Review

Trophy hunting and lion conservation: a question of governance?

FRED NELSON, PETER LINDSEY and GUY BALME

Abstract Lion *Panthera leo* populations and distributions in Africa have contracted considerably in the past 30 years. Recent policy debates focus on restricting trophy hunting as a measure to address concerns about excessive offtakes of lions. We review the impact of trophy hunting in relation to lion conservation goals, using comparative case studies from Southern and East Africa, which together contain most of Africa's remaining lion populations. The comparison demonstrates that the impact of trophy hunting on lion populations is variable and shaped by the way trophy hunting is managed and wildlife is governed in different range states. In Tanzania, the most important lion range state, hunting produces significant revenues but weaknesses in how hunting is managed and revenues are distributed undermine the potential of hunting and encourage overharvesting. In Southern Africa linkages are stronger between revenue generated by trophy hunting and lion conservation outcomes on private and communal lands. Trophy hunting is most beneficial to lion conservation where revenues and user rights over wildlife are devolved, ensuring benefits from lion hunting compensate for their costs to local people, and where hunting is managed through long-term and competitively allocated concession systems. Policy interventions should focus on supporting trophy hunting as a conservation tool where it is effective and well-managed, and work to promote reform of hunting and wildlife governance elsewhere.

Keywords Africa, governance, international trade, lion, *Panthera leo*, trophy hunting, wildlife

Introduction

The plight of the African lion *Panthera leo* has attracted considerable attention. Estimates suggest that lion numbers have declined by at least 30% since the 1970s (Chardonnet, 2002; Bauer & van der Merwe, 2004). The species' range has contracted by > 82% compared to historic baselines, primarily because of conflicts with people resulting from livestock depredation but also because of habitat loss and depletion of prey (IUCN, 2006a,b). An additional, more controversial factor potentially contributing to lion declines is trophy hunting. Lions are one of the most sought after and economically valuable species in Africa's trophy hunting industry (Lindsey et al., 2012). Several recent studies have indicated that trophy hunting may be a significant contributor to lion declines in a number of key range states (Loveridge et al., 2007; Packer et al., 2009, 2011; Croes et al., 2011).

Partly in response to these findings and partly because of opposition in principle to trophy hunting, various animal welfare groups have lobbied for restrictions on international trade in lion trophies. The first such proposal was tabled by Kenya in 2004 at the 13th Conference of the Parties (CoP) of CITES, in Bangkok, Thailand, to list lions on Appendix I (Nowell, 2004). This proposal was subsequently withdrawn but since that time debate over the appropriate role of trophy hunting in lion conservation has continued. In March 2011 a consortium of animal welfare organizations filed a petition to list lions under the US Endangered Species Act (Platt, 2011). The European Union is also under pressure to prohibit imports of lion trophies (Lindsey et al., 2012). If successful, such interventions could severely limit the movement of lion products or trophies across international borders and substantially curtail the commercial sport hunting of the species in Africa.

The ongoing debate about lion conservation policies and trophy hunting, under CITES and other unilateral statutes such as the US Endangered Species Act, hinges on whether trophy hunting supports or impedes lion conservation. This question is complex: trophy hunting generates > USD 200 million in annual revenue from lions and other wildlife in African countries, providing potentially important economic incentives to conserve species and their habitats (Lindsey et al., 2007). A range of international policy statements affirms the importance of consumptive forms of sustainable use to effective conservation practice, including the Addis Ababa Principles and Guidance on Sustainable Use of Biodiversity of the Convention on Biological Diversity, and successive statements from IUCN World Conservation Congresses. For example, the IUCN Policy Statement on Sustainable Use of Wild Living Resources,

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issued at the 2000 World Conservation Congress at Amman, Jordan, states that the 'use of wild living resources, if sustainable, is an important conservation tool because the social and economic benefits derived from such use provide incentives for people to conserve them' (IUCN, 2000).

