has more than doubled between 1989–2019 (KNBS, 2019), the traditional elephant migratory route between Tsavo East National Park and Arabuko Sokoke Forest is completely blocked by human settlements and other activities such as farming. During prolonged droughts, elephants try to trace this route to Arabuko Sokoke Forest. Consequently, Ganze and Magarini areas have seen escalated incidences of conflicts with elephants. The demand to securely produce food for a rising population with support from government food security policies also make local communities to enhance agriculture, a land use not compatible with conservation, in wildlife conservation areas. These practices are also enhanced by consequences of depressed livelihoods. Therefore, while policies on food security are important for the development of the country, the same policies contradict conservation efforts. Prolonged droughts, most likely as a result of climate change, also push wild herbivores out of Shimba Hills and Tsavo national parks into human settlements and farms

causing damages. The development of large infrastructure such as the standard gauge railway and roads, has been accused of blocking wildlife migratory corridors, diverting movement of elephants between Tsavo West National Park and Kwale to human settlements. While this infrastructure is good for the economic development of the country, more scrutiny is needed especially where conservation of wildlife and coexistence with communities is likely to be affected. There is also pressure on protected areas from neighbouring communities and droughts, that tend to reduce forage in these areas (Habel et al., 2017).

The impacts of damages caused by HWCs in the Coast conservation area is varied. More generally, loss of crops, livestock and property enhances poverty. Considering that some of the regions affected by HWCs in the Coast conservation area are amongst the poorest in the country, e.g., in Kilifi and Kwale, HWCs impacts therefore become so severe on people who are already living a precarious life. In Kilifi, 70% of the population is considered poor and over 65% are food insecure (MoALF, 2016). It is thus not surprising that majority of stakeholders consider communities in the hotspots to be having low ability to cope with the consequences of HWCs.

4.5.7 Western conservation area

Western conservation is not a serious HWCs hotspot. Areas that are hit by some HWCs include around Ruma National Reserve, Mt. Elgon National Reserve, Kamnarok National Reserve and Kerio Valley National Reserve. There are also reported cases of conflicts with hippos on a series of vegetable farms along Lake Victoria. The most prevalent type of HWCs is crop damage, accounting for more than half

of the cases reported in 2017–2021 (Figure 23). On average, there were 141 cases of crop damage reported per year between 2017 and 2021. This is not surprising considering that agriculture is the dominant land use in rural western areas. Except for human injuries and disease transmission, all the types of HWCs in the Western conservation area are reported to be increasing.

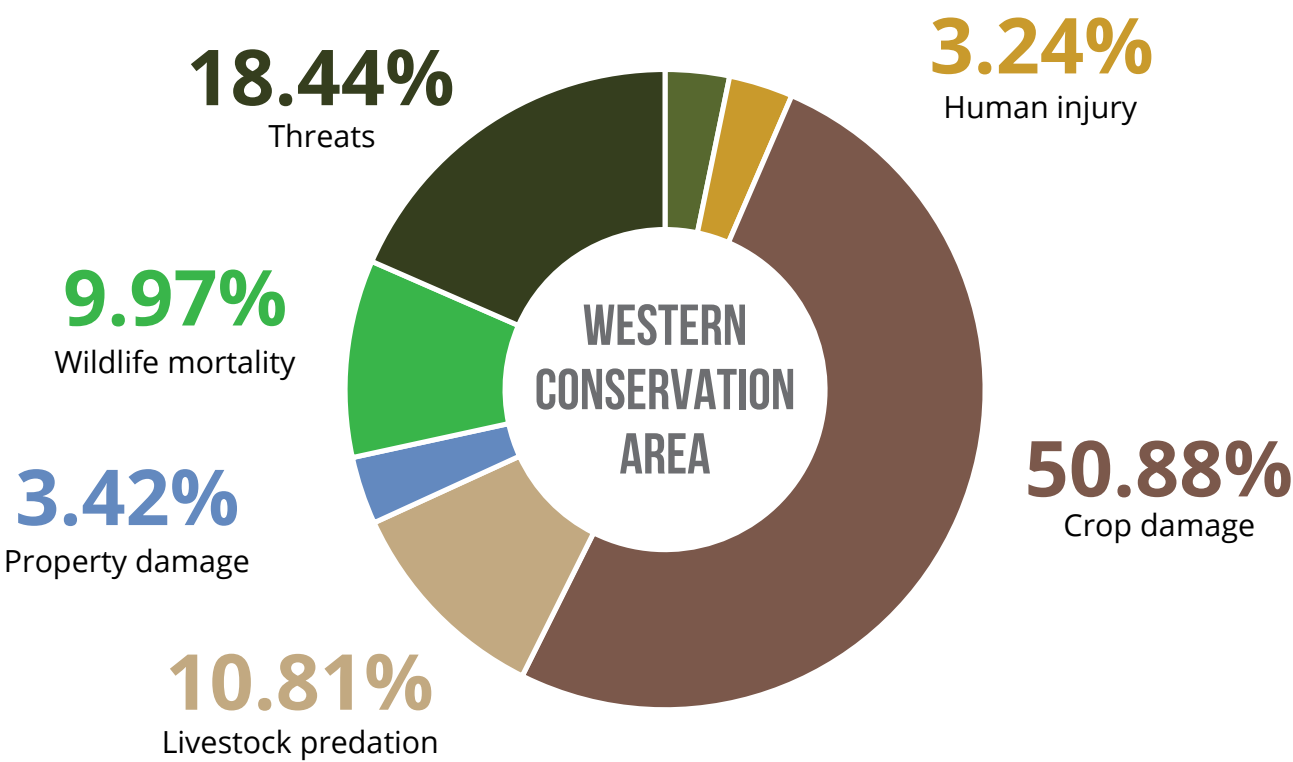


Figure 23: Types of HWCs recorded by KWS in Western conservation area (2017-2021)

Species in conflicts

In sum, between 2017 and 2021, there was an average of 267.47 cases of HWCs reported each year in the Western conservation area (Table 11). Nonhuman primates are responsible for most of the incidences accounting for 34.49% of all the cases reported, followed by hippos that accounted for 25.87 (Table 11). Most of the animals that cause conflicts with people come from different areas including: Lake Victoria and Lake Kanyaboli (Siaya County), where conflicts with hippos and crocodiles are reported; rivers, including Nyando, Nzoia, and Yala, where conflicts with hippos and

crocodiles are reported; swamps such as Yala Swamp and Saiwa Swamp; parks, including Ruma and Nasalot; forests, including Kakamega, Lambwe, Kaguta, Koderia, and Mount Elgon; NRT conservancies; and wildlife corridors, such as that between Nasalot and Rimo national reserves. Generally, HWCs are most prevalent during long wet seasons and long dry seasons. In long wet seasons, when crops are in the farm, primates destroy them more. Long dry seasons are characterised by conflicts with hippos on irrigated farms along the lakes and rivers.

Table 11: Species in conflicts recorded by KWS in Western conservation area (2017-2021)

Species	Mean ± Std. Error	Percentage
Nonhuman primates	92.25 ± 47.85	34.49%
Hippo	69.20 ± 43.76	25.87%
Hyena	18.20 ± 9.27	6.80%
Crocodile	15.60 ± 6.65	5.83%
PAC	23.67 ± 16.79	8.85%
Snake	18.00 ± 6.21	6.73%
Buffalo	8.80 ± 3.79	3.29%
Leopard	10.50 ± 4.75	3.93%
Elephant	5.25 ± 2.97	1.96%
Serval cat	6.00 ± 1.90	2.24%
Total		100%

Drivers and impacts

The increase of HWCs in the Western conservation area is largely due to the expansion of urbanization and its associated infrastructure, such as roads. As urban centres expand, more land is cleared for space, thereby destroying wildlife habitats and blocking migratory corridors and dispersal areas (those areas near protected areas). Also, increased poverty and depressed livelihoods lead to agriculture expansion, including in riparian lands along rivers and lakes where hippos, crocodiles, and primates live. Agriculture established in these areas leads to conflicts with wild animals. HWCs in western Kenya is largely the result of tensions arising from land tenure. Except in Turkana County, where most of the land is held in trust by the county government, land in Western conservation area is owned by individuals. Those with individual titles have the freedom to use them however they wish provided they abide by environmental conditions and other laws. This leads to the expansion of agriculture,

urban centres, and land use incompatible with conservation or that increases the likelihood of HWCs.

The impacts of these conflicts are far-reaching. Damages to people's livelihoods lead to significant economic losses with the potential of plunging households into poverty. Primates lead to low harvest, plunging households and the region into food insecurity and impairing government food security policies. Economic losses from HWCs in the area also discourages investments into crop farming. Retaliatory attacks against animals causing conflicts threaten their numbers and overall biodiversity. For example, hyenas are reported to die from eating carcasses of poisoned hippos around Lake Victoria. Monitor lizards and mongooses are also reported to die from eating poisoned birds. Poisoning also leads to the death of aquatic animals, such as fish and reptiles.

4.5.8 Northern conservation area

Although far less than the national average, HWCs do occur in the Northern conservation area. The annual average over a span of five years (2017–2017) is 200 incidences. Crop and property damages are the highest types of conflicts reported from this conservation area, accounting for 28% and 27% of all cases reported, respectively (Figure 24 and Figure 24). Despite being an area characterised by human insecurity, wildlife mortality is reported to be very low, at only two cases per year (2017–2021).

Elephants account for most of the conflict cases, with 124 cases per year over the five-year period (2017–2021),

representing over 61% of all the cases reported. Leopards are responsible for most of the livestock predation, accounting for 15 cases per year (2017–2021) (Table 12). Problem animals usually come from Marsabit National Park, Jaldesa and Songa conservancies, forests, and wildlife migratory corridors. Generally, HWCs are reported to be increasing in this conservation area. Conflicts with wild animals increase with drought. More incidences are reported during long dry seasons than other seasons, as elephants move into settlements, destroying water points and other property.

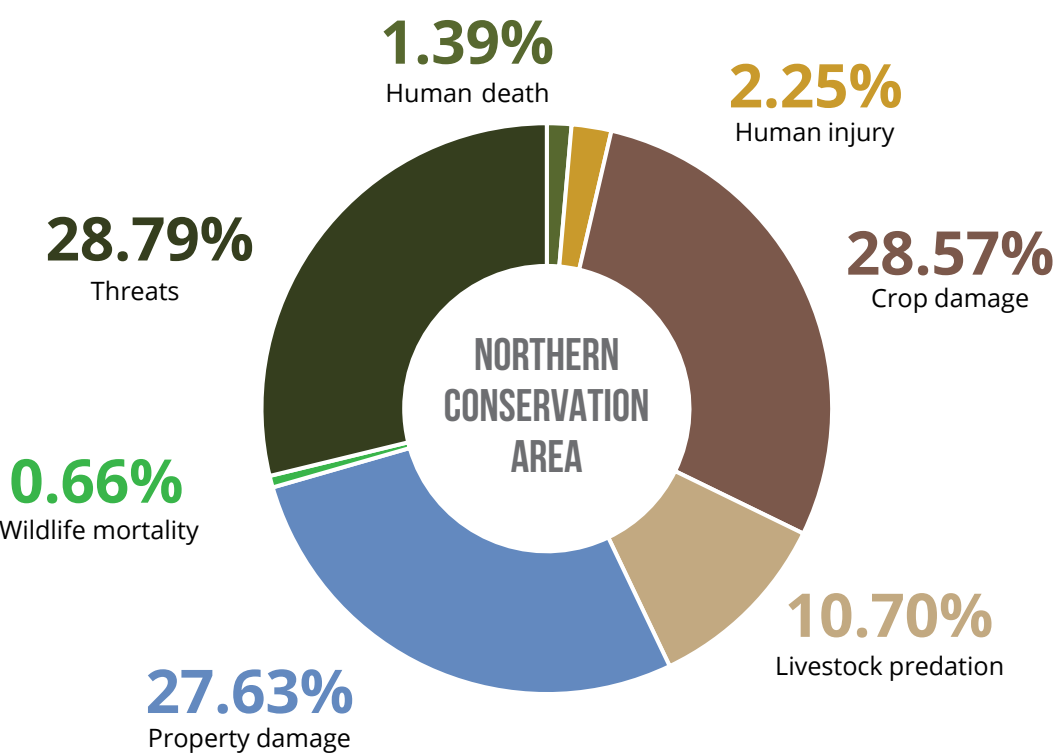


Figure 24: HWC types recorded by KWS in the Northern conservation area (2017 to 2021)

Table 12: Species in HWCs recorded by KWS in Northern conservation area (2017-2021)

Species	Mean ± Std. Error	Percentage
Elephant	124.00 ± 64.52	61.98%
Snake	17.20 ± 9.98	8.60%
Hyena	15.60 ± 8.72	7.80%
Leopard	15.00 ± 0.00	7.50%
Buffalo	9.67 ± 3.39	4.83%
Lion	7.33 ± 1.69	3.67%
Crocodile	1.25 ± 0.22	0.62%
PAC	3.00 ± 0	1.50%
Mongoose	3.00 ± 0	1.50%
Unidentified	1.00 ± 0	0.50%
Jackal	1.00 ± 0	0.50%
Primates	1.00 ± 0	0.50%
Cheetah	1.00 ± 0	0.50%
Total		100%

HWC drivers and impacts

HWC prevalence follows rainfall patterns. Due to climate change, droughts are becoming longer and more severe in northern Kenya. Wildlife, especially elephants, leave protected areas to look for water and forage in human settlements, resulting in conflicts and damage. Further, livestock encroach into wildlife areas, especially during dry seasons, leading to transmission of zoonotic diseases. Invasion of wildlife areas, including corridors and dispersal areas, significantly increases HWCs in the area. Government policies that support infrastructure construction, such as the LAPSET Corridor project, convert more wildlife dispersal areas and block wildlife corridors. Further, infrastructures built adjacent to conservation areas increase conflicts between people and wildlife.

HWCs lead to various impacts. Retaliatory attacks on wild animals by the aggrieved communities lead to reduced animal populations and biodiversity loss. Retaliation in Northern conservation area typically takes three forms: poisoning, snaring, and spearing, which is the most common type. Poisoning baboons indirectly affects flesh-eating birds and domestic dogs who feed on the carcass. Livestock also usually fall victim of traps set for wild dogs, buffaloes, and elephants. Gunshots sounded by residents to scare elephants chase away bird species as well as antelopes, buffaloes, and baboons. Effects on communities include loss of livelihoods, leading to an increase in poverty for communities whose livelihoods are already precarious due to aridity and previous government marginalisation.



Costs to Communities and the Government

5.1 Introduction

Human-wildlife conflicts compensations are costly. Communities that live with wildlife bear a huge cost in the form of lost livelihoods, property damage, physical injuries, and even the loss of life. Wildlife directly affects people living adjacent to protected areas, in wildlife corridors, or other human-wildlife interfaces. Often, the most poor, vulnerable and marginalised people bear the biggest burden of HWCs. Human-wildlife coexistence should therefore be a significant consideration for sustainable conservation and development . The country's present and long-term challenge, has been finding a reasonable way to ensure that wildlife conservation does not interfere with people's livelihoods and vice versa (Muthui, 2018). Hence it is critically necessary to mainstream

HWC issues into sustainable development programmes. Moreover conservation programmes can play a big role; in reducing poverty; increasing the participation of women, youth, and the disabled; improving governance and accountability structures; promoting food security; and delivering a sustainable environment for future generations. Yet around the world, and specifically in Kenya, vast sums of money are being spent to eradicate poverty and grow economies without giving adequate attention to the link between sustainable development and a healthy environment. Despite being so strongly linked to the Sustainable Development Goals (SDGs), human-wildlife conflict costs and impacts continue to be overlooked by policymakers (UNEP, 2021).

5.2 The costs of human wildlife conflict

The costs of human-wildlife conflicts can be delineated into direct and indirect costs (Table 13). These costs then translate into the negative impacts felt by myriad stakeholders, including local communities, conservancies, businesses, county governments, and the national government. The most evident and direct negative costs from wildlife are losses relating to crop and property damage, livestock predation and depredation, livestock diseases, and injuries and death to humans. Other costs include those incurred to mitigate conflicts, such as putting up fences, predator deterrence light and paying herders.. Indirect costs consist of the hidden, unquantifiable, and intangible costs resulting from HWCs.

These costs are social and psychological, and they manifest themselves in the form of fear, discomfort, sleeplessness, and deviated focus (Hoare, 2001). It is important to note that indirect costs are not compensated and include transaction costs, healthcare costs, and opportunity costs. International Union for Conservation of Nature–World Conservation Congress (IUCN-WCC) resolution 101 of 2020 recognises that HWCs decrease crop and livestock yields, diminish profits, and lessen human safety. IUCN-WCC further acknowledges that HWCs compromise food security, economic growth and possibilities of attaining Sustainable Development Goals (IUCN-WCC, 2020).

Table 13: Highlight of impacts of human-wildlife conflicts

Impact on local communities	Local communities bear inordinate costs of living with wildlife in the form of crop damage, livestock losses, disease, injury, and death. Further, huge costs of undertaking HWC management and safety measures increase the financial burden borne by communities from HWCs.
Impact on equity	Living with and around wildlife involves costs that are unevenly distributed and disproportionately fall to those living with wildlife; on the other hand, returns from wildlife conservation, such as tourism revenue, are often more widely distributed and do not reach those who are more directly affected and forced to bear the negative consequences of living with wildlife.
Impact on supply chains	HWCs negatively affect businesses producing agricultural commodities. Animals raid crops intended for sale, leading to reduced farm yields, localised food insecurity, lost economic opportunities, lost investments, and decreased economic competitiveness. Elephants devastate maize and fruit plantations. For subsistence farmers who rely on their crops for survival and have no other sources of income to buffer against damage, animal attacks can cause existential hardship. The expansion of commercial agriculture and animal husbandry into wildlife habitats and corridors may result in high losses for businesses and wildlife. These commodity production losses eat into the property margins of companies.

Impact on social dynamics	HWCs result in social strains and mistrust when expectations and responses to incidents are misaligned. When incidences occur and KWS is perceived to be slow in its response, it leads to anger and decreases tolerance to wildlife. When HWCs affect a community member, that community may blame the government for being overly protective of the problem animal, while conservationists may feel that the communities encroached on wildlife habitats. Each stakeholder may have a different perspective on the conflict; thus a single event can lead to complex arguments that involve all strata of society. Conflicts amongst people over wildlife and its management can be highly intense, especially when people unequally share the costs and benefits of coexisting with wildlife and when differences in status and power, as well as deep-rooted communal conflicts, complicate matters (Madden and McQuinn, 2014).	
Impact on long-term well-being	HWCs centre on the interaction between humans and wildlife and as such have strong linkages and impacts on the achievement of the Sustainable Development Goals. HWCs create adverse ecological, social, and economic impacts that require multi-sectoral collaboration, integration, and planning. If HWCs are not addressed, their adverse effects can impede the achievement of SDGs in the following manner:	
	SDG 1 – No poverty	HWCs affect the incomes of farmers, herders, and fishers, particularly those with low incomes and low resilience to disruptions.
	SDG 2 – Zero hunger	Wildlife damage food stores and crops, as well as injure and kill livestock.
	SDG 3 – Good health and well-being	Negative interactions between humans and wildlife directly affect health and well-being in the form of injuries and death or indirectly through psychological effects that include stress, fatigue, and sleep deprivation.
	SDG 4 – Quality Education	Wild animals are a threat to school going children's. Elephants can damage infrastructure that is essential for learning, such as water tanks while animals such as baboons may harass children. School programmes may be interrupted by HWC control activities such as Children engagement in guarding/herding activities. diminishing school attendance. The loss of household incomes from crop damage, livestock predation and depredation, property damage, and injury or death of the breadwinner can result in families' inability to meet the costs of education.
	SDG 8 - Decent work and economic growth	HWCs can contribute to a vicious cycle of poverty and low livelihood diversity in HWC hotspots.
	SDG 9 – Industry, innovation and infrastructure -	HWC incidents increase due to infrastructural developments that fail to take into account migratory routes and spatial distribution of wildlife.
	SDG 10 – Reduced inequalities	HWCs contribute to the inequality of cost and benefit distribution if those who pay the price for coexisting with wildlife do not receive tangible, economic benefits from wildlife.
	SDG 13 – Climate action	Increasing frequencies of famine and drought as a result of climate change are exacerbating human-wildlife conflicts.
	SDG 14 – Life below water	Marine HWCs negatively impact the survival of many marine species and the blue economy that are key sources of food and livelihoods, respectively.
	SDG 15 – Life on land	The survival of multiple terrestrial species depends on successful HWC management.

	SDG 16 – Peace, justice and strong institutions	Predators and mega herbivores pose a safety risk to communities. The ability of communities to observe wildlife laws and inhibit retaliatory attacks against wildlife depends largely on KWS's and other stake holders responses and capacity.
	SDG 17 – Partnerships on the goals	Human-wildlife coexistence and sustainable development each require integrated decision-making, participation, collaboration or co-creation and good governance at the community, county, and national levels. HWC mitigation requires strong participation of civil society institutions.

The government of Kenya and conservation partners incur huge costs as a result of human-wildlife conflicts due to expenses related to compensation and mitigation .The Kenya Wildlife Service overhead costs include personnel cost, operation and fence maintenance(Table 14).

Table 14: Community wildlife department costs

Community Expenses	2018/19 FY	2019/20 FY	2020/21 FY	2021/22 FY	2022/23 FY	Total
Personnel costs	98	90	92	88	93	460
Operations and maintenance	138	173	155	911	903	2,279
Fences	106	227	263	160	87	843
Total	341	490	509	1,158	1,083	3,582

Figures are in millions of Kenya Shillings

In fiscal year 2017/18, KWS received CSI project requests amounting to Ksh 23.743 million. These increased to Ksh 230 million in FY 2018/19 and grew to Ksh 600.2 million in FY 2019/20. The government also covers the costs of compensation for loss of life, human injury, property damage, crop damage, and loss of livestock. Over the five-year period 2017–2021, claims for compensation totalled Ksh 7.367 billion. Claims for crop destruction were the highest, standing at Ksh 3.37 billion, followed by livestock predation at Ksh 1.86 billion. During the same period, there were 25,645 HWC incidents reported in 42 counties. Table 15 summarises the compensation claims for the five-year period 2017–2021.

Table 15: HWCs Compensation Claims

Claim type	Year					Grand Total
	2017	2018	2019	2020	2021	
Death	163	102	78	60	21	424
Injury	772	461	174	103	51	1,561
Crop destruction	1,004	345	308	447	1,266	3,370
Predation	590	535	265	302	168	1,860
Property damage	37	15	36	10	54	152
Total	2,566	1,458	861	922	1,560	7,367

In the five-year period 2017–2021, the government settled a total of 6,338 claims (the payment covered claims for incidences that were reported up to 2016) worth Ksh 2,517,350,228. Death accounted for the largest chunk of the payments, at Ksh 1,327,400,000 for 277 deaths, followed by Ksh 995,152,350 for 3,237 injuries; Ksh 139, 234,276 for 1,675 incidences of crop destruction; Ksh 55,298,870 for 1,145 cases of predation; and Ksh 264,732 for four cases of property damage (Table 16).

Table 16: HWCs Payments

HWC Incident	No. of claims	Amount paid (KES)
Death	277	1,327,400,000
Injury	3,237	995,152,350
Crop destruction	1,675	139,234,276
Predation	1,145	55,298,870
Property damage	4	264,732
Total	6,338	2,517,350,228

In FY 2021/22, there were 312 claims that were partially paid worth Ksh 326,794,443. The Ministerial Wildlife Conservation Committee (MWCC) approved 6,351 claims worth Ksh 2,388,439,288, but they have remained unpaid. Another 9,233 claims are awaiting conclusion by the MWCC. Of those, 2,730 claims worth Ksh 493,183,295 have been deliberated and valued; and another 6,503 claims estimated to be worth Ksh 1,500,000,000 are awaiting deliberation and valuation. At the county level, 7,000 claims with a projected value of Ksh 1 billion are awaiting deliberation by the CWCC. It is currently estimated that Ksh 5.8 billion is required to settle the approved and projected claims.

The costs of mitigation through various methods, such as fencing, requires large amounts of capital expenditure. Electric fences provide a long-term solution to problematic wildlife species but have high installation and maintenance costs. Table 17 gives the average costs of construction of different types of electric fences.

Table 17: Average cost of constructing fences
Source: Ministry of Tourism and Wildlife

Type of fence	Average cost/km (KES)
Butterfly	2,200,000.00
Chain link	1,964,285.71
Intermediate	1,765,703.26
Intermediate (new)	2,000,000.00
Comprehensive	2,727,969.35

It is estimated that putting up new fences in all hotspot areas is likely to cost Ksh 2.365 billion.

5.3 Additional costs of human wildlife conflict

Communities living with wildlife incur costs that sometimes can go uncompensated. These include transaction costs that are incurred by individuals due to the systemic inadequacies and delays associated with the compensation process. Often, those affected by HWCs in Kenya experience difficulties in reporting incidences. The compensation process is complex and expensive because of communication costs, transportation costs, printing costs, collusion & corruption in claims process and payments to have county officials assess the extent of losses. The lack of education and awareness of those involved, the inability of KWS staff to attend to claims in a timely manner due to lack of adequate capacity and logistical arrangements, and delays in the disbursement of funds by the National Treasury also complicate the process. Additional transaction costs borne by communities as a result of HWCs include purchasing food due to the loss of food supplies, borrowing money, applying for loans to fix damaged property, and obtaining treatment for injuries. These issues put a strain on family finances. Impaired freedom of movement due to fear of injury or death also hinders people from harnessing economic opportunities.

Communities also incur opportunity costs, those losses incurred by the community for taking particular actions to mitigate against, or because of, HWCs instead of more preferred and beneficial activities. For example, the destruction of water tanks and pipes results in people having to walk longer distances to fetch water at the expense of other social and economic activities. Lack of access to sufficient, safe, acceptable, and physically accessible water has adverse effects on the health, dignity, and prosperity of communities. Inadequate access to water significantly affects the realisation of other human rights. Children and women are disproportionately affected as they must walk long distances for water. This limits the participation of women in economic activities and prevents children from spending the necessary time to study. Guarding farms during the day and at night comes at the expense of more productive undertakings. Funds intended for education, healthcare, and development are often diverted to mitigate losses from HWCs, thus impoverishing communities even further. Health costs as a result of the stress and anxiety of animal attacks are also borne by community members.



Response Times, Capacities and Protection of Citizens

6.1 Protection protocols and KWS response time

Protection of citizens by the government and line agencies is at the heart of containing HWCs (WCMA, 2013; Ministry of Tourism and Wildlife, 2020). This is consistent with two key objectives of the wildlife policy of (1) increasing access, incentives, and sustainable use of wildlife resources as a national heritage; and (2) promoting partnership (e.g., with local communities) and incentives for wildlife-based enterprises (Ministry of Tourism and Wildlife, 2020). KWS has protocols and Standard Operating Procedures (SOPs) for handling incidences of human wildlife conflicts.

Human injury, death, and insecurity caused by wildlife are considered emergencies by most communities and

stakeholders (Table 18). Even though many stakeholders in the Southern Rift (Narok area) considered most issues related to HWCs to be emergencies perhaps due to their scale, intensity, and impacts, some stakeholders did not consider crop raiding and livestock predation as such. Accordingly, it is important to create awareness on the existence of the SOPs by KWS so that other stakeholders can support its implementation to enhance effectiveness and to ensure that emergencies arising from HWCs are addressed swiftly and in a coordinated manner.

Table 18: Protection of citizens from HWCs in some KWS conservation areas

Conservation areas	HWC issue	Presence / Absence of evacuation policy (% mention)	What do communities consider as emergency	Who leads (position) the emergency procedure and to what end (objective)
Southern	Predation	22%	11% Emergency, 11% Not emergency.	- KWS officers in the field and at HQs and community warden Objective:- - Enhance coexistence between people and wildlife. - Console the affected families.
	Property damage	22%	11% Emergency; 11% Not Emergency	
	Crop raiding	22%	11% Emergency; 11% Not Emergency	
	Human death	33%	22% Emergency; 11% Not Emergency	
	Human injury	33%	22% Emergency; 11% Not Emergency	
	General insecurity	33%	22% Emergency; 11% Not Emergency	

Conservation areas	HWC issue	Presence / Absence of evacuation policy (% mention)	What do communities consider as emergency	Who leads (position) the emergency procedure and to what end (objective)
Central / South Rift	Predation	17%	Emergency	- KWS officers, local administrations e.g., chief and police, agriculture officer and livestock valuation officers Objective:- - Enhance coexistence between people and wildlife
	Crop raiding	17%	Emergency	
	Property damage	17%	Emergency	
	Human death	17%	Emergency	
	Human injury	17%	Emergency	
	General insecurity	17%	Emergency	
Eastern	Predation	40%	Not Emergency	- Community and county wardens Objective:- - Protect lives and property, and ensure peaceful coexistence between people and wildlife.
	Crop raiding	40%	Not Emergency	
	Property	34%	14% Emergency; 20% Not Emergency	
	Human death	29%	Emergency	
	Human injury	29%	Emergency	
	General insecurity	29%	Emergency	

Note: There was no response on the existence of protocols by key informant and focus group discussion members from Western, Coast, Tsavo, and Northern conservation areas.

One critical issue regarding the protection of citizens in HWCs is response time. Across all conservation areas, there was a general feeling amongst communities and stakeholders that KWS didn't respond as fast as expected. However, in some cases the response time was found to be fast, especially in the Eastern and Mountain conservation areas. Accordingly, this strategy recommends that HWC complaints should be notified to KWS quickly and clearly through designated hotlines that go directly to the contact centre managed by trained professionals to ensure that information gets to relevant officers. It was found that there were several reasons why KWS didn't respond swiftly, especially when multiple cases

were reported. These included an inadequate number of rangers and other key personnel, or a lack of resources, such as thunder flushes, blank bullets, fuel, and adequate vehicles. For instance, it was noted that the Problem Animal Management Unit (PAMU) in Kibwezi had used local innovations that produced the same sound as thunder flashes to scare elephants, and this was very encouraging. For effective and timely response to HWC issues in all the conservation areas, it's important to ensure that the required resources are always readily available, including adequate capacity of PAC and PAMU personnel.

6.2 Effectiveness and Efficiency of HWC Responses and Compensation Process

Stakeholders lauded KWS for collecting and promptly reporting HWC incidences and claim forms for compensation as per the (Wildlife Act 2013). For the conservation areas where there were clear protocols of doing this, the stakeholders noted that process effectiveness and efficiency ranged from high to very high, including the evacuation process and management of people injured or killed by wildlife. (Table 19).However, there were concerns on the evacuation process of those injured or killed by wildlife. These included the cumbersome nature of the process, inadequate awareness of the process,

insufficient resource allocation to the Community Wildlife Conservation Committee (CWCC) for it to do its job, technical challenges in verifying cases and wildlife species involved, and fraud and corruption that occurred during the process that went unpunished

Considering the current staff strength at KWS, there is need to enhance the KWS staffing levels for both ranger and officer's cadres to effectively deal with emergency cases of HWCs in all the conservation areas.

Table 19: Factors Impacting KWS response time to HWC issues
1 = Very slow, 2 = Slow, 3 = Medium, 4 = Fast, 5= Very fast

Conservation area	KWS explanation for factors determining response time	Community views on response time (Mean ± SE)
Southern	Harshness of the terrain, hostility by communities, and lack of enough resources.	2.50 ± 0.50 Medium
Central Rift	Inadequete personnel and equipment.	3.00 ± 00 Medium
Eastern	Inadequate equipment & personnel.	4.00 ± 0.00 Fast
Mountain	Inadequate personnel & equipment	4.00 ± 00 Fast

Table 20: Efficiency and effectiveness of evacuation protocols for human injury and death due to HWCs
1 = Very low, 2 = Low,3 = Medium, 4 =High, 5= Very high

Conservation area	HWC data routinely kept at relevant KWS location and submitted to KWS HQ	Community score (Mean ± SE) on evacuations	Challenges and resolutions on protocols and management of human injury and death
Southern	Yes = 100%	4.50 ± 0.50 High efficiency	- HWC data-sharing is not done. There's no real database, and the data are only available on Excel spreadsheets. Late and inaccurate HWC claims. Resolutions - Development of a good HWC database. - Development of an HWC real-time data collection protocol. - Capacity building. - Education and awareness. - Adequate resource allocation.
	No = 0%	4.50 ± 0.50 High effectiveness	
Eastern	Yes = 100%	5.00 ± 0.00 Very high efficiency	Resolutions - Inclusion of experts in the CWCC. - Education and awareness. - Verification of reported cases. - Islamic burying of corpse without post-mortem due to religious beliefs. - Access to experts' opinions, e.g., doctors, vets, and pathologists.
	No = 0%	5.00 ± 0.00 Very high effectiveness	
Mountain	Yes = 100%	-	- Long documentation process of HWC cases. - Fraud by state officials. Resolutions - Clear and precise documentation process of HWCs. - Serious penalties for HWC claim fraud.
	No = 0%		

6.3 Compensation Rate of Wildlife Impacts and Associated Challenges

The history of wildlife compensation in Kenya dates to 1976 with the enactment of the Wildlife (Conservation and Management) Act, which provided for compensation for human injury or death and crop and property damage, including livestock depredation. The compensation scheme commenced in 1977 and was implemented until 1989 (Government of Kenya, 2018; Ministry of Tourism and Wildlife 2020). The scheme faced many challenges, including lack of adequate funds from Treasury, cumbersome procedures for verifying compensation claims and, in some cases, outright corruption and unfairness. The history of the scheme is marked with several milestones over decades that saw the birth of the Wildlife Conservation and Management Act 2013. This act is currently guiding the country's wildlife compensation scheme for handling HWCs (Government of Kenya, 2018). It may not be perfect, but many of its provisions are in tandem with current socioeconomic realities. A life lost through an HWC cannot be fully compensated, but the compensation scheme takes into account that victims leave behind dependents who need to be supported.

The law that guides wildlife management in the country (Government of Kenya, 2018) provides for the establishment of a Community Wildlife Conservation Committee. The CWCC receives, recommends, and forwards verified claims for compensation according to the act. Human death is compensated at Ksh 5 million, while injury leading to permanent disability is compensated at Ksh 3 million. Other injuries are compensated for Ksh 2 million, while general damages to property (livestock predation, crop raiding, and other property) are compensated at market value under Part 3 (25) of the Wildlife Act (Government of Kenya, 2018). The

problem with this provision has been the long verification process and slow compensation payout. As a result, many locals are reluctant to report HWC cases and instead resort to retaliation (e.g., spearing, poisoning, snaring, blocking wildlife migration routes, erecting physical barriers, or using other methods to displace wildlife from their homes). The challenges of past years on compensation for HWC issues are still prevalent in the country. One challenge is mobilising designated officers in the CWCC, such as the agriculture officer, medical officer, livestock officer, and veterinary officer if not an employee of KWS as envisaged in section 4 (18) of the Wildlife Conservation and Management Act to make time to conduct HWC assessments and file reports.

As of October 2022, there were 2,730 verified, submitted, and approved claims valued at Ksh 493,183,295, while a further 6,503 claims still pending.. At the county level, there are an estimated 7,000 claims awaiting CWCC deliberation. Since this is a continuous process, the CWCC and ministry were meeting regularly to process compensation claims as they received them from the field. The projection of claims as at as October 2022 was about Ksh 5.8 billion (State department for wildlife,)). Only 6,351 cases valued at Ksh 2,388,439,288 were fully settled (Table 21).The overall conclusion is that the process of compensation as currently structured is tedious and unsustainable. There is a need to restructure and digitize the compensation process through development of a private scheme administrator. Moreover ,this calls for all stakeholders to focus on prevention, mitigation, and benefit systems for effective and long-term sustainable management of HWCs in the country.

Table 21: Number of claims and projected funds needed to settle them across various HWCs types in 2022 (Source: State department of Wildlife, October 2022).

No	Claim type	Claims partially paid (pending payments)		Claims not fully settled	
		Number of claims	Amount needed (KES)	Number of claims	Amount needed to settle claims (KES)
1	Crop raiding	2	2,195,543	2765	282,600,707
2	Human injury	253	182,098,900	1081	446,760,873
3	Human death	57	142,500,000	306	1,520,400,000
4	Livestock predation	-	-	2130	132,545,805
5	Property damage	-	-	70	6,131,903
Total		312	326,794,443	6,351	2,388,439,288

6.4 Stakeholder Participation in Enhancing Human Wildlife Coexistence

i Community, private, and co-owned conservancies

Local conservancies are now playing a crucial role in reversing the loss of wildlife species and improving community livelihoods. Conservancies also provide buffer zones to PAs, which reduce the edge effects, link various PAs to each other, and conserve critical migratory corridors for wildlife while helping to boost and diversify economic activities across the country for economic transformation. Local community participation in conservation (estimated at 1 million households) also improves natural resource governance.

There are 215 conservancies covering over 6.35 million ha (11% of Kenya's land mass) registered in the country as of 2023 (KWCA, 2023), with most of them under the umbrella Kenya Wildlife Conservancies Association (Table 22). Of those conservancies, about 130 (47%) are community-owned, covering about 6,110,625 ha, or 87% of total area covered by conservancies. There were 95 privately owned conservancies (34% of conservancies) covering 595.911.3 ha (9% of Kenya's land mass).

Table 22: Number, coverage and the location of private and community conservancies Source: A conservancies' draft report for TNC provided by Ken Esau, 2022.

Conservation area	Number of conservancies*	Area (ha) covered by the conservancies	Regional associations of conservancies
Southern	29	Amboseli (43,355), Soralo (22,569) Total = 65,924 (1.04%)	Amboseli AET (15), Soralo (4), Athi Kapiti (10)
Tsavo	26	Taita Taveta (340,301), 5.35%	Taita Taveta (26)
Central Rift	36	Maasai Mara (136,512), Rift lakes (46,238), Baringo (30,078.27) Total = 212,828.27 (3.35%)	Maasai Mara (16), Rift lakes (13), Baringo (7)
Western	8	Western (11,109), 0.17%	Western (8)
Mountain	18	Laikipia (246,259.2), 3.87%	Laikipia (18)
Northern	33	NRT Samburu (3,035,038), Logoron (15,154) Total = 3,050,192 (48.00%)	NRT Samburu (32), Logoron (1)
Coast	15	NRT coast (541,075), Pwani (932,505) Total = 1,473,580 (23.19%)	NRT coast (7), Pwani Ecosystems (8)
Northern Eastern	10	Northeastern (926,645), 14.58%	Northeastern (10)
Total	175	6,635,112.67	

There were 41 group-owned conservancies (3%), covering 218,121.88 ha (3%) of conservancies' area. Thirteen conservancies (5%) covering 82,554 ha (1%) of the total area under the management of conservancies were co-managed by different entities. Collectively, conservancies supported 930,000 households and directly provided job opportunities to more than 4,500 conservancy employees. For example, in Maasai Mara, Ksh 369 million was paid in land leases, and another Ksh 71 million was invested in community development by 2015. In the Northern conservation area through the Northern Rangeland Trust, some Ksh 257 million was invested in communities in 2015 (KWCA website, <https://kwakenya.com/>).

