

Relinquishing Control:  
Conservation Oriented Toward Increased  
Indigenous Agency and Non-Human Autonomy  
in Invasive Species Management

by

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# **Invasive Species Management—Indigenous Agency as Necessary for Biocultural Diversity and Diplomacy**

By Cam Scharff

## **Abstract**

1. Current invasive species management is problematic in its unclear/xenophobic terminology, insufficient in practice given the scale/cost/complexity of the issue, and colonial in its normative assumptions. In exploring the normative assumptions underpinning current settler invasive species conservation, I mean to demonstrate how these practices maintain visions of the settler homeland and settler futures, with little consideration for indigenous cosmologies and futures.
2. Most settler agencies structure response to invasion as prevention ideally, eradication if possible, and long term management if necessary. This presents an underlying bias toward eradication of the “other” (be they human or non) that pervades settler colonial states, which is contrasted with indigenous relational cosmologies capable of more just diplomacy with plant “nations,” to borrow an Anishinaabe concept.
3. Building from this, I demonstrate the connection between cosmology, management, and land. For this purpose, I focus on biocultural frameworks, and utilize this framework to argue for how increased “biocultural diversity” is not only an issue of justice in what cultures are reified in the landscape, but also important for the improved conservation that can result from increased biocultural diversity.
4. Most importantly, the largest issue with invasive species management is the failure to adequately respect and collaborate with indigenous peoples. Such collaborations provide potential for increased indigenous agency and self-determination in management practices; justice in contributing to indigenous governance resurgence; and justice for people/non-humans in that it can diversify the cultural landscape.
5. Settlers have much to learn from indigenous management practices/understandings of invasive species. Particularly helpful are concepts of indigenous relationships with non-humans, which show greater respect for non-human autonomy and can thereby lead to invasive species practices not oriented toward eradication as ideal.
6. Lastly, I address three potential pitfalls to avoid in promoting indigenous agency in collaboration, less about the practice itself, and more expressing concerns for co-option. These areas of concern are: settler powers instrumentalizing indigenous knowledge (IK) and practices; a lack of respect for IK; and a retrenchment of the status quo.



## Introduction

Current invasive species management is insufficient (Green & Grosholz, 2020) and colonial given the temporal arbitrariness of “restoring” a particular time period according to settler ideas of “nature” (Mehrabi, 2016; Jepson, 2022; du Toit & Pettoirelli, 2019). Additionally, the sheer scale of the issue (IPBES, 2023) suggests that eradication is not feasible (ecologically or economically) (Wehi et al., 2023). For example, ecologically speaking, Lorenzo & Morais (2023) state that for “invasive alien plants (IAPs)” there are “acceptable short-term outcomes” that result from current management practices, but that these have “proven to be unfeasible or unaffordable in the long-term or for large invaded areas.” Further, it is now recognized that 28-36% of the planet’s ice free land is covered by novel ecosystems, and that this amounts to nearly twice the global coverage by novel ecosystems than wildlands (Kennedy et al., 2018, ref. Perring & Ellis, 2013). The rate of biological invasions is anticipated to increase and worsen as a result of facilitation by climate change (Chown et al., 2015), although the exact dynamics between the two are hard to predict (Finch et al., 2021; Runyon et al., 2012; Mainka & Howard, 2010). This does not bode well economically either—in 2019, it is estimated that \$423 billion was the cost of invasive species worldwide (IPBES, 2023). Ecological and economic impacts aside, the current control focused management of invasives speaks to the underlying fractured status of our relationship to our environments.

Indigenous cosmologies to accommodate environmental change (and thereby invasive species) far more effectively than colonial worldviews premised on control (Holling & Meffe, 1996; Johns, 2019). For example, Anishinaabe worldviews see plants as “nations” who migrate according to their agency (Reo & Ogden, 2018). Hernandez (2022) describes how introduced species may be considered “displaced relatives.” Both ideas lend well to Reo & Ogden (2018) point that it is the responsibility of humans to determine the shape of the relationship between humans and species. In this regard, not only is increased indigenous agency necessary for justice and improved practices, but as a means to incorporate diplomacy among the nations of people and plants (Reo & Ogden, 2018). For this, it is important to explore indigenous ideas of invasive species management that arise from their cosmologies, to compare to settler ones, but more importantly to suggest more pragmatic, relational, and just approaches to conservation.

To do this, I will first explore the current terminology of invasive species management under settler states in order to draw out some of the initial conceptual issues and culturally rooted assumptions. Second, I will examine the issues with current invasive biology management as they relate to efficacy, conceptual issues/inconsistencies, and indigenous justice/relationships. Third, I will explore biocultural frameworks to demonstrate that part of the problem is that the landscape has been shaped by exclusively settler cultural powers while indigenous biocultural dialectics have been suppressed, and how settler normative assumptions are derived from certain cultural inheritances that are reified in the landscape. I will utilize

this framing to establish that the need for indigenous “diplomacy” with invasive species, and to discuss how the resulting practices have deep implications for (re)engaging these nature/culture dialectics, thereby increasing indigenous self-determination, biocultural diversity, and justice for indigenous people and non-humans. Thus, I conclude that indigenous agency is essential not only for its own sake, but for the diplomacy it offers invasive species that settler practices premised on cosmologies of control cannot. There is an opportunity for settlers to learn from indigenous people that there is greater complexity in invasive species management than “invasive-bad/native-good” that coincides nicely with opportunities for indigenous self-determination and governmental resurgence.

## Background

### 1. Terminology

There is a growing body of literature in “invasion biology” that utilizes a number of related terms, often somewhat interchangeably—*invasive species*, *alien species*, *non-native species*, *introduced species*, *invasive alien species* (IAS), *non-indigenous species* (NIS), etc. (Iannone III et al., 2020; Colautti & MacIsaac, 2004). There are some subtle differences among them, but generally these terms are juxtaposed to native or indigenous species (ie: the species which evolved together over long periods of evolutionary time in a set biogeographic context) (Crees & Turvey, 2015; USDAa, 2024). When present, these *non-native species* contribute to the creation of what are termed *novel ecosystems* (Hobbs et al., 2013). *Invasive species* are typically defined as species (plant, animal, insect, etc.) who are introduced to a new biogeographic region, either intentionally by humans or accidentally as a result of human activity, that have a negative impact on the “native” ecosystem (USDAb, 2024; Iannone III et al., 2020; Colautti & MacIsaac, 2004). However, it is worth noting that invasive species are actually a subset of a larger category of *introduced species* (also called *non-native*, *alien*, *non-indigenous*, etc. [Iannone III et al., 2020; Colautti & MacIsaac, 2004]) and only refer to the select few species (the 10% Rule) who have a demonstrably negative impact on the ecosystems into which they are introduced (EPA, 2024). These concepts are further complicated by questions of timescale (native *since when?*) and agency (species move around without human assistance too [Reo & Ogden, 2018: Anishinaabe view migration as natural]—are they introduced? Invasive?). Further, Colautti & MacIsaac (2004) describe how nonindigenous species are nonindigenous *populations* of a species that is indigenous somewhere else (p. 136). The distinction is slight, but important—it connects invasive species to history, and steals some of the assigned malevolence from them.

Often, the terms utilized in invasion biology (like invasive species) are xenophobic and even militaristic, with the implication that these foreign alien species possess a malevolent agency, with destructive intention stemming from the word “invasive” (Larson, 2008; Inglis, 2020). Think invading army, invading force—something which enters a homeland intent on stealing,

destroying, and killing (Larson, 2005; Larson, 2007; Larson 2008; Larson, 2011). Defense against invasion is justified—even if it means waging war. However, this militaristic language (Larson, 2005) is especially damaging given that it is so closely related to racist and xenophobic ideologies (Subramaniam, 2001).

What emerges from concerns regarding the xenophobic/militaristic language is a focus on belonging, temporality, and authority in deciding *who belongs where* according to some (arbitrarily?) selected timeframe. In this way, the entire field of invasion biology and the terminology it employs not only does lip service to settler-colonial conceptions of nature (Larson, 2008) and homeland (Whyte, 2017), but it actively disenfranchises indigenous ideas of nature, sovereignty, belonging, time, experience, and moves to position the settler as native (Cattelino, 2017; Subramaniam, 2001).

Before delving deeper into the cultural connections between land stewardship, lifeways, invasive species management, and indigenous futures, it is helpful to clarify what invasive species management is. Invasive species management, as it is currently practiced in the U.S. and other settler states, demonstrates a lack of empathy, ecological understanding, long-term thinking, and a failure to connect diverse peoples and beings (Reo & Ogden, 2018).<sup>1</sup> Current practices for invasive species management take a scorched earth approach—the aim is eradication through physical, chemical and biological means, with an orientation based on an approach best surmised as “These invaders do not belong, and should be removed” (Subramaniam, 2001). However, this approach does not fit well with cosmologies based on relationships (Wildcat & Voth, 2023; Whyte, 2018).

We therefore must incorporate more diverse perspectives into management and land-use decisions to prevent further injustices against indigenous people and other marginalized communities. Failure to do so will only retrench colonial systems, effectively “colonizing the future,” especially in regard to the ecological effects of climate change, invasive species, and other settler induced environmental change (Krznaric, 2020).

## 2. Why Current Invasive Biology Is Insufficient

There are a number of reasons why invasion biology needs to change, and these can be divided along lines of limited effectiveness, conceptual issues, and problems of justice.

### I. *Issues of Efficacy*

There are currently 6500 invasive species in the U.S. alone (BIA, 2024), and an estimated 37,000 across the globe, of which 3500 have been identified as harmful invasive species (IPBES, 2023). The rate of biological invasions

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<sup>1</sup> Reo et al. 2017, p. 208: “Despite all the partnerships that Indigenous groups appear to be participating in, they can be left out of the loop or informed too late about new invasive species populations, compromising early response strategies. As a representative from the Caldwell First Nation in Ontario indicated, “We are [often] not informed that a new species has taken root until it is already too late and then we are dealing with damage control.””

shows no sign of slowing down (IPBES, 2023), and it is estimated that the world is now covered in twice as many novel ecosystems as wildlands (Kennedy et al., 2018). While there is some uncertainty about the exact effects of climate change on invasive species (Finch et al., 2021; Runyon et al., 2012), Mainka & Howard (2010) suggest that together climate change and invasive species can “compound impacts on the environment in general and biodiversity in particular” (p. 108). Biological invasions are thereby an issue of global scale and significance.

There have been a number of efforts to quantify the economic impacts of invasive species in different countries (Pimentel et al., 2005; Xu et al., 2006; Office of Technology Assessment, US Congress, 1993). Recent estimates place the cost of invasive species damage at \$423 billion globally in 2019 worldwide (IPBES, 2023). Despite immense financial effort, “many invasive species problems remain unresolved” (Gutierrez & Ponti, 2013).

Typical invasive species management to this point has largely been based on eradication of the invasive species. The issue is that eradication-oriented practices are imperfect—they often have a number of (potential and observed) side effects (Norgaard, 2007; Weidlich et al., 2020, p. 1807), do not account for complex interactions between invasive species and native species (Genovesi, 2008, p. 390) that may result as a result of rapid co-evolution (Mooney & Cleland, 2001). Further, eradication is nearly impossible once an introduced species is established (DOI, 2024), especially for plant species which have seed banks that can remain dormant and viable for years (Genovesi, 2008, p. 389). Eradication is often only possible shortly after a species is introduced, but if awareness and mobilization are not fast enough, eradication is not possible and management actions must be taken to stop the spread (DOI, 2024; Reo et al., 2017 describes one indigenous person saying they are often “left out of the loop,” so when they act, it is already too late, p. 208). There is an “invasion process” chart that suggests that past a certain point, species are established and cannot be eradicated (DOI, 2024; Reo et al., 2017). Most land managers now recognize the need for containment and suppression strategies rather than eradication (Green & Grosholz, 2020).

Despite this realization, the paradigm still operates from a position of prevention is best, but eradication is ideal once they are here. Only when eradication proves impossible do conservation goals shift to containment and suppression (USDAC, 2024). Thus, given the scale of the issue, the cost of the damages/management, the increasing rate of invasions, and the failure of eradication-based programs to adequately address the issue, there is a need to transition to a new framework for invasive species management, one premised on long term management and prevention than long-term management only because eradication is unfeasible. This requires challenging the underlying worldview and assumptions of invasive species management, and conservation as a whole.

## *II. Conceptual issues*

Before delving further into the need for paradigmatic shifts in settler conservationist practices, it is important to address key conceptual issues with invasive species management. Preliminarily, as the terminology section above suggests, there is a need to specify the level of harm a species can have on an ecosystem. There is a conflation between the concepts of introduced species and invasive species that is harmful and confusing—not all introduced species become invasive, and not all invasive species are introduced—native species can spread and become invasive if the conditions are right (Valéry et al., 2009).

