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## Evaluating the principles of wildlife conservation: a case study of wolf (*Canis lupus*) hunting in Michigan, United States

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Details surrounding any particular instance of predator control are varied. Addressing the appropriateness of predator control requires attention to those details. Here, we focus on the case of wolf (*Canis lupus*) hunting in Michigan. In Michigan, wolves were removed from the list of United States endangered species in December 2011. By June 2013, plans had been finalized to begin hunting wolves in fall 2013. According to these plans, a purpose of the hunt was to reduce wolf abundance in particular regions of Michigan to reduce threats to livestock and human safety. Here, we evaluate those plans using 2 basic tenets of wildlife management. The 1st tenet is the North American Model of Wildlife Conservation, which is held in high regard by many hunting organizations, wildlife professionals, and state agencies. A central component of the North American Model of Wildlife Conservation is a set of 7 principles representing ideas such as that wildlife is held in the public trust, management should be based on principles of democracy and best-available science, and wildlife should only be killed for a legitimate purpose. The 2nd tenet pertains to the ability to answer 3 fundamental questions: What is the purpose or goal of a management action? How will the management action meet the purpose or goal of the actions? Why are the purpose and goals appropriate? Plans for hunting wolves in Michigan appear not to meet the principles of either tenet. This conclusion suggests that either wolf hunting as it has been planned in Michigan is inappropriate or both sets of standards for evaluating wildlife management are inappropriate. Better understanding of issues like this will require reflecting on the fundamental nature of wildlife management and its guiding principles.

Key words: *Canis lupus*, ethics, human dimensions, hunting, North American Model of Wildlife Conservation, referendum

Predator control entails killing predators for the purpose of reducing their perceived negative impacts and is a common practice throughout the world (Reynolds and Tapper 1996; Berger 2006). Examples include killing seals (*Pagophilus groenlandicus*) in the North Atlantic to protect commercial fisheries, killing cormorants (*Phalacrocorax auritus*) to protect sport fisheries, killing coyotes (*Canis latrans*) to control livestock losses, and killing wolves in Alaska in the interest of subsistence hunting of moose (*Alces alces*). While some believe predator control is a valuable tool, others believe it is too often ineffectual and largely antithetical to conservation (e.g., Stone et al., this issue; Wallach et al., this issue, both in this Special Feature).

The considerations that arise in addressing the appropriateness of predator control vary greatly with context, such as the

species, the extent of impacts, and the justifications provided for control. Because the considerations are so varied, it may be impossible to conclude that predator control is universally wrong or universally acceptable—that is, the appropriateness of predator control likely depends on the details of each case. We focus our assessment on a particular case study, that is, the hunting of wolves in Michigan for the purpose of reducing threats to human safety and livestock production.

In addressing this case study, we also provide a general method for evaluating the appropriateness of an action taken in the name of conservation. This general method involves detailed comparison and contrast of an action and its surrounding circumstances with the principles—in this case, the principles of conservation—that are expected to guide such actions.

The method is simple in principle but can be complicated in its application. Because of this method's dialectical nature, it has potential to create insight not only on the appropriateness of an action, but also on the appropriateness of the principles themselves by, for example, illuminating the kinds of actions the purported conservation principles would admit. This method may have broad value because predator control is not the only contested activity associated with conservation and because the principles of conservation itself are contested (Vucetich et al. 2015).

### BACKGROUND TO THE CASE STUDY

At the time of European settlement, wolves lived throughout Michigan. From 1838 and up until 1960, Michigan wolves were subject to a state-paid bounty. By 1960, wolves had been extirpated from Michigan's entire Lower Peninsula, with only a few surviving in the Upper Peninsula. In 1973, wolves began receiving protection from the United States Endangered Species Act. Between 1990 and 2013, the Michigan wolf population increased from about 20 wolves to approximately 650 wolves (15.2 wolves/1,000 km<sup>2</sup>). For details on the ecological history of Michigan wolves, see Beyer et al. (2009).

In recent years, the legal status of Michigan's wolves has been a complicated series of actions by the United States Fish and Wildlife Service, federal courts, and the state government of Michigan (Appendix I). In December 2011, wolves in Michigan, Wisconsin, and Minnesota were removed from the United States list of endangered species. Litigation in federal court aiming to relist these wolves was pending throughout the period of time during which wolf hunting was planned and implemented. By May 2013, the Michigan government had finalized plans for a public hunting season on wolves that would begin in November 2013. For details on the legal history of these wolves, see United States Fish and Wildlife Service (2013).

Wolf-related litigation has been steeped in legal technicalities and politically strategic actions on behalf of various nongovernmental organization and Native American tribal interests. However, much of the impetus for litigation continues to be society's inability to understand what it means for a species to be considered "endangered" (Vucetich et al. 2006). In particular, litigation is fueled by an inability to satisfyingly answer the question, how much of its former range does a species need to securely occupy to be considered recovered (Vucetich et al. 2006; Bruskotter and Enzler 2009; Vucetich and Nelson 2013)? A 2nd critical impetus for litigation has been concern that, without protection from the United States Endangered Species Act, wolves would be hunted or trapped in a manner that is unjust (at least from the perspective of the litigants).

Hunting and trapping are collectively referred to by wildlife managers as "harvesting." Because that term "harvest" is taken by many readers as inappropriately euphemistic, we use "hunt" in an operational sense to refer collectively to hunting or trapping, though we acknowledge other readers who see shortcomings in lumping those activities together. While

hunting and trapping are traditional recreational activities, the proportion of the public participating has been on the decline for decades (Decker and Batcheller 1993; Pergams and Zaradic 2008). Advocates of hunting and trapping are understandably concerned about the future role of those activities in American culture and conservation. One reaction to this concern is a recent rise in appreciation for the North American Model of Wildlife Conservation (hereafter, The Model), which is held in high regard and even used to guide the justification of wildlife policy by many hunting organizations, wildlife professionals, and state agencies in the United States. The Model is also advocated by The Wildlife Society, a professional society describing itself as an "international organization committed to addressing national and international issues that affect the current and future status of wildlife in North America and throughout the world" (Wildlife Society 2014). The Model is portrayed sometimes as a historical narrative and sometimes as an environmental philosophy that ascribes to hunting and trapping a powerful, positive role in conservation (Nelson et al. 2011). A central component of The Model is a set of 7 principles. Those principles have been worded variously, but a representative expression is offered in a technical paper published by The Wildlife Society (Organ et al. 2012):

1. Wildlife resources are a public trust
2. Markets for game are eliminated
3. Allocation of wildlife is by law (and principles of democracy)
4. Wildlife can be killed only for a legitimate purpose
5. Wildlife is considered an international resource
6. Science is the proper tool to discharge wildlife policy
7. Democracy of hunting is standard

For the purposes of this essay, principles 1, 3, 4, and 6 are most relevant. Each principle is succinctly communicated by those short phrases, except principle 3, which requires some elaboration. To understand principle 3, consider alternative expressions of that same principle. Two such expressions are "Democratic Rule of Law" and "Principles of Democracy" (Western Association of Fish and Wildlife Agencies 2009; Rocky Mountain Elk Foundation 2013). The Western Association of Fish and Wildlife Agencies elaborates further by saying, "Hunting and Angling laws are created through public process" (Western Association of Fish and Wildlife Agencies 2009). Principles of democracy are clearly a central element of principle 3. Principle 4 is sometimes expressed as a prohibition on the "frivolous use" of wildlife (Rocky Mountain Elk Foundation 2013; Boone and Crockett Club 2014).

In addition to The Model, the quality of any particular wildlife management plan or action could also be evaluated, at least in part, by its ability to answer 3 questions: What is the purpose or goal of a management action or plan? How will the management actions meet the purpose or goal of the actions and how will success or failure in meeting the purpose and goal be judged? Why are the purpose and goals appropriate, and why are the actions an appropriate means of achieving those goals and purposes? The first 2 questions represent the most basic

principles for any kind of management (Daft and Marcic 2012). The 3rd question is important so long as a goal or purpose could conceivably be inappropriate or unjustified (Sen 2009).

Here, we use that set of questions—What? How? Why?—and the 7 principles of The Model to evaluate the recent efforts to establish a public hunt of wolves in Michigan. This kind of evaluation is no less than an evaluation of the fundamental nature of wildlife management.