Conservancies directly contribute to conservation of wildlife species, such as black and white rhinos, Grevy's zebras, hirola antelopes, wild dogs, and elephants. Sera Conservancy hosts rhinoceros; Ishagbini hosts hirola antelopes; Olchoro hosts white rhinoceroses; Solio, Ol Pajeta, Lewa, and Borana conservancies host black and white rhinoceroses; and Namunyak Reteti hosts elephants. However, conservancies have challenges. The major one is their economic and social ability to sustain themselves and provide benefits to the landowners. To do this, an enabling environment, policy support, government incentives, and capacity building at the conservancy and institutional levels are critical. The registration process for conservancies needs to be expedited, and requirements should be lessened. The government should consider subsidies, enabling policy and legislation,

ii Conservation NGOs and HWC mitigation

Conservation NGOs provide critical support to the government in biodiversity conservation. In 2015, Conservation Alliance of Kenya (CAK) was formed to improve the coordination and engagement with the government and remove duplication of initiatives. There are many NGOs engaged in conservation and HWC mitigation (Table 23). NGOs engage in various activities, such as education and awareness, providing consolation and compensation, research; providing community support and local scout training and employment; supporting carbon credits; providing services (water, infrastructure such as roads and power, and building schools and dispensaries); establishing conservancies and helping build their capacity; establishing grazing, zoning, and spatial plans; providing active species conservation and protection; advancing other compatible livelihood options in communities; and supporting capacity building, policy, and other framework activities to enhance conservation in the country.

In terms of HWCs, conservation NGOs have leased and helped manage and operate conservancies, have recruited, trained and employed community rangers who are critical in involving communities in conservation, monitoring wildlife

and motivational incentives for conservancies like those offered to other critical sectors of the economy. There is also a need to diversify from wildlife-based ecotourism to other compatible land uses, such as beekeeping, sustainable grazing with grazing plans, multiple land uses where spatial planning has been done and this is environmentally possible, carbon credit sale, informed consent fees, and so forth. In terms of containing HWCs, conservancies benefiting from wildlife should be required to have a comprehensive management plan of helping prevent, mitigate and compensate for HWCs occurring within their areas. Although conservancies have provided land for conservation, however, they do have the capacity to actively contain cases of HWC on a regular basis. Involving conservancies in active HWC management is therefore urgently needed, along with a framework on how to effect such a recommendation.

There are an estimated 3,500 community rangers (game scouts) in all the conservancies in Kenya supporting conservation initiatives including mitigation of HWC. However, to effectively manage HWCs, the conservancies need more rangers—especially in expansive and remote areas—to complement activities of the KWS, PAC. Conservancies are also constrained by inadequate budgets mostly funded by philanthropic sources. The funding mechanism to support community conservancies are unpredictable and unsustainable as most conservancies do not raise enough funds of their own to compensate the landowners and develop infrastructure and capacity.

movements, and assisting in preventing HWCs. The support provided by NGOs has helped improve attitudes and local perceptions towards wildlife conservation. Other conservation NGOs are active in providing consolation funds (to prevent wildlife retaliation against specific species). In this respect, elephants and carnivores (lions, hyenas, leopards, and cheetahs) have greatly benefited from NGOs' involvement, as the government compensation process is long. Other NGOs provide education and awareness concerning the importance of wildlife and try to reverse cultural and traditional adverse effects on species, such as lion hunting and using wildlife ceremonial attires like colobus monkey skins. The government should therefore consider providing tax relief, easing the importing of HWC mitigation equipment and encouraging their involvement, especially in establishing actionable HWC mitigation strategies, developing consolation schemes for communities, and creating positive awareness and attitudes of communities towards wildlife. However there is a need to regulate the NGOs in conservation and align their activities to avoid duplication of efforts and skewed funding mechanisms to improve governance and their accountability.

Table 23: Some key conservation NGOs and their activities across KWS conservation areas

Conservation area	County	Conservation NGOs	Conservation activities undertaken
Southern	Nairobi	Stand Up Shout Out (SUSO)	• Stand Up Shout Out is present in 39 of the 47 counties. It deals with good governance, poverty reduction and conservation, youth empowerment, and youth engagement.
		Wildlife Direct	• Wildlife Direct operates in many landscapes, including the Maasai Mara, Amboseli, and Samburu, on wildlife research, wildlife filming, education and awareness, and conservation advocacy.
	Kajiado	Amboseli Trust for Elephants	• The Amboseli Trust for Elephants aims to ensure the long-term conservation and welfare of Africa's elephants in the context of human needs and pressures through scientific research, training, community outreach, public awareness, and advocacy.
		Big Life Foundation	• Big Life Foundation has established a successful holistic conservation model in the Amboseli-Tsavo-Kilimanjaro ecosystem that incorporates wildlife protection, employment of community rangers, support for communities dealing with wildlife raiding crops, conflict mitigation through compensation, and support education.
		Born Free Foundation	• The organisation operates in several landscapes, including Meru, Amboseli, and Maasai Mara, and is devoted to wildlife conservation and animal welfare. It endeavours to protect threatened species and keep wildlife in the wild whilst enhancing the socioeconomic welfare of local communities.
		Elephant Voices	• Elephant Voices aims to ensure a future for elephants by advancing the study of elephant cognition, communication, and social behaviour, and to promote the scientifically sound and ethical management and care of elephants.
		Amboseli Ecosystem Trust	• AET is a not-for-profit umbrella organisation that brings together the local community and governmental, conservation, and developmental stakeholders in the Amboseli ecosystem to drive collective action and innovative collaborations for the well-being of the people, wildlife, and habitats of the ecosystem.
Tsavo	Tsavo	African Wildlife Foundation	• AWF works in Tsavo conservation area and is involved in leasing space for wildlife (corridors), providing conservancies support, researching, publishing educational publications, advocacy, and promoting alternative livelihoods compatible with wildlife conservation.
		Makueni (Kuku Group Ranch)	• Maasai Wilderness Conservation Trust (MWCT) focuses on the community and landscape of Chyulu Hills, home to a critical wildlife migration corridor and habitat reserves, forests, and carbon sinks. It operates and runs programmes in conservation, education, health, REDD+ carbon, livelihoods, and ecotourism to promote sustainable economic benefit from conserving the ecosystem and creating a cutting-edge model of successful community conservation.

Conservation area	County	Conservation NGOs	Conservation activities undertaken
	Taita-Taveta	Amara Conservation	Amara Conservation works to conserve wildlife and critical habitats and to promote sustainable livelihoods through environmental education and capacity building in rural communities, primarily in the Tsavo conservation area. They worked to establish the Mbulia Conservancy and have a presence in all the areas bordering the Tsavo conservation area.
	Taita-Taveta	Tsavo Trust	Tsavo Trust is a field-based, Kenyan not-for profit conservation organisation working to undertake positive and meaningful action in wildlife conservation and community well-being in the Tsavo conservation area.
	Taita-Taveta	Care for the Wild Kenya	Care for the Wild Kenya is an effective wildlife, community, and environmental organisation dedicated to protecting animals from cruelty and exploitation, addressing the issues of habitat destruction, and addressing community needs.
	Chyulu	David Sheldrick Wildlife Trust	The David Sheldrick Wildlife Trust embraces all measures that complement the conservation, preservation, and protection of wildlife. These include promoting anti-poaching measures, safeguarding the natural environment, enhancing community awareness, addressing animal welfare issues, providing veterinary assistance to animals in need, rescuing and hand-rearing elephant and rhino orphans, as well as caring for other species so that they can ultimately enjoy a quality of life in the wild when grown.
Coast	Kwale and Kilifi	Worldwide fund for Nature (WWF Kenya)	WWF has worked in Kenya for over 59 years to improve the lives of the communities and wildlife that call Kenya home. WWF also works in Amboseli, the mountain areas, along the coast, and in Maasai Mara.
	Lamu and Laikipia	The Nature Conservancy	TNC focuses on some of Kenya's most pressing challenges by strengthening governance, diversifying economies, and improving natural resource management.
	Mombasa	Global Environment Facility (GEF) Small Grants Programme	The GEF programme provides grants directly to local communities, including Indigenous people, community-based organisations, and other nongovernmental groups for projects in biodiversity, climate change mitigation and adaptation, land degradation and sustainable forest management, and international waters and chemicals.
	Coast/ Northern Kenya		
	Mombasa	Community Action for Nature Conservation	Community Action for Nature Conservation comprise multi-disciplinary professionals and practitioners motivated and committed to advocating for and contributing to good environmental governance, conservation, and sustainable use of natural resources and responsible development.
	Central/ Southern Rift	Save the Elephants	STE works to secure the future of elephants in Africa. Specialising in elephant research, it provides scientific insights into elephant behaviour, intelligence, and long-distance movements and applies them to the challenges of elephant survival.
	Narok	Friends of Maasai Mara	Friends of Maasai Mara is a community-based organisation working towards a healthy coexistence of people and wildlife in the Maasai Mara ecosystem.
	Narok	Kenya Wildlife Trust	Kenya Wildlife Trust funds data-driven community-supported predator conservation, especially cheetahs and lions, while supporting community-based grassroot projects.

Conservation area	County	Conservation NGOs	Conservation activities undertaken
	Samburu	Grevy's Zebra Trust	The Grevy's Zebra Trust conserves the endangered Grevy's zebra and its fragile habitat in partnership with communities. Its work is rooted in local values, capacity, and action.
Central Rift	Laikipia	Laikipia Nature Conservancy (LNC)	LNC is a dynamic, membership-driven organisation that works to bring sound technical solutions to common land use and conservation challenges, and aims to link public and private services and funding to Laikipia's needs.
	Laikipia	Laikipia Wildlife Forum (LWF) Conservation in Action	LWF is a 10,000-member-strong non-profit membership organisation dedicated to serving the natural resources conservation and livelihood interests of its members in the greater Laikipia area. It supports a variety of Laikipia land-based organisations whose future lies in the sustainable use of its natural resources. LWF focuses on land use and management through supporting forests, rangelands, water, and wildlife.
	Samburu	Ewaso Lions Project	The Ewaso Lions Project is a 100% African wildlife conservation organisation dedicated to conserving lions and other large carnivores by promoting coexistence between people and wildlife in the Samburu National Reserve, Buffalo Springs National Reserve, and Shaba National Reserve of the Ewaso Nyiro ecosystem in Northern Kenya.
Western	Kisumu	Osienala	Osienala creates awareness locally and internationally about the problems facing Lake Victoria while creating structures that would support local communities to become the responsible custodian of their environment and the lake.
	Kisumu	Dunga Ecotourism and Environmental Youth Group	Dunga Ecotourism and Environmental Youth Group is a youth-led organisation working towards the conservation of the environment and promotion of ecotourism. The group undertakes wetland monitoring, bird watching, education and awareness, boat rides, tree planting, and health outreaches.
	Kisumu	Rufford Foundation	The Rufford Foundation project in Kisumu strengthens existing school-based conservation clubs located in communities on or near the shores of Lake Victoria using the spotted-necked otters, hippos, and fish fauna as focal ambassadors. The project contains a self-help component supporting the development of a local wetlands and hippo focus group designed to supplement fishermen's incomes by taking tourists to view the wildlife.
	Kisumu	Ecofinder Kenya	Ecofinder Kenya is run by a group of proactive, experienced, and trained personnel and volunteers as members or officials who in the spirit of community service, collective responsibility, teamwork, environmental stewardship, and volunteerism undertake numerous programmatic interventions headed by team leaders.
	Kisumu	Kenya Voluntary Development Association/	Kenya Voluntary Development Association is an indigenous, non-political membership organisation. Through its Tich-Kouma Conservation Initiative, the association focuses on community sustainable development such as agroforestry, ecotourism, and conservation activities.
	Kisumu	Biogas International (Dunga)	Biogas International specialises in the manufacture and installation of biogas digesters for biogas production for both domestic and commercial purposes.

Conservation area	County	Conservation NGOs	Conservation activities undertaken
Northern	Garissa	Hirola Conservation Programme	The Hirola Conservation Programme establishes and sustains activities that make lasting contributions to the future of hirola antelopes and the local community.
	Garissa/ Wajir/ Mandera	Somali Giraffe Project	The Somali Giraffe Project partners with communities to conserve endangered reticulated giraffes through research and education.
Mountain	Nyeri	Rhino Ark Kenya Charitable Trust	Rhino Ark works to save Kenya's black rhino population in the Aberdare ecosystem.
	Meru	Mount Kenya Trust	The vision of Mount Kenya Trust is to protect the integrity of the Mount Kenya ecosystem for the welfare of all who depend on it. Projects cover a range of themes, including education and awareness, reforestation, anti-poaching, illegal activity monitoring, HWC mitigation, and habitat connectivity.



Species Impacted and their Conservation

7.1 Conservation Status and Wildlife Population Trends in Relation To HWCs

The first comprehensive national wildlife census in Kenya was jointly conducted by KWS, Wildlife Research and Training Institute (WRTI), and Ministry of Tourism and Wildlife, between April to July 2021 and covered >343,380km², about 59% of the Kenya's land mass (Ministry of Tourism and Wildlife, 2021). Over 30 species of marine organisms, birds, and mammals were counted, and overall, there was a notable increase in numbers of what are primarily regarded as charismatic species, including hirola antelopes, elephants, lions, rhinos, giraffes, and Grevy's zebras. But there were notably lower numbers of most of the plains game species. The survey attributed the low numbers to: (a) land use and land tenure changes; (b) the rapid increase in human population and associated aspects, like land demand for farming, infrastructure development, and settlements; and (c) the loss of wildlife habitats due to rampant human encroachment into wildlife use areas and associated inappropriate activities that are incompatible with conservation.

Nationally, elephants, a key species involved in HWCs, had a population of 36,280, with the Tsavo ecosystem being the main stronghold at 14,964 elephants (41.24% of the population). However, that is still far below the historical population of more than 40,000. The Laikipia-Samburu-Marsabit-Meru ecosystem was the second stronghold, with an estimated 7,475 elephants (20.60%); the third was the Maasai Mara ecosystem, with 2,595 individuals (7.15%) (Table 24). Despite the recent increase in elephant population in the country, their conservation status remains of great concern, and the species is listed as endangered. All the large carnivores—lions, cheetahs, leopards, spotted hyenas, and wild dogs—are problematic species, but their dwindling population and conservation status are worrying. In particular, the lion, cheetah, and wild dog are listed as endangered in the country, while the spotted hyena is vulnerable. The decline of lions has been documented across Africa, including Kenya. Reliable counts of large carnivores in the country are scanty, but lions have historically and in the recent past been relatively abundant in Kajiado (Southern conservation area) and Narok (Central Rift conservation area) counties. As of 2021, 2,589 lions were estimated to be found in all the conservation areas. They were more abundant in (a) the Tsavo ecosystem combined with the Southern conservation area, (b) Laikipia-Samburu landscape, and (c) Maasai Mara ecosystem. Smaller populations occurred in (a) the Meru conservation area, (b) Lake Nakuru National Park, and (c) South Turkana.

KWS is currently implementing the second national recovery and action plan for lions and spotted hyenas (2020–2030). Despite the lion conservation gains that have been achieved,

there has been widespread persecution of the species in its strongholds. For example, between 1998 and 2004, 87 were killed by the Maasai outside Nairobi National Park (Frank et al., 2006). These authors also documented that between 2001 and 2006, 108 lions were killed in the Amboseli-Tsavo ecosystem due to HWCs; however, that may have been an underestimate. This underpins how serious HWCs are to the future of not just lions but many other wildlife species that are persecuted daily and annually in all the conservation areas.

Unlike for other large predators, the spotted hyena population was relatively higher. The 2021 estimate was approximately 5,147 across the country (Table 24). But the survey didn't document the population in each of the conservation areas. However, prime areas where the species was abundant were the Southern and Tsavo landscapes juxtaposed to the northern part of the Coast conservation area towards the Kenya-Somalia border. This was followed by the Mountain conservation area and parts of the Northern conservation area towards Lake Turkana and the Kenya-Ethiopia border. Over 1,000 cheetahs and 865 wild dogs were reported in the 2021 census, but as with the spotted hyenas, there were no estimates on their population in every conservation area (Table 26). Nonetheless, it has been documented that the population trend of these species over the years has continued to put them at risk of being pushed into extinction unless effective and appropriate conservation actions are used. Given their natural vulnerability, there's an urgent need to halt further decimation of the species and in particular secure their natural habitats due to their expansive home ranges and landscape requirements.

The hippopotamus, eland, common zebra, and Cape buffalo are extensively involved in HWCs. Hippos are feared by many communities wherever they are found and have been documented to cause considerable crop damage, human deaths, and serious injuries each year. The species is mostly found in large numbers in the Maasai Mara ecosystem, with approximately 534 (30.20% of the population), followed by Tsavo, with 518 (29.30%) (Table 24). However, nationally the hippo is listed as a species of least conservation concern. The common zebra was the most abundant species, with a population of 121,911, followed by the Cape buffalo (41,659), and eland (13,581). These species were widely distributed. The latter was mainly found in large numbers in the Amboseli-Magadi ecosystem with 4,274 (31.47% of the population) and the Tsavo conservation area, with 4,635 (34.13%). Cape buffaloes were largely found in the Maasai Mara ecosystem with 11,604 individuals (27.85% of the population), followed by the Laikipia-Samburu-Marsabit-Meru ecosystem (8,999 individuals or 21.60%) and Tsavo area (8,501 individuals or

19.33%) of the population. On the other hand, the common zebra was abundant in the Maasai Mara ecosystem with an estimated 32,358 individuals (26.54%), 28,046 individuals in the Amboseli-Magadi ecosystem (23.01%) and the third highest population were in the Laikipia-Samburu-Marsabit-Meru landscape with 24,507 individuals (20.10%) (Table 24). While the population of these most abundant species is good from a conservation perspective, the species will nevertheless continue to subject communities cohabiting with them to relentless conflicts. These species require a lot of space for ranging, and as the space and habitats they use diminish and become degraded by human activities, conflicts between them and communities will escalate.

The International Union for Conservation of Nature has classified the spotted hyena and lion as vulnerable and species of least concern, but in Kenya, lions are categorised as endangered due to their low numbers (estimated at approximately 2,000) (Mio T W, KWS, 2020). The spotted hyena was categorised as vulnerable due to its declining population and range reduction. Currently, the two species are present in the Laikipia-Samburu ecosystem, Nairobi-Athi-Kapiti ecosystem, Nasalot-Rimoi-South Turkana ecosystem, Lamu ecosystem, Maasai Mara ecosystem, Tsavo ecosystem, Meru conservation area, Amboseli-Magadi ecosystem, and Naivasha-Nakuru ecosystem.

Opinions on population status and trends of key species involved in human-wildlife conflicts varied across the conservation areas. These critical species include lions,

leopards, hyenas, elephants, baboons, African wild dogs, hippopotamuses, Cape buffaloes, common zebras, and crocodiles.

- **Lions:** In the Southern, Central Rift, and Mountain conservation areas, the lion population was reported to be increasing, while in Tsavo, their numbers have declined.
- **Spotted hyenas:** The population of spotted hyenas was medium in the Southern conservation area, high in Central Rift, and very high in Mountain conservation area. Their numbers were reported to be increasing in all three areas.
- **Cheetahs:** The population of cheetahs was low in Southern conservation area and decreasing. Their numbers were also low in the Mountain conservation area, but on the rise. In the Central Rift conservation area, cheetah numbers were reportedly increasing.
- **Leopards:** Leopard numbers in Western, Tsavo, Northern, and Eastern and conservation areas were characterised as low by stable. The Mountain conservation area also had low numbers, but the population is reportedly decreasing.
- **African Wild Dogs:** In the Tsavo and Mountain conservation areas, the wild dog population was low but stable. Their numbers in Eastern conservation area were also low and unfortunately declining.

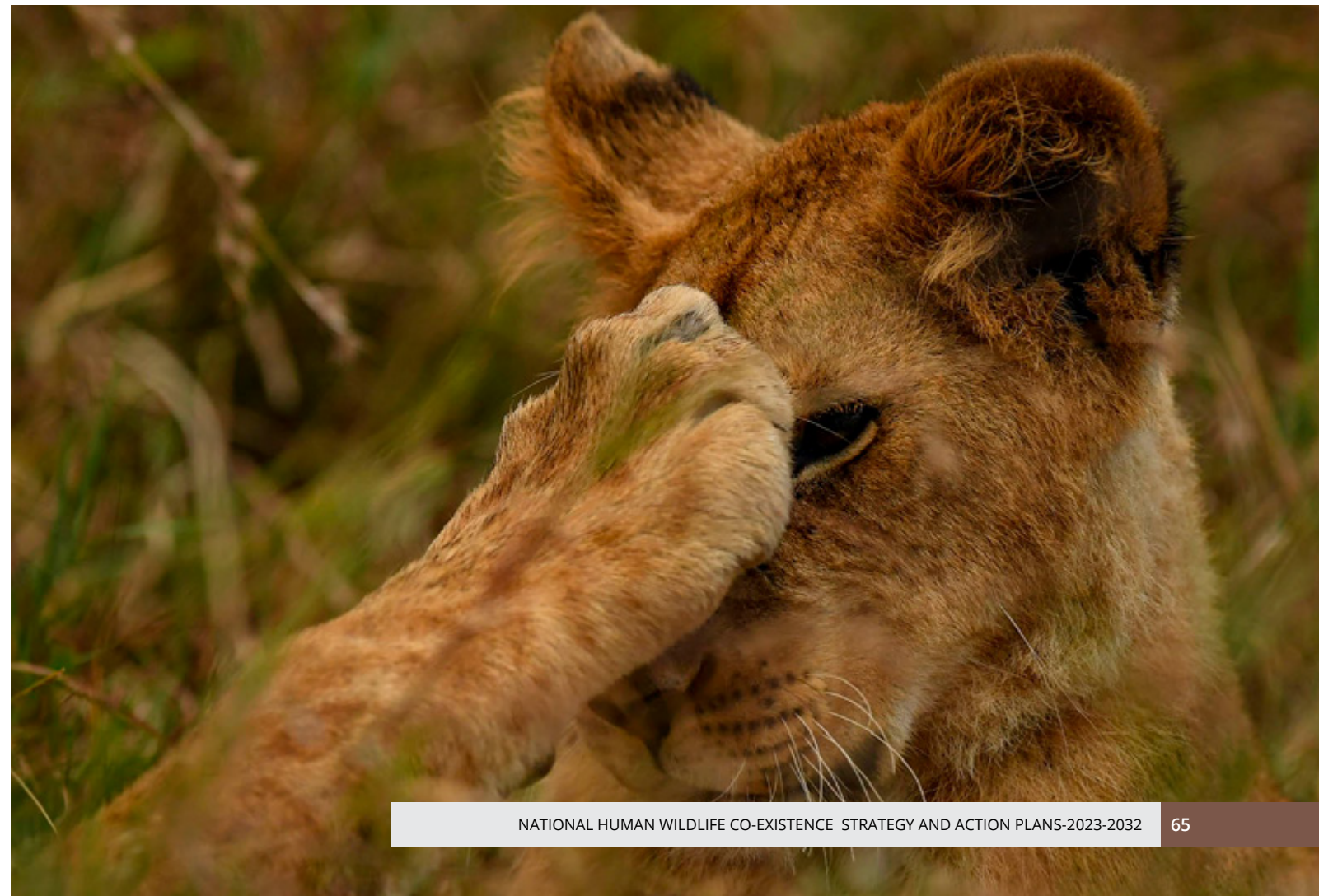


Table 24: Population size of wildlife species involved in HWCs per 2021 national wildlife census

Landscape	Population size and national conservation status of wildlife species									
	Elephant	Lion	Spotted hyena	Cheetah	Wild dog	Hippo	Buffalo	Eland	Common zebra	Crocodile
Tsavo ecosystem	14,964 (41.24%)					518 (29.30%)	8,051 (19.33%)	4,635 (34.13%)	17,964 (14.74%)	47 (18.95%)
Amboseli-Magadi ecosystem	1,641 (4.52%)	11	1			97 (5.49%)	537 (1.29%)	4,274 (31.47%)	28,046 (23.01%)	32 (2.99%)
Laikipia-Samburu-Marsabit-Meru ecosystem	7,475 (20.60%)					202 (11.43%)	8,999 (21.60%)	1,543 (11.36%)	24,507 (20.10%)	373 (34.83%)
Maasai Mara National Reserve ecosystem	2,595 (7.15%)					534 (30.20%)	11,604 (27.85%)	1,280 (9.42%)	32,358 (26.54%)	161 (15.03%)
Athi-Kapiti ecosystem						10 (0.57%)	30 (0.07%)	1,054 (7.76%)	11,355 (9.31%)	
Lamu-Lower Garissa ecosystem						171 (9.67%)	3,053 (7.33%)	5 (0.04%)	898 (0.74%)	49 (4.58%)
Naivasha-Nakuru ranches						5 (0.28%)	1,506 (3.62%)	508 (3.74%)	4,886 (4.01%)	65 (6.07%)
National population size	36,280	2,589	5,147	1,160	865	1,768	41,659	13,581	121,911	1,071

From table 24, there are variations in population status of wildlife species in various ecosystems in Kenya resulting to variations in the levels of HWCs per species. To address HWC in various ecosystems in Kenya where wildlife populations are increasing there is a need to expand the space for conservation through community participation, improve monitoring and adopt innovative approaches to address the challenge. In areas with declining wildlife populations

there is need to consolidate wildlife populations to ease their management thus reducing HWC incidences

A critical look at the elephant mortality levels for Amboseli (Table 25) and Tsavo ecosystems (Table 26) making comparisons between natural causes and HWCs related mortalities reveals that HWC is a key factor contributing to elephant mortalities within the two ecosystems.

Table 25: Elephant mortality and causes in the Amboseli landscape (2009–2020)
(Source: KWS Oloitokitok PAC Records)

Year	Elephant age category and proportion (%)	Key locations (ranked) of reported cases of elephant mortality	Cause of mortality and percentage of incidence	Remarks and deductions
2009	Juvenile – 30 (24.59%) Sub-adult – 22 (18.03%) Adult – 70 (31.82%)	Oltukai area, Oldare, Emali Highway, Rombo, Ilmarba, Kitenden, Kimana, Engong Narok	Natural death – 73 (64.60%), PAC action – 2 (1.77%), Poaching – 9 (7.96%), Poisoning – 1 (0.88%), Snaring – 1 (0.88%), Spearing – 21 (18.58%), Unknown – 11 (9.73%)	• More adult elephants died in 2009, followed by juveniles and lastly sub-adults. • Elephant deaths were mainly caused by natural causes, followed by HWC-related causes. • This was during the severe drought in the Amboseli-Tsavo landscape (2007 to 2009).
2010	Juvenile – 8 (30.77%) Sub-adult – 1 (3.85%) Adult – 17 (65.38%)	Oltukai, Kenya-Tanzania border, Oldare, Ilchalai	Natural death – 21 (77.78%), Poaching – 3 (11.11%), Spearing – 3 (11.11%)	• More adult elephants died in 2010, followed by juveniles and lastly sub-adults. • More elephants died of natural causes than HWC-related causes. • This was during the severe drought in the Amboseli-Tsavo landscape.
2011	Juvenile – 1 (10%) Sub-adult – 2 (20%) Adult – 7 (70%)	Oldare, Emali Highway, Olmoti, Lemong'o, Oltuka, Enkii	Natural death – 9 (75%), Poaching – 1 (8.33), Spearing – 2 (16.67%)	• More adult elephants died in 2011, followed by juveniles and lastly sub-adults. • More elephants died of natural causes than HWC-related causes
2012	Juvenile – 2 (16.67%) Sub-adult – 0 (0%) Adult – 10 (83.3%)	Kimana Sanctuary, Murtot, Olmoti, Engong Narok, Elerai, Namelok	Natural death – 7 (50%), PAC action – 1 (7.14%), Spearing – 2 (14.29%), Unknown- 4 (28.57%)	• More adult elephants died in 2012, followed by juveniles and lastly sub-adults. • More elephants died of natural causes than HWC-related causes.
2013	Juvenile – 1 (9.09%) Sub-adult – 0 (0%) Adult – 10 (90.91)	Oldare, Oltukai, Engong Narok, Ilchalai, Kilitome, Isiruai (in Kuku B)	Natural death – 3 (30%), PAC action – 1 (10%), Spearing – 6 (60%)	• More adult elephants died, followed by juveniles and lastly sub-adults. • More elephants died of HWC-related causes, followed by natural causes.
2014	Juvenile – 0 (0%) Sub-adult – 4 (25%) Adult – 12 (75%)	Olorika, Oldare, Esiteti, Ol Donyo Wuas, Kimana Sanctuary, Elerai, Elangata Kaputei	Natural death – 4 (22.22%), PAC action – 2 (11.11%), Spearing – 6 (33.33%), Unknown – 6 (33.33%)	• More adult elephants died, followed by juveniles and lastly sub-adults. • More elephants died of HWC-related causes, followed by natural causes.

Year	Elephant age category and proportion (%)	Key locations (ranked) of reported cases of elephant mortality	Cause of mortality and percentage of incidence	Remarks and deductions
2015	Juvenile – 2 (13.33%) Sub-adult – 2 (13.33%) Adult – 11 (73.33%)	Eselenkei, Kitendeni, Engong Narok, Elerai, Esompe, Oldare, Elangata- Rongai	Natural death – 8 (50%), PAC action – 1 (16.67%), Poaching – 1 (16.67%), Spearing – 5 (31.25), Unknown – (16.67%)	- More adult elephants died, followed by juveniles and lastly sub-adults. - An equal number of elephants died of natural and HWC-related causes.
2016	Juvenile – 1 (8.33%) Sub-adult – 3 (25%) Adult – 8 (66.67%)	Elerai, Oldare, Eselenkei, Ilmariba, Kitenden, Lemong'o, Olpili	Natural death – 1 (6.25%), PAC action – 3 (18.75%), Poaching – 1 (6.25%), Spearing – 3 (18.75%), Unknown – 7 (43.75%)	- More adult elephants died, followed by juveniles and lastly sub-adults. - More elephants died of HWC-related causes than natural causes.
2017	Juvenile – 8 (27.59%) Sub-adult – 3 (10.34%) Adult – 18 (62.07%)	Engong Narok, Eselenke, Lemong'o, Olmoti, Kitiru, Oldare, Ilmariba	Natural death – 17 (56.67%), PAC action – 1 (3.33%), Poaching – 2 (6.67%), Spearing – 4 (13.33%), Unknown – 6 (20.0%)	- More adult elephants died, followed by juveniles and lastly sub-adults. - More elephants died of HWC-related causes than natural causes.
2018	Juvenile – 1 (7.14%) Sub-adult – 2 (14.29%) Adult – 11 (78.57%)	Kitirua, Eselenkei, Kunju, Buko, Ilmarba, Olmoti, Elerai	Natural death – 4 (28.57%), PAC action – 2 (14.29%), Spearing – 6 (42.86%), Unknown – 2 (14.29%)	- More adult elephants died, followed by juveniles and lastly sub-adults. - More elephants died of HWC-related causes than natural causes.
2019	Sub-adult – 1 (25%) Adult – 3 (75%)	Risa, Engong Narok, Eselenkei	Natural death – 2 (50%), Spearing – 1 (25%), Unknown – 1 (25%)	Slightly more adult elephants died than sub-adults.
2020	Sub-adult – 1 (6.25%) Adult – 15 (93.75%)	Elerai, Porini Conservancy, Olmoti, Oldare, Ilmarba, Osewan, Kilunyeti, Ilchalai, Lemomo	Natural death – 6 (37.5%), PAC action – 3 (18.75%), Poaching – 1 (6.25%), Unknown – 6 (37.5%)	- More adult elephants died than sub-adults. - More elephants died of natural causes than HWC-related causes.

Table 26: Elephant mortality due to diverse causes in the Tsavo ecosystem (2002–2019)
(Source: KWS Problem Animal Control Records)

No.	Year	Illegal killing (poaching)	PAC management causes	Natural mortality causes	Unknown causes	Total elephant numbers
1	2002	57.89% (33)	1.75% (1)	33.33% (19)	7.02% (4)	2.25% (57)
2	2003	28.90% (13)	13.33% (6)	53.33% (24)	4.44% (2)	1.80% (45)
3	2004	30% (21)	12.86% (9)	24.29% (17)	32.86% (23)	2.80% (70)
4	2005	36.10% (22)	6.56% (4)	52.46% (32)	4.92% (3)	2.40% (61)
5	2006	31.70% (25)	7.60% (6)	50.6% (40)	10.13% (8)	3.11% (79)
6	2007	25.90% (15)	10.34% (6)	50% (29)	13.79% (8)	2.30% (58)
7	2008	29.11% (23)	11.40% (9)	44.30% (35)	15.20% (12)	3.11% (79)
8	2009	15.81% (52)	1.22% (4)	74.16% (244)	8.81% (29)	12.97% (329)
9	2010	67.90% (55)	1.23% (1)	25.93% (21)	4.94% (4)	3.19% (81)
10	2011	60.75% (65)	5.61% (6)	28.04% (30)	5.61% (6)	4.21% (107)
11	2012	65.85% (135)	2.44% (5)	26.34% (54)	5.37% (11)	8.08% (205)
12	2013	45.70% (133)	1.37% (4)	27.84% (81)	25.10% (73)	11.47% (291)
13	2014	49.42% (85)	1.16% (2)	43.02% (74)	6.40% (11)	6.78% (172)
14	2015	33.07% (42)	1.60% (2)	63.80% (81)	1.57% (2)	5.01% (127)
15	2016	21.80% (37)	1.20% (2)	66.50% (113)	10.60% (18)	6.70% (170)
16	2017	11.11% (39)	1.99% (7)	80.34% (282)	6.60% (23)	13.84% (351)
17	2018	15.83% (22)	0% (0)	79.14% (110)	5.04% (7)	5.48% (139)
18	2019	25% (29)	3.45% (4)	49.14% (57)	22.41% (26)	4.57% (116)
TOTAL		846	78	1,343	270	2,537
33.35%		3.07%	52.94%	10.64%		

7.2 Level of Human Retaliatory Attacks on Declining Wildlife Species Involved in Hwcs and The Impact on their Population

In response to HWCs, communities also act against wildlife, either by targeting species involved or by targeting species merely perceived to be involved. Retaliatory attacks take different forms, including spearing, snaring, general harassment (e.g., using dogs and chasing wildlife), and poisoning. Numerous species were persecuted by communities, but the most targeted across the conservation areas were lions, spotted hyenas, leopards, elephants, crocodiles, Cape buffaloes, hippopotamuses, wild pigs, and primates, especially baboons. Poisoning of large lions and spotted hyenas occurred in the Eastern, Mountain, Tsavo, Southern, and Central Rift conservation areas.

Numerous studies have also shown that retaliatory attacks against wildlife is widespread in the country. For example, Huaping et al. (2019) documented that 2,150 wild animals were killed in the country between 2005 and 2016. The study found that 15 wildlife species involved in conflicts were the most killed (Figure 28), and the commonly targeted species were the olive baboon, Cape buffalo, hippopotamus, crocodile, common zebra, elephant, spotted hyena, and lion. Nonetheless, these results should be interpreted with some caution since reported cases depended on other factors, like farmers’ or locals’ expectations for compensation by MoTW for losses and damages incurred.

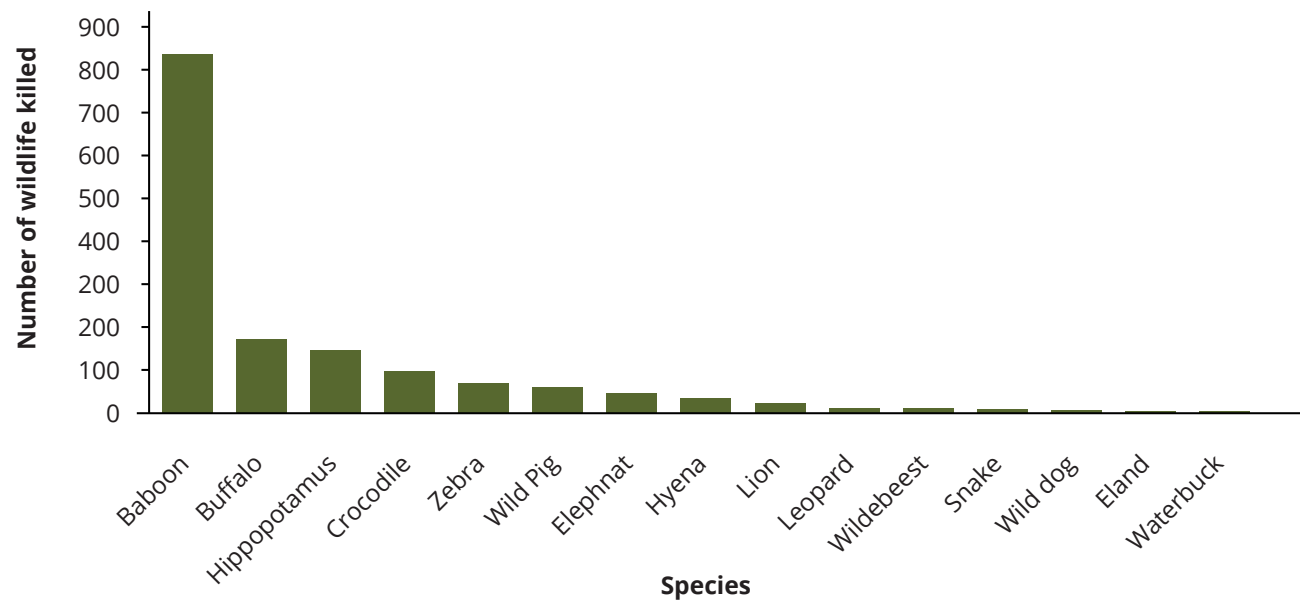


Figure 25: Species involved in HWCs that were most often killed (2005–2016)
(Source: Huaping et al., 2019)

Retaliatory attacks against lions by pastoral communities have also been documented to be prevalent across the conservation areas where the species inhabits. For instance, Ontiri et al. (2018) found that lion-livestock depredation was the only case that provoked high incidences of lion killing by the Maasai in the Amboseli area, Kitengela wildlife dispersal area, and Maasai Mara. However, lion killing was not provoked by livestock depredation by other large predators. Overall,

the probability of killing lions increased as the number of livestock killed by large predators increased in the three conservation areas. Pastoralists in Amboseli were more likely to kill lions than those in Kitengela wildlife dispersal area and Maasai Mara. The study found that retaliatory attacks against lions were not indiscriminate amongst the species of large carnivores. Instead, the Maasai killed lions when they were merely perceived to have been involved in

livestock depredation. The lion population in the country has declined substantially in the last couple of decades, and land use changes and persecution by communities are key threats to the species. Therefore, the prevalence of retaliatory attacks against lions is worrisome and if this is not addressed urgently and appropriately, they are likely to be extinct in the coming decades.

