

CBNRM and the Desert-Adapted Lions: Human-Centered Research Methods Contributing to Conservation Interventions in Kunene, Namibia

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ABSTRACT

Human-lion conflict (HLC) is the premier threat to the population viability of the desert-adapted lions in Kunene, northwest Namibia. In Kunene lions primarily inhabit communal conservancy land, where seminomadic pastoralism is the primary source of residents' income. A form of community-based natural resource management (CBNRM), conservancies seek to unify human land uses and wildlife conservation outcomes. Using historical and social survey methods, as well as drawing upon environmental and lion-focused research, we show that pastoralists attribute three distinguishing properties to lions: fearsomeness, destructiveness, and increasing numbers. Pastoralists' perspectives on lions threaten to undermine the pillars of CBNRM and government-imposed limitations on local ownership rights over lions contradict Ostrom's Seven Design Principles for common-pool resources – a framework that was central to the establishment of the conservancy system. By linking the historical and contemporary challenges pastoralists' experience of living with lions we reveal the need for recentering HLC mitigation around human-(livestock-)lion relationships. Centering pastoralists' perspectives is necessary to strengthening the pillars of CBNRM. We introduce the Lion Rangers program, which is placing local people at the center of lion conservation and HLC mitigation, as a means of fulfilling important dimensions of Ostrom's Design Principles. We close by emphasizing the importance of human-centered methods for incorporating local perspectives into wildlife conservation when it takes place on multi-use lands.

Keywords: human-lion conflict; community-based natural resource management; distinguishing properties; human-animal studies; Ostrom; human-wildlife conflict

The Kunene Region of northwest Namibia is home to a population of free-ranging¹ desert-adapted lions (*Panthera leo*). Nearly eradicated during the last years of apartheid (Reardon 1986; Heydinger forthcoming), the desert-adapted lions have grown from a low of approximately 20 individuals in 1997 to an estimated 180 in 2015 (NMEFT, 2017; Stander, 2018). This 800% population increase has primarily taken-place upon unfenced communal conservancy land. Kunene is also home to a diverse population of humans, including ovaHereros,² Damara, Nama, and Riemvasmakers, primarily deriving their income from semi-nomadic pastoralism. The rebounding population of lions and subsequent expansion of lion range within communal lands has been accompanied by increasing human-lion conflict (HLC) between pastoralists and lions, which greatly affects both the viability of the desert-adapted lion population and pastoralists' livelihoods. From 2003 to 2015, lions and other predators were responsible for 5,862 livestock attacks in core lion-range conservancies (see below). Since 2000, human-caused mortalities have accounted for 80% of adult lion mortalities, and 100% of sub-adult (non-cub) lion mortalities. These disproportionately affect males, skewing the population's sex-ratio to 5.4 females per male (Stander, 2018).

¹ Free-ranging is defined as lions inhabiting fenced areas >1,000 km² in size, or partially fenced areas >500 km² (IUCN 2018).

² The designation ovaHerero is used as an inclusive term to refer to the Kunene Herero, Himba, and Tjimba. Though self-identified as a single, group of people unified by their home language of Otjiherero, differences between these groups became sharpened during the colonial era. However, ovaHerero remains an inclusive term. A Himba saying states this clearly: 'omuHimba omuHerero', a Himba is a Herero (Jacobsohn 1998:17). For a discussion of the historical relationships between the Herero, Himba, and Tjimba in northwest Namibia see: Heydinger, 2020a.

Currently, the Namibian government considers HLC to be the premier threat to the viability of the desert-adapted lion population.

HLC presents a multi-faceted challenge to residents and conservationists. However, these challenges are not new. The lives of humans, livestock, and lions have long been interwoven in Kunene. Contemporary human-lion interactions are influenced by, and in many ways resemble, historical human-lion interactions. Humanities and social science methods, including historical document analysis, oral histories, and social surveys, are integral to productively addressing HLC. Using these methods, along with environmental and lion-centered information, we examine historical and contemporary human-centered aspects of HLC for new approaches to conserving the desert-adapted lions without sacrificing pastoralists' safety and livelihoods. This shines a light on some of the experiences and effects of human-wildlife conflict among African pastoralists and demonstrates the role of human-centered research in conserving iconic wildlife where it overlaps with human land uses.

How pastoralists interpret human-lion interactions are central to innovating human-centered approaches to lion conservation. Through interviews and surveys, we found pastoralists associate lions with particular “distinguishing properties” – a term adapted from human-animal scholar Jamie Lorimer (2007). These distinguishing properties include lions' fearsomeness, destructiveness, and increasing numbers. These distinguishing properties have profound effects on how pastoralists experience living with lions and bear strong resemblance to past experiences of living with lions. In Kunene, human-lion relations among pastoralists are mediated by the role of livestock. Emphasizing the region's ovaHerero people, we show how livestock, particularly cattle, function as both economic and cultural entities among communal pastoralists, with subsequent effects for lion conservation.

The framework deployed here accords with the objectives of community-based natural resource management (CBNRM). In Kunene, CBNRM is considered central to affirming the rights of local residents as custodians of the region's wildlife (NACSO, 2020). By reviewing the theorization and existing practices of CBNRM within core lion-range communal conservancies, alongside historical material and pastoralists' perspectives of human-lion interactions, we reveal shortcomings in existing CBNRM as it pertains to desert-adapted lion conservation. Once these shortcomings are evident, CBNRM-focused lion conservation interventions can be tailored to repair CBNRM policies and practices. The recommendations put forth emphasize a return to the Design Principles for common-pool resource management introduced by Nobel Prize-winning economist Elinor Ostrom (1990), whose work was central to developing Namibia's CBNRM program in the 1990s (Jones, 2010a). We close by showing how one CBNRM-focused lion conservation program, the Lion Rangers, is implementing CBNRM practices to achieve unified desert-adapted lion conservation and community benefits.

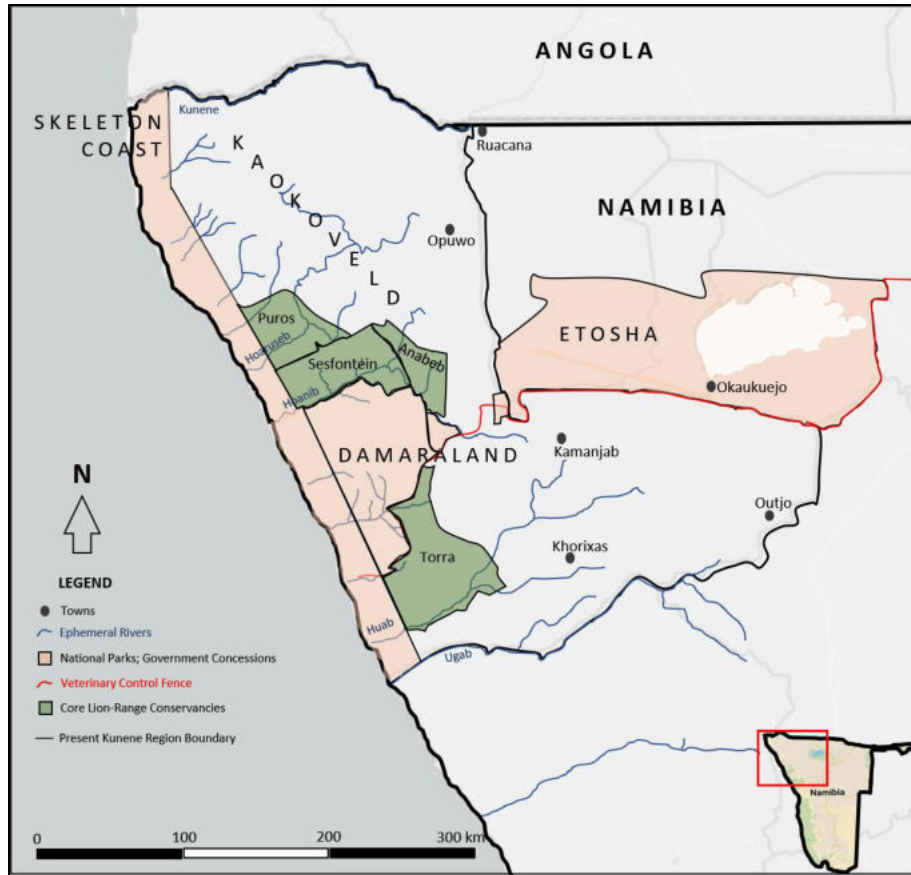


Figure 1: Map of Kunene with Core Lion-Range Conservancies and Government Protected Areas. Created by authors.