Additionally, in conjunction with this collapse between terms like invasive and introduced, there are other inconsistencies in determining what species to manage. The nativist bias seems to halt when it comes to food crops, for example, which makes sense given that so much of our food plants come from other places (Khoury et al., 2016). Yet people pull weeds despite many (dandelions for example, or common plantain) not causing undue harm (Reo & Ogden, 2018, p. 1448). Further complexities emerge with the recognition that some introduced species can have positive impacts ecologically and culturally (Sax et al., 2022; Wehi et al., 2023).

To complicate matters further, invasive species are only a small percentage of all introduced species. The IPBES (2023) says that 3,500 of the 37,000 introduced species worldwide are recognized as harmful invasives. This falls roughly in line with the EPA’s “10% rule,” which says that of all species that are introduced, only 10% survive to become established, and only 10% of those species become invasive (EPA, 2024).<sup>2</sup> In other words, only 10% of all introduced species are likely to become invasive. Combined with the relative neutrality of many introduced species (roughly 90%, according to the EPA and IPBES) and the benefits of others (Sax et al., 2022), it becomes clear that there is a need to clarify what species need to be managed.

### *III. Issues of Justice/Relationships*

This need to be clear in distinguishing invasive species from introduced species and the implications this has for management rapidly becomes an issue of justice when one considers that many indigenous people utilize introduced species as substitutes for threatened or extirpated local relatives (Reo et al., 2017; Wehi et al., 2023). Additionally, there is evidence that some indigenous people even utilize invasive species that have cultural significance. For example, in Hawaii hau and kukui plants are listed as invasive by the settler state yet have significant cultural meaning for indigenous Hawaiians (Wehi et al., 2023, p. 1405). In this regard, justice emerges as a focal point in invasive species management because what is invasive in one culture may be a relative in another.

Other aspects of justice stem from the non-target effects of conventional invasive species management. For example, Norgaard (2007) makes the case that there are cultural differences in levels of acceptable risk when it comes to the use of herbicides to manage weeds. Norgaard (2007)

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<sup>2</sup> Indeed, the IPBES estimate is equivalent:  $3500/37000 = 0.095$ , or roughly 10%.

notes that “many of the concerns and perspectives of community members derived from their attachment to place, historical observations of the area, and the possibility of their direct exposure [via cultural practices]” (p. 473). Norgaard (2007) presents the use of herbicides as an environmental justice issue as a result.

Two key takeaways emerge regarding justice and invasive species management. First, current management privileges settler understandings of human/nature relationships and management practices shapes the landscape accordingly. Second, there are cultural influences regarding the acceptability of certain practices, which combined with the privileging of settler “invasive-bad/native-good” binary, leads to very real implications for invasive species management. Thus, it is a matter of justice to challenge the cultural underpinnings of conventional invasive species management and the resulting practices.

### 3. Biocultural Frameworks: Dialectic Processes Between Culture and Environment

#### I. *Borrowing Hunt’s (2014) “Colonialscape”*

Hunt (2014) lays out a landscape concept she calls “the Colonialscape,” itself a modification of the concept “securityscapes” (p. 50), to “understan[d] the spatial rationales through which colonial relations are continually remade” (p. 60). These “spatial rationales” include but are not limited to “the logics of *terra nullius*, the frontier, and the reserve” (p. 60) and “their outside, non-reserve spaces, cities, and so on” are “culturally rooted ideas which together form a colonial way of seeing the Canadian landscape” (p. 72). Hunt (2014) says:

Colonialscapes...might be understood as representations of the space now called ‘Canada’, which perpetuate and manifest particular (colonial) expressions of power. Such representations take not only visual forms (...maps, paintings or photographs of ‘Indians’) but also textual (legal) forms within which western ontologies of space, race, gender and power are embedded. Just as landscapes appear to create a complete view of a particular space, colonialscapes create the appearance that a colonial spatio-legal perspective of ‘Canada’ is somehow ‘true’. Colonialscapes thus cover over other spatial relations and representations, as the colonial view blankets over these prior and deeper spatial orders. (p. 72).

While Hunt refers specifically to Canada, it should be noted that this process of “military, commercial, and cultural expansion” applies to the United States and other settler states (New Zealand, for example [Whyte, ancestors’ dystopia 207-208]). Hunt (2014) focuses on how the “colonialscape” is a reification of the Canadian legal system in which the status of “Indian” refers to indigenous people, who while no longer forcibly relegated to reserves, are

subject to “justice wormholes” which transport them “to a different spatio-temporal configuration” (Osofsky 2008, 118) to spaces where violence is expected and naturalized, in situations of interpersonal violence” (p. 73). In other words, Hunt’s colonialscape is one in which “It is not the reserve that is ubiquitous...but the colonial imaginary...based on indigenous erasure” (p. 73).

For the purposes of this paper, it is Hunt’s focus on the reification of indigenous erasure (of people, culture, and lifeways), the connection between physical landscape, settler legal systems, and constructed settler homeland that I wish to draw on.<sup>3</sup> The status of “Indian” is prescribed by settler legal systems while simultaneously being excluded from it—and not only in terms of legal protection, but physical landscape.<sup>4</sup> Part of Hunt’s major argument is that the legal framework of “Canada” can be thought of as part of the landscape—it part of the teleological cellophane of settler colonialism that is stretched over the land, ignoring history and how things got to be “this way.” Instead, the way things are is taken for granted, naturalized, and society operates from there. In Hunt’s own words:

The processes and logics underpinning colonial socio-legal relations are depoliticized through dominant ways of seeing the nation of Canada. The realization of the grid...entailed the violent displacement of Indigenous peoples in order to physically empty the land upon which the grid could be materialized...[B]y imagining the lands through the grid, Indigenous peoples cultural, political and legal systems of meaning were rendered invisible or inconsequential...[W]ithin the a-historical, depoliticized colonialscape...[a]nywhere and everywhere is terra nullius, as the empty lands imaginary can be seen as underpinning natural resource acquisition...Indigenous resistance to this development has made visible the ways that the lands are actually in use and are inhabited by Indigenous nations, although it may fail to ‘matter’ within legal processes. (p. 73-74)

While Hunt (2014) is focused on the legal ramifications of this reified settler landscape, given my focus on invasive species, I am focused more on the ramifications of this naturalized settler homeland on the landscape itself, and subsequently what lifeways/cultural activities are facilitated or hindered.

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<sup>3</sup> Hunt, 2014, p. 72: “As representations of the colonialscape, Indian reserves reinforce the underlying power relations which naturalize settlement, and hide Indigenous ways of living in relation to the land in ontologically distinct understandings of space.”

<sup>4</sup> Hunt, 2014, p. 72: “Further, the spatial representations which make up the colonialscape have been given material significance through legal and social enforcement...Importantly, I am also speaking of the spaces of settlement which form their outside: the city, civility, spaces of progress and resource extraction are all naturalized through the colonialscape as that which is not Indigenous.”

Despite the difference in our focus, Hunt’s conception of the “colonialscape” is illustrative in describing the ways in which the violent creation of the settler homeland is obfuscated, hidden, and the resulting settler homeland naturalized. Hunt’s exploration of how this negatively impacts indigenous people is no less enlightening, although I wish now to turn to exploring the concept of the “colonialscape” in regard to invasive species management.

Given that land conceptualized as a grid of private property (Hunt, 2014, p. 73), there is much overlap between the creation of settler legal structures and current invasive species practices. For one, the colonialscape, per Hunt’s description, is “ahistorical and depoliticized”—I used the term “teleological cellophane” to describe how the settler homeland wraps itself over the indigenous ones. Settler society takes as its starting point the assumption that it should exist, and examines things with a damaging presentist lens (Whyte, against crisis epistemology) that privileges approaching things as they are now rather than viewing things as historically and contextually grounded, the result of a long series of interacting events. To ignore history is to abandon the future—one cannot look backward or forwards if the focus is on an ever present “Now,” and one cannot plan if they cannot see the stories and events that led us to where we are. By using the concept of the colonialscape to explore invasive species management across settler and indigenous cultures, I aim to demonstrate the need to resituate the present into a longer view of time, one which makes room for justice, collaboration, and agency despite pressing issues.

## *II. Cronon—Changes in the Land as a Shift in Biocultural Diversity*

In *Changes in the Land* (2003), Cronon, an environmental historian by trade, lays out his central premise as exploring *why* the “different ways of living” between the Euro-American settlers and the indigenous people of what is now known as New England “had such different effects on...[the] ecosystems” (p. 12). Cronon’s exploration is launched with an emphatic declaration that this change in landscape was “not between two landscapes, one with and one without a human influence; it is between two human ways of living, two ways of belonging to an ecosystem” (p. 12). Clearly, Cronon (2003) understood the landscape as being intimately related to the practices of the people who managed it. Cronon (2003) describes this approach to environmental history as follows:

An ecological history begins by assuming a dynamic and changing relationship between environment and culture, one as apt to produce contradictions as continuities. Moreover, it assumes that the interactions of the two are dialectical. Environment may initially shape the range of choices available to a people at a given moment, but then culture reshapes the environment in responding to these choices. The reshaped environment presents a new set of possibilities for cultural reproduction, thus setting up a new cycle of mutual determination. Changes in the way people create and re-create their livelihood must



be analyzed in terms of changes not only in their *social* relations but in their *ecological* ones as well. (emphasis original, p. 13).

So it is that Cronon (2003) sees the social and the ecological as “connected parts of an interacting system” (p. 14). He does not argue for *functionalism*, and in fact argues against it—the idea that cultural practices/institutions exist to “unconsciously” serve a certain function in maintaining ecological stability—because they can lead to a “static and ahistorical view of both cultural agency and ecological change” (p. 13). Cronon’s emphasis on dialectical relationships between culture and environment is illustrative, and key to the arguments of this paper.

In this way, Cronon (2003) may be viewed as part of the tradition that the concept “biocultural diversity” has emerged from. In exploring the historical development and modern implications of “biocultural diversity,” Bridgewater & Rotherham (2019) synthesize decades worth of contributions into the following pair of definitions:

1. ***Biocultural assets and heritage*** result from interactions between people and nature at a given time in a given place.
2. ***Biocultural diversity*** is a dynamic, place-based, aspect of nature arising from links and feedbacks between human cultural diversity and biological diversity. (p. 302).

Note the similarity to Cronon’s “dialectical” relationship between environment and culture in Bridgewater & Rotherham’s definition of biocultural diversity as a “dynamic...feedback between human cultural diversity and biological diversity” and the unique “biocultural assets and heritage” that arise from this dynamism (p. 302). In either case, what is illustrated is how a change in the cultural diversity of a place leads to a dramatically altered landscape.

Importantly, Bridgewater & Rotherham (2019) draw out the conservation consequences of ignoring the concept of biocultural diversity. Bridgewater & Rotherham (2019) describe and provide examples from Britain and Europe as to how “cultural severance” can lead to “dramatic declines in ecological richness” (p. 293). Bridgewater & Rotherham (2019) do acknowledge that this is not always the case however, and that: “In some cases...there may be the emergence of distinctive novel and recombinant ecologies” (p. 293, referencing Higgs, Hobbs, & Hall, 2013; Rotherham, 2017). Taken in conjunction with Cronon’s (2023) emphasis that a transition from one cultural rule to another (settler to indigenous) can be said to lead not only a decrease in biocultural diversity and as a result, ecological richness (Bridgewater & Rotherham, 2019), but that in doing so, this feedback loop is likely to continue without an increase in indigenous agency in land management practices.

### *III. Issues with Settler-Colonial Normative Assumptions of Relation to Land*

Reo et al. (2017) discuss how the assumption of invasive species in a settler-colonial framework (like the purportedly “unprecedented” changes of the Anthropocene (Whyte, 2017)) is inappropriate when it comes to determining the risk posed to indigenous people by invasive species (p. 213). Primarily, they assert that it is inappropriate to assume that invasive species are an issue for indigenous people, and that indigenous evaluation of risks posed by invasive species and the appropriate responses to them should be shaped by indigenous histories of dealing with environmental change and introduced species (p. 213).<sup>5</sup> In essence, indigenous people are harmed by discourses that render them “vulnerable” to some environmental change like invasive species, and erases their agency/capacity for action from within their own histories and culture (Reo et al., 2017). As Haalboom & Natcher (2012) write in regard to indigenous perspectives on vulnerability discourse, it is not that they do not recognize that there are serious issues placing more pressure on the indigenous communities than ever before—rather, it is about cautioning how one approaches responding to these serious issues such that colonial power dynamics are not entrenched and indigenous autonomy, self-determination, and kinship relations further severed.<sup>6</sup> If current invasive species management practices are allowed to continue, this is exactly what will happen. To better appreciate this danger, we must unpack some of the basic norms underpinning western science and settler culture.