The elephant is the most problematic wildlife species wherever they occur in the country’s conservation areas, causing a lot of pain and significant losses and damages to communities. Attacks on the species are therefore rampant, but their frequency and severity vary amongst the conservation areas. Working in Transmara District, Wakoli and Sitatti (2012) found that between 2000 and 2009, 41 elephants were either killed or injured by communities due to conflicts. Webber et al. (2011) and Hema et al. (2011) noted that hundreds of elephants in Africa are killed each year due to rampant human-elephant conflicts, but that number is much less compared with those killed through poaching. Okello and Kiringe (2018) found that the poaching of elephants for trophies in the Amboseli area (Southern conservation area) was almost eliminated and instead, spearing of elephants by locals due to conflicts had become prevalent and an immediate threat to their survival. They also found that construction of an electric fence by Big Life Foundation in the region to separate farming communities and elephants significantly reduced incidences of retaliatory attacks.

It is therefore evident that actions against wildlife by communities due to human-wildlife conflicts are widespread in the country. This is a key threat to wildlife conservation, especially for those species that have been documented to have declined sharply, for example elephants and all the large predators. Apart from endangering the survival and population size of these species, the conflicts usually create hatred towards large carnivores and elephants, making their long-term conservation a big challenge. Another notable direct impact is the reduction in their movement/ranging patterns, space use, and size/area used, all of which ultimately reduces the population of the affected species. In some instances, the type of retaliatory attack used (e.g., poisoning and snaring wildlife due to conflicts) also negatively effects other non-target species, thereby compromising the survival and conservation of numerous species. In conservation areas where poisoning livestock carcasses due to depredation was rampant (Southern, Tsavo, Central Rift, Western, Eastern, Mountain, and Northern conservation areas), a high mortality of vultures, marabou storks, jackals, spotted hyenas, cheetahs, and mongooses was reported. Similarly, in conservation areas where snaring large herbivores like Cape buffaloes and elephants is common, it has been documented that other species that were not the target have also been injured or killed, including common zebras, gazelles, and antelopes.



7.3 Community Attitudes And Perceptions Towards Declining Wildlife Species And Implications For Their Conservation

A major concern associated with human-wildlife conflicts is that they can greatly change and influence communities attitudes and perception toward wildlife, both of which can become deeply rooted in a society or culture (Redpath et al., 2013). The deep-rooted fear against some wildlife species due to conflicts is usually a reason for communities to harbour negative attitudes or hostility towards those species (Treves, 2009; Dickman, 2010). For example, large carnivores are often believed to be problematic wildlife species because of the perceived severe threat to human livelihoods, even if such experiences are known only through stories or others' experiences instead of through direct experience (Dickman et al., 2014; Inskip et al., 2016). These conflicts often set communities against not only carnivores but also the conservation efforts aimed at protecting those species (Treves and Karanth, 2003). Consequently, understanding the attitudes of people living with and near wildlife is important since it can provide vital information to help forecast the level of success conservation efforts may have, as well as provide a way to assessing conservation actions (Manfredo et al., 2004).

A notable observation in all conservation areas was that communities generally tended to have some degree of negative attitudes towards wildlife, especially large carnivores and elephants. The economic losses caused by carnivores through livestock depredation and by elephants through crop raiding and property damage are likely the cause of such attitudes. Locals have endured a lot of pain caused by elephants. They cause social, physiological, and emotional stress by injuring, maiming, and killing people, and most of those people affected are not compensated. Elephants also disrupt community social life more frequently compared with other wildlife species. Different studies have therefore examined community attitudes, perceptions, and tolerance regarding large carnivores and elephants. For example, Allison et al. (2018) studied locals' attitudes towards the spotted hyena, lion, African wild dog, and leopard due to livestock-carnivore conflicts in Westgate community conservancy, Samburu County. The study found that 66% and 63% of the community members had positive attitudes towards leopards and lions, respectively. But they were negative towards the spotted hyena, with 68% saying that they disliked the species, and 55% saying they disliked the Africa wild dog. Attitudes towards spotted hyenas and lions were mostly proportional to their involvement in livestock depredation. However, the

frequency of livestock predation by carnivores did not always elicit such an expected response, since locals had positive attitudes towards leopards despite their high involvement in livestock depredation but disliked the African wild dogs regardless of their low involvement. This discrepancy in community attitudes could be attributed to perceived risks of depredation, economic losses, and cultural values.

Similarly, Femke et al. (2018) evaluated community attitudes and behavioural intentions towards large carnivores in Maasai Mara (Central Rift conservation area) and found that about 58% of the respondents had positive attitudes towards large predators. This was dependent on the occupation of interviewees, benefits obtained, membership to conservancies, and a perception of ownership of the predators, but it was not dependent on costs incurred due to livestock depredation. Interviewees who were conservancy members tended to have positive attitudes towards large carnivores, but this varied across the conservancies. It appeared that participating in local conservation politics and getting additional benefits from wildlife conservation could influence community attitudes, perceptions, and tolerance levels towards species involved in conflicts. Additionally, procuring employment of the local Maasai in the tourism industry and obtaining benefits from conservation had a positive influence on interviewees' attitudes towards large carnivores.

In yet another study in Ewaso Nyiro area, Mountain conservation area, Georgiadis (2011) assessed attitudes and tolerance levels of communities and large-scale private ranchers towards large carnivores. Over 90% of the ranchers tended to tolerate the presence of predators on their land compared with communities, with approximately 20% of communities indicating they can tolerate spotted hyenas while 40% indicated that they can tolerate other large carnivores on their land. Communities were more likely to tolerate large carnivores on their land if the benefits of having them reached individuals directly versus going to the community as a whole—say, for example, to construct community projects. Willingness to have predators on community land depended on their level of education, with more educated members having a higher tolerance towards predators on their land. Commercial ranchers were found to be more tolerant of livestock losses due to livestock depredation compared with the community. Though the future conservation of large carnivores was better on large-scale private ranches, this was not the case on communally owned land.

Numerous studies have been done on community attitudes and perceptions towards elephants in different parts of the country. For example, in Maasai group ranches around Amboseli National Park, Christine et al. (2013) found that a slight majority (53%) of local community members indicated they would support the presence of elephants on their land while (47%) were not willing to do so. In her study in 1991 in the same group ranches, Kangwana (1993) found similar findings and collectively these 2 studies show relatively stable but still polarised attitudes towards elephants. According to Christine et al. (2013), community members who were opposed to their presence, attributed the attitudes to the various losses and damages they incurred due to living with elephants, mainly crop damage, tree damage, livestock death or injury, human injury and sometimes human death. Okello et al. (2016) also assessed local attitudes towards elephants in the same region focusing on Rombo, Mbirikani, Kimana, Olgulului-Olorashi and Kuku group ranches and the private farms around cultivated areas in the Oloitokitok belt. The study showed that communities disliked elephants, although 70% mentioned that conservation of elephants was important. Again, this dislike towards elephants was attributed to the negative impacts they had on local's socioeconomic welfare.

Kamau (2017) compared local perceptions towards elephants in the Tsavo conservation area, especially in the eastern boundary of Chyulu Hills National Park, along the Nairobi–Mombasa highway in Makueni County and the five communities around Mount Kasigau, Taita Taveta County. The study showed that communities around Mount Kasigau had better attitudes towards elephants than those around the Chyulu Hills National Park. Attitudes towards elephants differed amongst the Kamba living near the eastern boundary of Chyulu Hills National Park from those of the Taita people living around Mount. Kasigau. Largely, positive attitudes and tolerance towards elephants were higher amongst the Kasigau Taita people than the Kamba near the Chyulu Hills. Amongst the Taita people in villages around Mount Kasigau, attitudes towards elephants were mostly shaped or influenced by crop raiding by elephants. In all the study sites, attitudes towards elephants were linked to the perception that communities living amongst elephants were not getting the numerous economic benefits accrued from them. Accordingly, 74% of interviewees in the Kamba community villages mentioned that they never realised any benefits from sharing their land and resources with elephants. They reasoned that revenue generated from elephant conservation in their locality

should be used to undertake various projects that assist the community, like providing bursaries to their children. Lack of compensation for crop damage was important in shaping views about elephants around Chyulu Hills National Park, with 64% of the interviewees mentioning that lack of compensation for crop damage caused by elephants reduced their tolerance towards them. The studies deduced that local perceptions about elephants in the Tsavo conservation area are political and mostly embedded in issues of rights to local livelihoods, access to and control over land, and key natural resources that were used by wildlife and communities.

The outlined case studies clearly demonstrate that living alongside wildlife influences community perceptions and tolerance towards wildlife, and this is due to the negative socioeconomic impacts they experience. Those impacts shape their attitudes towards wildlife, especially species that make them incur considerable livelihood and social losses. It especially lowers their degree of tolerance towards more problematic wildlife. Ultimately, intolerance and negative attitudes forces them to engage in all forms of retaliatory attacks against wildlife. In the long-term, it negatively impacts the population of species involved in such attacks, complicating their conservation efforts. Elephants and large predators are some of the hardest species to conserve in Kenya due to the ranging space they require. They are also amongst the most problematic species due to the substantial damages and losses they subject communities to. The long-term and sustainable conservation of these species largely depends on securing large tracks of community land outside the existing network of protected areas, yet these are the areas where negative encounters with people. Therefore, finding ways to help communities increase their tolerance of elephants and large predators is critical both for their survival and for the survival of long-term conservation in the country. Distributing benefits from wildlife conservation so that they reach individuals, particularly those who tolerate losses from large predators and elephants, is critical to the future of these species on community land. In addition, wildlife conservation approaches in the country must increasingly adopt effective and realistic human-wildlife coexistence strategies with a view of reducing losses and costs associated with living with wildlife.

7.4 Actions That Can Be Deployed/ Used To Enhance Human-Wildlife Coexistence

Stakeholders consulted during the study proposed various actions that can be used to enhance coexistence between wildlife and communities (Table 27). Five key actions were suggested to promote coexistence between large predators and communities: -

- a. Timely compensation and consolation after livestock depredation
- b. Use of predator-proof bomas,
- c. Translocation of problematic large predators
- d. Predator deterrent lights
- e. Community education and awareness

Various actions were also proposed to enhance community coexistence with herbivorous wildlife, especially large species (Table 27). like elephants, common zebras, and Cape buffaloes: -

- a. Securing and gazetting wildlife corridors
- b. Community education and awareness creation
- c. Establishment of more conservancies;
- d. Development of national HWC protocols
- e. Use of land use plans to harmonise development and conservation in the country.

Table 27: Actions to enhance human-wildlife coexistence

Conservation area	For large carnivores	For herbivores
Southern	• Provide compensation and consolation promptly • Use predator deterrence, e.g., lion deterrent lights • Build predator-proof bomas • Increase awareness in affected communities • Prioritise conservation action plans for large carnivores • Develop HWC protocols/guidelines	• Secure wildlife movement corridors and landscape connectivity • Provide water in conservancies • Establish more conservation areas/ conservancies • Construct more electric fences in vulnerable areas • Prioritise species conservation action plans • Develop HWC protocols/guidelines • Create community awareness
Tsavo	• Provide compensation and consolation promptly • Build predator-proof bomas • Translocate problematic large predators • Increase awareness in affected communities	• Erect wildlife barriers • Increase awareness in affected communities
Coast	• Foster community education and awareness • Provide compensation and consolation promptly • Capture and translocate problematic large predators quickly • Provide predator deterrent lights to communities	• Construct physical barriers to deter large species like elephants and Cape buffaloes • Ensure quick response by PAC teams • Demarcate, acquire, and gazette wildlife movement corridors. • Provide water in remote dry areas • Use deterrent mechanisms, e.g., beehive and chili fences • Use modern technology like drones, camera traps, and aerial patrols to monitor wildlife movement

Conservation area	For large carnivores	For herbivores
Central Rift	• Use predator deterrent lights • Provide consolation • Place carnivore traps in all KWS outposts for quick response to problematic large carnivores • Develop community outreach programmes	• Secure wildlife movement corridors • Develop clear compensation procedures for crop raids, human deaths, and injuries
Western	• Introduce wildlife clubs in schools • Translocate problematic large predators • Enhance public education and awareness creation	• Establish KWS outposts in hotspots • Fence off protected areas • Regularly research to understand the nature, impacts, severity, and drivers of conflicts and the best strategies to manage them • Provide water to communities living away from the lake to reduce attacks by crocodiles while fetching water
Northern	• Enhance community education and awareness	• Enhance community education and awareness • Implement land use plans
Eastern	• Use local knowledge to manage some large predators, like leopards • Introduce benefits sharing schemes/programmes in communities • Timely provide compensation and consolation • Provide communities with predator lights to deter lions and leopards	• Introduce benefits sharing schemes/ programmes in communities • Use chili fences and implement beekeeping to ward off predators • Map out and secure wildlife corridors and routes
Mountain	• Build predator-proof bomas • Use predator deterrent lights • Timely provide compensation and consolation • Foster community education and awareness • Secure and protect habitats and home ranges of large predators	• Erect electric fences in HWC hotspots • Enhance wildlife user rights, e.g., beekeeping, and tortoise, ostrich, and crocodile farming • Secure and gazette elephant, Cape buffalo, and common zebra movement corridors and routes



08

Conflict Mitigation Strategies and their Upscaling

8.1 Introduction

Historical context of HWC Management

HWC management in Kenya has gone on for decades but with mixed success. The problem has persisted across the entire country, especially in conservation areas where wildlife populations are abundant. Essentially, HWC management is aimed at reducing the negative impacts arising from human-wildlife interactions and creating favourable or suitable environments for long-term coexistence between people and wildlife. In addition, HWC management is expected to ameliorate the negative attitudes and perceptions of communities towards wildlife, wildlife conservation as a land use, and government-led agencies in charge of wildlife conservation.

Over the years, communities living in wildlife-rich conservation areas have used a wide variety of strategies to deal with HWCs. These have been invented by locals to deal with conflicts arising from either specific species like elephants or multiple wildlife species. Other especially sophisticated interventions, such as the use of electric fences, have

been introduced to communities by KWS, its predecessor institutions, and stakeholders working in wildlife conservation across the country. These stakeholders have continued to assist communities to embrace low-cost mitigation methods and enhance effectiveness of locally invented interventions. More recently, they have developed and applied modern and more technologically advanced strategies like georeferencing using mobile phone platforms. Collectively, the methods used to manage HWCs demonstrate that this problem is multi-faceted and highly dynamic, and requires holistic, strategic, and innovative approaches.

HWC management is done using different approaches and methods (Maingi et al., 2012; Mukeka et al., 2012 and 2018; Mwaura and Manoa, 2016; Kiringe et al., 2016; Ministry of Tourism and Wildlife, 2019) that are broadly grouped into (a) Understanding the conflict (b) Policy (c) preventive strategies, (d) responsive strategies (e) Mitigation strategy financial strategies, and (f) Results monitoring,

- a) Understanding the conflict**
- b) Policy**
- c) Preventive strategies**

These methods are aimed at stopping or preventing HWCs before they occur and include electric fences; land use planning; predator-proof bomas; deterrents (large predator lighting systems, scarecrows, crop guarding, guarding dogs, watch towers, early warning systems); better livestock herding by pastoralists; and education and awareness. Electric fences to manage human-wildlife conflicts are widely used in Africa and other parts of the world (Ngure, 1995; Thouless and Sakwa, 1995; Hoare, 2001). The goal of this method is to prevent or forestall HWC occurrence using either electric or non-electric fences (Ministry of Tourism and Wildlife, 2019). It normally involves building predator-proof bomas to separate communities from myriad wildlife, including the following: (a) mega-herbivores like elephants, buffaloes, and hippos; (b) medium-size species like waterbucks, elands, and greater kudu; and (c) large predators like lions, leopards, cheetahs, and spotted hyenas. Electric fences are usually used in areas experiencing a high prevalence of severe HWCs, such as Amboseli region in the Southern conservation area, Tsavo area, Aberdares area, and Samburu–Laikipia landscapes. For the Amboseli region, for instance, Big Life Foundation, one of the key wildlife conservation NGOs working in the landscape, has constructed slightly more than 100 km of solar-powered electric fencing to prevent human-elephant conflicts (Okello and Kiringe, 2018). In the same region, especially within the group ranches, Born Free has supported numerous Maasai homesteads to prevent livestock depredation by lions and

spotted hyenas by building predator-proof *bomas*. Mwaura and Manoa (2016) found that this method reduced livestock predation by 91% and significantly reduced the time spent guarding livestock at night. Nonetheless, the long-term effectiveness of bomas depends on sustained maintenance to continue their deterrence against large predators at night. Adequate livestock guarding during the day by adults and not children was found to reduce daytime livestock attacks.

In the Tsavos conservation area, stakeholders, including KWS, David Sheldrick Wildlife Trust, and various donors have supported construction of >100 km of solar-powered electric fences on the eastern boundary of Kibwezi Forest and Chyulu Hills National Park and the western boundary of Tsavo East (Ministry of Wildlife and Tourism, 2019). One of the longest conservation electric fences in Kenya—indeed, the world—is the Rhino Ark Aberdare fence, which is nearly 400 km and was completed 28 August 2009. The fence was constructed not only to secure the Aberdare Conservation Area, which covers over 2,000 km², from wanton destruction and encroachment by locals but also to mitigate rampant human-wildlife conflicts. The fence is 7 metres tall and is electrified and wired to 3 feet below the ground to ward off burrowing wildlife species. Its upright posts are hot wired to effectively keep off monkeys and baboons, which are not readily mitigated by typical electric fences due to their behaviour of scaling and manoeuvring around them.

Laikipia County in Northern conservation area is one of the conservation areas in Kenya characterised by a high HWC occurrence. For decades, locals have incurred enormous socioeconomic losses due to the conflicts, including human injury, property damage, and human and livestock death. One method used to address the conflicts is electric fencing, the most recent being a 163 km long 7,000-volt fence that was completed in 2018. The fence was funded by different stakeholders: Space for Giants; the national government through KWS; Laikipia County Government; British Army Training Unit, Laikipia Nature Conservancy, and Laikipia Wildlife Forum. Communities benefiting from the fence are in Kamwenje, Matwiku, Ol-Moran, Sosian, Rumuruti, and Mutara, where cases of invasion by wild animals are rampant.

Despite the durability, effectiveness, and sophistication of electric fences in mitigating human-wildlife conflicts, they have numerous drawbacks, especially the huge amount of money needed to construct and maintain them. For instance, Muruthi (2005) indicated that construction of a 3.3-meter-high electric fence around Aberdare National Park would cost about \$ 20,000 per kilometre, which is quite substantial. The Ministry of Wildlife and Tourism (2019) also outlined the average cost of constructing different types of wildlife fences in the country, ranging from Ksh 1.77 million/km to Ksh 2.73 million/km. It has also comprehensively summarised the status of human-wildlife mitigation fences in all the hotspots across the eight KWS conservation areas. In some instances, they have been documented to shift conflicts to other areas within the same landscape, and elephants easily learn how to outmanoeuvre them. The fences are also very susceptible to theft and vandalism by communities. Further, they are prone to failure when their management is put under target communities. For instance, the failure of the Kimana and Namelok fences in the Amboseli region between mid- and late 2000 was largely attributed to poor ownership and mismanagement by communities who were benefiting from the fences. In the same region, Kiringe and Okello (2018) found that beneficiaries of the Big Life Foundation electric fence were unwilling to own and manage it, and instead preferred that these duties be done by Big Life Foundation. Moreover, most of them were not contributing the agreed annual maintenance fees of Ksh 1,000 per beneficiary. Although there was significant reduction in human-elephant conflicts and the number of retaliatory attacks against elephants after the fence's construction, unwillingness of the beneficiaries to own and contribute to its maintenance is worrisome. Should Big Life Foundation stop overseeing the fence and hand it over to the community, the chances of it failing are very high. In this regard, it's important to ensure prior to construction of electric fences that all the people who live nearby will support its construction and management and will not tamper with it.

In some instances, fences may stop communities from accessing resources like firewood, livestock pasture, timber, water, and medicinal plants, as was seen during this study in Laikipia. This might make them resent construction of the fence and damage it. In situations in which communities have legitimate needs or rights to access important resources, it's critical to work out a way through the fence so they can

continue to access those resources. Moreover, establishing effective and accountable fence management committees comprising local leaders and other key stakeholders is useful in addressing any problems that arise after the fence has been constructed. It is worth noting that an electrified fence will only work and effectively mitigate human-wildlife conflicts if it is well maintained.

In all eight conservation areas, communities used a wide variety of traditional methods to forestall conflicts with wildlife, including beating drums, lighting fires at night, and guarding crops, especially at night. This is consistent with other studies, such as Sitati and Walpole (2006); Walpole and Linkie (2007); Graham and Ochieng (2008); and Ochieng (2009). Collectively, these are used as deterrents aimed at preventing HWCs. Using bees as a deterrent was mostly used in the Tsavo and Mountain conservation areas, while use of fire was common in Central Rift and Mountain conservation areas. Managing conflicts using observations on wildlife movement patterns and their signs was used in six conservation areas: Northern, Eastern, Southern, Tsavo, Coast, and Western. Monitoring changes in local seasons as a means of understanding changes in animals' behaviour was used in the Eastern, Coast, Northern, Central Rift, Western, and Mountain conservation areas. The high application of these two methods in most of the conservation areas suggests they could be effective early warning systems and enable communities to adequately prepare to deter wildlife incursions in their areas. In this regard, they should be studied in detail to assess their efficacy in assisting communities to manage conflicts with wildlife.

Another recent innovation to manage HWCs is the use of mobile phones either by calling or through WhatsApp groups. This method was used in Southern, South Rift, Northern, and Eastern conservation areas. In Laikipia, some stakeholders introduced the "Push to Talk" method using mobile phones to manage crop-raiding by elephants, especially in Ex-Erok, Mwenje, and Rumuruti where this problem was rampant. This technology was found to significantly improve the coordination of responses to human-elephant conflicts in these three areas whilst improving relations between KWS, local communities, private landowners, and the police. This suggests that mobile phones can be used by communities, even those with incomes too low to collectively manage conflicts between them and wildlife. This is an area that should be scaled up in all the conservation areas. Sitati et al. (2005) observed that in mitigating human-elephant conflicts, providing early warnings of possible crop raiding is a very successful deterrent. Effective and timely communication amongst farmers and between farmers and wildlife management authorities can therefore enhance successful management of conflicts with elephants as well as other problematic species.

In the last couple of years, use of community rangers has become prevalent in the country, especially in the Maasai Mara, Amboseli, Tsavo, Laikipia, Western, and Samburu regions. Their engagement has increased in response to the establishment of private and community wildlife conservancies. KWS has continued to work with various county governments, such as those in Pokot, Narok, Samburu, and Turkana, as well as with key conservation stakeholders, e.g., the International Fund

for Animal Welfare (IFAW), Big Life Foundation, Kenya Wildlife Trust, and Northern Rangeland Trust to train community rangers at its law enforcement academy in Voi. This is aimed at enhancing skills and capacity of the rangers. The training has enabled them to undertake a wide range of activities, such as patrolling to ensure wildlife security, monitoring illegal activities threatening wildlife and their habitats, and collecting key wildlife data and information. In addition, they assist communities and KWS rangers in managing human-wildlife conflicts. Overall, use of community rangers has

- d) **Response strategies**
- e) **Mitigation Strategies**

Community awareness, education, and training on HWC mitigation strategies

This is both a preventive and responsive strategy. Awareness creation and education is normally done by KWS and other conservation stakeholders and typically targets school children and adults (e.g., through community meetings and farmers' field days). The goal is to change the behaviour of communities living with wildlife outside protected areas. Change in behaviour is expected to reduce their vulnerability to human-wildlife conflicts and the associated negative impacts affecting the wildlife and communities. Moreover, it can encourage the adoption of land uses and livelihoods that are compatible with wildlife conservation, which then reduces the occurrence of human-wildlife conflicts. They are also likely to embrace wildlife conservation as a suitable land use and livelihood option. Events furthering education and awareness are also used as platforms for training and helping communities in coping with human-wildlife conflicts.

- f) **Results Monitoring**
- ### Financial strategies

This form of human-wildlife mitigation approach is designed to enhance the local community's tolerance levels for losses and damage caused by wildlife and reduce retaliatory attacks against the wildlife species involved (Muruthi, 2005). According to the Wildlife Conservation and Management Act (2013 and revised 2019), the national government is expected to compensate for permanent injuries leading to disability, deaths, or property damages arising from conflicts. Such claims are launched with the County Wildlife Conservation and Compensation Committee. Compensation for any citizen killed by wildlife is Ksh 5 million, while cases of injury resulting in permanent disability are compensated at Ksh 3 million. Any person who incurs damages or losses of their property, livestock, or crops should make a claim with the CWCCC for verification and advice regarding compensation. Such compensation is normally done after valuation of the loss based on the prevailing market rates. However, there must be sufficient evidence showing that a person making such a claim has put in place adequate measures to protect their

been applauded as a big milestone across the country as a means of providing additional local personnel to augment work done by KWS rangers, especially in enhancing wildlife security and managing conflicts between communities and wildlife. Given that KWS rangers and other critical resources needed for effective wildlife protection and conflict mitigation are inadequate for the vast areas they need to cover, not to mention the numerous and diverse wildlife issues they are expected to deal with, more community rangers are necessary, especially in conflict hotspots.

A wide range of stakeholders are involved in training and managing human-wildlife conflicts across the country, including the KWS as the lead government agency in charge of wildlife conservation. The Southern conservation area (especially in Amboseli area) and Tsavo conservation area have the highest number of NGOs involved in empowering communities to deal with conflicts between them and wildlife. Coincidentally, these are key HWC hotspots in the country and are endowed with an abundant and diverse assemblage of large wildlife species, including elephants, lions, and spotted hyena—all of which are some of the most problematic species with regards to conflicts with communities. This partly explains why there's such a high presence of organisations focusing on wildlife conservation and helping communities coexist with wildlife.

property, livestock, or crops from damage by wildlife or that the land use being practiced by the claimant is compatible with the recommended landscape or ecosystem-based management plan for the area. Those dissatisfied with the committees' decision can appeal first to the National Environment Tribunal (NET) and then to the Environment and Land Court (ELC) within 30 days after receiving the decision.

Over the years, different types of consolation schemes have been established amongst the pastoral communities, such as in the Maasai Mara, Amboseli, Samburu, and Laikipia. They primarily target compensation for conflicts between humans and large predators, especially with lions, spotted hyenas, and leopards. Husbandry is highly regarded amongst pastoralists, playing a key role in their livelihoods, traditional ceremonies, and men's social standing both in the community and the larger society. Accordingly, livestock depredation by wildlife elicits emotional reactions amongst pastoralists, leading to retaliatory attacks. This has increasingly posed

a threat to the future and long-term conservation of the predators involved. Big Life Foundation, Lion Guardians, and the Maasai Wilderness Conservation Trust are involved in large predator's consolation schemes in Amboseli area, and despite the challenges they face, they have been instrumental in reducing retaliatory attacks by the Maasai. Such schemes are used elsewhere in Africa and other parts of the world but with mixed success. Most have been found to be deficient due to high transaction costs (Saberwal et

Benefit sharing

Human-wildlife conflicts are a socioeconomic burden to communities outside protected areas, creating a bad environment for the long-term conservation of wildlife and their envisioned coexistence. For affected communities to appreciate wildlife, its conservation, and its value to them and the country, tangible benefits are necessary to enhance their socioeconomic well-being. They should also be involved in wildlife conservation and management and, where possible, draw financial benefits from wildlife on their land through earnings from tourism. Across the conservation areas, KWS through the Community Wildlife Service supports community programmes mainly in health, education, and water projects (Ministry of Tourism and Wildlife, 2019). The need for these projects is usually initiated by communities to ensure ownership and their sustainability after they are

Community conservancies

Historically, local communities were locked out of wildlife conservation, yet it has been documented that more than 70% of the country's wildlife resides outside protected areas for most of the year. This is partly the reason communities resent wildlife and its conservation, instead viewing it as a state resource. But this narrative started to change in the mid-1990s when community sanctuaries like the Kimana Sanctuary in Amboseli were established. Since then, this conservation model has gained popularity across the entire country, and today there are 167 community-based (private and communal) wildlife conservancies. These cover over 6.35 million ha, or 11%, of Kenya's land mass, and an estimated 930,000 households benefit directly from them. Moreover, these conservancies have continued to create employment opportunities, with an estimated 4,500 employees, most of whom are community members. Apart from playing a pivotal role in transforming local socioeconomic livelihoods, the conservancies act as critical wildlife use areas outside protected areas. They promote landscape ecological connectivity and, in some

Responsive strategies

The rationale of this strategy is to manage or contain problematic wildlife species. This is done by KWS personnel under its PAC unit. PAC personnel are found in all the protected areas and outposts across all eight conservation areas. The main function of the unit is to drive away wild animals

al., 1994; Blanco, 2003), delayed payments (Fourli, 1999; Madhusudan, 2003), mistrust, lack of transparency, and inadequate funds to compensate all the affected community members (Montag, 2003; Western and Waithaka, 2005). In view of this, conservation practitioners find consolation schemes to be cumbersome, fraudulent, and inadequate in meeting their objectives (Treves et al., 2003).

handed over. Water projects like shallow wells, water tanks, boreholes, and livestock watering pans are also done to enhance easy access to this critical resource by households. KWS views education of children living in communities outside protected areas as a game changer on many fronts, including empowering communities to better conserve wildlife resources on their land and encouraging livelihood options that don't precipitate human-wildlife conflicts. To that end, it has continued to support programmes such as the construction of classrooms and school administration blocks, and the issuance of bursaries to needy children in secondary schools, colleges, and universities. Ultimately, all these benefits extended to communities are geared towards improving their socioeconomic welfare despite the challenges they face from coexisting with wildlife.

cases, act as wildlife movement corridors. They also assist in reducing human-wildlife conflicts and human encroachment into wildlife habitats, thereby ameliorating the occurrence of human-wildlife conflicts. Some play an important role in conserving threatened and endangered species like elephants, wild dogs, Grevy's zebras, white and black rhinos, and hirola antelopes. Despite the current benefits associated with community conservancies, most of them still face the challenge of being economically viable, especially due to their high reliance on tourism, which is extremely fragile and unpredictable. Others, especially those in the Maasai Mara and Amboseli, compete with numerous more lucrative land uses, like irrigated commercial agriculture, whose financial returns are better than those from tourism. It should suffice to say that the future of community conservancies is highly uncertain, and unless innovative economic ventures are developed, their reliance on tourism as a key source of revenue will lead to their collapse.

whenever there's a conflict between them and communities. They also use various deterrence approaches against wildlife whenever a need arises, such as use of thunder flashes to scare away wild animals from community land. When some individuals of specific species become too problematic, the

unit can eliminate them by shooting them, or by capturing and translocating them. Translocating and collaring large predators like lions, spotted hyenas, cheetahs, and leopards are commonly done in the Southern, Western, Eastern, and Mountain conservation areas. The effectiveness of this

method in mitigating HWCs was found to be average. This means it can be used as a management strategy for conflicts arising from these predators but only in conjunction with other suitable methods used by locals.

Livestock husbandry and changes in farming practices

Crop raiding and livestock depredation experienced by communities living outside protected areas results in enormous economic losses for households. It also threatens household and community food security while precipitating retaliatory attacks against wildlife, especially the species thought to be involved. It has been shown that by embracing better livestock husbandry, such as using adults to herd livestock instead of children and securing livestock in predator-proof bomas or enclosures at night significantly minimises livestock depredation by large carnivores. Accordingly, conservation organisations working in pastoral communities like Maasai Mara, Amboseli, Tsavo, Samburu, and Laikipia have continued

to train communities on better livestock husbandry strategies. This has significantly reduced the prevalence of livestock depredation and retaliatory attacks against large predators. In addition, communities living near water bodies infested with crocodiles are normally advised to avoid taking their livestock to such areas either for watering or in search of pasture. Good livestock husbandry also entails herders being vigilant when taking care of their animals so that they can easily notice and chase away predators. Community members involved in farming activities are usually advised to vary the planting time and, where possible, to plant crops that are less attractive to wild animals.

8.2 Suitability And Effectiveness Of Mitigation Strategies In Reducing Human-Wildlife Conflicts

From discussions with stakeholders during field visits of all the conservation areas, communities, KWS, and other stakeholders used a variety of methods to mitigate human-wildlife conflicts (Table 28). Lions, spotted hyenas, cheetahs, and leopards were the most problematic large predators, with elephants, Cape buffaloes, common zebras, and elands being some of the more problematic herbivores in all the conservation areas. Except in the Northern and Mountain conservation areas, conflict management for large predators was mainly done building predator-proof bomas. This indicates that this method is more effective compared with others. This is corroborated by Mwaura and Manoa (2016), who found that predator-proof bomas significantly reduced human-large-predator conflicts in the Amboseli area. Translocation was the second most frequently used method to manage conflicts with from large predators. This method was used in six conservation areas: Southern, Central Rift, Coast, Tsavo, Western, and the Mountain. Use of predator lights was the third most commonly used strategy and was applied in Eastern, Central Rift, and Southern conservation areas.

The level of usage of human-large-predator mitigation methods varied across the conservation areas, with the lowest use being in the Coast conservation area, which scored 1.13 ± 0.54 (very low usage). The highest was in the Southern conservation area, with a score of 2.56 ± 0.13, followed by Mountain conservation area at 2.52 ± 0.02, and

lastly the Northern conservation area at 2.02 ± 0.34 (Table 28). Overall, usage of this method ranged from very low to average/medium. This might be due to the high cost of constructing and maintaining predator-proof bomas. The relatively high usage of bomas in the Southern and Northern conservation areas is attributed to the financial support given to households by conservation organisations working in the areas when constructing them. A household in need of constructing a predator-proof boma contributes a certain percentage of the total construction cost, while the rest is provided by the conservation organisations. Households are also offered training on how to maintain the bomas to sustain the effectiveness.

Performance of the methods used to mitigate human-large-predator conflicts varied across the conservation areas, with the highest effectiveness score being 3.71 ± 0.30, followed by a score of 3.50 ± 0.00, 3.42 ± 0.36 and 3.14 ± 0.35 for Coast, Southern, and Mountain conservation areas, respectively (Table 28). Low scores were found in the Northern conservation area (2.64 ± 0.29), followed by Tsavo at 2.67 ± 0.36. These results indicate that the effectiveness of the methods varied from average/medium to almost high, but overall, their performance was average. This may partly explain why human-predator conflicts are still prevalent in all the conservation areas despite the various strategies that have been employed by communities and

other stakeholders. There's therefore an urgent need to either support communities to construct predator-proof bomas (especially where conflicts are prevalent and severe) due to their high level of deterrence against large predators, or to develop other effective methods.

Table 28: Expert opinions on mitigation strategies used in HWCs in all the conservation areas and their effectiveness (*1 = Very low 2 = Low 3 = Average / medium 4 = High 5= Very high)

Conservation area	Mitigation strategies used against wildlife species involved in HWCs	Score on effectiveness of the strategies (Mean ± SE*)	Score on how widely the strategies were used (Mean ± SE*)
Southern	Large carnivores: Lions, spotted hyenas, cheetahs, and leopards (Building predator-proof bomas; guarding; using predator lights; translocating, trapping, or collaring the animal; creating awareness; using dogs; improving compensation)	3.10 ± 0.25	2.75 ± 0.25
	Herbivores: Elephants, Cape buffaloes, elands, and common zebra (Securing wildlife corridors; using electric fences; providing water to wildlife in remote areas; using fires; using beehive fences; guarding crops; making loud noises, e.g., blowing a vuvuzela)	3.42 ± 0.36	2.56 ± 0.13
Tsavo	Large carnivores: Lions, spotted hyenas, cheetahs, and leopards (Building predator-proof bomas; trapping and translocating the animal)	2.67 ± 0.36	1.65 ± 0.36
	Herbivores: Elephants, Cape buffaloes, elands, and antelopes (Using electric fences)	3.42 ± 0.36	2.45 ± 0.13
Coast	Large carnivores: Lions, spotted hyenas, cheetahs, and leopards (Using dogs; trapping and translocating the animal; building predator-proof bomas)	3.50 ± 0.00	1.13 ± 0.54
	Herbivores: Elephants, Cape buffalo, elands, and antelopes (Using electric fences; using thunder flashes; making noise using banging debes)	4.25 ± 0.48	1.78 ± 0.24
Central Rift	Large carnivores: Lions, spotted hyenas, cheetahs, and leopards (Using predator lights; trapping and translocating the animal; building predator-proof bomas; guarding)	2.75 ± 0.41	1.52 ± 0.39
	Herbivores: Elephants, Cape buffaloes, and common zebras (Scaring the animal; using beehive or electric fences; growing chili and pepper; using thunder flashes; translocating the animal)	3.40 ± 0.45	2.11 ± 0.28

Conservation area	Mitigation strategies used against wildlife species involved in HWCs	Score on effectiveness of the strategies (Mean ± SE*)	Score on how widely the strategies were used (Mean ± SE*)
Western	Large carnivores: Lions and spotted hyenas (Trapping and translocating the animal; using dogs; building predator-proof bomas)	2.90 ± 0.41	1.66 ± 0.41
	Herbivores: Sitatungas, duikers, hippos, and wild pigs: (Making noise using iron tins to scare the animals away; using fire; digging trenches and ditches (mainly for elephants); using thunder flashes)	3.67 ± 0.40	1.89 ± 0.43
Northern	Large carnivores: Lions, spotted hyenas, cheetahs, and leopards: (Using PAC teams; making loud noises using debes to scare animals away)	2.64 ± 0.29	2.02 ± 0.34
	Herbivores: Elephants, Cape buffaloes, and common zebras (Using electric fences; trapping and translocating problem animals)	3.71 ± 0.27	2.15 ± 0.67
Eastern	Large carnivores: Lions, spotted hyenas, cheetahs, and leopards (Collaring animals for monitoring; building predator-proof bomas or predator lights; using dogs)	3.71 ± 0.30	1.89 ± 0.37
	Herbivores: Elephants, Cape buffaloes, and common zebras (Guarding; using wildlife barriers; trapping and translocating the animal)	2.58 ± 0.42	1.73 ± 0.48
Mountain	Large carnivores: Lions, spotted hyenas, cheetahs, and leopards (Trapping and translocating the animal; using fire; using dogs)	3.14 ± 0.35	2.52 ± 0.20
	Herbivores: Elephants, Cape buffaloes, and common zebras (Using electric fences; zoning out wildlife movement and migration corridors; using chili and pepper; digging trenches; using beehive fences)	2.39 ± 0.20	2.74 ± 0.25

Mitigating conflicts associated with elephants, common zebras, Cape buffaloes, and hippopotamuses were also done using various methods (Table 28). Most were simple deterrents like using fire, making noise (shouting or hitting metallic objects), guarding property (either using people and dogs), and using scarecrows. These methods are designed to repel wild animals or scare them away and the deterrents are either acoustic (loud or specific sounds) or visual (scarecrows and fire). Fire was commonly used in the Southern, Tsavo, and Western conservation areas,

while beehives were used in the Southern, Tsavo, Central Rift, and Mountain conservation areas (Table 28). Guarding property either by locals or dogs was more common in the Southern, Tsavo, Eastern, and Central Rift conservation areas. Another commonly used deterrent was making noise to keep or scare away wild animals and was mostly used in the Southern, Tsavo, Coast, and Western conservation areas. According to Parker et al. (2007), noise deterrents are widely used to scare away elephants, but unfortunately, they quickly get used to it. For more advanced mitigation

methods, electric fences were used in all conservation areas except the Western conservation area, while using thunder flashes was used by either KWS or community rangers. That method was common in the Tsavo, Southern, Central Rift, and Coast conservation areas. Translocation of problematic animals was used in the Central Rift, Eastern, and Northern conservation areas. These findings show that most methods used by locals to manage conflicts with wildlife are usually simple, cheap, and easy to use compared with the more advanced methods. They also show that HWC mitigation requires different approaches since none of them can fully and effectively manage these problems.