STUDY AREA

Kunene encompasses an area bounded by the Ugab River in the South, the Kunene River in the north, the Skeleton Coast along the Atlantic in the west, and Etosha National Park in the east. The region is almost entirely held under communal land tenure, excepting southeastern Kunene which contains large privately-owned farms – this area has no resident lions and we do not focus on it. Kunene 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 and renamed Kaokoland and Damaraland (1964-1990). Throughout this paper we use the geographic designations from the relevant era. However, we refer to the territory formerly known as German South West Africa (1885-1915) and South West Africa (1915-1990) as Namibia throughout.

Kunene is composed of a variety of heterogenous environments. Dominated by the northern Namib desert, the region contains mountains, gravel plains, and sandy dunes pocked by small marshes and oases, and bisected by ephemeral riverbeds. The basaltic soil is shallow, rocky, and low in productivity (Mendelsohn et al., 2002; Stander, 2018). Desert-adapted species and subspecies, such as lion, black rhinoceros (*Diceros bicornis*), elephant (*Loxodonta africana*), oryx (*Oryx gazella*), and mountain zebra (*Equus zebra*), are found throughout the region. Rainfall is low (50-250 mm per year) and erratic. During the wet season (January-May) rains may come in brief, localized downpours. Prey species, including oryx, mountain zebra, and giraffe (*Giraffa camelopardalis*), follow the rains to find fresh grass and often congregate in ephemeral riverbeds during the dry season (June-December). Springbok (*Antidorcas marsupialis*) generally stay to the plains, while kudu (*Tragelaphus strepsiceros*) generally keep to stands of trees, thick bush, and cliffsides. Surface water is normally sparse. However, an extensive government borehole-drilling program in 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. However, periodic, extreme droughts have multi-generational effects for humans and wildlife; even among desert-adapted species. From 2011 to 2017, indicator prey species diminished by as much as 60% and livestock numbers by as much as 67.9%, due to drought (Heydinger et al., 2019). Relatively low amounts of rainfall over the past decade suggest global climate change may increase aridity in the region – though this remains to be seen.

In 2017 Namibia’s Ministry of Environment, Forestry and Tourism (MEFT) identified four core desert-adapted lion range conservancies where HLC was deemed critical: Anabeb, Puros, Sesfontein, and Torra (NMEFT, 2017). The environments of these four conservancies are typical for western Kunene. They are characterized by vast, rugged landscapes, limited population, and arid or semiarid conditions with erratic rainfall and low ecosystem productivity (Mendelsohn et al. 2002). They are also among the wealthiest conservancies in the region, as measured by annual conservancy income primarily coming from tourism and hunting receipts, primarily of game species such as oryx, springbok, zebra, kudu, and giraffe (NACSO, 2018).



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

METHODS

Historical material on human-lion interactions in Kunene are diverse in format. Precolonial materials include accounts by European ‘explorers’ and archaeological evidence. Colonial era records primarily come from Namibia’s National Archives and published sources. Twenty-two semi-structured oral histories were collected by us across the four core lion-range conservancies, from July 2017 to May 2019. These interviews were performed among key conservancy residents, as identified by other community members and ourselves. Of the interviews performed, sixteen were with men and six with women (in one case a pair of elderly sisters were interviewed together). To protect anonymity respondents are quoted as conservancy leaders, i.e. “Conservancy Leader #1.” Other oral accounts come from published anthropological literature. Grey literature, limited-circulation documents, and a small number of published studies compose the majority of historical and contemporary environmental and lion-focused data.

Contemporary accounts of human-lion interactions are drawn from eighty-five semi-structured social surveys performed across three of the four core lion-range conservancies – Anabeb, Puros, and Sesfontein – from September to December 2017.³ The surveys were part of a government and NGO program to examine the costs incurred by communal pastoralists during the recent drought, with particular emphasis on assessing livestock losses to HLC. To avoid double-counting livestock and livestock losses, surveys were performed with the ‘head’ of each livestock-owning household. In the majority of cases, the household head was a senior male (78%, n=67); when he was absent a senior female, usually his eldest wife, was surveyed. Other household members frequently elaborated answers or assisted as needed. To protect

³ Complete social surveys methods are described in Heydinger, Packer, Tsaneb 2019, Section: 2. Materials and methods.

anonymity respondents are identified as a pastoralist from the relevant conservancy, i.e. “Puros Pastoralist #1.” All oral history interviews and surveys were performed by Heydinger, with translation by Tsaneb when necessary, who also contributed to interpretations of local perspectives. In some cases one or both of us had a preexisting relationship with the interviewee. Though certain respondents associated us with regional lion conservation activities, and occasionally with government, there was no indication respondents felt constrained from answering truthfully. All interviews and surveys took place at respondents’ homes or in a neutral space, such as in the field during herding activities, were carried out in the preferred language of the respondent, including English, Afrikaans, Otjiherero, and Damara>Nama, and were audio recorded with relevant sections transcribed later. Quantified survey results emphasizing financial costs of drought and livestock loss have been published previously (Heydinger et al., 2019).

Interpretations of local perspectives draw upon concepts from human-animal studies, and science and technology studies (STS). Human-animal studies scholars examine how humans and animals affect the actions and prospects of each other. Useful introductions to this field include works by Tim Ingold (1988), Susan Jones (2003), and Donna Haraway (2008). Human-animal scholars, such as Steve Hinchliffe (2010), and Fuentes and Baynes-Rock (2017), have shown that the context in which humans and nonhumans interact greatly influences human understandings of animals. As an environmental historian (Heydinger) and lion conservationists (Heydinger and Tsaneb) with more than four years’ experience performing lion monitoring and community extension work in Kunene, we show that lessons from “animal-sensitive” histories (Swart 2019) and social research can make meaningful contributions to community-centered conservation interventions. First-hand experience participating in farming activities, community meetings, engaging in and leading conservation interventions, and implementing conservationist training workshops alongside local partners, provided further insight into pastoralists’ interactions with lions and interpretations of HLC. The mediation of livestock in human-lion interactions is central to this study. Mediation is not only an intervening factor, but, as defined by STS scholar Bruno Latour (1999: 307), always exceeds its conditions: mediators add something additional to the components they bring together. When human-lion relationships are mediated by livestock, in effect becoming human-livestock-lion relationships, the experience of living alongside lions is transformed, yielding new challenges for CBNRM and lion conservation.

BACKGROUND: CBNRM and HLC

Namibia’s communal conservancy system is considered a signal achievement of the CBNRM approach to unifying wildlife conservation and rural development (Jones, 2001). The CBNRM movement grew out of discontents with ‘fortress conservation,’ whereby local people, primarily in the developing world, were alienated from natural resources within areas considered to be of high conservation value (Brockington, 2002). From its earliest applications CBNRM sought to ensure social justice and material well-being without sacrificing environmental integrity, or turning disempowered people into ‘conservation refugees’ (Dowie, 2009). As a framework, CBNRM stands upon four conceptual pillars. These are: sustainable use as a conservation paradigm, economic instrumentalism, devolution, and collective proprietorship (Panel A). In southern Africa, CBNRM programs formed part of a regional counter-hegemonic political movement seeking to make natural resources meaningful to rural communities through market-oriented mechanisms and access, and to rectify apartheid and neocolonial policies alienating rural people from civil liberties and resource rights (Dressler et al. 2010).

