CBNRM and the Desert-Adapted Lions: Centering Local Perspectives to Limit Human-Lion Conflict

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ABSTRACT

Human-lion conflict (HLC) is the premier threat to the desert-adapted lions of Kunene, Namibia. Here lions inhabit communal conservancy land, where seminomadic pastoralism is the primary source of residents' income. Founded upon the community-based natural resource management (CBNRM) framework, conservancies were implemented to improve wildlife conservation outcomes and residents' livelihoods. Using historical and social survey methods, we show that pastoralists attribute three distinguishing properties to lions: fearsomeness, destructiveness, and increasing numbers. Pastoralists' perspectives of HLC undermine the pillars of CBNRM and threaten the lion population. After detailing pastoralists' perspectives, we propose recentering HLC mitigation within the CBNRM framework, using Elinor Ostrom's Design Principles for Common-Pool Resources as a guide. To show how this is being implemented, we introduce the Lion Rangers program, which is placing local people at the center of HLC mitigation. Drawing on Indigenous and scholarly concepts for interpreting human-animal interactions, as well as environmental and lion-focused research, we examine transformations in human-livestock-lion interactions as a productive foundation for reinforcing locally-centered conservation and livelihood outcomes within multi-use lands.

Keywords: human-lion conflict; community-based natural resource management; Ostrom; distinguishing properties; Panthera leo

The Kunene Region of northwest Namibia is home to the free-ranging[1] desert-adapted lions (*Panthera leo*). Nearly eradicated during the 1980s (Heydinger, 2021a), the desert-adapted lions have grown from approximately 20 individuals in 1997 to an estimated 180 in 2015 (NMET, 2017; Stander, 2018). This increase has primarily occurred within unfenced communal conservancy (conservancy) land. Kunene is also home to a diverse population of humans, primarily deriving their income from seminomadic pastoralism. The rebounding population of lions and subsequent expansion of lion range has been accompanied by increasing human-lion conflict (HLC) between pastoralists and lions. This greatly affects the viability of the lion population and pastoralists' livelihoods. Since 2000, human-caused mortalities have accounted for 80% of adult lion mortalities, and 100% of subadult (non-cub) lion mortalities. From 2003 to 2015, lions and other predators were responsible for 5,862 livestock attacks in core lion-range conservancies. Currently, the Namibian government considers HLC to be the premier threat to the viability of the desert-adapted lions (NMET, 2017).

The effects of HLC have long challenged pastoralists' livelihoods and safety (Heydinger, 2020b; 2021a) within Kunene. Local interpretations of human-lion interactions are central to innovating effective approaches to HLC. Applying historical and social science methods, we examine local perspectives of HLC. Our aim is to uncover new approaches to desert-adapted lion conservation, without sacrificing pastoralists' livelihoods and rights. We found pastoralists associate lions with particular "distinguishing

[1] Free-ranging is defined as lions inhabiting fenced areas >1,000 km^2 in size, or partially fenced areas >500 km^2 (IUCN 2018).

properties" (Lorimer, 2007). These distinguishing properties include lions' fearsomeness, destructiveness, and increasing numbers. Within Kunene, human-lion relations are mediated by the role of livestock. Emphasizing the region's ovaHerero people (Heydinger 2020a), we show how livestock mediate pastoralists' economic and cultural lives, with subsequent effects for lion conservation. Our approach demonstrates one role for human-centered research in conserving iconic wildlife where it overlaps with human land uses.

Our research emphasizes the objectives of community-based natural resource management (CBNRM). In Kunene, CBNRM structures empower local residents as custodians of wildlife (NACSO, 2020). Reviewing the theorization and existing practices of CBNRM, alongside historical material and contemporary perspectives of human-lion interactions, we reveal shortcomings within the CBNRM system affecting core lion-range conservancies. Rather than lions causing rifts among people, we ask how lions can serve as a productive foundation for conversations around HLC. This approach is borrowed from the region's ovaHerero people, and concepts developed by scholars within human-animal studies and science and technology studies. With this premise in place, we turn to Nobel-prize winning economist Elinor Ostrom's Design Principles for Common-Pool Resource Management. These provide one guide for re-envisioning CBNRM. We close by introducing the Lion Rangers, a CBNRM program working towards address HLC through locally-centered conservation approaches.

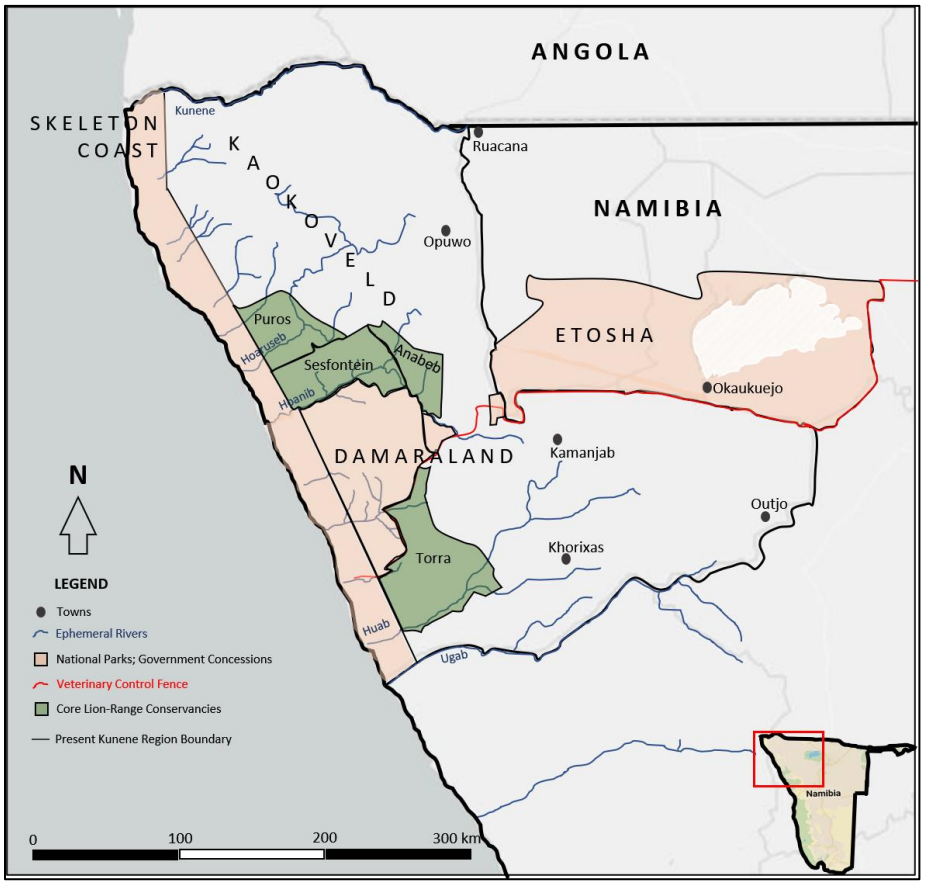

Figure 1: Map of Kunene with core lion-range conservancies and government protected areas. Created by authors.

STUDY AREA

Kunene is bounded by the Ugab River in the south, the Kunene River in the north, the Skeleton Coast along the Atlantic, and Etosha National Park in the east. The region is primarily held under communal

(conservancy) tenure, excepting southeastern Kunene which contains large privately-owned farms – this area has no resident lions and we do not focus on it. Communal lands are unfenced: people and their livestock live side-by-side with wildlife. During the South African colonial era (1915-1990), Kunene consisted of the Kaokoveld 'ethnic homeland,' which was later split into Kaokoland and Damaraland (1964-1990).

