Ethical responsibilities in invasion biology

Emily C Parke and James C Russell

About the authors

Emily is a philosopher of science in the School of Humanities, University of Auckland, Auckland, New Zealand.

James is a conservation biologist jointly appointed in the School of Biological Sciences and the Department of Statistics, University of Auckland, Auckland, New Zealand.

Citation

Parke EC and Russell JC (2018) Ethical responsibilities in invasion biology. *The Ecological Citizen* **2**: 17–19.

Keywords

Animal ethics; conservation; ecological ethics; values

There is a classic problem in ethics of reconciling the moral standing of collectives (*e.g.* populations, species and ecosystems) with the moral standing of individuals. We briefly survey key issues and make recommendations for positioning viewpoints about practical ethics with particular reference to invasion biology and invasive species eradications, a context in which commitments to collectives and to individuals often come into conflict. We will use 'environmental ethics' as shorthand for holistic views about the moral status of environmental collectives, and 'animal ethics' as shorthand for individualist views about the moral status of non-human animals. Both ethics encompass a range of views, such as in animal ethics from rights to liberation to (relatively weaker) welfare positions.

A now-classic debate in environmental ethics centres on varying degrees of optimism or pessimism about the compatibility of environmental and animal ethics (*e.g.* Callicott, 1980; Katz, 1983; Sober, 1986). More recently, people have proposed ways to reconcile particular views within environmental and animal ethics, or principles for combining elements of both in practice (*e.g.* Jamieson, 1998; Attfield, 2012; Fraser, 2012). Much of this discussion focuses on compatibility (or lack thereof) at the theoretical level, or through the lens of particular conservation scenarios. Despite now-common acknowledgement of 'blurry margins' between the commitments of environmental and animal ethics (Callicott, 1998), there still exist real challenges in reconciling them in conservation practice.

Many of these reconciliation attempts are compelling, and underscore the importance of allowing for nuances in broad ethical positions, especially in application. However, many of them are not obviously action-guiding for conservation, at least not in a generic sense. For example, when concern for ecosystems conflicts with concern for individual animals in a given instance, it will not always be clear how to hold to all four of Fraser's (2012) proposed guiding principles at once (see Box 1). We say this not to criticize any of the reconciliation proposals as such, but to indicate that more work is still needed to consider how to make ethically informed decisions in real conservation scenarios.

This issue is particularly acute in the management of invasive species, where harms to native species by invasive species compete against harms to invasive species through their management. These harms can be particularly strong when they manifest as lethal control of invasive animal populations (Russell et al., 2016). If we consider the ecosystem first, and if its health or integrity by some definition is challenged by invasive species, the course of action might seem obvious: remove the invaders. But individualist animal ethics put significant weight on traits which the invasive animals in question, depending on their species membership, often arguably or uncontroversially have (*e.g.* sentience or the capacity to experience pain). It is not always clear how to take commitment to ecosystems (or species or populations) into account alongside commitment to individual animals, beyond

Box 1. Four guiding principles for animal ethics (Fraser, 2012).

1 Provide good lives for the animals in our care.
2 Treat suffering with compassion.
3 Be mindful of unseen harm.
4 Protect the life-sustaining processes and balances of nature.

simply agreeing to let one trump the other. Conservation biologists themselves are not always clear about where their ethical commitments stand with regard to the ecological hierarchy of individuals versus species versus whole ecosystems, often taking for granted that they have duties to all of them at once and thus conflating the conflicts referred to above.

> "Most real-life situations call for compromise. We think that a productive ethical discussion which is action-guiding for conservation should give more credit to this point."

One approach to applied ethics is to choose a favourite ethical theory (or set of theories or principles) and apply it to relevant real-life situations. However, most real-life situations call for compromise. We think that a productive ethical discussion which is action-guiding for conservation should give more credit to this point. We are sceptical about the possibility of devising an overall reconciliation of environmental ethics and animal ethics that will be generically action-guiding for all scenarios. However, in the context of specific conservation problems, particular recommendations for how to reconcile them can probably be profitably generated.

The prospect of entirely eradicating an invasive animal population from a defined geographical location is a context particular enough that coming up with such recommendations is a plausible and worthwhile aim. In managing broader human–wildlife conflicts, Dubois and colleagues (2017) propose seven principles which we believe illustrate the level of specificity that could be applied to ethically evaluating any proposal for invasive animal eradication (see Box 2). An especially central question when taking animal ethics into account in invasion biology hinges on the justification, or lack thereof, of eradication using lethal control. To date, successes using non-lethal control methods for invasive animal eradication have been very limited. Where non-lethal control methods such as reproduction limitation are a viable eradication technology, invasive species eradication can become reconcilable with views in animal ethics (specifically animal liberation and animal welfare[1]) in a way that lethal control methods are not.

To whatever extent decision-making in conservation biology *is* guided by commitment to particular ethical theories or principles, it is important to be clear about which these are. As noted earlier, conservation biologists often take themselves to be committed to environmental ethics, but this encompasses a variety of views, around ecocentrism (which has stronger and weaker versions) versus biocentrism, and the relative importance of different levels of ecological organization. Similarly for animal ethics, commitment to animal rights versus animal liberation views can have very different implications for practical guidance in conservation. It may not always be possible to reconcile competing ethical theories for any particular conservation scenario. But when those involved clarify their own positions and acknowledge the positions of others, it should be possible to avoid unnecessary conflicts (Redpath *et al.*, 2013), or at least more productively deliberate the ethical implications of a given conservation scenario on common ground. ■

Box 2. Seven principles for guiding management of human–wildlife conflicts, to be followed in sequence (Dubois *et al.*, 2017)

1. When possible, modify human practices first.
2. Justify the need for control.
3. Have clear and achievable outcome-based objectives.
4. Cause the least harm to the fewest number of animals.
5. Consider community values as well as scientific and technical information.
6. Include long-term systematic management plans.
7. Base control on specifics of the situation rather than negative labels applied to the target species in question.

Notes

1 As Hutchins (2008) points out, animal rights and environmental ethics are arguably incompatible in this context.

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