Holling & Meffe (1996) characterize contemporary natural resource management (of which ISM is part) as being infected by a “command and control pathology.” Reo & Ogden (2018) highlight this “command and control” ethic as being one of the major concerns expressed by Anishinaabe tradition bearers, along with “Euro-American property ownership regimes” and a “worldview predicated on the separation of people from nature” (p. 1449). Together, these three things form the central components of what Reo & Ogden (2018) term an “invasive land ethic,” which concern Anishinaabe tradition bearers more than invasive species (p. 1449). The concern about this

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<sup>5</sup> Reo et al (2017) writes: “Whatever Indigenous peoples are doing today to approach invasive species flows out of their own histories with environmental change and how these histories shape their assumptions today about the meaning or significance of their current interactions with novel species. These histories and assumptions—which do not flow out of nonindigenous frameworks such as “the Anthropocene”—shape what Indigenous peoples view as appropriate approaches to invasive species. Without losing sight of the reality of Indigenous vulnerabilities and Indigenous suffering, our focus is on what Indigenous peoples’ agency will hopefully disclose about Indigenous strategies, knowledge, and capacities for stewardship and policy responses to invasive species.”

<sup>6</sup> “While we acknowledge that northern communities are likely being challenged at a rate and scale never yet encountered (Abele et al., 2009), we are concerned about the very real, though perhaps unintended, consequences of characterizing northern indigenous communities as vulnerable.” p. 320

“invasive land ethic” arises from the forced replacement of indigenous land division protocols and stewardship practices with Euro-American systems of private ownership and practices (Reo & Ogden, 2018; Holling & Meffe, 1996; Cronon, (2003)).<sup>7</sup> To understand why “command and control” techniques of land management are favored by settler states, one must look at the associated culture. Selected here are three key cultural underpinnings (although there are likely more): Christianity; the triad of wilderness, private property, and capitalism; and language.

#### *A. Christianity*

There is no shortage of literature on the damaging effects of settler-colonial ideologies, the “invasive land ethic,” on the environment. Primarily, a millennium of Christianity has done a number on the development of Euro-American land relations. White (1967) wrote “[i]t has become fashionable today to say that, for better or worse, we live in the “post-Christian age.”” (p. 1205). However, White remarks that while language and practice may have changed, the underlying ideas/values are remarkably similar.<sup>8</sup> Notions like “an implicit faith in perpetual progress” and an “exploitative” relation to nature based on God-granted dominion over nature that effectively “established a dualism of [hu]man and nature” which made it “God’s will that man exploit nature to his proper ends” (White, 1967, p. 1205). As it arose in its Western European form, White (1967) calls Christianity “the most anthropocentric religion the world has ever seen” (p. 1205). White (1967) traces these traditions into modern scientific and technological thought, and though he does not explicitly state it, contributes to the tradition which views the Enlightenment as less of a revolution and more of a costume change, which substituted nature and science for God, etc.

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<sup>7</sup> Reo & Ogden (2018) describe the existence of land division protocols that existed for the Anishinaabe prior to European colonization. “Prior to the imposition of Euro-American ownership regimes, Anishinaabe had their own systems for controlling access to land and resources that revolved around active and proper use. As described in our interviews, if a family was actively and properly (according to cultural norms) using land for maple sugaring, hunting, berry picking or other subsistence purposes, other families knew to keep out or to ask permission to access these lands. Families with these traditional rights could use these lands seasonally, for example, during summer harvest activities, and safely leave their lodges and tools behind for the rest of the year.” (p. 1449).

<sup>8</sup> White (1967), p. 1205: “Certainly the forms of our thinking and language have largely ceased to be Christian, but to my eye the substance often remains amazingly akin to that of the past. Our daily habits of action, for example, are dominated by an implicit faith in perpetual progress which was unknown either to Greco-Roman antiquity or to the Orient. It is rooted in, and is indefensible apart from, Judeo-Christian theology. The fact that Communists share it merely helps to show what can be demonstrated on many other grounds: that Marxism, like Islam, is a Judeo-Christian heresy. We continue today to live, as we have lived for about 1700 years, very largely in a context of Christian axioms.”

Sticking with the anthropocentricity of Christianity and its subsequent adoption into questions of human nature and the basis of inequitable property rights, it is important to recognize our modern settler societies as *post-Christian*, rather than secular (White, 1967). This is essential because it emphasizes that while traditions and cultures may morph over time, key core tenets may remain the same—notably, the idea of human dominion over nature. Also, conceptual aspects of Christianity aside, the Church itself supported and encouraged the colonization of the Americas, particularly with the Papal Bull of 1493, which divided the Americas between Spain and Portugal (Curley, 2021, p. 80).

### *B. Wilderness, Private Property, and Capitalism*

Curley (2021) argues that “resources is just another term for colonialism,” detailing the history of settler extraction and concurrent indigenous abuse. In their quest for resources and wealth, Euro-Americans expanded into indigenous lands, forcibly removing and massacring people as they went (Cronon, 2003; Whyte, 2017; Wolfe, 2006). Ostensibly, these settler societies required justification for their actions. Private property and wilderness were two such concepts that allowed for the moral justification of abhorrent colonial theft and violence committed in the capitalist pursuits of resources and wealth (for example: Locke, 2008).

Wilderness is a Euro-American invention that was used to justify the taking of land from indigenous people and obfuscating the violence that led to its being uninhabited (e.g. disease, warfare, forced removal, etc.) (Cronon, 1996, p. 7, 15-16). To add insult to injury, not only were people removed, but then the beauty of the land was marketed as unspoiled wilderness, in its “pristine,” “virgin,” “unspoiled state,” as it were immediately after God’s creation (Cronon, 1996, p. 16). However, as Cronon (1996) points out, there is a tension in the concept of wilderness because as it is unspoiled, it is also ripe for the taking (he describes tourist consumption, but at the beginning of colonization, it was all about consumption of land and material resources). Curley (2021) sums up this taking by stating that “European kingdoms competed with each other to claim the largest and most profitable parts of the world that they could conquer through violence” (p. 80).

Wilderness is also inextricably linked to private property and wealth accumulation. Cronon (2003) describes the notion of “improvement” that was at the core of developing wealth (p. 77-78). By applying land relations based on private property, it was ensured that any “improvements” made to the land would translate into accumulated wealth for the owner and their descendants (p. 77). Accordingly, there was a moral justification for taking indigenous lands that boiled down to a prescriptive rule: they are not *using* it correctly, or more specifically, they are not “improving it” to increase its value as “capital” (Locke, 2008, p. 298-299; Cronon, 2003, p. 77). Only by taking the land, bounding it, and adding one’s labor towards the improvement of it was the land being properly utilized (Locke, 2008, p. 298-299; Cronon, 2003, p. 77).

Notions of racial superiority, proper use of land, and the myth of wilderness as available land to be tamed justified settlers in taking the land.

In combining discussions of land, race, and capitalism, it emerges that in the European tradition, Tuck et al. (2014) describe the process of converting “land and bodies into property [as] necessary for settlement onto other people’s land” (p. 3). Further, Tuck et al. (2014) quote Wilderson (2010) describing the three demands in U.S. settler states: “the (White) demand for expansion, the (Indian) demand for return of the land, and the (Black) demand for ‘flesh’ reparation” (p. 29)” (p. 4). Saito (2017) describes the transition from feudal Europe to industrial Europe as one which severed the connection between the people and land, as they became landless, selling their labor to acquire the necessary things for survival that they were able to acquire from the land outside their toils as serfs (p. 35-42). In the U.S. settler framework, Tuck et al. (2014) say that “to be made into property, according to settler colonialism, Black people must be kept landless” (p. 3, ref. Tuck & Mackenzie, 2014). I do not mean to compare the plight of the proletariat to the slave—I only mean to highlight the connections Tuck et al. (2014) note regarding the process of conversion of land/people into property/wealth, and the rise of capitalism as told from Saito’s ecosocialist interpretation of Marx (2017). Thus, it emerges that capitalism is inherently racial, as wealth accumulation must be afforded to the few at the expense (theft, literally and metaphorically) of the many.

### C. *Language*

Culture is entangled with language, and how we speak, the words/ways of describing the world create/recreate our relation to it (Bridgewater & Rotherham, 2019). Consider the difference between English and Potawatomi. Kimmerer (2013) reminds us of the power of language, its strong ties to culture, worldview, and lifeways. In describing her experiences in trying to learn the language she would speak had colonization not happened, Kimmerer writes:

To actually *speak*, of course, requires verbs, and here is where my kindergarten proficiency at naming things leaves off. English is a noun-based language, somehow appropriate to a culture so obsessed with things. Only 30 percent of English words are verbs, but in Potawatomi that proportion is 70 percent. Which means that 70 percent of the words have to be conjugated, and 70 percent have different tenses and cases to be mastered. (p. 53)

Kimmerer (2013) appropriately draws out the connection between speaking of the world as objects, as dead, as things to be bought and sold for money and the structure of the English language. Another example she uses is the term “it”—this is how we are taught to speak about non-humans (Kimmerer, 2013). English lacks what Kimmerer (2013) terms “the grammar of animacy,” and thereby English speakers are experiencing the world as dead, while

Potawatomi speakers experience it as alive (p. 53-55). However, the impact on English speakers is that it further entrenches the idea of human supremacy and exceptionalism because we are the only ones who cannot be objectified.<sup>9</sup>

*D. The Worldview: Fear What Cannot Be “Commanded and Controlled”*  
Given these brief examples, our cultural inheritance as settlers impacts our invasive species practices. For example, building on Kimmerer’s (2013) discussion of English lacking a “grammar of animacy” (p. 55), when it comes to relationships with invasive species, we might describe our practices as “conservation” or “management.” By contrast, Hernandez (2022) says “there is no word for conservation in many of our Native and Indigenous languages” (214). Hernandez (2022) says that in Zapotec there are phrases that translate to “taking care of” or “looking after,” which is not what settlers mean by management or conservation (Hernandez, 2022, 214). Instead, to settlers, both invoke connotations of control and security, or the political euphemism, “protection.”

Hernandez (2022) continues to say that many invasive species are actually “displaced relatives” of white people who were “introduced during colonial times by settlers and colonizers” (p. 215). Hernandez (2022) continues:

What this means is that many white people have lost their ancestral roots due to the assimilation the Americas have undergone and, as a result, they have lost their relationships with the same plants they now deem as terrible beings. (p. 215).

Never in a million years would it occur to a settler ecologist to consider the common plantain a relative—but indigenous people are well aware of its association with European colonizers, as it seemed to pop up everywhere they went, leading to some New England peoples naming it “Englishman’s foot” (Cronon, 2003, p. 143). Instead of recognizing it as a relative, the English and now contemporary settlers characterize it as a “weed,” a nuisance plant to be pulled (Cronon, 2003, p. 143; Reo & Ogden, 2018, p. 1448).

These linguistic and cultural examples demonstrate how separated Euro-American settlers conceive of themselves from the environment. Stemming from a cultural background that holds humans are superior to nature, separate from it, and with the “right” to utilize it anyway, it is clear how contemporary invasive species management emerges from this tradition.

Invasive species management emerges from these traditions with a default emphasis on eradication of that which “does not belong” (Wehi et al., 2023). There is a sense that things now are not as they should be—the “should be” implying a static ahistorical state (Larson, 2008), one which has developed based on the conditions of the land that settlers “inherited” (stole) from the indigenous people. This idea of “belonging” is itself a colonial concept, connected to invasive species management via the same xenophobic

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<sup>9</sup> And even this is not true—chattel slavery, sexualization of women, etc.

sentiments that spurned racial superiority and eugenics movements in Europe and the Americas (Wehi et al., 2023, p. 1406-1407). Just as ideas of racial superiority and eugenics can shape national policy and treatment of minorities/immigrants, so too can ideas of “native” and “invasive” lead to xenophobic responses to introduced species premised on eradication of “the other” (Subramaniam, 2001; Wehi et al., 2023, p. 1406-1407).

In this way, invasive species management as it is currently practiced in many contexts stems from ideas of command/control, terraforming, and maintenance of the homeland (Holling & Meffe, 1996; Cronon, 2003; Whyte, 2017; Hunt, 2014). Emphasis now is on the preservation and re-creation of the homeland: first settlers created it physically while naturalizing our right to be here and use the land (Cronon, 2003; Locke, 2008); now we get to decide how the land should be as a result (naturalization of the invader is bitterly ironic [Subramaniam, 2001]). Invasive species management, therefore, arising out of a tradition of settler colonialism, is part of the structures that displace indigenous ways of being and invalidate indigenous worlds.