However, as these international conventions and accords widely recognize, hunting, if not managed in a sustainable manner with an appropriate suite of mechanisms that create incentives for sustainable use, may contribute to the declines of hunted species. To design appropriate policy measures at both national and international levels it is essential to understand the factors that enable hunting to support sustainable use and lion conservation in the long term while mitigating the negative impacts of hunting. This is particularly important as hunting occurs under a wide range of governance regimes, with consequently variable impacts and outcomes (Dickson et al., 2009).

To inform policy debates over lion hunting and conservation strategies we compare the relationship between trophy hunting and lion conservation in a number of the key lion range states, all in East and Southern Africa where the majority of Africa's lions occur (IUCN, 2006a). We examine the conditions and factors that influence how trophy hunting threatens or supports lion conservation objectives under various management frameworks, paying particular attention to policy and governance factors that shape the incentives created by trophy hunting.

Methods

Our review uses published, unpublished and web-based sources of information to construct overviews of the relationship between trophy hunting and lion conservation in a number of key lion range states and management contexts. We collected information on lion and wider wildlife population trends, trophy hunting revenues, hunting concession allocation and management systems, extent and location of hunting concessions, lion offtake levels and analyses of their sustainability, and general wildlife policy and governance issues in Namibia, Mozambique, South Africa, Tanzania and Zimbabwe. Kenya, where no trophy hunting of lions or other species takes place, is included as a control case study. This review complements other studies that have assessed the significance of African lions for the financial viability of trophy hunting and the maintenance of wild land (Lindsey et al., 2012) and evaluated the scale and impact of lion hunting across the species' range (P.A. Lindsey et al., unpubl. data). Selection of country cases was determined primarily by the availability of data, particularly on hunting revenues, species offtakes, quotas and lion populations (e.g. Zambia is an important lion range state but there are limited data available on population trends and hunting offtakes regarding lions and other species).

Tanzania

Tanzania holds four of the six remaining wild lion populations that exceed 1,000 breeding adults and are considered viable in the long term (IUCN, 2006a). Despite the presence of sizeable lion populations in some of the region's largest protected areas (e.g. Selous Game Reserve, Ruaha–Rungwa–Kizigo complex, Greater Serengeti ecosystem), lions are declining outside state protected areas and in and around smaller protected areas (Kiffner et al., 2009; Kissui, 2009; Chardonnet, 2010; Packer et al., 2011).

Tanzania hosts the second largest trophy hunting industry in Africa, generating c. USD 77 million annually (Booth, 2010). Lions are particularly important to Tanzania's hunting industry because, unlike most countries in the region, lions are included in the quotas allocated for the majority of hunting concessions, revenues generated by lion hunting are particularly lucrative (valued at c. USD 70,000 per animal excluding government fees), and Tanzania allows hunting of relatively few elephants *Loxodonta africana*, another highly valued species (Lindsey et al., 2012). Between 1996 and 2009 an average of 171 lion trophies were exported annually from Tanzania, more than the next two highest-exporting countries (Zambia and Zimbabwe) combined (Packer et al., 2009). This excludes South Africa, which exported > 800 trophies from captive-bred lions in 2009, a facet of lion hunting unique to South Africa and that has little relevance to wild lion conservation (UNEP WCMC, 2011).

Tanzania's Game Reserves, which cover c. 13% of the country's land area, are used primarily for trophy hunting. This is in contrast to National Parks, which cover c. 4.4% of the country and do not allow consumptive utilization of wildlife (URT, 2007). Trophy hunting also occurs outside state protected areas; c. 56% of the 300,000 km^2 used for such hunting is outside protected areas, on or around community lands, particularly in the north and west (Baldus & Cauldwell, 2004). Land used for trophy hunting comprises 34–50% of the range of lions in Tanzania (P.A. Lindsey et al., unpubl. data). Consequently, trophy hunting has potential to have substantial impact on lion conservation, depending on how it is managed (Packer et al., 2011). However, trophy hunting in Tanzania has long been characterized by weaknesses in how wildlife utilization is governed and how revenues are distributed, leading to long-running debates over reform of the industry. These governance factors serve to undermine the development of a positive relationship between wildlife conservation and hunting revenues (Baldus & Cauldwell, 2004; Nelson et al., 2007).