Kunene contains heterogenous environments. Dominated by the northern Namib desert, the region contains mountains, gravel plains, and sandy dunes pocked by small oases, bisected by ephemeral riverbeds. The basaltic soil is shallow, rocky, and low in productivity (Mendelsohn et al., 2002; Stander, 2018). Iconic desert-adapted species include lion, black rhinoceros (*Diceros bicornis*), elephant (*Loxodonta africana*), gemsbok (*Oryx gazella*), and mountain zebra (*Equus zebra*). Rainfall is low (50-250 mm per year) and erratic, generally increasing from west to east. During the wet season (January-May) rains fall in brief, localized downpours. Prey species, including gemsbok, mountain zebra, and giraffe (*Giraffa camelopardalis*), follow the rains to fresh grass and often congregate in riverbeds during the dry season (June-December). Springbok (*Antidorcas marsupialis*) generally stay to the plains, while kudu (*Tragelaphus strepsiceros*) keep to stands of trees and cliffsides. Surface water is sparse. However, an extensive government borehole-drilling program during the 1970s greatly increased year-round water availability. Since that time livestock and wildlife are generally grazing-, not water-limited (Bollig, 2020). Boom-and-bust rainfall patterns cause prey numbers to fluctuate widely. Beginning in 2000 the region experienced a relatively wet period, resulting in wildlife and livestock increases. From 2011 to 2017, extensive drought caused the decline of indicator prey species by as much as 60% and livestock by as much as 67.9% (Heydinger et al., 2019).

Pastoralism comprises the majority of Kunene household incomes, which are often low and insecure (Mendelsohn et al., 2002). Social and economic prospects are limited. Kunene has Namibia's highest primary school drop-out rates; only fifty-five percent of residents complete primary school by age seventeen (UNICEF, 2013). Forty percent earn ≤ US$1/day, while twenty-three percent earn ≤ US$0.73/day (NNPC, 2012). By comparison, our surveys uncovered a mean household loss of US$2,985 worth of livestock to lions during the recent drought (Heydinger et al., 2019). Though they are unequally distributed, livestock losses are worsening livelihood prospects. This increases the economic vulnerability of communal pastoralists and is straining the conservancy system (Bollig, 2016).

In 2017 Namibia's Ministry of Environment and Tourism (MET) identified four core desert-adapted lion range conservancies where HLC is a critical concern: Anabeb, Puros, Sesfontein, and Torra (NMET, 2017). These are also among the wealthiest conservancies in the region, as measured by annual conservancy income, primarily derived from tourism and hunting receipts of game species (NACSO, 2018).

Figure 2: Typical landscape in core lion-range conservancies, 2018. Photo: A. Wattamaniuk.

METHODS

Twenty-two oral histories and eighty-five semi-structured social surveys were collected within four core lion-range conservancies, from September to December 2017.[2] These were part of a government and NGO program examining the effects of recent drought and HLC upon communal pastoralists, emphasizing livestock losses to lions at the household level. To protect anonymity, respondents are identified either as "Conservancy Leaders" (for oral history data) or as conservancy pastoralists, i.e., "Puros Pastoralist #1" (for survey data). Surveys were usually performed with the 'head' of each livestock-owning household, primarily the senior male (78%). When he was absent a senior female, usually his eldest wife, was surveyed. Other household members frequently elaborated answers. Oral histories were split among men and women. All oral history interviews and surveys were performed, translated, and analyzed by the authors. Quantified results emphasizing the financial costs of drought and livestock loss were previously published (Heydinger et al., 2019). Perspectives from interview and survey data were augmented by precolonial and colonial sources on human-lion interactions, including accounts by European 'explorers' and archaeological evidence, records from Namibia's National Archives, and published sources.

Perspectives of human-lion interactions are interpreted using frames from human-animal studies, and science and technology studies (STS). Human-animal scholars have shown that the context in which humans and nonhumans interact greatly influences human understandings of animals (e.g., Hinchliffe 2010; Fuentes and Baynes-Rock 2017). Performing lion research, monitoring, and community extension work in Kunene, we also apply insights from "animal-sensitive" histories (Swart 2019) and social research, which has been part of Heydinger's previous work (2021a, 2021b). Long experience implementing conservation interventions in Kunene (Muzuma) and as livestock owners (Muzuma and Tsaneb), provide insight into pastoralists' interactions with lions and interpretations of HLC.

The mediation of livestock in human-lion interactions is central to this study. Mediation, as defined by STS scholar Bruno Latour (1999: 307), always exceeds its conditions: mediators add something to and transform the components they bring together. When human-lion relationships are mediated by livestock, effectively becoming human-livestock-lion relationships, the experience of living alongside lions is transformed, yielding new challenges for CBNRM.

BACKGROUND: CBNRM and HLC

Namibia's conservancy system is considered a signal achievement of the CBNRM approach to unifying resource conservation and rural development (Jones, 2001). CBNRM programs aim towards social justice and material well-being without sacrificing environmental integrity, or turning disempowered people into 'conservation refugees' (Dowie, 2009). In southern Africa, CBNRM constituted a late-colonial counter-hegemonic movement applying market-oriented mechanisms for rural communities securing civil liberties and resource rights (Dressler et al. 2010). As a framework, CBNRM stands upon four conceptual pillars. These are:

- *Sustainable use as conservation paradigm* – As the premier threat to natural habitats and resources, landscape transformation necessitates creating incentives for sustainable resource use, rather than technical interventions or compulsion to limit appropriation.
- *Economic instrumentalism* – Economic considerations drive resource decisions. Resource provision and appropriation must be economically competitive or else landscape transformation may occur. This includes the creation of supporting structures and access to markets.
- *Devolution* – Responsibility for resources is supported by the authority and entitlement necessary to generate stewardship. Local control enables rights to manage, benefit from, and dispose of resources.

[2] Complete social surveys methods are described in Heydinger, Packer, Tsaneb 2019, Section: 2. Materials and methods.

- *Collective proprietorship* – Communities of collective interest are the locus for rights-devolution. Internal legitimacy comes from communities whose membership, boundaries, and constitution are self-defined. External legitimacy comes from legislation.

  (Adapted from Jones and Murphree 2001.)

During the colonial era, Kunene's Black African inhabitants were economically and politically marginalized and geographically isolated. Policies alienating rights to wildlife exacerbated these difficulties. The 'community conservation counter-narrative' drew attention to the co-occurrence of wildlife losses and lack of elite investment in rural development (Jones, 2001). During the 1980s and early 1990s, outreach and consultation driven by conservationists and traditional authorities revealed intrinsic values Indigenous communities place on wildlife and other natural resources (Owen-Smith, 2010). Following independence in 1990, Namibians inhabiting communal land secured government approval to form communal conservancies. Namibia's Nature Conservation Amendment Act (No. 5/1996) devolves ownership rights to 'huntable game' species for conservancy purposes (e.g., subsistence hunting) without recourse to further government authorization. Conservancies also engage in trophy hunting based upon government-approved quotas, can apply to hunt protected species, such as lions, and can trade and sell game products with government approval. Though the intent of conservancy legislation was to provide residents with ownership rights to wildlife, certain restrictions, including limitations on hunting protected species, created "considerable gaps" (Jones, 2010b: 117) between the original intent of CBNRM and implemented legislation. Within the CBNRM framework, Ostrom's Design Principles for Common-Pool Resource Management played an important conceptual role in implementing community management and benefit of wildlife (Jones, 2010a). (Ostrom's principles, as a metric for assessing progress concerning HLC, are outlined below.)

