

Differentiating between regulation and hunting as conservation interventions

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Protecting biodiversity requires that we correctly identify major threats and effective interventions to abate them (Salafsky & Margoluis 2003; Sutherland et al. 2004). If the scientific community wants the world to heed our warnings of ecosystem collapse (Ripple et al. 2017), we

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should be aware of past warnings and current misunderstandings. A century ago, similar alarms sounded over extinctions of wild animals taken for commercial meat markets (Roosevelt 1916). The near-extinction averted in the early 20th century provides useful contemporary lessons (Figure 1). Then, over-hunting threatened the persistence of multiple species and the public policy intervention replaced commercial extraction with regulatory systems. Regulated hunting seems to have saved wildlife from extinction by limiting methods, participants, and quantities taken by hunters and trappers. Yet, the observation that regulation saved wild animals of western nations is persistently being misrepresented (as we describe below) and replaced in the scientific and management literature by an implicit assertion that hunting itself was the intervention.

The misrepresentation of the history is that the act of hunting, rather than regulation of hunting, saved commercial species from extinction. This misrepresentation was illustrated recently in a 19,000 word review aimed at “Finding effective ways of conserving large carnivores ... as a priority in conservation.” (Abstract, Redpath et al. 2017). In that article, 19 prominent conservation scientists wrote, “...many predator populations thrive in the presence of hunting/trapping programs (hereafter just referred to as hunting) supported by local people;” (p. 2158, Redpath et al. 2017). Without evidence for the claim populations “thrive”, the authors condense “hunting/trapping programs” into simply “hunting” without defining programs to include permits, regulations and enforcement. Nor is that article unusual. Going back decades, one finds agencies and prominent institutions advocating hunting as a conservation intervention (Clark & Milloy 2014). For example, assertions, that hunting is an effective conservation intervention in and of itself, without accompanying evidence of positive outcomes for the hunted populations, have been published or promoted by The International Union for the Conservation of Nature, The Wildlife Society, the Association of Fish and Wildlife Agencies, the Western Association of Fish and Wildlife Agencies, and the Wildlife Management Institute (Jackson 1996; Batcheller et al. 2010). Similar claims are made by academics penning titles such as, “Why lions need to be hunted” (Howard 1988), or promoting

trophy hunting generally (Di Minin et al. 2016). To be clear, we are not disputing the common and well-substantiated claim that hunters and their organizations have contributed financially and through other indirect means to conservation (Holsman 2000). Nor is the problem we detect one of advocacy – all people prefer asking and answering certain questions and interpreting data in a particular way. Instead, we discuss how the lack of evidence supporting that advocacy misrepresents the intervention that protected animal populations in the past.

Hunting never directly saves the targeted animal. To our knowledge, there is no evidence that hunting has ever saved an animal population or species from extinction. By contrast, restrictions on hunting have certainly stemmed extinctions and extirpations (Wilcove 1999). These superficially obvious statements help to point the way to scientific evaluation of hunting as a conservation intervention. Specifically, hunting alone could only indirectly protect non-target individual animals (Treves 2009). The conservation community needs incisive experiments to disentangle the hypothesis that hunting itself protects animals from the competing hypothesis that *regulating* hunting protects animals. No one to our knowledge has tested whether regulation or another aspect of modern hunting or trapping programs was the effective intervention in the early 20th century. Was over-exploitation by hunters and trappers prevented by the enforcement of quotas and bag limits or prevented by other factors related to organized hunting? Asserting an effective conservation tool without presenting scientific evaluation of population-level outcomes risks misleading the public and policy-makers. The history of fisheries contains many such examples (Finley 2011). By analogy, scientists should cry foul if public health organizations touted ‘eating’ to fight cancer, rather than touting ‘healthful diets’ (i.e., regulated eating). Touting ‘hunting’ rather than ‘regulated hunting’ can create a risky misconception. As Platt (1964) predicted, scientific fields that do not effectively identify and test between opposed hypotheses will advance slowly, if at all. Only when claims are framed as opposed hypotheses will the field progress and the many claims about hunting as a conservation tool be falsifiable.

We see three pernicious consequences of omitting regulation from scientific treatments of conservation interventions. First, a lack of transparency about regulation prevents the objective evaluation of it as a help or hindrance to conservation efforts. For example, some might believe that regulation saved public hunting itself – because a society might have banned all hunting when commercialization threatened the public’s wildlife. Others might believe that regulation is a hindrance to hunting as a conservation instrument. By omitting mention of regulation, the implicit notion advances that regulation is unnecessary. Indeed, one must beware of omitting regulation from the narrative about hunting as a conservation intervention, especially given the potential for financial conflicts of interest created by powerful, moneyed interests seeking unlimited exploitation. That leads us to the second pernicious consequence of discounting regulation. When authorities ignore or under-emphasize the importance of regulation, perpetrators of environmental crime, such as poaching, may feel emboldened or immune to prosecution. This idea was seemingly advocated by Kaltenborn & Brainerd (2016) with the notion that poaching acts as a release for rural resentment over national restoration of controversial wildlife. Treves et al. (2017a) reviewed four other cases where inaccurate measurement of poaching had led governments to downplay the major threat to endangered gray wolves (*Canis lupus*). Predators in particular seem to be targets for the notion of hunting as a conservation intervention (Figure 2); the common hypothesis being that the predator populations benefit indirectly when people kill a minority of them, because then people tolerate the survivors better or revenue flows to direct conservation (Loveridge et al. 2007; Treves 2009; Treves & Bruskotter 2014; Chapron & Treves 2017; Macdonald et al. 2017). The third pernicious consequence of forgetting the importance of regulation relates to the paucity of scientific evidence into this question. Given this paucity, our criticism of hunting as conservation might be seen as opposition to hunting itself. We do not, however, view hunting as incompatible with conservation. Confusing our work with anti-hunting advocacy would once again confuse the activity with the scientific evaluation of its effectiveness for protecting the hunted population.