The frequency of using mitigation methods to manage conflicts with elephants, hippos, common zebras, and elands varied across the eight conservation areas (Table 28). Higher frequency occurred in the Mountain conservation area, with a score of 2.74 ± 0.25, followed by the Southern and Tsavo conservation areas, with scores of 2.56 ± 0.13 and 2.45 ± 0.13, respectively. The Eastern, Coast, and Western conservation areas used mitigation methods less frequently, with scores of 1.73 ± 0.48, 1.78 ± 0.24 and 1.89 ± 0.43, respectively. Tsavo and Southern conservation areas are wildlife conflict hotspots in the country, and to manage these problems, a lot of conservation organisations have a very strong presence

and are actively involved in management of the conflicts in collaboration with KWS and local communities. This may have partly contributed to the relatively high adoption and use of various mitigation methods by the locals compared with other conservation areas where such organisations were either absent or very few.

Method effectiveness also varied from one region to another (Table 28), the highest score being in the Coast conservation area, which had a score of 4.25 ± 0.48 (high effectiveness). Effectiveness in the Northern and Western conservation areas was medium, at 3.71 ± 0.27 and 3.67±0.40, respectively. The lowest level of effectiveness of methods used was in the Mountain conservation area, which had a score of 2.39 ± 0.20, followed by Eastern at 2.58 ± 0.42. Overall, usage of these methods varied from very low to average/medium indicating low application of these methods despite their simplicity and low cost. This may be partly attributed to the relatively low to average performance of the methods, which makes some community members resistant to using them or, if they do, they may be inconsistent in using them. The relatively high effectiveness score of the mitigation methods in the Coast, Tsavo, and Northern conservation areas may be attributed to widespread use of more advanced methods, especially electric fences and thunder flashes.

8.3 Mitigation Strategies, Their Reliability, And Animal Learning

The reliability of methods used to manage human–large-predator conflicts varied amongst the conservation areas (Table 29). Predator-proof bomas were the most reliable, with 100% reliability in the Southern, Tsavo, and Mountain conservation areas. Their performance was also high in the Northern (80%), Eastern (80%), Coast (60%), and Western (60%) conservation areas. It was lowest in the Central Rift conservation area at 20%. Translocation of large predators was noted to be more reliable, with a performance percentage of 80% in the Northern conservation area, 70% in the Mountain conservation area, and 60% in the Western conservation area. Its reliability was lowest in the Tsavo and Central Rift conservation areas at 20% each. Consolation schemes to compensate communities for livestock lost to large predators was also used to ameliorate the negative impacts arising from depredation. However, its reliability was much lower compared with the translocation of predators and use of predator-proof bomas. Its percentage reliability was highest in the Southern and Northern conservation areas at 40% each and lowest in the Western conservation area at 20%. These findings show that of the methods used to manage conflicts between communities and large predators, use of predator-proof bomas was the most reliable. This corroborates the study by Mwaura and Manoa (2016), which showed that

predator-proof bomas were better and more effective in managing conflicts between large predators and the Maasai in the Amboseli area.

Across the conservation areas, the ease at which large predators learnt to cope with various mitigation methods ranged from 2.71 ± 0.34 in Tsavo to 3.33 ± 0.63 in Central Rift (Table 29). In the Southern, Central Rift, Northern, Eastern, and Mountain conservation areas, it was average/medium (range 3.00 ± 0.26 to 3.33 ± 0.63). It was relatively low in Western (2.77 ± 0.78) and Tsavo (2.71 ± 0.34) conservation areas. These findings show that large predators easily learn to circumvent most of the methods used to deter them. This is a significant obstacle to long-term and sustainable mitigation of human–large-predator conflicts in the country.

The reliability of methods to mitigate crop raiding by herbivorous wild animals (e.g., elephants, common zebras, antelopes, elands, and Cape buffaloes) also varied amongst the conservation areas, ranging from 20% (e.g., for using fire, making loud noises to scare away animals, growing chili fences, and guarding) to as high as 100% for using patrols by KWS PAC and community rangers. In six conservation areas—Southern, Tsavo, Central Rift, Northern, Eastern, and Mountain—reliability of electric fences was very high, ranging

from 60% in Eastern and Northern conservation areas to 93% in the Southern conservation area, 80% in the Tsavo conservation area, and 90% in the Mountain conservation area (Table 29). Dependability of translocating problematic animals was highest in the Mountain conservation area at 90%. In Western conservation area, it was 80%, and in Eastern, 60%. It was lowest in the Tsavo, Central Rift, and Coast conservation areas at 20% each. Mitigation of elephant conflicts using beehive fences was highest in the Northern and Eastern conservation areas at 90% each, followed by the Southern and Mountain conservation areas at 60% each, and lowest in the Central Rift conservation area at 40%. Reliability of chili fences to manage elephant conflicts was highest in the Northern conservation area at 72%, and lowest in the Eastern and Central Rift conservation areas at 35% and 20%, respectively.

Collectively, these results show that use of electric fences as a mitigation strategy against large wildlife species is the most reliable method, followed by translocation of problematic animals. Nonetheless, the two approaches are difficult to undertake and require a lot of financial resources compared with other methods. Ease of learning the various methods used to mitigate crop raiding varied from one region to another, ranging from 2.56 ± 0.13 in Tsavo conservation area to 3.34 ± 0.42 in Coast conservation area and 3.34 ± 0.56 in the Mountain conservation area. Generally, learning in all the conservation areas was average/medium, showing that across the eight conservation areas, chances that crop raiding animals will circumvent mitigation methods is relatively high. This is worrisome and a big challenge to the envisioned long-term containment of occurrence of crop raiding conflicts in the country.

Table 29: Expert opinions on performance/reliability of HWC mitigation strategies and ease at which wildlife master those strategies (*1 = Very low 2 = Low 3 = Average / medium 4 = High 5= Very high)

Conservation area	Mitigation strategies in HWCs and their percentage performance (reliability)	Ease at which wildlife species learn and get used to the strategies (ME ± SE*)
Southern	Livestock predation: Building predator-proof bomas (100%); shining lion deterrent lights (60%); providing compensation (40%); creating awareness (40%); using traps (60%); using ranger patrols (60%); and guarding property (100%)	3.14 ± 0.40
	Crop raiding: Establishing conservancies and securing wildlife movement corridors (70%); guarding at night (90%); providing water (60%); using electric fences (93%); patrolling by community rangers (100%); increasing awareness (40%); providing compensation (60%); making loud noises (20%); using guard dogs (60%); collaring (100%); using beehive fences (60%)	3.24 ± 0.24
Tsavo	Livestock predation: Building predator-proof bomas (100%); using traps (60%); collaring (20%); translocating problem animals (20%)	2.71 ± 0.34
	Crop raiding: Using electric fences (80%); erecting wildlife barriers (60%); collaring (20%); translocating problem animals (20%)	2.56 ± 0.13
Coast	Livestock predation: Using electric fences (100%); building predator-proof bomas (60%); trapping and collaring problem animals (20%)	3.00 ± 0.38
	Crop raiding: Using wildlife barriers like ditches (40%); collaring or translocating problem animals (20%)	3.34 ± 0.42
Central Rift	Livestock predation: Using traps (80%); shining lion deterrent lights (51%); building predator-proof bomas (40%); patrolling by rangers (20%); collaring problem animals (40%); translocating problem animals (20%); guarding property (100%)	3.33 ± 0.63
	Crop raiding: Translocating problem animals (20%); collaring problem animals (40%); using electric fences (70%); using beehive fences (40%); growing chili fences (20%)	2.78 ± 0.78

Conservation area	Mitigation strategies in HWCs and their percentage performance (reliability)	Ease at which wildlife species learn and get used to the strategies (ME ± SE*)
Western	Livestock predation: Culling (46%); creating awareness (80%); providing compensation (20%); trapping problem animals (60%); translocating problem animals (60%)	2.77 ± 0.36
	Crop raiding: Using PAC patrol teams (100%); translocating problem animals (80%); using guard dogs (100%); making noise (90%); digging trenches (40%)	2.98 ± 0.26
Northern	Livestock predation: Collaring (20%); translocating problem animals (80%); creating awareness (70%); providing compensation (40%); building predator-proof bomas (80%); shining lion deterrent lights (40%); guarding property (60%)	3.00 ± 0.26
	Crop raiding: Using electric fences (60%); trapping problem animals (40%); providing water (60%); creating buffer zones (60%); using fire (60%); making loud noises (76%); using pepper fences (72%); using beehive fences (90%); using thunder flashes (60%); guarding crops (20%); using PAC patrol teams (60%)	3.27 ± 0.67
Eastern	Livestock predation: Collaring problem animals (100%); using PAC team patrols (70%); translocating problem animals (60%); creating awareness (20%); building predator-proof bomas (80%); shining lion deterrent lights (10%).	3.27 ± 0.22
	Crop raiding: Using electric fences 60%); using beehive fences (90%); using pepper fences (35%); digging ditches (40%); collaring problem animals (30%); using PAC patrol teams (70%); translocating problem animals (60%)	3.08 ± 0.29
Mountain	Livestock predation: Collaring problem animals (66%); translocating problem animals (70%); creating awareness (100%); shining lion deterrent lights (70%); guarding property (100); building predator-proof bomas (100%)	3.06 ± 0.27
	Crop raiding: Using electric fences (90%); translocating problem animals (72%); using PAC patrol teams (70%); creating awareness (90%); digging trenches (100%); using beehive fences (60%)	3.34 ± 0.56

8.4 Costs And Implications Of Hwc Mitigation Strategies

Sustainable and long-term management of human-wildlife conflict partly depends on the ability of affected communities to mitigate the conflicts themselves. Therefore, it is critical that communities can initiate, use, maintain, and replace tools deployed to deter wild animals. Their capacity to initiate strategies to manage conflicts with large predators was high in the Eastern conservation area (3.94 ± 0.28), Central Rift conservation area (3.75 ± 0.25), Mountain conservation area (3.73 ± 0.33), and Southern conservation area (3.70 ± 0.40), and average/medium in the Coast conservation area (2.60 ± 0.51), Western conservation area (2.75 ± 1.03), and Northern conservation area (2.93 ± 0.35). Communities' ability to initiate mitigation strategies against crop raiding by large herbivorous wildlife species ranged from 2.89 ± 0.56 (average/medium) in the Coast conservation area to high in Central Rift conservation area (4.32 ± 0.49) and very high in the Tsavo conservation area (4.65 ± 0.34) (Table 30). Community initiative was high in the Coast conservation area, very high in the Tsavo conservation area, and average/medium for the other conservation areas. Communities in five conservation areas were able to easily initiate strategies on their own (high initiation ability) to manage conflicts associated with large predators, while in three conservation areas (Coast, Western, and Northern), the ability was average/medium. This is very encouraging as it shows that communities in all the conservation areas have taken initiatives to mitigate –large-predator and crop raiding conflicts, and there's enormous, good will across the conservation areas to manage conflicts. It also shows that if the government and other stakeholders were to collaborate with communities on initiatives aimed at managing conflicts, they will readily agree to participate.

Communities' ability to use large-predator conflict mitigation methods ranged from low (2.16 ± 0.20) in the Mountain conservation area to average (3.24 ± 0.29) in the Southern conservation area (Table 30). Their ability to use crop raiding mitigation methods ranged from average/medium in the Mountain conservation area (2.89 ± 0.24) to high in the Western (4.03 ± 0.76), Tsavo (3.89 ± 0.45), and Southern (3.47 ± 0.31) conservation areas. For the rest of the conservation areas, it was average/medium. Thus, the overall ability to use mitigation methods against large predators and crop raiding conflicts was mostly average for most of the conservation areas. This implies that although communities in all the conservation areas were able to use various strategies to mitigate human-wildlife conflicts, this ability was still largely inadequate. There's therefore a need to enhance this ability through training and increasing awareness to improve their

ability to manage HWCs effectively and sustainably on their own or in partnership with KWS and other stakeholders in the conservation sector.

The relative cost of maintaining methods used to manage crop raiding and large predator conflicts varied amongst conservation areas (Table 30). For large predator management strategies, the cost ranged from low (2.10 ± 0.43) in the Coast conservation area to high (3.70 ± 0.26) in the Tsavo while those for crop raiding varied from average (2.67 ± 0.43) in the Mountain conservation area to high (3.52 ± 0.45) in the Tsavo (Table 30). In all the conservation areas, maintenance costs of methods used to manage the two conflict types were generally average. This is a financial challenge for communities, KWS, and other stakeholders involved in human-wildlife conflicts. Further, it might make communities pay less attention to HWC management despite its socioeconomic impacts. It may also lead to an increased incidence of retaliatory attacks against wildlife, especially those involved in conflicts. KWS and stakeholders involved in HWC management will also face a lot of financial strain in managing this problem. Accordingly, there is need for innovative strategies of sourcing finances to manage HWC.

The cost of replacing strategies used to mitigate conflicts with large predators varied from low (2.38 ± 0.35) in the Western conservation area to high in the Mountain (3.78 ± 0.24) and Eastern (3.62 ± 0.35) conservation areas (Table 30). Those used to manage crop raiding conflicts ranged from average (3.02 ± 0.36) to high in the Mountain (3.94 ± 0.36), Western (3.94 ± 0.31), and Eastern (3.76 ± 0.36) conservation areas (Table 30). Generally, replacement of large predator management strategies was average in five conservation areas (Southern, Tsavo, Coast, Central Rift, and Northern), high in the Mountain and Eastern conservation areas, and low in the Western conservation area. However, replacement of crop raiding mitigation methods was high in the Southern, Coast, Western, Northern, Eastern, and Mountain conservation areas, and average in the Central Rift and Tsavo conservation areas. A wide range of wildlife species are involved in crop raiding than the predator species thus crop farmers bear a bigger impact as compared to livestock farmers. In addition, crop farming in all the conservation areas has increased significantly over the years that can be attributed to various factors ie human population pressure and land uses incompatible with conservation.

8.5 Context Specific Hwc Management Strategies

Human-wildlife conflicts have continued to inflict damages and costs on communities across the country. In turn, most communities have developed negative attitudes towards wildlife, aggravating the conflicts and impeding conservation efforts to harmonise coexistence between wildlife and communities. Further, communities take actions against wildlife that directly and indirectly threaten their survival

and long-term conservation. To counter this cycle, there is an urgent need to protect communities living with wildlife and reduce their degree of vulnerability to conflicts. It is equally important to protect wildlife from the negative impacts sustained from communities through retaliatory attacks and other inappropriate actions.

Table 30: Expert opinions on mitigation strategies used across conservation areas, and communities' ability to initiate, use, and maintain them (*1 = Very low; 2 = Low; 3 = Average / medium; 4 = High ;5= Very High)

Conservation area	Mitigation strategy	Ability to initiate strategy (Mean $\pm$ SE*)	Ability to use strategy (Mean $\pm$ SE*)	Level of strategy maintenance (Mean $\pm$ SE*)	Ability to replacement strategy (Mean $\pm$ SE*)	Relative affordability of strategy (Mean $\pm$ SE*)
Southern	Livestock predation: Building predator-proof bomas; translocating problem animals; predator deterrent lights; using ranger patrols and security guards	3.70 $\pm$ 0.40	3.24 $\pm$ 0.29	3.00 $\pm$ 0.32	3.21 $\pm$ 0.41	3.67 $\pm$ 0.33
	Crop raiding: Establishing conservancies and securing wildlife movement corridors; guarding property at night; providing water; using electric fences; using KWS and community ranger patrols; providing compensation; making loud noises; using guard dogs; using beehive fences	3.25 $\pm$ 0.33	3.47 $\pm$ 0.31	3.20 $\pm$ 0.37	3.73 $\pm$ 0.24	3.19 $\pm$ 0.34
Tsavo	Livestock predation: Building predator-proof bomas; translocating problem animals	3.60 $\pm$ 0.40	2.50 $\pm$ 0.45	3.70 $\pm$ 0.26	3.20 $\pm$ 0.33	4.00 $\pm$ 0.30
	Crop raiding: Using electric fences; erecting wildlife barriers; collaring for monitoring or translocating problem animals	4.65 $\pm$ 0.34	3.89 $\pm$ 0.45	3.52 $\pm$ 0.45	3.42 $\pm$ 0.33	3.90 $\pm$ 0.34

Conservation area	Mitigation strategy	Ability to initiate strategy	Ability to use strategy	Level of strategy maintenance	Ability to replacement strategy	Relative affordability of strategy
		(Mean ± SE*)	(Mean ± SE*)	(Mean ± SE*)	(Mean ± SE*)	(Mean ± SE*)
Coast conservation area	Livestock predation: Using electric fences; building predator-proof bomas; translocating problem animals	2.60 ± 0.51	2.80 ± 0.49	2.60 ± 0.51	3.40 ± 0.51	2.80 ± 0.80
	Crop raiding: Using wildlife barriers like moats; collaring for monitoring or translocating problem animals	2.89 ± 0.56	3.32 ± 0.54	2.76 ± 0.47	3.65 ± 0.21	3.78 ± 0.51
Central Rift	Livestock predation: collaring for monitoring, or trapping and translocating problem animals; predator deterrent lights; building predator-proof bomas; using ranger patrols; guarding property	3.75 ± 0.25	2.64 ± 0.43	2.10 ± 0.43	2.55 ± 0.43	3.27 ± 0.41
	Crop raiding: Translocating or collaring problem animals; using electric fences; using beehives; growing chili fences	4.32 ± 0.41	3.44 ± 0.23	2.87 ± 0.90	3.02 ± 0.78	3.20 ± 0.32
Western	Livestock predation: Using PAC team patrols; creating awareness; providing compensation; trapping and translocating problem animals	2.75 ± 1.03	2.94 ± 0.40	2.67 ± 0.33	2.38 ± 0.35	3.00 ± 0.54
	Crop raiding: Using PAC team patrols; translocating problem animals; using guard dogs; making loud noises; digging trenches	3.45 ± 0.76	4.03 ± 0.76	3.54 ± 0.45	3.94 ± 0.31	3.70 ± 0.42
Northern	Livestock predation: Collaring for monitoring or translocating problem animals; creating awareness; predator deterrent lights; guarding the property; building predator-proof bomas	2.93 ± 0.35	2.52 ± 0.28	2.54 ± 0.23	2.50 ± 0.24	2.73 ± 0.27
	Crop raiding: Using electric fences; translocating problem animals; using PAC patrol teams; creating awareness; digging trenches; using beehive fences	3.23 ± 0.90	2.98 ± 0.36	2.76 ± 0.32	3.65 ± 0.76	3.73 ± 0.42

Conservation area	Mitigation strategy	Ability to initiate strategy	Ability to use strategy	Level of strategy maintenance	Ability to replacement strategy	Relative affordability of strategy
		(Mean ± SE*)	(Mean ± SE*)	(Mean ± SE*)	(Mean ± SE*)	(Mean ± SE*)
Eastern	Predation: Collaring for monitoring or translocating problem animals; using PAC team patrols; creating awareness; building predator-proof bomas; using predator deterrent lights	3.94 ± 0.28	2.71 ± 0.31	2.54 ± 0.23	3.62 ± 0.35	3.36 ± 0.33
	Crop raiding: Using electric fences; using beehive fences; growing chili fences; digging ditches; collaring or translocating problem animals; using PAC patrol teams	3.80 ± 0.22	3.02 ± 0.27	2.96 ± 0.24	3.76 ± 0.36	4.03 ± 0.28
Mountain	Livestock predation: Collaring for monitoring or translocating problem animals; creating awareness; predator deterrent lights; guarding property; building predator-proof bomas	3.73 ± 0.33	2.16 ± 0.20	2.94 ± 0.22	3.78 ± 0.24	4.11 ± 0.24
	Crop raiding: Using electric fences; translocating problem animals; using PAC patrol teams; creating awareness; digging moats; using beehive fences	3.38 ± 0.32	2.89 ± 0.24	2.67 ± 0.43	3.94 ± 0.36	4.09 ± 0.29

Management of HWCs is a complex process necessitating a wide range of context-specific integrated approaches to achieve Such methods should be piloted to assess their effectiveness and any negative impacts they might have before they are scaled up. Approaches such as community-based

conservation using conservancy models and predator-proof bomas to deter large carnivores against livestock depredation have a lot of potential in ameliorating human-wildlife conflicts and should be scaled up appropriately.

8.6 Training Needs Of Communities On HWC Mitigation Strategies

Building capacities for communities in HWC management is key in reducing the intensities of conflicts and sustaining their adaptation to the changing nature of HWCs. Capacity building for HWCs management should be based on the local context of the problem. For instance where predator-proof bomas are used, communities should be trained on how to construct and maintain the bomas to ensure effective deterrence of large predators. Area-specific training include the following:

Southern conservation area: Communities must learn how to handle and manage problematic species; how to monitor and repair predator-proof bomas; and the importance of creating more conservancies as a strategy of reducing HWC occurrence.

Tsavo conservation area: Communities require training on how to use modern HWC management techniques, and how and when to report HWCs to KWS and other stakeholders working in the region.

Coast conservation area: Those in this region must learn the importance of reporting conflicts to KWS and conservation organisations working in the region, and should be trained how to construct and maintain predator-proof bomas.

Central Rift conservation area: Communities must learn how to use drones to mitigate HWCs.

Western conservation area: Residents should receive more education and awareness on HWCs and learn how to use modern technology and equipment to mitigate and manage conflicts.

Northern conservation area: Community members should receive more exposure, education, and awareness on HWCs and their mitigation.

Eastern conservation area: Communities should receive training on how to monitor and manage problematic animals and be empowered on handling wildlife matters themselves.

Mountain conservation area: Community members should be trained on how to use modern equipment in managing HWCs.

8.6.1 Organisations That Fund, Train, And Equip Communities To Manage HWCs

There are various organizations that offer capacity building for communities and KWS personnel on how to deal with HWCs in various parts of the country. Some of this organizations are also directly involved in the management of HWCs (Table 31). Generally, capacity building involves how to initiate, use,

maintain, and replace equipment, as well as how to use other methods to control conflicts associated with large predators and species involved in crop raiding.

Table 31: Organisations involved in capacity building for communities to manage HWCs in all the conservation areas

Conservation area	Organisation that did the training	Approaches used to mitigate HWCs
Southern	KWS; IFAW; Big Life Foundation; Nature Kenya; WWF; MWCT; Born Free; Lion Guardians; Amboseli Ecosystem Trust; Amboseli Trust for Elephants	Livestock predation: Predator-proof bomas; lion deterrent lights; consolation; awareness creation; trapping and translocation; PAC control teams; KWS and community ranger patrols; guarding; livestock herding; early warning system; reporting of HWCs by communities to KWS and community rangers Crop raiding: Establishment of conservancies and securing wildlife movement corridors; guarding at night; water provision; electric fences; KWS and community ranger patrols; PAC control teams; awareness creation; compensation; early warning system; reporting of HWCs by communities to KWS and community rangers; REDD++ project in Chyulu Hills
Tsavo	KWS; David Sheldrick Wildlife Foundation; Born Free; AWF; Wildlife Works; STE; Tsavo Trust; Friends of Tsavo; Tsavo Conservation Group; Amara Conservation	Livestock predation: Predator-proof bomas; lion deterrent lights; consolation; trapping and translocation; KWS and community ranger patrols; PAC teams; guarding; collaring; flashlights; awareness creation; reporting of HWCs by communities to KWS and community rangers Crop raiding: Water provision; wildlife barriers, especially electric fences; collaring; translocation; early warning system; flashlights, pressure horns; beehive and chilli fences; establishment of conservancies; reporting of HWCs by communities to KWS and community rangers; REDD++ project in Kasigau; awareness creation; PAC teams
Coast	KWS; Colobus Conservation; Diani Turtle Watch; Conservation Education Society; David Sheldrick Wildlife Foundation	Livestock predation: Traps and translocation; PAC teams Crop raiding: Electric fences; scaring away animals; awareness creation; PAC teams
Central Rift	KWS; WWF; County Government; Conservancies; Mara Elephant Project; Maasai Mara Wildlife Conservancies Association; Friends of Maasai Mara; Elephant Aware Mara; Mara Predator; Conservation Programme; Mara Elephant Trust; Mara Predator Trust	Livestock predation: Predator-proof bomas; lion deterrent lights; translocation; awareness creation; KWS and community ranger patrols; PAC teams; consolation; reporting of HWCs by communities to KWS and community rangers Crop raiding: Establishment of conservancies; electric fences; awareness creation; reporting of HWCs by communities to KWS and community rangers; PAC patrol teams

Conservation area	Organisation that did the training	Approaches used to mitigate HWCs
Western	KWS; Ministry of Interior; National Museums of Kenya; Nature Kenya; Kenya Forest Service; County Government	Livestock predation: Consolation; awareness creation; trapping and translocation; PAC patrol teams; predator-proof bomas Crop raiding: Compensation; awareness creation; trapping and translocation; PAC patrol teams; trenches; electric fences
Northern	KWS; Born Free Foundation; County Government; Conservancies; CBOs; Kenya Forest Service; WWF	Livestock predation: Lion deterrent lights; consolation; awareness creation; trapping and translocation; PAC patrol teams Crop raiding: Compensation; awareness creation; trapping and translocation; electric fences; PAC patrol teams
Eastern	KWS; Rhino Ark; Ewaso Lions; Conservancies; CBOs; Media; Kenya Forest Service; David Sheldrick Wildlife Foundation; Born Free Foundation; STE; Mount Kenya Trust	Livestock predation: Predator-proof bomas; lion deterrent lights; consolation; awareness creation; trapping and translocation; KWS and community ranger patrols; PAC patrol teams; reporting of HWCs by communities to KWS and community rangers Crop raiding: PAC patrol teams; electric fences; crops planted at buffer zones; beehive fences; awareness creation; trapping and translocation; KWS and community ranger patrols; reporting of HWCs by communities to KWS and community rangers
Mountain	KWS; WWF; Space for Giants; County Government; NGOs; Conservancies under Laikipia Conservancies Association; Northern Rangelands Trust (NRT); Wildlife Research and Training Institute (WRTI); Mpala Research Centre; Kenya Forest Service	Livestock predation: Predator-proof bomas; lion deterrent lights; awareness creation; trapping and translocation; KWS and community ranger patrols; guarding at night; PAC patrol teams; reporting of HWCs by communities to KWS and community rangers Crop raiding: Awareness creation; electric fences; trapping and translocation; KWS and community ranger patrols; PAC patrol teams; guarding; scaring animals away; reporting of HWCs by communities to KWS and community rangers

8.7 Market-Based Approaches To HWC Mitigation

8.7.1 Community enterprises around human-wildlife coexistence

Wildlife-based tourism is an important resource contributing nearly 10% of the country’s GDP (Ministry of Tourism and Wildlife, 2022).

benefit from wildlife-based tourism, they become more tolerant to wildlife allowing tourism activities to flourish.

Economic considerations are therefore important in fostering human wildlife co-existence. For instance, when communities

Opportunities for wildlife economy

The Kenya government’s “National Report to the Convention on Biological Diversity” identified potential economic areas that can be harnessed from wildlife. Some of these, such

as tourism, have already been realised, while others are at varying stages of development. Table 34 summarises the economic value chains in Kenya’s wildlife economy.

Table 32: Economic value chains in Kenya’s wildlife economy

	Agricultural sector	Crops and livestock
		Game farming and game ranching
		Live capture and sales
	Tourism sector	Wildlife-based tourism
		Coastal tourism
		Recreation
	Energy sector	Sport fishing
		Fuel wood and charcoal
		Hydroelectric energy
	Fisheries sector	Wave energy
		Freshwater fisheries
		Aquaculture and fish ranching
	Forestry sector	Subsistence fishing
		Timber
		Non-timber forest products
	Health sector	Forest-based carbon credits
		Medicinal plants
		Nature-based therapy

	Trade and industry	Commercial photography and filming
		Nature based carbon credits
		Other payments for ecosystem services
	Other	Educational activities
		Research activities
		Cultural activities
		Religious activities

In addressing the potential of the wildlife economy, Kenya needs to develop a multi sectoral integrated natural resource policy that recognizes wildlife conservation as a form of landuse. A wide range of national policy ,legal instruments and regulations will need to be aligned with the country's sectoral integrated natural resource policy once it is developed The need for a country's unified conservation policy is

informed by the realization that the land use is shifting towards consolidation and individualisation. For instance, extensive extracts of land required to support wildlife are being physically demarcated and split into smaller units that are insufficient to support wildlife. Table 33 illustrates the situation with some of the group ranches in the Amboseli ecosystem.

Table 33: Land subdivisions in the Amboseli ecosystem(source:Amboseli report on land subdivision ,2021)

Group ranch	Hectares	Registered members	Land subdivision stage
Kimana/Tikondo	25,120	843	Subdivided.
Olgulului/Ololarashi	147,050	13,428	The group ranch is undergoing subdivision.
Kuku B	96,000	6,052	Subdivision has been done on arable (for irrigated agriculture) clusters of the ranch but only under user rights management.
Kuku A	18,712	6,517	Survey has already been done, together with zonation, which protects the corridor from Kaanzi, Mutikanju, to Kimana Sanctuary.
Rombo	38,000	3,665	Half of the ranch has been subdivided and the subdivision is now happening on the rangeland. The size is small to accommodate different zones, but wildlife corridors have been protected.
Eselenkei	74,794	3,413	The subdivision is complete, with the zonation scheme allowing for rangelands, agriculture, conservation, and settlement.
Mbirikani	122,893	4,627	Subdivision has been completed in arable areas around the swamp. Zonation has included land for irrigation, settlement, and rangelands.

Part of the challenge in preserving land for wildlife stems from the fact that benefits from wildlife have not been extended to communities. Conservancies provide a way forward in this respect by enhancing benefit sharing models based on ventures on community lands. However, conservancies and community ranches face challenges. These challenges include:

- The expectation gap that exists when conservancies and communities hold different expectations of the financial benefits accruing from hosting wildlife on their land. Very often the returns to communities do not match their expectations, partly because the financial benefits are initially overstated.
- Unsustainability resulting from an over-reliance on tourism revenue, which has recently become unstable due to terrorism activities, election cycles, and travel restrictions following the COVID-19 pandemic.
- Equity challenges in which the most privileged and educated participants accrue greater benefits because they possess more information.
- Proper governance of conservancies. The conservancy approach is still a new model. Most conservancies are still in their infancy and grappling with basic issues of formal registration and governance, including setting

- up management structures and developing policy documents such as management plans. Central to good governance is financial transparency and accountability. Stakeholders need to be informed about revenue from commercial operations and donor funding, and the use of such revenues. Annual general meetings should be mandatory for all conservancies and group ranches.
- Lack of enterprise capacity. Conservancies need enterprise values to make conservation a profitable and viable land use. Providing management skills, advice, and funding in the form of credit facilities at friendly interest rates are needed. County governments need to enhance the support they provide to conservancies and other community wildlife enterprises. Such support may take the form of reduced taxes and license fees. The national government can also provide favourable tax policies to stimulate investments in conservancies.

There is a need for Public Private Partnership to to develop guidelines for the regulation of conservancies' operations in Kenya. The overall aim of the guidelines should be to promote healthy, stable ecosystems that integrate livelihoods and wildlife conservationThe guidelines will also enhance transparency and empower communities when they negotiate terms such as in land leases or easements

Emerging opportunities

A. Carbon Finance

The Taskforce on Scaling Voluntary Carbon Markets (TSVCM) estimates that demand for carbon credits could increase by a factor of 15 or more by 2030 and by a factor of up to 100 by 2050 (Paris agreement 2016). Carbon trading is an emerging innovative approach for funding conservation and improving community livelihoods through income generated from wildlife resources. Kenya's carbon registry has over 15 sector projects participating in voluntary carbon markets and other clean development mechanisms (CDM) (Table 34). The challenges that need to be addressed in utilising this opportunity include the lack of local capacity to develop

projects, high cost of developing and qualifying projects, and the lack of resource tenure rights, affecting benefit sharing (Bouyer and Gachanja, 2013). Presently, unregulated trading is costing billions of shillings in unrealised revenue. Kenya therefore needs to build capacity and align carbon trading regulations to improve transparency and it's uptakeAs part of the process of invigorating carbon trading , the Nairobi International Finance Centre (NIFC) has signed a collaborative agreement with Air Carbon Exchange. Table 34 lists carbon projects in Kenya under voluntary carbon markets:

Table 34: Carbon projects in Kenya
Source: Sena, 2015; Plan Vivo Database, 2020; VCS & CCB Database, 2020

Project name	Key stakeholders	Annual emission reductions (tCO ₂)	Total emission reductions (tCO ₂)/ Duration (years)	Estimated total revenue (in USD)
Kasigau Corridor (I&II)	Wildlife Works, community ranches	1,866,391	55,991,730 tCO ₂ e over 30 years	\$1 million per year
International Small Group & Tree Planting Programme (TIST) – 7 projects	Clean Air Corporation, 10,839 groups with 76,442 members in Kenya	489,116	4,200,000 tCO ₂ e over 20 years	\$42 million
Mikoko Pamoja Mangrove Restoration	Mikoko Pamoja Conservation Organisation	9,880	106,929 tCO ₂ e over 20 years	\$400,000 (\$76,253 paid to communities)
Chyulu Hills REDD++ Programme	Chyulu Hills Conservation Trust, 140,000 beneficiaries	1,100,943	18,452,476 tCO ₂ e over 30 years	\$6 million per year
Northern Kenya Grasslands Project	NRT, 14 conservancies, 112,483 people	1,797,493	53,924,788 tCO ₂ e over 30 years	\$161,744,364
Kenya Agricultural Carbon Project	VI Agroforestry Programme, 60,000 farmers	99,004	1,980,088 tCO ₂ e over 30 years	\$750,000
The Forest Again Kakamega Forest	Eco2librium LLC, Kenya Forest Service, Communities	10,652	426,083 for 40 years	\$1,323,000-\$3,087,700

B. Blue Economy

The blue economy seeks to promote economic growth, responsible production and consumption, social inclusion, preservation, and improvement of livelihoods while at the same time ensuring environmental sustainability of ocean and coastal systems (Western Indian Ocean Marine Science Association [WIOMSA], 2021). The Indian Ocean is critical to the development of communities living along the coast as a source of direct and indirect livelihood. Steadily, there has been a shift from the previous ‘brown’ development model in which oceans are treated as an unregulated source of resource extraction and dumping to reframing them as development spaces prioritising the coastal and marine environment to benefit people, alleviate poverty, generate employment, and promote equity. Kenya’s coastal tourism, for instance, now contributes about 60% of the overall tourism

earnings, and about 30% of the country’s hotel beds are in coastal beach areas. Opportunities for sustainable fishing also exist, but communities struggle to benefit from the country’s rich marine resources due to limited economic capacity and under-performing fishing vessels and equipment. Inadequate facilities for fish storage and value addition also limit returns to communities. Building a large fish market in Mombasa would not only provide a market but also serve as a tourist site (WIOMSA, 2021). Mariculture in Kenya is an emerging opportunity for generating income for communities and funding for conservation- if education and awareness is improved. There is also a need for communities to form cooperatives for fishing activities to enable them scale-up sustainable fishing opportunities and ecotourism facilities.

C. Film, photography and media

Wildlife based filming photography and media exchanges is an emerging opportunity for wildlife economy. This is informed by ther realization that the media world is rapidly changing , with spending shifting to digital products and services. For instance, digital spending today accounts for the largest share of media spending. These developments are important because they have opened up opportunities

for mainstreaming filming to accrue income to support conservation innitiatives. The spread of social media, for instant TikTok, Instagram, and YouTube, has transformed information exchange approaches which may be used to generate income to support conservation and community livelihoods.

8.7.2 Piloting Insurance and Private Scheme administration for HWC Compensation

The current wildlife compensation scheme as constituted under the WCMA, 2013 is fraught with many challenges including manual processing of compensation leading to delays in the verification and payment of compensation claims, fraud and haphazard funding for the payment of claims and thus unsustainable. The lack of clear time frames for settlement of claims frustrates communities creating negative perceptions towards communities. There is a need to review the compensable species (Schedule III) and thresholds as

provided under WCMA,2013. There is also a need to restructure the HWC compensation processes including digitization to ensure efficiency, information management and reporting. The insurance scheme may be used to encourage PPP in the management of HWC processes while the private scheme administration may provide an opportunity to fast track the payment of compensation claims. The Kenya government has outlined a number of compensation categories (Table 35).

Table 35: Kenya's compensation categories

Impacted person	The WCMA, 2013 recognises affected persons as those who have suffered injuries, their personal representatives, successors and assigns of a deceased person, persons whose crops have been destroyed or who have had property damaged or livestock killed as a result of wildlife.
Eligible HWC incident	The Third Schedule of the WCMA provides the list of the incidents covered. They include death and injury, and crop, livestock, and property damage.
Covered wildlife species	The designated species for which compensation is paid under the Third Schedule are: Death and Injury Elephant Lion Leopard Rhino Hyena Crocodile Cheetah Buffalo Hippo Wild dog Crop, Livestock, and Property Damage Elephant Lion Leopard Rhino Hyena Crocodile Cheetah Buffalo Hippo Zebra Eland Wildebeest Wild dog
Reporting	Reporting is done to Kenya Wildlife Service, specifically the Community Wildlife Service Department, local administration, and the Kenya Police.
Verification	The verification agents consist of KWS officers and officials from the county governments who provide professional input, such as valuation of the damage and ascertainment of the nature and cause of injury or death.

