



Promoting predators and compassionate conservation

Arian D. Wallach,^{*†‡¶} Marc Bekoff,^{‡§} Michael Paul Nelson,^{**} and Daniel Ramp[‡]

^{*}Dingo for Biodiversity Project, P.O. Box 156, Mount Perry 4671, Queensland, Australia

[†]Charles Darwin University, School of Environment, Darwin, Northern Territory, Australia

[‡]Centre for Compassionate Conservation, School of the Environment, University of Technology Sydney, P.O. Box 123 Broadway, NSW, 2007, Australia

[§]Ecology and Evolutionary Biology, University of Colorado, Boulder, CO 80309, U.S.A.

^{**}Department of Forest Ecosystems and Society, Oregon State University, Corvallis, OR 97331, U.S.A.

Introduction

Predators are at the forefront of a compassionate revolution in conservation. Promoting predators for conservation has deep roots (Leopold 1949), and the reintroduction of wolves (*Canis lupus*) to Yellowstone National Park in 1995 simultaneously enhanced wolf conservation and restored landscapes by suppressing over-abundant deer. It is now widely acknowledged that apex predators provide crucial ecological functions as suppressors of population irruptions, and their recovery is revolutionizing conservation (Chapron et al. 2014; Ripple et al. 2014). However, this success stands in stark contrast to conservation practices premised on killing animals to control populations. Conservation has a long history of striving to save species by killing members of other species. Although death is part of nature, it is becoming apparent that the belief that human-mediated killing can right human-caused disturbance is fallible. For example, an intensive 9-year wolf cull to save declining woodland caribou (*Rangifer tarandus caribou*) in Canada did not provide a long-term solution (Hervieux et al. 2014). Using insights from Australian conservation, we argue that a 3-tiered conservation ethic that encompasses the welfare of individuals, populations, and ecosystems be used to guide decision making for improved conservation and animal welfare outcomes.

Evidence of low efficacy, insufficient monitoring, and deleterious unintended consequences (Warburton & Norton 2009; Carroll 2011; Davis et al. 2011) of killing for conservation are leading some scientists to advocate

for restraint in using lethal means to attain conservation goals. Killing raises pernicious ethical questions regarding the values placed on individuals and populations, suppression of one species to promote another, categorization of species as invasive and inherently malicious, eradication of species from their introduced ranges when their populations are jeopardized in their native ranges, and penalizing others for our own misdeeds (Bekoff 2013). Humanity has a moral obligation to help restore threatened populations, but harming sentient beings is a serious matter that cannot be justified solely on the basis of noble aims. Killing for conservation often proves to be unjustified because although the costs to those individuals killed are certain, the benefits to populations and ecosystems are not (Vucetich & Nelson 2007).

Killing for conservation can have human social costs as well. The public, including children, are frequently encouraged to participate in killing. For example, “toad busting” campaigns engage volunteers, including children, in killing non-native cane toads in Australia. Landholders may also be legally obligated to participate in killing programs (DEPI 2014). Establishing killing as a normative practice is achieved with the use of militarized jargon (Larson 2005) and can alienate society from nature by diminishing compassion and encouraging violence as an appropriate route to problem solving (Clayton 2012). Although Britain’s Hunting Act banned the hunting of native foxes with dogs due to animal-welfare concerns, in Australia similar and possibly more severe hunting practices aimed at wild boar are legitimized because wild boar are not native (Ramp et al. 2013). Compassion is an

¶email arian.wallach@cdu.edu.au

Paper submitted November 26, 2014; revised manuscript accepted February 23, 2015.



Figure 1. Sign warning of 1080 bait deployment to kill foxes in an Australian national park (photo by L. Mullan) and the dingo, an apex predator, which limits fox populations but succumbs to 1080 poisoning (right) (photo by A.W.).



Figure 2. Red fox with a Little Penguin on Middle Island (photo courtesy of Middle Island Maremma Project) and Maremma sheepdog protecting a Gannet colony (seen in the background) (photo by L. van Bommel).

important motivation driving society's support for conservation, and practitioners risk losing public support when they rely on unsubstantiated dichotomizations of those who deserve to live and those who deserve to die.

There is growing interest in developing creative ethical and ecological dialogue when balancing the welfare of individuals and populations (Harrington et al. 2013; van Dooren 2014). Compassionate conservation is an emerging field promoting the protection of individuals and populations within conservation (Bekoff 2013; Ramp & Bekoff 2015). It asserts that there are limits to the ability to predict the outcomes of human intervention in ecosystems and adopts as a founding principle *first do no harm* (Bekoff 2010). These principles remind practitioners that some interventions may fail or even exacerbate problems and give rise to alternative management objectives and to alternative avenues for resolving problems. Several examples showcase how actions consistent with compassionate conservation provide more effective and ethical outcomes.