Firstly, revenues from trophy hunting accrue to hunting operators and central government, largely bypassing the communities and landholders who live with and bear costs from wildlife (Leader-Williams et al., 2009). Local

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communities are not directly involved in negotiations or authorization of hunting concession allocations on their village lands and no revenue is paid directly by hunting operators to communities except through mandatory, but poorly defined and inconsistently applied, contributions to local development projects. Recent changes to regulations governing Wildlife Management Areas give communities greater authority over trophy hunting in these areas; however, these changes have yet to be fully implemented and their impacts remain unclear. Such distribution of costs and benefits is particularly significant for the lion, which is a key conflict species because of its impacts on livestock and the threat to human life. Lions attacked at least 1,000 people in Tanzania during 1990–2007 (Kushnir et al., 2010). Where the people living with lions do not benefit financially from their presence the species is unlikely to be tolerated (Kissui, 2008).

Secondly, Tanzania employs a closed tender system for allocating hunting areas, resulting in lower earnings than could be generated via public auction systems. This system allows discretionary allocation of valuable hunting concessions by government officials, creating conditions conducive to corruption and the use of hunting blocks for political patronage (Nelson & Agrawal, 2008; Leader-Williams et al., 2009). Thirdly, the majority of government income from Tanzanian hunting blocks comes from trophy and licence fees, which has encouraged the establishment of unsustainably high quotas (Booth, 2010). Furthermore, there has been a tendency for hunting blocks to be subdivided, resulting in substantially increased overall quotas over time (Hurt & Ravn, 2000). Operators are required to pay for 40% of quotas in advance, regardless of whether animals on the quota are actually hunted, further encouraging excessive and unselective harvests (P. A. Lindsey et al., unpubl. data). As a result of these factors lion quotas and offtakes are higher than the recommended maximum of 0.5–1.0 per 1,000 km^2 in most Tanzanian hunting areas (Packer et al., 2011). Lastly, Tanzanian hunting blocks are leased for periods of 5 years, which is shorter than lease lengths in most other countries, discouraging management for long-term sustainability (Hurt & Ravn, 2000).

In the mid 1990s the government approved policy reforms to introduce a competitive bidding system for hunting concessions, which would have reduced corruption and devolved rights over wildlife management and benefits, including hunting revenues, to local communities (with respect to wildlife living on community lands outside core protected areas). However, these reforms were blocked by government officials following lobbying by national and international trophy hunting organizations (Baldus & Cauldwell, 2004). Groups and individuals within government and industry have long benefited from the non-transparent and non-competitive system of hunting concession allocation that has kept down concession prices and allows concessions to be distributed via personal or political means (Nelson & Agrawal, 2008). The World Bank (2008) estimates that the market value of Tanzanian hunting concessions is USD 7 million greater than their actual administratively determined price. These excess rents become available to those companies that are allocated blocks and then sub-lease them at market rates, and to government officials who control the process (Nelson, 2009). Tanzanian investigative journalists have described a range of elected officials and other political elites who, through various proxies and relatives, have ownership stakes in numerous hunting companies and thus vested interests in concession allocation (This Day, 2008; cited in Nelson, 2009).

The result is that long-entrenched wildlife governance issues in Tanzania have not been effectively addressed despite 20 years of policy debate, including multiple reviews highlighting the problems (Baldus & Cauldwell, 2004; Barnett & Patterson, 2006; TNRF, 2008). Although trophy hunting does provide aggregate macro-economic incentives for the retention of land under wildlife at the national scale in Tanzania (Lindsey et al., 2007, 2012), and in protected areas where there are no resident people, incentives for conservation in areas occupied by or adjacent to rural communities are weak.

