

# Exploring the ethical basis for conservation policy: the case of inbred wolves on Isle Royale, USA

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*Canis lupus*; conservation ethics; content analysis; empirical ethics; endangered species; genetic rescue; stakeholder engagement.

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## Abstract

Data about values are beneficial for resolving disagreements over conservation policy choices because values influence policy acceptance and compliance with conservation rules. Empirical conservation ethics integrate social science methods with conservation dilemmas to determine the origins of values and contribute new solutions to resolving debate. Using the case of genetically rescuing an inbred population of wolves as a policy exemplar, we explored (1) ethical paradigms invoked in justifying policy choices; (2) objects of moral relevance related to choices; and (3) ascriptions of responsibility for action. Discussion board posts revealed diverse ethical paradigms and ascriptions of responsibility, a strong tendency toward collectivism, and associations between some policy choices and ethical paradigms. Conservation ethics can help the conservation community better understand key human dimensions of conservation problems by providing a novel diagnostic framework for policy debate, structuring stakeholder engagement, and informing evaluation.

## Introduction

Conservation policy choices can be complicated by stakeholder debate over the value of an individual animal's life, humans' role in nature, or the effectiveness of conservation actions (Gore *et al.* 2008; Treves & Naughton-Treves 2005). Social science data about values (i.e., enduring beliefs) is beneficial for resolving disagreements over conservation policy choices because values often influence the acceptability of policy and the likelihood that stakeholders will abide by conservation rules (Treves & Martin 2011). Understandably, many conservation social scientists have explored stakeholder values and value orientations (i.e., aggregated sets of beliefs) (e.g., Bruskotter & Fulton 2008) in a variety of conservation contexts.

Knowing what values stakeholders hold, however, is different than understanding how stakeholders justify

holding such values. Ethics can be used to identify and understand stakeholders' justifications. Ethical considerations are increasingly accepted as important dimensions of conservation practice. The utility of considering ethics in conservation decision making can be bolstered when ethics are empirically modeled (Haider & Jax 2007; Nichols 2011). The relatively nascent subdiscipline of empirical ethics (sometimes called experimental philosophy) integrates traditional social science methods with ethical issues to determine the psychological origins of policy choices and explore new or alternative solutions (Nichols 2011).

Herein, we apply an empirical conservation ethics approach to a policy choice of global relevance: the genetic rescue of an inbred and spatially isolated wildlife population. Our goals are to (1) distinguish between what people think about conservation policy choices and which ethical principles people invoke when justifying their

choice; and (2) enhance the ability of conservation scholars and practitioners to empirically apply ethics.

## Background

### Genetic rescue and wolves

Isle Royale National Park (544 km<sup>2</sup>), Michigan, USA, is a federally designated island wilderness area located in Lake Superior, North America. The island is managed under the legal jurisdiction of the United States National Park Service. Wolves (*Canis lupus*) first colonized Isle Royale in the late 1940s by crossing an ice bridge. Rääkkönen *et al.* (2009) showed that inbreeding depression, manifest as congenital bone deformities in the vertebral column, is present in Isle Royale wolves. The authors discussed the appropriateness of mitigating inbreeding depression with genetic rescue, a conservation policy choice relevant to other species, such as the Florida panther (*Puma concolor coryi*) or Indian rhinoceros (*Rhinoceros unicornis*). Rääkkönen *et al.* (2009) proposed a decision about genetic rescue could involve at least four values: (1) a wilderness value whose virtue is noninterference; (2) the value of healthy populations and ecosystems; (3) the value of gaining more scientific knowledge about genetic rescue; and (4) an animal welfare value of possibly reducing the chance that future Isle Royale wolves experience pain associated with the observed bone deformities. As a means of sharing results from Rääkkönen *et al.* (2009), from February to May 2009, the Isle Royale Wolf-Moose Project established a free online public discussion board alongside the article. The discussion board provided an opportunity for web viewers to read the article and share their opinions about the question: "Do Isle Royale wolves need genetic rescuing?"