Valuation	The WCMA provides payments at the following rates:	
	Incident	Compensation (Ksh)
	Death	5,000,000
	Injury occasioning permanent disability	3,000,000
	Other injuries	Maximum 2,000,000
	Crops, livestock, and property	Based upon ruling market rates following verification by the CWCC
Scheme administration	Compensation is administered by the government of Kenya	
Scheme funding	The WCMA provides that the scheme shall be funded through: - Monies specifically allocated for purposes of allocation through the budget process; - An insurance scheme to be established by the Cabinet secretary for the National Treasury; and - Monies from any other source approved by the Cabinet secretary for the National Treasury.	
Payment timing	There is no set time anchored in law or policy guidelines for which compensation must be paid.	
Payment type	The payments are compensation-based and are subject to funds availability.	

The importance of compensation schemes

The Taskforce on Human-Wildlife Conflict Compensation Scheme, formed 14 June 2019, found out that successful compensation schemes had the following characteristics:

- a. High community involvement:** Schemes that run successfully encourage community participation and buy-in. They have a high degree of transparency that promotes accountability. This is integral in all the processes, including safeguarding against moral hazards (Ministry of Tourism and Wildlife, 2020). Strict penalties are assessed against community members who make fraudulent claims that affect the payouts of other members. Select community members are also involved in the verification process.
- b. Predictability:** The consolation figures in most of the schemes have been agreed upon in advance. The claims administration process is simple, transparent, and timely. Slow payment processes lead to a lack of faith and interest in participating in the scheme, as do insufficient payment amounts.

- c. Use of technology:** Successful compensation schemes rely heavily on technology for the claims process. GPS-enabled devices are used to record incidences, take pictures, and accurately record the exact location of the incidents.
- d. Prevention and mitigation:** Successful schemes encourage community members and provide incentives to those who employ best practice strategies when safeguarding their livestock and crops. These strategies include using predator-proof bomas and ensuring that herders have attained the age of maturity. Payment eligibility is conditional on participants also undertaking certain preventive actions. There are examples of functioning compensation schemes that exist in Kenya and outside Kenya (Table 36).

Table 36: Compensation schemes

Big Life Foundation Predator Compensation Scheme	
Big Life Foundation works with community members around the Amboseli area to deliver a scheme based on cost-sharing in which the foundation contributes 70% of the premium. Farmers, through their group ranch management, contribute 30%. Once a loss is reported, Big Life dispatches two officers: a Maasai and a non-local to eliminate bias, both of whom will inspect the livestock carcass to verify it was killed by wildlife. This must be done within 24 hours. The owner must take care not to tamper with the carcass or harm the wild animal involved. Losses incurred due to negligence attract significantly lower compensation. Upon verification and approval, losses are recorded, credit notes signed, and claims are paid every two months.	
Maasai Wilderness Conservation Trust—Wildlife Pays Programme	
Through an innovative programme called Wildlife Pays, MWCT, using funds from the tourism surcharge levied on visitors, compensates Maasai herders quarterly for losses due to wildlife predation in exchange for their participation in conservation activities. The programme was started to reduce retribution killing of wildlife and to bring herders more fully into the fold of conservation efforts. Aside from the quarterly payments, herders receive financing for actions that help to mitigate HWCs, such as constructing predator-proof bomas. The programme is self-sufficient and does not rely on philanthropic funding, and as such it is an example of a sustainable model of compensation. Payout amounts to herders are predetermined.	
Mara North Conservancy Compensation Scheme	
This compensation scheme began in 2016 to compensate herders for livestock losses. It is funded through member contributions and tourism partnerships. The scheme runs with the support of compensation officers who are responsible for verifying the claims. They take photographs on GPS-enabled devices and complete claim forms. Claims received by the organisation are deliberated by a committee that meets quarterly. After deliberation, approved claims are forwarded to Mara North’s Nairobi office for payment. The scheme is credited with having reduced retaliatory attacks on predators, contributing to enhanced coexistence.	
Borana Conservancy Consolation Scheme	
The Borana Conservancy has a “community livestock to market” programme that willing community members participate in. Following the sale of an animal, a community member is required to contribute 10% of the proceeds to an insurance kitty for the primary purpose of compensating others for livestock killed by predators. Verification is conducted by cattle supervisors alongside security representatives within the conservancies. These officials record the GPS coordinates and take photos of the animal that has been killed or injured.	
Global Schemes	
Several countries, including Namibia, Canada, Pakistan, and India, have schemes to compensate communities. These are summarised below.	
Namibia	Namibia implemented the Human-Animal Conflict Self-Insurance Scheme and its successor, the national Human-Wildlife Self-Reliance Scheme. The scheme is termed ‘self-insurance’ because the community-based organisations contribute directly to the payouts. Under this scheme, payments are made to cover livestock losses and damage to crops, as well as for human death or injury. Participating members must take mutually agreed proactive measures to protect themselves, their crops, and cattle. Strict payment conditions require that community members practice responsible husbandry (fencing cattle at night and herding during the day) as well as make an effort to guard crop fields at night. Incidents must be reported within 24 hours and verified by the country’s Ministry of Environment, Forestry, and Tourism or a conservancy game guard to ensure only valid claims are made.
Canada	Canada administers crop damage and livestock predation compensation via the provincial agricultural service or insurance corporations (e.g., the Saskatchewan Crop Insurance Corporation). Each province compensates producers for damage to crops or livestock caused by wildlife. Producers do not need to pay a premium to receive compensation. Corporations also usually offer compensation to allow producers to prevent damage to their stock. Producers can also take out private insurance for crops and livestock.
Pakistan	Project Snow Leopard, initiated in 1998, was set up with the purpose of conserving the snow leopard by reducing retaliatory killings by local farmers due to livestock predation. Farmers pay premiums into an insurance fund and are fully compensated in the event of a loss. The fund is co-financed through ecotourism activities.
India	An insurance programme for livestock depredation from snow leopards was set up in 2002 in Himachal Pradesh. Villagers contribute each month to the insurance fund and receive payouts for livestock killed, as well as compensation for damage prevention.

The efficacy of compensation as a way of mitigating HWCs needs public-private sector collaboration and partnership. Private companies can partner with communities to market and promote the uptake of insurance, verify losses, and process claims. This is especially important for crop damage, livestock predation and depredation, and property damage, all which account for the highest incidences of human-wildlife conflicts. Table 39 summarises HWC incidents over the last five years.

Table 37: Summary of HWCs over the last five years

Conflict type	2017	2018	2019	2020	2021	Grand Total
Human death	103	77	43	117	56	396
Human injury	246	186	130	225	182	969
Crop damage	1384	1192	812	1866	1646	6900
Livestock predation	732	1182	657	1234	904	4709
Property destruction	112	86	157	239	381	975
Wildlife mortality	30	63	72	308	55	528
Threats	2,656	2,379	2,252	2,191	1,690	11,168
Grand Total	5,263	5,165	4,123	6,180	4,914	25,645



09

Land Use and Spatial Plans

Since independence, Kenya's human population has increased rapidly, including on all conservation areas where it has occurred as a result of high birth rates and immigration of other ethnic groups from different parts of the country. This population explosion has significantly changed socioeconomic systems across the conservation areas. A high demand for land coupled with changes in land tenure and land use, such as agriculture, infrastructure, and human settlements and urban areas. In addition, pastoral communities, which typically are outside most of the country's protected areas, have become sedentary in response to changes in their traditional lifestyles and government policies that have improved their socioeconomic status. Collectively, land use and human demographic changes have led to (a) human encroachment into wildlife use areas; (b) rampant environmental degradation in wildlife use areas; (c) the loss, reduction, and fragmentation of wildlife habitats and use areas; (d) proliferation of fences in wildlife use areas to deter wildlife; (e) reduction in water and forage resources, increasing competition between communities and wildlife for resources; and (f) introduction land use and human activities in wildlife areas outside protected areas that are incompatible with wildlife conservation. These activities have increased human-wildlife contact, fomenting human-wildlife conflicts.

To promote sustainable development in the entire country, the 2010 Constitution bestowed upon county governments the responsibility of undertaking county spatial planning and development to control unplanned development (Ministry of Wildlife and Tourism, 2019). Preparation of the plans is therefore a requirement of each county under the County Government Act. The plans act as guiding frameworks for current and future development for each county and are supposed to be implemented within their stipulated time frame of 10 years. Primarily, they drive a set of planning scenarios for each county and are expected to reconcile the desire for large-scale infrastructure development, agricultural expansion, human settlements, and urban and market centres development and conservation.

As of October 2022, only 13 counties—Kajiado, Bomet, Lamu, Kilifi, Makueni, Kericho, Baringo, Bungoma, Nakuru, Meru, Mombasa, Nairobi, and Kakamega—had prepared their spatial plans. Apart from county spatial plans, there exists across the Ecosystem Management Plans, Conservancies management Plans, and Protected Areas Management plans. These are aimed at controlling the proliferation of inappropriate human activities that may threaten biodiversity, natural resources, ecosystem services and goods, and other benefits obtained from such areas. A critical review of existing county spatial plans shows that they have provisions for enhanced conservation of the environment, wildlife, and other key natural resources. However, they don't clearly and sufficiently indicate how they will implement the provisions and how adherence of the same will be ensured. They focus more on spurring the socioeconomic well-being of communities, which is seen to be more critical than protecting the environment and natural resources found in the counties. Accordingly, to a large extent,

the plans are unsuitable in safeguarding the expected long-term and sustainable coexistence between communities and wildlife in the country, and this is an issue of concern. However, it's worth mentioning that the existing Ecosystem Management Plans, conservancies' management plans, and protected areas management plans have clear and comprehensive provisions aimed at safeguarding long-term coexistence between communities and wildlife. But plans for protected areas and conservancies cover very small areas compared with their adjoining areas or landscapes where most of the wildlife reside and where human-wildlife conflicts are most prevalent.

Across the conservation areas, only a limited number of stakeholders were aware of the county spatial plans and why they were important. Those stakeholders were mostly national and county government officials working in relevant ministries or departments. Stakeholders involved in conservation were also familiar with the plans but, generally, most communities were not. This is a challenge since communities are major stakeholders in shaping development, conservation, and environmental protection in their county as envisioned in the 2010 constitution. With such inadequate familiarity of the county plans and their importance, it's difficult for county governments to implement them and to oversee adherence of the same by communities whose activities are responsible for rampant degradation of the environment and natural resources in all the conservation areas.

Generally, the level of implementation of the county spatial plans was minimal or almost absent. This was attributed to several factors. First, in the counties, there's a lot of emphasis on creating better and diverse socioeconomic opportunities for communities. As a result, there's a lack of commitment to support implementation of the plans since they are not viewed as a priority. In some cases, the county governments don't see the importance of the plans. Second, in all the conservation areas, stakeholders consulted during the study said that counties lacked funds to implement the plans. Most of the annual budget of county governments is funded by the national government. However, most of them have consistently complained that they don't receive adequate funds, or don't receive them on a timely basis, to support their devolved functions. Moreover, a lot of the funds are spent in recurrent expenditures, leaving very little financial resources for development projects and implementation of spatial plans. Third, counties lack enough skilled personnel and other vital resources for implementing the plans, monitoring the same, and ensuring plan adherence by all stakeholders. Spatial plans are very technical and require skilled and competent personnel for their implementation and oversight, but such staff are very few across all the counties. Fourth, preparing a county spatial plan is extremely expensive, forcing counties to prioritise other activities and development projects in view of the financial crunch they face. Fifth, implementation of most plans will face a herculean task of managing existing uncontrolled development and rampant encroachment by communities in critical wildlife areas. This will face a lot of resistance from affected communities and

individuals and create a lot of political backlash. For instance, in the Kitengela wildlife dispersal area and Amboseli in the Southern conservation area, most of the communal Maasai group ranches have been subdivided, and non-Maais have bought land and settled in these areas. A lot of development has also taken place in some areas; yet the proposed land uses in the Kajiado county spatial plan (Figure 29) have not taken this into account. It suffices to say that application of land use planning using county spatial plans as a strategy of promoting long-term and sustainable coexistence between communities and wildlife through reduction in human-wildlife conflicts remains a significant challenge.

Unregulated land use has been recognised as a key driver of HWCs in all the conservation areas. This should be addressed as a priority action by ensuring that all counties have spatial plans and can actualise their implementation.

Counties without plans should be compelled by the national government to prepare them as soon as possible. Likewise, counties that have plans but that haven't implemented them should also be compelled to do so. In addition, each county should develop guidelines and by laws as an action point to facilitate plan implementation and put in place a multi-stakeholder taskforce to oversee implementation, evaluation, and monitoring of the process. Smooth, timely, and effective implementation of plans will require (a) allocation of adequate funds; (b) hiring of adequate and competent personnel; (c) provision of key resources to facilitate the implementation process; (d) establishment of a monitoring and evaluation framework; and (e) development of penalties for non-compliance of the plan's guidelines and bylaws.

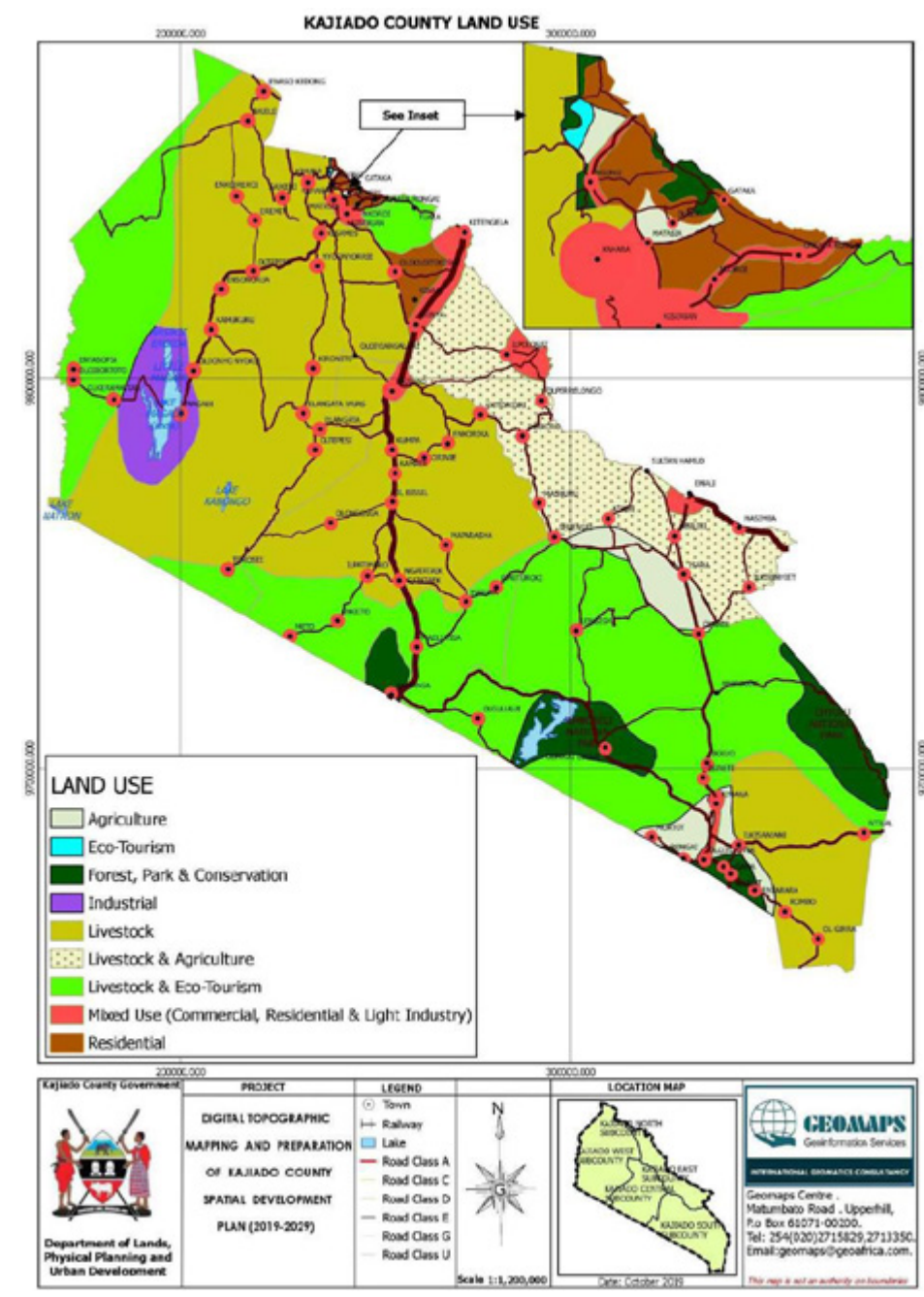


Figure 26: Proposed land use plan for Kajiado County (Source: Kajiado County Spatial Plan-2019-2029)



Enhancing Conservation Education

10.1 Introduction

There are relatively few organisations in Kenya that conduct wildlife conservation education and awareness in communities and schools. KWS and Wildlife Clubs of Kenya (WCK) are some of the leading government agencies in conservation education. There are other NGOs that also have educational awareness as a key component of their work such as the Giraffe Centre, AWF among others. Among the challenges that these organizations experience challenges in

terms of inadequate facilities and personnel, but they also have opportunities that can be harnessed in order to upscale their conservation education initiatives. There is need of an overarching strategy to harmonize the conservation education activities being undertaken in the country. Conservation education need to be mainstreamed in the National education curriculum.

10.2 Enhancing Wildlife Conservation Education And Awareness Programmes

Wildlife conservation education and extension services can be used to enlist the public support for wildlife conservation and address the emerging challenges of human wildlife co-existence. To achieve this objectives we seek to enhance the following activities:

- Create awareness of the Kenyan public about the importance of conservation and positive coexistence with wild animals.
- Address park visitors to promote good park practices, which can enhance habitat conservation and minimise animal harassment and provocation.

- Advocate to entrench conservation education in schools and other learning institutions curricula.
- Develop and produce teaching materials for school curriculums on conservation education.
- Train and build capacity of conservation education staff.
- Link with and collaborate with other conservation agencies engaged in conservation education.

To carry out these functions, the CEE department has developed the following programme activities:

1. In-house education programme

KWS officers host members of the public at KWS education and information centres. Education centres are equipped with a lecture hall, hostel, kitchen, and library. There are five education centres: Tsavo East National Park, Tsavo West National Park, Meru National Park, Lake Nakuru National Park, and Nairobi KWS headquarters. (The education centre in Nairobi is currently inactive because there is no staff designated to run it and the hall was converted to a photo gallery for Nairobi National Park.) Information centres have a lecture hall with educational displays. There are seven information centres in the country: Kisite Mpunguti, Kisumu

Impala Sanctuary, Watamu Marine Park, Malindi Marine Park, Saiwa National Park, Kakamega Forest Reserve, Aberdares National Park, and Marala (upcoming). The education centres and information centres receive students in all levels of learning. Visitors are given a talk by the community warden, education warden, or park warden and then watch a conservation-related film. Visitors may request a talk and film on a preferred topic. Most of the topics usually cover the history of the parks, park management, and challenges facing conservation in the areas.

2. Outreach programme

KWS officers organise and visit learning institutions and communities, as well as other organised groups, to engage them through lectures, presentations, and wildlife documentaries. KWS officers also visit community members

and other organised groups to sensitise and encourage them to take an active role in wildlife conservation. Through lectures and talks offered in schools, KWS complements the school curriculum.

3. Special programme

Here, KWS engages students through environmental and wildlife clubs in specific hands-on environmental conservation activities like cleaning parks, planting trees, removing invasive species from parks, naming trees, feeding wild animals in

orphanages, and celebrating international environmental days like World Wildlife Day and World Wetlands Day.

4. Essay competition

KWS targets selected learning institutions and engages them in essay and poster competitions. The goal is to tap conservation ideas from young minds while nurturing the young generation to have a positive attitude towards wildlife and conservation. This can have a long-term impact on promoting human-wildlife coexistence. Each year, a conservation topic is selected by KWS for the competition.

The awards are often given during celebrations of specific environmental days, such as World Wetlands Day (February 2), World Wildlife Day (March 3), World Water Day (March 22), and World Environment Day (June 6). Funding for this activity is often insufficient; therefore, there is need for more collaboration, including with NGOs and the private sector.

5. Interpreted park visits and school ecology trips

When schools visit KWS-managed parks and facilities, KWS provides a naturalist or tour guide who accompanies learners to the park and teaches them about the ecosystem and the wildlife therein. Schools' ecology trips target learners from schools adjacent to protected areas. For those students, KWS, through its CEE Department, organises visits to the

protected area to teach students about environmental and wildlife conservation. Conservation education programmes are customised to address certain environmental and wildlife conservation challenges prevalent around their schools and homes.

6. Production, distribution, and sourcing of conservation learning materials

KWS, in collaboration with other conservation stakeholders, develops learning materials like posters, brochures, wildlife documentaries, animal checklists, and booklets on environmental conservation and then distributes them to

students. The materials inform on various environmental conservation topics while supplementing the formal school curriculums.

7. Nature school programme

This is a programme done in partnership with the school management and other conservation partners like Wildlife Clubs of Kenya. Schools participating in this programme usually have embraced conservation and express it through

having a "talking school". This is achieved through having stated environmental policies and implementing sound environmental conservation activities within the school.

8. Music festivals for schools and colleges

KWS sponsors themes on wildlife conservation during the annual school and college music festivals organised by the Ministry of Education where winners in various categories are rewarded for best performance.

Scaling up conservation education at KWS

1. KWS allocates a budget for conservation education. This budget is insufficient to support education activities as planned. There is therefore need for the government to scale-up funding for the department and make the funding available so that the various activities can be achieved.

2. There is need for human capacity enhancement for conservation education in KWS conservation areas. Currently, only a few conservation areas and KWS-managed protected areas and ecosystems are equipped with sufficient education wardens. For more details on the capacity gaps in the education and information centres in various conservation areas, see Table 38.

3. Expand the number of education and information centres that can serve the public around conservation areas. Some of the areas where education centres are
- required include Maasai Mara ecosystem, Amboseli ecosystem, and Laikipia area. Review the education and outreach programmes in various organisation offering conservation education programmes such as WCK and KWS.

4. Embrace technology in in disseminating conservation education programmes through social media such as YouTube, TikTok, Whatsapp and other platforms are gaining traction as powerful entertainment and education technologies that can be used responsibly to promote human-wildlife coexistence.

5. There is also need for an information portal and digital libraries for conservation education at all institutions providing conservation education programmes where people can access and use from any location.

Table 38: Educational facilities and gaps for education centres or education officers (wardens) across KWS conservation areas

Conservation area	Education centre	Information centre	Education warden
Coast	None	- Kisite Mpunguti Marine Park - Malindi Marine Park - Kwale Hall, constructed by Base Titanium Company as CSR but unequipped.	No
Southern	Nairobi National Park headquarters; inactive Hall converted to photo gallery	No	No
Tsavo	- Tsavo West National Park - Tsavo East National Park	No	Yes
Eastern	- Meru National Park	No	Yes
Central Rift	- Lake Nakuru National Park	No	Yes
Western	No	- Kisumu Impala Sanctuary - Saiwa National Park - Kakamega Forest Reserve	No
Mountain	No	- Aberdares Forest National Park - Maralal (upcoming)	Yes, in Maralal
Northern	No	No	No



Fostering Research And
Information Gathering For
Management Of HWC

Management of HWCs requires reliable data and information for decision making process. As such research and monitoring should be used as a basis for implementing the strategic objectives aimed at preventing HWCs. The national research agenda for Kenya (WRTI,2023) has identified thematic areas where information is required for effective management for HWCs. Furthermore, there is a need to collar wildlife in various HWC hotspots and use it to relay real time data that can be used in the management of HWC. Additionally, there

is a need to develop an integrated HWC and compensation platform to be used to collect, collate and analyse data for decision-making. Currently there exists some digital platforms using GIS can be used to inform and improve decision making.

There is a need to put in place mechanisms improve reporting, capturing and sharing of HWC data and information by all stakeholders, in all the conservation areas.



12

Enhancing Policy, Legal And Regulatory Reforms

Kenya is currently suffering from HWC due to lack of a unified conservation policy, weak cross sectoral legal alignments and lack of an accompanying regulatory frameworks. This chapter examines the policy, legal, and regulatory frameworks

and the funding mechanism that should be considered to strengthen human-wildlife coexistence.

12.1 Human-Wildlife Coexistence Fund: Structure, Funding, And Operation

One of the key drivers of HWCs in Kenya is the fragmented nature of the conservation policies. For instance, there are separate policies for water management, forest management, land tenure and land use management. There is therefore a need to align all the natural resource conservation policies to ensure that the policies are not working at cross purpose and also to achieve an ecosystem approach towards management of HWCs. There is also a need to implement other legal frameworks such as the Land Act and Community Land Act 2016. Moreover, the country is also facing serious budgetary allocation to fund HWC management and there is therefore a need to fully operationalize the Wildlife Conservation Trust Fund and be used for fund raising and support to conservation initiatives including support to the management of HWCs.

The Wildlife Conservation Trust Fund will also deal with fundraising and mobilising resources, enlisting partners for resource mobilisation, initiating creative mechanisms for raising funds, and ensuring there is financial support for management of HWCs by the government. There is therefore a need to gazette the regulations governing establishment of the Wildlife Conservation Trust Fund.

Another driver of HWCs is the natural resource use conflicts relating to wildlife, forest and water among others. There is therefore a need to review, align it to all sectors, finalize and gazette the Natural Resource Sharing Bill 2023. There is also a need to domesticate all Multilateral Environmental Agreements (MEAs) and other international protocols relating to management of natural resources to mitigate against HWCs.

To effectively manage HWCS, institutions such as KWS need to be restructured to make it responsive to managing HWCs. Some of the proposed restructuring is the need to upgrade the CWS department at KWS into a fully-fledged Directorate. To support policy development, there is need to strengthen the State Department for Wildlife at the Ministry of Tourism and Wildlife.

To support conservation at the county levels where land use activities affect conservation causing HWCs, the government should fully implement the legislation which prescribes the county governments to have approved spatial plans.

To support community participation in wildlife conservation, there is need to review composition of the CWCCs through implementation of the Wildlife Conservation and Management Bill 2023.

To expand land for conservation, a review of various legislations on land tenure and ownership should be undertaken so as to incentivise communities and other land owners to provide land for conservation hence mitigating HWCs.

Develop policies and laws for mapping, gazettment and implementation of wildlife corridors and dispersal areas to reduce blockage of migratory corridors and control land uses that are incompatible to conservation in areas adjacent to wildlife areas.

Develop and gazette all ecosystem management and county spatial plans as guiding tools to inform land use and development in Kenya



Action Plans

13.1 Understanding The Drivers And Mapping Conflict Hotspots

For effective mitigation of HWCs, there is a need for a clear understanding of the status, drivers and impacts of HWCs. This understanding requires ongoing research that considers the spatial, temporal, and social characteristics of HWC incidences. In this chapter, we describe the actions as follows:

- Document HWC occurrences and the extent of damages in Kenya's conservation areas
 - Review and determine the severity of HWC in the hotspots
- Map hotspots in all conservation areas
 - Develop and implement ecosystem management and County spatial plans to secure wildlife habitats
 - Identify and restore degraded habitats
 - Adopt a multi-agency approach and streamline conflicting government policies to minimise HWCs

Table 39: Action plans on HWC hotspots, drivers, and impacts

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Document HWC occurrences and the extent of daily damages in all 8 KWS conservation areas	- Understand the nature and scope of HWCs in Kenya - Understand HWC trends in the country	- State Department for Wildlife - KWS - Proposed Human-Wildlife Coexistence Board - WRTI - Conservancies	- Review HWC reporting in order to allow quantification consequences of conflicts, e.g., crop acreage of famers, number of small stock, number of large stock, and number of people killed, number of people with permanent and temporary injuries, and number of wildlife killed according to species. - Digitise reporting of HWCs and store the data on KWS's HWC server. - Collaborate with all stakeholders, including community members, NGOs, and conservancies.
Review and determine the severity of HWC in the hotspots	- Understand the contextual differences of HWCs within different conservation areas in order to assign appropriate resources	- State Department for Wildlife - KWS - Proposed Human-Wildlife Coexistence Board - WRTI - Conservancies	- Work out a new modality to determine HWC thresholds, e.g., High, Medium, Low.
Map hotspots in all conservation areas	- To enhance appropriate allocation of resources for HWC prevention and mitigation	- State Department for Wildlife - KWS - Proposed Human-Wildlife Coexistence Board - WRTI - Conservancies	- Record information about HWC occurrences and provide detailed monthly summaries and geopoints. - Create maps showing HWC hotspots within each of the conservation areas and national summary.

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Develop and implement ecosystem management and County spatial plans to secure wildlife habitats	- Protect wildlife habitat from incompatible human activities	- State Department for Wildlife - KWS - Proposed Human-Wildlife Coexistence Board - WRTI - County governments - Conservancies	- Develop and gazette ecosystem management plans in all the conservation areas lacking them. - Implement ecosystems management plans in all the conservation areas across the country. - Have the national government participate in county spatial planning for all the conservation areas. - County governments to regulate activities incompatible with wildlife conservation.
Identify and restore degraded habitats	- Reduce HWC incidences caused or enhanced by climate change - Undertake habitat restoration and transformation activities, e.g., planting trees, controlling invasive species, reseedling, and creating climate change awareness - Enforce existing relevant laws, i.e., on livestock incursion into wildlife protected areas, riparian area management, Water Act; WCMA, 2013; EMCA, 1999, etc.	- State Department for Wildlife - KWS - WRTI - County governments - Conservancies - Private sector	- Support and undertake habitat restoration in protected areas and on conservancies. - Provide artificial water points within the protected areas and inside core areas of the conservancies.
Adopt a multi-agency approach and streamline conflicting government policies to minimise HWCs	- Ensure that government development policies promote conservation efforts - Undertake environmental and social impact assessments (ESIA) for every mega infrastructure	- State Department for Wildlife - KWS - The National Treasury - NEMA - Proposed Human-Wildlife Coexistence Board - WRTI - County governments	- Adopt a multi-agency approach at all times during the formulation and implementation of government development policies in conservation areas. - Undertake a robust ESIA and audit for every government mega development policy and project in wildlife conservation areas. - Ensure that land tenure reforms make concrete regulatory provisions on how coexistence with wildlife is to be achieved. - Require genuine public participation for infrastructure development and policy formulation that affect wildlife conservation areas.

13.2 Managing Costs Of HWCs To Communities And The Government

Communities in Kenya bear a huge cost for living with wildlife. Mainstreaming HWC issues—specifically the costs involved—into conservation programmes is necessary. Addressing both direct and indirect costs is a key step in providing a remedy to HWCs. Socioeconomic factors are important in shaping tolerance to wildlife, promoting community resilience to the damage and destruction caused by wildlife is thus a key aspect in creating tolerance and harmonious coexistence between humans and wildlife. Households are better able to respond to, cope with and recover from HWCs when they have the resources to replant farms, purchase food and livestock, repair nets and replace damaged property. Strengthening KWS response to both mitigate and deal with human-wildlife conflict issues is also crucial. Greater funding needs to be provided to enhance capacity in the form of personnel, skills, and equipment, and to cooperate with partners in undertaking mitigating actions such as fence

installation and problem animal control. Table 40 outlines actions to be undertaken and include:

- Mainstreaming issues of HWCs into national development dialogues, strategies, and blueprints
- Strengthening KWS's capacity to manage HWCs
- Enhancing corporate social investments/ corporate social responsibility for communities affected by wildlife
- Addressing indirect/additional cost additional costs of human-wildlife conflict
- Mainstreaming HWC issues into national development dialogues, strategies, and blueprints
- Enhancing corporate social investments/ corporate social responsibility for communities affected by wildlife

Table 40: Action plans for managing costs of HWCs to communities and the government

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Mainstreaming issues of HWCs into national development dialogues, strategies, and blueprints	To ensure the impacts of HWCs on communities are addressed in national planning to prevent economic inequalities	- National government ministries, departments led by the State Department for Wildlife, state corporations, semi-autonomous government agencies, and public funds - County governments - KWS - NGOs - CBOs - Civil society	- Strengthen lobbying, participation in national dialogues, and publicity for HWC issues to drive awareness. - Establish a coordination mechanism through wildlife sector working groups in national planning. - Promote collaboration amongst government ministries, departments, and agencies in planning and policy development to avoid policies at odds with conservation goals.
Strengthening KWS's capacity to manage HWCs	To provide KWS with the requisite capacity to deal with HWC issues, including undertaking mitigating actions and fostering community tolerance to wildlife	- State Department for Wildlife - KWS	- Provide adequate or greater funding to KWS. - Recruit and train more KWS personnel to address HWCs. - Re-train existing KWS personnel to deal with HWC issues; updating of the current training curriculum at the Law Enforcement Academy; and provision of refresher courses to KWS staff. - Provide adequate equipment and tools to KWS to undertake HWC mitigation.

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Enhance corporate social investments/ corporate social responsibility for communities affected by wildlife	Gain buy-in/support for conservation of wildlife by wider sharing of benefits	- KWS - Private sector players - NGOs and CBOs - Conservancies - Tourist facilities and other hospitality entities	- Enhance CSR as a revenue sharing model (based on an allocation of revenue generated from parks, other government agencies, and the private sector). - Collaborate with partners to enhance CSI, by strengthening partnerships and PR in KWS. - Providing recognition to entities undertaking CSI activities.
Addressing indirect/ additional cost of human-wildlife conflict	To ensure that indirect costs to communities are known and addressed	- KWS - Conservancies - National Government Administration Officers - Civil society and religious groups - NGOs and CBOs	- Expand counselling to communities affected by HWCs. - Collaborate with local leadership to address the additional cost of HWCs. - Scale up best practices and tools in HWC mitigation and resilience promotion. - Work with stakeholders to provide extension services and veterinary services to prevent the transmission of diseases from wild animals to livestock. - Expand and deploy PAMUs strategically, especially in conflict hotspots.
Mainstreaming HWC issues into national development dialogues, strategies, and blueprints	To ensure the impacts of HWCs on communities are addressed in national planning to prevent economic inequalities	- National government ministries and departments led by the State Department for Wildlife, state corporations, semi-autonomous government agencies and public funds - County governments - KWS - NGOs - CBOs - Civil society	- Strengthen lobbying, participation in national dialogues, and publicity for HWC issues to drive awareness. - Establish a coordination mechanism through wildlife sector working groups in national planning. - Promote collaboration amongst government ministries, departments and agencies in planning and policy development to avoid policies that are at odds with conservation goals.
Enhancing corporate social investments/ corporate social responsibility for communities affected by wildlife	Gain buy-in/support for conservation of wildlife by wider sharing of benefits	- KWS - Private sector players - NGOs and CBOs - Conservancies - Tourist facilities and other hospitality entities	- Enhance CSR as a revenue sharing model (based on an allocation of revenue generated from parks). - Collaborate with partners to enhance CSI by strengthening partnerships and PR in KWS. - Recognise entities undertaking CSI activities. - Strengthen incentives for honorary wardens so that they can feel a sense of pride for their activities.

13.3 Monitoring And Managing Species Involved In HWC Incidences

Several species involved in HWC incidences face endangerment or even extinction. At the very least, there numbers are of concern. They include: large carnivores (lions, leopards, cheetahs, spotted hyenas, wild dogs), herbivores (elephants, hippos, common zebras, African buffaloes, common waterbucks), and reptiles found in aquatic environments (like crocodiles). Many have other mortality factors affecting them. Therefore, there must be a sustained effort to monitor and manage these species and minimise population attrition from HWCs. This can be done through constantly monitoring of mortality from HWCs and other causes, studying population trends and behaviour, monitoring factors associated with livestock predation and crop raiding of specific species, and understanding how to prevent, respond, and mitigate them. The strategic management and recovery action plans for lions, spotted hyenas, elephants, wild dogs, and cheetahs are all listed on the KWS website (<http://www.kws.go.ke/downloads>).

It is also important to train locals and personnel involved in HWCs on how to correctly identify wildlife species involved in livestock predation and crop raiding. It is common for livestock predation by spotted hyenas, leopards, and cheetahs to be attributed to lions, causing unwarranted retaliatory attacks by communities. Table 41 proposes the action plans needed to safeguard these species as follows:

- Monitor species abundance, movement and distribution
- Identification, classification, Control and regulation of all substances used to poison wildlife
- Strengthen Long-term human wildlife coexistence measures (for prevention and response)
- Create community awareness on wildlife species involved in HWCs

Table 41: Actions plans for conserving wildlife species involved in HWC incidences

HWC issue for action	Mitigation strategy and action plan	Stakeholders	Requirements
Monitor species abundance, movement and distribution	• Management reports, recovery plans, and other documents of these species have information on population size and trends over time. • Collect data and information on site-specific trends, especially in HWC hotspots, and clearly document those whose mortality is the result of conflicts • Continuous research and monitoring in all the conservation areas • Implementation and renewal of management and species recovery plans	• KWS/government • Conservation NGOs • County governments • Research institutions/ universities • WRTI • Conservancies	• Require implementation by all conservation stakeholders
Identification, classification, Control and regulation of all substances used to poison wildlife	• Research and laboratory identification of substances commonly used by communities for poisoning wildlife due to conflicts • Enact stiff penalties for using pesticides to poison wildlife, as with poaching, since it affects many non-target species • Companies and organisations that import pesticides used as poison to kill wildlife should be prosecuted after these chemicals are listed as restricted or forbidden substances	• KWS/government • Conservation NGOs • County government • Research institutions/ universities • WRTI • Judiciary • Pharmacy and poisons board	• Identify chemicals, classify restricted/ prohibited substances, and enforce compliance by all parties involved

HWC issue for action	Mitigation strategy and action plan	Stakeholders	Requirements
Strengthen Long-term human wildlife coexistence measures (for prevention and response)	• Put in place long-term strategies for expanding wildlife spaces for these species, e.g., increasing conservancies, opening wildlife movement and migration corridors, and restraining conversion of wildlife dispersal areas for other land uses in all the conservation areas • Draft integrated land plans at the county level and enforcing the need for landscape and county spatial and land use plans	• KWS/government • Conservancies • Conservation NGOs • County governments • Local communities and landowners	• Enforce spatial and land use plans at the ecosystem and landscape levels in all the counties • Secure wildlife movement and migration corridors and dispersal areas • Strengthen conservancies' fora
Create community awareness on wildlife species involved in HWCs	• Enhance education and awareness on the dangers of harmful retaliation against wildlife using pesticides as poisons due to their harm impacts. • Educate communities on the importance of large carnivores in the food chain, national parks and ecotourism and sensitise them on the need to be tolerant towards these species	• KWS/government • WCK • Conservation NGOs • Conservancies, County governments • Local communities and landowners	• Deploy, train, study, and combine complementary HWC mitigation strategies to provide the highest level of efficiency and effectiveness against species involved in HWCs • Involve all stakeholders in sourcing funds to support these proposed actions • Develop MoUs and awareness campaigns • Provide tools and equipment

13.4 Empower Communities To Support HWC Mitigation Measures

13.4.1 Community empowerment and mitigating measures

To improve HWC mitigation measures, there is need for the government to empower the communities through financial compensation and other inducements. The following measures (Table 42) focuses on mapping migration corridors; securing dispersal areas; recording spatial land planning and land use changes; developing integrated land management plans; and providing encouragement and support for the communities they serve.

