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PERSPECTIVE

Reflecting on the role of human-felid conflict and local use in big cat trade

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Abstract

Illegal trade in big cat (*Panthera* spp.) body parts is a prominent topic in scientific and public discourses concerning wildlife conservation. While illegal trade is generally acknowledged as a threat to big cat species, we suggest that two enabling factors have, to date, been under-considered. To that end, we discuss the roles of *human-felid conflict*, and "*local*" *use* in illegal trade in big cat body parts. Drawing examples from across species and regions, we look at generalities, contextual subtleties, ambiguities, and definitional complexities. We caution against underestimating the extent of "local" use

Joint first authors—Melissa Arias and Peter Coals contributed equally to this work.

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of big cats and highlight the potential of conflict killings to supply body parts.

KEYWORDS

conflict, illegal trade, jaguar, leopard, lion, Panthera, snow leopard, tiger, wildlife crime

1 | INTRODUCTION

Big cats, including all species in the *Panthera* genus (i.e., lion, *Panthera leo*; tiger, *P. tigris*; jaguar, *P. onca*; leopard, *P. pardus*; and snow leopard, *P. uncia*), have long been valued in human culture (e.g., Good et al., 2017). Trade in big cats, their body parts, and derivatives spans thousands of years and covers a wide spectrum of products and uses, which may be legal or illegal, and is driven by various and often complex motivations (e.g., Somerville, 2019). Poaching due to trade adds to the multiple threats already faced by big cats, such as habitat loss, conflict with humans due to fear, safety, and livestock losses, and decreasing prey populations (Macdonald & Loveridge, 2010). Illegal trade has long been recognized as a major threat to some species such as tiger (Goodrich et al., 2015), leopard (Raza et al., 2012) and snow leopard (Li & Lu, 2014; Maheshwari & Niraj, 2018) and has recently become a concern for jaguars (Morcatty et al., 2020) and lions (Coals et al., 2020a; Everatt et al., 2019). Published consideration is generally given to species individually or, sometimes, as geographical or market collectives as opposed to general discussions of trade across all *Panthera* species (Williams et al., 2022). Taxon-wide discussion of conservation issues can provide potentially valuable broad-scale insights to inform research and policy, and identify cross-cutting trends, and management opportunities across species (Dickman et al., 2015a; Holland et al., 2018). The benefits of multi-species, multi-system wildlife trade research have yet to be fully harnessed. Such an approach could be particularly useful for species that share similar pressures from trade, including similar markets and trade drivers (Williams et al., 2022).

We consider two distinct, but linked, proposed enabling conditions of illegal trade in big cat (*Panthera*) body parts to inform research and dialogue. Drawing examples from across big cat species and geographical contexts, we discuss *human-felid conflict*, and "*local*" *use* and explore the dynamics of these likely influences on illegal trade. We focus on these two aspects because they are underrepresented in big cat trade discourse, yet we believe they are important determinants and worthy of further consideration. Our aim is not to systematically describe or validate the linkages between these drivers and illegal trade in big cats.

This Perspective serves as a general primer to considerations of the role that human-felid conflict and "local use" may play in trade in *Panthera* body parts. We summarize (non-exhaustively) current knowledge (including knowledge limitations) and definitional complexities with the view that these aspects are basal to directing further research and discourse to better understand drivers of trade in big cats. We do not seek to specifically explore regulatory mechanisms and permitting of trade, nor do we discuss the rightness of various use types and regulations. Rather, we provide a background to understanding interactions between human-felid conflict, local use, and trade. We hope to provide considerations relevant to a range of interested parties in big cat trade systems.

