Compassionate versus consequentialist conservation

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Abstract

Ethical treatment of wildlife and consideration of animal welfare have become important themes in conservation but ethical perspectives on how best to protect wild animals and promote their welfare are diverse. We present the advantages offered by the consequentialist 'harms' ethical framework applied to managing wild herbivores for conservation purposes. We argue that, to minimize harms while achieving conservation goals, overabundant wild herbivores should in many cases be managed through consumptive *in situ* killing. This argument is based on six advantages: 1) imposing negative welfare states on animals being killed for only very short durations, 2) not depriving the remaining animals of positive welfare states (e.g., linked to rearing offspring), 3) preventing overpopulation and poor welfare states facing overabundant populations (e.g., starvation), 4) preventing welfare impacts imposed on heterospecifics through resource depletion (i.e., competition), 5) harvesting meat and thereby not requiring other (agricultural) animals to be raised to supply that meat, and 6) incurring minimal costs and thereby maximizing funding available for other wildlife management and conservation priorities. Alternative ethical approaches to our consequentialist framework comprise deontology (including animal rights), and forms of virtue ethics, some of which underpin 'compassionate conservation'. These alternative ethical approaches emphasize the importance of avoiding intentional killing of animals but, if no management occurs, are likely to impose considerable unintentional harms on overabundant wildlife and indirectly harm heterospecifics through ineffective population reduction. If non-lethal ontrol is used, they are likely to deprive overabundant animals of positive welfare states and incur prohibitive economic costs. We encourage all with a stake in conservation to consider animal welfare consequentialism as an ethical approach to minimize harms to the animals under their duty of care as well as other animals that policies may affect while at the same time pursuing conservation goals.

Introduction

Concern for animal ethics plays an increasingly prominent role in discussions concerning approaches to conservation. The umbrella term 'compassionate conservation' has been used to describe ethical approaches that purport to prioritize animal welfare by avoiding intentional harm to animals, including deliberate killing of animals in routine conservation activities (Ramp 2013; Wallach et al. 2018). However, these approaches take a narrow view of animal welfare by primarily considering what is intentionally done to animals by humans, but with less focus on what happens broadly to animals as a result of anthropogenic processes.

Here, we use the case study of herbivore management to argue that another ethical approach, welfare consequentialism, can better address animal welfare without obstructing activities required to protect biodiversity and other conservation goals. Our focus is not to make animal welfare the sole or primary goal of conservation activities, but to ensure that the best possible animal welfare outcomes are achieved while aligning with conservation priorities. There are welfare-based arguments for more interventionist approaches to animal welfare for wild animals (including intervening with natural processes such as predation; Horta 2017) but, here we focus on welfare consequences for animals resulting from anthropogenic activities.

Using the example of wild herbivores that become overabundant due to anthropogenic changes, we compare the implications for affected animals from welfare consequentialism and alternative ethical approaches that purport to prioritize the welfare of wildlife. We argue that, when lethal control is performed professionally, and when animals are killed *in situ*, and in addition when they are consumed, animal welfare outcomes are in most cases superior to alternative management options.

A Background to Animal Welfare, Ethics and Conservation

There are different and potentially conflicting ethical approaches to what is the right way to manage and conserve wildlife (Warburton & Norton 2009; Gamborg et al. 2012). But recognition of this pluralism is not evident in many publications in conservation that promote one ethical position and denounce others as 'unethical' (Bekoff & Ramp 2014).

Both wildlife management and animal welfare share similar ethical origins in that both have been traditionally underpinned by consequentialist ethics, emphasizing the importance of an action's *consequences* over other ethical considerations such as moral rules, character traits or rights (Nelson et al. 2016; Palmer et al. 2018). Under consequentialist approaches, contentious actions such as killing are considered ethically permissible if, when compared to alternative actions, they deliver a better balance of positive versus negative welfare effects (Gamborg et al. 2012; Dubois et al. 2017). These positive effects may be reduced suffering at an individual animal level (euthanasia; Wilson et al. 2015), producing reduced negative impacts on ecosystems (Howland et al. 2014), desirable outcome for humans through harvesting (Lewis et al. 1997), improvement in water quality in drinking catchments (Bennett et al. 2015), reduced vehicle collisions (DeNicola & Williams 2008), or desirable outcomes for other animals, either agricultural or wild heterospecifics (through reduced transmission of infectious disease; Warburton & Livingstone 2015). So far consequentialist arguments, with a focus on animal welfare, have been made to defend the use of lethal culling of carnivores in some situations (e.g., island conservation; Russell et al. 2016) but there has been less focus on the management of herbivores, with notable exceptions such as the advancement of the concept of "therapeutic hunting" (Varner 2011).