Table 42: Action plans for community empowerment in initiating and deploying mitigation measures against HWCs

Action plans and mitigation strategy needed	Stakeholders involved	Requirements
- Long-term: Secure migration corridors and dispersal areas, encourage conservancies, draft spatial and land use plans, conduct integrated land planning, and carry out educational programmes	- Government/ KWS/WCK - Conservancies - CBOs and CAK - Conservation NGOs - County governments - Local communities and landowners	- Require counties to pass spatial plans - Require landscapes to make and enforce land use plans - Have government identify and gazette migration corridors and wildlife dispersal areas
- Build predator-proof bomas - Use crop repellents and bees - Deploy early warning systems (motion lights, movement monitoring by scouts) - Improve livestock husbandry practices - Employ preventive measures (strong and well-equipped KWS rangers and game scouts) - Improve responsiveness (fast and efficient KWS rangers and community scouts) - Guard crops (watch towers, dogs, vigilance) - Build electric fences, stone walls, and moats (separation from agriculture hard edge)	- Government/ KWS/WCK - Conservancies - Conservation NGOs - County governments - Local communities and landowners	- Deploy, train, study, and combine complementary HWC mitigation strategies to provide the highest level of efficiency and effectiveness against species involved in HWCs - Involve all stakeholders in sourcing funds to support these proposed actions

13.4.2 Benefits to communities

Communities’ coexistence with wildlife is directly influenced by the degree to which they are willing to tolerate the costs and damages caused by wildlife. Tolerance in this case can be greatly improved if communities are guaranteed benefits that offset the costs of HWCs. Benefits can be economic, political, and sociocultural.

There exist many models through which communities can draw direct benefits from wildlife conservation. Conservancies are popular ways in which communities can directly benefit from coexisting with wildlife. While community and group conservancies have increased in number, impact, and popularity in Kenya, numerous challenges erode the benefits

that they hitherto avail to communities and therefore reduce their effectiveness in promoting coexistence. To ensure that benefits to communities promote coexistence, this strategy recommends the following:

1. Increase benefits to communities to offset the costs.
2. Enhance wildlife user rights.
3. Enhance resilience of households to impacts of HWCs.

These objectives can be achieved if specific actions are taken (Table 43).

Table 43: Action plans for ensuring benefits to communities to enhance human-wildlife coexistence

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Enhance wildlife user rights	Ensure equitable distribution of benefits from conservation	- State Department for Wildlife - KWS - Proposed Human-Wildlife Coexistence Board - NGOs supporting conservancies - KWCA and regional associations - Conservancies	Develop and implement regulations on wildlife user rights
Add value to conservancies and other non-consumptive-related enterprises	Increase benefits of coexistence with wildlife by increasing incomes to conservancies	- State Department for Wildlife - State Department for Tourism - KWRTI - Kenya Tourism Board - KWS - NGOs supporting conservancies - Private tourism investors - KWCA and regional associations - Conservancies	- Fund land restoration in conservancies in arid and semi-arid lands (ASAL) - Experiment with diverse revenue streams to increase conservancy incomes - Finance and support local sports, e.g., Maasai Olympics, in HWC hotspots - Support the production and marketing of films produced by local communities. - Explore using the digital economy, e.g., income from YouTube videos - Finance and support strategic marketing strategies for conservancies within and outside Kenya - Diversify the economic portfolios within the conservancies to allow for benefits, e.g., carbon trading, mining, etc.

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Improve transparency in land lease agreements to provide insight on increasing benefits	Enhance transparency in the lease agreements negotiations between conservancy landowners and investors	- State Department for Wildlife - State Department for Tourism - Office of the Attorney General - Kenya Tourism Board - KWS - NGOs supporting conservancies - Private tourism investors - KWCA and regional associations - Conservancies	- Mediate the renegotiation of land leasing contracting modalities - Revise modalities of lease agreements to peg them either a proportion of turnover or verified value of land under lease
Improve conservancy governance	Improve governance structure of group and community conservancies	- State Department for Wildlife - KWS - NGOs supporting conservancies - KWCA and regional associations - Conservancies	- Develop customisable protocols for Monitoring, Evaluation, Accountability, and Learning (MEAL) for community and group conservancies - For community and group ranches, provide regulation that enforces democratic and transparent principles of conducting annual general meetings and electing leaders - Assign MEAL implementation to a KWS office - Organise regular trainings related to governance
Enhance benefits from tourism and human-wildlife coexistence	Increase income generation from tourism to communities	- State Department for Wildlife - KWS - NGOs supporting conservancies - KWCA and regional associations - Conservancies	- Support communities to develop coexistence tourism products in viable areas, e.g., community managed lodges, conservancies, living cultural museums - Negotiate CSR activities with at least one medium tourism facility with the conservation areas - Monitor and evaluate economic performance and income distribution - Coordinate with tourist hotels to ask visitors to donate directly to specific CSR projects

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Increase household resilience to HWCs	Increase resilience of households to HWC impacts	- State Department for Wildlife - KWS - NGOs supporting conservancies - KWCA and regional associations	- Implement grassroots financial solutions, e.g., <i>chamas</i> and savings and credit cooperatives - Support income-diversification in HWC hotspots and evaluate their impact on resilience - Link households from HWC hotspots to affordable microfinancing schemes such as the government's Hustler Fund. - Link and support households from HWC hotspots to insurance schemes covering their crops and livestock
Tie HWC mitigation methods to income generation	Strengthen the capacity of communities to generate income from mitigation strategies	- State Department for Wildlife - KWS - NGOs supporting conservancies - KWCA and regional associations - WRTI - Universities	- Research mitigation strategies that can also earn income for communities, and evaluate their economic viability, e.g., growing ginger and garlic, building bee fences, and linking communities to markets - Support communities to engage in HWC mitigation methods from which they can also earn an income, and help link them to markets, e.g., chili fences and bee fences
Consider carbon payment schemes	Explore feasibility of expanding carbon payment schemes to incentivise compatible land use for coexistence in HWC risk zones	- State Department for Wildlife - KWS - Ministry of Environment and Natural Resources - NGOs supporting conservancies - KWCA and regional associations - WRTI - Universities - Private sector	- Conduct a feasibility assessment for carbon credit schemes in the different conservancies - Support conservancies to participate in carbon credit schemes including negotiating with investors

13.4.3 Wildlife economy and community enterprises

The economic contribution of wildlife resources needs to be recognised since wildlife contributes a large part to Kenya's GDP. Hence, enterprises in the sector need to be scaled and special incentives provided to enable their growth. Most conservancies are still in their infancy and could benefit greatly from enterprise advisory services and governance support. There are several ways to build the wildlife economy—for

example, creating markets for products such as honey and enhancing their value chains; embracing emerging opportunities such as film, and involving local communities; and developing regulations and guidelines for carbon finance and investing in education and awareness creation. Table 44 outlines actions to be undertaken to promote the wildlife economy and community enterprises.

Table 44: Action plans for the wildlife economy and community enterprises

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Provision of incentives for communities to maintain wildlife on their lands or engage in compatible land uses	Ensuring that wildlife is seen as a competitive land use option that provides long-term financial rewards in comparison with other economic activities	- State Department for Wildlife - National Treasury - Ministry of Industrialisation, Trade and Enterprise Development - Conservancies - NGOs and CBOs	- Review leases and standardise lease rates through lease rate guidelines to ensure fairer terms and transparency for landowners for the use of their land - Develop self-regulation standards for conservancies through their umbrella body, the Kenya Wildlife Conservancies Association - Enhance development projects to communities living with wildlife, such as school facilities, medical facilities, and those that provide water, electricity, and lighting - Prioritise employment opportunities in the wildlife sector to those communities living with wildlife, e.g., recruit rangers and community wildlife scouts - Provide tax incentives, e.g., deductions on equipment, such as fences, as well as waivers and exemptions for community wildlife enterprises - Award scholarships to communities living with wildlife to redress inequities - Decentralise carbon rights and promote sale of carbon credits

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Diversification of wildlife use	Expanding the opportunities from wildlife beyond tourism	- State Department for Wildlife - KWS - Private sector players - Conservancies - NGOs and CBOs	- Harness the use of PPPs in the management of under-utilised parks and reserves that have high potential as well as community and group conservancies - Enhance the administration of PPPs for facilities located in game parks and reserves by establishing key performance indicators for renewal of agreements - Government to conduct periodic review of fees for use of wildlife assets—e.g., filming fees could be charged based on viewership (film rights can be shared by both KWS and the filming entity), and fee for research and the establishment of hospitality facilities in protected areas - Explore the use of financial instruments to diversify wildlife value, e.g., listing wildlife assets on the Nairobi Securities Exchange - Start large-scale community production of honey in areas adjacent to game parks and reserves (government can jumpstart this by providing beehives and providing extension services) - Promote education and increase awareness on wildlife enterprises, including researching the legal requirements for establishing such enterprises and the value chains associated with them - Harness opportunities in the blue economy by developing a National Blue Economy Strategy and Implementation Plan covering aspects such as fisheries and aquaculture, pharmaceuticals and chemicals, research and blue carbon
Development of enabling legislation, policies, and guidelines to promote economic activity	Providing frameworks that enable Kenya to harness economic opportunities from wildlife, especially those that are emerging, including carbon finance	- State Department for Wildlife - KWS - NGOs and CBOs - National Assembly	- Develop multi-sectoral committees between wildlife, marine, forestry, agriculture, trade, the National Treasury, and other sectors to identify and unlock opportunities in the wildlife economy - Develop national frameworks on carbon finance, including establishing a National/ Regional Carbon Trade Exchange or participating in international exchanges. - Develop policies facilitating live trade of animals and sustainable trade in herbal/ pharmaceutical, oil, aromatic, and industrial plants
Capacity building of nature-based enterprises	Providing communities with the requisite skills and capacity to undertake sustainable community enterprises based on wildlife	- KWS - Business incubators - Conservancies and community ranches - NGOs and CBOs - Universities	- Train communities on nature-based enterprises. - Promote good governance and sustainable business practices by documenting and enforcing best practices in establishing community enterprises through umbrella organizations e.g. KWCA - Offer wildlife industry and enterprise courses in colleges and universities

13.4.4 Pilot insurance and schemes administration to Fastrack payment of HWC claims

Effective insurance or scheme administrator model for compensation can play a big role in increasing tolerance to wildlife, reducing and preventing retaliatory attacks, and incentivising measures to reduce wildlife damage. However, for them to succeed and be embraced, there needs to restructure and digitise the present compensation model to ensure timely and fair insurance payments, clear rules, guidelines, regulation and enforcement, and participation. Table 45 outlines actions to be undertaken to enhance the efficiency in settling HWC compensation claims.

Table 45: Action plans to enhance the uptake of insurance to mitigate human wildlife conflicts

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Develop and implement guidelines and regulations for the government compensation scheme	Provide standards and operating procedures for government compensation, including for claims, verification, approvals, processing, payments, timelines, and the institutions involved	- State Department for Wildlife - National Treasury - Community representatives, including from NGOs, CBOs, conservancies, and community ranches	- Develop guidelines and standards for the National Government Compensation Scheme and pilot Insurance/ scheme administrator services - Develop an integrated HWC and compensation management information system - Submit an annual report on the status of Compensation to the Parliamentary Committee on environmental and natural resources and the Treasury.
Promote the establishment of local community compensation schemes	Enable communities to participate in compensation schemes at the local level to provide them with protection when HWC incidents occur	- KWS - NGOs and CBOs - Conservancies and community ranches - County governments	- Establish community compensation schemes by community ranches - Bundle insurance with other incentives for enhanced agricultural and livestock production (programmes undertaken by the Ministry of Agriculture, Livestock, Fisheries and Cooperatives should have an element of insurance) - Share best practices in community compensation arrangements under the umbrella organizations - Undertake valuation of livestock assets in community ranches
Enhance education and create awareness about insurance as a way of mitigating HWCs and preventing losses	Education community members on insurance as an option for HWC mitigation and promote the adoption of insurance as a mechanism for mitigating losses	- Association of Kenya Insurers - Insurance companies and consultants - KWS - Conservancies	- Undertake outreach programmes with communities and the public including through public barazas, social and mainstream mass media. - Host annual conferences on HWC mitigation. - Build community awareness on the importance of insurance through radio programming, community barazas, and places of worship

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Fully operationalize the Wildlife conservation Trust Fund to support establishment of Conflict Mitigation Fund	Ensure that government compensation schemes and premiums paid by the government on behalf of communities are financially sustainable	- State Department for Wildlife - KWS - National Treasury - Private sector players, including players in the tourism and hospitality sector - County governments	- The government to Gazette regulations for operationalizing the Wildlife conservation Trust Fund - Fully constitute a board and establish the fund secretariat. - Develop and implement the Resource Mobilisation Strategy for conservation
Strengthen participation of private sector/ insurance service providers in provision of insurance and compensation	Drive private sector participation in wildlife insurance and promote micro-insurance as a model for insurance against losses occasioned by wildlife	- Association of Kenya Insurers - Insurance companies and consultants - State Department for Wildlife - KWS - Conservancies and community ranches - NGOs	- Explore options on how insurance companies can compensate costs of crop, livestock, and property damages - Utilise technological tools and platforms such as apps and USSD codes to make programs easier to use and increase uptake of insurance products - Develop cost-effective insurance products that take into account the economic and demographic profiles of communities living with wildlife - Harness weather-index-based insurance products as an entry point for scaling up insurance uptake and bundle coverage for HWCs as part of weather-based-index insurance policies - Replicate learnings and experiences from other jurisdictions

13.5 Land Use And Spatial Planning In Conservation Areas

Land use planning and spatial plans are critical in safeguarding migration corridors and wildlife dispersal areas, and containing encroachment of incompatible land uses from wildlife space. This will help reduce HWCs and is a critical and effective long-term strategy. Many protected areas and ecosystem

and a few Counties have conservation and development plans. However, there is a poor implementation due to limited resources. Table 46 proposes some actions plans.

Table 46: Action plans for land use and spatial planning in conservation areas

Human-wildlife coexistence issue	Purpose	Stakeholders	Requirements
Catalogue all counties, protected areas, landscapes, and conservancies where spatial and management plans are required but not drafted or implemented, establish challenges, and find a way forward	Identify counties, protected areas, conservancies, and landscapes struggling to preparing spatial plans and address obstacles	- NEMA - Conservation NGOs - County governments (committee on wildlife in the CoG) - KWS - Conservancies - CBOs and stakeholders in conservation landscapes	- Enforce this mandate and require that county governments and applicable entities in conservation areas prioritise drafting and implementing plans - Seek funding for the process, including technical expertise
Establish good practices in negotiated plans, compromise, and address obstacles in implementation	Identify constraints to preparing and implementing spatial and management plans and address them appropriately	- NEMA - Conservation NGOs - County governments (committee on wildlife in the CoG) - KWS	Create a committee (at the national level or under the CoG) to advance this process in collaboration with KWS and NEMA
Lobby for the development of spatial plans in all counties	- Require every county, landscape, and protected area to have a spatial and management plan that is accepted by all and is enforceable - Actualise the goals of the plans, their enforcement, and compliance by all stakeholders	- National government - NEMA - Conservation NGOs - County governments (committee on wildlife in the CoG) - KWS (parks and reserves) - Local communities - Conservation NGOs	- Prioritise development of plans - Ensure sufficient funding and prudent use of these resources - Ensure that plans are gazetted and implemented - Hire skilled personnel - Involve many stakeholders, especially landowners and local and community leaders, to improve acceptability and ensure compliance

Human-wildlife coexistence issue	Purpose	Stakeholders	Requirements
Identify all wildlife movement and migration corridors in each conservation areas	Identify key wildlife movement and migration corridors that should be protected, reclaimed, and gazetted by the government	- National government - NEMA - Conservation NGOs - County governments (committee on wildlife in the CoG) - KWS (parks and reserves) - Conservancies - CBOs and stakeholders in conservation landscapes - Landowners (private and communities)	- Form a Multiagency Committee to spearhead identification of priority key corridors to be secured, reclaimed, and gazetted, and the process to be used - Provide funds for the entire process and compensate affected people - Ensure implementation
Develop and review ecosystem management plans	- Enhance wildlife conservation - Promote human-wildlife coexistence - Harmonise environmental conservation and development	- NEMA - County governments (committee on wildlife in the CoG) - KWS - Local communities - Conservation NGOs	- Provide funding - Involve many stakeholders, especially landowners, to increase acceptance - Ensure plans are implemented and enforced

13.6 Scaling Up Conservation Education And Awareness On Human-Wildlife Coexistence In Kenya

Conservation education programmes are key in promoting Human wildlife coexistence. Conservation education institutions should be expanded and resourced to make them more effective. Table 47 summarizes the specific action plans for scaling up conservation education and awareness programmes.

Table 47: Action plans for scaling up conservation education and awareness

Human-wildlife coexistence issue	Purpose	Stakeholders	Requirements
Undertake national conservation education programmes	- Produce a national campaign to educate Kenyans on the importance of wildlife to tourism, ecosystems, and livelihoods, and as a national heritage - Emulate the domestic tourism campaigns used in <i>Jivinjari</i> and <i>Tembea Kenya</i> but include strong educational content	- KWS - State Department for Wildlife - Ministry of Basic Education - WCK and other conservation partners	- Coordinate programme content and sourcing - Decide on effective media outlets to use - Maintain consistent messaging through funding support - Have Ministry, KWS, WCK, and NGOs collaborate to upscale impact
Fund and increase capacity of both KWS and the WCK for educational personnel and budgets	- Allow KWS to operationalise its education and information centres countrywide - Help WCK expand programmes and regions of influence -Ensure that both organisations consistently meet their mandates	- State Department for Wildlife - KWS - WCK - Private players interested in conservation education in Kenya	- Include appropriate budgetary proposals for this activity - Develop proposals to raise funds to support conservation education programmes - Request conservation NGO support and collaboration in providing education outreach
Strengthen the primary, secondary, and tertiary school curricula for to make conservation and environmental themes significant topics	-Encourage schools that have not engaged with WCK or have no wildlife/ environmental club to do so	- Ministry of Education (TSC, KICD) - WCK - KWS	- Promote collaboration, goodwill, and consistency of purpose - Recognise teachers for exceptional engagement in conservation

Human-wildlife coexistence issue	Purpose	Stakeholders	Requirements
Request that the Ministry of Education and KICD formalise inclusion of conservation education in curricula and teacher responsibilities, and credit and reward best performing programmes	- Reward certification and collaboration with WCK on conservation education as a valuable teacher contribution either in class or as an extracurricular activity	- Ministry of Education (TSC, KICD) - WCK - KWS	- Liaise with WCK and KWS for content and determine how to mainstream it into the education curriculum or extracurricular programmes - Harmonize all conservation education programmes
Scale up a national programme using media (TV, radio, print, etc.)	- Produce a national campaign to educate Kenyans on the importance of wildlife to tourism, ecosystems, and livelihoods, and as a national heritage - Emulate the domestic tourism campaigns used in <i>Jivinjari</i> and <i>Tembea Kenya</i> but include strong educational content	- Government Department for Wildlife - KWS - WCK and networks - Many participating NGOs with education focus in Kenya - Interested public and private institutions	- Coordinate programme content and sourcing - Decide on effective media outlets to use - Maintain consistent messaging through funding support - Have Ministry, KWS, WCK and NGOs teaming together to upscale impact

13.7 Fostering Research And Harnessing Information For The Management Of Human-Wildlife Conflicts

To effectively manage HWCs there is a need for reliable data to support management decisions. Table 48 outlines the actions to be undertaken to ensure that the management of HWCs is data driven.

Table 48: Action plans on HWC data and information for human-wildlife coexistence

Human-wildlife coexistence issue and activity	Purpose	Stakeholders	Requirements
Build capacity for KWS and WRTI to collect data and conduct research to support HWCs	Use HWC research data and information to make informed decisions on how to enhance human-wildlife coexistence	- KWS - WRTI	- Arrange discussions on how KWS and WRTI officers will collaborate on research of HWCs in the conservation areas - Develop joint thematic areas for research on HWCs
Draft HWC data and information sharing agreements and protocols	More stakeholders to make input to the national HWC data and information database at KWS	- KWS - WRTI - Conservation NGOs - Conservancies - CBOs and CAK	- Conduct annual conferences between KWS , WRTI and other partners to share the findings - Harmonize HWC data collected by various conservation partners
Standardise the format and protocol of documenting comprehensive data and information on HWCs for use by all stakeholders	Collect comprehensive HWC data and information in all the conservation areas	- KWS - WRTI - Conservation NGOs - Conservancies - CBOs - County governments - National government local administrators - Relevant departments from the national government	Convene regional meetings (Conservation areas) of partners at regional level to discuss and evaluate HWCs issues
Document and share information on how HWC data and information can be shared with stakeholders and the public consistent with partnerships and the 2010 constitution	- Be accountable and share HWC data and information with relevant stakeholders - Share on an as-needed basis sensitive HWC data and information with relevant stakeholders	- KWS - Conservation NGOs - Conservancies - CBOs and CAK - Relevant departments from the national government	- Enhance HWC data and information sharing agreements - Monitor and evaluate HWC activities - Develop a standardised template for the information required

13.8 Funding Mechanisms And Legal And Regulatory Frameworks

13.8.1 Operationalize the Wildlife Conservation Trust Fund

Human-wildlife conflict compensation primarily comes from the exchequer. The operationalization of the Wildlife Conservation Trust Fund will improve funding to support the management of HWCs. The accessed to the funds is outlined in the PFM Act 2023.

13.8.2 Gaps in policy, legal, regulatory and institutional frameworks

The effective implementation of HWCs management has been hampered by contradictions in policy, legal, regulatory and institutional Frameworks. There is a need to implement actions aimed at aligning the various policies legal and regulatory frameworks to make institutions and HWCs management initiatives more responsive. Table 54 outlines proposed action plan for legal, regulatory and institutional framework to support conservation.

Table 49: Action plans for legal, regulatory, and institutional frameworks

Human-wildlife coexistence issue	Purpose	Stakeholders	Requirements
Align all conservation sector laws to minimize overlaps and contradictions	Strengthen WMCA, 2013 so that it can be used to enforce designated land use, as well as spatial and management plans in conservation areas	- State Department for Wildlife - KWS - Legislative arm of the government	Attain government consensus on the importance of this proposal to secure wildlife space and corridors outside protected areas
Insert a statement in WMCA, 2013 stating that KWS is mandated to protect human life and property	Ensure local communities realise that the government and other relevant stakeholders value both wildlife and people	- State Department for Wildlife - KWS - Legislative arm of the government	Conduct an appropriate review of the WMCA, 2013
Fast-track implementation of the report on wildlife migration corridors and dispersal areas	- Address all obstacles and challenges to this process through negotiation and consensus building ??Publish?? gazette already mapped out wildlife migration corridors and dispersal areas	- State Department for Wildlife - Ministry of Lands - Ministry of Planning - KWS - WRTI - Conservation NGOs - Communities/ landowners - County governments - Local politicians and other key opinion leaders	- Reactivate this process as key to long-term mitigation of HWCs - National government to spearhead the implementation process

Human-wildlife coexistence issue	Purpose	Stakeholders	Requirements
Support wildlife conservancies in various areas of Kenya	• Improve conservancies' management capacity and viability • Diversify conservancies' income streams • Assist conservancies in improving human-wildlife coexistence and local livelihoods	• State Department for Wildlife • County governments • Conservation NGOs • Tourism investors • KWS	• Enable policy and grant government subsidies as with agriculture • Support the preparation and implementation of management and spatial plans



14

Coordination and Next Steps

The first step is to embed institutional and legal changes to the WCMA, 2013 that provides multiple-pronged approach with multi-agency cooperation in implementing institutional changes in KWS to operationalize the Wildlife Conservation Trust Fund and provide resources for implementation of this strategy. This should go simultaneously with improving the

capacity of KWS to prevent further conflicts and respond to HWC incidences effectively. This could be done through increased funding to acquire additional personnel and equipment, provide incentives to KWS rangers, and partner with organisations and county governments to hire additional community wildlife rangers.

This strategy proposes the following as first steps toward implementing this plan

- 01** Call for a validation workshop to disseminate the action plan to various actors and conservation partners. Participants to discuss the recommendations and action points of this strategy, and stakeholders should indicate what they can contribute to enhance human-wildlife coexistence.
- 02** Call a national conference on human-wildlife coexistence for all stakeholders. Subsequent annual conferences on human-wildlife coexistence—hosted by the State Department of Wildlife and KWS should take place to allow stakeholders to discuss best practices; mitigation measures and their performance; national strategies in reducing conflicts; any achievements; and any challenges and how they can be addressed to achieve even better benchmarks for reduced HWCs in Kenya in the following year.
- 03** Arrange an HWC Strategy Resource Mobilisation Workshop to jumpstart the resource mobilization. This workshop will bring together donors, the government, and NGO implementers of the strategy, with the goal of discussing a potential budget, clarifying government capacity to financially support the strategy, creating awareness for the levies that will be collected from beneficiaries to support the fund; seeking donor commitments to support different components of the strategy; and seeking commitments from NGOs and other expert practitioners to provide in-kind support for the strategy, e.g., training, consulting, joining coordination committees, conducting research, and training communities.
- 04** Within the next half a year and across all landscapes where wildlife is still abundant and where there are conflicts, determine the strengths and weaknesses of the plans, strategies, and conservation actions using either METT-4 or the Safe Approach tool. These tools will assess management efficiency and expose areas of weakness and strength for each landscape or conservation area. Further, they will reveal more site-specific actions that need to be done. This can then be followed by landscape-specific actions, including revising management plans, protecting citizen protocol development, and the like.
- 05** Develop a monitoring and evaluation matrix so that progress on the implementation of this strategy can be tracked. This matrix will serve as a medium for sharing information, implementing good practices, and monitoring progress on human-wildlife coexistence in Kenya. It is recommended that this task be done by all stakeholders in the resource mobilisation workshop recommended in step 4 above.



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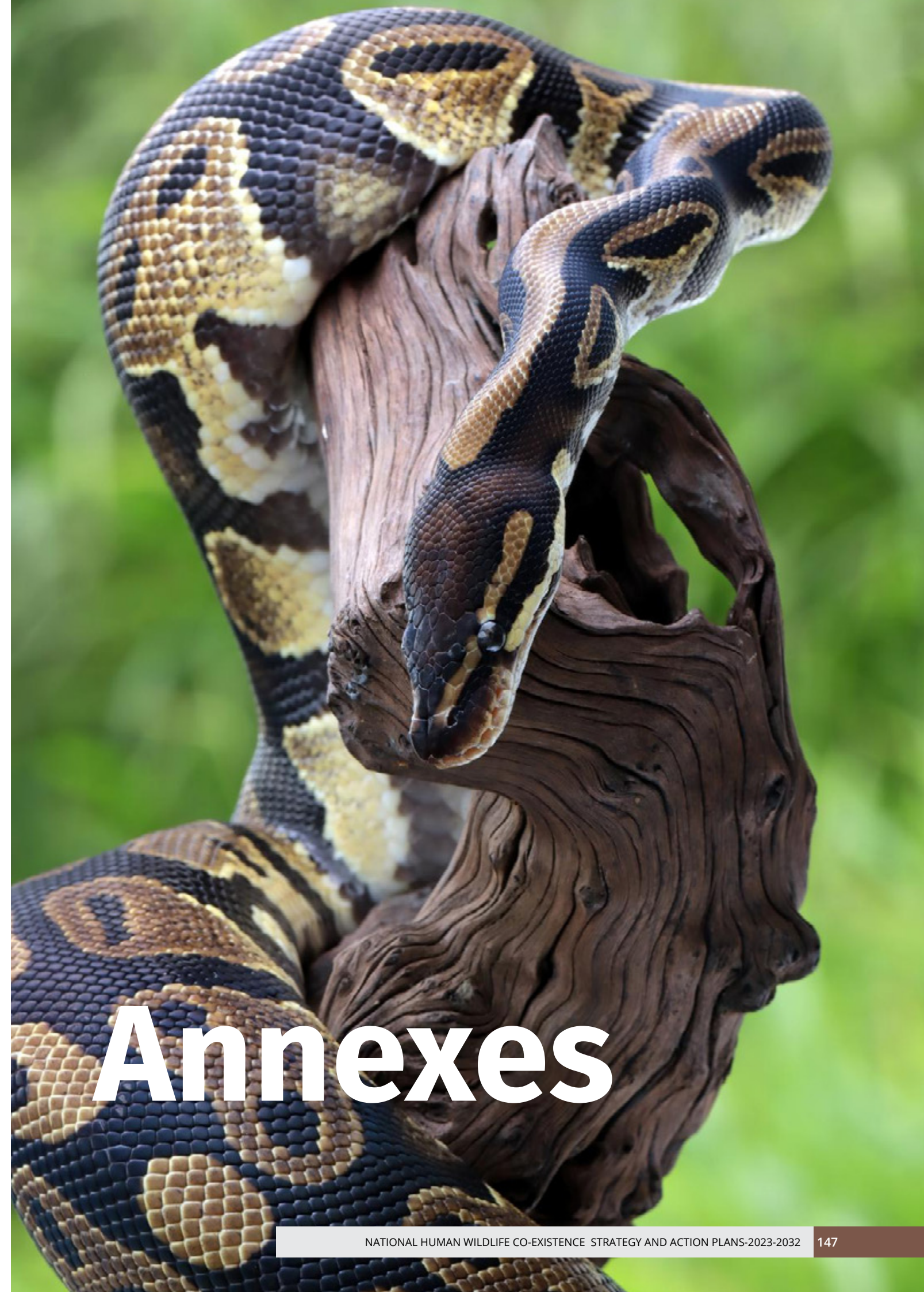
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Annexes

ANNEX 1 Distribution Of HWCs Across Counties
From 2017 to 2021

(Source, Kws Database)

