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## Conservation trophy hunting: implications of contrasting approaches in native and introduced-range countries

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### ABSTRACT

Tensions between trophy hunting, sport/conservation hunting, invasive mammal species control and compassionate conservation highlight the rising worldwide issue in the wildlife management and the tourism sector. Hunting, either for food or recreation, has played a significant role in the development of the conservation movement from its inception. While initially considered part of wildlife tourism, some 'conservation hunting' focuses exclusively on trophy hunting, especially iconic species, often justified to generate conservation benefits and revenue for the local community. Exploitation to incentivise protection has many proponents, but the trade-off at a population level for the protection of animal lives has considerable ethical and practical challenges. Further, trophy hunting can also drive population-level changes that may cause population collapse. Here we discuss trophy hunting practice in Nepal, New Zealand and compare the harvesting approaches in native and introduced range countries.

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We believe that tensions between trophy hunting, sport/conservation hunting, invasive mammal species control and compassionate conservation are highlighting a rising worldwide issue in the wildlife management and the tourism sector that needs to be addressed (Aryal et al. 2015; Leader-Williams et al. 2005; Ramp and Bekoff 2015). Hunting, either for food or recreation, has played a significant role in the development of the conservation movement from its inception (Leopold [1933] 1986, 1949). While initially promoted as part of wildlife tourism, some 'conservation hunting' focuses exclusively on trophy hunting, especially of iconic species. Such hunting is often justified in terms of conservation benefits and revenue for the local community. While exploitation to incentivise protection has many proponents, we consider that the trade-off at a population level for the protection of animal lives has considerable ethical and practical challenges that need to be addressed (Ramp and Bekoff 2015). Further, the ecological consequences of trophy hunting need closer examination to ensure unanticipated or negative outcomes are avoided, such as population-level changes that may cause population collapse (Aryal et al. 2015).

In the twenty-first century, the tenets of animal conservation ethics (Gamborg, Palmer, and Sandoe 2012)

support the development of sustainable trophy hunting approaches that maintain viable populations while assisting local communities to improve their social and economic status. For example, bharal (*Pseudois nayaur*) and Himalayan tahr (*Hemitragus jemlahicus*) have been hunted for sport and trophies in Nepal since the 1980s, generating considerable revenue based on hunting quotas determined by the government (Aryal et al. 2015). However, the non-lethal approach promoted by the compassionate conservation ethic (Ramp and Bekoff 2015) views trophy hunting quite differently.

The motivation for promoting trophy hunting is often driven by context-dependent values which, we believe, need to be more closely evaluated. As an example, in both New Zealand and Nepal, tahr are prized as a recreational/trophy hunting resource (Aryal et al. 2015; Davys, Forsyth, and Hickling 1999; Department of Conservation (DoC) 1993, 2006; Forsyth 1999). In New Zealand, tahr are considered a 'pest' by conservationists because they are non-native and hunted. By contrast, within their native range in Nepal, tahr are categorised as near-threatened (IUCN Red Data; Bhatnagar and Lovari 2008). While trophy hunting has generated significant revenue in Nepal and other countries (Aryal et al. 2015), it is having a severe

effect on tahr population dynamics; for example, hunting mainly of males has skewed population sex ratios, thereby progressively reducing the reproductive male population (Aryal et al. 2015). Clearly, the dynamics of such a skewed population needs to be better understood to ensure effective management. In New Zealand, only a few individuals were initially introduced resulting in a narrow gene pool. Thus, this founder population could easily fall within an extinction vortex due to overharvesting and the pressures of inbreeding and deleterious genes arising from only having a small founder population (Frankham 2005). Similarly, more female African lions (*Panthera leo*) are hunted than males (Creel and Creel 1997; Loveridge et al. 2007). High male hunting pressure leads to female fecundity which drives population-level changes that may cause a population to collapse (Ginsberg and Milner-Gulland 1994). Trophy hunters may also differentiate based on age, with consequent population-level changes (Palazy et al. 2012). Research also shows that trophy size and cost are not always strongly related (Palazy et al. 2012), although rarity can increase the price of a trophy specimen (Palazy et al. 2012).

Within native habitats, some authorities have allowed unrestricted hunting without necessarily considering the implications on the sex ratios or genetic diversity of species within their reserves. Consequently, hunting quotas have been set without establishing the species' full ecological requirements (Aryal et al. 2015). In Tanzania, for example, such hunting quotas have led to severe declines of leopard (*Panthera pardus*) and lion populations (Packer et al. 2011).

Globally, the consequence of trophy hunting on specific genders is poorly understood (Aryal et al. 2015; Caro et al. 2009). We suggest that international standards guided by scientific and ethical evidence should be formally developed to determine when, where and of what sexes/age classes of animals hunting is allowed. This should assist legal protection to ensure that hunting quotas are not exceeded and that the correct age classes are taken, whilst also promoting respect for all wildlife. Similarly, we suggest that all quotas should be set based on scientific date and well-constructed population harvesting models. On the benefit side, we suggest hunting fees should be set by private auctions as that approach generally results in the highest prices for trophy auction (Palazy et al. 2012). Festa-Bianchet (2003) showed, for example, that bighorn sheep (*Ovis canadensis*) trophy prices reached US\$400,000 at auction and contributed significantly to government revenue and the local community (Aryal et al. 2015).

Trophy hunting for males may create a population imbalance and additional risks of population extinction. Therefore, we suggest a minimum age for trophy males should be set as part of hunting quotas based on sex

ratio of the target species, population structures, level of predators and human impact (Milner, Nilsen, and Andreassen 2007; Whitman et al. 2004). For sustainable hunting of tahr in Nepal we recommend a minimum age threshold of greater than seven years of age (and for bharal, a horn size greater than 46 cm, curved and more than eight years old: based on the lifespan of the animal, 10–15 years; Aryal, unpublished data). In developing these strategic hunting policies, we believe a more considerate conservation approach is required that incorporates both animal welfare and the ethics of hunting, and maximisation of the benefit to conservation from the money raised by trophy hunting.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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