As an example of how hunting revenues, local community incentives and conservation outcomes for lions interact, Tanzania's Maasai Steppe holds the country's fourth largest population of lions (Kissui, 2008). More than 80% of the Maasai Steppe lies within the boundaries of village lands managed by local pastoralist communities (Sachedina & Nelson, 2010). Human–lion conflict because of livestock predation is widespread, with Kissui (2008) recording 85 lions killed in 12 villages during a 19-month period. The Maasai Steppe is the most important trophy hunting area in northern Tanzania, with more than a dozen concession areas. However, because hunting revenues flow to central government and private hunting companies, with limited benefit-sharing with resident communities living alongside wildlife, hunting does not provide incentives for local communities to protect wildlife habitat or tolerate species such as lions (Sachedina & Nelson, 2010). The Maasai Steppe is thus emblematic of the broader paradox of wildlife conservation in Tanzania: wildlife is highly valued and productive but the distribution of costs and benefits engendered by existing policy and governance arrangements results in local incentives that discourage conservation, particularly for a high-conflict species such as the lion. Wildlife in the Maasai Steppe, as in the majority of Tanzania's main wildlife areas, has declined significantly since the 1990s (Stoner et al., 2007). Lions in particular have suffered; Kissui (2009) reports that the Tarangire National Park lion population, a key stronghold for the species in the region, declined by 15–20% between 2003 and 2008.

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Southern Africa

Southern Africa has a unique shared regional experience of adopting a number of important wildlife management and policy reforms that have led to wildlife recoveries across large areas of private and communal land (Child, 2004). Namibia, South Africa and Zimbabwe (which have large commercial farming sectors on private land) all devolved user rights over wildlife to landholders in the 1960s and 1970s (Bond et al., 2004). Most countries in the region have also experimented with reforms that facilitate community-based natural resource management, with the aim to devolve significant control over wildlife use and benefits to people living alongside wildlife on communal lands, although only in Namibia has this devolutionary aspiration come close to being fully realized and implemented (Roe et al., 2009; Nelson, 2010). These different long-term management strategies and wildlife governance experiments provide key insights into the relationship between trophy hunting and lion conservation.

Southern Africa dominates Africa's trophy hunting industry in economic terms, accounting for 84% of total annual revenues (Lindsey et al., 2007). This was not always the case. In the 1960s Kenya accrued the highest national revenue from hunting but when the industry was banned in 1977 much of Kenya's business shifted to Southern Africa. In addition, while West, Central and East Africa have all witnessed long-term declines in large mammal populations, Southern Africa has generally experienced substantial recoveries in wildlife populations across large areas of private and, in some cases, communal lands (Bond et al., 2004; Craigie et al., 2010).

There are three scenarios under which trophy hunting is carried out, which reflect the region's three main land tenure categories: private ranches and conservancies, communal conservancies, and state protected areas.

Private ranches and conservancies

Large areas of privately owned rangelands, including former cattle farms where large predators such as lions were historically persecuted, have been converted to wildlife ranches (and mixed wildlife/cattle ranches in many cases) across Southern Africa: 205,000 km^2 in South Africa, 27,000 km^2 in Zimbabwe (prior to the land seizures initiated in 2000) and 288,000 km^2 in Namibia (Lindsey et al., 2013). Earnings from trophy hunting have been a key driver of these restorative conservation efforts (Lindsey et al., 2007). Such land conversion has driven a steep increase in some wildlife populations; for example, 1.8–2.8 million wild ungulates occur on freehold land in Namibia, which is 10–20 times the number occurring in the protected area network (Lindsey et al., 2013). The impacts on predator conservation are less clear (Lindsey et al., 2009a). Many commercial game ranchers perceive large carnivores as competitors and some persecute them accordingly (Lindsey et al., 2005). However, in cases where landowners have pooled land to create collaboratively managed conservancies, land uses tend to shift to high-value trophy hunting and ecotourism where lions and other predators are considered valuable (Lindsey et al., 2009b). In several such circumstances lion populations have been reintroduced or allowed to recover. For example, lions naturally recolonized and were also reintroduced to the Bubye Valley and Savé Valley Conservancies in Zimbabwe and now occur in significant numbers in both (Lindsey et al., 2008). Similarly, $>$ 500 wild lions have been reintroduced into private conservancies in South Africa for ecotourism and hunting purposes, adding considerably to the country's two naturally occurring lion populations (Slotow & Hunter, 2009).

On private lands in Southern Africa the growth of wildlife-based land uses during the past 30–40 years stems from policy and legislative reforms that devolve user rights over wildlife to landowners, enabling them to benefit financially from recreational hunting (Bond et al., 2004). However, successful lion conservation appears to require an additional step, namely collaborative management agreements among neighbouring landowners that facilitate development of sufficiently large land units (Lindsey et al., 2009b).