Figure 3: Desert-adapted lioness in Hoanib riverbed, 2019. Photo: A. Wattamaniuk.

Lions in Kunene

Lions historically occurred across central and northern Namibia (Shortridge, 1934). Currently, free-ranging lions persist in Kunene, as well as Etosha National Park and Namibia's northeastern Zambezi region. During the South African colonial period, interactions between humans and lions served the racialized goals of the state. By providing access to firearms and industrial poisons, the colonial administration supported White settler-farmers who sought to kill lions and other predators on private land. Concurrently, Black African pastoralists were denied access to these destructive technologies (Heydinger, 2020b). This affected the geography of lion survival. Lions persist within many African-dominated rangelands. In contrast, lions are absent from lands historically controlled by Whites.

Kunene is one of the few places in Africa where lion numbers have increased on multi-use land during the past twenty years (Bauer et al., 2015). Since the late 1990s, lion range in Kunene has expanded from approximately 7,000km^2 to more than 40,000km^2 (NMET, 2017), primarily within conservancies. The recovery of the desert-adapted lions is a bright spot among otherwise dire news. Lion populations are diminishing across Africa, with lions currently listed as "Vulnerable" by the IUCN (IUCN, 2018). Each year, tens of millions of US dollars go towards arresting lion population declines (Lindsey et al., 2018). Yet, African lion range has decreased by forty-three percent since the late-1990s. There are currently 20,000-30,000 free-ranging lions in Africa (IUCN, 2018). Due to the relative success of conservation efforts in Kunene and neighboring Etosha National Park, and the behavioral adaptations of lions to these arid and semiarid habitats, northwest Namibia is considered a 'lion stronghold' – areas deemed critical for the survival of free-ranging lions (Jacobson and Riggio, 2018).

Beginning in the late 1990s, Namibian Philip Stander began uncovering the previously unseen lives of lions in Kunene (Stander, 2018). Using modern monitoring technologies, such as low-light binoculars, night-vision cameras, specially-designed off-road vehicles, veterinary drugs for lion immobilization, and very-high frequency (VHF), as well as GPS/satellite collars, Stander's work brought increased government and international attention to the desert-adapted lions. Notably, Stander and other researchers encounter lions in very different contexts than pastoralists do. Examinations of HLC have not featured prominently in published desert-adapted lion research. Viewed from a safe distance, primarily via mediating technologies, and largely at one's discretion, lions and other iconic, dangerous species may be abstracted from the challenges of living alongside them. This creates dissimilar interpretations of human-lion interactions for researchers or international viewers from those of pastoralists. Environmental philosopher Holmes Rolston (1982) has shown that ethics regarding the world are generated within the context they take place. It is unsurprising that communal pastoralists interpret HLC differently from those experiencing lions as research subjects or as iconic symbols of wild Africa.

RESULTS

Pastoralists' Distinguishing Properties of Lions

Among communal pastoralists, the distinguishing properties of lions are their fearsomeness, destructiveness, and increasing numbers. Distinguishing properties are not innate, but emerge from human-lion interactions constrained and enabled by technologies, human bodies, and cultural and environmental contexts (Lorimer, 2007). Distinguishing properties do not imply other properties are absent, rather that they are secondary. We emphasize the properties of fearsomeness, destructiveness, and increasing numbers because they were the most consistently identified by pastoralists. These properties greatly affect pastoralists' interpretations of human-lion interactions, constraining CBNRM approaches to lion conservation.

Fearsomeness

* "Lions are very dangerous; they are eating people. We must be careful. We must be safe."[3]

* "Lions are coming to the house. Even in the morning when you are coming out of the house you are seeing the tracks here, next to the fire…you are afraid."[4]

[3] Puros Pastoralist #1, 14 November 2017.

* "Something that is life-threatening…as a local person I will say that, we can't live with that thing."[5]

* "To be safe people can only move from this time to this time. Can only cook from this time to this time."[6]

* "Kids are schooling near here and are walking back to farms. You don't know what might happen."[7]

* "Lions kill people."[8]

Lions have long terrorized residents of northwest Namibia. Early European 'explorers' Francis Galton and C. J. Andersson, wrote of locals cursing and vilifying lions, and "lamenting most piteously…that they should perish miserably by the fangs of the wild beasts" (Andersson, 1861: 109). Though Europeans often used stories of 'white male gigantism' (Coleman, 2011) to assert superiority over African nature and by extension Indigenous peoples, one cannot dismiss historical accounts of fearfulness. Human-eating was considered common-place during the nineteenth century, such as when "[t]wo lions had entered the [livestock] enclosures, and succeeded in carrying away a poor fellow, whom they tore to pieces and devoured within a short distance of our camp" (Andersson, 1861: 139).

During the colonial era, lions were objects of fear for African pastoralists and White settler-farmers alike. Yet, while White financial success was considered central to a viable colonial economy and supported through farmers receiving firearms and poison, African financial autonomy was considered anathema to White rule (Heydinger, 2020b). This led to many African pastoralists confronting lions armed with spears or other traditional weaponry. As one colonial official reported,

> "This usually results in several of the hunters being mauled. Only a few days ago [a Himba] was treated for an arm wound caused by a lion, and he intimated that two of his less fortunate comrades were laid up with more serious wounds."[9]

During the 1930s and 1940s, conflict between pastoralists and predators were common enough that colonial officials in the region included a 'Carnivora'[10] section within their monthly and quarterly reports. These detailed livestock losses, from lions, as well as wild dogs (*Lycaon pictus*), spotted hyena (*Crocuta crocuta*), leopard (*Panthera pardus*), and black-backed jackal (*Canis mesomelas*). Such conflict has an enduring legacy visible in the geography of predator survival and perceptions of predators.

Stories of lion fearsomeness remain commonplace, framing perspectives in which humans remain vulnerable. When asked which predators pose the greatest threat to people, 85% of respondents said lions do; at 53%, leopard were the second most feared. One Sesfontein pastoralist shared this story,

> "One man was looking for honey, he went out with a donkey. He went into the mountains and was camping there and the lions killed him there. The people around here were looking for him, looking for him. But they didn't find him. My father went into the mountains to get some honey also and saw the bones [of the man] lying there and brought the bones back so

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[4] Anabeb Pastoralist #1, 26 October 2017.
[5] Conservancy Leader #3, 11 March 2018.
[6] Anabeb Pastoralist #2, 27 October 2017.
[7] Sesfontein Pastoralist #1, 24 November 2017.
[8] Anabeb Pastoralist #3, 27 October 2017.
[9] (NAN) Namibia National Archives, (NAO) Native Affairs, Ovamboland 061. (1946). Kaokoveld Annual Report, 1946. Officer in Charge, Native Affairs, Kaokoveld to Chief Native Commissioner, Windhoek, 23 December.
[10] e.g. NAN NAO 029. 1942. Annual Report of Native Affairs. Officer in Charge of Native Affairs, Kaokoveld to Chief Native Commissioner, Windhoek. 8 December; NAN NAO 029. 1944. Kaokoveld Annual Report: 1944. Officer in Charge of Native Affairs, Kaokoveld to Chief Native Commissioner, Windhoek. 20 December.