Trophic cascade theory explains the role of apex predators in regulating populations of their prey and mesopredators. Many apex predators are, however, endangered, primarily due to persecution by humans (Ripple et al. 2014). Consequently, both native and introduced species, that otherwise would be constrained, have irrupted and caused harm (Wallach et al. 2015). Lethal control is society's attempt to assume the ecological function once performed by apex predators. But, these shoes do not fit us well (Berger 2005). Predator-prey interactions involve not only killing but communication, and prey respond to danger in complex ways, including predator avoidance behaviors (Brook et al. 2012).

Australia provides a continental-scale case study of both killing for conservation and trophic cascades. Introduced animals, particularly mesopredators, have contributed to an extinction wave—the highest in the world in the past 2 centuries (Johnson et al. 2007). Therefore, much conservation effort in Australia is devoted to killing introduced species, particularly red foxes

(*Vulpes vulpes*). Yet the most common method used to control foxes, 1080 poison-baiting, also kills dingoes (*C. dingo*), an apex predator (Fig. 1). Thus, dingoes are persecuted across both pastoral and conservation regions. Across the continent, dingo distribution is a major predictor of low fox densities and high survival of native mammals (Johnson et al. 2007; Letnic et al. 2011). The very method used to promote biodiversity has paradoxically driven its decline (Wallach et al. 2010; Colman et al. 2014); thus, violating the ethical commitment to individuals, populations, and ecosystems (Vucetich & Nelson 2014).

The loss of apex predators has also resulted in higher densities of their native prey and, in turn, to conservation killing. The Dingo Proof Fence, Australia's 5500 km predator exclusion fence, has created 2 ecological universes in which kangaroos (and other herbivores) dominate inside the fence and vegetation productivity is higher outside the fence (Letnic et al. 2012). Due to dingo persecution, over 3 million kangaroos are killed annually for commercial harvest and as pests (Ramp 2013). Similarly, the eradication of wolves (*C. lupus*) from parts of North America increased deer densities, spurring culling operations (Ripple & Beschta 2004). Restoration of apex predators has widespread application consistent with individual, population, and ecosystem values.

Compassionate solutions can even trump killing in regions where apex predators are absent. A breeding colony of Little Penguins (*Eudyptula minor*) in Middle Island, Australia, decreased from 600 to 10 birds in 5 years due to fox predation. Killing foxes with poison, den fumigation, traps, and guns did not address the threat because foxes recolonized the island at low tide. In 2006, a trial was initiated to use Maremma sheepdogs to guard the colony (Fig. 2). Since its implementation, fox predation has been eliminated, the penguin population has increased, and the project has expanded to protect a colony of Australasian Gannets (*Morus serrator*) (van Bommel 2010). This success prompted Zoos Victoria to invest over half-a-million dollars in the trial use of guardian dogs to facilitate a bandicoot (*Perameles gunnii*) reintroduction (Zoos-Victoria 2014).

Faith in, and tolerance for, killing for conservation is waning (Bekoff 2013; Ramp & Bekoff 2015). Despite this, killing still monopolizes conservation. Visions of restoring ecological communities to ancestral configurations are fantasies that continue to harm millions of animals globally each year. Rather than paralyzing action, compassion can help restrain impulsive decisions that cause harm and provide a guiding framework that enables innovation in conservation. Landholders who choose not to kill can experience immense pressure to toe the line (Ford-Thompson et al. 2012; Estévez et al. 2014). As a first step, testing of non-lethal approaches must be allowed. One avenue is the establishment of a

predator-friendly network to support these landholders. What would happen if killing was moved to the bottom of the conservation toolkit or removed altogether? The time has come to find out.

Acknowledgments

The authors thank M. Burgman, T. van Dooren, and 3 anonymous reviewers for insightful comments on earlier versions of this work.