Panel A: Four ‘Pillars’ of CBNRM (adapted from Jones and Murphree, 2001)

- 1) Sustainable use as a conservation paradigm – Landscape transformation, not resource utilization, is considered the main threat to habitats and resources. This necessitates the creation of incentives for sustainable resource use, rather than technical interventions to limit appropriation. Sustainability changes as social-ecological conditions change, therefore adaptive management is required.
- 2) Economic instrumentalism – In rural southern Africa, economic benefits are considered the major driver of resource decisions. Resource provision and appropriation must be an economically competitive form of land-use. The creation of supporting structures and access to markets is an important part of creating opportunities to use resources. If resources are not economically competitive, landscape transformation can occur.
- 3) Devolution – During colonialism and early postcolonialism, centralized state systems across southern Africa formally controlled local resources, but often struggled to manage them due to inadequate capacity and financial constraints. Because of this, local people maintained de facto control, particularly concerning wildlife. In CBNRM, responsibility over resources is supported by the authority and entitlement to generate stewardship. Devolution empowers locals with the rights to manage, benefit from, and dispose or sell resources.
- 4) Collective proprietorship – In Namibia, CBNRM was based on existing rights enjoyed by free-hold farmers. Within communal areas, communities of collective interest were identified as the locus for rights-devolution. Internal legitimacy comes from communities empowered to form conservancies whose membership, boundaries, and constitution are self-defined. External legitimacy is given through national legislation. This approach was based on insights from common property theory, including the work of Ostrom.

During the colonial era, inhabitants of northwest Namibia (Kaokoland and Damaraland) were economically, politically, and geographically isolated by apartheid policies and government practices. Policies alienating rights to wildlife exacerbated these difficulties. The acute effects of drought and poaching by local residents in the late-1970s to 1980s resulted in cataclysmic declines of wildlife. Certain colonial officials had an emerging ethos of wildlife conservation, but little recognition of local rights within conservation spaces. The ‘community conservation counter-narrative’ drew attention to the co-occurrence of wildlife losses and lack of state and private investment in rural development programs (Jones, 2001). CBNRM was championed by a committed group of White South African and Namibian conservationists partnering with local leaders attempting to halt the poaching and rebuild wildlife herds. During the 1980s and early 1990s, processes of consultation, engagement, and empowerment among conservationists and local leaders revealed intrinsic values that locals placed on wildlife and other natural resources (Owen-Smith, 2010; Jones and Murphree, 2001).

Following independence in 1990, Namibians inhabiting communal land were empowered by government to form communal conservancies. Within the CBNRM framework, Ostrom’s work was particularly formative in the development of communal conservancy legislation. Ostrom’s seven Design Principles for common-pool resource management (Panel B), which sought to overturn outmoded thinking about the ‘tragedy of the commons,’ (Hardin, 1968) directly inspired actors interested in securing the rights of local communities to manage and benefit from ‘their’ wildlife (Jones, 2010a). Namibia’s Nature Conservation Amendment Act (No. 5/1996) devolves ownership rights to ‘hunnable game’ species for conservancy purposes (e.g. subsistence hunting) without recourse to further government authorization. Conservancies can also carry out trophy hunting based upon government-approved quotas, can apply to hunt protected and specially-protected species, such as lions, and can trade and sell game species with government approval. Though the intent of conservancy legislation was to provide communal residents

with ownership rights to wildlife, additional restrictions, such as limitations on hunting specially-protected species, including lions, created “considerable gaps” (Jones, 2010b: 117) between the original intent of CBNRM and implemented legislation.

Panel B: 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.



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

Lions in Kunene and HLC

Lions historically occurred across Kunene as well as central and northern Namibia (Shortridge, 1934). Beyond Kunene free-ranging lions persist in Etosha National Park and in Namibia's northeastern Zambezi region. During the South African colonial period, interactions between humans and lions, as well as other predators, were coopted to serve the racialized goals of the South African state. Heydinger (2020b) has shown how human-livestock-lion interactions presented similar challenges, but with different effects, to White settler-farmers and Black African pastoralists, based upon state interventions to support a White-dominated colonial economy. This affected the geography of lion survival in Namibia: lions persisted on African-dominated rangelands where pastoralists were provided with minimal or no support to combat HLC. In contrast, lions are absent from lands historically, and in many cases still, controlled by Whites.

Kunene is one of the few places in Africa where lion numbers have increased on multi-use and communal land during the past twenty years (Bauer et al., 2015; Stander, 2018). Whereas by the late 1990s, lion range in Kunene had contracted to approximately 7,000km² – primarily on lands excluding pastoralists, lions now range across more than 40,000km² (NMEFT, 2017), primarily within multi-use communal land. Coinciding with the rise of CBNRM, the recovery of the desert-adapted lions has been a bright spot among otherwise dire news concerning African lions. Since assessments were compiled in the late 1990s, lion range across Africa has decreased by forty-three percent. There are currently 20,000-30,000 free-ranging lions in Africa – down from a continent-wide population roughly estimated at 40,000 in 2002 (IUCN 2018). Due to the relative success of lion conservation efforts in Kunene and neighboring Etosha National Park, and the apparent behavioral adaptations of lions to the desert and semiarid habitats, these areas compose a 'lion stronghold,' which are areas considered critical for ensuring the survival of free-ranging lions (Jacobson and Riggio, 2018).

Namibian Philip Stander has brought worldwide attention to the desert-adapted lions (Whitehead, 2016; Heydinger, 2020c). Beginning in the late 1990s, Stander began uncovering the previously unseen lives of the desert-adapted lions. 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 and satellite collars, he has been consistently monitoring desert-adapted lions for twenty-plus years. For government officials, conservationists, and the international public, Stander's work has created a new paradigm of human-lion interactions in Kunene. Notably, Stander and other researchers encounter lions in very different contexts than pastoralists do and lion effects on livestock have not featured prominently in desert-adapted lion research. Viewed from a safe distance, through binoculars, a vehicle, or television, and at one's discretion, lions and other iconic species are easily abstracted from the challenges of living alongside them. Environmental philosopher Holmes Rolston (1982) has argued that ethics regarding the world are generated within the context they take place. It should be unsurprising that pastoralists living alongside lions interpret human-lion interactions differently from those of us who experience lions as research subjects or as iconic symbols of wild Africa, as lions so frequently are treated in popular western media.

Pastoralism comprises the majority of Kunene household incomes, which are low and often tenuous (Mendelsohn et al., 2002). Social and economic prospects for Kunene residents are limited. Kunene has Namibia's highest primary school drop-out rates, with only fifty-five percent of residents completing primary school by age seventeen (UNICEF, 2013). Forty percent of local residents earn ≤ US\$1/day, while twenty-three percent of residents 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 ongoing drought (Heydinger et al, 2019). Though these losses are unequally distributed, livestock losses to lions are exacerbating the livelihood effects of drought. The reduction in local wealth has increased the economic vulnerability of communal pastoralists and is straining the conservancy system (Bollig, 2016).

Alongside black rhino and elephant, lions are among the most iconic species within Kunene conservancies. These three species are also designated as 'specially-protected' by the Namibian government (Nature Conservation Act 4/1975). Therefore, conservancies do not enjoy ownership rights over these species. As a result, lion conservation does not accord with the instrumental, devolution, and collective

proprietorship pillars of CBNRM. As we show below, ownership rights and attribution of responsibility to manage lions are a source of antagonism among communal pastoralists towards government.

Meaningful progress in limiting HLC in Kunene will be greatly facilitated by recentering local perspectives as a return to the principles of CBNRM which have proven successful in managing other Kunene wildlife. 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.”

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, for example, to a lion, 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 consistent among pastoralists we spoke to. These properties greatly affect how pastoralists interpret human-lion interactions and therefore the spectrum of possible CBNRM approaches to desert-adapted lion conservation.