> they could bury the bones. This is when I was a very young person – my father told me about this."[11]

More recently, one Puros woman related, "my husband was riding on a donkey and the lion came at the man and the donkey. Luckily enough the man get away from the donkey and ran and the lion took the donkey and ate [it]."[12]

One account takes place within a Himba man's home:

> "Kamasitu graphically recalled his lucky escape when a lion had tried to enter his ondj[i]wo [traditional-style house]... The silvery scars on his forearms bore witness to that terrifying night which would have ended in tragedy if a Herero neighbor had not owned a .303 [rifle]. He had shot the lion in the spine as it crouched, slashing at Kamasitu with one paw in the low tunnel entrance to the auxiliary's ondj[i]wo" (Jacobsohn 1998: 48).

The traditional Himba ondjiwo is built with a low entrance, forcing people and lions to crouch to enter. It suggests long familiarity with the prospect of lions attacking people, even in their homes.

This is what happened during the last confirmed lion-caused human mortality in Kunene. Though it occurred in 1982, one cannot overstate the familiarity of this story among area residents. Details among storytellers differ, but agree on the following:

> Early in the year [1982], a starving lioness moved westward from near Okaukuejo in Etosha, where an ongoing drought had decimated prey numbers. One evening this lioness entered the house of a Damara farmer, near the river in the town of Sesfontein. Surprised and terrified, the man jumped at the lion and grasped her by her ears while telling his wife to take their infant daughter and run outside. The lioness was so weak that the man temporarily held her. The wife ran but left the girl behind. The man escaped, leaving the lion and, unknowingly, the child inside the house. He ran to a nearby military base. When he returned with the soldiers, they shot and killed the lion, who had already devoured the infant's head and one arm.[13]

As an expression of lion's fearsomeness, the 40-plus years that have elapsed since this killing are eclipsed by the message the story conveys: that lions attack and kill people. The specifics emphasize a shared understanding that lions are particularly dangerous when extremely hungry. 85% of pastoralists maintain if lions cannot capture prey or livestock, they will attack people. As the region suffers through an ongoing drought resulting in 60% decline in prey species (Heydinger et. al, 2019) lions may pose a grave danger.

The symbolic and figurative importance of fearsome lion stories underscores interpretations of human-lion interactions. The importance of such stories exemplifies historian Luise White's (2000) examination of stories and rumors in colonial eastern and central Africa as frames for people's experiences of extraordinary events. In such cases accurate descriptions alone may be insufficient. To convey truth, people construct and repeat stories carrying the values and meanings most forcibly supporting their point. White finds people use well-known stories, rather than just personal experience, to explain what has happened. Fearful lion stories are not only literal, but (also) idiomatic; creating a basis for interpreting human-lion interactions. The relative scarceness of lions in Kunene, in comparison to areas where human killing is more common, heightens the power of frightening stories. Such stories may be the only interaction many conservancy residents have with lions. Even if lions are infrequently seen,

[11] Sesfontein Pastoralist #6, 24 November 2017.
[12] Puros Pastoralist #5, 14 November 2017.
[13] Sesfontein Pastoralist #8, 25 November 2017; Conservancy Leader #7, 26 November 2017; Conservancy Leader #3, 11 March 2018; Reardon 1986.

their presence is felt. People herding livestock, or with little access to the resources to protect themselves, share space with lions in ways tourists, conservationists, and researchers rarely will.

Destructiveness

* "The problem of the lion…lions come and kill someone's cattle that they are living from. Living from the milk or whatever. That is when people are getting angry."[14]

* "[A lion] is not like an elephant, that when it comes it may break a branch and leave. When a lion comes to a kraal it may kill the whole kraal."[15]

* "If you keep goats near the house lions come and kill. When you take them in the veld they can kill. Even digging underneath kraals."[16]

* "Each and every day the lions were coming here. Taking cattle from the kraal. The only decision we could take was [to kill the lions]."[17]

* "I am becoming poor because of lions."[18]

The challenges of living alongside lions are transformed by the presence of livestock. Within the CBNRM framework, economic instrumentalism is the primary means for influencing decision making around resources. Among pastoralists, lions are primarily viewed as destructive entities from which they receive little direct benefit. Though spotted hyena account for a greater number of incidents (Heydinger et al., 2019), the actual and potential magnitude of livestock lost to lions in any incident make lions a unique threat. Three recent, regionally well-known HLC incidents are illustrative. In the early morning hours of 9 November, 2017, twelve lions invaded one farm, killing 86 goats and sheep – approximately 75% of the livestock there (Hartmann, 2017a). Less than a week later the same lions killed a further 171 goats and sheep at another, nearby farm (Hartmann, 2017b). On 15 January, 2018 two lions killed 172 goats and sheep kraaled near a lodge south of the core-lion range conservancies (Hartmann, 2018). Though such events are uncommon, pastoralists do not consider them to be aberrations.

[14] Conservancy Leader #1, 20 February 2018.
[15] Puros Pastoralist #2, 16 November 2017.
[16] Sesfontein Pastoralist #2, 23 November 2017.
[17] Conservancy Leader #6, 15 November 2017.
[18] Sesfontein Pastoralist #3, 2 December 2017.


Figure 4: Aftermath of HLC incident at Torra Conservancy farm, 9 November, 2017. Photo: authors.

The mediation of livestock transforms human-lion interactions. One pastoralist put the matter succinctly: "If you are only a person you can live with lions. But if you are having livestock, then it is not good."[19] Prior to intensive pastoralism, small bands of highly-mobile Hai||om (Khoe-Sān) of Etosha maintained a give and take with lions:

> "We even shared meat with the lions. In the daytime we took their meat and at night we served them our wounded game!" Another elaborates that "the lions were regarded as 'colleagues,' if not friends." And if they tried to attack them? Kadison explains that there was a saying shouted at approaching lions: "||Gaisi ai!nakarasa!", meaning "You ugly face, go away!" (van Schalkwyk and Berry 2007: 66, 73)

Large numbers of domesticated stock, including cattle, have been present in northwest Namibia since at least the sixteenth century (Kinahan, 2016, 2019). Relatively docile, embodiments of human property, livestock's arrival created relationships lions were ill-equipped to navigate. Historically, livestock have mediated human-predator relationships (van Sittert, 1998; Coleman 2004). Historian Jon Coleman has shown that wolves in colonial New England "had enough sensibility to retreat from people, but…[w]hen they sank their teeth into cows, pigs, and sheep, wolves committed sins unimaginable to them" (2004: 36). Similarly for lions, there was no historical precedent for them to understand that the destruction of an individual of one species could engender the retribution of another.

Livestock destruction has both economic and cultural effects. Mean-average cattle losses in recent years have been 68% of herds due to all factors, including, drought, disease, predators, and theft, with 18% lost to lions alone. Though the government provides annual funding to offset livestock losses from human-wildlife conflict, 92% of pastoralists are dissatisfied with the offset program – stating the money available is too little. While the offset program at the time provided the owner of a cow with NAD$1,500 (~US$120) in compensation, the mean-average price of a cow given by respondents was NAD$5,852 (~US$470). Even as pastoralists benefit from other conservancy programs tied to wildlife, these losses, occurring at the household level, undermine the economic instrumentalism pillar of CBNRM.