As Reo & Ogden (2018) and Tuck & Yang (2012) point out, there were clear systems in place of how the land was to be divided and managed prior to European arrival. It is a matter of justice then to ensure that invasive species management is collaborative, respectful of indigenous practices and agency (Wehi et al., 2023; Atchison et al., 2024; Reo et al., 2017). Further, in accordance with Wehi et al. (2023), I advocate for the incorporation of “indigenous management frameworks that are relational and biocultural” into invasive species management (p. 1403).

#### *IV. Indigenous Relational/Biocultural Frameworks: Developing a “Kincentric Ecology” of Invasive Species*

Reo et al. (2017) end their article by borrowing the term “kincentric ecology” from Rarámuri (Tarahumara) scholar Enrique Salmón, closing out their paper by asking what a “kincentric ecology of invasive species look[s] like, or if none exists, how could such an understanding be cultivated?” (p. 218). This process of fitting invasive species into indigenous cosmologies provides one of the strongest reasons to protect indigenous agency in conservation. This is not to advocate an instrumental view of indigenous peoples—to the contrary, it is simply a statement of recognition that their cultures are better equipped to incorporate invasive species than Euro-American settler cultures which are still premised on human superiority to and separation from nature.

Consider how Robinson et al. (2005) describe the views and values that introduced and now “feral” species like the water buffalo, horse, and pig have taken on in indigenous Jawoyn culture. Robinson et al. (2005) break it down as water buffalo as bush ‘tucker’ or food, horses as bush pets, and pigs as bush threats. In other words, rather than cast all these introduced species as bad by virtue of being introduced, the Jawoyn people utilize observation and experience to determine what their relationships are to these new species (Robinson, 2005, p. 1389-1390).

Wehi et al. (2023) similarly describe the complicated relationship that Polynesian peoples have to introduced species, stating that they are just one people who have “intentionally migrated plant and animal populations deemed useful into new or existing homelands over many thousands of miles and years” (p. 1405). Two of these species are *kukui* and *hau*, both of which are still harvested by Hawaiians to this day, thereby “continuing biocultural and socioecological relationships despite the plant's invasive status” (Wehi et al., 2023, p. 1405, ref. Abbott, 1992).

In the case of both the Jawoyn people and Polynesian descended Hawaiians, there is no simple value-laden bifurcation between introduced-bad, native-good. Instead, as Wehi et al. (2023) put it, “What matters is both the behaviour of the alien animal or plant within a community of human and more-than-human relatives, as well as how (and whether) that community can respond” (p. 1405).

Indigenous cultures are not monolithic, and indeed their distinctiveness is part of why the call for plurality of perspectives and practice in invasive species management is so important (Wehi et al., 2023). What is illustrative from these examples is that each demonstrates the importance of acting with respect toward more-than-human kin.

For the Anishinaabe, this understanding of kinship gives rise to a land ethic based on the concept of “aki,” which is often translated as “Earth,” and “encompasses a broader cosmological sense of the sacredness of place” (Reo & Ogden, 2018, p. 1446, referencing Cornell, 1990). Settler strategies of “command and control” are entirely inappropriate because they jeopardize relationships, responsibilities, non-human agency, etc. (Reo & Ogden, 2018, p. 1449).

To the Anishinaabe plants are assembled into “nations,” and hold the status of people (Reo & Ogden 2018, p. 1447 cite my favorite example from Kimmerer 2013: that trees are “standing people”). As such, movement/migration is entirely natural, derived from plant and animal agency. Rather than fearing introduced species and potential change, some Anishinaabe suggest treating invasive species as “new arrivals” whose use/gifts, relations, role, etc. have not been figured out yet:

[I]t is the responsibility of humans to determine the reason why new plants or animals have arrived in their territories, and actively determine the nature of novel human–animal or human–plant relationships” (Reo & Ogden, 2018, pp. 1446-1447).

Note how much more reasonable this approach is—rather than reaching for herbicide and loppers, there is an attempt to understand these new arrivals as “displaced relations” (Hernandez, 2022). There is acceptance and willingness to learn about the new species, work with it to establish a relationship with reciprocal responsibilities. To determine this, some Anishinaabe have “expressed interest in learning about newly introduced plants and animals from the indigenous people who have the longstanding connections to those



species as well as from the new species themselves” (p. 1447). However, this can be complicated, because in some places people have lost this knowledge (Euro-American settler descendants, in Hernandez (2022) example).

Three key differences emerge between non-indigenous and Anishinaabe thinking about invasive species management. First, settler practices/language mark these species as malevolent enemies, while indigenous people are able to accommodate the agency of these species and seek to form relationships with them rather than obliterate them instinctively (Reo & Ogden, 2017; Hernandez, 2022; Larson, 2011). Second, philosophical differences emerge regarding the role of human stewardship, where indigenous peoples focus on relationship building and settlers focus on management for function—our culture lacks the immediate means to allow us to make sense of the idea of forming mutualistic interpersonal relationships with more than human beings (Reo et al., 2017; Wehi et al., 2023). Third, as Reo & Ogden (2018) suggest, they seem capable of deploying a more measured approach to invasive species management, which they describe as one of “wait-and-see pragmatism” (p. 1449). Compare this to U.S. environmental agencies calling for eradication unless it is impossible, and the importance of cultural cosmologies to management practices emerge.

Clearly there is something distinctly unique about the multitude of indigenous community worldviews that position them to incorporate invasive species into their “relational ontologies” (Whyte, 2018; Martinez et al., 2023; Kimmerer, 2013) better than Euro-American settlers. Combined with the effectiveness of indigenous methods of management, it becomes clear that it would take a cultural revolution for Euro-American settlers to develop a cosmology capable of incorporating invasive species as anything other than enemies to be eliminated. As such, it is expedient to elevate indigenous people in management because they already possess such a worldview which allows them to approach invasive species with a more measured, diplomatic approach (especially when compared to settler war style management [Larson, 2005]). However, this action must be grounded in justice, paired with stories of history, so as not to instrumentalize indigenous people’s knowledge, elevating them only as a “means to an end.”

## **Discussion**

### **1. The Case for Indigenous Agency**

Consider the questions one must ask when issues of climate, environmental, and indigenous justice are considered in the context of invasive species. Initially, the statement is “we must remove/manage this invasive species because it is not from here and is a risk to the native ecosystem species and function.” First, one must question this assumption—is it *really* invasive? Is it actually a harm to the ecosystem? The EPA’s rough guideline is that just 1% of all introduced species are problematic enough to be deemed invasive (2024—the 10% rule). Second, one ought to consider who gets to determine (a) if the species is a problem and (b) how to manage it? Is it on private property? Public land? More to the point, what indigenous peoples’ *stolen*

land are you on? Why do they not get a say? Third, assuming a coalition of stakeholders, state/local agencies, nonprofits, property managers, indigenous people, etc. can be formulated—who gets to make the decisions? How do we communicate cross-cultural values? What is the goal for the management—manage it *until when* and to what end? In other words, is the management oriented toward eradication of the species or long-term control of the species? Is it combined with other management programs to maximize eventual return on investment via a timber harvest, or is the goal improved habitat for native berry producing shrubs to provide native birds with habitat, food, etc.? Is the land managed for profit or ecosystem health? Is the land managed in a way that obfuscates indigenous lifeways, while elevating settler-colonial ones? To reiterate—who gets to decide? *Why?*

I could continue this stream of consciousness style exercise, but the point should be clear—invasive species management is more than dumping herbicides and cutting vines, and it cannot be left up to empirical scientists alone. There is a need for cross-cultural collaboration, communication, and relationship building/repairing, and this can take a long time. Cultural values, inherited assumptions, underlying worldviews—these are embedded within how we operate in the world and are embedded within how we manage/relate to land. How we manage/steward/relate to the land today determines how our children can manage/steward/relate to the land in the future, and how the land is managed impacts what lifeways are possible. Only through effective, just collaboration can indigenous futures, if not indigenous lands, begin to be decolonized. And for this, there is a need to increase indigenous agency in collaborative management.

### *I. Challenging Invasion Biology—Science Denialism or Perspective Plurality?*

The colonialscape’s power is that it is invisible to settlers—or more specifically, its management is framed as supported by objective sciences free from any valuation, or otherwise naturalized (Hunt, 2014). This however, has long been disproven—objective science hides colonial values/assumptions within it (Vinyeta, 2022). Indeed, there has been much critique of the developing field of “invasion biology” precisely for the subjective valuations it involves.

To begin, there is an overwhelming negative bias towards invasive species in the literature (Sax et al., 2022). The next section of this paper will explore this bias in greater detail, but what is notable here is that not only is there a bias, but anyone who speaks out against negative characterizations of invasive species or current management practices are at risk of being labeled a “science denier.”

There is a defensiveness from the camp of some invasion biologists when anyone, but particularly non-scientists, dare to challenge their recommendations for conservation and invasive species management, derived from their ultimate authority as *objective scientists*. However, given the intimate linkages discussed between ecology, management/practice, and

culture that this paper explores, it should be clear to those who haphazardly throw out accusations of “science denialism” that these issues *require* interdisciplinarity. Without naming names, there are a select few invasion biologists (Ricciardi & Ryan 2018; Russell & Blackburn 2017) who as Munro et al. (2019) put it, “threaten to stymie constructive debates in and about invasion biology” with their “prejudicial” and “unfounded” accusations of invasive species denialism (ISD) which are “not arrived at by rigorous scientific analysis” (p. 801). Munro et al. (2019) conclude their examination of these ISD allegations by reminding their nameless colleagues (Ricciardi, Ryan, Russell, and Blackburn) that:

Tolerance of different perspectives is a quality widely valued in open societies, including scientific communities. In science one accepts that a diversity of perspectives is an advantage, not a problem. It is also an ethical imperative because including minority views in scientific institutions is an expectation of modern science (White et al. 2018). The intolerance by some invasion biologists of different perspectives, made manifest in fallacious accusations of science denialism, is problematic. (p. 801).

I highlight this issue because of the emphasis on a plurality of perspectives as being necessary in science generally, and invasive species management in particular. While the intention of Munro et al. (2019) may be limited to a defense of scientific inquiry and debate, there is a deeper issue of rejecting ideas based on other knowledge or ways of being.

For example, Wehi et al. (2023) describe that Indigenous communities, by contrast, are able to hold space for greater complexity when it comes to invasive species:

This is not to say that Indigenous communities fail to recognise that the behaviour of alien species can be damaging in new places or that eradication may be an appropriate agreed response. Rather, it is to say that a thoughtful and just approach will result from taking the time to unpack the complexities at play and from grappling with the finer layers of more-than-human connections. (p. 1411).

Two key things emerge here—first, that indigenous views on invasive species are grounded in different cosmologies, and second, that indigenous methods of dealing with invasive species are capable of holding both urgency and thoughtfulness together (Whyte, 2020). Given the quote from Wehi et al. (2023) above, and what others have written about indigenous relationships to and views on invasive species (Reo & Ogden 2018; Reo et al. 2017; Hernandez, 2022), it becomes clear that more than stymying scientific debate, those who cry “science denier!”, (and notably, even those who do not, but uphold a colonial view of nature) actively maintain a colonial tradition which

seeks the disempowerment and dismissal of indigenous cosmologies and knowledge.

While it should be noted that there have been a number of critiques from within the western scientific community as well (no community is a monolith), stemming from a settler culture, western scientists are not as impartial as they would like to believe, and instead their “objective” data is interpreted through a socialized worldview with attendant normative values (Khan, 2022). Therefore, to advocate for advancing Indigenous agency in invasive species management, it is important to understand the normative assumptions that structure current invasive species management.

**2. The Positive Impacts of Elevating Indigenous Agency**

*I. Demonstrate Indigenous Difference in Action, Increase Indigenous Esteem*

To emphasize indigenous agency, in many aspects of environmental thought indigenous people must stop being constructed as passive victims, helpless in the face of increasing “vulnerability” from climate change, invasive species, etc. (Reo et al., 2017; Haalboom & Natcher, 2012). It is not that indigenous people are not facing environmental challenges, but rather that highlighting their vulnerability robs them (at least in the public eye) of the ability to address the issues themselves, on their terms (Reo et al., 2017, p. 203). What is needed are collaborative management efforts that elevate, respect, and make space for indigenous agency.

To document indigenous initiatives regarding invasive species, Reo et al. (2017) conducted a survey of 106 respondents who were by “enrollment, descent, and employment” members of or associated with indigenous communities from across North America. Reo et al. (2017) found a number of goals and associated actions when it comes to invasive species.<sup>10</sup> These responses and the associated percentage of respondents are reconstructed from Reo et al. (2017) in Table 1.