Literature Cited

- Bekoff M. 2010. Conservation and compassion: first do no harm. *New Scientist* 1 September:2775:24–25.
- Bekoff M, editor. 2013. Ignoring nature no more: the case for compassionate conservation. University of Chicago Press, Chicago.
- Berger J. 2005. Hunting by carnivores and humans: does functional redundancy occur and does it matter. Pages 315–341 in J Ray, K Redford, R Steneck, J Berger, editors. Large carnivores and the conservation of biodiversity. Island Press, Washington, D.C.
- Brook LA, Johnson CN, Ritchie EG, Dickman C. 2012. Effects of predator control on behaviour of an apex predator and indirect consequences for mesopredator suppression. *Journal of Applied Ecology* 49:1278–1286.
- Carroll SP. 2011. Conciliation biology: the eco-evolutionary management of permanently invaded biotic systems. *Evolutionary Applications* 4:184–199.
- Chapron G, et al. 2014. Recovery of large carnivores in Europe's modern human-dominated landscapes. *Science* 346:1517–1519.
- Clayton SD. 2012. The Oxford handbook of environmental and conservation psychology. Oxford University Press, Oxford.
- Colman NJ, Gordon CE, Crowther MS, Letnic M. 2014. Lethal control of an apex predator has unintended cascading effects on forest mammal assemblages. *Proceedings of the Royal Society B: Biological Sciences* 281:20133094.
- Davis MA, et al. 2011. Don't judge species on their origins. *Nature* 474:153–154.
- DEPI (Department of Environment and Primary Industries). 2014. Noxious weed and pest management. DEPI, Victoria, Australia.
- Estévez RA, Anderson CB, Pizarro JC, Burgman MA. 2014. Clarifying values, risk perceptions, and attitudes to resolve or avoid social conflicts in invasive species management. *Conservation Biology* 29:19–30.
- Ford-Thompson AE, Snell C, Saunders G, White PC. 2012. Stakeholder participation in management of invasive vertebrates. *Conservation Biology* 26:345–356.
- Harrington LA, Moehrenschrager A, Gelling M, Atkinson RP, Hughes J, Macdonald DW. 2013. Conflicting and complementary ethics of animal welfare considerations in reintroductions. *Conservation Biology* 27:486–500.
- Hervieux D, Hebblewhite M, Stepnisky D, Bacon M, Boutin S. 2014. Managing wolves (*Canis lupus*) to recover threatened woodland caribou (*Rangifer tarandus caribou*) in Alberta. *Canadian Journal of Zoology* 92:1029–1037.
- Johnson CN, Isaac JL, Fisher DO. 2007. Rarity of a top predator triggers continent-wide collapse of mammal prey: dingoes and marsupials in Australia. *Proceedings of the Royal Society B: Biological Sciences* 274:341–346.
- Larson BM. 2005. The war of the roses: demilitarizing invasion biology. *Frontiers in Ecology and the Environment* 3:495–500.
- Leopold A. 1949. Thinking like a mountain. Pages 129–132 in A Sand County almanac, and sketches here and there. Oxford University Press, New York.

- Letnic M, Greenville A, Denny E, Dickman CR, Tischler M, Gordon C, Koch F. 2011. Does a top predator suppress the abundance of an invasive mesopredator at a continental scale? *Global Ecology and Biogeography* **20**:343–353.
- Letnic M, Ritchie EG, Dickman CR. 2012. Top predators as biodiversity regulators: the dingo *Canis lupus* dingo as a case study. *Biological Reviews* **87**:390–413.
- Ramp D. 2013. Bringing compassion to the ethical dilemma in killing kangaroos for conservation. *Journal of Bioethical Inquiry* **10**:267–272.
- Ramp D, Bekoff M. 2015. Compassion as a practical and evolved ethic for conservation. *BioScience* **65**:323–327.
- Ramp D, Ben-Ami D, Boom K, Croft DB. 2013. Compassionate conservation: a paradigm shift for wildlife management in Australasia. Page 295 in M Bekoff, editor. *Ignoring nature no more: the case for compassionate conservation*. University of Chicago Press, Chicago.
- Ripple WJ, Beschta RL. 2004. Wolves and the ecology of fear: Can predation risk structure ecosystems? *BioScience* **54**:755–766.
- Ripple WJ, et al. 2014. Status and ecological effects of the world's largest carnivores. *Science* **343**:1241–1244.
- van Bommel L. 2010. *Guardian dogs: best practice manual for the use of livestock guardian dogs*. Invasive Animals Cooperative Research Centre, Canberra.
- van Dooren T. 2014. *Flight ways: life and loss at the edge of extinction*. Columbia University Press, New York.
- Vucetich JA, Nelson MP. 2007. What are 60 warblers worth? Killing in the name of conservation. *Oikos* **116**:1267–1278.
- Vucetich JA, Nelson MP. 2014. Wolf hunting and the ethics of predator control. Pages 1–15 in L Kalof, editor. *Oxford handbook of animal studies*. Oxford University Press, New York.
- Wallach AD, Johnson CN, Ritchie EG, O'Neill AJ. 2010. Predator control promotes invasive dominated ecological states. *Ecology Letters* **13**:1008–1018.
- Wallach AD, Ripple WJ, Carroll SP. 2015. Novel trophic cascades: apex predators enable coexistence. *Trends in Ecology & Evolution* **30**:146–153.
- Warburton B, Norton BG. 2009. Towards a knowledge-based ethic for lethal control of nuisance wildlife. *Journal of Wildlife Management* **73**:158–164.
- Zoos-Victoria. 2014. Someone to watch over me? Available from <http://www.zoo.org.au/news/someone-to-watch-over-me> (accessed March 2015).