[19] Anabeb Pastoralist #8, 25 October 2017

Such losses have cultural valences. The role of cattle among Kunene ovaHerero, who compose the majority (77%) of surveyed pastoralists, cannot be overstated (Jacobsohn, 1998). Within ovaHerero matriclan and patriclans, cattle transactions bind a family's past, present, and future (Crandall, 1998). The possession of cattle confers status among men, connects people to their extended family, and provides a tangible link between a person and their ancestors (Jacobsohn, 1995). Generation-to-generation transactions of livestock are a time when political power is renegotiated and property rights reassigned (Bollig and Gewald, 2000). As a form of mobile property, cattle and other livestock also encourage economic and even political autonomy, such as when they served as mediators of resistance to South African rule during the colonial era (Heydinger, 2020a).

Increasing

* "In the past days the cattle were sleeping in the field but now they cannot because the lion population is high."[20]

* "[T]hey are all over… [W]hile people are reporting [from one] area, they come from another direction… 'This side is thirty lions, this side is eight, this side is seven.' "[21]

* "Lions have increased… Their numbers need to be managed."[22]

* "Lions will not [disappear]. Even now the cubs are being born and they will [always] be here."[23]

* "Lions are common [here]. Even last week it was behind the old man's house there."[24]

Among the challenges exacerbating HLC is the perception that lion numbers have increased. 72% of pastoralists consider lions to be "common" or "very common" in their conservancy. A shared perception of increasing lion numbers is linked to transformations in conservation policies and practices. During the colonial era, northwest Namibia was politically and economically marginalized and geographically isolated (Bollig, 1998; Heydinger 2021b). Among other challenges, African residents could neither count on government to address predator-caused problems nor did officials enforce conservation regulations (Owen-Smith, 2010; Heydinger, 2020b). This began changing under CBNRM. By formalizing local rights to wildlife, so the narrative goes, prey and predator numbers increased (NACSO, 2016). However, the conservancy system has also led to greater law enforcement. As lions are designated as 'protected' by the Namibian government (Nature Conservation Act 4/1975), there are long-standing prohibitions against killing lions, except when they are an immediate threat to human safety or property. Prior to Independence, this was largely unenforced. Two elder pastoralists spoke nostalgically for aspects of the colonial era:

> "[W]ild animals were killed [then]. When the conservancy was established, they said the predators shouldn't be killed…The people in the olden days; that is when they were killing those animals and there were no problems…[N]ow, conservancies have come in and totally said 'no, we won't kill wild animals anymore'… Now it is difficult. Because of predators – that is the problem."[25]

[20] Conservancy Leader #4, 30 March 2019.
[21] Conservancy Leader #2, 15 July 2017.
[22] Anabeb Pastoralist #4, 29 November 2017.
[23] Sesfontein Pastoralist #5, 25 November 2017.
[24] Anabeb Pastoralist #5, 24 October 2017.
[25] Conservancy Leader #5, 15 July 2017.

Nostalgia for aspects of the colonial era can serve as a critique of the contemporary state (van Wolputte et al., 2013). Prohibitions against killing predators leads to feelings of increased vulnerability. The perspective that decreased lion killing leads to increased HLC, is commonly held.

> "Lion[s] have increased because they are not being killed. If we had been allowed to kill [lions] then maybe the numbers could have decreased. But we are not allowed to kill them so they are just increasing."[26]

> "In the olden days my father and the people living here were killing lions. And so the lions were just stealing [and running] because the lion knows, 'if I kill something, they will track me.' But now, since Independence, lions are taking out of the kraal and they are lying there and they are eating."[27]

Linked to these perceptions, pastoralists are critical when conservation elites – government and NGOs – seemingly prioritize lions over economic wellbeing and human safety. This can lead to lion killing as a form of protest. Throughout Africa, marginalized communities have repeatedly killed protected species as a means of gaining attention (Carruthers, 1989; Kissui, 2008; Goldman et al., 2013). The growing visibility of HLC in recent years, for example following the death of 'Cecil' the lion in Zimbabwe, makes lion death one of the few platforms for otherwise marginalized people to gain elites' attention. One communal pastoralist, who readily admits to killing at least four male lions over nine months, stated,

> "We report [the lion problems] to the government but there was no decision. We had maybe three or four [calls to them]. We even had a big meeting with people coming from Windhoek and they said they would go back and take a decision, but even until now, no response… The government is responding [to livestock deaths] by sending people, maybe one car. But if there is a lion injured, then they will maybe send eight cars."[28]

Seen in this light, lion killing is a form of 'everyday resistance' to oppression (Scott, 1985), which pastoralists my wield as a rhetorical tactic to emphasize discontent (Boomgaard 2001: 227). One pastoralist emphasized the focus on lions as a driver of HLC:

> "In terms of incidents that have been caused by lions it is not more than even a jackal but all over people are just thinking of lion, lion, lion. But when it comes to on the ground, the challenges are less than all the other predators."[29]

While killing a spotted hyena or jackal brings no response, in contrast, "if I shoot a lion; the helicopter is in the sky. Other vehicles [are coming]."[30]

[26] Anabeb Pastoralist #7, 24 October 2017.
[27] Puros Pastoralist #2, 16 November 2017.
[28] Conservancy Leader #6, 15 November 2017.
[29] Anabeb Pastoralist #13, 27 October 2017.
[30] Conservancy Leader #4, 30 March 2019.

Figure 5: Two lions killed following HLC incident, 2019. Photo: C. Tjikundi.

Local animus regarding a perceived prioritization of lions is illustrated by a particular claim that, to our knowledge, is unique to human-lion interactions in Kunene. During our surveys, 34% of pastoralists, unprompted, claimed that some combination of government, NGOs, and tourism operators feed lions. The most common reasons given for lions being fed was that they are baited to provide tourists with viewing opportunities, or to perform scientific research. Providing lions with meat, while people suffer food insecurity, is tantamount dehumanizing area residents. During important ovaHerero social occasions, including community meetings, holidays, or weddings and funerals, the provision of meat conveys one's social status and is received as a sign of respect. It is nearly unthinkable that an important occasion not include generous amounts of meat being provided and consumed, and there is a hierarchy of who is served which portions, in what order. This has remained true during the recent years marked by drought, widespread livestock death, and constrained livelihoods. Though we found no direct evidence of lion feeding, this belief may persist from the 1950s when lions in Etosha were routinely fed by park staff (Heydinger, 2021a); it remains the conviction among certain pastoralists that this still takes place.[31] Such stories contribute to a perception that conservancies are being cultivated spaces for wildlife, while people suffer. Such practices may also increase the danger lions pose to people: many interviewees think lions are losing, or have already lost, their fear of people because they are being fed. This absence of fear suggests human-lion encounters may become more common.

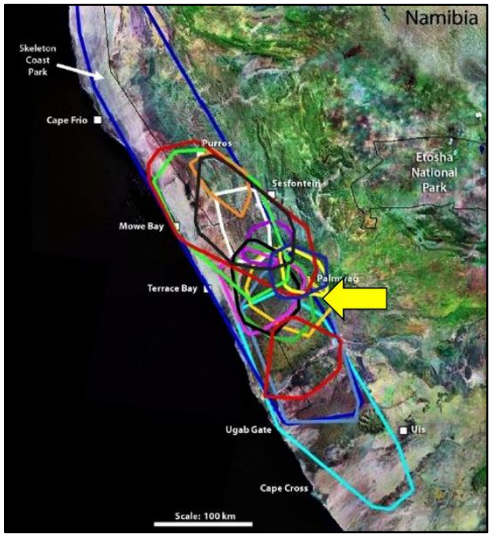
The region's arid and semiarid ecology likely contributes to perceptions of high lion numbers. Drought has caused declines in prey numbers, leading to increased lion attacks on livestock. 87% of conservancy farmers state HLC has either "greatly increased" or "somewhat increased" since the beginning of the drought. One farmer points to the diminishing prey base as the cause,

> "Lions are very smart. They know that due to drought the wildlife has become less so they are moving into people's territory. And then they figure out, here are goats and cattle and sheep and those type of things and when they see that they settle down there."[32]

Another respondent attributes increasing HLC to greater prey mobility in search of grazing, saying that "[d]uring drought the game is moving a lot. Lions are following the game's tracks and when they are coming close to the village they are smelling [the livestock] also."[33]

[31] Anabeb Pastoralist #12, 29 October 2017.
[32] Anabeb Pastoralist #8, 25 October 2017.