### CHRONOLOGY OF POLITICAL EVENTS

Evaluating the Michigan wolf hunt requires reviewing some of the political activities in Michigan that led to wolf hunting. Those political activities included legislative actions that were subsequently repealed by voters, many of whom had strong feelings about killing wolves. We review the details of these events next.

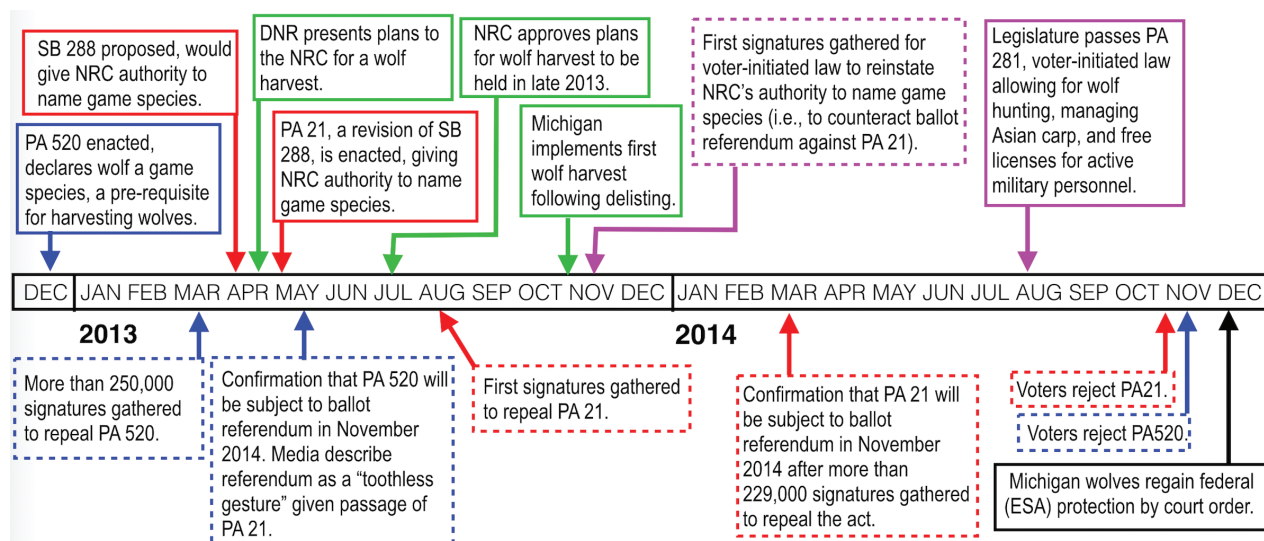
Until recently, the Michigan legislature had the exclusive authority to determine which species are “game,” a special status reserved for animals that can be “taken” via public hunt. Public Act (PA) 520 is a Michigan law that names the wolf as a game species. PA 520 is a legal prerequisite for establishing a wolf hunt and became law in December 2012. Shortly after being enacted, a petition was initiated to subject PA 520 to a ballot referendum (Fig. 1), a process whereby voters can repeal an act of the legislature. When the petition was submitted for validation to the Michigan Board of State Canvassers in March 2013, the media reported that 250,000 signatures had been collected, more than twice the number necessary to hold a referendum (Martin 2013).

During the 2-month period while those petition signatures were being validated, Senate Bill (SB) 288 was introduced to

the Michigan Senate. That bill extends to the Natural Resource Commission, a 7-member panel appointed by the Governor, what had previously been the legislature’s exclusive authority to add species to the list of game species. According to Michigan’s constitution, bills with appropriations cannot be subjected to a ballot referendum. That detail is relevant because SB 288 was introduced with an unrequested million dollar appropriation to the Michigan Department of Natural Resources (hereafter Department of Natural Resources) for “research, education, and outreach related to hunting, fishing, game animals, predators, and prey.” Inclusion of the appropriations would block the possibility that SB 288 could be subject to a ballot referendum (should that bill become law).

After the appropriation had been dropped from the bill, the Governor signed the bill into law (PA 21) on 8 May 2013. Fourteen days later, the Board of State Canvassers confirmed that 250,000 signatures had been gathered and that SB 288 would be on the ballot in November 2014. The media reported that the referendum would be a “toothless gesture” given the recent passage of PA 21 (Associated Press 2013), which provides an alternative legal pathway to wolf hunting, even in the event that SB 288 is repealed by a vote of the citizens.

Public Act 21 was defended by several elected officials, including the governor, on grounds that it was consistent with the spirit of Proposal G, a law enacted in 1996 which requires the Natural Resource Commission “to the greatest extent practicable, to use principles of sound scientific management in making decisions regarding the taking of game” (Michigan Representative Dianda 2013; Office of the Governor of Michigan 2013). Several elected officials, including the governor, also stated that PA 21 was necessary to ensure scientifically sound management of wolves and that this consideration



**Fig. 1.**—Timeline of key political events pertaining to the management of Michigan wolves. The details of each event are given in “Chronology of Political Events.” Events above the timeline disfavor wolves and events below the timeline favor wolves. Dashed boxes indicate actions initiated by citizens. Solid boxes indicate actions initiated by the government. Key actors in the timeline are the Michigan Natural Resource Commission (NRC), Michigan Department of Natural Resources (DNR), and the United States Endangered Species Act (ESA). The online version of this figure includes color to indicate which events were associated with the executive branch (green), the courts (black), and each of the particular laws—Public Act (PA) 520 (blue), Senate Bill (SB) 288 and PA 21 (red), and PA 281 (magenta).

was more important and appropriate than the democratic process associated with the referendum ([Office of the Governor of Michigan 2013](#)).

A 2nd petition drive was initiated, during summer 2013, to hold a ballot referendum on PA 21. To appear on the ballot in November 2014, that petition drive was required to produce 161,305 signatures. After submitting more than 229,000 signatures, the Michigan Board of State Canvassers announced in May 2014, that PA 21 would appear on the ballot in November 2014.

Michigan held its 1st (and to date, only) wolf hunt in November and December of 2013. The quota was 43 wolves, representing 7% of the 636 wolves estimated to be in the population in April 2013. The quota was not met during the 6-week hunt. In total, 23 wolves were killed by hunters. The controversy associated with this hunt seems to be about the principles behind the idea of hunting wolves, not the scale of the hunt.

As Michigan held its 1st wolf hunt, a 3rd petition was started in November 2013 to create a voter-initiated law, a process whereby voters can propose a law and then vote on whether that proposal becomes law. The proposed law would reinstate the Natural Resource Commission's ability to designate game species and thereby render the referendum against PA 21 as moot ([Oosting 2013a](#)). The petition also contained a one-million-dollar appropriation to manage Asian carp and a provision that would allow active military personnel to obtain hunting and fishing licenses for free. In May 2014, the Michigan Board of State Canvassers confirmed that more than the requisite number of signatures (258,000) had been gathered. In August 2014, the Michigan Legislature passed that proposed law as PA 281, which had been given the name, "Scientific Fish and Wildlife Conservation Act." PA 281 is immune from ballot referendum because it contains an appropriation and it took effect in March 2015.

In September 2014, the government of Michigan confirmed its decision to not plan for a wolf hunt in 2014—citing lack of authority to do so while the results of the 2 ballot referenda were undecided ([Karoub 2014](#)).

In November 2014, Michigan voters rejected PA 520 (Proposal 1), by a margin of 55% to 45% and rejected PA 21 (Proposal 2), by a margin of 64% to 36%. While rejection of PA 520 and PA 21 prohibit wolf hunting and trapping, those rejections may, in the future, be superseded by the 2014 law, PA 281 ([Fig. 1](#)).

### SCIENCE AND DEMOCRACY

In this section, and the next 2 sections, we juxtapose the political history described in "Chronology of Political Events" with the principles of The Model. The Model indicates that good wildlife management depends on both democracy (principle 3) and science (principle 6). The science of wildlife management is the primary basis for answering questions about how management goals could be, in a technical sense, accomplished. Wildlife professionals also have a responsibility to provide the reasoning behind management practices, explaining to

citizens "why" the purpose or goal of any particular management is appropriate, as well as "why" the means for achieving any goal or purpose are appropriate. Nevertheless, citizens working through fundamental principles of democracy have ultimate responsibility for judging what laws and policies are good or bad for a society, and holding their elected officials accountable.