Fearsomeness

* “Lions are very dangerous; they are eating people. We must be careful. We must be safe.”⁴

* “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, even to move around.”⁵

* “Something that is life-threatening...as a local person I will say that, we can’t live with that thing.”⁶

* “To be safe people can only move from this time to this time. Can only cook from this time to this time.”⁷

* “Kids are schooling near here and are walking back to farms. You don’t know what might happen.”⁸

* “Lions kill people.”⁹

Lions have long terrorized residents of northwest Namibia. Francis Galton and C. J. Andersson, who were among the first Europeans to enter the region, 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 Galton, Andersson, and other Europeans used stories of ‘white male gigantism’ (Coleman 2011) to demonstrate the superiority of brave Whites over both lions, and by extension fearful Africans, one cannot entirely discount 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

⁴ Puros Pastoralist #1, Personal Communication, 14 November 2017.

⁵ Anabeb Pastoralist #1, Personal Communication, 26 October 2017.

⁶ Conservancy Leader #3, Personal Communication, 11 March 2018.

⁷ Anabeb Pastoralist #2, Personal Communication, 27 October 2017.

⁸ Sesfontein Pastoralist #1, Personal Communication, 24 November 2017.

⁹ Anabeb Pastoralist #3, Personal Communication, 27 October 2017.

carrying away a poor fellow, whom they tore to pieces and devoured within a short distance of our camp” (Anderson, 1861: 139).

During the colonial era lions were objects of fear for African pastoralists and White settler-farmers alike. However, while White economic success was considered central to the viability of the colony, autonomous African political success was not, and was even considered anathema to White rule (Heydinger, 2020b). As a result, Whites were supported by government with firearms and poisons to eradicate lions and other predators, while Africans inhabiting so-called ‘ethnic homelands’ were prohibited from accessing these technologies. This led to many pastoralists confronting lions armed with spears or 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.”¹⁰

During the 1930s and 1940s conflict between pastoralists and predators were so common in the region that official reports included a section entitled ‘Carnivora,’¹¹ which often detailed livestock losses and human-predator conflict, not just from lions, but wild dogs (*Lycaon pictus*), spotted hyena (*Crocuta crocuta*), leopard (*Panthera pardus*), and black-backed jackal (*Canis mesomelas*). Such conflict had an enduring legacy in regards to the geography of predator survival and the perception of predators.

Among communal pastoralists lions particularly remain objects of fear. When asked which predators pose the greatest threat to people, 85% of communal pastoralists responded lions do; at 53%, leopard were the second most feared predator. Stories of lion fearsomeness are commonplace, framing perspectives on human-lion relationships and forming the backdrop to a landscape of fear in which humans are vulnerable to lion attacks. 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 they could bury the bones. This is when I was a very young person – my father told me about this.”¹²

A Puros headman recalls “[w]hen I was a young man, I was with a man who was attacked by a lion.”¹³ 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].”¹⁴

In the early 1990s, Jacobsohn (1998: 48) related the story of one Himba man’s encounter in his home:

“Kamasitu graphically recalled his lucky escape when a lion had tried to enter his ondjuwo [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

¹⁰ (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.

¹¹ 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.

¹² Sesfontein Pastoralist #6, Personal Communication, 24 November 2017.

¹³ Puros Pastoralist #4, Personal Communication, 1 December 2017.

¹⁴ Puros Pastoralist #5, Personal Communication, 14 November 2017.

shot the lion in the spine as it crouched, slashing at Kamasitu with one paw in the low tunnel entrance to the auxiliary's ondjuwo.”

Traditionally, the Himba ondjuwo is built with a low entrance to force lions to crouch-down to enter, suggesting long familiarity with lion habits and penchant for attacking people, even in their homes. This is what happened during the last confirmed lion-caused human mortality in Kunene. Even though this death occurred in 1982, the story resonates above all others, and remains a relevant lens through which residents interpret the threat of living with lions. Details among storytellers differ, but agree on the following:

Early in the year [1982], a starving lioness moved westward from near Okaukuejo in Etosha National Park, 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 could temporarily hold her. The wife ran but left the girl behind. The man escaped out of the house, leaving the lion and, unknowingly, the child inside. He ran to a nearby military base. When the man returned with the soldiers, they shot and killed the lion, who had already devoured the infant's head and one arm.¹⁵

One cannot overstate the familiarity of this story among area residents: it is frequently given as evidence lions attack and kill people. The specifics also reveal a shared understanding that lions are particularly dangerous when suffering from extreme hunger. 85% of pastoralists maintain if lions are unable capture prey or livestock, they will attack people. Because the region is suffering through an ongoing drought resulting in 60% depletion in prey species (Heydinger et. al, 2019) lions are seen to pose a grave danger.

The importance we place on fearsome lion stories draws on historian Luise White's (2000) examination of how stories and rumors in colonial eastern and central Africa framed people's experiences of extraordinary events. White offers the premise that people do not speak with truth for an accurate description of what they saw. To say what they mean people construct and repeat stories that carry the values and meanings to most forcibly get their point across. She finds people use well-known stories, rather than relying solely on experience, to explain what has happened. Fearful lion stories are not only – though they may be – literal, but (also) idiomatic; creating a basis for interpreting human-lion interactions. The relative scarceness of lions in Kunene, in comparison to areas within Kenya, Tanzania, or Mozambique where human killing is more common, heightens the power of frightening lion stories. Without alternative evidence, such stories may be the only interaction conservancy residents have with lions in their lifetime. Even if lions are infrequently seen, their presence is felt. People walking in the field with livestock, or living in remote areas with little access to electricity or the resources to protect themselves, share space with lions in ways tourists, conservationists, and researchers rarely will. Though we have never been given cause to question the veracity of these stories, their symbolic and figurative importance must be emphasized for one to appreciate how human-lion interactions are interpreted by pastoralists.

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.”¹⁶

¹⁵ Sesfontein Pastoralist #8, Personal Communication, 25 November 2017; Conservancy Leader #7, Personal Communication, 26 November 2017; Conservancy Leader #3, Personal Communication, 11 March 2018; Reardon 1986.

¹⁶ Conservancy Leader #1, Personal Communication, 20 February 2018.

* “[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.”¹⁷

* “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.”¹⁸

* “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].”¹⁹

* “I am becoming poor because of lions.”²⁰

The challenges of living alongside lions are transformed by the presence of livestock. While CBNRM relies heavily on economic instrumentalism to engage locals, communal pastoralists view lions as primarily destructive entities from which they receive little direct benefit. Stories of lions destroying livestock are well-known in the region. Though spotted hyena account for a greater number of incidents (Heydinger et al., 2019), the magnitude of actual and potential livestock lost to lions undergirds the shared conviction that lions pose a threat unique in scope. 86% of survey respondents state lions are a “serious” problem in their conservancy; more than any other predator. Three recent, regionally well-known HLC incidents illustrate this conviction. 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 group of 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). These three incidents illustrate the scale of possible destruction when lions, particularly large groups of them, invade conservancy farms. Though they are uncommon in terms of scale, pastoralists do not consider such events aberrations.



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

¹⁷ Puros Pastoralist #2, Personal Communication, 16 November 2017.

¹⁸ Sesfontein Pastoralist #2, Personal Communication, 23 November 2017.

¹⁹ Conservancy Leader #6, Personal Communication, 15 November 2017.

²⁰ Sesfontein Pastoralist #3, Personal Communication, 2 December 2017.

Loss of livestock-derived income further marginalizes pastoralists' economic and livelihood prospects. Though the government provides limited annual funding to compensate for livestock lost to human-wildlife conflict, 92% of communal pastoralists are dissatisfied with the program. While the compensation program provides the owner of a cow with NAD\$1,500 (~US\$120), the mean-average price of a cow given by survey respondents was NAD\$5,852 (~US\$470). In contrast, more than 89% of communal pastoralists feel they do not directly benefit from having lions in their conservancy. These conflict with the economic instrumentalism pillar of CBNRM.

The presence or absence 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."²¹ Large numbers of domesticated stock, including cattle, have been present in northwest Namibia since at least the sixteenth century (Kinahan, 2016, 2019). Prior to the arrival of intensive pastoralism, lions and small bands of highly-mobile Khoe-Sān may have maintained somewhat collegial relationships. Anthropologist Ute Dieckmann (van Schalkwyk and Berry 2007: 66, 73) recorded memories of Etosha-area Hai||om (Khoe-Sān) recognizing the give and take between themselves and lions, based upon different times of day or night:

"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!"