Connections between lion mobility and HLC are supported by lion movement data. Desert-adapted lions maintain the largest home ranges among African lions (Heydinger, 2020c: 151-182). This is likely due to lions covering extensive ranges to support caloric needs from low amounts of available prey. Average nightly movements of female desert-adapted lions of 7.3 (±0.9) km over a mean-average home range of 3,577 km^2 indicates that, on a given night, they cover between 0.00178-0.00229% of their range. In comparison, lions in Serengeti cover approximately 0.015% of their mean-average home range – more than seven times as much. Two maps of desert-adapted lion ranges illustrate the challenge this poses.



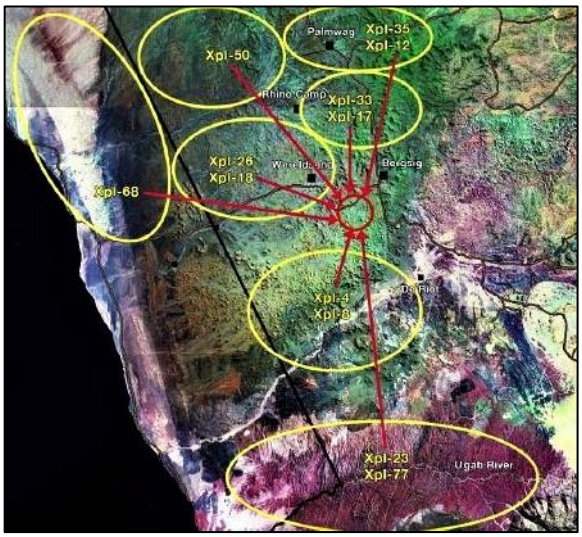


Figure 6 (left): Map of overlapping home ranges for 19 lions fitted with GPS/satellite collars between 2008 and 2015. Yellow arrow indicates area enlarged in Figure 7 (NMET, 2017: 23).

Figure 7 (right): Map of core home ranges for 12 collared lions (each represented by XPL-## IDs) causing HLC at a conservancy farm between 2006 and 2013. Farm area indicated by red circle. (NMET, 2017: 35).

From 2006 to 2013 twenty-two cases of HLC were recorded at a single farm in Torra Conservancy, resulting in sixteen lions being destroyed (Figures 6 & 7). The relatively low likelihood of a lion's presence within any part of its home range allows for considerable range overlap, increasing the potential for HLC, and leading to inflated population estimates as pastoralists encounter more lions. This is not to suggest pastoralists contextualize lion movements and population numbers relative to a home range framework. They do not. Rather, pastoralists' perspectives can be aligned with research-informed perspectives. This provides a platform for bringing Indigenous and scientific perspectives into productive conversation.

Finally, available scientific information indicates that lion numbers in Kunene *have* increased both since the 1990s, and relative to a longer timeline. Approximately forty lions were estimated to inhabit communal areas during the 1970s and 1980s, with additional individuals along the Etosha boundary (Owen-Smith, 1971; Viljoen 1980). Though historical records are anecdotal, these data provide historical lion population trends. Furthermore, historical records reveal the persistence of lions distinguishing characteristics and durability of HLC (Heydinger, 2021a). In 1952, one White farmer

[33] Puros Pastoralist #1, 14 November 2017.

requested government permission to pursue lions into Etosha National Park to kill them.[34] Rudolph Böhme was convinced that lions in his area were fearsome: they attacked people, even killing his neighbor. They were destructive: he claimed forty-two stock losses within a year including "1 very valuable bull, 1 horse, 1 work oxen…[with] another cow severely mauled." And their numbers were increasing: Böhme recalled no lions in the area in his youth, while attributing increasing HLC to the area's growing lion population. Though some of his claims, such as Etosha containing "thousands" of lions, were clearly fantastical, Böhme's complaints were discussed among government officials. But they refused to act.[35] A more extensive history of lions and official response to HLC in the region has been written by Heydinger (2020a).

For conservationists familiar with lion populations and densities elsewhere, lion numbers in Kunene appear marginal. Recently estimated between 112-139 over 38,950 km^2 (Stander, 2018: 144), lion density in northwest Namibia (0.33-0.53 per 100 km^2) is among the lowest recorded among viable lion populations in Africa (Heydinger, 2020c: 151-182). By comparison the Serengeti ecosystem contains an estimated twenty times as many lions. Yet, for Kunene pastoralists, these data are immaterial. Communal pastoralists experience with lions is personal and local, while lion conservationists contextualize desert-adapted lion conservation within a pan-African perspective (pers obs). Pastoralists' information about lions circulates within a different information ecosystem from conservationists. This is important for reconciling diverse perspectives on HLC. For example, differentiated response to lion versus livestock killing may be driven by disparate interpretations of lion numbers and asymmetrical information. This can exacerbate the effects of HLC. An international emphasis on declining lion numbers is eroding already limited lion-derived benefits for communal pastoralists. Since late 2017, the Ministry of Environment, in consultation with conservancy management, has suspended lion trophy hunting. This is due to a skewed female:male sex ratio (1:0.18) which is thought to primarily be the result of retaliatory killing following HLC (NMET 2017; pers obs).[36] This eliminates one of the few ways lions formerly contributed direct monetary benefits to conservancy coffers. Clearly it can simultaneously be true that lion numbers are decreasing across Africa and have recently increased in Kunene. HLC affects livelihoods on a local and immediate, not international and abstract level.

DISCUSSION

Unifying Insights for CBNRM of Lions

Within conservancies, lion conservation is primarily a social process. Ideologies that lions are fearsome, destructive, and increasing are an active part of humans, livestock, and lions sharing unfenced landscapes. The principles of CBNRM emphasize the importance of local consultation, engagement, and empowerment (Jones and Murphree, 2001). These are also critical to sustainably managing HLC. As anthropologist Margaret Jacobsohn (2019), one of the founders of Namibian CBNRM, has written, "the first step in community-based conservation is forging a relationship of trust and respect with local people which means being concerned about their needs and issues, not just your own conservation aims." The question becomes how to create positive CBNRM transformations around improved livelihoods to enable lion conservation?

Importantly, pastoralists do not *only* consider lions as fearsome, destructive, and increasing. Distinguishing features do not preclude other perspectives. Pastoral communities have lived alongside lions for hundreds of years; providing nuanced perspectives. For one Himba man, lion encounters during the colonial era engendered a perspective of lions as individuals:

[34] NAN South West Africa Administration (SWAA) 2329. (1952). Letter from Rudolph Böhme, Onguma Farm to the Office of the Administrator, Windhoek, 23 June; NAN SWAA 2331 A.510/1. (1952). Destruction of Lions. Letter from Mr. R. Böhme, Onguma, Tsumeb. 7 March.