In other words, science informs us about the range of management actions that are technically possible, but science cannot say what is wrong or right, good or bad, or whether we ought to do something. Judgments about good and bad are not and never have been the purview of science. In a free society, exercising principles of democracy is the best chance for understanding the collective good.

With respect to hunting wolves, science clearly indicates that we have the technical ability to manage a wolf hunt without endangering population viability (but see [Treves et al., this issue](#), this Special Feature). But there is no science, by itself, that can conclude it is *necessary* or even appropriate to hunt wolves in Michigan. As such, democratic principles have a proper and significant role in determining whether we should allow wolf hunting and why.

Those principles seem uncomfortably juxtaposed to circumstances in Michigan. Government officials supported wolf hunting while citizens opposed wolf hunting. Officials vigorously cited science as the justification for wolf hunting ([Dianda 2013](#); [Michigan Department of Natural Resources 2013a](#); [Michigan Natural Resources Commission 2013](#); [Office of the Governor of Michigan 2013](#); [Pepin 2013a](#)). By advancing a wolf hunt while democratic processes opposed to wolf hunting were still in play, these officials seem to implicitly acknowledge that democratic principles were less important in this particular case than officials' portrayal of the science (which we evaluate below). Advocates of wolf hunting, including senior personnel from the Department of Natural Resources, also cited The Model as justification for wolf hunting ([Mason et al. 2013](#); [Pepin 2013b](#)).

### PUBLIC TRUST

The Model indicates that wildlife is held in the public trust (principle 1), meaning that all citizens, hunters, and nonhunters alike are beneficiaries to the State's management of wildlife (where wildlife is, in this case, the trust—[Bruskotter et al. 2011](#)). Yet citizens are often unaware, uninterested, or unable to exercise their role as engaged citizen-beneficiaries and often through no fault of their own ([Horner 2000](#); [Redmond 2009](#)). Disengaged citizens can be a frustrating obstacle to healthy democracy and this case in Michigan would be disappointing if it were the result of disengaged citizenry. However, a broad segment of citizens sought to exercise their role through the referendum process—a circumstance that accentuates disappointment in the governance of this case.

This rightful interest to engage in the management of wildlife is also consistent with past experience. For example, Michigan voters overwhelmingly rejected a law in 2006 that allowed for

sport hunting of mourning doves (*Zenaida macroura*). Voters rejected the measure in all 83 counties, including all rural counties where participation in hunting is greatest (Michigan Department of State 2016). Michigan citizens cast more votes against the shooting of mourning doves than for any candidate for office in that election (Michigan Department of State 2016).

Undue influence by special interests can also be an obstacle to the proper handling of public trusts. In this context, non-governmental organizations, especially the Humane Society of the United States, provided leadership in the effort to reject PA 520 and PA 21 in the ballot referendum (Fig. 1). That leadership led some supporters of wolf hunting to express concern that “special interests” were distorting the democratic process (YoungeDyke 2014; see also Lute and Gore 2014). Given the number of people in opposition to wolf hunting, it may be a distortion to portray that leadership as serving a special interest. It may be more appropriate to describe that leadership as enabling citizens to express their will.

Wildlife professionals sometimes disparage wildlife management by referenda (Mech 1996) on grounds that the public is not adequately qualified to make technical decisions associated with wildlife management. However, judging whether it would be good or right to allow wolf hunting is, for the most part, a value judgment, not a scientific judgment. The referendum process can be a kind of antidote to cases where wildlife professionals fail to provide adequate leadership on value judgments, that is, fail to provide a satisfying answer to the question, “Why is the purpose or goal of a particular management plan appropriate?” The increased use of ballot referenda and initiatives may be more likely with increasing disparity between public policy and public opinion (Minnis 1998).

So long as wildlife is a public trust and so long as the non-hunting community is interested in exercising their rights and responsibilities as citizens, there will be some burden for the hunting community to offer good reasons for why various kinds of hunting are appropriate. The hunting community might fear nonapproval from nonhunters (Nie 2004). However, that fear is largely misplaced because research indicates that nonhunters generally support hunting, so long as adequate reason is provided (Duda and Jones 2008; Treves and Martin 2011).

The reasons provided for wolf hunting are also important in a broader context. Reason plays a vital role in maintaining the balance between justice and democracy. Inasmuch as democracy is merely voting (directly or indirectly through elected representatives), then democracy has dark and tyrannical forms that are manifest anytime most people want to do something inappropriate. An important assurance against unjust democracy is that the things upon which we vote are supported by good reasons (Sen 2009). In other words, a just democracy is inescapably a reasoned democracy. There is value in inspecting the quality of reasons that have been offered for why a purpose or goal is appropriate.

### REASONS FOR HUNTING WOLVES

The Model indicates that wildlife should not be killed for “frivolous use” (principle 4). More straightforwardly, one should

not kill a living creature without an adequate reason. That is, hunters have an obligation to provide good reasons for various kinds of hunting. That standard is critical for differentiating simple killing from the honorable tradition of hunting, a standard that is routinely imposed by hunters on themselves (Peterson 1997; Ortega y Gasset 2007).

In a 21-page memorandum sent to the Natural Resource Commission, the Department of Natural Resources recommended the purposes, plans, and regulations for a wolf hunt (Mason et al. 2013). Hereafter, we refer to this document as the Memorandum. The Memorandum was prepared at the request of the Natural Resource Commission to aid in executing their exclusive authority to determine regulations for hunting game species and was prepared while the petition for ballot referendum on PA 520 was being validated. Details of the Memorandum, described below, offer an opportunity to evaluate the reasons for wolf hunting in Michigan.

### PURPOSE, PLAN, AND HOPED-FOR OUTCOMES

The purpose, expressed in the Memorandum, for hunting wolves is to protect human safety and livestock. The plan specifies killing approximately 20% of the wolves living in each of 3 management units. The combined area of these wolf management units is about 12% of Michigan’s Upper Peninsula. (Wolf range was at that time limited to the Upper Peninsula.) The 3 wolf management units were identified and delineated on grounds that 1 (unit A) had been experiencing unacceptable threats to human safety and that 2 (units B and C) had been experiencing unacceptable losses of livestock.

One hope, stated in the Memorandum, is that the hunt would reduce wolf abundance in the wolf management units. Another hoped-for outcome, as stated in the Memorandum, is that hunting wolves would change the behavior of wolves in a way that would make them less of a threat to humans and livestock.

The proposed hunt had little or no chance of harming the health of Michigan’s wolf population. Moreover, proponents of this plan believed that it judiciously balanced the risk of hunting too lightly to achieve the objectives with the risk of hunting more intensively than is needed, with the understanding that the kill rate can be adjusted in subsequent years depending on the results of previous hunts. Proponents also apparently believed that the objective and scientific reasoning that supported the plan overrode the value of bending to democratic principles and the will of citizens who are less reasoned and informed about those circumstances. Those positive impressions of the plan seem to be overridden by the various considerations outlined below.

### CHARACTERIZING THE PROBLEMS

In the Memorandum, the idea that wolves are a threat to human safety in unit A is represented by the number of citizen complaints (93) about wolves received by the Department of Natural Resources since 2010. Recognizing and dealing with public perceptions about human safety is critically important.

However, the threat that some perceive—as represented by the number of citizen complaints—is liable to be a significant exaggeration of the assessed (or actual) risk that wolves pose to human safety. For example, science unequivocally indicates that threats to human safety by wolves are exceedingly rare (Linnell et al. 2002). The Memorandum also fails to evaluate the effectiveness of efforts to reduce complaints in unit A, where government officials had killed several wolves that had precipitated a number of these 93 complaints.

Treating the number of complaints about wolves as a basis for hunting wolves is troubling for another reason. In particular, it gives a very small minority of citizens undue influence over whether wolf hunting is allowed by their simply calling the Department of Natural Resources with complaints about wolves (Gore et al. 2006). That circumstance is antithetical to both sound science and democracy. That such a circumstance might be common in wildlife management is no reason to be tolerant of its occurrence.

Some wildlife professionals in the Department of Natural Resources believe complaints about wolves may be on the decline or will soon decline because people are becoming more comfortable with living near wolves and realizing that most wolf sightings do not constitute a threat (B. Roell, Michigan Department of Natural Resources, pers. comm.). That development would not only be desirable, it is also expected, given general principles from the academic field of risk perception. That body of research indicates that one's perception of risk tends to decline as one becomes increasingly familiar with the cause of the perceived risk (Slovic 1992; Sjoberg 2000). For example, research conducted in the context of carnivore conservation demonstrates that the news media portrays wolves more negatively in articles originating from areas where wolves are relatively new, compared to areas where wolves have long been established (Houston et al. 2010). Likewise, opposition to carnivores has been shown to increase for a time after their arrival, but then decreases as humans living near carnivores become more accustomed with their presence (Zimmermann et al. 2001).