Communal conservancies

Wildlife-based land uses have also developed on communally owned lands in parts of Southern Africa, most notably in Namibia. Namibia has put in place policy and legal measures, starting in the mid 1990s, which devolve user rights over wildlife to local landholders. Communities in Namibia are able to establish 'communal conservancies' where local residents can legally hunt wildlife for their own consumption or sell a quota to a hunting operator, keeping 100% of the revenue (Jones & Weaver, 2009).

Trophy hunting has played a key role in the development of Namibian conservancies by providing an entry point for communities into wildlife-based land uses and acting as a catalyst for changing attitudes towards wildlife (Weaver & Petersen, 2008). The number of conservancies in Namibia has increased rapidly, and there are now 71 covering 149,829 km^2, or 18.2% of Namibia's land area (NACSO, 2010). Wildlife, including lions, in the conservancies has recovered dramatically (Jones & Weaver, 2009). For example, the lion population in the Kunene region in north-west Namibia, where many communal conservancies are located, grew from only a few in 1999 to $>$ 120 by 2009 (Stander, 2010). Lions hunted on conservancies may generate $>$ USD 60,000, much of which accrues to the conservancy members, who are rural, economically marginalized

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people with limited economic alternatives to wildlife and livestock. In 2008 trophy hunting generated a total of USD 1.3 million for Namibia's communal conservancies (Weaver & Petersen, 2008).

Key to the success of the Namibian communal land conservancies has been the allocation of clearly defined user-rights over wildlife, the integral involvement of communities in wildlife management decisions, and the fact that all earnings from wildlife on communal lands accrue to the communities rather than local or national governments (Jones & Weaver, 2009). In cases where wildlife has been promoted as a land use on communal lands in Southern Africa without full devolution of user-rights over wildlife and where greater proportions of earnings accrue to local or national governments, conservation success has been less clear (Child, 2009). In Zambia, for example, the Zambia Wildlife Authority retains 50% of daily rates and 80% of concession fees from trophy hunting in Game Management Areas situated on customary community lands, resulting in weak local incentives for conservation and the decline of wildlife populations (Simasiku et al., 2008).

State protected areas

Most Mozambican wildlife areas were severely depleted during and after the many years of civil war and many were partially settled by communities. Because of their remoteness and low wildlife densities, many wildlife areas in Mozambique are currently unsuitable for ecotourism and trophy hunting represents the only commercial form of wildlife use that can generate significant revenue from wildlife.

Many Mozambican trophy hunting operators are investing in their hunting blocks and running at a loss, on the assumption that profits will be forthcoming following recovery of wildlife populations (Lindsey et al., 2012). Central to the prospect of success is investment in anti-poaching to protect wildlife resources. In one hunting concession area, for example, hunting operators removed 5,000 gin traps during 2002–2010 and have reintroduced lions (Lindsey & Bento, 2010).

Trophy hunting is the primary land use in the Niassa Reserve, one of Southern Africa's largest state protected areas (42,000 km^2), and represents the core portion of the distribution of lions in Mozambique (Chardonnet et al., 2009). Trophy hunting in Niassa generates USD 400,000 in annual income, some of which is retained for running of the reserve (Mozambique Ministry of Tourism, 2006). Hunting operators are granted exceptionally lengthy leases for their blocks (20–25 years), providing incentives for conservative long-term management and investment in their concessions. The Niassa lion population, estimated at c. 700–1,000, is one of the few in Africa believed to be growing (IUCN, 2006a). In Niassa lion conservation has additionally benefited from the development and implementation of a programme to restrict hunting to that of male lions of 6 years and older (Begg & Begg, 2009).

Kenya

Kenya provides an illuminating contrast as all hunting has been banned there since 1977, making it the only country in Africa with a population of > 1,000 lions that does not allow any licensed trophy hunting. Despite the ban on trophy hunting, wildlife conservation efforts in Kenya have been notably unsuccessful. Numbers have declined by 60–70% since the 1970s in state protected areas and on communal lands (Norton-Griffiths, 2007; Western et al., 2009).