[35] NAN SWAA 2329. (1952). Proposed Extermination of Lions, Etosha Pan Game Reserve, Secretary South West Africa to Magistrate, Grootfontein. 21 April.

[36] According to IUCN regulations, only males may be trophy hunted.

> "Those of us who have lived with lion know that, like all animals, and indeed like people, each lion is different. Most lions cannot be allowed to remain near stock. They are killers of cattle and must die. Others who do not know cattle may be timid and leave cattle to graze in peace" (Jacobsohn, 1998: 47).

Among those surveyed, 74% affirmed a desire for lions to persist in their conservancy. This provides reason for hope. The possibility that human-lion interactions can be positively transformed is reinforced both within Indigenous perspectives and scholarly work from STS and human-animal studies.

The diverse social mediations of cattle and other livestock among the ovaHerero suggest that animals can productively mediate human relationships (Ginn et al., 2014). OvaHerero value cattle for monetary and nonmonetary reasons. Not only signs of wealth and prestige, cattle embody relationships among people, linking multigenerational kin relationships across matriclans (*omaanda*) and patriclans (*otuzo*). Cattle also cross barriers between the impermanent (*kamanga*) and the timeless (*karerera*); between the sacred (*zera*) and the secular (Gibson, 1956; Crandall, 1998). Yet, "cattle possess no intrinsic symbolic value whatever, but only acquire such value as they come to represent things entirely foreign and exterior to themselves. Cattle are representational media whose value derives from the value human beings ascribe to the persons, objects, entities or activities cattle represent" (Crandall, 1998: 101). Drawing on ovaHerero understandings that animals can mediate human relationships suggests the possibility that human-livestock-lion relationships can produce positive human-human interactions.

Yet, lions are not livestock, and the perspectives of pastoralists and conservation elites differ dramatically. A conceptual means of surmounting this gap comes from STS scholars Susan Leigh Star and James Griesemer (1989). They developed the concept of 'boundary objects': entities both plastic enough to have different properties attributed to them and robust enough to maintain a common identity between different people. "The creation and management of boundary objects," they write, "is a key process in developing and maintaining coherence across intersecting social worlds" (1989: 393). This resonates with the flexible mediations of cattle among the ovaHerero, as well as the different perspectives of HLC among pastoralists and conservationists. Boundary objects, such as libraries, species, sociopolitical boundaries such as countries, and standardized indexes, have been shown to be plastic enough to be differently defined and used by different groups, while maintaining enough solidity to bridge differences between groups. Elsewhere Star (2010: 602) writes, "[b]oundary objects…allow different groups to work together without consensus." Star and Griesemer provide a framework for how boundary objects can link disparate social groups, provided each group respects the integrity of the others' perspectives, and those goals are aligned. Addressing discordant perspectives on HLC through constructive negotiation in the manner of boundary objects can personalize disparate groups, while bringing differing HLC perspectives into conversation. For example, while 84% of pastoralists state they do not benefit from lions, there is widespread recognition that lions contribute tourism, which tourism brings income to conservancies.

Within a CBNRM framework, processes of consultation, engagement, and empowerment can be the foundation addressing HLC. To practically demonstrate how this can be achieved, we turn to Ostrom's Seven Design Principles (Panel A) for common-pool resource management. These principals provide a means for assessing the strength of the CBNRM approach. To ground this examination, we provide the example of the Lion Rangers. Spanning eleven Kunene conservancies, including all four lion-range conservancies, the Lion Rangers draw-upon local perspectives and scientific approaches to address HLC. Lion Rangers are communal pastoralists employed by their conservancy. By employing, training, and equipping conservancy residents to use community-centered, scientific, and technical methods for limiting HLC, the Lion Rangers provides lion-centered benefits while addressing HLC. This approach is modeled after similar community conservation programs (Hazzah et al., 2014; Muntifering et al., 2015) and founded on the historical and contemporary perspectives outlined above. Ostrom's Design Principles indicate how the Lion Rangers are addressing existing shortcomings in HLC management.

Panel A: Ostrom's Seven Design Principles for Long-enduring Common-pool Resource (CPR) Institutions (adapted from Ostrom, 1990)

1) Clearly defined boundaries – Individuals who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.
2) Congruence between appropriation and provision rules and local conditions – Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material, and/or money.
3) Collective-choice arrangements – Most individuals affected by the operational rules can participate in modifying the operational rules.
4) Monitoring – Monitors, who actively audit CPR conditions and appropriate behavior, are accountable to the appropriators or are the appropriators.
5) Graduated sanctions – Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both.
6) Conflict-resolution mechanisms – Appropriators and their officials have rapid access to low-cost arenas to resolve conflicts among appropriators or between appropriators and officials.
7) Minimal recognition of rights to operate – The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.

Principle 1 – Boundaries

Within Kunene conservancies, boundaries are spatial and also embodied by lions. Since the early 2000s, lion conservation has been the province of government and NGOs. Their approaches have largely been informed by technologically-mediated tools, such as VHF and GPS/satellite collars, not available to communities. Asymmetrical access to technology effectively places aspects of lion monitoring beyond conservancies' reach, creating dissimilar perspectives on HLC.

Confusion also exists concerning ownership rights and responsibilities for lions. 39% of pastoralists stated lions are the government's responsibility, while 49% stated lions are the responsibility of local people or the conservancy. 54% stated lions belong to the government, while 30% stated lions belong to local people or the conservancy. This confusion is understandable. Though conservancies maintain limited rights to huntable game species, lions are designated among protected species – under government control. The alienation of lions as community resources undercuts CBNRM as a mechanism for local people's collective proprietorship (Dressler et al., 2010).

The Lion Rangers operate with government approval as de facto managers of lions within their conservancy. They are the conduit between pastoralists, the conservancy, government, and NGOs concerning HLC. They have access to collar movement data. When lions move between conservancies the program provides structure for different conservancies' Lion Rangers to collaborate. At other times conservancies have united around provisioning tourism and grazing access. These provide models for Lion Rangers to innovate new means for sharing responsibilities and delivering lion-related benefits.

Principle 2 – Appropriation and Provision

Gaps between the appropriation of lions as resources and the provisioning of them as a resource stock undercuts the efficacy of conservation efforts. Provisioning problems (concerning resource stock) are experienced because pastoralists and conservation elites contextualize lion numbers differently. Appropriation problems (concerning resource allocation) are experienced because lion benefits are

lacking, though lions are expected to be treated as a common-pool resource. An asymmetry also exists regarding the costs lions impose, and the actual or potential benefits they provide. When the government grants a trophy permit for a lion within a conservancy, that conservancy receives a trophy fee. However, because livestock losses occur at the household level, these benefits may not reach those pastoralists most affected by HLC.

Sustainable benefit flows require policymakers to align lions as a resource stock with the appropriation of them, as well as clearly communicate how lion benefits are channeled. Within CBNRM, matching the magnitude of costs and benefits is important for program success (Störmer et al., 2019). This may go beyond tourism and trophy hunting-derived benefits. Across sub-Saharan Africa the effects of trophy hunting have been mixed: restrictions on lion hunting have been shown to have negative conservation outcomes (Lindsey et al., 2012), while unsustainable levels of hunting have driven declines in lion abundance in certain areas (Packer et al., 2011). Declines in tourism stemming from the COVID-19 pandemic reveal the tenuousness of relying on tourism-derived income (Lindsey et al., 2020). By having employment explicitly tied to lion presence, Lion Rangers receive non-consumptive monetary benefits tied to lion presence. Other programs for delivering non-consumptive, non-tourism-based benefits are being developed (Heydinger et al., 2022a).