Alternative ethical approaches to welfare consequentialism have become increasingly popular in recent decades. Deontological approaches determine the moral value of an action by its conformity to a moral rule. Applications of deontology to conservation and other human activities have been prominent in opposing animal killing. Among these applications of deontology is the *animal rights* approach (Regan 1983) that gives priority to respect for rights, one of which is the right not to be killed.

A separate, and more ancient, field of classical ethics, virtue ethics, has been invoked to support the tenets of 'compassionate conservation' (Wallach et al. 2018). Virtue ethics are focused on character traits (virtues) deemed to motivate proper conduct, rather than moral rules or guidelines (Sandler & Cafaro 2005). Hence virtue ethics determine the moral value of an action by its manifestation of a quality of character. Virtue ethics hence has a contextual nature whereby practical wisdom (rather than moral rules or consideration of consequences) must be used to determine an appropriate course of action (Wallach et al. 2018). The argument that virtue ethics can support 'compassionate conservation' applies the premise that compassion is a virtue and that its application as a motivating trait towards conservation generally precludes intentionally harming wildlife.

Overabundant Wild Herbivores

Populations of wild (free-ranging) herbivores are increasingly deemed unwanted or overabundant and many species are the subject of population reduction programs in post-industrial countries (Gordon 2009). Animals may be deemed to be foreign, exotic, invasive or feral (wild but having previously been domesticated) and therefore harmful to biodiversity, agriculture or human infrastructure or cultural sites. A well-known example is the culling of introduced feral camels (*Camelus dromedarius*) in Australia (Hampton et al. 2016) despite that group of animals representing the only wild population of the species in the world (Lundgren et al. 2017). A native animal species may also be overabundant (existing at a population density that exceeds the carrying capacity of their environment; Nugent et al. 2011). Well-known examples include overabundant white-tailed deer (*Odocoileus virginianus*) in north-eastern USA (VerCauteren et al. 2011) and overabundant kangaroos (*Macropus* spp.) in south-eastern Australia (Descovich et al. 2015).

Options for reducing the abundance of unwanted animals can be divided into lethal and non-lethal methods. Lethal methods reduce abundance by increasing animal mortality (shooting etc.) while non-lethal methods reduce animal recruitment (fertility control) or immigration (translocation, domestication or fencing). Some lethal methods involve several management stages (e.g., capture and then transport to slaughter facilities; Hampton et al. 2016) and do not kill wildlife in their natural environment. These methods are referred to as *ex situ* killing as distinct from single-stage *in situ* killing whereby animals are killed without prior manipulation (Pollard et al. 2002).

Assessment of Animal Welfare

Animal welfare in conservation has primarily focused on anthropogenic activities that intentionally and directly impose negative effects on animals (e.g., kill-trapping). There has been less awareness of activities that indirectly and/or unintentionally cause impacts (Fraser 2012). However, the animal welfare outcomes of any management program extend beyond the individual animal intentionally manipulated to those animals that are indirectly (e.g., cohort animals) or unintentionally (e.g., heterospecifics) affected. The range of these effects can be conceptualized by means of the consequentialist 'harms' framework of Fraser & MacRae (2011) that includes consideration of processes that harm animals but may not be perpetrated deliberately or widely recognized.

Fraser & MacRae (2011) proposed that people affect animals through four broad types of activity or harm: (1) keeping domestic or captive wild animals; (2) causing deliberate harm to wild animals through activities such as hunting; (3) causing direct but unintended harm to wild animals

through infrastructure such as fencing; and (4) harming wild animals indirectly by disturbing ecological systems. Animal welfare assessments have traditionally focused on Type 1 and 2 activities with less consideration of Type 3 and 4 activities (Fraser & MacRae 2011). Some proposed approaches for assessing animal welfare for managed wildlife consider only the intended and direct effects of management actions on targeted animals (Type 2 activities), and not how these actions may affect other animals, either unintentionally or indirectly (Beausoleil & Mellor 2015). There is growing awareness of the importance of indirect impacts, sometimes referred to as 'invisible' harms (Finn & Stephens 2017).