The underlying drivers of wildlife declines in Kenya are rapid human population growth, changes in land use, and disincentives to invest in wildlife as a form of land use (Norton-Griffiths, 2007). Although ecotourism generates large amounts of revenue (tourism as a whole is worth > USD 1 billion annually) the vast majority of wildlife tourism occurs on only 5% of the land, limiting the distribution of revenues generated by wildlife (Norton-Griffiths, 2007). Elsewhere, generating income from wildlife is largely precluded because ownership is retained by the state and all forms of consumptive utilization are prohibited. As a result, incentives for conservation are weak and wildlife-based land uses are generally unable to compete with alternative, less conservation-compatible alternatives (Norton-Griffiths, 2007). Since the 1990s there have been recurrent attempts to reform current wildlife law and reintroduce hunting (Kabiri, 2010). However, at least in part because of the notable influence of western animal welfare organizations in Kenya, these reform efforts have been unsuccessful (Norton-Griffiths, 2007).

Lions in Kenya, although not subjected to any legal hunting, are rapidly declining because of conflicts with people and resultant killing through poisoning or other means, loss of habitat, and depletion of prey (Frank, 2010). Kenya Wildlife Service officials have estimated that the country is losing 100 lions annually and that at this rates of offtake the lion could be extirpated from Kenya within 20 years (Barley, 2009).

Discussion

Our review demonstrates that the relationship between the trophy hunting of lions and their conservation is complex and varies considerably amongst the countries in East and Southern Africa. Table 1 provides a summary of the role of trophy hunting in relation to lion population trends in the countries and different management contexts discussed.

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TABLE 1 Summary of comparative regional examples of the interaction between trophy hunting and lion population trends and their drivers across key lion range states in East and Southern Africa.

Country	Lion population trends	Role of trophy hunting
Kenya (countrywide)	Decreasing	No hunting in Kenya
Mozambique (Niassa Reserve)	Stable or increasing	Hunting provides the bulk of revenue for management of the Reserve
Namibia (community conservancies)	Increasing	Hunting is a key component of revenues to community conservancies
South Africa, Zimbabwe (private land)	Stable or increasing	Hunting revenues provide significant incentives for lion conservation on private lands
Tanzania (Game Reserves)	Stable or decreasing	Hunting provides macro-economic rationale for maintaining large protected areas as Game Reserves
Tanzania (community lands)	Decreasing	Weak links between hunting revenue generated on community lands & local communities; communities do not have rights over revenue or hunting concession allocation

TABLE 2 Key governance factors that promote sustainable use and foster positive linkages between trophy hunting and lion conservation.

Factor	Example
Revenues from trophy hunting accrue directly to local landholders where hunting takes place	Private lands in South Africa, Zimbabwe, Namibia; communal lands in Namibia
Hunting concessions granted for at least 10 years & ideally longer	Mozambique (Niassa Reserve)
Hunting concessions allocated through competitive & transparent bidding process	Throughout Southern Africa
Hunting restricted to males aged 6 years & older	Mozambique (Niassa Reserve)

Tanzania's trophy hunting industry is notable in that most revenue, whether on state or communal lands, accrues to the state and private operators, and the state remains responsible for concession allocation, with limited authority devolved to local landholders. These factors, combined with the lack of transparency and public oversight in hunting concession allocation, undermine the ability of trophy hunting to generate long-term incentives for local people to tolerate lions and the sustainable use of Tanzania's wildlife more generally (Baldus & Cauldwell, 2004; Nelson & Agrawal, 2008; Leader-Williams et al., 2009).

From the perspective of lion conservation the priority in Tanzania is to develop measures that provide stronger linkages between trophy hunting and local communities living alongside lions. This requires reform of the governance of trophy hunting and wildlife use more generally, a need that is widely acknowledged (Baldus & Cauldwell, 2004; Barnett & Patterson, 2006) but that has been undermined by the constellation of private and public interests that benefit from existing arrangements (Nelson & Agrawal, 2008). Any efforts to promote lion conservation through international trade regulations, directed at trophy hunting or otherwise, should be logically oriented towards encouraging domestic wildlife governance reforms in Tanzania.