Principle 3 – Collective-choice

CBNRM pillars of devolution and collective proprietorship underscore the important role of local rights when managing resources (IRDNC, 2011). Emphases on consultation, engagement, and empowerment will include addressing lions' fearsomeness, destructiveness, and increasing numbers. STS theorists have demonstrated that disinterested 'objectivity' is an illusion (Haraway 1990) – neither locals nor conservationists maintain neutral perspectives. Living alongside lions should be an important qualification for those empowered to make decisions concerning HLC. The Lion Rangers are themselves pastoralists. They embody the experience of living with lions and are charged to faithfully represent the challenges surrounding HLC. Results from Namibia and other community conservation settings demonstrate the efficacy of community-centered approaches to managing wildlife and other resources (NACSO, 2020; Salerno, 2020). While CBNRM is not a panacea, it has been shown to support robust local governance, ensure social justice, and improve material well-being and environmental integrity (Dressler et al., 2010).

Principle 4 – Monitoring

"The worst of all worlds may be one where external authorities impose rules but are only able to achieve weak monitoring and sanctioning" (Ostrom, 2000: 147). Prior to the activation of the Lion Rangers there was limited monitoring of lions. When pastoralists suffered from HLC incidents, the response of conservation elites was irregular or inappropriate, leading to pastoralists' antagonism. An important first step has been enabling conservancy access to lions. Increasing safe, relatively controlled interactions with lions also helps demystify their fearsomeness.

The Lion Rangers are improving inclusive monitoring and information dissemination, but the program's reach and effectiveness require strengthening. Locals serving as conduits of information is an important step towards conservancies managing human-livestock-lion relationships. A similar approach has been successful in reducing HLC and generating stewardship among rural pastoralists on communal lands in the Amboseli-Tsavo ecosystem of southern Kenya (Hazzah et al., 2014).

Principle 5 – Sanctions

Regular sanctions are currently lacking. Though 95% of survey respondents stated the government will investigate when lions are killed, and 54% believe someone killing a lion will face criminal charges, enforcement of lions' protected status is irregular. Crucially, the threat of sanctions comes not from the conservancy (provisioners) but from government. During the development of the conservancy system, community-centered enforcement of anti-poaching regulations was considered critical to protecting wildlife (Owen-Smith, 2010). While community monitoring continues, sanctions tied to economic

instrumentalism can increase a conservancy's role as HLC managers. To more productively address HLC, one option could be for benefit flows from lions to be tied to conservation performance. Contracts around conservation performance, with the threat of lost income for violating contract stipulations, have been shown to be successful in rural communities living with snow leopards (*Panthera uncia*) (Mishra et al. 2003). A conservation performance program is currently being developed in consultation with conservancies (Lion Rangers 2022). When performance measures of this program are not met, as monitored by a conservancy's Lion Rangers, sanctions can take the form of lost income.

Principle 6 – Conflict-Resolution

Conflict-resolution mechanisms are needed, particularly when lions kill livestock. The only formal mechanism is monetary offsets. However, 92% of communal pastoralists feel the offset program is inadequate, with the most common response being that the money provided is much less than the value of the livestock lost. Furthermore, simply commodifying livestock loss, particularly of cattle, is insufficient. As local pastoralists, Lion Rangers can better contextualize the magnitude of livestock loss. By acknowledging emotions associated with diminished autonomy when livestock are killed, Lion Rangers provide more comprehensive forms of mitigation and conflict response. Conflict-resolution is an important part of ensuring lions do not become objects for communicating protest. While the Lion Ranger program is itself a form of conflict-resolution, further approaches relevant to conservancies' role as provisioners and appropriators are needed. Additionally, conflict-resolution tailored to historical and contemporary experiences of HLC is more likely to create lasting positive changes to local attitudes.

Principle 7 – Rights to Operate

Concerning lions, conservancies do not currently enjoy autonomous rights operate. Pastoralists recognize that limitations on their right to dispose of lions constrains their livelihoods. This leads to antagonism towards conservation elites. Government should consider opening dialogue for devolving greater lion management rights to conservancies. This could include greater support for conservancies to develop their own institutions for managing HLC and increased involvement in drafting policy. The Lion Rangers are the first platform to demonstrate that communities can be trusted to sustainably manage 'their' lions. In this vein, it is worth remembering that pastoralists and lions have long lived alongside one another. Even under negative future the scenarios, the neighboring population of Etosha lions will likely remain secure (Heydinger et al., 2022b), and lions from Etosha have periodically (re)colonized communal lands. The park's lion population thus serves as a buffer against mismanagement. This allows for flexibility in the learning process. We believe increased rights to operate, alongside increased monitoring, graduated sanctions, and new conflict-resolution activities, will benefit both pastoralists and the long-term viability of lions in Kunene. This will more fully place lions within the CBNRM paradigm.

CONCLUSION

The four pillars of CBNRM reinforce the importance of recentering HLC experiences. When pastoralists' experiences are examined, the challenges facing lion conservation and HLC management are apparent. CBNRM rests on an emotive foundation of natural resource stewardship (Murphree 2009). As such, CBNRM programs must be "embedded in sociocultural relations [and] politics" (Dressler et al., 2010: 13).

Lions' fearsomeness calls into question whether local sociocultural relations currently form the appropriate commitment to lion stewardship – even as 75% of respondents affirm that they want lions to persist in their conservancies. The historical durability of lion fearsomeness indicates HLC mitigation should engage, rather than dismiss, local perceptions to foster increased tolerance of lions. Among the ovaHerero, human-livestock relationships provide one roadmap for how lions can unify disparate groups. Increasing safe access to human-lion interactions via the Lion Rangers program can help transform pastoralists' perspectives of lions.

The antagonistic character of human-livestock-lion interactions is a central challenge to addressing HLC. Lions' destructiveness undermines the economic instrumentalist and collective

proprietorship pillars of CBNRM as well as Ostrom's appropriation and provisioning design principles. The severing of social bonds when livestock are killed reveals a gap in the CBNRM framework around economic instrumentalism, even as conservancy residents benefit from other wildlife. Reframing HLC by acknowledging the risks to livelihoods, human safety, and group autonomy, can help refocus conservation interventions towards livestock survival. Centering collective-choice around those experiencing HLC strengthens the potential for conflict-resolution relevant to the breadth of challenges pastoralists experience. Reframing lions as part of a broader set of resources from which pastoralists do benefit may also increase tolerance.

As we have shown, pastoralists perception of increasing lion numbers is supported by available data. This can serve as a foundation for unifying perspectives with those of conservation elites. Programs such as the Lion Rangers integrate vernacular and scientific perspectives on HLC within a platform privileging local knowledge. In a CBNRM paradigm it is the responsibility of conservationists to adapt to local perspectives, rather than vice-versa (Owen-Smith 2010; Jacobsohn 2019). Progress on this front may contribute towards removing lion killing as means of protest.

Our method puts theory into practice: by facilitating dialogue around HLC, as we have done in our oral histories and social surveys, new perspectives are uncovered. In this case, we better understand how locals experience living with lions and through the Lion Rangers have adapted conservation approaches accordingly. Across Africa, a paradigm shift is needed if lions are going to survive within human landscapes. More perspectives, not fewer, are required to productively address wildlife conservation and livelihood challenges.

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