Not as adapted to resisting predators as wild prey, the arrival of livestock created relationships that lions were ill-equipped to navigate. Human-animal historians have written extensively about the antagonistic relationships between humans and predators. Lance van Sittert (1998) and Jon Coleman (2004) have particularly emphasized the mediating role of livestock. As Coleman (2004: 36) has written, 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." As with wolves in New England, there was no historical precedent for lions to understand that the destruction of an individual of one species could engender the retribution of another.

When desert-adapted lions destroy cattle and other livestock it causes both monetary harm and cultural disruption. Mean-average cattle losses in recent years have been 67.9% due to all factors, including, drought, disease, predators, and theft, with 18.4% lost to lions alone. Such losses can be experienced as more than loss of livelihood. Cattle in particular possess cultural value for the region's ovaHerero, who make up the majority (77%) of surveyed pastoralists. Anthropologists D.P. Crandall (1998), Jacobsohn (1998), and Michael Bollig (1997) have shown that the role of cattle among Kunene ovaHerero cannot be overstated; Heydinger (2020a) has shown the important role of cattle and other livestock as mediators of ovaHerero resistance during the South African colonial era. Among ovaHerero matriclan and patriclan kin-networks, cattle transactions bind a family's past, present, and future (Crandall, 1998). Jacobsohn's (1995) extensive ethnographic work among the Himba shows the possession of cattle confers status among men, links people to their extended familial clan, and serves as a tangible link between a person and their ancestors. From the precolonial era to the present, generation-to-generation transactions of livestock across matriclans and patriclans serve as a time when political power is renegotiated and property rights reassigned (Bollig and Gewald, 2000).

Increasing

* "In the past days the cattle were sleeping in the field but now they cannot because the lion population is high."²²

²¹ Anabeb Pastoralist #8, Personal Communication, 25 October 2017

²² Conservancy Leader #4, Personal Communication, 30 March 2019.

* “[T]hey are all over... [W]hile people are reporting [from one] area, they come from another direction... ‘This side is 30 lions, this side is eight, this side is seven.’”²³

* “Lions have increased... Their numbers need to be managed.”²⁴

* “Lions will not [disappear]. Even now the cubs are being born and they will [always] be here.”²⁵

* “Lions are common [here]. Even last week it was behind the old man’s house there.”²⁶

Two recent transformations underscore the perception that lion numbers have increased: the ongoing drought and its subsequent effects on animal movements, and the change in wildlife conservation policies since the implementation of CBNRM. There is a widespread perception that the drought has been responsible for declining prey numbers and a subsequent increase in predators. The decline of prey species is also believed to be driving predators to attack livestock in greater numbers. 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, stating,

“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.”²⁷

Another attributes the increase in HLC to increased 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.”²⁸

Perceived increasing lion numbers are linked to changes in wildlife conservation policies. During the colonial era, northwest Namibia was politically and economically isolated as a matter of state policy (Bollig, 1998). Among other challenges, African residents could neither count on government to solve predator-caused problems nor did government officials enforce conservation regulations (Heydinger, 2020b; Owen-Smith, 2010), leading to high levels of illegal wildlife killing (Reardon, 1986). This began changing with the implementation of CBNRM in the 1980s. By formalizing local rights to benefit from wildlife, so the narrative goes, prey numbers increased and a climate of tolerance for all wild species took hold. For wildlife the new system was a boon (NACSO, 2016). However, the conservancy system has led to greater oversight and enforcement of conservation laws. Many residents are ambiguously committed to this new paradigm. 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. And that is where the problems come from... 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.”²⁹

The perspective that human persecution of lions has changed, and is leading to increased HLC, is commonly held. Van Wolputte et al. (2013) interpret nostalgia for aspects of the colonial era as a critique of the

²³ Conservancy Leader #2, Personal Communication, 15 July 2017.

²⁴ Anabeb Pastoralist #4, Personal Communication, 29 November 2017.

²⁵ Sesfontein Pastoralist #5, Personal Communication, 25 November 2017.

²⁶ Anabeb Pastoralist #5, Personal Communication, 24 October 2017.

²⁷ Anabeb Pastoralist #8, Personal Communication, 25 October 2017.

²⁸ Puros Pastoralist #1, Personal Communication, 14 November 2017.

²⁹ Conservancy Leader #5, Personal Communication, 15 July 2017.

increasing intervention of the postcolonial state in daily life. Prohibitions against killing lions is one way in which individual rights have been functionally rolled-back.

“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.”³⁰

“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.”³¹

An inability to destroy predators, is one example of how pastoralists’ vulnerabilities have been exacerbated by CBNRM legislation and government oversight. The shared conviction that lions have increased since independence is supported by available data on historic lion numbers in Kunene. Estimates from the 1970s and 1980s suggest lions numbered approximately forty individuals in core lion-range conservancies, with additional individuals likely present bordering Etosha (Owen-Smith, 1971; Viljoen 1980). Though these and any earlier numbers should be treated as anecdotal, an important contribution of oral history and survey data has been to establish historical trends in the lion population, even where precise numbers are unavailable.

Linked to the perception of increasing lion numbers is a critique among pastoralists that government and NGO response to HLC prioritizes lion conservation over human safety and pastoralists’ economic wellbeing. This is driven by asymmetrical interpretations of lion numbers. While pastoralists overwhelmingly consider lion numbers and the frequency of HLC to have increased, there is a pervasive international discourse that lion populations are diminishing across Africa. Lions are now listed as “vulnerable” by the IUCN and tens of millions of dollars each year goes towards lion conservation efforts (Bauer et al., 2016; Lindsey et al., 2018). While it can simultaneously be true that lion numbers are decreasing across Africa and have recently increased in Kunene, the rising international emphasis on lion conservation is contributing to the further erosion of already limited lion-derived benefits for communal pastoralists. In late 2017 MEFT began operating under an unofficial policy that no lion trophies would be granted in core lion-range conservancies until a lion population survey was completed,³² thus eroding one of the few ways lions directly contribute monetary benefits to conservancy coffers.

Communal pastoralists criticize government staff for not responding, or responding inappropriately, to HLC incidents when livestock are killed but lions remain uninjured. This increases hostility towards lions which can lead to lion-killing (Dickman, 2010; Redpath et al., 2013). One communal pastoralist, who willingly confesses 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.”³³

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 perform visible economic and political protests. Seen in this light, the killing of desert-adapted lions is an embodied form

³⁰ Anabeb Pastoralist #7, Personal Communication, 24 October 2017.

³¹ Puros Pastoralist #2, Personal Communication, 16 November 2017.

³² MET Official #1, Personal Communication, 10 December 2017.

³³ Conservancy Leader #6, Personal Communication, 15 November 2017.

of ‘everyday resistance’ to oppression, akin to other types of resistance commonplace during the colonial era (Scott, 1985; van Wolputte, 2004). Throughout Africa, marginalized communities have repeatedly used the killing of protected species as a means of gaining the state’s attention (Carruthers, 1989; Kissui, 2008; Goldman et al., 2013). Communal residents are aware that lion conservation is considered a priority among government and NGO staff, and that conservation practitioners and animal welfare activists worry about retaliation following HLC. Because of the broader social valence of lion conservation, lion threats to people may be over-emphasized and wielded strategically by communal pastoralists (Boomgaard, 2001: 227). One pastoralist pointed to the special fear of lions and the attention paid to them, rather than conflict incidents, 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.”³⁴

While killing a spotted hyena or jackal brings little response, in contrast, “if I shoot a lion; the helicopter is in the sky. Other vehicles [are coming].”³⁵ Animal lives and deaths are linked to human social worlds, including political, economic, and cultural forces (Kirksey & Helmreich, 2010).