### Conservation ethics

Our empirical analysis of justifications related to conservation policy choices such as genetic rescue was motivated by three questions. First, *do people justify a policy choice with reference to a particular ethical paradigm and if so, is support for or opposition to policy associated with any particular paradigm?* Western ethics is characterized by several paradigms, some with histories tracing back over two millennia. These ethical paradigms include Consequentialism, Divine Command, Human Authority, Motive, and Natural Law (Table 1; see also DesJardins 2006). Each paradigm represents a different approach to justifying what constitutes a right and wrong conservation policy choice. Ethical paradigms provide ways of thinking about ethics in much the same way that thinking about

ecological communities as being constructed from assembly rules (e.g., Cody & Diamond 1975) or as the result of random processes (e.g., Hubbell 1997) represent fundamentally different views on ecological communities. Ethical paradigms can offer a conceptual framework for empirically measuring the origins of justifications for conservation policy choices such as support or opposition to genetic rescue. The aforementioned paradigms represent a related set of justifications for human responsibilities to the natural world and may be thought of as conceptual kin to value orientations. The relationship between behaviors, attitudes, beliefs, value orientations, and values about specific conservation policy choices is well studied (e.g., Vaske & Donnelly 1999). Less is known about the relationship between the ethical paradigm an individual invokes and his or her attitudes about specific conservation policy choices. Exploring this latter relationship may deepen conservation practitioners' understanding about how ethics underlay conservation policy choices, such as genetic rescue, lead to more robust decision-making processes and outcomes, and advance understanding about how ethics can help conservation practitioners in agencies and nongovernmental organizations explain or predict human behavior.

Second, *do people justify a conservation policy choice such as genetic rescue with reference to concern for ecological collectives or individual animals (Table 1)?* Ethicists and others have developed reasons to think nonhuman animals and ecological collectives are intrinsically valuable (i.e., have value for their own sake) and have legal standing (e.g., Stone 1972). Crafting effective conservation policy in the face of conflicting values often poses a challenge for conservation scholars and on-the-ground practitioners (Vucetich & Nelson 2007). For example, when conservation policy alternatives involve killing individuals of an invasive species to promote ecosystem health, social conflict between individualists and collectivists may ensue and inhibit effective conservation. Social scientists have previously lacked an adequate understanding of how to best provide tools with which conservation practitioners can ethically assess and respond to how people cope with decisions related to a particular conservation dilemma (Bedau 1991; White 2008).

Third, *do people justify a conservation policy choice such as genetic rescue by referencing the idea that humans and nature are separate or that humans and nature are linked?* Although this question is known to be important to and is well studied by ethicists (e.g., Infield 2001), the connection between a stakeholder's view of the human-nature relationship and beliefs about specific policy positions is not well understood. One dimension of the human-nature relationship is attribution of responsibility or stewardship (e.g., who has to deal with or has control over addressing

**Table 1** Operational definitions of five Western ethical paradigms (see Desjardins 2006), two objects of moral relevance, and three ascriptions of responsibility applied in a content analysis of the discussion board question about genetically rescuing the inbred wolves of Isle Royale