Intolerance is a generic term representing any of a range of very different phenomena, such as negative attitudes about wolves, voicing displeasure about wolves in public discourse, and prohibitively high rates of human-caused wolf mortality (Bruskotter and Fulton 2012). If promoting tolerance is the objective of a hunt and if management is to be based on sound science (principle 6 of The Model), then there is a burden to specify what form of tolerance the planned hunt aims to promote and to demonstrate how science suggests such a hunt would meet that objective. These burdens exist for 2 reasons: first, so citizens know whether the objective is no more than promoting tolerance in the sense of placating a minority of citizens who have unconditional, unjustified hatred for wolves (see below), and second, because it is far from obvious that a hunt is a sensible way to promote other kinds of tolerance.

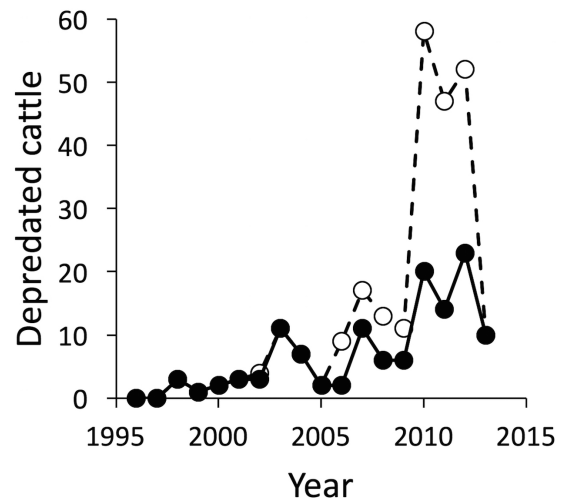
The Memorandum explains that wolves reportedly killed 80 livestock between 2010 and 2013 in unit B. But the memo did not explain how most of those losses occurred on a single farm or how poor livestock husbandry may have increased the risk

of depredations on that farm (Barnes 2013a). The Department of Natural Resources' knowledge of practices on that farm was revealed by a request through the Freedom of Information Act (Michigan Department of Natural Resources 2013b). Because those circumstances are relevant for judging whether a wolf hunt is justified, failure to discuss these circumstances in the Memorandum leads to a misleading justification for hunting wolves. Eventually, that livestock owner was convicted of violating animal welfare laws. The Memorandum also fails to indicate that the annual loss of cattle to wolves for all of Michigan between 2000 and 2010 was, on average, 11 cattle (Fig. 2).

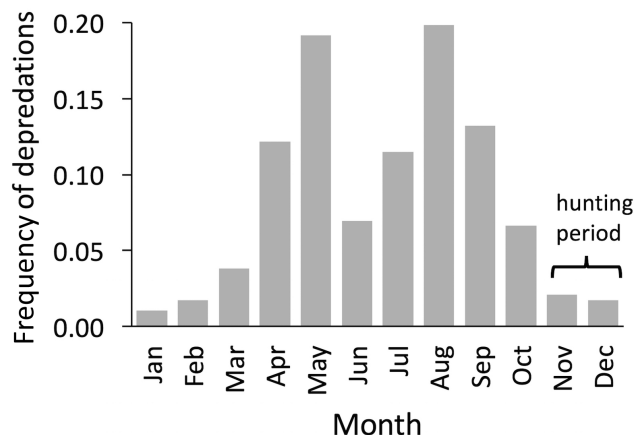
### TREATING THE PROBLEMS

When threats to human safety do occur they should be managed appropriately. In particular, protecting human safety should not wait until the upcoming hunting season, with the subsequent hope that some hunter has the good fortune to somehow kill the offending wolf. If human safety concerns are dealt with appropriately (i.e., immediately, accurately, precisely, thoroughly), then offending and potentially offending wolves would either be dead or living with plenty of fear of humans by the time the next hunting season arrives.

Livestock losses are also important and they should be dealt with appropriately, through nonlethal methods and indemnification (financial compensation for livestock losses), as well as lethal control. The scientific consensus about protecting livestock from wolf depredation is that responses need to be timely and very precisely targeted (Bradley et al. 2015). A hunt would not be so targeted, in part, because the hunt would take place months after most livestock losses occur (Fig. 3). Some have also expressed concern that wolf hunting could even exacerbate



**Fig. 2.**—Verified instances of wolves killing cattle (depredations) in Michigan, 1996–2013. The solid line indicates losses from throughout the geographic range of wolves in Michigan, excluding losses that occurred on 1 farm. The dashed line is the additional losses attributable to that 1 farm, where poor animal husbandry likely increased the risk of depredations (see “Characterizing the Problems”). The number of depredations declined considerably just prior to the planning and implementation of Michigan’s 1st wolf hunt in 2013. *Source:* Michigan Department of Natural Resources (May 2014).



**Fig. 3.**—Seasonal occurrence of wolves killing cattle (depredation events) in Michigan, 1996–2012. Note that only 3.8% of depredations occur during the planned hunting season. *Source:* Michigan Department of Natural Resources (May 2014).

depredations (Wielgus and Peebles 2014; but see Poudyal et al. 2016). If threats to human safety and livestock (given the rate of their occurrence in Michigan) were dealt with properly, there would be no significant role that a public hunt could play in addressing those concerns.

### MEETING OBJECTIVES

Addressing the question—*How will the management action meet the management objectives?*—is critical to providing good reason for any management action, particularly actions that involve killing sentient creatures. A critical element of addressing that question is to provide criteria for evaluating the success or failure of management actions.

The management objectives, as indicated by the Memorandum, are to reduce the number of complaints and number of livestock losses. While that objective certainly has value, it raises questions of what constitutes successful management. Would a decline in complaints (or livestock losses) indicate the hunt had been successful and no longer necessary? Or would a decline in complaints or livestock losses indicate that the hunt has been partially effective at accomplishing that end, and thereby justify the need for more hunting to further reduce complaints or losses? Serious problems can arise from failing to provide evaluative conditions for the success or failure of management. For example, it can make it easier for decision makers to increase the geographic scope and intensity of wolf hunting in subsequent years without adequate justification. Something similar happened with bear (*Ursus arctos*) management in Alaska, where inadequate provisions for evaluation led to irresponsible levels of hunting (Miller et al. 2011).

### LOSING THE TRUST OF CITIZENS

The poverty of reasons for hunting wolves and inadequate answers to the “how?” and “why?” questions give the impression that government officials are simply determined to have a wolf hunt and that human safety and livestock, as reasons for

the hunt, are afterthoughts. If threats to human safety and livestock are genuine concerns, it seems that other actions, known to be much more reliable in ameliorating those concerns, would have been proposed. In particular, it would have been valuable to plan to continue funding Wildlife Services (a unit within the United States Department of Agriculture). While Wildlife Services is controversial for the numbers of wildlife that they kill on an annual basis (Bergstrom, *this issue*), it has been useful for managing conflicts involving wolves, humans, and livestock. When the Memorandum had been written, Michigan’s government appears to have been poised to discontinue funding Wildlife Services (Hammill et al. 2013). If one were charged with developing solutions to solve those threats, then Wildlife Services would certainly be a centerpiece of that plan, but it is far from obvious that hunting wolves should even be a part of that solution set.

Reasons for hunting wolves appear to be a case of the “tail wagging the dog” and a justified occasion for Michigan’s citizens to lose trust in the stewards of wildlife—a kind of trust that tends not to be easily regained (Slovic 1993). Failure to answer the “how” and “why” questions is a basic kind of management failure, and when management involves killing sentient creatures, it is tantamount to killing without an adequate reason.

### UNSTATED REASONS TO HUNT

A number of people hate wolves (Fogleman 1989; Kleese 2002; Fritts et al. 2003; Nie 2003; Coleman 2004). Hatred and dislike of wolves appears to rise for a variety of reasons, both sociocultural (Kränge and Skogen 2011) and perceptual (Slagle et al. 2012). The perceptions associated with that hatred (e.g., risk of wolves to human safety) are also at odds with scientific knowledge. If satisfying some people’s desire to kill for hatred were a significant motivation for allowing a wolf hunt, and if hatred is not a legitimate reason to kill a living creature, then that circumstance would seem to violate the 4th principle of The Model, which indicates that wildlife should only be killed for a legitimate purpose.