Drawing links between ongoing and historical HLC reveals persistent frustration with government responses to the challenge of living with lions. Heydinger has detailed the numerous records from northwest Namibia, wherein residents complained to colonial officials about the killing of livestock by lions and other predators (Heydinger, forthcoming). Archived letters from one White farmer, Rudolph Böhme,³⁶ who requested government permission to pursue lions into Etosha National Park to kill them, show the durability of HLC challenges for livestock owners. Back in 1952, Böhme was convinced then, as communal farmers still are, that lions in his area were fearsome: they attacked people and even killed his neighbor. That 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 that their numbers had recently been increasing: while Böhme noted there were no lions in the area in his youth, he pleaded for assistance with increased incidents of HLC, which he attributed it to a recent growth in the area’s lion population. Böhme’s complaints were given a full hearing, even though some of his claims, such as Etosha containing “thousands” of lions, were clearly absurd. But the government did not act.³⁷

³⁴ Anabeb Pastoralist #13, Personal Communication, 27 October 2017.

³⁵ Conservancy Leader #4, Personal Communication, 30 March 2019.

³⁶ 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. Bohme, Onguma, Tsumeb. 7 March.

³⁷ NAN SWAA 2329. (1952). Proposed Extermination of Lions, Etosha Pan Game Reserve, Secretary South West Africa to Magistrate, Grootfontein. 21 April.



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

The depth of animosity towards the perceived prioritization of lions over locals 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 lions are being fed by some combination of government, NGOs, and tourism operators. The implication that lions are being provided with meat, while many conservancy residents suffer from limited food availability, is particularly revealing. It is tantamount to dehumanizing local residents in favor of lions. During important ovaHerero social occasions, such as large community meetings, holidays, or weddings and funerals, the provision of meat to guests conveys one's social status and is received as a sign of respect. It is nearly unthinkable that an important social occasion not include generous amounts of meat being provided and consumed, and there is a hierarchy of who is served certain portions and in what order. This has remained true during the recent years marked by drought, widespread livestock death, and constrained livelihoods. 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. Though we found no direct evidence of lion feeding by government or NGO staff, the belief lions are being fed may be a hold-over from the 1950s when lions in Etosha were routinely fed by park staff (Heydinger, forthcoming); it remains the conviction among certain pastoralists that this still takes place.³⁸ Such rumors feed into a perception among residents that communal lands are being cultivated as a space for wildlife, while people suffer. It is also seen to 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 provided with meat.

DISCUSSION

Reinvigorating CBNRM

Ideologies that lions are fearsome, destructive, and increasing are not problems of misperception to be corrected, repressed, or ignored; they are an active part of the historical and ongoing process of humans, livestock, and lions sharing unfenced landscapes. A reexamination of the pillars of CBNRM and Ostrom's Design Principles, in light of the challenges reviewed here, suggest the need for reframing HLC towards a paradigm in which pastoralists' perspectives of human-livestock-lion relationships motivate, define, and constrain lion conservation interventions. As such, lion conservation is reimagined as a human-centered process, rather than as primarily a scientific challenge.

³⁸ Anabeb Pastoralist #12, Personal Communication, 29 October 2017.

Though CBNRM provides adequate justification for drawing-upon local experiences as a means of informing lion conservation, this does not entail that local and ‘scientific’ perspectives of lions exist in opposition to each other. Examining HLC interactions makes it clear the nonhuman ‘natural’ world and human-centered ‘society’ cannot be meaningfully separated. Nor does one pollute the other. There is only one Kunene, containing both humans and lions, lion stories, lion actions, and lion conservation. In his seminal work on the creation of scientific knowledge, Latour (1993) peels back the illusion that the sciences are purified of such polluting concepts as interest, subjectivity, or irrationality. This is akin Haraway’s (1990) insistence that both scientific and vernacular knowledge are locally situated, historically contingent, and subject-oriented; that by being so each provides a faithful account of the ‘real’ world that is strong rather than weak. Rather than contrast local ‘stories’ to scientific ‘knowledge’ about lions, this recognition provides the platform for bringing the two into conversation.

Pastoralists’ perspectives can be aligned with research-driven perspectives of lion behavior. As noted above, desert-adapted lion numbers have increased dramatically since the late 1990s, echoing pastoralists’ concerns. Among surveyed pastoralists, 72% stated that lions are “common” or “very common” in their conservancy. Yet, lion density in northwest Namibia (0.33-0.53 per 100 km²) is among the lowest recorded among viable lion populations in Africa (Heydinger, 2020c: 151-182). Currently estimated between 112-139 over 38,950 km² (Stander, 2018: 144), lions are hardly ubiquitous – for example the Serengeti ecosystem contains an estimated twenty times as many lions as Kunene. How do lion conservationists reconcile what appear to be relatively low lion density and numbers with communal perspectives?

Desert-adapted lions maintain the largest known home ranges among African lions (Heydinger, 2020c: 151-182). Due to such large home ranges intra-species competitors cannot be consistently evicted. Average nightly movements of female desert-adapted lions of 7.3 (±0.9) km over a mean-average home range of 3,577 km² indicates that, on a given night, they cover between 0.00178-0.00229% of their home range. In comparison, lions in Serengeti will cover approximately 0.015% of their mean-average home range – more than seven times as much. Home range size and the relatively low likelihood of a lion’s presence within any part of it at a given time allows for home range overlap. Two maps of desert-adapted lion range illustrate the challenge overlapping home ranges pose for communal pastoralists.

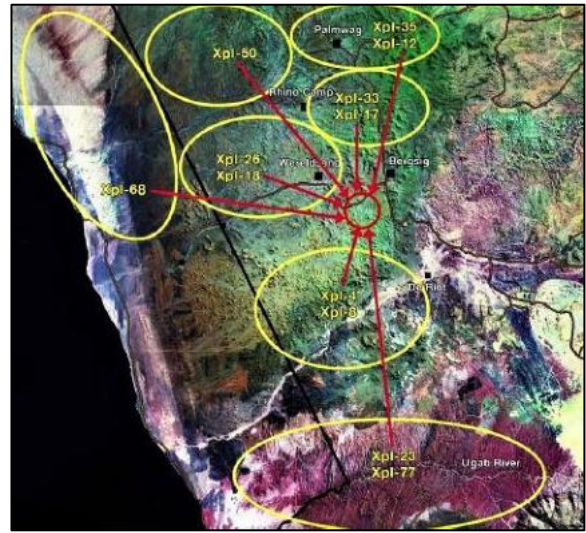


Figure 6 (left): Map of overlapping home ranges for 19 lions fitted with satellite radio collars between 2008 and 2015. Yellow arrow indicates area enlarged in Figure 33 (NMEFT, 2017: 23).

Figure 7 (right): Map of core home ranges for 12 radio-collared lions that caused HLC at a single conservancy farm between 2006 and 2013. Farm indicated by red circle. (NMEFT, 2017: 35).

From 2006 to 2013 22 cases of HLC were recorded at a single farm in Torra Conservancy, resulting in 16 lions being destroyed, including 11 of the 12 radio-collared lions (Figures 6 & 7). Areas inhabited by communal pastoralists where multiple lion home ranges overlap are known as conflict ‘hotspots’ (NMEFT, 2017). These areas suffer disproportionately from HLC. Our surveys show farms at community-identified hotspots contributed 82% of all cattle, 100% of all sheep, 62% of all goats, and 67% of all donkeys lost due to HLC, though these areas compose only one-third of surveyed farms. In addition to heightened conflict, overlapping home ranges can result in pastoralists frequently seeing different groups of lions, leading to inflated population estimates. Because communal pastoralists do not compare lion numbers or density in with numbers and densities elsewhere, 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. Neither pastoralists’ nor conservationists’ perspectives are incorrect; both are incomplete. Combining home range data with local perspectives allows for lion conservationists to better understand context-specific experiences of living with lions. Communicating pan-African lion information to pastoralists can foster discussion around HLC challenges. Reinvigorating CBNRM approaches to lions can focus on creating shared spaces of information among people who contextualize and experience human-livestock-lion relationships differently.

