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Looking to the Past for the Future: Using Wolves to Restore Ecosystems (Response To Belant, Mech, and Trimble)

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but our research demonstrates that trespass is common (Mech 1994).

The prospects for public tolerance of such costly and intensive management seems dim anytime soon.

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Fences are More than an Issue of Aesthetics

Licht and colleagues (*BioScience* 60: 147–153) identify South Africa's pioneering efforts to reintroduce top predators to small, fenced protected areas as a conservation model America might be wise to follow. However, South African success at large predator reintroduction is largely the result of ubiquitous fencing that generally prevents predator conflict with people and livestock (see Gusset et al. 2008).

The consequences of applying a similar paradigm in America are not only aesthetic, as implied by Licht, but could also compromise the long-term success of biodiversity conservation. A recent review of fencing for conservation concluded that fencing is an acknowledgment that we are failing to coexist with and successfully conserve biodiversity, and that the costs—economic and ecological—generally far exceed the benefits (Hayward and Kerley 2009). Ecological costs include fence-line mortalities, influences on natural behavior, impingement on natural mechanisms of population control, restriction of animal movements in response to environmental changes (e.g., fires, climate change, drought), limitation of migration and genetic flow, and impediment to recolonization and source–sink population dynamics.

Licht and colleagues stated that there are relatively few concerns in South Africa about the fence around Kruger National Park. This is incorrect—there are serious ecological concerns including extinction debt and species persistence of many iconic herbivores, even though the park covers nearly 20,000 square kilometers (Nicholls et al. 1996, Ogutu and Owen-Smith 2003). Fences around smaller protected areas can be even more problematic.

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Several authors have highlighted their issues with our suggestion that small groups of wolves could facilitate ecosystem restoration in select areas (Licht et al. 2010). They expressed concerns, based on their experiences, about the complexities and uncertainties surrounding the proposal—concerns that we acknowledge. However, their focus on issues that have been addressed with large carnivore reintroduction elsewhere, in addition to their failure to consider the potential value of nontraditional restoration opportunities, unintentionally reinforces our broader contention that new thinking about the role of wolves in ecosystem conservation is needed.

Trimble and van Aarde and Belant and Adams note that fencing for conservation creates a host of problems. We concur that there are logistical, ecological, and aesthetic challenges, and that such an approach should be considered only after other options have been dismissed. However, the model is successfully and routinely used in other countries to restore large predators, species richness, and ecosystem processes. Decades of experience in places such as South Africa have exposed some issues, but they have also demonstrated substantial economic and ecologic benefits. Furthermore, many of the potential negative aspects of fencing that Trimble and van Aarde listed would also apply to island situations; although wolves at Isle Royale do not become entangled in boundary fences, they do regularly drown or fall through thin ice in Lake Superior. Yet after 60 years, wolf establishment at Isle Royale stands unchallenged as a conservation success story.

Based on previous experience with wolf conservation, Mech and colleagues raise many similar concerns about the feasibility of ideas presented in our research, citing excessive cost, high likelihood of escape, and increased conflict in surrounding areas. These constraints are largely

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rooted in human attitudes and values. We argue that, in undertaking future conservation actions, it should be recognized that different perspectives are possible. Failure of imagination might cause us to forfeit opportunities for ecosystem restoration, limited though they may be.

Envisioning the future of conservation using current thinking is fraught with difficulty. We offer two historical examples of seasoned biologists attempting to predict future wolf conservation possibilities.

1. In speculating about what would happen if bounty payments for dead wolves were discontinued, state game biologist A. M. Stebler wrote in 1940 to his supervisor, Michigan Game Division Director H. D. Ruhl: "Zoning the state into areas which are agricultural or otherwise has been suggested, with control practiced in the agricultural areas. But who is going to do the zoning, and according to what standards? Even if such a plan were practicable, the control problems would still remain along the zone borders, even if nowhere else. Then, too, how much control would be justifiable, who would make the decisions, and who would pay the shot?" (Game Division files, letter dated 25 October 1940).

2. A decade or more before wolf recovery really took off in Michigan in the early 1990s, state wildlife regional director Ralph Bailey (who also chaired the first recovery team appointed for wolves in any part of the United States) made frequent public reference (recalled by Rolf Peterson) to his prediction that there was sufficient "room" for about three packs of wolves in the Upper Peninsula of Michigan. In 2009 there were more than 100 packs of wolves distributed across 25,000 square kilometers of Michigan.

What seems impractical today may be quite possible in the future. Rather than discounting the potential role of small populations of wolves in ecosystem restoration, we should look to the future while learning from the past. Overcoming the logistical constraints identified by others is increasingly possible. However, dismissing the appropriateness or feasibility of any conservation action based on assumed limitations of human attitudes is to create a tragic self-fulfilling prophesy.

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