Concept	Operational definition	Examples from discussion board
<i>Ethical paradigm: A foundation or justification for why people think some course of action is right or wrong, good or bad.</i> <i>Consequentialism</i>	Focused on the results of mitigating or not mitigating and how effects contribute to conservation knowledge.	<ul style="list-style-type: none"> <li>• "Allowing the wolves to die out will cause disruptions throughout the ecosystem, not just in the effects on moose populations, but all of the other flora and fauna."</li> <li>• "Since the wolves live in a very small area, inbreeding is a result and genetic variation is a good solution to the problem."</li> <li>• "I do not believe it is 'playing God' to keep a species from going extinct. God gave us certain abilities to prevent things."</li> <li>• "Mans ability to alter environments and/or the genetic makeup of a pack of wolves does not give them the right to do it."</li> </ul>
<i>Divine command</i>	Focused on adhering to a preordained set of commandments or guidelines, possibly from an organized religion.	<ul style="list-style-type: none"> <li>• "It would be a real tragedy to stand by and do nothing and let all these animals die."</li> <li>• "It is man's responsibility to intervene and help the wolves survive... I recently attended a lecture given by L. David Mech..."</li> </ul>
<i>Motive</i>	Focused on deontology, duty, or obligations to act apart from the consequence of action. Rights and virtue are two components of this paradigm.	<ul style="list-style-type: none"> <li>• "Isle Royale is a very special place... it is perfect to observe nature the way it is supposed to be without the interference of man."</li> <li>• "Keep mans impact at a minimum and let the cards be played as nature has dealt."</li> </ul>
<i>Human authority</i>	Focused on the authority of humans, including peers (e.g., family, media, government, scientist), past precedence (e.g., events of the past), or self (e.g., the post exudes its own authority because of experience or expertise).	<ul style="list-style-type: none"> <li>• "If intervention alleviates the suffering of the individual wolves... than I am in support of intervention in this matter."</li> <li>• "All three individuals of the founder population carried the genetic disorders."</li> <li>• "Possibly there is a higher rate of death in the deformed population."</li> </ul>
<i>Natural law</i>	Focused on the assumption that we ought to follow the dictates or guides of nature, that naturalness equals goodness.	<ul style="list-style-type: none"> <li>• "Had wolf populations not been decimated by man for the last few hundred years..."</li> <li>• "...my staff at the Wildlife Center should be able to help..."</li> <li>• "...genetic rescue should be considered by the scientists that research and use data from... Isle Royale."</li> <li>• "...let nature take its course."</li> </ul>
<i>Moral relevance: The focus of ethical significance.</i> <i>Individual</i>	Object of moral relevance is a single individual (e.g., a wolf). Indicators can represent appeals to physical or emotional needs of individual animals within a population in the past, present, or future.	
<i>Collective</i>	The object of moral relevance is a population (e.g., wolf population). Indicators can represent appeals to habitat requirements, genetic diversity, or opportunity to mate in the past, present, or future.	
<i>Ascription of responsibility: Who is or who should be responsible for managing the current conservation situation.</i> <i>Ingroup</i> <i>Outgroup</i>	An independent individual or member of a group is responsible. Other humans, such as agencies, are responsible.	
<i>Nature</i>	Nature, such as wilderness, wolves, or evolution, is responsible.	

the issue, provide resources for management) (Pojman 1994; Treves & Martin 2011). The essence of our question focused on exploring whether an association between an individuals' policy choice and ascription of responsibility could be credited to the ingroup (e.g., personal responsibility), outgroup (e.g., agency responsibility), nature (Berghoefer *et al.* 2010), or some combination of the three (Table 1).

## Methods

### Units of analysis

Although the questions that motivated our research focused on *people*, the unit of analysis for this study was a discussion board *post*, or a discrete web entry made by any person identified by a unique username. We do not intend to suggest that a post is a wholly legitimate substitute for a person but rather the post as a unit of analysis for research was the most appropriate unit of analysis with which to achieve study objectives in this case. This is because (1) usernames were the only unique and constant identifying information across all posts; (2) we were not able to ensure that the same individual wrote multiple posts with the same username; and (3) usernames were the only publicly available information on the discussion board and we did not have Institutional Review Board approval to seek private information such as Internet Protocol addresses from web viewers. By using posts, we could avoid the potential for sampling or coverage error and minimize threats to the study's validity and reliability (Fielding *et al.* 2008) (see Supplementary Material for more information on units of analysis and validity). Self-selected users were able to post as many times as desired between February and May 2009.

### Data collection

We used content analysis on discussion board posts to address our research questions. Content analysis involves the systematic investigation of text for the purpose of identifying patterns (Wimmer & Dominick 2003). We read posts and developed a set of five coding categories based on our three guiding research questions for topics discussed in posts. Each category included a range of questions with either categorical or ordinal response options.

- (1) *Post information.* We recorded post characteristics such as length, original comment, or reply.
- (2) *Ethical paradigm.* We characterized the presence of each of the five ethical paradigms in each post (Table 1).