Concern over such motivation is raised, for example, when the stated reasons offered for wolf hunting seem weak. That concern is raised further when, for example, the former coordinator of the United States Fish and Wildlife Service Rocky Mountain wolf recovery program apparently believes that wolf hunting is appropriate, at least in part, because “a little blood satisfies a lot of anger” (Robbins 2011).

Additional concern is raised when professionals assert that a public hunt would promote tolerance of wolves and help prevent rates of poaching from reaching levels that are detrimental to population viability (Federal Register 50:17 [7 June 2013], p. 35685). Those rationales seem misplaced for several reasons. First, there is no evidence to support the idea that poaching is threatening or about to threaten the viability of any wolf population in the Great Lakes region (Bruskotter et al. 2014). Second, there is no evidence to suggest that killing quenches hatred or promotes tolerance. For example, survey data indicate that wolf hunters in Montana were no more tolerant of wolves after



the 2011 wolf hunting season than they were before (Pauley 2013). Also, a recent review found no evidence for the claim that allowing higher quotas of legal hunt resulted in reduced rates of poaching (Andren et al. 2006; Treves 2009; see also Browne-Núñez et al. 2015). Moreover, attitudes toward wolves tended to be more negative during a period of time when legal lethal control had been allowed than when wolves had been fully protected (Treves et al. 2013). By contrast, Kaltenborn and Brainerd (2016) claim to have found “partial support” for the hypothesis that “poaching may unintentionally have contributed to allowing the public opinion to adjust to the renewed presence of wolves and maintain a high level of acceptance.” We are concerned that this may not be the most parsimonious conclusion to draw from the empirical results that they report, especially their table 5.

From a broader perspective, it is hard to envision any scenario in which killing is viewed as a sensible (or morally acceptable) therapy for reducing hatred or intolerance (Gaylin 2003). Finally, poaching is wrong in the sense that it is against the law. Poaching is also wrong for a deeper reason—i.e., it represents, for one reason or another, an inadequate reason to kill. The wrong done in poaching a wolf is not made right simply by legalizing the killing of wolves. An action may or may not be moral, but it is not made moral simply by legalizing it.

Negative attitudes about wolves are importantly fueled by perceptions of wolves that are grossly at odds with scientific knowledge (Schanning 2009). While recognizing and dealing with public perception is important, conflating a perceived risk with an assessed risk when they are known to differ so greatly is irresponsible and can result in unintended outcomes, including failed management. Calls for the use of sound science, such as Proposal G, are important for discouraging such confluations, not to prevent citizens from opposing actions which they have good reasons to believe are wrong.

There may be other unstated reasons to hunt wolves. For example, one might argue that wolf hunting in Michigan is motivated by an interest to increase deer (*Odocoileus virginianus*) abundance. That motivation is, however, inconsistent with the details of the wolf hunt. If the wolf hunt is expected to result in increased deer abundance, then the wolf hunt would need to kill wolves at a rate that would reduce wolf abundance. However, the quota was too low (~7% of total abundance) to expect the hunt to result in decreased wolf abundance (Adams et al. 2008; Creel and Rotella 2010), let alone having an effect on deer abundance.

The wolf hunt might have been motivated to provide an opportunity for a trophy hunt. Most Michigan citizens would likely have judged that purpose to be inappropriate. In particular, sociological research indicates that while ~85% of citizens approve of hunting for meat, fewer than 30% approve of hunting for trophies (Duda and Jones 2008). Anticipated lack of public support may be an explanation for why that reason was not advanced. Other evidence indicates that the general public is increasingly concerned with the humane treatment of carnivores (Slagle et al., this issue). Any further evaluation of these or other reasons is beyond the scope of this paper (but see Vucetich and Nelson 2014).

## LOCAL GOVERNANCE

While PA 520 and PA 21 (Fig. 1) were rejected among Michigan voters as a whole, those proposals were supported by a majority of voters in each county of Michigan’s upper peninsula—i.e., the geographic range of wolves in Michigan. That circumstance highlights a conflict between the virtue of “local governance” and the idea that all citizens are beneficiaries of the trust (i.e., wildlife). One cannot, in principle or in general, conclude that one of those ideas trumps the other. Both ideas are basic to fair governance. Interestingly, sociological research observed no geographic pattern in attitudes about wolf hunting in Michigan (Lute et al. 2014).

Context provides the guidance necessary for navigating these ideas. First, “local governance” could mean anything from “let local citizens do as they wish” at one extreme to “engage local citizens merely to minimize opposition” at the other extreme. Both extremes have shortcomings. An appropriate middle ground is found by understanding the reasons local citizens want to hunt wolves.

Fear of wolves may be an important reason that many local citizens want to hunt wolves (Lute et al. 2014). The concern is that scientific knowledge (principle 6) indicates that wolves do not actually do the things—injure people and exaggerated claims of their impact on deer and livestock—that cause people to be fearful. The fear is real and important, and it should be managed. However, killing wolves is an unwise way to manage that fear. The wiser approach to management would be for government officials to allay fears on the basis of scientific knowledge about wolves. Unfortunately, government officials have, instead, fostered fear (and distrust—Barnes 2013b; Oosting 2013b).

## DISCUSSION

The prohibition on wolf hunting represented by voters’ rejection of PA 520 and PA 21 may be superseded by PA 281 which would allow for hunting wolves. Inasmuch as PA 281 is the result of a legal process, one might suggest that it adheres to the principles of fairness and democracy. However, that an action is legal cannot be the complete argument for an action also being fair and in accordance with the principles of democracy. The context surrounding PA 281, as described in “Chronology of Political Events,” clearly indicates that it is not motivated by the principles of democracy or science.

The plans and preparations for hunting wolves in Michigan depended on misrepresenting the purview of science (see previous section, “Science and Democracy”), misrepresenting scientific knowledge of wolves (i.e., the threat of wolves to human safety and livestock), dishonoring the proper role of democracy, and failing to treat wolves as a public trust. The 1st misrepresentation is discussed in “Science and Democracy,” and the 2nd misrepresentation refers to the exaggerated threat that wolves represent to human safety and livestock. These plans also fail to provide an adequate reason for killing a sentient creature. In doing so, plans to hunt wolves in Michigan violates principles 1, 3, 4, and 6 of The Model.

Similarly, plans for hunting wolves fail to provide adequate answers for the essential questions, What? How? and Why? In particular, the stated goals and purpose of the hunt seem to misconstrue what the problem actually is. When the issue is portrayed accurately, a general hunt hardly seems a sensible solution. Even if the problem were accurately portrayed and if a general hunt were a sensible solution, the Michigan plan still would lack an adequate account of how to evaluate success or failure in its implementation.

These weaknesses and other evidence are consistent with the idea that hatred is the reason people want to kill wolves. If so, and if science is not equipped to determine the “need” to hunt wolves, then the question of whether we should hunt wolves is not fundamentally a technical problem best solved by professionals, but instead is fundamentally a normative issue. Normative (or value) claims can be neither proved nor disproved and are sometimes distinguished from empirical (scientific or technical) claims that are potentially falsifiable (e.g., Hempel 1970; Putnam 2002). For example, a predominately empirical claim is, the risk of a fatal car collision increases with increasing speed. Whereas, a predominantly normative claim is, for example, it is unacceptable (i.e., wrong) to drive faster than 65 miles per hour on some roads.

If wolf hunting, as a normative issue, was difficult to understand or of concern only to a small number of citizens, then the question of wolf hunting might be best decided by technocrats (i.e., wildlife professionals working on behalf of elected government officials). This is not the case, because judging the appropriateness of hunting wolves is an issue which every citizen can readily understand and has a stake in judging.

We discussed drafts of this essay with colleagues, and several of them noted that many management plans would fail to provide adequate answers to the questions—What? How? and Why? If so, there would be value in promoting, as a basic principle of wildlife management, the idea that good wildlife management depends on the ability to answer those questions. The Model and the “What? How? and Why?” questions can also be used to evaluate other instances of predator control. The “What? How? and Why?” questions and several principles of The Model would likely be useful for evaluating many kinds of decisions in natural resource management.