2 | SCOPE

While we recognize that other felids may share similarities or may become intertwined with trade in *Panthera* species, we limited the bulk of our considerations to species in this genus. Similarly, we chose to focus on trade of body parts but acknowledge that trade in live specimens can sometimes be inter-related (e.g., Tricorache et al., 2021). Moreover, we focus on illegal trade in big cat products even though trade varies in legality by species, product, source, users, time, and location. Discussion of illegal trade may overlap with legal trade, particularly in contexts where legal and illegal trades interact temporally or spatially, and in legally "grey" areas where laws and regulations are not clear. While we appreciate that different definitions of illegal trade may exist, here we understand illegal trade to be monetary or non-monetary exchanges of big cat body parts not permitted or authorized by law and acknowledge that subsistence, traditional, and commercial uses are frequently intertwined.

3 | HUMAN-FELID CONFLICT AS A DRIVER OF ILLEGAL TRADE IN BIG CATS

Human-wildlife conflict refers to the struggles that emerge when wildlife poses an actual or perceived threat to human interests or needs, has negative impacts on people, wildlife, or both (IUCN, 2020). Killing of big cats in retaliation for real or perceived loss of livestock and

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other domestic animals, or human safety and risk perceptions (e.g., fear), or in protest to authorities' management approaches is considered a leading cause of decline for all big cat species (Holland et al., 2018; Inskip & Zimmermann, 2009).

Due to its widespread and frequently large-scale nature (Inskip & Zimmermann, 2009), human-big cat conflict *could* represent a prime source of body parts entering illegal trade. However, once big cat body parts leave their source location, ascertaining their origin can be challenging (e.g., Coals et al., 2021), and there is limited reliable evidence on the causal relationship between big cat trade and conflict. With few exceptions (some of which are described below), this relationship has not been studied in detail but its strength is likely to vary for each species and location, be temporally and spatially dynamic, and dependent upon a variety of social-ecological factors (e.g., Carter et al., 2017).

There are limited examples in which trade in big cat body parts has been clearly identified as a by-product of conflict between big cats and humans. In Venezuela, the extraction of body parts for subsistence or trade was considered indistinguishable, and it followed almost every case of conflict-related jaguar killings recorded over the past 80 years (Jędrzejewski et al., 2017). In Bolivia, jaguar skins, skulls, and teeth from individuals shot due to conflict with cattle are often kept to be sold to foreign traders (da Silva, 2017; *EP pers. obs.*). Conflict has been identified as the leading cause of snow leopard mortality, and more than half of retaliatory killings result in opportunistic attempts to sell body parts (Nowell et al., 2016). Similarly, human-tiger conflict was found to be the main cause of tiger killings and the source of body parts entering illegal markets in India (Nowell, 2000; Saif et al., 2018), and in Mozambique, commercially motivated removals of body parts have been suggested to incentivize conflict-related killing of lions (Everatt et al., 2019). In other cases, however, conflict has been found to play a less important role in the illegal trade in big cats when compared to other killing motivations and body part sources, such as targeted commercial killing (i.e. economic incentives), accidental snaring or opportunistic killing as a result of chance encounters with hunters (Arias et al., 2021a; Coals et al., 2020a; Johnson et al., 2006; Naude et al., 2020a).

Conflict-related, commercial, cultural, subsistence, and recreational motivations behind big cat killings are often intertwined (Arias et al., 2021a), and their relative weight is context-specific and spatially and temporally dynamic. In Bangladesh, the origins of tiger body parts and the motives for killing tigers (e.g., retaliation, safety, money), depended on the actors involved (Saif et al., 2018). In the case of leopards, mortalities vary with location: being often related to the skin trade for religious purposes in South Africa (Naude et al., 2020b), whereas by contrast trade seems to be a less likely outcome of human-leopard conflict in West Asia and the Caucasus (Parchizadeh & Adibi, 2019; von Jaffa, 2017). The source of big cat body parts may also change with time, as shown through the example of tigers in the Russian Far East, where conflict mortalities were overtaken by commercial killing following macroeconomic changes (Miquelle et al., 2005).