All management options for unwanted wild herbivores will impose some harm on animals. Animals may be harmed through imposition of negative welfare states (e.g. capture stress) or through deprivation of positive welfare states (e.g., wild animals brought into captivity; Mellor & Beausoleil 2015). Killing itself may be considered an animal welfare impact in the way in which it may deprive animals of a future life where positive states outweigh negative ones, but it is controversial to which extent loss of life can be viewed as a welfare problem (see Kasperbauer & Sandøe 2016 for a more full discussion of this issue). Here, we do not take a side in this debate. For the sake of not making the argument too elaborate, we will assume that the painless killing of an animal incurs no welfare cost, but our overall argument will apply even if the killing of an animal counts as a future welfare cost that can then be compensated by the increased welfare of surviving animals.

Below we describe the harms and benefits associated with different management approaches (lethal, non-lethal, no management) for overabundant herbivores.

Harms Arising from *in situ* Lethal Control

There are no Type 1 harms as animals are not confined to captivity or domesticated. All lethal control imposes Type 2 harms on targeted animals. The magnitude of these harms may be minimized if animals are not disturbed before being killed and if the frequency of adverse animal welfare events (e.g., a protracted death or non-fatal wounding) can be minimized (Hampton & Forsyth 2016). Animal welfare impacts are fewer for animals killed *in situ* than those transported or mustered prior to killing (Hampton et al. 2016), due to the absence of transport stress (Pollard et al. 2002; Grigor et al. 2004). Type 3 harms may arise through unintentional shooting of non-target species, through stress caused to cohort animals in gregarious species (Nuñez et al. 2014), or through orphaning of dependent juvenile animals (e.g., kangaroo 'young-at-foot'; Sharp & McLeod 2016). Another Type 3 harm associated with shooting is poisoning of scavenging birds through use of toxic lead-based bullets

(Pauli & Buskirk 2007; Kelly et al. 2014). Type 4 harms may be imposed if population reduction is poorly regulated and reduces the abundance of the target species below a desired level (i.e., overharvesting). Type 4 harms may also occur through changed abundance and behaviour of scavengers if large numbers of culled animal carcasses are available to scavengers (Newsome & van Eeden 2017). Type 4 harms arising from ineffective population reduction are discussed below.

Harms Arising from Non-Lethal Control

Non-lethal management approaches have gained increasing popularity in the past decade (Ramp 2013; Wallach et al. 2018). Type 1 harms are imposed when animals are brought into captivity (Nuñez et al. 2014) or subjected to domestication and removal from their cohort, sometimes referred to as 'rehoming' (Koncel 2016). Type 2 harms are imposed by any capture or manipulation of animals in the process of administering fertility control or performing translocation. For typical fertility control programs (e.g., Tribe et al. 2014), capture stress is imposed, with such operations often requiring animals to be darted, mustered, trapped, anaesthetized, or undergo surgical procedures (Hampton et al. 2015; Palmer et al. 2018). Type 2 harms are also imposed by methods such as fertility control and fencing that deprive animals of positive welfare states such as mating and dispersal (Mellor & Beausoleil 2015). Type 3 harms which will be caused by several non-lethal strategies include exclusion fencing (animals injured in exclusion fences; VerCauteren et al. 2006) and translocation (disease transmission to resident animals at a translocation release site; McCann et al. 2016).

Harms Associated with No Control or Ineffective Control

Type 4 harms will be imposed by any management strategy (lethal and non-lethal) that is ineffective at reducing the abundance of an overabundant species due to ecological resource depletion. Type 4 harms resulting if population reduction is ineffective will impact on overabundant animals through loss of body condition, increased susceptibility to infectious diseases and parasites (Wilson et al. 2015), increased likelihood of unintended anthropogenic injuries (e.g., vehicle collisions; DeNicola & Williams 2008) and eventual starvation (Figure 1). Situations involving starvation and mass mortality of introduced wild horses are currently developing in the south-west of the USA (Masters 2017) and south-eastern Australia (Cox 2018) and provide a vivid example of Type 4 harms that may be imposed on overabundant herbivores through ineffective (or absent) population control. Another

pertinent example is populations of koalas (*Phascolarctos cinereus*) of anthropogenic origin becoming emaciated in the absence of management actions (Wilson et al. 2015).

Type 4 harms imposed on heterospecifics will also result if population reduction is ineffective. These harms are effects of competition for food or water (Hall et al. 2018), loss of critical shelter and the increased risk of predation associated with that loss, and the longer-term degradation of critical habitat. For example, the abundance of grass-dwelling reptiles was found to be reduced in grassland areas of Australia in which kangaroo densities were high and unmanaged (Howland et al. 2014).