- (3) *Conservation policy choice.* We categorized reference to support for or opposition to genetic rescue.
- (4) *Moral relevancy.* We categorized references to the object of ethical significance within each post as an individual animal, a collective (Table 1), neither, or both.
- (5) *Human-nature relationship.* We categorized references to responsibility for implementing conservation policy choices about inbreeding depression within each post as ingroup (e.g., self), outgroup (e.g., agencies), or nature (e.g., wilderness) (Table 1).

Two coders were trained according to content analysis methods outlined in Wimmer & Dominick (2003) and supplied with the protocol and codebook (see Supplementary Material for content analysis protocol, coding scheme, codebook, analytical approach, and additional references about content analysis).

### Data analysis

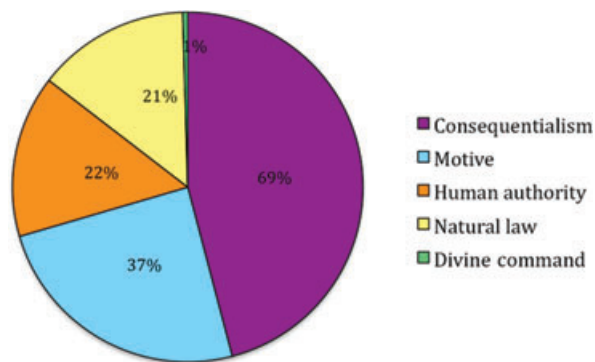
Cohen's kappa ( $K$ ) is commonly used in content analysis as a measure of intercoder agreement. We considered  $K \geq 0.6$  to be sufficient (Cohen 1960). The lead author served as the tiebreaker when  $K < 0.6$  (Wimmer & Dominick 2003) (see Supplementary Material). Presence/absence variables were considered ordinal variables for analysis; thus we tested associations between variables using Kendall's tau-b ( $T$ ) (Sheskin 2007) using PASW-Statistics 18 software (SPSS Inc. 2010).

## Results

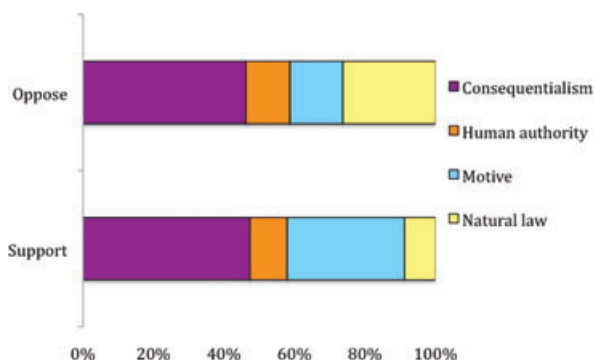
We examined 147 discussion board posts associated with 102 different usernames. Three-quarters of posts ( $n = 111$ ) were original comments and the remainder (25%,  $n = 36$ ) replies. The majority of usernames were associated with a single discussion board post (59% of discussion board posts,  $n = 86$ ). Posts ranged from 6 to 553 words; mean length was 107 words. Forty-three percent of posts ( $n = 63$ ) did not reveal a policy choice regarding genetic rescue. One quarter ( $n = 37$ ) of all posts endorsed genetic rescue; 32% ( $n = 47$ ) did not.

### Ethical paradigms invoked by posts

The majority of posts invoked consequentialism although all five paradigms were detected (Figure 1). Four of the five ethical paradigms were used to justify conservation policy choices about genetic rescue; divine command was not used to justify policy even though it appeared in one discussion board post (Figure 2). Two-fifths (40%,  $n = 58$ ) of posts invoked two ethical paradigms to justify a



**Figure 1** Proportion of posts invoking one of five ethical paradigms in justifying a position genetically rescuing the inbred wolves of Isle Royale.