A simplified view of the relationship between conflict and illegal trade, espousing a basic cause-and-effect of livestock depredation leading to big cat killing and the supply of body parts to markets, likely misses important factors pertaining to the complex relationships between people and big cats across continents (see Jacobsen et al., 2021 for consideration of additional complexities). While in some cases conflict might strongly explain illegal trade in big cats, it is not always the case. Only a few studies have explicitly evaluated the relative weight of conflict as a driver or source of big cat trade relative to other motivations for killings and the social-ecological factors that may mediate the relationship between the two (e.g., Arias et al., 2021b; Jędrzejewski et al., 2017), making this an important knowledge gap. In addition, explicit consideration of trade-related opportunities and benefits to those involved in human-felid conflict may lead to the development of more effective strategic interventions that not only work to prevent conflict but also address illegal trade supply chains, criminality, and demand cascades.

4 | LOCAL USE AS A DRIVER OF ILLEGAL TRADE IN BIG CATS

Interactions between local uses of big cat body parts and illegal trade are generally poorly understood across many species and geographies. "Local" use is definitionally complex. In some contexts it may be related to geographical delimitations such as village, district, or even country level. In others, it may be related to the *users* of big cat body parts, their cultural and societal networks, and their purposes. In our experience, "local use" may be used as a by-word for subsistence, traditional, or culturally significant uses (often linked to "Indigenous" or "traditional" societies—both complex terms in their own right). Without clearly defined limits to the specific wildlife trade system under consideration, uncertainty is likely to result (Coals et al., 2019a) and in the absence of a universal understanding of what "local" use is, comparison between systems is hampered.

In general, we suggest that the term "local use" most often refers to a wide range of big cat body part uses

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made by groups of people who live in a delimited locality and/or share common characteristics (i.e., culture, ethnicity, religion). We also suggest that local use is frequently taken to be associated with shorter geographical supply chains that are, for the most part, domestic (e.g., within national borders) or subnational, and which fall inside or near big cats' range of distribution.

For some big cat species, local uses and exchanges of their body parts by communities that coexist with big cats have been described as a dominant driver of mortality and a potential source of body parts for illegal trade (e.g., Arias et al., 2020; Arias et al., 2021b). For instance, lion mortalities and body part removals appeared to be largely related to the traditional killing of lions and subsequent display of honor and prestige across a number of East African pastoralist groups, despite being illegal (Goldman et al., 2013; Hazzah et al., 2017). Similarly, tiger poaching, use, and trade in some areas of Bangladesh have been associated with local beliefs surrounding the benefits of tiger parts, as medicinal ingredients, as protection from forest "dangers" and to enhance social status or well-being (Saif et al., 2016).

Local uses have rarely been systematically studied or measured to determine their actual scale and impacts on big cats, their sustainability, or legality. In reality, their cumulative offtake levels may exceed the capacity of big cat populations, and their trade chains may quickly extend beyond national and legal boundaries (Coals et al., 2022). For example, the illegal harvest of jaguar body parts by rural and Indigenous communities for personal use and trade within family and community circles for subsistence, medicinal, and cultural reasons (e.g., as symbols of bravery and masculinity, Kelly, 2018), has been reported to exceed cases of international trade in jaguar body parts, and to have reached levels that are most likely impacting jaguar populations (CITES, 2021). Another important example is the use of leopard skins among the estimated 4 million followers of the Nazareth Baptist "Shembe" Church in South Africa (Naude et al., 2020b). As part of the Church's beliefs and practices, every man in a household is eligible to wear leopard skins—leading to staggering levels of leopard skin possession, transnational sourcing of leopard skins, and the circumvention of leopard protection in South Africa (Naude et al., 2020b).

Local uses that are associated with cultural or subsistence needs of local people may be met with moral relativism from conservationists (i.e., the notion that distinct cultural values cannot be objectively judged), often being more tolerated than international or non-traditional uses (Dickman et al., 2015b). Conversely, cultural and subsistence uses may be subjected to unfair regulation or even be used to justify the persecution of local people (Duffy et al., 2016). Nevertheless, widespread local use may put substantial pressure on some big cat populations and encourage illegal trade across a variety of scales (Nijman et al., 2019). Thus, a greater exploration of the definitions, legality, scope, characteristics, and sustainability behind "local uses" of big cats, especially cultural or traditional ones, remains necessary.