The magnitude of Type 4 harms resulting from any strategy will depend on the efficacy of population reduction. Lethal control methods are often, but not always, efficacious in reducing population abundance rapidly (e.g., DeNicola & Williams 2008) as they rely on increasing mortality rather than slowing reproduction or preventing immigration. Approaches such as fertility control have often been shown to have low efficacy or be appropriate only for small or habituated populations (Hobbs & Hinds 2018). Even if fertility control is effective in reducing population abundance, the interval between when management is initiated and when population reduction occurs may be several years for long-lived species such as wild horses (Hobbs & Hinds 2018). In the case of koala fertility control, the magnitude of this lag phase (during which Type 4 harms would continue) was estimated to be 5–10 years because of high adult female survival rates (Todd et al. 2008).

Economic and Opportunity Costs

Economic costs influence animal welfare outcomes as they determine what can feasibly be achieved and which animals or operations should be prioritized. An advantage of consumptive killing is that it improves the cost-effectiveness of management programs by minimising operational costs per animal and providing a source of income to offset operational costs (Nugent & Choquenot 2004). For example, for control of peri-urban kangaroos in Australia, Mawson et al. (2016) reported a mean cost per animal removed of AUD $36 for *in situ* harvesting. In contrast, Tribe et al. (2014) reported a mean cost per animal of AUD $104–$184/animal for fertility control and translocation. Cost savings may be used by management agencies to fund other conservation or animal welfare priorities (i.e., 'biodiversity offsetting'; Norton & Warburton 2014).

Benefits Arising from Consumption of Culled Animals

If lethal methods are used to manage unwanted wildlife, killed animals may be used (consumed) or not. Non-consumptive killing is common with animals with little commercial or cultural value. If

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consumed, meat, fur, or organs can be harvested commercially (Nugent & Choquenot 2004), collected for traditional/recreational use (DeNicola et al. 1997; McCann et al. 2016) or provided for scientific research (Mawson et al. 2016). Meat may be used for human consumption (Mawson et al. 2016), fed to domestic animals (e.g., pet dogs; Hercock & Tonts 2004) or zoo animals (Harrison et al. 2006). The relevance of consumption to cumulative animal welfare impacts is that meat may be harvested from killed wildlife to substitute meat that would otherwise be derived from slaughtered livestock (Hoffman & Cawthorn 2012). As a consequence, there may be an animal welfare benefit to consuming unwanted wildlife as the slaughter of less domestic livestock is required to supply the same quantity of meat. In view of the requirement of consequentialist ethics to maximize benefits and thereby attempt to reach the optimal harm versus benefit ratio, using products that would otherwise be wasted from the regulated lethal control of herbivores is a benefit that should be considered (Littin et al. 2004; Littin & Mellor 2005). It needs to be made clear that the quantity of this effect is restrained by the fact that only very few people in affluent countries have access to abundant herbivores (Gordon 2009).

An additional benefit of consuming wildlife is that it may prevent harmful interference with food webs. Thus provision of large numbers of carcasses of unharvested culled animals (e.g., Forsyth et al. 2014) may constitute an indirect and unintentional Type 4 harm imposed on wildlife through supporting large populations of scavengers and predators. Possible indirect welfare consequences may include changed foraging patterns, inflated scavenger populations and starvation of these animals in the long-term if culling ceases or declines (Newsome & van Eeden 2017; Robin 2017). These arguments have been made for readily harvestable herbivores such as peri-urban kangaroos (Fedorowytsch 2017; Gibbs 2017) and white-tailed deer (DeNicola et al. 1997; VerCauteren et al. 2011).

The Consequentialist Case for Consumptive *in situ* Killing

We argue that, from a consequentialist perspective, consumptive *in situ* killing that is effective in reducing abundance will often yield the best animal welfare outcomes for overabundant wild herbivore management. In summary, our conclusion is based on six advantages: 1) imposing negative welfare states on animals being killed for only very short durations, 2) not depriving the remaining animals of positive welfare states (e.g., linked to rearing offspring), 3) preventing overpopulation and poor welfare states in overabundant animals associated with unsustainable animal densities (e.g., starvation), 4) preventing welfare impacts imposed on other wild animals by overabundant animals

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through resource depletion (i.e., competition), 5) harvesting meat and thereby not requiring other (agricultural) animals to be raised to supply that meat, and 6) incurring minimal costs or generating income and thereby maximizing funding available for other animal welfare/conservation priorities.