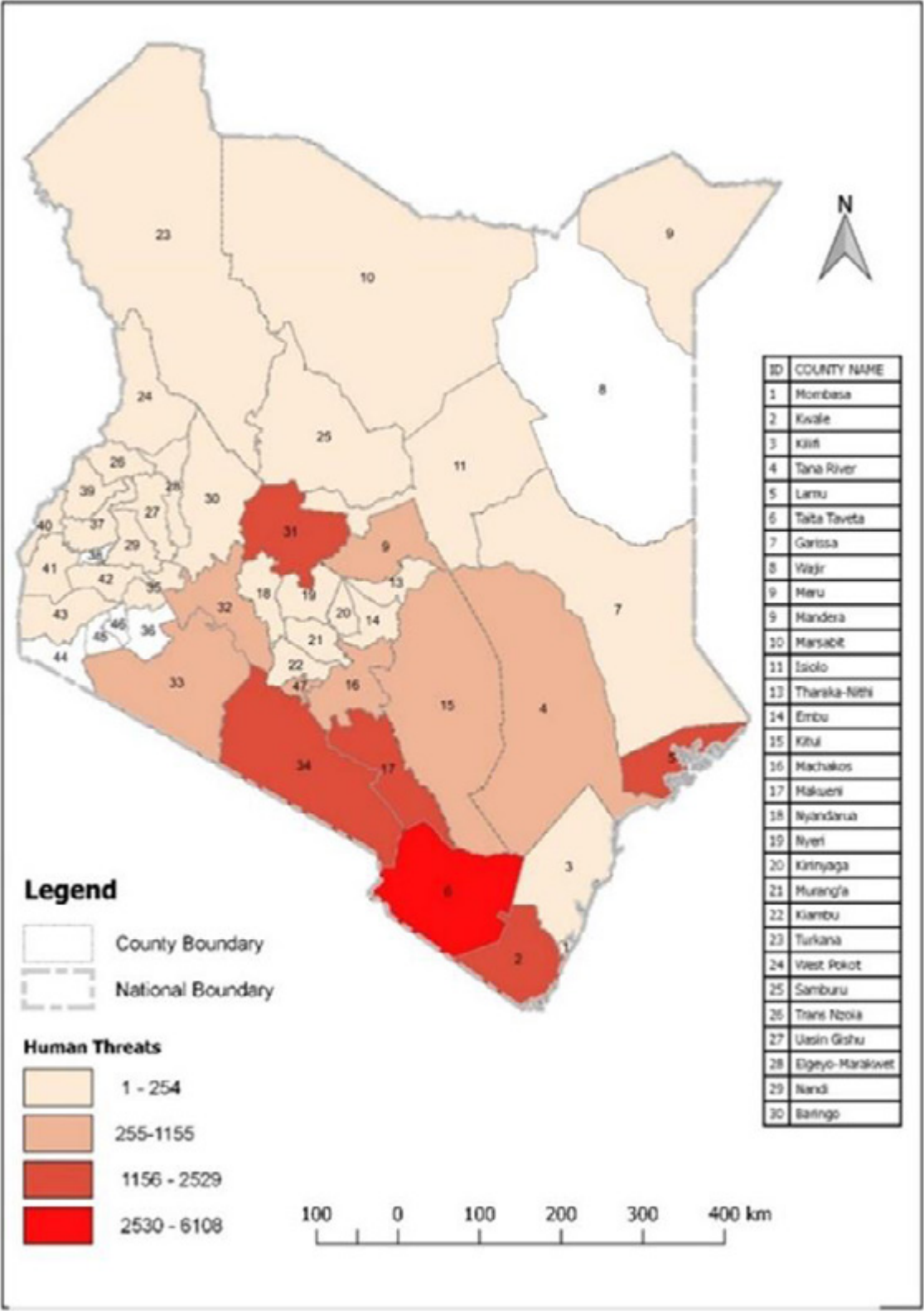


Figure 27: Distribution of human threats to wildlife across counties

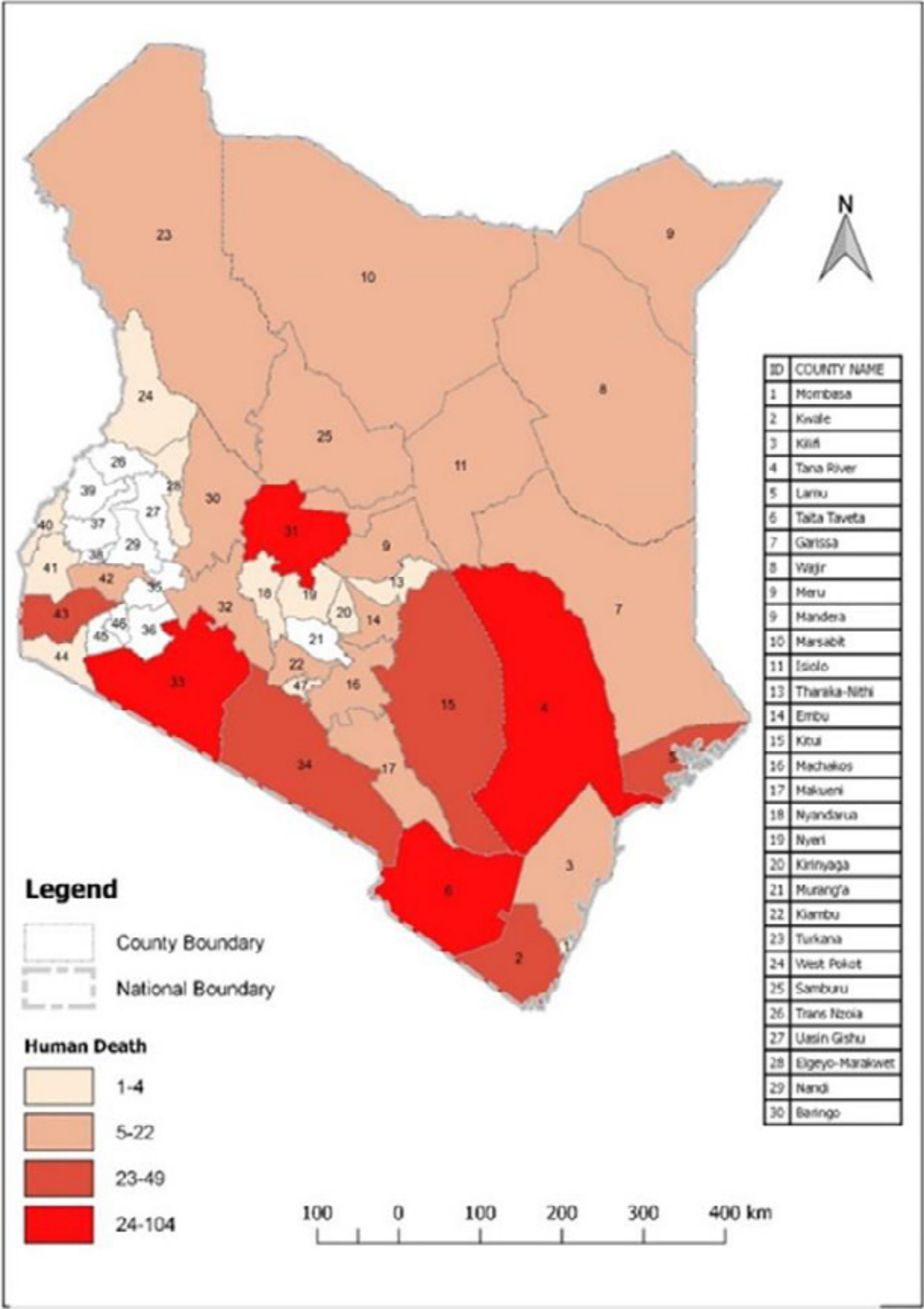


Figure 28: Distribution of human death due to HWCs across counties

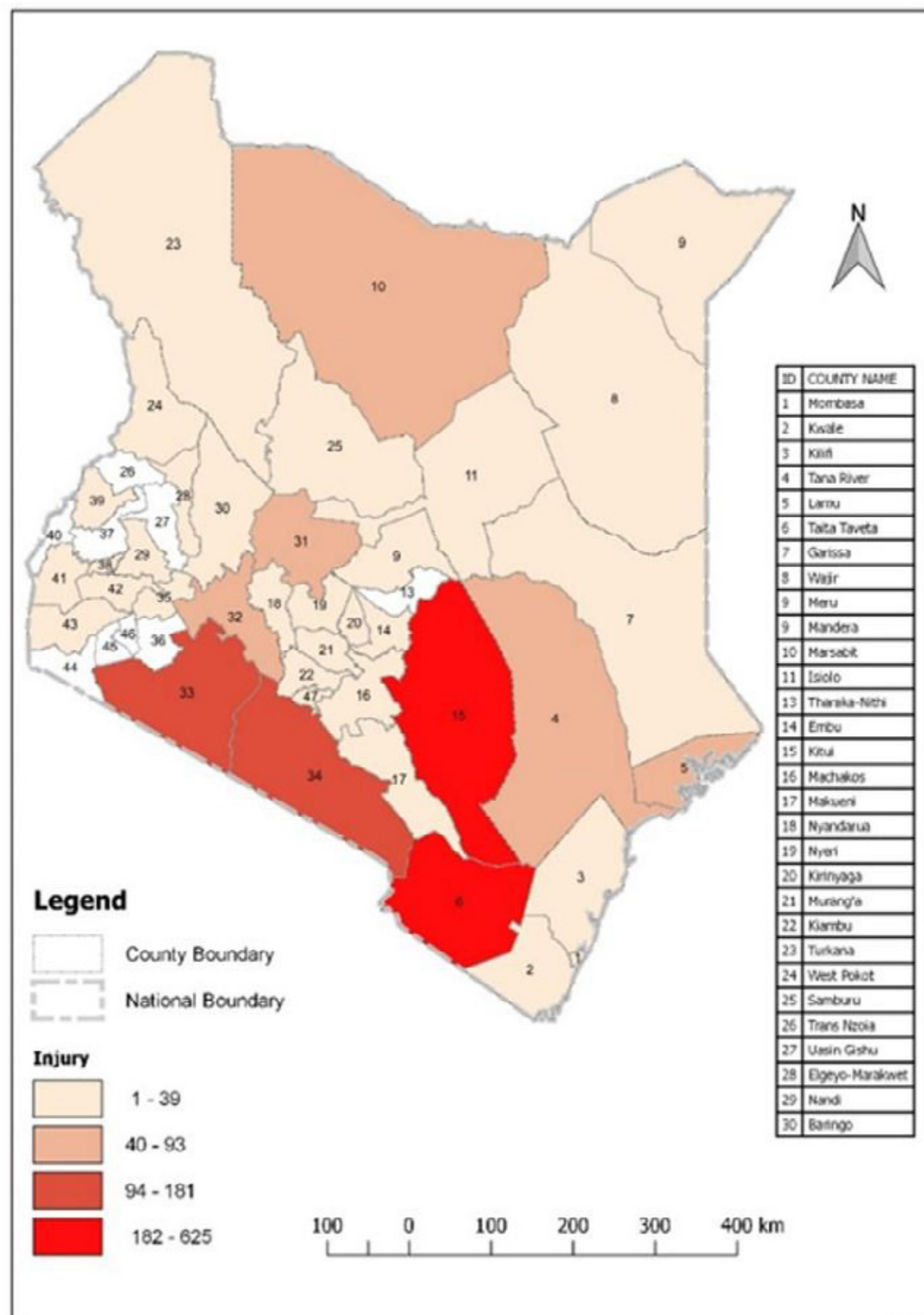


Figure 29: Distribution of human injuries due to HWCs across counties

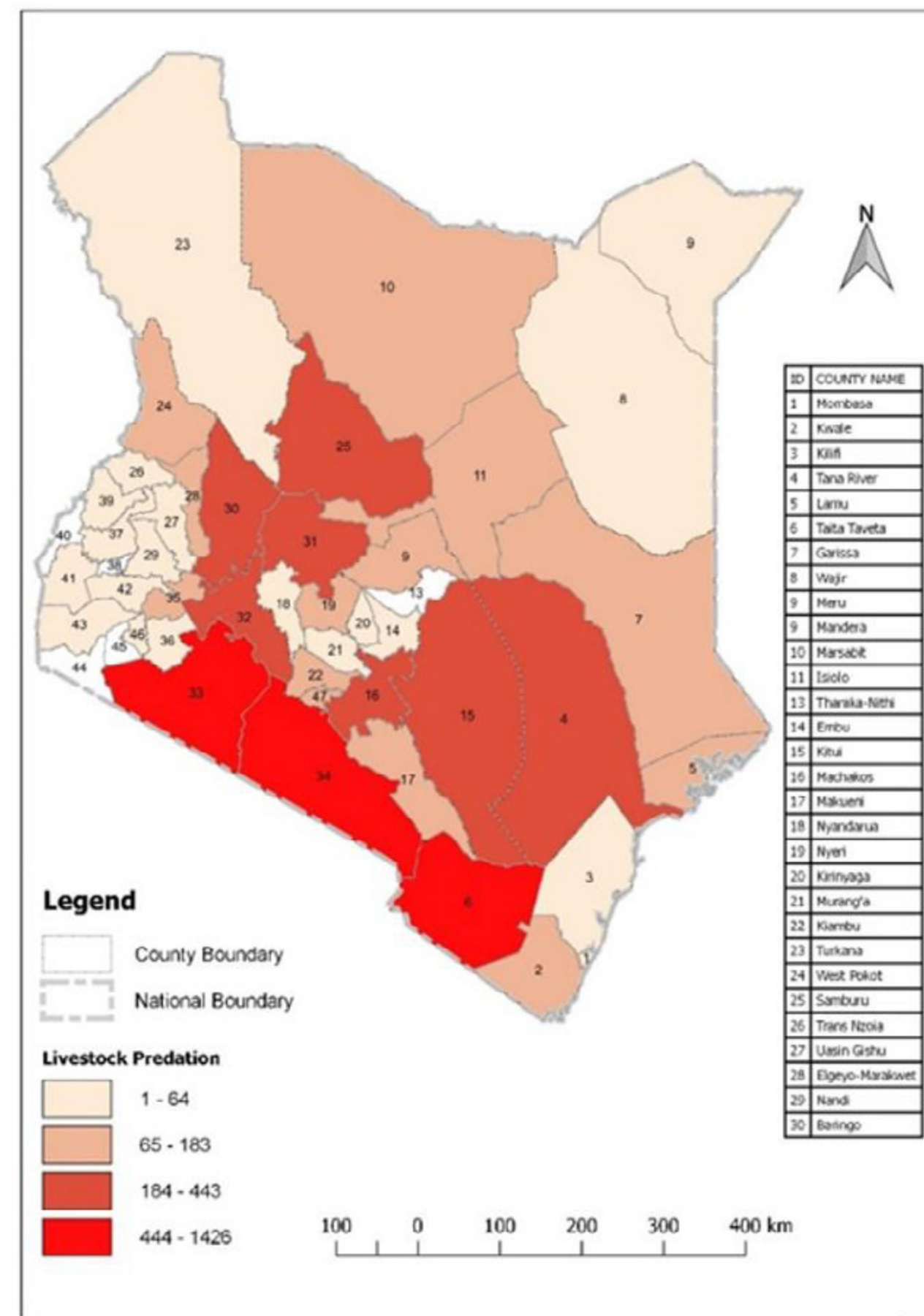


Figure 30: Distribution of livestock depredation across counties

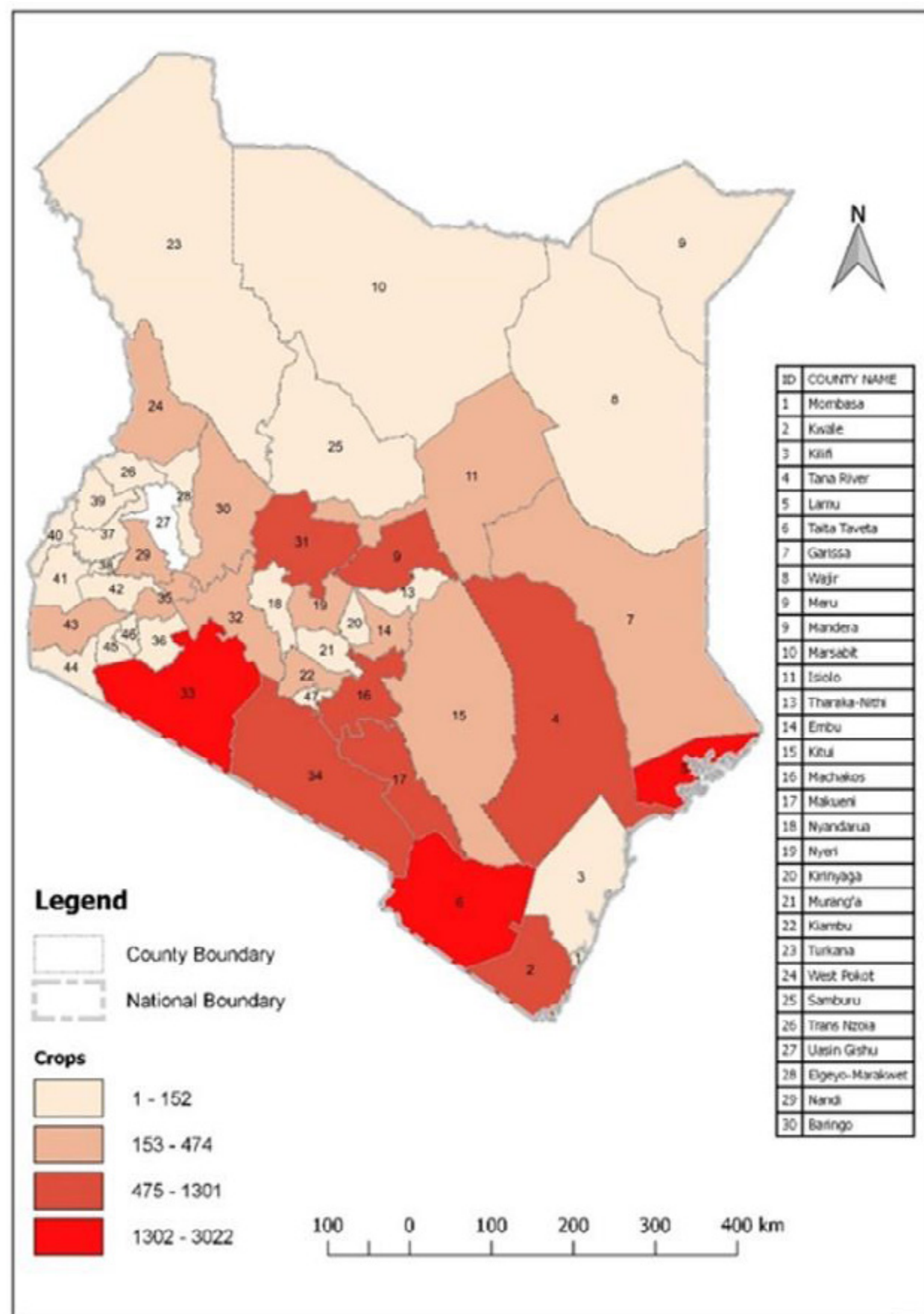


Figure 31: Distribution of crop damage due to HWCs across counties

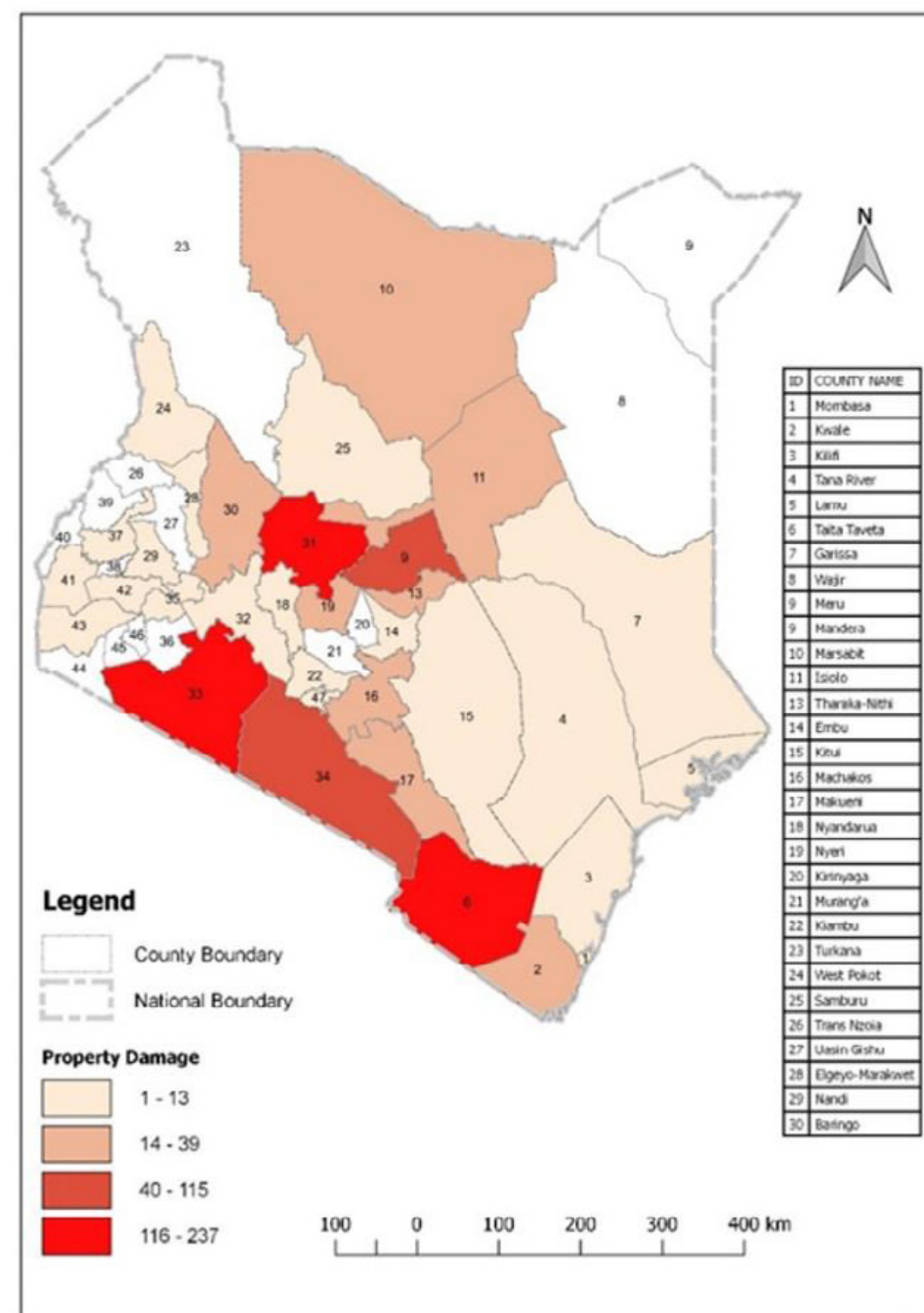


Figure 32: Distribution of property damage due to HWCs across counties

ANNEX 2 Stakeholder Reflections

Stakeholder opinions on the status of HWCs in Kenya: a comparative analysis

Plenary sessions with various stakeholders provided a wealth of ideas on the status and trends of HWCs in the country, impacts and drivers of the conflicts, the future of wildlife, and the way forward for effective HWC mitigation. Regarding specific landscapes, the Southern, Tsavo, and Mountain conservation areas were found to have the most significant impacts, followed by Central Rift conservation area and Northern conservation area, both of which had above average wildlife impacts on communities (Table 50). Eastern conservation area had average impacts, while Coast conservation area and Western conservation area had low impacts. Crop raiding was the most prevalent impact, followed by property damage and livestock predation (Table 50). Incidences of property damage may not be frequently reported by communities compared with crop raiding and livestock predation and may therefore appear low in its impact in actual HWC data. Overall, wildlife impacts depended mostly on the livelihood and land use practices of communities in each conservation areas. The lowest wildlife impact was insecurity and human injury or death. However, it's important to note that human injury and death is the most emotive and elicits the strongest emotional reactions by communities. If not handled quickly and with empathy, such cases trigger eruptions of retaliation against wildlife and ultimately entrenches permanent negative attitudes towards wildlife.

Many communities felt that wildlife has entrenched poverty amongst them. Uncompensated cases of livestock predation, crop raiding, property damage, and human injury and death, as well as general insecurity, affects their economic activities, life aspirations, and growth. Many community members said they had not harvested reasonable crop yields for years, so crop raiding by wildlife had substantially lowered their food security and exposed them to perpetual hunger. Most of them felt unable to engage in their daily economic activities due to fear (insecurity) of injury or death due to wildlife. They were usually compelled to return home early from work or to linger in public places to socialise with others in order to minimise encounters with wildlife, especially late in the evening and early in the morning. In addition to actual economic costs that take long to be compensated (if they get compensated at all), many community members said they had lost economic opportunities because of many hours spent guarding crops and protecting livestock from large predators. Other additional costs, such as those incurred in initiating mitigation measures (e.g., constructing predator-proof shelters for livestock, and investing in predator deterrent lights, guard dogs, and other warning devices)

take away finances from other household needs. All these losses increase the cost and burden of communities to live alongside wildlife, especially where elephants, lions, spotted hyenas, and leopards are prevalent and roam freely. There are stories told of farmers receiving bank loans for farming initiatives only to lose their assets to wildlife, leaving of them with loans to service. Others have lost donkeys they depended on to ferry goods such as water and other household goods, especially during pastoral movements. These stories affect people in personal ways that compensation and consolation schemes cannot easily heal.

Regarding the impact of people on wildlife, stakeholders indicated that Southern and Coast conservation areas had the highest incidences, while it was above average in Tsavo and Mountain conservation areas. The impact of people on wildlife across indices was average in all other conservation areas (Table 51). Snaring wildlife for bushmeat or intention to harm, as well as general harassment of wildlife, were the most common forms of impact of people to wildlife. Many small to medium species (e.g., giraffes, zebras, dik diks, gazelles, and most antelopes) have been heavily exterminated in most areas outside protected areas. Bush meat poaching is driven not only by retaliation but as an effort to remove and displace wildlife from their habitats so that communities can engage in agriculture. Poverty also drives bush meat poaching. Further, bush meat is a cheap protein source; carcasses can be exchanged for other properties, such as motorcycles for the youth; bush meat can be sold in local butcheries; and poaching is an alternative livelihood for many unemployed people—mostly youth—in rural areas. Commercial elephant poaching has declined, but other species have become targets, including pangolins, monitor lizards, crocodiles, snakes for their skins, and primates for cultural costumes. Underground live animal sales, amongst other illegal activities, also threaten wildlife.

Retaliatory poisoning has become common, especially against large carnivores such as lions, spotted hyenas, and leopards. This causes indiscriminate death to non-targeted species, including raptor birds and other scavengers, thereby killing many species in the process. Although not as common, many disenchanted pastoralists often poison wildlife when they repeatedly lose significant quantities of livestock to large carnivores. Herbivores are also poisoned, especially elephants and primates, for frequently raiding crops. Watermelon is the common medium in which poison is laced and offered in retaliation, especially against elephants and primates. Poisoning is used not only retaliation but also as a way to

exterminate these species from their habitats to reduce their numbers and minimise impacts on the community. There is another form of harassment, especially in Meru area in Eastern conservation area, in which students and some community members reportedly drug primates with alcohol and other substances to watch them get drunk, stagger, and become immobilised. This also happens to fish around Lake Victoria in the Western conservation area, where poison and illegal substances are used for fishing. The most disturbing

form of impact happens mostly in areas where insecurity abounds in the Northern conservation area and parts of the Eastern and Western conservation areas. Because of the prevalence of guns in the communities, it's common for youth to use wildlife—especially baboons, vervet monkeys, zebras, and wildebeest—as shooting targets. This is quite common in Turkana, Isiolo, Marsabit, Samburu, and Garissa.

Table 50: Stakeholders' perceptions of impacts of wildlife on people in the conservation areas
1 = Very low, 2 = Low, 3 =Average, 4 = High. 5 = Very high

Conservation area	Livestock predation (Mean ±SE)	Property damage (Mean ±SE)	Crop raiding (Mean ±SE)	Insecurity from wildlife (Mean ±SE)	Human death and Injury (Mean ±SE)	Overall impact of wildlife on people (Mean ±SE)	Position of most vulnerable to wildlife impacts
Southern conservation area (Loitokitok)	4.57 ± 0.26	3.98 ± 0.36	4.57 ± 0.20	3.94 ± 0.21	3.45 ± 0.24	4.10 ± 2.10	1
	Above high	High	High	High	Average	High	
Tsavo (Voi)	4.14 ± 0.14	4.14 ± 0.26	4.68 ± 0.18	4.01± 0.23	3.14 ± 0.26	4.02 ± 2.50	2
	High	High	High	High	Average	High	
Coast conservation area (Kwale)	2.00 ± 0.15	3.10 ± 0.35	3.10 ± 0.23	2.90 ± 0.28	2.20 ± 0.29	2.66 ± 2.30	8
	Low	Average	Average	Average	Low	Low to average	
Central Rift conservation area (Narok)	4.13± 0.13	4.20 ± 0.20	4.00 ± 0.31	3.00 ± 0.22	3.00 ± 0.22	3.67 ± 2.70	3
	High	High	High	Average	Average	Above average	
Western conservation area (Kisumu)	3.19 ± 0.21	2.13 ± 0.24	3.63 ± 0.18	2.94 ± 0.31	2.25 ± 0.19	2.83 ± 2.80	7
	Low	Average	Average	Average	Low	Low to average	
Northern conservation area (Marsabit)	4.13± 0.30	4.38 ± 0.8	4.00 ± 0.27	2.88 ± 0.44	2.43 ± 0.28	3.56 ± 3.80	5
	High	High	High	Average	Low	Average	
Eastern conservation area (Meru)	2.91 ± 0.16	3.09 ± 0.28	4.00 ± 0.23	2.73 ± 0.30	2.45 ± 0.16	3.04 ± 2.60	6
	Average	Average	High	Average	Low	Average	
Mountain conservation area (Nanyuki)	3.70 ± 0.45	3.90 ± 0.41	4.70 ± 0.15	3.50 ± 0.27	2.40 ± 0.22	3.64 ± 3.70	4
	Average	High	High	Average	Low	Above average	

Table 51: Stakeholder perceptions of impacts of people on wildlife in all the conservation areas
1 = Very low, 2 = Low, 3 = Average, 4 = High, 5 = Very high

Conservation area	General wildlife harassment (Mean ±SE)	Retaliatory spearing (Mean ±SE)	Retaliatory poisoning (Mean ±SE)	Snaring for bushmeat and retaliation (Mean ±SE)	Poaching for trophies for gain (Mean ±SE)	Overall impact on wildlife (Mean ±SE)	Position on impacts to wildlife
Southern conservation area (Loitokitok)	2.90 ± 0.38 Average	2.20 ± 0.29 Low	2.00 ± 0.30 Low	2.36 ± 0.34 Low	1.10 ± 0.10 Very low	4.10 ± 0.10 High	2
Tsavo conservation area (Voi)	4.17 ± 0.31 High	1.50 ± 0.34 Low	2.57 ± 0.40 Low	4.86 ± 0.15 Very high	1.80 ± 0.53 Low	3.67 ± 0.33 Above average	3
Coast conservation area (Kwale)	3.30 ± 0.40 Average	1.70 ± 0.33 Low	3.90 ± 0.28 High	4.70 ± 0.21 Very high	4.60 ± 0.16 High	4.50 ± 0.17 High	1
Central Rift (Narok)	3.14 ± 0.34 Average	3.14 ± 0.51 Average	2.43 ± 0.37 Low	3.43 ± 0.53 Average	3.29 ± 0.18 Average	3.29 ± 0.41 Average	6
Western conservation area (Kisumu)	3.06 ± 0.31 Average	2.69 ± 0.24 Low	2.13 ± 0.27 Low	3.13 ± 0.22 Average	2.44 ± 0.24 Low	3.00 ± 0.16 Average	7
Northern conservation area (Marsabit)	2.78 ± 0.28 Average	2.00 ± 0.24 Low	2.11 ± 0.42 Low	2.67 ± 0.44 Average	1.56 ± 0.24 Low	2.33 ± 0.24 Low	8
Eastern conservation area (Meru)	3.18 ± 0.23 Average	2.27 ± 0.44 Low	2.00 ± 0.19 Low	2.91 ± 0.21 Average	1.36 ± 0.15 Very low	3.36 ± 0.24 Average	5
Mountain conservation area (Nanyuki)	3.50 ± 0.22 Average	2.70 ± 0.37 Low	2.30 ± 0.33 Low	3.00 ± 0.30 Average	1.30 ± 0.21 Very low	3.60 ± 0.16 Above average	4

The blocking of wildlife movement and migration corridors, conversion of wildlife dispersal areas, increase in human population, local increase in some wildlife species, incompatible land uses, depressed livelihoods and poverty, and competition for natural resources (e.g., space, water, pasture, salt licks) are some of the driving factors of HWCs in the country. The blocking of migration corridors and conversion of dispersal areas were high in the Southern, Mountain, and Central Rift conservation areas but average in all other conservation areas (Table 52). Land use changes and high immigration into the Kajiado and Machakos ranches in the Athi Kapiti plains have introduced incompatible land uses such as cultivation and human settlements. This has led to a blockage of wildlife movement and migration corridors. Wildlife dispersal areas have been converted for alternative land uses such as settlements, agriculture, urbanisation, and infrastructure and industrial development. As the government delays in gazetting wildlife corridors (as proposed in the 2017 report), the acquisition of wildlife corridors and dispersal areas around the country continues, diminishing space available for wildlife. This results in wildlife losses, wildlife persecution, and permanent wildlife displacement. In most conservation

areas and landscapes, some former wildlife corridors are fully blocked while others are partially blocked. Elephants, zebras, primates, and other species that are trapped in pockets of forest/bush habitats along the blocked corridors (e.g., in Laikipia) resort to raiding crops and in some cases injure or kill community members. These situations only serve to escalate the already worsening conflicts in these areas.

According to stakeholders, other HWC drivers in Kenya include competition for limited resources (water, pasture, space); the increase in human population (both from birthrate and immigration); and local increase of some wildlife species (such as elephants and vervet monkeys) (Table 53). Given the population increases of both people and wildlife, it is therefore expected that the conflicts between them will also increase because of the higher frequency of encounter with each other. In areas where there are no barriers (electric fences in particular), where land uses are incompatible (such as agriculture and dense settlements), and where encroachment into protected area boundaries is prevalent, there will be persistent and intense HWCs. It was thought that some wildlife species were increasing in numbers, but this may just

be due to local compression and concentration because of displacement from their natural habitats or attractive land uses that provide water and forage especially agriculture. However, the 2021 national wildlife census showed that the population of most species were static or even declining (Ministry of Tourism and Wildlife, 2021).

Table 52: Stakeholders' perceptions on indirect but serious impacts of people on wildlife in all the conservation areas
1 = Very low, 2 = Low, 3 = Average, 4 = High, 5 = Very high

Conservation area	Blocking wildlife movement and migration corridors (Mean ±SE)	Conversion of wildlife dispersal areas (Mean ±SE)	Overall perception on decrease in wildlife space (Mean ±SE)	Key reasons for escalation of HWCs (Mean ±SE)	Position on impact on space
Southern conservation area (Loitokitok)	4.75 ± 0.15 Above high	4.00 ± 0.25 High	4.23 ± 0.14 High	Mainly land use changes, competition for resources and increasing human population	1
Tsavo (conservation area Voi)	3.86 ± 1.46 Above medium	3.33 ± 0.33 Medium	3.35 ± 0.01 Average	Infrastructure development, land issues and being locked in by Tsavo parks and ranches	7
Coast conservation area (Kwale)	3.00 ± 0.26 Average	3.90 ± 0.18 Above average	3.45 ± 0.28 Average	Increasing human population and poverty in most areas	6
Central Rift conservation area (Narok)	4.57 ± 0.00 Above high	3.71 ± 0.00 Medium	4.14 ± 0.27 High	Agriculture and cattle ranching as more attractive land use options	3
Western conservation area (Kisumu)	3.00 ± 0.26 Average	3.94 ± 0.17 High	3.47 ± 0.30 Average	Increasing human population and poverty	5
Northern conservation area (Marsabit)	3.67 ± 0.41 Average	3.33 ± 0.17 Average	3.50 ± 0.11 Average	Changing land uses and insecurity	4
Eastern conservation area (Meru)	3.18 ± 0.38 Average	3.27 ± 0.30 Average	3.23 ± 0.03 Average	High human population, competition for space, and encroachment into wildlife use areas	8
Mountain conservation area (Nanyuki)	4.50 ± 0.17 High	4.00 ± 0.21 High	4.25 ± 0.16 High	High human population, competition for space, and encroachment into wildlife use areas	2

Table 53: Stakeholders' perceptions on the contribution of key drivers of HWCs in all the conservation areas
1 = Very low, 2 = Low, 3 = Average, 4 = High, 5 = Very high

Conservation area	Incompatible land uses (Mean ±SE)	Increasing human population (Mean ±SE)	Poverty and depressed livelihoods (Mean ±SE)	Resource competition (Mean ±SE)	Increase in local wildlife population (Mean ±SE)	Overall score on drivers of HWCs (Mean ±SE)	Position based on high drivers
Southern conservation area (Loitokitok)	3.86 ± 0.16 High	3.50 ± 0.15 Average	4.43 ± 0.25 High	4.57 ± 0.16 Above high	3.54 ± 0.22 Above average	3.88 ± 0.26 High	6
Tsavo conservation area (Voi)	4.14 ± 0.22 High	4.00 ± 0.26 High	4.57 ± 0.20 High	4.67 ± 0.21 High	4.00 ± 0.29 High	4.28 ± 0.14 High	1
Coast conservation area (Kwale)	3.60 ± 0.31 Average	4.70 ± 0.15 Above high	4.80 ± 0.13 Above high	4.20 ± 0.13 High	3.00 ± 0.26 Average	4.06 ± 0.34 High	3
Central Rift conservation area (Narok)	4.14 ± 0.26 High	4.00 ± 0.22 High	3.43 ± 0.30 Medium	4.00 ± 0.31 High	3.86 ± 0.26 High	3.89 ± 0.12 High	5
Western conservation area (Kisumu)	3.63 ± 0.15 Average	3.44 ± 0.18 Average	4.00 ± 0.13 High	3.31 ± 0.25 Average	1.44 ± 0.13 Very low	3.16 ± 0.45 Average	8
Northern (Marsabit)	3.43 ± 0.28 Average	4.29 ± 0.26 High	4.13 ± 0.30 High	4.25 ± 0.25 High	4.00 ± 0.27 High	4.02 ± 0.16 High	4
Eastern conservation area (Meru)	3.27 ± 0.19 Average	3.64 ± 0.20 Average	3.36 ± 0.28 Average	3.64 ± 0.20 Average	3.55 ± 0.16 Average	3.49 ± 0.08 Average	7
Mountain conservation area (Nanyuki)	4.20 ± 0.25 Average	4.10 ± 0.10 High	4.20 ± 0.25 High	4.80 ± 0.13 High	4.00 ± 0.33 High	4.26 ± 0.14 High	2

These findings reveal is the HWC issue is very complex and influenced by many factors, most of which tend to be linked. Many stakeholders argue that the cost of living with wildlife must be offset with benefits. This explains why CSR projects and welfare inducements given to communities—especially in Tsavo conservation area, Southern conservation area, and Maasai Mara—have not instantly and significantly improved locals' attitudes towards wildlife. Benefits must be significant, consistent, what communities really need, and given easily with community participation in the decisions, and they must shift significantly to offset the cost of living with wildlife. Some of the common benefits include employment opportunities, revenue sharing, CSR projects, revenue from tourism investors, educational scholarships, and other welfare support (Table 54). The benefits were scored as low to average by stakeholders across all the conservation areas. This implies that the benefits that communities receive from wildlife are mostly tokens and insignificant and should be improved substantially. The Southern conservation area was the only landscape that scored benefits to communities as high, specifically from employment, revenue sharing, CSR projects, and tourism investments. All other benefits across the conservation areas were rated as low. It is important that benefits move from being merely tokens to empowering communities to generate their own benefits and wealth

through wildlife economy and enterprise activities (e.g., conservancies, wildlife farming, wildlife ecotourism, etc.). This is consistent with the Wildlife Act (2018 revised), which allows landowners to benefit directly from wildlife.

High costs and low benefits to communities will always lead to a negative attitude towards wildlife and support for conservation in general. The situation is worsened when costs and low benefits are accompanied by the lack of compensation for wildlife impacts, a compensation process that is long and cumbersome, and KWS staff that are not trained in handling communities' grievances empathetically. The combination of these factors entrench negative attitudes and poor perceptions of wildlife and its conservation, and if these are not significantly addressed, communities will resort to intense wildlife persecution and displacement. Many communities indicated that this was the situation in most conservation areas. Only Northern and Mountain conservation areas had comparatively better perceptions towards wildlife, but even in those areas, the attitude was indifference towards wildlife (Table 54). All other conservation areas had negative attitudes and perceptions of wildlife. When people are negative, they tend to pass a possible threshold at which they can accept to live alongside wildlife. There seems to be a tolerance threshold beyond which communities will

never accept wildlife either as a land use or as something to coexist with. That threshold is quickly being approached in most of the conservation areas. If communities are not displacing wildlife, they will be demanding effective and long-term HWC mitigation strategies that permanently separate them from wildlife, such as electric fences, high walls, and deep moats.

Electric fences have now been constructed at least in every major wildlife rich landscape—including Tsavo, Maasai Mara, Amboseli, Meru, Aberdares, Mount Kenya, Laikipia, Isiolo, and Samburu—and is now seen by most communities as the most desirable mitigation strategy since it promises complete separation from wildlife. But not only are electric

fences expensive to install and maintain, but without other supporting mitigation strategies, they will ultimately fail. This is especially true if fences fail, elephants learn to destroy them, or communities start sabotaging the fence integrity. A poorly constructed fence is as good as no fence, as it serves only to provide wildlife snaring materials to poachers and is a danger for wildlife. However, some communities refuse to accept the installation of an electric fence despite wildlife impacts so that they can continue to access key resources like water, wood fuel, and pasture that are found in protected areas and conservancies (as was observed in a field visit in Laikipia).

Table 54: Stakeholders' perceptions of benefits and perceptions of wildlife in all conservation areas
1 = Very low, 2 = Low, 3 = Average, 4 = High, 5 = Very high

Conservation area	Employment of local community (Mean ±SE)	KWS and CSR revenue sharing (Mean ±SE)	Benefits from ecotourism investments (Mean ±SE)	Educational scholarships to communities (Mean ±SE)	Overall community perceptions on level of benefits and rank (Mean ±SE)	Overall community perceptions on wildlife (Mean ±SE)	Rank based on worst wildlife perception
Southern conservation area (Loitokitok)	4.75 ± 0.15 Very high	4.00 ± 0.25 Good	2.90 ± 0.38 Average	2.20 ± 0.29 Low	2.60 ± 0.31 (5) Low	2.09 ± 0.25 Negative	1
Tsavo conservation area (Voi)	3.00 ± 0.33 Medium	2.57 ± 0.43 Poor	2.29 ± 0.52 Low	3.86 ± 0.51 Above average	3.25 ± 0.25 (2) Average	2.43 ± 0.20 Negative	3
Coast conservation area (Kwale)	3.90 ± 0.28 High	1.90 ± 0.35 Poor	1.60 ± 0.16 Low	1.90 ± 0.35 Low	2.00 ± 0.31 (7) Low	2.50 ± 0.17 Negative	5
Central Rift conservation area (Narok)	3.67 ± 0.21 Average	2.80 ± 0.37 Medium	2.86 ± 0.26 Average	2.43 ± 0.30 Low	3.14 ± 0.26 (3) Average	2.50 ± 0.56 Negative	5
Western conservation area (Kisumu)	3.56 ± 0.27 Average	2.13 ± 0.18 Poor	2.50 ± 0.18 Low	1.27 ± 0.11 Very low	2.07 ± 0.15 (6) Low	2.20 ± 0.14 Negative	2
Northern conservation area (Marsabit)	2.22 ± 0.36 Low	1.00 ± 0.46 Very poor	1.00 ± 0.46 Low	2.78 ± 0.60 Above low	2.93 ± 0.25 (4) Average	3.25 ± 0.56 Indifferent	8
Eastern conservation area (Meru)	3.00 ± 0.23 Average	2.09 ± 0.21 Poor	2.18 ± 0.18 Low	1.73 ± 0.19 Low	1.73 ± 0.19 (8) Low	2.45 ± 0.25 Negative	4
Mountain conservation area (Nanyuki)	3.50 ± 0.17 Average	2.90 ± 0.23 Average	3.30 ± 0.30 Average	2.80 ± 0.20 Low	3.30 ± 0.21 (1) Average	3.00 ± 0.15 Indifferent	7

Many authors, including Ogutu et al. (2011), Ogutu et al. (2014), and Okello and Novelli (2014), believe that increasing wildlife space and landscape connectivity, encouraging wildlife conservation as a land use option, appropriately funding prevention and response, and improving attitudes/ perceptions of local communities (e.g., by having benefits offset costs and handling communities with empathy and understanding) will improve prospects for the future of wildlife in the country. However, these long-term HWC mitigation strategies were all scored low to average in their status in all the conservation areas (Table 55). This means that radical long-term measures that would secure the future of wildlife outside protected areas are currently poorly applied. Unfortunately, with increasing human population, competition for space, and poor regard for wildlife as a critical national asset, the future prospects for wildlife are dismal.

Lastly, overall stakeholder opinions for wildlife and conservation in the country are bleak (Table 55). Analysis of various key indicators such as benefits, impacts of people to wildlife, impacts of wildlife to people, an examination of HWC drivers, poor prevention and response strategies to impacts, and poor local and conventional mitigation strategies against HWCs (both short-term and long-term) was consistent with this

overall view for wildlife. This is especially so when you consider that negative human-wildlife interactions have been ongoing since the early 1960s and no serious and consistent effort has been made by stakeholders to arrest and contain the situation. This issue needs the same attention as poaching of megafauna like elephants and rhinoceroses and the recovery of endangered or threatened species. The relatively better average score for overall prospect on the future of wildlife in the country was in the Coast conservation area, followed by Tsavo and Northern conservation areas. The worst score for the future of wildlife was in the Southern, followed by Western, Eastern, and Mountain conservation areas. Land use changes; increasing human population; competition for resources (space, water, pasture); escalating impacts of wildlife to people; escalating impacts of people to wildlife and its space; low benefits; lack of spatial planning or other long-term coexistence strategies; and poor perception of wildlife by communities are eroding any tolerance people may have to coexist with wildlife in most conservation areas. If this persists and is not significantly corrected, the future of wildlife and conservation outside protected areas is bleak.