The ovaHerero Model

We have shown that living alongside lions is experienced differently by differently positioned people. For the Hai||om lions may be “colleagues, if not friends,” for researchers they are objects of puzzlement and fascination, for farmers ‘vermin,’ for pastoralists objects of fear, for tourists sought-after, for hunters potential trophies and means for displaying human (particularly masculine) dominance. Lions can also embody multiple meanings for an individual. Jacobsohn (1998: 47) provides one such account from the Himba: lion encounters during the colonial era were common enough that individual lions were not necessarily disdained:

“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.”

But can lions be platforms for forging relationships among pastoralists and conservationists to overcome different perspectives?

The ovaHerero value cattle for monetary and nonmonetary reasons. Not only a sign of wealth and prestige, cattle embody relationships among people, serving as a tangible means of tracing multigenerational kin relationships across matrilineal (*omaanda*) and patrilineal (*otuzo*). Cattle also cross barriers between the impermanent (*kamanga*) and the timeless (*karerera*); between the sacred (*zera*) and the secular (Gibson, 1956; Crandall, 1998). Ownership of cattle is familial more than personal: each generation tends the herd for the next. As Crandall (1998: 101) notes in his study of the Himba, “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.” Anthropologists Bollig, Crandall, and Jacobsohn have explored the depth and extent of the diverse role of cattle and other livestock among the ovaHerero; their insights are central to our work.

Drawing on the ovaHerero understanding that animals can embody human relationships and bind people together (Ginn et al., 2014) suggests human-livestock-lion relationships can contribute to a new paradigm of constructive cooperation. STS scholars Susan Leigh Star and James Griesemer (1989) have innovated the concept of boundary objects: entities that are both plastic enough to have different properties attributed to them and robust enough that they maintain a common identity between different people. Bearing similarities to the flexible uses and identities of cattle among the ovaHerero, “[t]he creation and management of boundary objects,” Star and Griesemer (1989: 393) argue, “is a key process in developing and maintaining coherence across intersecting social worlds”. Elsewhere Star (2010: 602) writes, “[b]oundary objects...allow different groups to work together without consensus.”

If desert-adapted lions can be used to create space for productive dialogue, improving human-livestock-lion relationships can be a participatory process. We show how CBNRM approaches to HLC activate lions as boundary objects reminiscent of cattle among the ovaHerero. Emphasizing processes of consultation, engagement, and empowerment, CBNRM can develop new relationships, as well as shared norms and values among differently positioned pastoralists and conservationists.

Ostrom’s Design Principles: One Method for Creating New Social Ties

The efficacy of Ostrom’s seven Design Principles (Panel B) for common-pool resource management are supported by theory and real-world data (Jones, 2010a; Ostrom, 2000). Implementing these principles can be one platform for bringing together disparate groups around HLC and lion conservation. This has been the approach of the new Lion Rangers program. An inclusive, CBNRM-focused program spanning twelve conservancies in Kunene, including all four lion-range conservancies, the Lion Rangers work to recenter lion conservation efforts among local communities. Lion Rangers are communal pastoralists employed by their conservancy to limit conflict between pastoralists and lions. By training, equipping, and employing conservancy residents to use both community-centered, as well as new scientific and technical, methods for monitoring lions and limiting HLC, the Lion Rangers provides benefits tied to lion persistence while engaging pastoralists and other community members around the challenges of living with lions. While this approach is modeled after similar programs in Kunene and other areas (Hazzah et al., 2014; Muntifering et al., 2015), its implementation is founded on both the historical experiences and contemporary local perspectives of living with lions outlined here. Program structure has been designed specifically in response to the social survey and oral history information that revealed the distinguishing properties of lions. Using Ostrom’s Design Principles we highlight the existing shortcomings in lion conservation and HLC management, and show how the Lion Rangers are working to address them.

Principle 1 – Boundaries

Boundaries are spatial and also embodied by lions. Confusion exists among communal pastoralists over who has ownership rights and responsibilities for lions. 39% of pastoralists stated lions are the government’s responsibility to manage, while 49% stated lions are the responsibility of the local people or the

conservancy. 54% stated lions belong to the government, while 30% stated lions belong to the local people or the conservancy. This confusion is understandable. Since the early 2000s, human-lion relationships have formally been managed by government, with NGO assistance, and largely informed by technologically-mediated information, such as radio and satellite collars, not available to communities. Though conservancies maintain limited ownership and use rights to huntable game species, lions are designated among specially-protected species, thus remaining under the government's purview. This lack of clarity and alienation of lions as community resources undercuts CBNRM as a mechanism for local people to assert collective proprietorship over natural resources (Dressler et al., 2010).

Following their recent activation, the Lion Rangers operate with government approval as de facto managers of lions within the boundaries of their conservancy and maintain lines of communication between pastoralists, the conservancy, and government concerning lion-related issues. When lions move between conservancies the program provides the structure for different conservancies' Lion Rangers to collaborate on management and conflict intervention. At other times different conservancies have united around issues such as provisioning tourism and grazing access rights. These provide models for Lion Rangers in neighboring conservancies to innovate new means for sharing responsibilities and potentially delivering lion-related benefits.

Principle 2 – Appropriation and Provision

Gaps between the appropriation of lions as community resources and the provisioning of lions as a resource stock undercuts the efficacy of lion conservation efforts. Provisioning problems (concerning the stock of a resource) are experienced because communal pastoralists and government contextualize lion numbers differently. Appropriation problems (concerning the allocation of resource flow) are experienced because lions are not seen to provide benefits to communities, though they are expected to be treated as a common-pool resource. Among communal pastoralists, though 84% of survey respondents stated they do not directly benefit from the presence of lions, 75% felt that it is important to continue to share communal land with them; the most frequently given reason was so that children could see lions. Monitoring and enforcement of lions (provision) and hunting (allocation) requires innovation.

By devolving management to a local scale through the Lion Rangers, flexibility and site-specific adaptation are encouraged (Olsson, 2004). Across sub-Saharan Africa the effects of trophy hunting of lions 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). Sustainable lion hunting and tourism benefits require policymakers and practitioners to align lions as a resource stock and the appropriation of them. While CBNRM can positively affect attitudes towards wildlife, the magnitude of benefits relative to the costs individuals experience are important for program success (Störmer et al., 2019). By virtue of having employment tied to lion presence within a conservancy, Lion Rangers receive monetary benefits from lions. New programs are being designed to expand the delivery of lion-related benefits to other conservancy residents through non-consumptive, non-tourism-based, means (Heydinger et al., forthcoming).

Principle 3 – Collective-choice

CBNRM emphases on consultation, engagement, and empowerment suggest local perspectives should guide locally-centered approaches to resource management. As those people most directly affected by HLC, communal pastoralists maintain a unique perspective on human-livestock-lion relationships. Chief among pastoralists' experiences of living with lions include extended contact with lions in uncontrolled settings, and the lived experience of human and livestock vulnerability to lions. Experiences of lion fearsomeness, destructiveness, and increasing numbers do not weaken the ability of communal pastoralists to effectively assess human-livestock-lion relationships, they strengthen it. Living alongside lions is considered an important qualification for those empowered to make decisions concerning human-lion relationships on communal land.

By coming from and representing their communities, the Lion Rangers, a majority of whom are themselves pastoralists, embody the experience of living with lions and are charged with faithfully

representing their conservancy's pastoralists. CBNRM processes of devolution and collective proprietorship underscore the importance of lion conservation interventions and management occurring at a local level (IRDNC, 2011). CBNRM rests on the conviction that the people most directly affected by any natural resource have the right to manage that resource. STS theorists have demonstrated that disinterested 'objectivity' is an illusion and results from Namibia and other community conservation settings have shown 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

Ostrom writes that “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). This characterizes the state of human-livestock-lion relationship management in Kunene. Prior to the activation of the Lion Rangers there was no systematic monitoring of the desert-adapted lion population and when communal pastoralists suffered from HLC incidents, government and NGO response was irregular, leading to antagonism on the part of pastoralists.