Hunters and trappers now make up a small minority of the United States population. The future role of hunting in America depends critically on the hunting community being able to explain to nonhunters why hunting and trapping is a value and honor to American culture and conservation. Given these circumstances, one should expect that moving forward with a wolf hunt in Michigan would harm the good honor of hunting and wildlife management and erode trust between citizens and stewards of wildlife. Indeed, a reason for the rise in ballot referenda and initiatives may be that those outside the hunting community feel disempowered and without adequate representation in the management of wildlife (Nie 2004). Perhaps in time, good reasons for hunting wolves in Michigan will be articulated. Perhaps in time, it will be possible to develop a hunting plan that honors whatever those reasons might be. But we have not yet reached that point.

We understand that many advocates of wolf hunting are also advocates of The Model and believe it offers justification for wolf hunting. Many of those advocates will object to various elements of this critique and its implications. Nevertheless, the policy of The Wildlife Society with respect to the North American Model of Wildlife Conservation has been to “support the critical review of the Model for completeness and application under current and future conditions” (Wildlife Society 2007:2). Objections to this critique will be as important as the critique itself. Both are necessary for inspiring a deeper understanding of The Model, the nature of wildlife management, and the relationship between hunting and conservation.

### CODA

Several developments, germane to the future of wolf hunting in Michigan, took place after the 2013 wolf hunt was implemented. First, in December 2014, a federal judge agreed with plaintiffs that the United States Fish and Wildlife Service had acted arbitrarily and capriciously when they removed United States Endangered Species Act protections from wolves in the Great Lakes region in December 2011 (Humane Society of the United States vs. Jewell 2014). The judge ruled that United States Endangered Species Act protections were to be reinstated. Wolf hunting in Michigan is precluded so long as that ruling stands. The judge’s decision is under appeal and forces have been afoot since 2015 that would have wolves delisted by direct intervention of the United States Congress. Second, PA 281, which would allow wolf hunting, has been challenged in Michigan’s courts on grounds that PA 281 entailed more than 1 issue (i.e., authorizes the Natural Resource Commission to designate game species, appropriations to manage Asian carp, and a provision for active military personnel to obtain hunting and fishing licenses for free). If Michigan’s judicial system were to determine that PA 281 entailed more than a single issue, then PA 281 would be repealed for violating Michigan’s constitution, which requires that voter-initiated laws be limited to a single issue (Pacelle 2014). That law was upheld by a Michigan judge and the decision was appealed. The appellate court struck down PA281. In response, Michigan’s legislature passed a bill allowing the Natural Resources Commission to designate a hunting season on wolves after delisting. The Governor signed that bill into law in January 2017.

### LITERATURE CITED

- ADAMS, L. G., R. O. STEPHENSON, B. W. DALE, R. T. AHGOOK, AND D. J. DEMMA. 2008. Population dynamics and harvest characteristics of wolves in the central Brooks Range, Alaska. *Wildlife Monographs* 170:1–25.
- ANDREN, H., ET AL. 2006. Survival rates and causes of mortality in Eurasian lynx (*Lynx lynx*) in multi-use landscapes. *Biological Conservation* 131:23–32.
- ASSOCIATED PRESS. 2013. Wolf hunt referendum to go on 2014 Michigan ballot. 22 May 2013. <http://detroit.cbslocal.com/2013/05/22/wolf-hunt-referendum-to-appear-on-2014-michigan-ballot/>. Accessed 24 March 2014.

- BARNES, J. 2013a. Michigan wolf hunt: farmer charged with animal cruelty in death of taxpayers' 'guard donkeys'. MLive Media Group, 10 December 2013. [http://www.mlive.com/news/index.ssf/2013/12/michigan\\_wolf\\_hunt\\_farmer\\_char.html](http://www.mlive.com/news/index.ssf/2013/12/michigan_wolf_hunt_farmer_char.html). Accessed 24 March 2014.
- BARNES, J. 2013b. Michigan's wolf hunt: how half truths, falsehoods and one farmer distorted reasons for historic hunt. MLive Media Group, 3 November 2013. [http://www.mlive.com/news/index.ssf/2013/11/michigans\\_wolf\\_hunt\\_how\\_half\\_t.html](http://www.mlive.com/news/index.ssf/2013/11/michigans_wolf_hunt_how_half_t.html). Accessed 7 January 2015.
- BERGER, K. M. 2006. Carnivore-livestock conflicts: effects of subsidized predator control and economic correlates on the sheep industry. *Conservation Biology* 20:751–761.
- BERGSTROM, B. J. This issue. Carnivore conservation: shifting the paradigm from control to coexistence. *Journal of Mammalogy*.
- BEYER, D. E., R. O. PETERSON, J. A. VUCETICH, AND J. H. HAMMILL. 2009. Wolf population changes in Michigan. Pp. 65–86 in *Recovery of gray wolves in the Great Lakes region of the United States: an endangered species success story* (A. P. Wydeven, T. R. VanDeelen, and E. J. Heske, eds.). Springer Press, New York.
- BOONE AND CROCKETT CLUB. 2014. The North American Model of Wildlife Conservation, sportsmen, and the Boone and Crockett Club. [www.boone-crockett.org/conservation/conservation\\_NAM.asp?area=conservation](http://www.boone-crockett.org/conservation/conservation_NAM.asp?area=conservation). Accessed 15 March 2016.
- BRADLEY, E. H., ET AL. 2015. Effects of wolf removal on livestock depredation recurrence and wolf recovery in Montana, Idaho, and Wyoming. *Journal of Wildlife Management* 79:1337–1346.
- BROWNE-NÚÑEZ, C., A. TREVES, D. MACFARLAND, Z. VOYLES, AND C. TURNG. 2015. Tolerance of wolves in Wisconsin: a mixed-methods examination of policy effects on attitudes and behavioral inclinations. *Biological Conservation* 189:59–71.
- BRUSKOTTER, J. T., AND S. A. ENZLER. 2009. Narrowing the definition of endangered species: implications of the U.S. government's interpretation of the phrase "a significant portion of its range" under the endangered species act of 1973. *Human Dimensions of Wildlife* 14:73–88.
- BRUSKOTTER, J. T., S. A. ENZLER, AND A. TREVES. 2011. Rescuing wolves from politics: wildlife as a public trust resource. *Science* 333:1828–1829.
- BRUSKOTTER, J. T., AND D. C. FULTON. 2012. Will hunters steward wolves? A comment on Treves and Martin. *Society and Natural Resources* 25:97–102.
- BRUSKOTTER, J. T., J. A. VUCETICH, S. A. ENZLER, A. TREVES, AND M. P. NELSON. 2014. Removing protections for wolves and the future of the U. S. Endangered Species Act (1973). *Conservation Letters* 7:401–407.
- COLEMAN, J. T. 2004. *Vicious: wolves and men in America*. Yale University Press, New Haven, Connecticut.
- CREEL, S., AND J. J. ROTELLA. 2010. Meta-analysis of relationships between human offtake, total mortality and population dynamics of gray wolves (*Canis lupus*). *PLoS ONE* 5:e12918.
- DAFT, R. L., AND D. MARCIC. 2012. *Understanding management*. 8th ed. Cengage Learning, Mason, Ohio.
- DECKER, T. A., AND G. R. BATCHELLER. 1993. Furbearer management in transition: challenges for the future. *Northeast Wildlife* 50:153–157.
- DIANDA, S. 2013. Letter sent to Robert Evans (Michigan citizen) on 24 April 2013. Acc 16-022(1), Michigan Wolf Hunting Correspondence. Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- DUDA, M. D., AND M. JONES. 2008. Public opinion on and attitudes toward hunting. Pp. 180–199 in *Transactions of the North American Wildlife and Natural Resources Conference*, Phoenix, Arizona, 23–28 March 2008 (Wildlife Management Institute Publications Department, eds.). Wildlife Management Institute, Washington, D.C.
- FOGLEMEN, V. M. 1989. American attitudes towards wolves: a history of misperception. *Environmental History Review* 13:63–94.
- FRITTS, S. H., R. O. STEPHENSON, R. D. HAYES, AND L. BOITANI. 2003. Wolves and humans. Pp. 289–316 in *Wolves: behavior, ecology, and conservation* (L. D. Mech and L. Boitani, eds.). University of Chicago Press, Chicago, Illinois.
- GAYLIN, W. 2003. *Hatred: the psychological descent into violence*. PublicAffairs, New York.
- GORE, M. L., B. A. KNUTH, P. D. CURTIS, AND J. E. SHANAHAN. 2006. Education programs for reducing human-bear conflict: indicators of success? *Ursus* 17:75–80.
- HAMMILL, J., J. A. VUCETICH, AND R. O. PETERSON. 2013. Letter to members of the Natural Resources Commission, State of Michigan, dated 30 April 2013. Acc 16-022(2). Michigan Wolf Hunting Correspondence, Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- HEMPEL, C. G. 1970. *Philosophy of natural science*. Prentice Hall, Englewood Cliffs, New Jersey.
- HORNER, S. M. 2000. Embryo, not fossil: breathing life into public trust in wildlife. *Land and Water Law Review* 35:23–75.
- HOUSTON, M. J., J. T. BRUSKOTTER, AND D. P. FAN. 2010. Attitudes toward wolves in the United States and Canada: a content analysis of the print news media, 1999–2008. *Human Dimensions of Wildlife* 15:389–403.
- HUMANE SOCIETY OF THE UNITED STATES VS. JEWELL. 2014. Civil Action No. 13-186, U.S. District Court for the District of Columbia. 19 December 2014. [www.animallaw.info/case/humane-society-united-states-v-jewell](http://www.animallaw.info/case/humane-society-united-states-v-jewell). Accessed 15 March 2016.
- KALTENBORN, B. P., AND S. M. BRAINERD. 2016. Can poaching inadvertently contribute to increased public acceptance of wolves in Scandinavia? *European Journal of Wildlife Research* 62:179–188.
- KAROUB, J. 2014. Officials: no wolf hunt in Michigan this year. Associated Press. *The Mining Journal*, 12 September 2014. [www.miningjournal.net/page/content.detail/id/605203/No-wolf-hunt-in-Michigan-this-year.html?nav=5006](http://www.miningjournal.net/page/content.detail/id/605203/No-wolf-hunt-in-Michigan-this-year.html?nav=5006). Accessed 15 March 2016.
- KLEESE, D. 2002. Contested natures: wolves in late modernity. *Society and Natural Resources* 15:313–326.
- KRANGE, O., AND K. SKOGEN. 2011. When the lads go hunting: the 'Hammertown mechanism' and the conflict over wolves in Norway. *Ethnography* 12:466–489.
- LINNEL, J. D. C., ET AL. 2002. The fear of wolves: a review of wolf attacks on people. NINA Oppdragsmelding 731:1–65. <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1026&context=wolfrecovery>. Accessed 9 March 2016.
- LUTE, M. L., A. BUMP, AND M. L. GORE. 2014. Identity-driven differences in stakeholder concerns about hunting wolves. *PLoS ONE* 9:e114460.
- LUTE, M. L., AND M. L. GORE. 2014. Knowledge and power in wildlife management. *The Journal of Wildlife Management* 78:1060–1068.
- MARTIN, T. 2013. Debate over possible Michigan wolf hunt enters new phase with signature submission. MLive Media Group, 27 March 2013. [http://www.mlive.com/news/index.ssf/2013/03/campaigns\\_related\\_to\\_possible.html](http://www.mlive.com/news/index.ssf/2013/03/campaigns_related_to_possible.html). Accessed 24 March 2014.
- MASON, R., ET AL. 2013. Memorandum to the natural resources commission. 13 May 2013. Acc 16-022(8), Michigan Wolf Hunting Correspondence,

- Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- MECH, L. D. 1996. A new era for carnivore conservation. *Wildlife Society Bulletin* 24:397–401.
- MICHIGAN DEPARTMENT OF NATURAL RESOURCES. 2013a. Natural Resources Commission authorizes limited public wolf harvest aimed at managing the state's wolf population. Released 9 May 2013. Acc 16-022(3). Michigan Wolf Hunting Correspondence, Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- MICHIGAN DEPARTMENT OF NATURAL RESOURCES. 2013b. John Koski Matchwood Farm report. Prepared by Brian Roell on 2/4/13. Acc 16-022(7). Michigan Wolf Hunting Correspondence, Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- MICHIGAN DEPARTMENT OF STATE. 2016. Election statistics. <http://miboecfr.nictusa.com/election/results/06GEN/>. Accessed 3 September 2016.
- MICHIGAN NATURAL RESOURCES COMMISSION. 2013. Rationale and basis for approval and adoption of wildlife conservation order amendments 13 and 14 of 2013. Acc 16-022(4). Michigan Wolf Hunting Correspondence, Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- MILLER, S. D., J. W. SCHOEN, J. FARO, AND D. R. KLEIN. 2011. Trends in intensive management of Alaska's grizzly bears, 1980–2010. *Journal of Wildlife Management* 75:1243–1252.
- MINNIS, D. L. 1998. Wildlife policy-making by the electorate: an overview of citizen-sponsored ballot measures on hunting and trapping. *Wildlife Society Bulletin* 26:75–83.
- NELSON, M. P., J. A. VUCETICH, P. C. PAQUET, AND J. K. BUMP. 2011. North American model: an inadequate construct? *The Wildlife Professional* 5:58–60.
- NIE, M. 2003. *Beyond wolves: the politics of wolf recovery and management*. University of Minnesota Press, Minneapolis.
- NIE, M. 2004. State wildlife policy and management: the scope and bias of political conflict. *Public Administration Review* 64:221–233.
- OFFICE OF THE GOVERNOR OF MICHIGAN. 2013. Letter sent from Kaitlin Nye, Constituent Services Division of the Office of the Governor to Nancy Warren (Michigan citizen) on 6 May 2013. Acc 16-022(5). Michigan Wolf Hunting Correspondence, Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- OOSTING, J. 2013a. New Michigan group seeks to protect future wolf hunts with citizen-initiated legislation. MLive Media Group, 26 November 2013. [www.mlive.com/politics/index.ssf/2013/11/new\\_michigan\\_group\\_seeks\\_to\\_pr.html](http://www.mlive.com/politics/index.ssf/2013/11/new_michigan_group_seeks_to_pr.html). Accessed 23 March 2016.
- OOSTING, J. 2013b. Michigan Senator apologizes for fictional wolf story in resolution: 'I am accountable, and I am sorry'. MLive Media Group, 7 November 2013. [www.mlive.com/news/index.ssf/2013/11/michigan\\_senator\\_apologizes\\_fo.html](http://www.mlive.com/news/index.ssf/2013/11/michigan_senator_apologizes_fo.html). Accessed 23 March 2016.
- ORGAN, J. F., ET AL. 2012. The North American Model of Wildlife Conservation. *The Wildlife Society Technical Review* 12-04. The Wildlife Society, Bethesda, Maryland. <http://wildlife.org/wp-content/uploads/2014/05/North-American-model-of-Wildlife-Conservation.pdf>. Accessed 9 March 2016.
- ORTEGA Y GASSETT, J. 2007. *Meditations on hunting*. Wilderness Adventures Press, Belgrade, Montana.
- PACELLE, W. 2014. Slugfest over Michigan wolves continues – so much at stake with November votes. *A Humane Nation*, 27 August 2014. <http://blog.humanesociety.org/wayne/2014/08/michigan-wolves-2.html>. Accessed 30 December 2014.
- PAULEY, G. 2013. Montana experience with wolf hunting. Midwest Wolf Steward's Conference, 17 April 2013, Silver City, Michigan. Acc 16-022(6). Michigan Wolf Hunting Correspondence, Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- PEPIN, J. 2013a. NRC OKs limited late-year wolf hunt in selected U.P. locations. *The Mining Journal*, Marquette, Michigan, 10 May 2012. [www.miningjournal.net/page/content.detail/id/586898/NRC-OKs-limited-late-year-wolf-hunt-in-selected-U-P--locations.html](http://www.miningjournal.net/page/content.detail/id/586898/NRC-OKs-limited-late-year-wolf-hunt-in-selected-U-P--locations.html). Accessed 23 March 2016.
- PEPIN, J. 2013b. DNR official refutes wolf hunt claims. *The Mining Journal*, Marquette, Michigan, 3 February 2012. [www.miningjournal.net/page/content.detail/id/584101/DNR-official-refutes-wolf-hunt-c---.html](http://www.miningjournal.net/page/content.detail/id/584101/DNR-official-refutes-wolf-hunt-c---.html). Accessed 23 March 2016.
- PERGAMS, O. R. W., AND P. A. ZARADIC. 2008. Evidence for a fundamental and pervasive shift away from nature-based recreation. *Proceedings of the National Academy of Sciences* 105:2295–2300.
- Peterson, D. (ed.) 1997. *Hunter's heart: honest essays on blood sport*. Holt, New York.
- POUDYAL, N., BARAL, N., AND S. T. ASAH. 2016. Wolf lethal control and livestock depredations: counter-evidence from respecified models. *PLoS ONE* 11:e0148743.
- PUTNAM, H. 2002. *The collapse of the fact/value dichotomy and other essays*. Harvard University Press, Cambridge, Massachusetts.
- REDMOND, P. 2009. The public trust in wildlife: two steps forward, two steps back. *Natural Resources Journal* 49:249–311.
- REYNOLDS, J. C., AND S. C. TAPPER. 1996. Control of mammalian predators in game management and conservation. *Mammal Review* 26:127–155.
- ROBBINS, J. 2011. Hunting wolves out west: more, less?. *New York Times*, 16 December 2011. [http://green.blogs.nytimes.com/2011/12/16/hunting-wolves-out-west-more-less/?\\_r=2](http://green.blogs.nytimes.com/2011/12/16/hunting-wolves-out-west-more-less/?_r=2). Accessed 24 March 2014.
- ROCKY MOUNTAIN ELK FOUNDATION. 2013. The North American wildlife conservation model. [www.rmef.org/Conservation/HuntingIsConservation/NorthAmericanWildlifeConservationModel.aspx](http://www.rmef.org/Conservation/HuntingIsConservation/NorthAmericanWildlifeConservationModel.aspx). Accessed 24 March 2014.
- SCHANNING, K. 2009. Human dimensions: public opinion research concerning wolves in the Great Lakes States of Michigan, Minnesota, and Wisconsin. Pp. 251–265 in *Recovery of gray wolves in the Great Lakes region of the United States* (A. Wydeven, T. R. van Deelen, and E. J. Heske, eds.). Springer, New York.
- SEN, A. 2009. *The idea of justice*. Belknap/Harvard, Cambridge, Massachusetts.
- SJÖBERG, L. 2000. Factors in risk perception. *Risk Analysis* 20:1–11.
- SLAGLE, K., BRUSKOTTER, J. T., AND R. S. WILSON. 2012. The role of affect in public support and opposition to wolf management. *Human Dimensions of Wildlife* 17:44–57.
- SLAGLE, K., J. T. BRUSKOTTER, A. S. SINGH, AND R. H. SCHMIDT. This issue. Attitudes toward predator control in the United States: 1995 and 2014. *Journal of Mammalogy*.
- SLOVIC, P. 1992. Perception of risk: reflections on the psychometric paradigm. Pp. 117–152 in *Social theories of risk* (S. Krimsky and D. Golding, eds.). Praeger, New York.
- SLOVIC, P. 1993. Perceived risk, trust, and democracy. *Risk Analysis* 13:675–682.
- STONE, S. A., ET AL. This issue. Adaptive use of nonlethal strategies for reducing wolf-sheep conflict in Idaho. *Journal of Mammalogy*.
- TREVES, A. 2009. Hunting for large carnivore conservation. *Journal of Applied Ecology* 46:1350–1356.