To protect biodiversity effectively, scientists must identify interventions that improve outcomes for populations. Decision-makers must be transparent in their value judgments about human activities they permit (Treves et al. 2017b) and the evidence they use to allocate natural resources (Artelle et al. 2018). Failure might contribute to ongoing extinctions and the erosion of public confidence in science.

References

- Artelle KA, Reynolds JD, A. T, Walsh JC, C. PP, Darimont CT. 2018 Hallmarks of science missing from North American wildlife management. *Science Advances* **4**:eaao0167.
- Batcheller GR, et al. 2010. *The Public Trust Doctrine: Implications for Wildlife Management and Conservation in the United States and Canada*. Bethesda, MD.
- Chapron G, Treves A. 2017. Reply to comments by Olson et al. 2017 and Stien 2017. *Proceedings of the Royal Society B* **20171743**.
- Clark SG, Milloy C. 2014. *The North American Model of Wildlife Conservation: An Analysis of Challenges and Adaptive Options*. Pages 289-324 in Clark SG, and Rutherford MB, editors. *Large Carnivore Conservation: Integrating Science and Policy in the North American West*. The University of Chicago Press, Chicago.
- Di Minin E, Bradshaw C, Leader-Williams N. 2016. Banning trophy hunting will exacerbate biodiversity loss. *Trends in Ecology and Evolution* **31**:99-102.
- Finley C 2011. *All the Fish in the Sea: Maximum Sustainable Yield and the Failure of Fisheries Management* University of Chicago Press, Chicago.

- Holsman RH. 2000. Goodwill hunting? Exploring the role of hunters as ecosystem stewards. *Wildlife Society Bulletin* **28**:808-816.
- Howard WE. 1988. Why lions need to be hunted. *Proceedings of the Mountain Lion Workshop* **3**:66-68.
- Jackson JJ. 1996. An international perspective on hunting. Pages 7–11 in Leader-Williams N, Kayera JA, and Overton GL, editors. *Tourist Hunting in Tanzania*. Occasional Publication 14, International Union for the Conservation of Nature and Natural Resources, Cambridge.
- Kaltenborn BP, Brainerd SM. 2016. Can poaching inadvertently contribute to increased public acceptance of wolves in Scandinavia? *European Journal of Wildlife Research*:DOI: 10.1007/s10344-10016-10991-10343.
- Loveridge AJ, Reynolds JC, Milner-Gulland EJ. 2007. Does sport hunting benefit conservation? Pages 224-241 in MacDonald D, and Service K, editors. *Key Topics in Conservation Biology*. Oxford University Press, Oxford.
- Macdonald DW, Loveridge AJ, Dickman A, Johnson PJ, Jacobsem KS, De Preez B. 2017. Lions, trophy hunting and beyond: knowledge gaps and why they matter. *Mammal Review*:doi: 10.1111/mam.12096.
- Platt JR. 1964. Strong inference. *Science* **146**:347–353.
- Redpath S, et al. 2017. Don't forget to look down – collaborative approaches to predator conservation. *Biological Reviews* **92**:2157–2163.
- Ripple WJ, Wolf C, Newsome TM, Galetti M, Alamgir M, Crist E, Mahmoud MI, Laurance WF, and 15 ssfc. 2017. World Scientists' Warning to Humanity: A Second Notice. *Bioscience* **67**:1026–1028.

Roosevelt TD 1916. *A Book-Lover's Holidays in the Open*. Charles Scribner's Sons, New York.

Salafsky N, Margoluis R. 2003. What conservation can learn from other fields about monitoring and evaluation. *BioScience* **53**:120-121.

Sutherland WJ, Pullin AS, Dolman PM, Knight TM. 2004. The need for evidence-based conservation. *Trends in Ecology & Evolution* **19**.

Treves A. 2009. Hunting to conserve large carnivores. *Journal of Applied Ecology* **46**:1350-1356.

Treves A, Artelle KA, Darimont CT, Parsons DR. 2017a. Mismeasured mortality: correcting estimates of wolf poaching in the United States. *Journal of Mammalogy* **98**:1256–1264.

Treves A, Bruskotter JT. 2014. Tolerance for predatory wildlife. *Science* **344**:476-477.

Treves A, Chapron G, López-Bao JV, Shoemaker C, Goeckner A, Bruskotter JT. 2017b. Predators and the public trust. *Biological Reviews* **92**:248-270.

Wilcove D 1999. *The Condor's Shadow*. H. Freeman and Co., New York.

Figure 1. Photograph from the mid-1870s of a pile of American bison skulls waiting to be ground for fertilizer. Public domain photo, credit:

https://en.wikipedia.org/wiki/Market_hunters#/media/File:Bison_skull_pile_edit.jpg

Figure 2. Market hunting of cougars

https://upload.wikimedia.org/wikipedia/commons/3/30/Market_hunting_of_cougars.jpg