The key takeaway from the work of Reo et al. (2017) is that there are *numerous* strategies currently being utilized by indigenous peoples in North America oriented toward prevention, mitigation, and adaptation in regard to invasive species. Clearly, Indigenous people are well aware of invasive species, and contrary to dominant vulnerability discourse actively responding to invasive species issues from within their own traditions (Reo et al., 2017). Reo et al. (2017) say that Indigenous nations use the same strategies as settler governments/NGOs, as well as some that are “unique [and] culturally informed” such as ceremony and documenting TEK (p. 202-203).

Goal	Action	Percent (n=106)
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<sup>10</sup> Reo et al. (2017) write: “In total, through enrollment, descent, and employment, respondents represent 144 unique Indigenous nations in 17 U.S. states and 4 Canadian provinces (figure 2). The final number of respondents is higher than our sample size of 106 because several respondents were citizens of one Indigenous nation and worked for a separate nation.” (p. 205).

Prevention	Increasing resilience	82
	Cooperating with non- Indigenous government agencies	81
	Creating education programs	70
	Cooperating with an NGO	58
	Cooperating with other Indigenous nations	55
	Cooperating with a university	50
	Developing policies with non- Indigenous entities	44
	Developing emergency response	25
	Creating Indigenous nation policies	24
Mitigation	Hand pulling	83
	Educational programs	76
	Mechanical removal	64
	Chemical application	50
	Fire	37
	Hunting	36
	Biocontrol	36
	Ceremony	21
	Grazing	20
Adaptation	Documenting traditional ecological knowledge	53
	Saving native seed	47
	Sharing strategies with other Indigenous nations	47
	Traveling farther to harvest native species	46
	Ceremony	38
	Transplanting native species	27
	Shifting from native to introduced species	16
	Using alternative materials	14

**Table 1:** Reconstructed from Reo et al. (2017, p. 206-207) this table shows the percentage of respondents who partook in actions oriented towards the goal of prevention, mitigation, and adaptation in regard to invasive species.

## II. *Ecological Benefits of Increased Indigenous Agency—Increased Efficacy*

Beyond their uniqueness, Indigenous management practices *work*—across the globe, a number of studies have found that indigenous lands are essential reservoirs of biodiversity, intact forest landscapes, and are overall identified as

biodiversity strongholds or important for climate mitigation (Kennedy et al., 2023; Brondizio & le Tourneau, 2016; Walker et al., 2020; Sze et al., 2021; Garnett et al., 2018; Estrada et al., 2022; Malmer et al., 2018). For example, O’Bryan et al. (2021) found that Indigenous Peoples’ lands are *essential* to the conservation of terrestrial mammals. Schuster et al. (2019) found that in Australia, Canada, and Brazil (“three of the largest six countries on Earth,” p. 4) “Indigenous-managed lands and existing protected areas host similar levels of vertebrate biodiversity” (p. 1). Further, Schuster et al. (2019) found that “the distributions of more species, and *more threatened species in particular*, overlapped Indigenous-managed lands *more often than overlapped existing PAs* [protected areas] or randomly selected sites overall 26,682 taxa examined” (p. 4, emphasis added). In other words, indigenous managed lands were significant in *which species* they harbored (i.e. significantly endangered ones). Beattie et al. (2023) studied the impact of armed conflict on indigenous lands, given the overlap of biodiversity hotspots and armed conflicts 1950-2000, and found that despite these armed conflicts, indigenous managed lands possessed a higher environmental quality in biodiversity hotspots than non-indigenous lands. Fa et al. (2020) found that 33% of intact forest landscapes (IFLs) are conservatively estimated to be on Indigenous peoples’ lands (p. 137), and that these lands are essential for the services they provide as well as the role they play in climate protection (p. 135, 138). Overall, it should be noted that whatever conservation practices indigenous peoples implement on their lands are effectively preserving biodiversity in the face of ongoing colonial oppression.

As a result, a number of these same papers also call for conservationists to support indigenous rights, indigenous sovereignty, indigenous land tenure, etc. (Kennedy et al., 2023; Brondizio & le Tourneau, 2016; Walker et al., 2020; Sze et al., 2021; Garnett et al., 2018; Estrada et al., 2022; Malmer et al., 2018). For example, Beattie et al. (2020) says that there is an “integral connection between supporting Indigenous Peoples’ rights and advancing socially-just biodiversity conservation” and that “[b]y doing so, we can work towards fulfilling the Convention on Biological Diversity’s vision of “Living in harmony with nature” by the year 2050.” (p. 5). However, we must be mindful of the shape our relationships with indigenous people take. Estrada et al. (2022) for example says, “Safeguarding Indigenous Peoples’ lands, languages, and cultures represents our greatest chance to prevent the extinction of the world’s primates.” However, it should be noted that they are worth protecting *in and of themselves*. If we are to heal relationships with indigenous people, we must be sure to avoid instrumentalizing their movements for self-determination and resurgence for our own purposes.

### *III. Heal Relationships With People and Land: Socially Just Conservation for Biocultural Diversity*

Given the concepts of the inscribed settler homeland into indigenous homelands (Whyte, 2017), the “colonialscape” (Hunt, 2014), nature/culture dialectics (Cronon, 2003), and biocultural diversity (Bridgewater &

Rotherham's 2019 review), it should be clear that the power dynamics between settler and indigenous peoples have led to the radical transformation of the landscape due to systems of settler supremacy that result in indigenous lifeways being hindered and settler ones are facilitated (Cronon, 2003).

However, given recent interconnected issues of climate change, biodiversity loss, environmental degradation, and invasive species, the landscape is becoming increasingly complicated, composed increasingly of "novel ecosystems" that require drastically new management techniques (Seastedt et al., 2008). As such, there emerges a space to make interventions into land relations and management that allow for greater indigenous agency and cultural flourishing.

Necessarily this requires collaboration and comanagement practices with the very settler colonial governments/agencies/peoples who are responsible for these environmental issues and centuries of indigenous genocide (Whyte, 2017; Wolfe, 2006). This demands attention to relationships to ensure that indigenous agency is respected now and into perpetuity, with attendant weight given to indigenous knowledge, cultural practices, and ways of being *not* as instruments of empire, but as unique biocultural/relational frameworks that exist *for their own purposes*.

Concurrently, settler people, agencies/governments can learn from indigenous "relational and biocultural frameworks" (Wehi et al., 2023) to improve their own land relations. While it may not be appropriate for settlers to claim the same language of kinship and relatives when speaking of non-humans, there is a need to develop concepts similar to this from within our own cultural inheritance. As it stands, settlers view non-humans as lesser, to be utilized or disposed of as we see fit. While done in the name of "ecosystem management," this reproduces harmful dominion-esque relationships between people and the land, as well as the false binary between the two. Only by engaging with indigenous people can settlers be introduced to other authentic ways of relating to the world from a relational cosmology.

However, settler-descendants must assess their relationships with indigenous people to ensure they do not fall into historically status quo relations of hierarchy, nor contemporary risks of instrumentalizing indigenous knowledge (Atchison et al., 2024; Kimmerer, 2002). Indigenous agency must be respected and protected if conservation goals are to be met, but more importantly, if conservation is to proceed in a socially just manner (Atchison et al., 2004). This can only be the case if indigenous people are the ones leading conservation efforts they are part of (Reo et al., 2017). Otherwise, there is risk of damaging indigenous esteem (Haalboom & Natcher, 2012) and reproducing the vulnerability discourse that requires white, settler led management to "save" the land and indigenous people (Haalboom & Natcher, 2012; Reo et al., 2017). Settler governments, agencies, and descendants must approach work with indigenous people as collaboration with equals (they legally must under many of the treaties that exist (Scott, 2018; Hiller, 2016)).

Lastly, not only is collaborating with indigenous people important for indigenous justice, but also for environmental justice. Given the intimate

connection between culture and environment (which is an inherent part of indigenous cosmologies), increasing agency of indigenous management practices will increase the availability of culturally specific and maintained landscapes, which may well prove to be essential in diversifying habitat and increasing biodiversity (Bridgewater & Rotherham, 2019). In doing so, there is greater chance for improved ecosystem function, as well as a strengthening of relationships between the land and people. In these ways, increased indigenous agency in invasive species management can lead to improved relationships between settlers and indigenous people, settlers and the land, and increased justice for indigenous people and non-humans as a result.

### **3. Pitfalls to Avoid in Increasing Indigenous Agency in Collaborative Management**

#### *I. Against Settler Instrumentalism*

While it is inspiring that a number of scholars are calling for supporting Indigenous rights and sovereignty in conjunction with conservation work, one reservation I hold in regard to this movement is that indigenous knowledge/people/ practices could be utilized instrumentally, then be discarded at the earliest convenience. My fear is that this advocacy could position Indigenous lands/people/cultural practices to operate almost as a “magical Negro” (Hughey, 2009) or “wise Indian” (Mehta, 2020) character in American literature/film. Where these characters are positioned to help the white hero, the “white messiah” (Mehta, 2020), dominant narratives in conservation seem to be positioning indigenous people in much the same way. The indigenous people are indeed “magical” or “wise” because they possess the knowledge or cultural ability to maintain biodiversity and quality habitats in a way that, if not the white messiah character, the settler “alliah” (Mehta, 2020) cannot. In this way, if we are not careful, even for settler allies it is all too easy to trip and fall down the rabbit hole of a relationship of use.

Settler governments have a history of abandoning their responsibilities to indigenous people when it serves them, particularly when it comes to disrespecting or ignoring indigenous sovereignty. For example, there are a number of treaties that are actively not enforced, and premised on a recognition of indigenous sovereignty only as far as it suited the colonial powers in stealing their land (Scott, 2018).<sup>11</sup> Therefore, it is as important to (1) consider the power dynamics/relationship structures with indigenous peoples to avoid retrenching colonial relations, and (2) to be cognizant of the distrust and caution many indigenous people may hold toward settler allies, settler agencies, settler governments, etc. (Winter et al., 2021, p. 338). It is not that two things cannot be true—it is possible to both foster indigenous sovereignty/rights and work collaboratively to increase justice and protect biodiversity. However, we must be careful to avoid prescriptive relationships

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<sup>11</sup> Scott (2018) writes: “They have just enough sovereignty to enter into treaties that legitimate the occupation of their land and establish the sovereign authority of the colonial powers, but not enough to meaningfully exercise their sovereign right to territorial control.” (p. 393).



with indigenous people—help us with this, do this, tell us this, etc. This is why we must focus on bolstering and respecting indigenous agency—they, like any other people, have the right to practice their culture and live well, according to their desires and in accordance with Scott (2018), the sovereignty *they never relinquished*.

It is important to recognize that indigenous communities are distinct from settler society due to cosmologies of relationality, kinship, and reciprocity (Kimmerer, 2013; Wildcat & Voth, 2023; Whyte, 2018). Developing out of these cosmologies are practices that focus on reciprocal relationships between humans and the more than human (Whyte, 2018; Kimmerer, 2013; Wehi et al., 2023). As a result, Artelle et al. (2019) states:

“Supporting the resurgence of governance systems that acknowledge the deeper, reciprocal connections between well-being of people and biodiversity might provide educational opportunities for non-Indigenous conservationists to better understand the fuller scope of potential ways of interacting with place” (p. 6).

However, Artelle et al. (2019) also make it clear that although there is great potential for conservationists to work with indigenous people to “rapidly advance conservation and stewardship that is both effective and just” (ref. Ban et al., 2018; Gavin et al., 2018; Zurba et al., 2012), nonetheless, working to increase indigenous justice “ought not be simply a means to an end for conservationists” (p. 6). Instead, Artelle et al. (2019) write that “Indigenous rights and title must be recognized as inherent and inalienable, not contingent on their compatibility with conservation targets” (p. 6, ref. Witter and Satterfield, 2018).

To restate—the instruction to work toward indigenous rights, sovereignty, and the like is important, and the fact that there is awareness and advocacy from the conservation community is inspiring. However, I urge an emphasis on indigenous agency at all steps of the process to avoid appropriation, foster respect, and facilitate justice.

## *II. Disrespect of Indigenous Knowledge (IK) Hinders Indigenous Agency in Collaborative Management*

Given the demonstrated ability of indigenous people to make room in their cosmologies for invasive species (Reo & Ogden, 2018; Wehi et al., 2023; Robinson et al., 2005) and take innovative actions grounded in their own specific biogeographic and biocultural contexts (see the examples above), why is the discourse about invasive species dominated by vulnerability narratives (Reo et al., 2017; Wehi et al., 2023)? The answer lies in a lack of respect for IK/associated cultural practices.