Negative animal welfare impacts relating to lethal wildlife management are generally confined to Type 2 harms imposed on the individual animals killed, and are, provided use of professional shooting methods, mostly of short duration, with few indirect or unintentional harms imposed (Descovich et al. 2015). Such shooting methods often achieve a high frequency of immediate insensibility while achieving near-zero non-fatal wounding (Lewis et al. 1997; Hampton & Forsyth 2016; Table 1). Regulated shooting methods observe prescriptive procedural restrictions (i.e., only head shots; DeNicola et al. 1997; Descovich et al. 2015) and are regularly audited by animal welfare scientists (Hampton and Forsyth 2016; Table 1). We have not considered the use of more imprecise killing practices such as shotguns or archery (Nixon et al. 2001); the animal welfare impacts of such forms of recreational hunting are outside the scope of this paper. Here we are only considering the use of professional harvesting methods with validated animal welfare outcomes such as kangaroo culling (Hampton and Forsyth 2016), urban white-tail deer sharpshooting (DeNicola et al. 1997; DeNicola & Williams 2008), and impala (*Aepyceros melampus*) cropping (Lewis et al. 1997).

With lethal *in situ* methods, animals can exhibit a full range of natural behaviors (reproduction, dispersal) and the positive experiences these provide, until the moment of death (Palmer et al. 2018). It needs to be made clear that, for consumptive *in situ* killing to provide desirable animal welfare outcomes, Type 3 harms associated with shooting must be minimized. Orphaning of dependent juvenile animals can be minimized by deliberately killing juvenile animals as a priorty (Sharp & McLeod 2016) and poisoning of scavenging birds can be avoided by using lead-free bullets (McCann et al. 2016). Several conservation programs worldwide currently use consumptive *in situ* killing to manage overabundant wild herbivores, including kangaroos (Mawson et al. 2016) and Asian swamp buffalo (*Bubalus bubalis*; Albrecht et al. 2009) in Australia, African bush elephants (*Loxodonta Africana*) in southern Africa (Le Bel et al. 2013), roe deer (*Capreolus capreolus*) in Europe (Hothorn & Müller 2010), and elk (*Cervus elaphus*; McCann et al. 2016) and white-tailed deer (DeNicola et al. 1997) in the USA amongst others.

Alternative Ethical Positions

Many ethical approaches, including deontology and virtue ethics, diverge from welfare consequentialism regarding the assessment of killing animals (Palmer et al. 2018) as discussed above.

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Alternatives to lethal control (often no management), or practices such as fertility control or guardian animals, are typically favored by these positions (Wallach et al. 2015). Regardless of their ethical origin, these seem primarily to consider animal welfare through discouraging deliberate killing (type 2 harms). We think that these approaches take too narrow a view of animal welfare by not giving sufficient weight to indirect and unintentional harms. Such approaches in our view focus on the plight of animals intentionally affected by human intervention at the cost of considering welfare outcomes for animals affected in a more indirect way.

Although often unstated, welfare consequentialist approaches underpin most applications of animal welfare science (Fraser 2012; Fawcett et al. 2018), including decades of integration with conservation (Littin et al. 2004; Littin & Mellor 2005; Dubois et al. 2017). Adoption of one of the outlined alternative ethical views would represent a considerable deviation from this focus. We recognize that consequentialism will be viewed by some as unduly cynical (Nelson et al. 2016) but it's focus on outcomes aligns with the tenets of animal welfare science and recognition of the importance of trade-offs in conservation (Leader-Williams et al. 2011).

It needs to be made clear that welfare consequentialism doesn't necessarily lead to the use of lethal methods. In some cases, adoption of welfare consequentialism may result in no management or non-lethal approaches being used. What the view implies is that no management approaches should be ruled out, but rather what guides the adoption of a particular strategy in a particular case should be what will bring about the best aggregate animal welfare outcome. From our welfare consequentialist standpoint, we argue that deciding to do nothing (failing to act) counts as an act (Dubois et al. 2017), and like the decision to implement lethal control, it may also determine which animals will be harmed and how they will be harmed (Russell et al. 2016; Lewis et al. 2017).

Conservation decisions must be taken in light of public consultation and our intention is to ensure that such consultation is well-informed. We respect that policies of wild herbivore management may be chosen based on the premise that killing of animals should be avoided at (nearly) all cost. Our main concern is that such choices are made in a way where our welfare consequentialist view is not ruled out as 'unethical' or 'insensitive' prior to consultation.

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Table 1. Frequency of key animal welfare outcomes achieved by shooting in kangaroo (*Macropus* spp.) culling programs.

Frequency (%) of immediate insensibility	Frequency (%) of non-fatal wounding	Sample size (n)	Source
98	0	141	Hampton and Forsyth 2016
99	0	367	Hampton 2016
97	0.6	338	Hampton and Cowled 2017
98	0	98	Hampton and Ward 2017
95	0	90	Hampton 2018