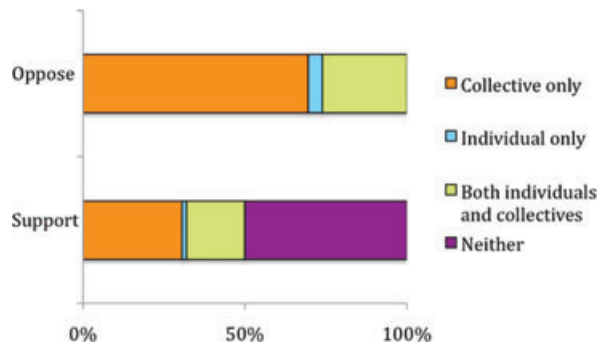


**Figure 2** Proportion of ethical paradigms invoked in discussion board posts ( $n = 147$ ) in support of (25%,  $n = 37$ ) or opposition to (32%,  $n = 47$ ) genetically rescuing the inbred wolves of Isle Royale. Four of five ethical paradigms were detected.

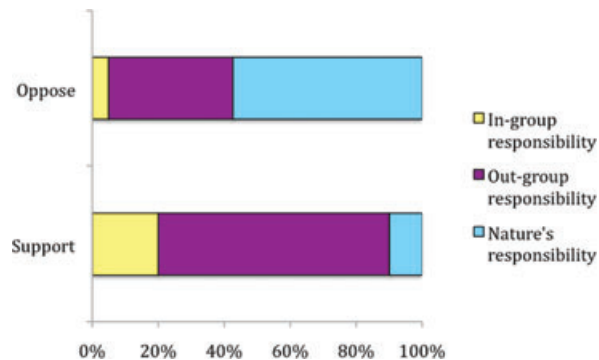
choice, 12% ( $n = 17$ ) invoked three, and 13% ( $n = 19$ ) did not invoke a paradigm at all. Two ethical paradigms, consequentialism and natural law, were invoked as a justification for both support of and opposition to genetic rescue. Seventy-three percent ( $n = 27$ ) of posts supporting genetic rescue invoked a consequentialist paradigm whereas 79% ( $n = 37$ ) of posts opposing genetic rescue invoked consequentialism ( $T = 0.155, p < 0.05$ ). Fourteen percent ( $n = 5$ ) of posts supporting genetic rescue invoked the natural law paradigm and 45% ( $n = 21$ ) of posts opposing genetic rescue invoked the same paradigm ( $T = 0.140, p < 0.05$ ) (Figure 2).

**Object of moral relevance invoked by posts**

A plurality of discussion board posts referenced collectives as the objects of moral relevance for the conservation policy choice of genetic rescue, although all categories were detected (Figure 3). Sixty percent of posts ( $n = 89$ ) referenced the collective, one-third referenced



**Figure 3** Proportion of moral relevancy categories invoked in discussion board posts ( $n = 147$ ) in support of (25%,  $n = 37$ ) or opposition to (32%,  $n = 47$ ) genetically rescuing the inbred wolves of Isle Royale.



**Figure 4** Proportion of responsibility categories invoked in discussion board posts ( $n = 147$ ) in support of (25%,  $n = 37$ ) or opposition to (32%,  $n = 47$ ) genetically rescuing the inbred wolves of Isle Royale.

both (31%,  $n = 45$ ), few (4%,  $n = 6$ ) referenced concern for the needs of only individuals, and 5% ( $n = 7$ ) referenced neither. We did not detect an association between posts' position on genetic rescue and object of moral relevance (Figure 3).

**Human-nature relationship invoked in posts**

More posts ascribed responsibility for resolving the conservation dilemma of inbreeding depression to the out-group over nature or the ingroup. Fourteen percent ( $n = 21$ ) ascribed responsibility to the ingroup, 51% ( $n = 75$ ) ascribed responsibility to the outgroup, and 31% of posts ( $n = 45$ ) ascribed responsibility for the solution to nature. Outgroup and nature were associated conservation policy choices (Figure 4). Eleven percent ( $n = 4$ ) of posts supporting genetic rescue referenced the responsibility of nature whereas 73% ( $n = 35$ ) of posts opposing genetic rescue referenced this responsibility ( $T = 0.156, p < 0.05$ ). Seventy-seven percent ( $n = 28$ ) of posts supporting genetic rescue referenced out-group responsibility whereas

48% ( $n = 23$ ) of posts opposing genetic rescue referenced the outgroup ( $T = 0.278$ ,  $p < 0.05$ ); among posts referencing the ingroup, supporters and opponents did not differ.