5 | FURTHER CONSIDERATION

While determining wide-ranging patterns concerning drivers of big cat trade is not always easy, and interventions must be tailored to be context-specific, some species and situations share commonalities that could provide insights to address illegal or unsustainable trade. When conflict is a leading cause of big cat mortality and source of body parts in trade, conflict mitigation measures and technologies developed and piloted for one species have been exported and applied to a wide range of big cats as well as other carnivores with positive results (Holland et al., 2018). Similarly, cross-species research on the substitutability of felids (and other species) in wildlife markets, though incipient, may achieve insights into consumer preferences (Coals et al., 2022; Coals et al., 2020b; Moorhouse et al., 2020; Rizzolo, 2020, 2021) and could increase preparedness to address trade in other potential substitute species. We are nevertheless cognisant of the deeply embedded nature of cultural values in determining a wide range of wildlife use (especially traditional) and the significant difficulties (practical and moral) associated with shifting such value structures (Manfredo et al., 2017). We therefore suggest that greater consideration of the cultural determinants of felid use and trade, particularly through the use of ethics-based frameworks to enhance understanding across multiple and complex stakeholder interactions (e.g., Coals et al., 2019b; Vucetich et al., 2019), will allow the better characterization of felid trade systems. We believe that an improved understanding of trade systems is a necessary prerequisite in directing appropriate conservation action, policy decisions, and general discourse (though recommending and designing such recommendations is largely outside the scope of this Perspective piece).

We also highlight law enforcement as an area where cross-cutting consideration of trades could benefit big cat conservation. In particular, convergences in trade in some big cats (and other species like elephants and rhinos), along with wider criminal activities (e.g., van Uhm & Wong, 2021), suggest that investigations of interlinked, multi-species illegal trade networks, as well as the cascading effects of bans and other enforcement efforts,

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are necessary. In addition to increasing the chances of detecting and effectively addressing trade in big cats by breaching "species silos," opening more collaborative spaces for the global community of big cat research and conservation stakeholders can deliver a wide range of benefits through incentivizing knowledge exchange and coordinating conservation actions. Interactions between human-big cat conflict and local use are worthy of further consideration, particularly from the perspective of contested illegality of wildlife resource use (Hübschle, 2017), especially for traditional and cultural practices that are likely to be perceived to be immutable (e.g., Coals et al., 2022), which has potential to incentivize conflict and may be used to justify legally prohibited practices (for example hunting of "problem" lions, Williams et al., 2017).

Overall, to date, we believe that conflict and "local" use have been under-considered as potential drivers of big cat trade and merit greater consideration across species and geographies. This paper highlights several trends across species and continents and we caution against underestimating the extent of local use and emphasize the potential of conflict killings to supply body parts. Such considerations are especially pertinent against a backdrop of globalized illegal trade fuelling further demand on decreasing and threatened big cat species. As an issue that is deeply tied to human behavior and social factors we call for a greater focus on transdisciplinary approaches (Macdonald, 2019) to address associated knowledge gaps and inform policy and strategic interventions. We believe that an evidence-based, interdisciplinary exploration would benefit from crossing species and geographical divides, while also taking care to avoid unproductive generalizations in favor of nuanced understandings and interventions.

AUTHOR CONTRIBUTIONS

Melissa Arias and Peter Coals are joint first authors and contributed equally to the conceptualization and preparation of the work. All authors contributed to designing and writing of the work. Amy Dickman, Andrew Loveridge, Esteban Payán and Kulbhushansingh Suryawanshi supervised the work.

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CONFLICT OF INTEREST STATEMENT

The authors have no relevant financial or non-financial interests to disclose.

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