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Guest Editorial

Beyond biology: the political and legal implications of "conservation reliance"

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The impact of human activities on our planet has been so profound that scientists have officially declared a new geologic era - the Anthropocene. One consequence of our impacts is the creation of novel, no-analog communities, and ecosystems. Within this context, scientists and managers alike are increasingly asked to consider management actions within the larger context of costs, benefits, and likelihood of success given the magnitude and irreversibility of many system-level changes. This consideration is particularly important when we acknowledge the stark reality that resources available for biodiversity conservation are woefully inadequate to accomplish the task. Should we, for example, continue to invest in efforts to control invasive species in systems where eradication is unlikely to be successful? Are some species effectively "lost causes" that work against biodiversity conservation by diverting limited dollars from activities that stand a much better chance of success? Can we achieve better outcomes if we preferentially apply resources to conservation efforts with a high likelihood of success?

This dialogue is also important as related to the legal and regulatory frameworks for conserving threatened and endangered species. One prominent example is the U.S. Endangered Species Act (ESA), which is intended to recover species threatened with extinction. Recovery requires that the threats to species are removed or reduced to the point where the long-term survival of the species in the wild is ensured and that the populations are self-sustaining, no longer require protection, and can be delisted. According to data accessed through the U.S. Fish and Wildlife Service (USFWS) website (http://ecos.fws.gov/ecp0/reports/delisting-report), recovery has been achieved for only 31 of the 1604 species listed in the U.S., including Peregrine Falcon (*Falco peregrinus*), Brown Pelican (*Pelecanus occidentalis*), and Bald Eagle (*Haliaeetus leucocephalus*). A similar situation is unfolding in Canada where the Federal government is becoming challenged by species recovery plans under SARA and COSEWIC designation.

Recovery to self-sustaining populations may be the goal of the ESA and similar laws in other countries, but the reality is that many environments are so altered that some species will require active management for the foreseeable future. Management can take many forms, such as controlling invasive predators or competitors, managing pathogens or parasites, or maintaining critical ecosystem processes or disturbances, such as fire, that no longer occur naturally. Species requiring such management are often referred to as "conservation reliant", a relatively new term that has been variously defined and interpreted (Scott et al. 2005, Scott et al. 2010, Goble et al. 2014, Reed et al. 2012, Rolf et al. 2014). Although one could argue that all species depend, at least to some degree, on our ability to successfully conserve habitats and ecosystems, that isn't what is meant by conservation reliance. For example, we used captive breeding and reintroduction to recover the Peregrine Falcon after the pesticide DDT decimated populations, but those efforts were temporary and required only until the threat was abated and populations recovered. In contrast, conservation reliance refers to cases where specific management interventions are likely to be required indefinitely. In this way, conservation reliance reflects the inability of a species to have self-sustaining (i.e., without help from humans) wild populations because threats to populations can be managed but not eliminated.

From a biological perspective, the concept of conservation reliance seems relatively straightforward. We recognize that some species depend upon our management actions for survival. The persistence of the U.S. federally endangered Black-capped Vireo (*Vireo atricapilla*), for instance, will likely always require that numbers of the brood parasitic Brown-headed Cowbird (*Molothrus ater*) be controlled in its brushy habitats of Texas and Oklahoma. Likewise, many endangered Hawaiian birds will always require some control of exotic and invasive ungulates, disease vectors, and predators. The management of Whooping Cranes (*Grus americana*) in North America is another excellent example of a conservation-dependent species. Other cases are more nuanced. A conservation-reliant species might, in theory, be able to recover to self-sustaining levels, but the problem is that we have elected not to restore the ecosystem to more "natural" conditions due to the costs or other social tradeoffs; instead we choose to intervene. Kirtland's Warbler (*Setophaga kirtlandii*) is one such example. As a habitat specialist that breeds in fire-dependent, jack-pine forest ecosystems, the Kirtland's Warbler might be able to recover to self-sustaining levels if we restored entire landscapes to allow for the reestablishment of wildfires. But because meaningful landscape restoration is economically and politically costly, we opt to protect smaller areas of forest in which fires or other disturbances are prescribed and controlled. Thus,

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our preferences and choices about management have effectively made some species, like the Kirtland's Warbler, conservation reliant. In an effort to improve the utility of the term in conservation decision-making, Rohlf et al (2014) propose a new definition of "conservation reliance" that is not binary but rather a spectrum of the degree to which a species can persist in the wild without human intervention.

Conservation reliance gets quite tricky when we move into political and legal realms. In particular, there is an active discussion underway about using conservation reliance as a justification to remove species from ESA's threatened and endangered lists. The concept also has been used to pre-empt federal listing of conservation-reliant species by way of advocating that conservation agreements are more appropriate for species requiring indefinite management (Rohlf et al. 2014). Is it fair to claim that ESA does not accommodate species requiring long-term management? To be clear, ESA already requires explicit consideration of the likelihood that conservation efforts will be implemented and effective when making decisions about listing, as mandated by the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE; https://www.fws.gov/endangered/esa-library/pdf/PECE-final.pdf). Moreover, simply by requiring agencies to examine the adequacy of existing regulatory mechanisms when considering delisting, Rohlf et al. (2014) argue that the ESA implicitly recognizes that continued protection or management may be required. The USFWS applied this reasoning to the delisting of the Yellowstone grizzly bear (*Ursus arctos*), which was justified, in part, by the agency's assurance that they would continue to manage the population, conduct periodic translocations, and protect habitat for bears. Thus, there is some support and precedence for the position that species can be delisted even when continued management is required.

Nevertheless, there is a real and growing concern that the concept of "conservation reliance" will be used as a political tool to undermine the conservation of imperiled species. In a recent review of 1136 recovery plans, Scott et al. (2010) found that 84% could be considered as conservation reliant because threats could not be completely eliminated without ongoing management. The removal of federal protection from most threatened and endangered species based on their conservation reliance would almost certainly have dire consequences, especially because there is no current regulatory mechanism to ensure management after delisting. What can scientists and practitioners do? Aside from advocating for better funding for conservation, we can be more careful in our language. It's easy to use the term "conservation reliance" loosely, and many of us are prone to conflate the biological and political/legal meanings of the term in our efforts to make our work more relevant to decision-makers. But words do matter. Through careful and deliberate use of terms, we have the opportunity to foster a more clear and productive discourse about conservation.

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