Cronon (1996) describes the need for an ethic that “we need an environmental ethic that will tell us as much about using nature as about not using it” (p. 21). Booth (2003), in referencing Nelson (1983), describes this as a “conservation ethic” (p. 345). Booth (2003) writes that Nelson (1983) and

Tanner (1979) could find no objective data that the cultural practices of the Koyukon (according to Nelson) and the Cree (according to Tanner) led to an achievement of the conservation goals they were (likely) oriented towards (p. 345). According to Booth, Berkes (1999) “makes an extensive case for a conservation ethic of the modern Cree” but also pointed to many “mistakes and misapprehensions” (2003, p. 345).

The “lack of objective data” while part truth, is misleading—no one was around making census of ecological impacts of indigenous North Americans in methods recognized by Western science, at least not prior to serious consequences by interactions with Europeans changed the land, decimated the population of people via disease and violence, and wreaked havoc on the ecosystems with the fur trade, expansion for agriculture, and various other extractive industries (Belshaw, 2015; Cronon, 2003; Curley, 2021; Whyte, 2017). Also, prior to European arrival, records were oral. Just as much was lost regarding “pagan” European traditions due to their traditions being oral and active erasure/genocide by empires like the Romans (Creer, 2023) or Charlemagne’s Holy Roman Empire (Cusack, 2011), indigenous traditions in North America prior to European contact were oral *and* actively dismissed/erased/genocided, etc. by Euro-American colonizers (Whyte, 2017). It is ignorant to assume that a lack of written data means a lack of successful conservation in this case.

There remains an odd attitude toward the time-tested land management practices of indigenous people and for indigenous peoples’ ability to conserve healthy environments and biodiversity. As recently as this year, Beattie et al. (2023) wrote:

The consistency of our results with other, broader studies showing a strong positive relationship between different indicators of environmental quality and Indigenous Peoples' lands suggests that the place-based linkage to Indigenous Peoples is likely to be genuine. However, our evidence is correlative, and we cannot ascribe cause to the patterns we have observed. (p. 5).

Even today there is a distrust of what should be blatantly obvious—it is indigenous peoples’ biocultural diversity, their deep connection to the land, their specific cultural practices that contribute to their lands being so biodiverse, *especially* in light of armed conflict. Indeed, the old maxim “correlation does not necessitate causation” is valuable—but in areas such as this, it privileges one type of knowledge (empirical data) over another (Indigenous knowledge). Not that I believe it to be Beattie et al.’s (2023) *modus operandi* to discredit the work of indigenous people, but all the same, this statement suggests that unless the indigenous people can *prove* to our empirical scientific standards that it is their *specific* biocultural and relational practices that are responsible for maintaining biodiversity and environmental quality, then we cannot *conclusively* say that it is their “place-based linkage” that causes these results.

If conservationists and scientists operating from a western science background are going to advocate for indigenous justice, indigenous rights, and indigenous inclusion in conservation activities like invasive species management to preserve biodiversity, they also need to respect other forms of knowledge and associated worldviews. IK is not just “data” that can be translated into western science—it must be presented as contextual, derived from within a specific culture (Kimmerer, 2002). Indeed, this is part of respecting indigenous agency in collaborative management—respecting the indigenous knowledge systems they may use in addition to western science as part of their conservation practices.<sup>12</sup>

### *III. Refusing Indigenous Agency Recreates “Ancestors’ Dystopia”*

Invasive species management relies on conceptualizations of “what does not belong,” and this takes a short view of history and an ahistorical view of landscape. What is really being said is what poses a threat to the recreation/maintenance of the settler homeland. Now, a caveat—some invasive species really are damaging, I do not deny this (provide a couple examples of the well-known bad ones). But even if the xenophobic vigor with which people react to and exterminate these new arrivals is put aside for a moment, it is *still* necessary to ask if invasive species are necessarily a bad

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<sup>12</sup>Robinson et al. (2021) write: “There are to some extent parallels between TEK and restoration ecology (revolving around environmental stewardship and resilience) but also notable and important differences. In particular, cultural value systems and traditional protocols, in addition to the deep/spiritual foundation of TEK, are sometimes branded to be unscientific, despite holding potential to improve systems-based approaches in restoration (Zedler & Stevens 2018). We believe ecological and cultural benefits can be achieved through ethical engagement with Indigenous peoples while prioritizing and supporting Indigenous-led projects. We find current narratives unnecessarily biased toward extracting “knowledge” without the reciprocity and respect for the rights and livelihoods of “Indigenous peoples” themselves. We also think there is a lack of acknowledgement for Indigenous peoples’ ingenuity and selective historical assumptions, as discussed by Pascoe (2018)...We propose that to consider TEK partnerships in restoration, there must be proper engagement with Indigenous peoples. This includes partnerships strictly abiding by international declarations on free, prior, and informed consent, in addition to comprehensive Indigenous community input and consultation at all stages, with the ability of Indigenous peoples to withdraw consent at any time (UN 2016). Furthermore, we emphasize that any knowledge sharing must be done primarily through deep listening and proper engagement in a way that advocates Indigenous leadership and prevents erosion of ecological and cultural integrity. Additionally, the acknowledgment and recognition of Indigenous data and knowledge sovereignty with the expressed right “to own, control, access and possess data that derive from ... [Indigenous Peoples] ... and which pertain to their members, knowledge systems, customs or territories” is integral to successful partnerships (Kukutai et al. 2020). To illustrate this, we present risks to TEK integrity, and highlight case studies of collaborations founded on inclusivity and stewardship.” (p. 2).

thing given the degraded condition of the environment at settler hands and the climate destabilization caused by many of the same activities which caused said environmental damage (development, production, roads, industrial agriculture, etc.). Whyte (2017) says that in the 19th and 20th centuries European settlers forced indigenous people to deal with:

the changes associated with deforestation, forced removal and relocation, containment on reservations (i.e., loss of mobility), liquidation of our lands into individual private property and subsequent dispossession, and unmitigated pollution and destruction of our lands from extractive industries and commodity agriculture. (p. 208-209).

Whyte (2017) describes these conditions as the dystopia of modern indigenous peoples' ancestors—or more succinctly, their ancestors' dystopia—which directly results from the process of settler colonialism and the creation of a settler homeland. Utilizing these processes and the changes in the land brought about by them, Whyte contends that indigenous people are not surprised by the anthropogenic change seen in current climate destabilization—rather, they “experience it nonetheless as associated with the repeated patterns of industrial settler tactics that [they] know all too well” (p. 209).

Whyte (2017) uses the term “campaigns” to describe these tactics because the “waves of settlement,” past and present, are “sustained, strategic, and militaristic” (p. 208). Whyte describes the tactics these campaigns utilize as ranging from “war-like violence and the tactics for suppressing populations” to “assimilative institutions (e.g., boarding schools) to containment practices (e.g., reservations) to the creation of dependency (e.g., commodity foods)” (p. 208). Whyte describes this process further:

As a means of carving out settler homelands from indigenous homelands, waves of settlers harnessed industrial means, from military technologies to large-scale mineral and fossil fuel extraction operations to sweeping, landscape-transforming regimes of commodity agriculture. Industrial settler states are the corresponding polities, from federal nation state governments to local municipalities and subnational provincial governments, that create and enforce the laws, policies, and jurisprudence that serve to protect and incubate the homeland-inscribing process from indigenous resistance, refusal, and resurgence in such territories. (p. 208).

Note the language Whyte uses—the purpose of settler law and government is to protect the process of settler “homeland-inscription” *from* indigenous interests (p. 208). This is why I am wary of current invasive species management practices—not because there are not issues with certain introduced species, but because blind adherence to practices set by experts in

settler universities, agencies, and governments is hardly conducive to the creation of a just future for anyone but elite settler descendants. This task becomes especially important given the daunting odds indigenous people face given the inequitable power of the settler state in comparison with the indigenous cause.<sup>13</sup>

What should emerge from this discussion is that the wealth and power of settler states is a direct result of dispossession, theft from, and violence against indigenous people over centuries of ongoing “homeland inscription” (Whyte, 2017, p. 208). Only by displacing and erasing indigenous people was/is the settler state able to legitimize its activities and naturalize its existence in indigenous lands. These settler “campaigns” (Whyte, 2017) have been so brutal and incessant that Whyte (2017) says:

Ecosystems have been reshaped to such a degree by settlers and their institutions that it is hard to recognize anything "indigenous" about them. Hence many scholars and activists describe settler colonialism as a structure of oppression that erases indigenous peoples (Lefevre). P. 208

Whyte (2017) conceives of this “ancestors’ dystopia” as the “junction” where “deep Anishinaabe history” meets “the vast degradation caused by settler colonial campaigns in such a short time” and where indigenous “conservation and restoration” is situated (p. 209). What Whyte (2017) describes here as the experienced world/depleted and changed landscape as the indigenous people of the Great Lakes region (and U.S. in general’s) “ancestors’ dystopia” is what Hunt (2014) refers to in some ways as “the colonialscape.” While there are some differences in Hunt’s exact usage, I wish to extend this term to the land itself in accordance with Whyte (2017) and Cronon’s (2003) implication that the landscape post-Euro-American settler is one that is not compatible with indigenous lifeways.

### **Conclusions**

Given the inherent biocultural structure of indigenous cosmologies and practices, Cronon’s (2003) insistence on a dynamic dialectic between environment and culture, and the positive ecological outcomes associated with indigenous management practices discussed above, it should be clear that there can be no separation of indigenous justice, environmental justice, and ecological health (Whyte, 2018). Due to the intimate relationship between culture and environment, to assure the most diverse environments (and thereby the greatest biodiversity), there must also be a diversity of cultures to practice their culturally specific management methods (specific relationships with the environment) (Rotherham & Bridgewater, 2019; Cronon, 2003).

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<sup>13</sup> Whyte (2017) writes: “Our degree of success in exercising self-determination is irreversibly coupled with our political relations with states whose constituent people and institutions wield daunting financial, military, and police resources and regulatory and legal enforcement capabilities.” (p. 208).

Given this need for “biocultural diversity,” the most effective methods moving forward are those which privilege relationships—with the land (including more than human entities), with Indigenous people, etc.—and thereby, justice (Whyte, 2018).

Ecologically speaking, given the ineffectiveness of current invasive species management to quell the rising tide of invasive species and their associated environmental impacts, respecting indigenous agency is even more essential given their ability to accommodate invasive species and environmental change better into their cosmologies than western/settler cosmologies premised on human/nature divide and (white) human superiority to the rest of nature (Plumwood, 2002). A continuation of the expression of settler cultures on the landscape (settler management) will only lead to more of the same environmental issues, and more of the ineffective warfare against introduced species (Larson, 2005). Rather than practices which effectively only continually disrupt the development of relationships, indigenous practices based on relationship building hold greater promise in navigating novel ecosystems and ensuring functioning of ecosystems.

However, co-management is not a means to an end—for justice to be assured and relationships properly managed, indigenous agency over management practices in their lands must be asserted (Reo et al., 2017) and their culture/IK respected on par with western science (conversation is fine; subsumption is not) (Ban et al., 2018). Current partnerships can be prescriptive or one sided, or at the very least, disjointed (Reo et al., 2017, p. 208). Only by respecting indigenous agency and cultures can a pluralistic vision of landscape management be accomplished, and thereby multiple cultures be expressed and reified in the world around (Wehi et al., 2023; Cronon, 2003). Failure to do so will inevitably result in the retrenchment of the “colonialscape” and a continuation of the difficult conditions of the indigenous’ “ancestors’ dystopia” (Whyte, 2017).