Table 55: Stakeholders’ perceptions on actions that can improve the future of wildlife conservation in all the conservation areas

Conservation area	Increase of wildlife space and landscape connectivity	Improving community's tolerance towards wildlife	Encouraging wildlife conservation as a land use option	More funding for HWCs mitigation and prevention activities	Overall perception on the future of wildlife in the country	Position based on prospects for the future of wildlife conservation in the country
	(Mean ±SE)	(Mean ±SE)	(Mean ±SE)	(Mean ±SE)	(Mean ±SE)	
Southern conservation area (Loitokitok)	3.30 ± 0.33	3.10 ± 0.25	2.55 ± 0.16	2.70 ± 0.40	2.50 ± 0.40	8
	Average	Average	Above low	Low	Low	
Tsavo conservation area (Voi)	4.71 ± 0.18	2.33 ± 0.33	3.57 ± 0.72	2.33 ± 0.88	3.50 ± 0.6	2
	High	Low	Above Average	Low	Average	
Coast conservation area (Kwale)	2.40 ± 0.16	2.90 ± 0.28	1.90 ± 0.18	3.00 ± 0.15	3.60 ± 0.37	1
	Low	Average	Low	Average	Average	
Central Rift conservation area (Narok)	4.00 ± 0.00	3.70 ± 0.34	3.47 ± 0.40	2.07 ± 0.60	3.33 ± 0.17	4
	High	Average	Average	Low	Average	
Western conservation area (Kisumu)	2.27 ± 0.20	2.80 ± 0.30	2.67 ± 0.70	3.13 ± 0.36	2.87 ± 0.23	7
	Low	Average	Low	Average	Average	
Northern conservation area (Marsabit)	3.00 ± 0.53	3.12 ± 0.27	2.2± 0.11	2.92 ± 0.28	3.50 ± 0.33	2
	Average	Average	Low	Average	Average	
Eastern conservation area (Meru)	2.27 ± 0.36	2.09 ± 0.28	1.73 ± 0.27	2.36 ± 0.28	3.09 ± 0.28	6
	Low	Low	Low	Low	Average	
Mountain conservation area (Nanyuki)	3.30 ± 0.26	2.90 ± 0.35	3.30 ± 0.33	2.50 ± 0.37	3.10 ± 0.28	5
	Average	Average	Average	Low	Average	

Opinions of KWS staff who receive and interact with HWC reports

KWS staff at HWC units receive and interact with field reports daily. From this experience, they rated the impacts of wildlife to people as generally low (for property and human injury or death) to average (for crop raiding and livestock predation). The most affected communities were in the Southern, Central, Tsavo, Mountain and Northern conservation areas (Table 56). Staff also scored the drivers of these HWCs—incompatible land use, increase in human population, local increase in wildlife population, depressed livelihoods, and competition for critical resources—as above average to high, especially increased human populations and incompatible land use. The conservation areas mostly affected by increasing drivers were Southern, Mountain, Coast, Tsavo, and Central Rift. Accordingly, these areas and their HWC hotspots should be prioritised for mitigation actions, as other studies (e.g., Manoa et al., 2020) have also identified them as areas of concern.

Regarding persecution of wildlife by people, KWS staff scored them from average to above average. The activities rated

average included the conversion of dispersal areas and blocking of migration corridors. But those rated above average were all direct impacts of people on wildlife, such as poisoning, snaring to harm and for bushmeat, spearing, and general harassment. Based on these findings, the conservation areas that were the most affected were Southern, Mountain, Central Rift, and Tsavo. KWS also noted that the benefits to communities were limited, with most CSR projects being consistently done only in the Amboseli landscape. Nevertheless, they noted that Southern conservation area, Mountain conservation area and Central Rift conservation area were also receiving benefits from KWS or other conservation partners such as NGOs operating in different conservation areas (Table 56). Their verdict on the future of wildlife in the country was rated as bleak because of costs incurred by communities due to conflicts, powerful and multiple drivers of HWCs and consistent inability of the government to act decisively on management of HWCs and their key drivers.

Overall vulnerability of KWS conservation areas

Opinions of experts and focused groups discussions on key HWC indicators revealed that the top 4 conservation areas of concern were Southern, Western, Tsavo, and Mountain followed by Central Rift, Eastern, Coast, and Northern, respectively (Table 57). There have been many initiatives in the Southern conservation area, especially in Amboseli, Machakos, and the Kitengela wildlife dispersal area, including KWS CSR projects and investments by conservation NGOs, but it seems that these are the most vulnerable areas. This can be explained by land use changes; competition for resources (land, water, pasture, and saltlicks) amongst people, livestock, and wildlife; and infrastructure development and expansion (Okello et al., 2011). These areas also face frequent livestock predation, crop raiding, and destruction of property by wildlife to the extent that any benefits to communities are greatly outweighed by costs due to HWCs. The good news, though, is on the spatial and ecosystem land use plans (through the Amboseli Ecosystem Management Plan done by AET and partners, establishment of numerous community conservancies and active conservation NGO activities (such as IFAW, Big Life, WWF, Lion Guardians, ACC, ACP, ATE, School for Field Studies, and the like) and still a willing community to engage conservation. However, the increase in human population and expansion of urban areas

and industry threaten all existing migration corridors and dispersal areas, as former group ranches are subdivided and offered for sale.

There is a high cost of wildlife conservation to communities in Kajiado County, an HWC hotspot thanks to the pastoralism lifestyle that dominates in that landscape; increasing agriculture; competition for water, pasture, and space; and increasing infrastructure development (Okello et al., 2011). There is also increased immigration fuelled by land sales in Amboseli arising from the dissolution of Maasai group ranches. Machakos ranches around Konza are also subdividing into individual ownership. The cost of living with wildlife is high for Tsavo due to high wildlife densities, competition for water and pasture amongst communities, communities being enclosed by Tsavos East and West national parks, and expansive ranches—all of which have confined communities to less space. Competition for space and resources is also high in Central Rift and Mountain conservation areas. In Eastern conservation area, all communities except those in Garissa are also struggling with having enough space and resources. The proposed LAPSSET Corridor Project—a major road and railway project in Kenya’s northern corridor—is also threatening wildlife space.

Table 56: Opinions of KWS HWC staff across the conservation areas

1 = Very low, 2 = Low, 3 = Average, 4 = High, 5 = Very high

(*The order of the scores are: South, Northern, Mountain, Eastern, Coast, Western, Central Rift, Tsavo)

No	Issue ranked	Rank of occurrence in 8 conservation areas*	Conservation areas where the issue is high to very high	Reason for rank
1	Livestock predation	5, 4, 3, 2, 2, 2, 5, 5 3.50 ± 0.49 (Average)	Southern, Northern, Central Rift, and Tsavo	• The impact of wildlife on people in terms of livestock depredation, property damage, crop raiding, and human injury is generally above average in their occurrence. Nevertheless, economic and social implications are very severe to communities. When human life is affected, community retaliation against wildlife is swift and often violent.
2	Property damage	3, 2, 3, 1, 2, 1, 1, 2 1.88 ± 0.32 (Low)	Generally, very low to low across the country	
3	Crop raiding	4, 2, 4, 2, 5, 2, 5, 5 3.63 ± 0.49 (Average)	Southern, Mountain, Coast, Central Rift, and Tsavo	
4	Human injury or death	3, 1, 3, 1, 2, 2, 3, 2, 2 2.11 ± 0.28 (Low)	Generally, low on average throughout the country	
5	Increase in human population	5, 1, 5, 4, 3, 5, 5, 2 3.75 ± 0.54 (High)	Southern, Mountain, Western, and Central Rift	• These drivers are varied depending on the region, with the human population lower in pastoral conservation areas (although rapid population and land tenure is also taking place). High-rainfall areas with large human populations, such as Central, Western, Mountain, and Eastern conservation areas, have greater drivers to fuel HWCs. • Key drivers are high human population, blockage of wildlife movement and migration corridors, conversion of wildlife dispersal areas, and incompatible land use.
6	Incompatible land use	5, 1, 4, 3, 4, 5, 5, 4 3.88 ± 0.52 (High)	Southern, Mountain, Coast, Western, Central Rift, and Tsavo	
7	Depressed livelihoods	2, 4, 1, 4, 2, 3, 3, 5 3.00 ± 0.39 (Average)	Northern, Eastern, and Tsavo	
8	Resource competition between locals and wildlife	5, 3, 5, 2, 4, 1, 4, 5 3.63 ± 0.53 (Average)	Southern, Mountain, Coast, Central Rift, and Tsavo	
9	Increase in wildlife population	4, 3, 4, 3, 4, 2, 4, 5 3.63 ± 0.28 (Above average)	Southern, Mountain, Coast, Central Rift, and Tsavo	• The overall cost of living with wildlife was rated high and is intense where wildlife numbers and human population are high, increasing the number of encounters.
10	Overall costs of living alongside wildlife	5, 2, 4, 5, 3, 2, 5, 5 3.88 ± 0.49 (Above average)	Southern, Mountain, Coast, Tsavo, Central Rift	

No	Issue ranked	Rank of occurrence in 8 conservation areas*	Conservation areas where the issue is high to very high	Reason for rank
11	Blocking of wildlife movement and migration corridors and routes	5, 1, 4, 3, 4, 1, 4, 5 3.38 ± 0.56 (Average)	Southern, Mountain, Coast, Central Rift, and Tsavo	• For the Southern conservation area, wildlife spearing and poisoning are high in Kitengela and Machakos. Wildlife retaliation is generally where there is a high number of human-wildlife conflicts. • Generally, drivers were above average towards high. This has great consequences given the multiplicative effect and synergism of these drivers taken together. The overall impact of such combined drivers becomes high to very high depending on the conservation area.
12	Conversion of wildlife dispersal areas	5, 1, 4, 2, 3, 1, 4, 4 3.00 ± 0.56 (Average)	Southern, Mountain, Central Rift, and Tsavo	
13	General wildlife harassment	5, 1, 4, 4, 2, 5, 4, 4 3.63 ± 0.53 (Above average)	Southern, Mountain, Western, Central Rift, and Tsavo	
14	Spearing of wildlife	5, 2, 3, 2, 3, 5, 4, 5 3.63 ± 0.45 (Above average)	Southern, Western, Central Rift, and Tsavo	
15	Poisoning of wildlife	5, 2, 3, 2, 3, 5, 4, 5 3.63 ± 0.45 (Above average)	Southern, Western, Central Rift, and Tsavo	• This scoring assessment is based on the number of hotspots for each region, and it's above average. • The benefits are generally limited unless if there is a combination of partners (conservation NGOs) who provide consolation and other welfare support to communities. These include NRT, WWF, AWF, Big Life Foundation, IFAW, Born Free, STE, Amboseli Elephant Trust, David Sheldrick Trust, Wildlife Works, RhinoArk, and Mount Kenya Trust.
16	Snaring wildlife	5, 2, 3, 2, 3, 5, 4, 5 3.63 ± 0.45 (Above average)	Southern, Western, Central Rift, and Tsavo	
17	Persecution of wildlife by people	5, 2, 5, 3, 4, 1, 4, 5 3.63 ± 0.53 (Above average)	Southern, Mountain, Central Rift, and Tsavo	
18	Employment from wildlife	4, 2, 5, 5, 3, 2, 5, 3 3.63 ± 0.49 (Average)	Southern, Mountain, Eastern, and Central Rift	
19	Revenue sharing	-----	Amboseli only and consistent (and only bursaries)	
20	Ecotourism revenue	4, 2, 5, 5, 3, 3, 4, 3 3.63 ± 0.39 (Average)	Southern, Mountain, Eastern, and Central Rift	
21	Educational scholarships	-----	Amboseli only	
22	Benefits from conservancies	3, 4, 5, 3, 4, 1, 4, 3 3.13 ± 0.48 (Average)	Northern, Mountain, Coast, and Central Rift	
23	Welfare projects benefits	4, 2, 5, 5, 3, 3, 4, 3 3.63 ± 0.39 (Average)	Southern, Mountain, Eastern, and Central Rift	• Attitudes are very gloomy given persistent HWCs and uncoordinated stakeholders' actions.
24	Benefits of wildlife to people	4, 3, 4, 3, 2, 2, 4, 3 3.13 ± 0.32 (Average)	Southern, Mountain, and Central Rift	
25	Overall perception of wildlife	2, 2, 1, 2, 2, 1, 2, 1 1.63 ± 0.17 (Negative)	Overall perception of wildlife is poor across the 8 KWS conservation areas	

Table 57: Various HWC indicators based on status in each conservation areas and prioritisation of actions
1 = Very low/very poor, 2 = Low/poor, 3 =Average, 4 = High, 5 = Very high

Conservation area	Position of most vulnerable to wildlife impacts (Mean ±SE)	Overall and Remarks on impacts to wildlife (Mean ±SE)	Blocking migration corridors and dispersal areas (Mean ±SE)	HWCs drivers (Mean ±SE)	Overall community perception on wildlife (Mean ±SE)	Overall benefits from wildlife from least benefiting (Mean ±SE)	Position based on status of potential interventions (Mean ±SE)	Overall on the future of wildlife in Kenya from the worst prospects (Mean ±SE)	Score and position of the conservation region from most vulnerable on threats (first 4) (Mean ±SE)
Southern (Loitokrok)	1	2	1	6	1	4	5	1	1
	4.10 ± 21	4.10 ± 0.10	4.23 ± 0.14	3.88 ± 0.26	2.09 ± 0.25	2.60 ± 0.31	2.70 ± 0.40	2.50 ± 0.40	4.08 ± 0.07
	High	High	High	High	Negative	Low	Low	Poor	High
Tsavo (Voi)	2	3	7	1	3	7	2	7	3
	4.02 ± 25	3.67 ± 0.33	3.35 ± 0.01	4.28 ± 0.14	2.43 ± 0.20	3.25 ± 0.25	2.33 ± 0.88	3.50 ± 0.6	3.83 ± 0.20
	High	Above average	Average	High	Negative	Average	Low	Medium	High
Coast (Kwale)	8	1	6	3	5	2	7	8	5
	2.66 ± 23	4.50 ± 0.17	3.45 ± 0.28	4.06 ± 0.34	2.50 ± 0.17	2.00 ± 0.31	3.00 ± 0.15	3.60 ± 0.37	3.63 ± 0.39
	Low to average	High	Average	High	Negative	Low	Average	Medium	Average
Central Rift (Narok)	3	6	3	5	5	6	1	5	4
	3.67 ± 27	3.29 ± 0.41	4.14 ± 0.27	3.89 ± 0.12	2.50 ± 0.56	3.14 ± 0.26	2.07 ± 0.60	3.33 ± 0.17	3.75 ± 0.18
	Above average	Average	High	High	Negative	Average	Low	Medium	Above average
Western (Kisumu)	7	7	5	8	2	3	8	2	8
	2.83 ± 28	3.00 ± 0.16	3.47 ± 0.30	3.16± 0.45	2.20 ± 0.14	2.07 ± 0.15	3.13 ± 0.36	2.87 ± 0.23	3.12 ± 0.14
	Low to average	Average	Average	Average	Negative	Low	Average	Above poor	Average
Northern (Marsabit)	5	8	4	4	8	5	6	6	6
	3.56 ± 38	2.33 ± 0.24	3.50 ± 0.11	4.02 ± 0.16	3.25 ± 0.56	2.93 ± 0.25	2.92 ± 0.28	3.50 ± 0.33	3.35 ± 0.36
	Average	Low	Average	High	Indifferent	Average	Average	Medium	Average

Conservation area	Position of most vulnerable to wildlife impacts (Mean ±SE)	Overall and Remarks on impacts to wildlife (Mean ±SE)	Blocking migration corridors and dispersal areas (Mean ±SE)	HWCs drivers (Mean ±SE)	Overall community perception on wildlife (Mean ±SE)	Overall benefits from wildlife from least benefiting (Mean ±SE)	Position based on status of potential interventions (Mean ±SE)	Overall on the future of wildlife in Kenya from the worst prospects (Mean ±SE)	Score and position of the conservation region from most vulnerable on threats (first 4) (Mean ±SE)
Eastern (Meru)	6	5	8	7	4	1	3	3	7
	3.04 ± 26	3.36 ± 0.24	3.23 ± 0.03	3.49 ± 0.08	2.45 ± 0.25	1.73 ± 0.19	2.36 ± 0.28	3.09 ± 0.28	3.28 ± 0.10
	Average	Average	Average	Average	Negative	Low	Low	Medium	Average
Mountain (Nanyuki)	4	4	2	2	7	8	4	4	2
	3.64 ± 37	3.60 ± 0.16	4.25 ± 0.16	4.26 ± 0.14	3.00 ± 0.15	3.30 ± 0.21	2.50 ± 0.37	3.10 ± 0.28	3.94 ± 0.18
	Above average	Above average	High	High	Indifferent	Average	Low	Medium	High

In Western conservation area, there was a low cost for living with wildlife in Kakamega, Vihiga, Busia, and Bungoma since most wildlife had been pushed to existing protected areas by the high prevalence of agriculture and high human populations. The cost of living with wildlife was, however, medium around Siaya, Homabay, and Mount Elgon (where there is still wildlife). HWCs in the Western conservation area were often associated with hippos, crocodiles, and sometimes snakes. The Tsavo ecosystem is the largest conservation areas in the country, but the high rate of poverty amongst communities has resulted in negative opinions about wildlife and its conservation, as well as direct impacts on wildlife. Poor investment in the area in regard to wildlife conservation and general mitigation of HWCs also hinder human-wildlife coexistence. Western conservation area and Mountain conservation area are high productive areas with high human populations. In those areas, agricultural land use is accompanied by displacement of wildlife or mitigation strategies designed to permanently separate people from wildlife, such as electric fences. Protected areas have been encroached up to their boundaries and every wildlife dispersal

area is under threat of conversion and every existing wildlife corridor is fully or partially blocked. Managing these issues and making wildlife a more profitable form of land use in terms of establishing conservancies and providing opportunities to landowners will greatly boost the prospects of wildlife for the future in these conservation areas.

Central Rift, Eastern, and Coast conservation areas also face challenges of wildlife impacts and wildlife persecution accompanied by competition for critical resources. Strong conservancy involvement and tourism investments have cushioned the blow for the areas, but these areas are threatened by community retaliation against wildlife, the shift in land use to agriculture, and commercial cattle ranching, all of which are more profitable land use options for landowners than wildlife. Insecurity in the Northern conservation area—driven by community encroachment both into protected areas for water, wood, and even bushmeat, and outside of protected areas for water and pasture—is a major source of HWC conflict and a driver for wildlife persecution by people. These issues need to be addressed immediately.

Some suggested actions to manage HWCs in conservation areas

Kenya's Vision 2030 (Government of Kenya, 2017) has outlined four strategies used in managing human-wildlife conflicts in the country. These strategies are:

1. Using preventive strategies (before a conflict occurs) that include electric or non-electric fences. This is by far the most adopted form of separating humans and wildlife. Even though fences (especially electric fences) are expensive, they are recommended due to their ability to control large herbivores and carnivores. Winning community support through education and awareness is also widely used along this strategy.
2. Using response strategies such as deploying PAC units in HWC hotspots across the country.

3. (Establishing community conservancies, which not only promote biodiversity conservation but also ensure that communities earn livelihoods from wildlife through tourism, employment, and various investments.
4. Increasing financial compensation by the national government and privately by some conservation NGOs such as Big Life Foundation, which started in 2010 in the Amboseli–West Chyulu region. This could help mitigate HWCs and increase community tolerance to living amongst wildlife.

Stakeholders suggested several recommendations to reverse the bleak future of wildlife and its conservation. These are grouped into the following four categories (Table 58) in order of priority.

1

Improving the capacity of KWS and community rangers to prevent HWC damages before they happen. KWS staff involved in HWCs live in poor conditions, are not well paid, are uninsured, are not adequately trained to deal with dangerous wild animals, and are often left traumatised because of encounters with wildlife involved in HWCs situations. Many rangers are also not trained on HWC resolution, human behaviour and sociology, and consensus building, which are very critical skills in assisting people involved in conflicts. They must be trained on these aspects, as well as skills in wildlife protection, wilderness survival, and ammunition. Moreover, they are poorly equipped—either lacking or having inadequate vehicles, a constant fuel supply, bullet blanks, thunder flashes, powerful lighting, traps and relocation cages—and as such they can't adequately prevent wildlife damages before they happen. Recruiting enough KWS personnel, paying them properly, and providing appropriate incentives and motivation are urgently needed.

2

Creating permanent spaces dedicated to wildlife. The government and stakeholders must buy space (corridors and wildlife dispersal areas) when communities and landowners put them up for sale, especially after dissolving communally owned land like group ranches. Wildlife use areas in Kitengela, Amboseli, Northern conservation area, and Mountain conservation area (Laikipia), which were private ranches, commercial farms, and so forth, could have been bought for wildlife conservation and connectedness to other protected areas. Loss of this opportunity because of government and stakeholder inertia has led to a permanent loss of critical wildlife spaces. The government must act decisively to secure identified wildlife corridors if it is to deal with the underlying challenges of solving HWCs and connectivity of protected areas. Spatial plans, ecosystem and landscape management plans, and zoning for critical wildlife spaces and landscapes need to be completed and implemented. Some counties have no spatial plans despite it being the law, and many that have started the process have not completed them. Some national reserves and parks in the country are moribund due to such challenges as human encroachment, rampant livestock incursion, and inadequate financial and human resources. These include Sibiloi and Malka Mari national parks; and Doodori, Arawale, Ngai Ndeithya, Losai, Boni, Rahole, Mwingi, and Bisanadi national reserves. Collectively these parks and reserves cover over 9,000km². The government should explore how to put these areas back in operation with a view of opening more wildlife use areas.

3

Investing in HWC mitigation strategies found to be innovative, affordable, and usable. This is important in helping communities to quickly acquire and deploy such methods to reduce wildlife impacts and to reduce community retaliation against wildlife. The use of barriers, including electric fences, moats, trenches, and ditches, may help but they must be complemented by other strategies like remaining vigilant, avoiding encroachment into wildlife movement and migration corridors and dispersal areas, and adhering to spatial plan guidelines and recommended land use. For livestock predation, predator-proof bomas and proper herding practices should be adopted, especially by pastoralists, taking care not to use children to herd, graze in protected areas, or abandon livestock in protected areas when there is no pasture outside. These easy measures are temporary but if done by communities, they can reduce the wildlife impacts on people and their properties.

4

Expanding the blue and green wildlife economies: There have been many proposals in the country to open up wildlife to various economic activities, but these proposals get bogged down by hunting debates. It must be clear that as we talk of a blue economy, wildlife must also benefit communities outside protected areas for it to be accepted as a suitable and competitive land use option. This does not mean the dangerous exploitation of those wildlife species with unstable, declining, or endangered populations. No species should be driven to extinction through this recommendation. Rather, locally abundant species also drive HWCs. There's therefore a need to accept the use of wildlife for other economic activities without threatening its long-term conservation. This can be initiated using pilot areas before scaling up in other parts of the country. Ultimately, this will encourage landowners to readily allow wildlife on their land given the economic returns accrued from these resources.

Table 58: Suggestions by wildlife conservation stakeholders on what can be done to reverse the bleak future of wildlife and its conservation in Kenya

Mitigation and prevention methods (see elephant coexistence tool by STE 2022)	Prevention, response, and compensation of damages by KWS approaches	Long-term strategies that target land uses, policies, and networking	Wildlife economy and enterprises
- Put into operation mitigation strategies that help farmers reduce impacts of wildlife on crops, such as growing unpalatable crops, using barriers (electric fences, thorny live fences, moats, stone walls, etc.). - Use strategies that prevent predation on livestock, such as practicing proper livestock herding methods (not herded in protected areas or left for children to take care of); establishing predator-proof bomas; using early warning systems (dogs, movement alarms, vigilance). - Install easy-to-use early warning systems that alert people on animal presence while also scaring animals away, such as wind-blown pieces of metal attached to ropes. - Use deterrents such as bees, plant unpalatable crops like chilies, install alarm systems, or construct chili fences using diesel-laced ropes. - Increase benefits to farmers employing successful HWC mitigation strategies by matching this with benefits and incentives from wildlife conservation.	- Equip KWS, recruit staff consistently, address personnel shortfalls, ensure favourable working conditions with proper reporting lines, and provide sufficient equipment - Preventing HWCs before they happen is better than paying compensation after they happen. - Improve response times to HWC incidences by maintaining available manpower, motivation, and facilitation of KWS officers in the frontline. - Train KWS officers on handling communities with gentleness and empathy so that people do not perceive that wildlife is more important than they are. - Simplify and accelerate the HWC compensation process.	- Fund counties coexisting with wildlife as a national service with allocations coming from the Treasury. Funding from the wildlife sector is poor compared with its national importance, support to the critical tourism industry and now community development through conservation movements. - Purchase land to be dedicated as wildlife use areas for conservation, such as wildlife movement and migration corridors and dispersal areas, especially when offered for sale by communities. - Streamline and conduct spatial planning, land use policy and zoning in all the conservation areas. - Create synergy amongst stakeholders and organisations in wildlife conservation so there are no clashes or contradictions in policies or their implementation. - Encourage key stakeholders (e.g., KWCA, WCK, and CAK) to give regular feedback to actors in the wildlife sector regarding wildlife conservation and HWC mitigation. - Increase education outreach and awareness.	- Revise wildlife policies to implement land use policies and address emerging trends and concerns. - Complete a comprehensive wildlife economy assessment in each conservation areas. This has been done in several reports and needs to be implemented (wildlife farming, wildlife enterprises etc.). - Put in place good scientific structures in monitoring and reporting for data collection any initiative and actions around wildlife economy so that they are not detrimental to wildlife by only targeting species that can be subjected to the economy.

ANNEX 3 Case Study For Stakeholders In Conservation Education

The Wildlife Clubs of Kenya

WCK was founded in 1968 as a member-based organisation promoting environmental education in schools and colleges in Kenya. It draws its members from primary and secondary schools, colleges and universities, individuals, and corporate organisations. The organisation operates in six KWS conservation areas (Southern, Mountain, Eastern, Western, Central Rift, and Coast). Table 59 specifies where WCK concentrates its activities. WCK focuses on environmental education, with the main objective spreading interest in and knowledge about wildlife and the environment through training, information sharing, and advocacy in Kenya. WCK's core function is to provide conservation education through school mobile outreach programme visits; establish wildlife clubs in schools; provide hostel facilities; conduct trainings, seminars, and workshops; assist schools in establishing micro-projects such as tree nurseries, compost pits, beehives and nature trails; and providing guided tours.

In Nairobi region, where WCK has most of its activities and facilities, the organisation runs a college that offers formal courses leading to a diploma in various conservation fields. Through its Nairobi Ecology Program, WCK provides conservation education mainly to primary and secondary school learners. The Lake Nakuru WCK Environmental Education Centre is located within Lake Nakuru National Park. The park is internationally recognised as an important rhinoceros sanctuary and a Ramsar site, and it recently achieved World Heritage site status. WCK's education centre is an ideal accommodation facility, hosting hundreds of students a year who come for conservation education in Lake Nakuru National Park. The programme is designed to make Kenya's youth and the public aware of the great economic, cultural, and aesthetic value of Lake Nakuru; develop a better understanding of the need to conserve wildlife and other natural resources for the benefit of the nation and its people; and spread the interest and knowledge about wildlife, the environment, and natural resources amongst the youth through conservation education.

WCK's programme in the Coast conservation area was established in 1993 in Mombasa. It was meant to highlight

on issues of the marine environmental ecosystems and its resources. Other important areas covered at that location include the Indigenous coastal forests, for example, the Arabuko Sokoke, the Kaya forests, in Kilifi, Kwale, and Malindi. These forests, which all have local, cultural, and spiritual significance, are now under threat as they are being destroyed for settlements, agriculture, tourism, and industrial development. The disappearance of these forests means destruction of habitats for the mammal and bird species found only in these ecosystems. Kenya's coastal region is world-renowned for its coastal and marine biodiversity, yet the local school children are not exposed to them. Opportunities for school children to learn about marine and coastal environments are scarce in formal and informal education in Kenya. Combined with local population growth and pollution, the insufficient marine education in the current education system makes it necessary to include extracurricular programmes in schools to build awareness of the marine environmental issues.

The WCK Marine Ecology Programme was developed to implement field trips to enhance marine education, give first-hand experience of the oceanic environment, and promote awareness amongst school children. For students in high school and colleges who take environmental classes, the Marine Ecology Programme has proved to be an excellent practical boost to their learning. WCK, alongside regional partners like KWS, Baobab Trust, National Museums of Kenya, Kenya Marine and Fisheries Research Institute, and schools, undertake yearly World Environment Day activities that target both students and the public. Activities give the public and students a chance to participate in marine conservation awareness campaigns, and they empower them to be generators of positive changes in marine environmental management. Due to the long distance, schools in Lamu benefit at a much smaller scale from these programs. However, they benefit from Marine Environment Day activities (Kiunga Marine Environment Day) organised by WWF. This activity takes place every September.

Table 59: WCK’s 10 regions, locations, and programmes throughout Kenya

WCK region and programme location	Protected areas and other important sites of interest	Major attractions in the region
Nairobi WCK headquarters located in Langata (opposite Nairobi National Park) on Langata Road	- Nairobi National Park - Nairobi Animal Orphanage - Mokoyeti Nature Trail, located within the WCK compound that drains into Ngong river inside Nairobi Park - Giraffe Centre - David Sheldrick Elephant Orphanage - National museums - Snake park and other sites	- Tree species and shrubs such as <i>Eucalyptus saligna</i>, <i>Euphorbia</i>, and aloe vera - Birds such as the common bulbul, Caped Robin-chat, and fire finch - Mammals such as Olive baboons, vervet monkeys, sunis, and sometimes leopards - Diverse species in Nairobi National Park and other recreational parks in Nairobi - Cultural bomas of Kenya
Nakuru and Central Rift Located in Nakuru National Park	- Lake Nakuru National Park - Nearby wildlife conservancies	- Nakuru National Park and environs
Central (Nyeri, Kirinyaga, Murang’a) Located at Wajee Nature Park, Mukurweini (Nyeri)	- Mount Kenya - Aberdare Mountain Range - Community and private wildlife sanctuaries - Important Bird Areas (IBA)	- Wajee has 126 bird species - Mukurweini Valley in Nyeri is one of the 60 IBA in Kenya - Has a rare endemic bird species called the Hindes babbler
Coast (Mombasa, Kilifi, Malindi, and Lamu)	- Marine environments, especially Mombasa Marine Reserve - Indigenous forests such as Arabuko Sokoke -	- Haller Park/Butterfly Pavilion - Nature Nguuni Sanctuary - Mombasa Marine National Park & Reserve - Jomo Kenyatta Public Beach - Fort Jesus/National Museums of Kenya - Historical Mama Ngina Drive - Mombasa Old Town - Arabuko Sokoke Forest - Nature Gede ruins - Vasco da Gama Pillar - Malindi Marine National Park and Reserve - Shimba Hills National Reserves - Mwaluganje Elephant Sanctuary

WCK region and programme location	Protected areas and other important sites of interest	Major attractions in the region
Kisumu and Western conservation area Kisumu	- Lake Victoria - Ndere Island - Kit-Mikayi - Fort Tenan Kavirondo Rift - Yala Swamp - Ruma National Park - Kisumu Impala sanctuary - Kakamega Forest - Lake Simbi Nyaima - Homa Hills - Mageta Island	- Thimlich Ohinga is a prehistoric site that consists of dry stones that form an enclosure. The site is equivalent to the great Zimbabwe ruins - Fort Tenan lies in Kavirondo Rift, a crack on the earth's crust that runs at a right angle to the main rift valley formed about 10 million years ago
Kitui and Eastern conservation areas Kitui, Mwingi, Machakos, and Makueni	- ASAL resources - North Kitui Wildlife Reserve	
North Rift Trans Nzoia, Turkana, and West Pokot	- Mount Elgon - Saiwa Swamp National Park - Nasolot Game Reserve - Turkwel Gorge - Lake Turkana	- Mount Elgon - Saiwa Swamp National Park - Nasolot Game Reserve - Turkwel Gorge - Lake Turkana
South Rift Narok, Bomet, Kericho, and Kisii	- Maasai Mara National Reserve - Mau Forest - Mara River	- Maasai Mara National Reserve - The Mau Forest - The Mara River
Northeastern Garissa, Mandera, and Marsabit	- Marsabit National Reserve	- Arid ecosystems that also harbour flora and fauna species of various levels of endemism

WCK's Lake Victoria Environmental Education Centre is located in Kisumu, next to the Impala animal sanctuary. It serves the former Nyanza and Western provinces and parts of the North Rift. Its core function is to promote environmental conservation education programmes within the lake region with the goal of securing the environmental integrity of Lake Victoria and other key ecosystems in the region. The centre offers conservation education to groups to increase their understanding of the Lake Victoria ecosystem and other important ecosystems and express the economic, cultural, and aesthetic value of these natural resources. Better understanding of the ecosystem goods and services helps to improve attitudes towards the environment.

The Kitui WCK office opened in 1997 to focus on ASAL biodiversity in the Eastern conservation area. The office coordinates various environmental education activities in the region, covering Kitui, Machakos, and Makueni counties. The objective is to increase public awareness on the conservation and importance of the region's ASAL biodiversity and to share information, knowledge, and skills about activities people should undertake to alleviate pressure on available resources. WCK hopes to eventually establish a fully operational ASAL Environmental Education Centre in Kitui.

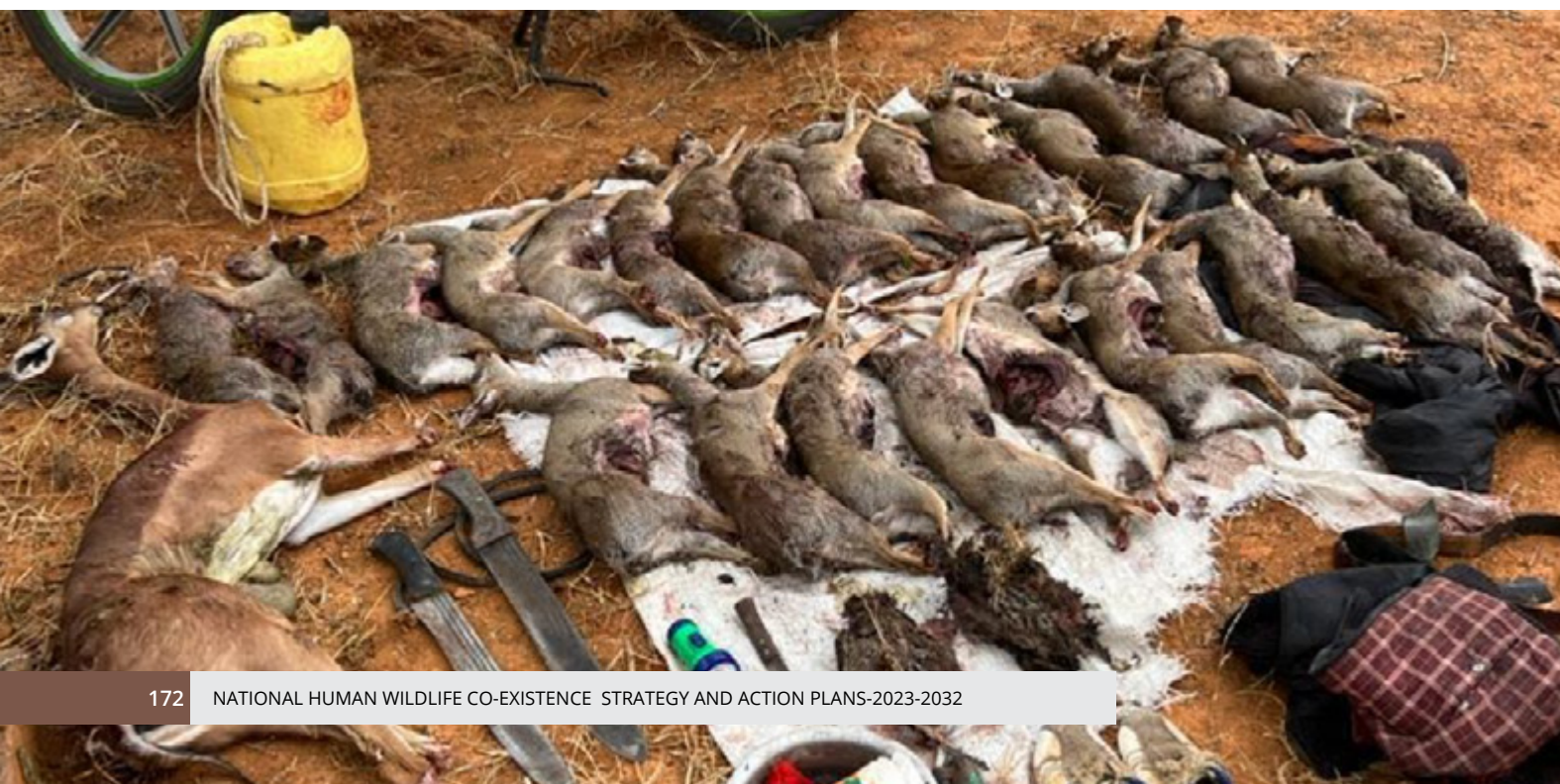
WCK Kitui carries out three programs. First is its outreach programme, which includes visiting schools each term to enhance conservation knowledge through lectures, films, and informative environmental materials. Second are its awareness forums, which are conducted monthly to create awareness on the importance of ASAL biodiversity and conservation measures. Event themes depend on the national theme of the year. Other awareness programmes include environmental rallies; ecological walks to degraded areas, hills, and forests for observation and restoration purposes; clean-ups to show the importance of clean and healthy environments; anti-poaching campaigns to discourage poaching activities

within the area; interclub meetings to exchange ideas and participate in discussions; and tree planting programmes to restore degraded areas and increase greening. Lastly is networking, in which WCK Kitui works with other stakeholders in the dissemination of conservation information, capacity building, advocacy, and exchange of ideas through seminars and workshops.

WCK North Rift covers parts of Trans Nzoia, West Pokot, and Turkana counties. Important conservation sites and attractions in this region include Mount Elgon National Park, Saiwa Swamp National Park, Nasolot Game Reserve, Turkwel Gorge, and Lake Turkana. WCK's conservation education programmes in this region address cross-cutting thematic issues on forests, water, livelihoods, wildlife, and climate change, amongst others. The WCK North Rift Action Group has been actively involved in conservation action.

The Southern WCK region covers Narok, Bomet, Kericho, and some parts of Kisii county. The region is rich in biological diversity, including important ecosystems like the Maasai Mara National Reserve, the Mau Forest, and the Mara River. The Mau Forest is the largest water tower in Kenya. Maasai Mara is a World Heritage site and home to the Great Wildebeest Migration, one of the Seven Wonders of the World. Here, WCK has an action group comprising school wildlife club patrons. WCK works with these clubs and other stakeholders in planning and implementing conservation programmes in the schools. The region is also visited by the National Mobile Education Unit every July.

WCK Northeastern conservation area includes Garissa, Mandera, and Marsabit. This arid ecosystem harbours flora and fauna of various levels of endemism. The WCK Mobile Education Unit visits this region every March. WCK has managed to implement its conservation education goals in the region through school partners and stakeholders.





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