## Discussion

Developing scientifically robust and widely acceptable policy is likely to remain a high priority for conservation decision makers as they are confronted with increasingly diverse conservation challenges in the face of limited financial, institutional, and social capital resources. Empirical ethics, though recognized as being relevant to conservation, continues to play an underrepresented role in conservation policy and policy-relevant research (Haider & Jax 2007). Conservation practitioners in NGOs and agencies may expect differing values among stakeholders, but commonalities in justifications uncovered through empirical conservation ethics may offer new routes by which practitioners can select and implement the most socially acceptable policy. As such, empirical conservation ethics warrants dedicated exploration by conservation scholars and practitioners. The extent to which conservation ethics are necessary and how to integrate this discipline into conservation for the potential benefit of more effective policy are of paramount concern. Here, we discuss our approach and implications for future research and policy (Table 2).

First, empirical conservation ethics may offer novel diagnostic tests for sources of stakeholder disagreement or concurrence. Haider & Jax (2007) noted resolving information deficits about ethical sources of stakeholder values is requisite for effective conservation policy. Our research offers a framework for isolating and measuring conservation ethics, demonstrating ethical concepts need not persist solely in the conceptual domain. Data indicated a strong tendency among posts toward collectivism, which is perhaps not surprising given that the discussion board asked about a population and conservation has historically focused on populations (e.g., Noss 1990; Beirne & South 2007). Theoretically, how an individual person conceptualizes the object of moral relevance (e.g., individual, collective) has implications for how he or she may assign rights such as legal entitlement, determine if rights have been harmed, and prioritize action on behalf of rights (Beirne & South 2007). Conflicts over rights, such as jobs versus the environment, may polarize stakeholder support for conservation policy that prioritizes individuals over collectives or vice versa. We know from the literature that the collectivist/individualist divide can be an important source of conflict among stakeholders (Vucetich & Nelson 2007), yet in our case study the con-

flict was not pronounced. Similar to the practical utility of wildlife value orientations, diagnosing the ethical origins of stakeholder values may help decision makers forecast patterns of attitudes on conservation policy choices (Fulton *et al.* 1996). New diagnostic tools may inform new approaches for implementing or evaluating conservation interventions (Nichols 2011) such as mechanisms to induce reflexivity among stakeholders.

Conservation ethics may offer opportunities to improve stakeholder engagement processes. For example, analysis of discussion board posts revealed a moral inclusivity that is both collectivist and individualist. Additional inquiry that characterizes the individual authors behind the morally inclusive posts (e.g., demographics, experience, expertise) could provide information to decision makers about how to more explicitly account for both the needs of collectives and individuals should the need arise. This information could help decision makers remedy tension between individualists and collectivists during participatory decision-making processes. Indeed, conservation policies that align with multiple values are more likely to receive broad public support (Treves & Martin 2011). Conservation ethics could also offer an approach for defining and identifying stakeholders for engagement or collaborative conservation processes in ways value or value orientation-based research cannot (Table 2).

Conservation ethics may inform more effective outreach and communication interventions designed to reinforce, restrain, or maintain stakeholder support for conservation policies such as genetic rescue. For example, discussion board posts revealed diversity in both ascriptions of responsibility and the association of those ascriptions with policy choices. Similar to our finding that a post's invoked ethical paradigm did not wholly forecast a policy choice about genetic rescue, characterizing a post's ascriptions of responsibility did not entirely foretell policy choice either. This finding is consistent with extant literature noting human-nature relationships take multiple forms contingent on local human needs (e.g., food, protection, reproduction) (Manfredo *et al.* 2009; Berghoefer *et al.* 2010). Typologies that aid in exploring human-nature relationships such as those herein or Schwartz (2004) may improve conservation outreach by helping to frame the content, format, and implementation of appropriate messages. Manfredo *et al.* (2009) noted the utility of understanding human-nature relationships for management and communication of, for example, migratory species or cross-cultural collaborations to combat global environmental problems. Conservation outreach and communication activities do not always explicitly incorporate people's beliefs and justifications for such beliefs regarding the human-nature relationship.