## References

1. Arquette, M. (2000). *The Animals*. In Haudenosaunee Environmental Task Force (eds.) *Words That Come Before All Else Environmental Philosophies of the Haudenosaunee*. Native North American Travelling College.
2. Beattie et al. (2023). Even after armed conflict, the environmental quality of Indigenous Peoples' lands in biodiversity hotspots surpasses that of non-Indigenous lands. *Biological Conservation*, Volume 286, October 2023, 110288. <https://doi.org/10.1016/j.biocon.2023.110288>
3. Belshaw, J. (2015). *Canadian History: Pre-Confederation*. Victoria, B.C.: BCampus. Retrieved from <https://opentextbc.ca/preconfederation/>.
4. BIA. (2022). 2022 National Invasive Species Awareness Week: Invasive Green Crabs Pose Threat. BIA. Accessed via: <https://www.bia.gov/guide/2022-national-invasive-species-awareness-week#:~:text=There%20are%20more%20than%206%2C500%20invasive%20species%20established%20across%20the%20United%20States>
5. Booth, A.L. (2003). We are the Land: Native American Views of Nature. In: Selin, H. (eds) *Nature Across Cultures. Science Across Cultures: The History of Non-Western Science*, vol 4. Springer, Dordrecht. [https://doi.org/10.1007/978-94-017-0149-5\\_17](https://doi.org/10.1007/978-94-017-0149-5_17)
6. Bridgewater, P. & Rotherham, I. (2019). A critical perspective on the concept of biocultural diversity and its emerging role in nature and heritage conservation. *People and Nature*. Vol 1, Iss 3, pp. 291-304. <https://doi.org/10.1002/pan3.10040>
7. Brondizio, E. & Le Tourneau, FM. (2016). Environmental governance for all. *Science*, 352, pp. 1272-1273. DOI:10.1126/science.aaf5122\_
8. Cattelino, J. (2017) Loving the native: invasive species and the cultural politics of flourishing. Ch. 13 in Heise, U., Christensen, J., and Niemann, M. (eds.) *The Routledge Companion to the Environmental Humanities*. Routledge.
9. Chown et al. (2015). Biological invasions, climate change and genomics. *Evol Appl*. Vol8 Iss1:pp. 23-46. doi: 10.1111/eva.12234. Epub 2014 Dec 9. PMID: 25667601; PMCID: PMC4310580.
10. Colautti, R. & MacIsaac, H. (2004). A neutral terminology to define 'invasive' species. *Diversity and Distributions*. Vol 10, Iss 2, pp. 135-141. <https://doi.org/10.1111/j.1366-9516.2004.00061.x>
11. Creer, T. (2023). The Suppression of the Druids in Caesar's Gallic War. *The Classical Quarterly*. Vol 73 Iss 1: pp. 169-183. doi:10.1017/S0009838823000447
12. Crees, J. & Turvey, S. (2015). What constitutes a 'native' species? Insights from the Quaternary faunal record. *Biological Conservation*, Vol 186, pp. 143-148. <https://doi.org/10.1016/j.biocon.2015.03.007>

13. Cronon, W. (1996). The Trouble with Wilderness: Or, Getting Back to the Wrong Nature. *Environmental History*, Vol. 1, No. 1, pp. 7-28. <http://www.jstor.org/stable/3985059>
14. Cronon, W. (2003). *Changes in the Land: Indians, Colonists, and the Ecology of New England*, Revised Edition. Hill and Wang.
15. Curley, A. (2021). Resources is just another word for colonialism. Ch. 7 in Himley, M., Havice, E., & Valdivia, G. (Eds.). *The Routledge Handbook of Critical Resource Geography* (1st ed.). Routledge. <https://doi-org.proxy.lib.umich.edu/10.4324/9780429434136>
16. Cusack, C. (2012). Pagan Saxon Resistance to Charlemagne's Mission: 'Indigenous' Religion and 'World' Religion in the Early Middle Ages. *Pomegranate The International Journal of Pagan Studies*. Vol 13 Vol 1. DOI:10.1558/pome.v13i1.33
17. DOI. (2024). Invasive Species: Finding solutions to stop their spread. DOI. Accessed via: <https://www.doi.gov/blog/invasive-species-finding-solutions-stop-their-spread>
18. Finch et al. (2021). Effects of Climate Change on Invasive Species. In Poland, Finch, Hayes, Patel-Weynand, Miniati, and Lopez (eds.) *Invasive Species in Forests and Rangelands of the United States A Comprehensive Science Synthesis for the United States Forest Sector*. Springer.
19. EPA (2024). Invasive Non-Native Species. EPA. Accessed via: <https://www.epa.gov/watershedacademy/invasive-non-native-species#:~:text=The%20%22Ten%20Percent%20Rule%22%20is,of%20species%20released>
20. Estrada et al. (2022). Global importance of Indigenous Peoples, their lands, and knowledge systems for saving the world's primates from extinction. *Sci. Adv.* Vol. 8. Eabn2927. DOI:10.1126/sciadv.abn2927
21. Fa et al. (2020). Importance of Indigenous Peoples' lands for the conservation of Intact Forest Landscapes. *Frontiers in Ecology and the Environment*. Vol 18, Iss 3, pp. 135-140. <https://doi.org/10.1002/fee.2148>.
22. Garnett et al. (2018). A spatial overview of the global importance of Indigenous lands for conservation. *Nat Sustain* Vol. 1, pp. 369–374. <https://doi.org/10.1038/s41893-018-0100-6>
23. Genovesi, P. (2008). Limits and Potentialities of Eradication as a Tool for Addressing Biological Invasions. Ch. 22 in Nentwig, W. (eds). *Ecological Studies*, Vol. 193. Springer.
24. Haalboom, B. & Natcher, D. (2012) The Power and Peril of "Vulnerability": Approaching Community Labels with Caution in Climate Change Research. *Arctic*, 65(3), 319–327. <http://www.jstor.org/stable/41758938>
25. Hernandez, J. (2022). *Fresh Banana Leaves: Healing Indigenous Landscapes Through Indigenous Science*. North Atlantic Books.
26. Hiller, C. (2016) "No, do you know what your treaty rights are?" Treaty



27. consciousness in a decolonizing frame, *Review of Education, Pedagogy, and Cultural Studies*, 38:4, 381-408, DOI: 10.1080/10714413.2016.1203684
28. Hobbs et al. (2013). Defining Novel Ecosystems. In *Novel Ecosystems* (eds R.J. Hobbs, E.S. Higgs and C.M. Hall). <https://doi.org/10.1002/9781118354186.ch6>
29. Holling, C. & Meffe, G. (1996). Command and Control and the Pathology of Natural Resource Management. *Conservation Biology*. Vol 10, Iss 2, pp. 328-337. <https://doi.org/10.1046/j.1523-1739.1996.10020328.x>
30. Hughey, M. (2009). Cinethetic Racism: White Redemption and Black Stereotypes in "Magical Negro" Films, *Social Problems*, Volume 56, Issue 3, pp. 543–577, <https://doi.org/10.1525/sp.2009.56.3.543>
31. Hunt, S. (2014). Witnessing the Colonialscape: lighting the intimate fires of Indigenous legal pluralism. PhD Thesis. Simon Frazier University.
32. Iannone et al. (2020). Invasive Species Terminology: Standardizing for Stakeholder Education. *The Journal of Extension*, Vol 58 Iss 3, Article 27. <https://doi.org/10.34068/joe.58.03.27>
33. Inglis, M.I. (2020). Wildlife Ethics and Practice: Why We Need to Change the Way We Talk About 'Invasive Species'. *J Agric Environ Ethics*, 33, 299–313. <https://doi.org/10.1007/s10806-020-09825-0>
34. IPBES (2023). Summary for Policymakers of the Thematic Assessment Report on Invasive Alien Species and their Control of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Roy, H. E., Pauchard, A., Stoett, P., Renard Truong, T., Bacher, S., Galil, B. S., Hulme, P. E., Ikeda, T., Sankaran, K. V., McGeoch, M. A., Meyerson, L. A., Nuñez, M. A., Ordonez, A., Rahlao, S. J., Schwindt, E., Seebens, H., Sheppard, A. W., and Vandvik, V. (eds.). IPBES secretariat, Bonn, Germany. <https://doi.org/10.5281/zenodo.7430692>
35. Kennedy, C. et al. (2023). Indigenous Peoples' lands are threatened by industrial development; conversion risk assessment reveals need to support Indigenous stewardship. *One Earth*, Vol 6 Iss 8, pp. 1032-1049. doi: 10.1016/j.oneear.2023.07.006
36. Kennedy, P. et al. (2018) Do novel ecosystems provide habitat value for wildlife? Revisiting the physiognomy vs. floristics debate. *Ecosphere: An ESA Open Access Journal*. Volume9, Issue3, e02172. <https://doi.org/10.1002/ecs2.2172>
37. Khan, Ayesha. (2022). Science is not objective or apolitical: Science isn't "neutral", it's an oppressive system shaped by global power dynamics. *Cosmic Anarchy*. Accessed via: <https://wokescientist.substack.com/p/science-is-not-objective-or-apolitical>
38. Kimmerer, R. (2002). Weaving Traditional Ecological Knowledge into Biological Education: A Call to Action, *BioScience*, Vol 52, Iss 5, pp.

- 432–438, [https://doi.org/10.1641/0006-3568\(2002\)052\[0432:WTEKIB\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2002)052[0432:WTEKIB]2.0.CO;2)
39. Kimmerer, R. (2013). *Braiding Sweetgrass: Indigenous Women, Scientific Knowledge, and the Teachings of Plants*. Milkweed Editions.
  40. Krznaric, R. (2020). *The Good Ancestor: A Radical Prescription for Long-Term Thinking*. The Experiment: New York.
  41. Larson, B. (2005). The War of the Roses: Demilitarizing Invasion Biology. *Frontiers in Ecology and the Environment*, Vol 3 Iss 9, pp. 495–500. <https://doi.org/10.2307/3868637>
  42. Larson, B. (2007). Who's invading what? Systems thinking about invasive species. *Canadian Journal of Plant Sciences*, 87: pp. 993-999.
  43. Larson, B. (2008). Entangled biological, cultural and linguistic origins of the war on invasive species. In R. Frank, R. Dirven, T. Ziemke & E. Bernárdez (Ed.), Volume 2 *Sociocultural Situatedness* (pp. 169-196). Berlin, New York: De Gruyter Mouton. <https://doi.org/10.1515/9783110199116.2.169>
  44. Larson, B. (2011). Advocating with Fear: At War against Invasive Species. Ch. 6 In *Metaphors for Environmental Sustainability: Redefining Our Relationship with Nature*. Yale University Press. <https://doi.org/10.2307/j.ctt5vm557>
  45. Locke, J. (2008). The Second Treatise of Civil Government. In Wootton, D. (eds). *Modern Political Thought: Readings from Machiavelli to Nietzsche*. Second edition. Hackett Publishing Company, Inc.
  46. Lorenzo, P & Morais, MC. (2023) Strategies for the Management of Aggressive Invasive Plant Species. *Plants (Basel)*. Vol 12 Iss 13:2482. doi: 10.3390/plants12132482. PMID: 37447043; PMCID: PMC10346621.
  47. Mainka, S. & Howard, G. (2010). Climate change and invasive species: double jeopardy. *Integrative Zoology*, Special Issue: Biological Consequences of Global Change, Vol 5, 12., pp. 102-111. <https://doi.org/10.1111/j.1749-4877.2010.00193.x>
  48. Malmer et al. (2018). Global Dialogue on human Rights and Biodiversity Conservation. *Stockholm Resilience Centre*. Report.
  49. Mehrabi, Z. (2016). Restoration: avoid arbitrary baselines. *Nature* Vol 533, Iss 469. <https://doi.org/10.1038/533469c>
  50. Mehta, J. (2020) "White 'Alliahs:' The Creation & Perpetuation of the 'Wise Indian' Trope," *PSU McNair Scholars Online Journal*: Vol. 14: Iss. 1, Article 3. <https://doi.org/10.15760/mcnair.2020.14.1.3>
  51. Mooney, H. and Cleland, E. (2001). The evolutionary impact of invasive species. *PNAS*, Vol 98 Iss10 pp. 5446-5451. <https://www.pnas.org/doi/full/10.1073/pnas.091093398>