- TREVES, A., J. A. LANGENBERG, J. V. LÓPEZ-BAO, AND M. F. RABENHORST. This issue. Gray wolf mortality patterns in Wisconsin from 1979–2012. *Journal of Mammalogy*.
- TREVES, A., AND K. A. MARTIN. 2011. Hunters as stewards of wolves in Wisconsin and the Northern Rocky Mountains, USA. *Society and Natural Resources* 24:984–994.
- TREVES, A., L. NAUGHTON-TREVES, AND V. SHELLEY. 2013. Longitudinal analysis of attitudes toward wolves. *Conservation Biology* 27:315–323.
- UNITED STATES FISH AND WILDLIFE SERVICE. 2013. Gray wolves in the western Great Lakes states. [www.fws.gov/midwest/wolf/](http://www.fws.gov/midwest/wolf/). Accessed 24 March 2014.
- VUCETICH, J. A., AND M. P. NELSON. 2013. The infirm ethical foundations of conservation. Pp. 9–25 in *Ignoring nature no more: the case for compassionate conservation* (M. Bekoff, ed.). University of Chicago Press, Chicago, Illinois.
- VUCETICH, J. A., AND M. P. NELSON. 2014. *Wolf hunting and the ethics of predator control*. Oxford Handbooks Online. 12 July 2014. [www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199927142.001.0001/oxfordhb-9780199927142-e-007](http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199927142.001.0001/oxfordhb-9780199927142-e-007). Accessed 9 March 2016.
- VUCETICH, J. A., M. P. NELSON, AND C. K. BATAVIA. 2015. The Anthropocene: disturbing name, limited insight. Pp. 66–73 in *After preservation: saving American nature in the age of humans* (B. A. Minteer and S. J. Pyne, eds.). University of Chicago Press, Chicago, Illinois.
- VUCETICH, J. A., M. P. NELSON, AND M. K. PHILLIPS. 2006. The normative dimension and legal meaning of ‘endangered’ and ‘recovery’ within the United States’ Endangered Species Act. *Conservation Biology* 20:1383–1390.
- WALLACH, A. D., D. RAMP, AND A. J. O’NEILL. This issue. Cattle mortality on a predator-friendly station in central Australia. *Journal of Mammalogy*.
- WESTERN ASSOCIATION OF FISH AND WILDLIFE AGENCIES. 2009. A resource guide: the North American Model of Wildlife Conservation. Acc 16-022(9), Michigan Wolf Hunting Correspondence, Michigan Technological University Archives and Copper Country Historical Collections, Houghton.
- WIELGUS, R. B., AND K. A. PEEBLES. 2014. Effects of wolf mortality on livestock depredations. *PLoS ONE* 9:e113505.
- WILDLIFE SOCIETY. 2007. Final TWS position statement on the North American Model of Wildlife Conservation. [http://wildlife.org/wp-content/uploads/2015/04/SP\\_NorthAmericanModel1.pdf](http://wildlife.org/wp-content/uploads/2015/04/SP_NorthAmericanModel1.pdf). Accessed 15 March 2016.
- WILDLIFE SOCIETY. 2014. About TWS. <http://wildlife.org/about/>. Accessed 15 March 2016.
- YOUNGEDYKE, D. 2014. Wolf hunt: Vote ‘yes’ for scientific management. *The Holland Sentinel*, 27 October 2014. [www.holland-sentinel.com/article/20141027/OPINION/141029186/10946/OPINION](http://www.holland-sentinel.com/article/20141027/OPINION/141029186/10946/OPINION). Accessed 15 March 2016.
- ZIMMERMANN, B., P. WABAKKEN, AND M. DÖTTERER. 2001. Human–carnivore interactions in Norway: how does the re-appearance of large carnivores affect people’s attitudes and levels of fear? *Forest Snow and Landscape Research* 76:137–153.

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## APPENDIX I

*Synopsis of recent legal history of wolves in Michigan.*—The United States Endangered Species Act (1973) allows, under certain circumstances, for a species to be listed and managed across an area that is smaller than the species’ entire geographic range. These areas are referred to as distinct population segments. In 2004, United States Fish and Wildlife Service proposed delisting wolves in the Eastern distinct population segment, to which Michigan wolves had belonged. In January 2005, court action nullified that proposal. In February 2007, the United States Fish and Wildlife Service reorganized wolf distinct population segments and declared that Michigan wolves would subsequently belong to a newly created and geographically smaller distinct population segment, known as the Western Great Lakes distinct population segment. In that same February 2007 action, the United States Fish and Wildlife Service also delisted wolves in the Western Great Lakes. In September 2008, court action resulted in wolves being relisted. In January 2009, the federal government announced a final rule to delist wolves in the Western Great Lakes distinct population segment. That same month, the final rule was withdrawn to permit further review of the rule. In March 2009, the final rule was affirmed, but the decision to delist was withdrawn again in July 2009 to provide opportunity for public comment. In September 2009, court action re-affirmed the need to withdraw that final rule. In May 2011, the federal government proposed again to delist wolves in the Western Great Lakes distinct population segment. That proposal was enacted in December 2011.