Southern Africa, by contrast, provides broad evidence of positive interactions between lion conservation and trophy hunting, with the economic value of hunting having helped drive the recovery of wildlife, including lions, across large areas. During the last 20–30 years there have been significant recoveries in wildlife populations and ranges because of the development of wildlife-based land uses. Changes in legislation occurring in the 1960s and 1970s granted user rights over wildlife to private landowners, enabling them to generate income from this resource through trophy hunting and other forms of consumptive wildlife use (Bond et al., 2004). Similarly, devolved user rights and control over wildlife's economic value underpin the recovery of wildlife, including lions, in Namibia's communal conservancies. The ability of trophy hunting to create incentives for wildlife conservation has thus been a function of governance institutions that grant landholders authority over wildlife use.

The experience of Kenya serves to illustrate that prohibiting trophy hunting does not assure effective conservation of lions or other large mammals. Kenya is experiencing some of the steepest declines in wildlife numbers of any country in the region.

Our review suggests that trophy hunting can provide conservation benefits for lions where well managed, or alternatively constitute a significant threat where governance of the industry is poor. Key criteria for effectively governed trophy hunting systems include clear, transparent and competitive systems for hunting concession allocation, long-term leases (> 10 years) for concessions to encourage long-term investments by operators, and the empowerment of local landholders to capture the bulk of revenues generated from hunting on private or communal lands (Table 2). The challenge for international conservation

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efforts is to encourage the forms of trophy hunting that benefit conservation, while promoting reforms to hunting and wildlife management in Tanzania and other key range states where hunting revenues do not provide effective or sufficient incentives for conservation measures.

Sweeping measures that simply curtail trophy hunting without reference to specific national situations will probably have a negative impact on lion conservation in countries such as Namibia and parts of Mozambique and Zimbabwe, while failing to target some of the key causes of lion population declines elsewhere (e.g. exclusion of the people from economic benefits derived from wildlife; Lindsey et al., 2012). For international regulatory mechanisms such as CITES to play an effective role in promoting the conservation of species affected by trade, polarized ideological positions need to give way to a more scientific and context-specific approach to problem-solving. Using international trade regulatory regimes to promote the necessary domestic governance reforms to trophy hunting should be explored as a strategy to address current lion declines and range contractions and encourage more effective conservation policies and practices.

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Biographical sketches

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ADDENDUM

Trophy hunting and lion conservation: a question of governance?—ADDENDUM

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This article (Nelson et al., 2013) highlights several factors that undermine the conservation value of trophy hunting in Tanzania and that may result in negative impacts on wildlife populations (including lions) in some instances. Since the article was finalized, however, Tanzania has instigated three measures to improve the sustainability of lion hunting.

Firstly, a minimum 6-year age limit on lion trophies has been implemented (Tanzania Wildlife Division, 2012), forcing operators to be more selective when hunting lions. The age of lion trophies in Tanzania is assessed by an independent NGO and age restrictions are enforced via quota penalties for underage lion trophies (Tanzania Wildlife Division, 2012).

Secondly, lion quotas were cut from 520 in 2008–2009 to 315 in 2011–2012 (Tanzania Wildlife Division, 2012). There has been a drop in lion trophy off-takes, from 165 in 2008–2009 to 85 in 2011–2012 (Tanzania Wildlife Division, 2012), although research is required to determine the extent to which this decrease is because of the cut in the quota and age restrictions and/or a result of continued declines in lion populations. We recommend that formalized population monitoring is implemented to evaluate whether or not the reforms are translating into population increases.

Thirdly, changes were made in 2012 to the regulatory framework for community-based conservation, in the form of the Wildlife Management Area regulations. Although many of the challenges related to transferring management rights and economic benefits from wildlife on community lands still exist, the new regulations grant local communities that have established Wildlife Management Areas greater involvement in granting trophy hunting concessions, and provide greater clarity regarding the sharing of revenues generated by hunting. These much-needed improvements need to be developed further but have substantially improved some of the shortfalls that we describe in this article.

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