**Table 2** Insights associated with using empirical conservation ethics to inform conservation policy choices such as genetic rescue

Conservation policy insight	Contribution of empirical conservation ethics
<i>Diagnosing disagreement and/or common ground</i>	<ul style="list-style-type: none"> <li>● Aid identification of context-specific factors influencing potential for consensus, collaboration, or conflict, either a priori or a posteriori.</li> <li>● Signal different priorities and incentives among stakeholders to participate in conservation efforts.</li> <li>● Serve as a mechanism to induce reflexivity among stakeholders.</li> <li>● Serve as a mechanism to facilitate weighing different conservation values.</li> </ul>
<i>Outreach and communication</i>	<ul style="list-style-type: none"> <li>● Provide explanatory variable(s) for how groups beyond conservation advocates or decision makers think about conservation policy choices and facilitate more deliberate content, format, and implementation of interventions.</li> <li>● Provide response variable(s) for how groups beyond conservation advocates and decision makers can have needs and perceptions attended to with different outreach and communication activities.</li> <li>● Provide response variable(s) for how groups beyond conservation advocates and decision makers will have conservation behaviors reinforced, restrained, or maintained by interventions.</li> <li>● Structure interventions to attend to full range of ethical dimensions at play in a policy debate.</li> </ul>
<i>Stakeholder engagement</i>	<ul style="list-style-type: none"> <li>● Aid understanding about who has a voice in conservation decision making, who gains and loses from conservation interventions, and how groups function in support of or opposition to conservation activities.</li> <li>● Serve as an approach for defining stakeholders for stakeholder engagement or collaborative conservation processes.</li> </ul>
<i>Monitoring and evaluation</i>	<ul style="list-style-type: none"> <li>● Avoid omitting stakes and stakeholders from conservation activities that can lead to misassessment of intervention success.</li> <li>● Provide policy evaluation metrics or indicators of success concerning the extent to which conservation policy affects or addresses various ethical paradigms invoked by diverse stakeholders.</li> <li>● Aid understanding about acceptability or social viability of interventions a priori.</li> </ul>
<i>Compliance</i>	<ul style="list-style-type: none"> <li>● Provide explanatory variable(s) for why groups beyond conservation advocates and decision makers comply or do not comply with conservation policy.</li> <li>● Provide response variable(s) for how groups beyond conservation advocates and decision makers have had their motivations to comply with conservation policy affected by interventions.</li> </ul>

This lack of attention can lead to unintended, negative, or unsustainable conservation outcomes (Berghoefer *et al.* 2010). Additional policy-relevant insights from this research include the extent to which conservation ethics can inform conservation monitoring and evaluation efforts as well as compliance with conservation rules (Table 2).

Empirical conservation ethics portends promise for building the capacity of conservation decision makers to resolve stakeholder disagreement about conservation policy choices by considering the origin of values. Herein, we use the case of genetically rescuing an inbred population of wolves as a policy exemplar, but policy-relevant conservation ethics research could also benefit issues such as assisted migration under climate change (e.g., McLachlan *et al.* 2007), the conservation value of non-native species (e.g., Schlepfer *et al.* 2011), or protected area downgrading, downsizing, and degazettement (e.g., Mascia & Pailler 2010). With further validation and testing to overcome study limitations precluding broad generalizability of results (e.g., uncontrolled unit of analysis, nonrandom sample, sample size, internet-based), empirical conservation ethics studies such as ours may help position the conservation community to better resolve and diffuse key human dimensions of conservation problems.

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## Supporting Information

The following supplementary material is available for this article:

**Appendix 1:** Content analysis protocol and codebook. The material is available as part of the online article.

Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.

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