Though the Lion Rangers are moving towards more inclusive monitoring and information dissemination to inform collective decision making, the program's reach and effectiveness requires further up-scaling. Aiming to transform locals into conduits of information about lion behavior and ecology and help develop locally-centered capacity, this is a first step towards conservancies asserting increased authority over human-livestock-lion relationships. A similar approach has been successful in reducing HLC and generating stewardship among rural pastoralists living with lions on communal lands in the Amboseli-Tsavo ecosystem of southern Kenya (Hazzah et al., 2014).

Principle 5 – Sanctions

Regular sanctions (Design Principle 5) are currently lacking. Though 95% of survey respondents stated the government will investigate if a lion is killed, and 54% believe someone who kills a lion will have a legal case brought against them, only one known case has been brought against communal residents suspected of killing lions. Crucially, the threat of sanctions comes not from the conservancy (appropriators) but from the central government. During the 1980s, local enforcement of anti-poaching regulations was seen to be an important part of protecting wildlife populations in the region. The emphasis on local monitoring and enforcement of sanctions was also seen to be an important part of generating stewardship of wildlife among communities before economic instrumentalism could be implemented (Owen-Smith, 2010). Without new legislation to devolve the imposition of sanctions away from government, this will continue to be a challenge to limiting HLC in Kunene.

Principle 6 – Conflict-Resolution

Conflict-resolution mechanisms are currently lacking, particularly when livestock are killed by lions. The only formal mechanism is compensation for killed livestock. 92% of communal pastoralists feel the compensation program is not working well, with the most common response being that the money provided is much less than the value of the livestock lost. Commodifying livestock loss, particularly of cattle, is, when used in isolation, an inappropriate response. By also acknowledging the non-monetary effects of livestock, including associated feelings of insecurity and loss, Lion Rangers provide a different form of mitigation and conflict response. As local pastoralists, Lion Rangers are more able to contextualize the nonmonetary magnitude of livestock loss and work with affected pastoralists to mitigate the situation. As we have shown, conflict-resolution is an important part of ensuring that lions do not become objects for communicating protest by otherwise disempowered or ignored individuals. While the Lion Ranger program is itself a form of conflict-resolution, further mechanisms could be developed through locally-centered approaches responsive to provisioners' (locals) and appropriators' (tourists and hunters) needs and in partnership with police and government. As future drivers of HLC management, Lion Rangers can partner

with government to create conflict-resolution tailored to the historical challenges and contemporary experiences faced by pastoralists in Kunene.

Principle 7 – Rights to Operate

Currently, conservancies are not guaranteed minimum recognition of rights to operate concerning the ownership and management of lions. If lions are going to properly fall within the pillars of CBNRM the Namibian government should open dialogue around devolving lion ownership rights to conservancies. Pastoralists recognize the roll-back of their rights to dispose of lions constrains their livelihoods. This leads to antagonism towards government which can be manifest in lion killing. The Lion Rangers are the first platform to demonstrate that communities can be trusted to sustainably manage ‘their’ lions. It is worth remembering that pastoralists and lions have long lived alongside one another in Kunene. Though mismanagement of the lion population is a valid concern, the neighboring population of Etosha lions is secure, and lions from Etosha have periodically (re)colonized communal lands, the park’s population therefore serves as a buffer to mismanagement. This allows for flexibility in the learning process of local management without risking the permanent eradication of the desert-adapted lions. If rights to operate are granted alongside increased monitoring, graduated sanctions and new conflict-resolution activities, we believe it will benefit both pastoralists and the long-term viability of lions in Kunene. If responsibility for lions, along with rights to benefits, are devolved to conservancies, lions will more comfortably fit within the CBNRM paradigm of unifying local leadership with local benefits.

CONCLUSION

The need to recenter pastoralists’ experience of human-(livestock-)lion interactions is motivated by the pillars of CBNRM and the gap between Ostrom’s Design Principles and the implementation of conservancy legislation regarding lions. When pastoralists’ experiences are recentered the challenges facing lion conservation and HLC management are apparent. Lions’ perceived fearsomeness calls into question whether lion conservation fits within the CBNRM framework. Sociologist and CBNRM theorist Marshall Murphree (2009) has shown successful CBNRM rests on an emotive foundation of natural resource stewardship. In a review of CBNRM conceptual development, Dressler et al. (2010: 13) concluded CBNRM programs must be “embedded in sociocultural relations [and] politics[.]” Circulating lion stories, combined with the felt immediacy of lion presence, call into question whether local sociocultural relations concerning lions form the appropriate commitment to stewardship for lion conservation to take place. At the very least, pastoralists’ commitment to lion stewardship may be undermined by convictions of lion fearsomeness and threats to human safety. The historical durability of lion fearsomeness indicates HLC mitigation should directly address, rather than seek to overcome, these long-held perceptions as part of innovating lion conservation interventions and fostering tolerance for living alongside lions.

Lions’ destructiveness, viewed in light of the mediating role of livestock in human-lion interactions, undermines the economic instrumentalist and collective proprietorship pillars of CBNRM as well as the appropriation and provisioning design principles of Ostrom. The severing of ovaHerero social bonds when livestock are lost to lions also reveals a gap in the CBNRM framework emphasizing economic instrumentalism over other types of human-livestock relationships. The antagonistic character of human-livestock-lion interactions is a central challenge to addressing local lion conservation within the CBNRM framework. Reframing HLC around the experience of human-livestock-lion interactions can acknowledge the risks to livelihoods and cultural continuity by focusing efforts on livestock survival as a means of limiting HLC and potentially increasing tolerance of lions.

As we have shown, pastoralists perception of increasing lion numbers accurately reflects the local situation and can serve as a foundation for unifying desert-adapted lion research and pastoralists’ experiences. Programs such as the Lion Rangers can be an important mechanism for bringing together diverse perspectives on lion conservation and human-lion interactions within a platform privileging local knowledge. Within the CBNRM paradigm it is the responsibility of conservationists to adapt their methods and understandings to local experiences, rather than vice-versa (Owen-Smith 2010; Jacobsohn 2019).

Progress on this front will be critical to removing lions as possible objects to enact protests of government policies and practices that are interpreted as favoring lion conservation over local safety and livelihoods.

The reinvigoration of Ostrom's Design Principles within a CBNRM framework via the Lion Ranger program does not exclude other approaches to transforming human-livestock-lion relationships in Kunene. However, our historical and social survey research strongly points to the need to refocus lion conservation and HLC management on the human-centered factors of HLC. The relatively recent paradigms of lion scientific research and conservation have to-date largely ignored the long history of human-livestock lion relationships in Kunene. Yet it is actually the treatment of lions separately from their interactions with humans and livestock which is the historical novelty. In contrast, pastoralism is not a recent perversion of a 'natural' landscape of predators and prey but a long-standing practice and means through which humans and lions have interacted. While human-lion interactions can be fruitfully approached from a variety of disciplines, only historical methods convey the persistence of HLC, and only human-centered methods interrogating pastoralists' perspectives uncover the experience of living alongside lions. Both the continuity of HLC and pastoralists' perspectives are critical to innovating new CBNRM approaches to lion conservation. Kunene history shows human willingness to share space with lions differs greatly depending historical, sociopolitical, economic, technological, and temporal positions.

As long as humans, livestock, and lions all persist on communal land, it is likely they will continue to come into conflict. The persistence of conflict is not admission of defeat. Lion conservation and CBNRM are processes, not destinations. Both engage moving targets and must remain flexible and durable. Eliminating conflict by disempowering people or by removing either humans, livestock, or lions from Kunene communal lands is no solution: it would transform Kunene in ways we cannot anticipate, and the loss would be irrecoverable. Only by relying on a variety of methods not often incorporated into conservation practice have we been able to uncover the persistence of conflict and some of the perspectives driving HLC. We emphasize that these methods complement, rather than replace, natural science methods used for examining lions and addressing HLC. More perspectives, not fewer, are needed to productively address wildlife conservation challenges.

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