52. Munro et al. (2019). On allegations of invasive species denialism. *Conservation Biology*. Vol 33, Iss 4, pp. 797-802. <https://doi.org/10.1111/cobi.13278>
53. Norgaard, K.M. (2007). The Politics of Invasive Weed Management: Gender, Race, and Risk Perception in Rural California. *Rural Sociology*. Vol 72 Iss 3, pp. 450-477. <https://doi.org/10.1526/003601107781799263>
54. O’Bryan et al. (2021). The importance of Indigenous Peoples’ lands for the conservation of terrestrial mammals. *Conservation Biology*. Vol 35, Iss 3, pp. 1002-1008. First pub. (2019). <https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/cobi.13620>
55. Plumwood, V. (2002). Decolonising relationships with nature. *PAN: philosophy activism nature*, 2, pp. 7-30
56. Reo et al. (2017). Invasive Species, Indigenous Stewards, and Vulnerability Discourse. *American Indian Quarterly*, Vol. 41, No. 3, pp. 201-223. <http://www.jstor.org/stable/10.5250/amerindiquar.41.3.0201>
57. Reo, N. & Ogden, L. (2018) Anishnaabe Aki: an indigenous perspective on the global threat of invasive species. *Sustain Sci* 13, pp. 1443–1452. <https://doi.org/10.1007/s11625-018-0571-4>
58. Ricciardi, A & Ryan, R. (2018). The exponential growth of invasive species denialism. *Biol Invasions* 20, pp. 549–553. <https://doi.org/10.1007/s10530-017-1561-7>
59. Robinson et al. (2005). Bush Tucker, Bush Pets, and Bush Threats: Cooperative Management of Feral Animals in Australia’s Kakadu National Park. *Conservation Biology*. pp. 1385–1391. DOI: 10.1111/j.1523-1739.2005.00196.x
60. Robinson, J. et al. (2021). Traditional ecological knowledge in restoration ecology: a call to listen deeply, to engage with, and respect Indigenous voices. *Restoration Ecology*. Vol 29, Iss 4, e1338. <https://doi.org/10.1111/rec.13381>
61. Runyon et al. (2012). Invasive Species and Climate Change. Ch. 7 in Finch, D. *Climate Change in Grasslands, Shrublands, and Deserts of the Interior American West: A Review and Needs Assessment*. Gen. Tech. Rep. RMRS-GTR-285. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 139 p.
62. Russell, J. & Blackburn, T (2017). The Rise of Invasive Species Denialism. *Trends Ecol Evol*. Jan;32(1):3-6. doi: 10.1016/j.tree.2016.10.012.
63. Saito, K. (2017). *Karl Marx’s Ecosocialism: Capital, Nature, and the Unfinished Critique of Political Economy*. Monthly Review Press.
64. Sax et al. (2022). Valuing the contributions of non-native species to people and nature. *Trends Ecol Evol*. Vol 37, Iss 12, pp. 1058-1066. <https://doi.org/10.1016/j.tree.2022.08.005>

65. Seastedt et al. (2008). Management of novel ecosystems: are novel approaches required?. *Frontiers in Ecology and the Environment*. Vol6, Iss10, pp. 547-553. <https://doi.org/10.1890/070046>.
66. Schuster et al. (2019). Vertebrate biodiversity on indigenous-managed lands in Australia, Brazil, and Canada equals that in protected areas. *Environmental Science & Policy*, Vol 101, pp. 1-6. <https://doi.org/10.1016/j.envsci.2019.07.002>
67. Scott, X. (2018). Repairing Broken Relations by Repairing Broken Treaties: Theorizing Post-Colonial States in Settler Colonies. *Studies in Social Justice*, Vol 12, Iss 2, pp. 388-405.
68. Subramaniam, B. (2001). The Aliens Have Landed! Reflections on the Rhetoric of Biological Invasions. *Meridians*, 2(1), pp. 26–40. <http://www.jstor.org/stable/40338794>
69. Sze et al. (2022). Reduced deforestation and degradation in Indigenous Lands pan-tropically. *Nat Sustain* Vol 5, pp. 123–130. <https://doi.org/10.1038/s41893-021-00815-2>
70. Tuck et al. (2014). Not nowhere: Collaborating on selfsame land. *Decolonization: Indigeneity, Education & Society*.
71. USDAa (2024). Why Native Species Matter. USDA. Accessed via: <https://www.usda.gov/peoples-garden/gardening-advice/why-native-species-matter>
72. USDAb (2024). What are Invasive Species? USDA National Invasive Species Information Center. Accessed via: <https://www.invasivespeciesinfo.gov/what-are-invasive-species>
73. USDAc. (2024). Control Mechanisms. USDA National Invasive Species Information Center. Accessed via: <https://www.invasivespeciesinfo.gov/subject/control-mechanisms#:~:text=The%20most%20economical%20and%20safest,t o%20control%20and%20management%20efforts>
74. Valéry et al. (2009). Invasive species can also be native... *Trends in Ecology and Evolution*. Vol 24, Iss 11, pp. 585
75. Vinyeta, K. (2022). Under the guise of science: how the US Forest Service deployed settler colonial and racist logics to advance an unsubstantiated fire suppression agenda. *Environmental Sociology*, 8(2), 134–148. <https://doi.org/10.1080/23251042.2021.1987608>
76. Walker et al. (2020) The role of forest conversion, degradation, and disturbance in the carbon dynamics of Amazon indigenous territories and protected areas. *PNAS: Biological Sciences*. Vol 117 Iss 6, pp. 3015-3025 <https://doi.org/10.1073/pnas.1913321117>
77. Walker, Yaari (2023). "Creator put the first yuk in the qayaq." - Yaari Walker. *YouTube*. Uploaded by Fine Arts Museum of San Francisco, 23 May 2023. Accessed via: [https://www.youtube.com/watch?v=znFlp\\_bdhV0](https://www.youtube.com/watch?v=znFlp_bdhV0)
78. Wehi et al. (2023). Contribution of Indigenous Peoples' understandings and relational frameworks to invasive alien species

- management. *People and Nature*, 5, pp. 1403–1414.  
<https://doi.org/10.1002/pan3.10508>
79. Weidlich et al. (2020). Controlling invasive plant species in ecological restoration: A global review. *Journal of Applied Ecology*. Special Feature: Informing decision-making with indigenous and local knowledge and science. Vol 57, Iss 9, pp. 1806–1817. <https://doi.org/10.1111/1365-2664.13656>
80. White, L. (1967). The Historical Roots of Our Ecologic Crisis. *Science*, 155(3767), 1203–1207. <http://www.jstor.org/stable/1720120>
81. Whyte, K.P. (2017). Our ancestors’ dystopia now: indigenous conservation and the Anthropocene. Ch. 21 in Heise, U., Christensen, J., & Niemann, M. (Eds.). *The Routledge Companion to the Environmental Humanities* (1st ed.). Routledge. <https://doi-org.proxy.lib.umich.edu/10.4324/9781315766355>
82. Whyte, K. (2020). Too late for indigenous climate justice: Ecological and relational tipping points. *WIREs Climate Change* — Special Issue: Is it too late (to stop dangerous climate change)? Volume 11, Issue 1. First published (2019). <https://doi.org/10.1002/wcc.603>
83. Wolfe, P. (2006). Settler colonialism and the elimination of the native. *Journal of Genocide Research*, 8(4), 387–409.  
<https://doi.org/10.1080/14623520601056240>

# Against Command and Control: Rewilding as a Fertile Framework for Respecting Non-Human Autonomy in Settler Conservation

By Cam Scharff

## Abstract

1. Current ecological issues like invasive species, biodiversity loss, and climate change are complex and interconnected. Biological invasions are facilitated by climate change, and eradication approaches are insufficient. As such, the future of ecosystems is uncertain.
2. Given the uncertain future conditions that result from climate change/biological invasions, and the emergence of novel ecosystems around the globe, there is a need to stop trying to control the environment, and work with non-human beings and humans from different cultural backgrounds. While most managers now recognize the need to focus on containment/suppression, there is a need to approach conservation that minimizes human intervention.
3. For this task, I offer rewilding as a conservation framework capable of managing ecosystems for the future, even in light of ecological uncertainty. Premised on respect for “non-human autonomy,” oriented towards encouraging the self-regulatory capabilities of ecosystems, and with an emphasis on function over structure, rewilding has much to offer invasive species management, particularly in its ability to increase collaboration between settlers and indigenous people.
4. As with any conservation framework, rewilding is not perfect, and there are drawbacks that must be addressed.

## Introduction

Environments have been changed because of indigenous human activity for at least the past 12,000 years (Ellis et al., 2021). Given the existence of dinosaurs and mega continents long before this, on a geological scale, the history of our world is one of change. Nonetheless, the world is changing rapidly today because of climate change, biodiversity loss, biological invasions, etc. To make matters more complicated, climate change interacts with biological invasion processes (Chown et al., 2015), and has the potential to facilitate them in the future (although the exact dynamics between the two are hard to predict) (Finch et al., 2021; Runyon et al., 2012; Mainka & Howard, 2010; Diez et al., 2012). Biological invasions in turn are responsible for much of the biodiversity loss currently occurring (Roberts et al., 2013; NOAA, 2024; IUCN, 2021), with some invasive species being noted as having important direct and indirect effects of it (Linders et al., 2019).<sup>14</sup>

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<sup>14</sup> Roberts et al. (2013) write: “At the 2010 Convention on Biological Diversity Conference of Parties (COP10) it was stated that: “*Invasive species are the second biggest driving force of species extinction, after the effects of human activity (habitat loss, overexploitation, and pollution).*” This extinction process

Ceballos et al. (2020) describe rates of vertebrate extinction as indicating a sixth mass extinction, and forecast dire consequences on the biosphere as a result, particularly if this biodiversity loss continues. Given the connection between invasive species and biodiversity loss, it becomes necessary to improve effective invasive species management.

However, this is easier said than done. Citing Perring & Ellis' (2013) findings that 28–36% of the planet's ice-free land is novel ecosystems, Kennedy et al. (2018) writes that there is twice as much land covered globally by novel ecosystems than wildlands. Furthermore, there are differences between introduced species and invasive species—not all introduced species become invasive, and some native plants can behave invasively (Colautti & MacIsaac, 2004; Valéry et al., 2009). Given that climate change could potentially facilitate biological invasions (Chown et al., 2015; Diez et al., 2012), this would only fuel the creation of novel ecosystems (Hobbs et al., 2009). In conjunction with the current prevalence of novel ecosystems (Kennedy et al., 2018), these facts suggest that eradication-as-ideal oriented management strategies are no longer a sufficient approach to invasive species management. Thankfully, most managers today recognize that eradication is not possible, and that containment or suppression are more pragmatic approaches (Green & Grosholz, 2020).

Indeed, it is becoming increasingly acknowledged that traditional invasive species practices premised on eradication and restoration are insufficient for dealing with the invasive species issue. The U.S. Department of the Interior says that “Once an invasive species becomes established, it is rarely possible to eradicate. The best way to avoid the harm that invasive species can cause is to prevent them from entering the country” (DOI, 2024). Further, there are complications for managing invasive plant species by virtue of seed banks, which can remain dormant yet viable in the soil beyond (Genovesi, 2008, p. 389). Overall, Gutierrez & Ponti (2013) say “despite years of effort and expenditures of hundreds of millions of dollars, many invasive species problems remain unresolved.” As a result, new frameworks, practices, and approaches are needed to invasive species management. For this, I recommend rewilding.

Rewilding is a framework premised on decreased human management and respect for non-human autonomy (Carver et al., 2021; Ward, 2019). It is capable of more open-ended approaches, and rewilding practices are often characterized by experimentation (Wynne-Jones et al., 2020; Svenning et al., 2015). Given that there is twice as much land covered in novel ecosystems as wildlands (Kennedy et al., 2018) and accelerating climate change has the potential to facilitate biological invasions (Chown et al., 2015; Diez et al., 2012), the reality of current life on Earth is that novel ecosystems will only increase (Hobbs et al., 2009; Hobbs et al., 2013). This requires we change tact, and rewilding provides a perfect framework.

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seems likely to accelerate, with climate change acting as one of its driving factors, as it may expand the ranges of many invasive species.”

In this paper, I will first describe rewilding as a framework for conservation and highlight the elements that I think are most important. Second, I will demonstrate the ability of rewilding to improve settler/indigenous collaboration through the compatibility of its underlying philosophy, and how this can facilitate rewilding practices oriented towards invasive species management in novel ecosystems despite limited quantitative data. Third, I will demonstrate how rewilding can lead to more just conservation practices due to its emphasis on relinquishing control of others' agency. Fourth, I will argue that rewilding provides an important framework for invasive species management given the reality of novel ecosystems, the need to maintain ecosystem function, and its compatibility with promising strategies like “functional eradication” (Green & Grosholz, 2020). Lastly, I will describe some of the pitfalls to avoid in rewilding practices.

## **Background**

### **1. Rewilding**

#### *I. Defining Rewilding*

Rewilding has several definitions that have emerged over the past few decades. In a detailed review of the concept, Carver et al. (2021) synthesized numerous definitions into the following:

Rewilding is the process of rebuilding, following major human disturbance, a natural ecosystem by restoring natural processes and the complete or near complete food web at all trophic levels as a self-sustaining and resilient ecosystem with biota that would have been present had the disturbance not occurred... (p. 1888)

What Carver et al. (2021) describe here is nothing short of a paradigm shift in the relationship of humans to nature in contemporary conservation (p. 1888). Whereas traditional settler conservation practices are premised on a “command and control pathology” (Holling & Meffe, 1996), rewilding flips this on its head, and becomes about relinquishing control, or “controlled decontrolling” (Keulartz, 2012) of ecosystems such that they can thrive on their own.

Torres et al. (2018) adopt a definition like the one put forward by Carver et al. (2021). In Torres et al. (2018), they proceed with rewilding defined as, “...[T]he process of restoring the structural and functional complexity of degraded ecosystems while gradually reducing the human influence” (p. 2). Arguably, this concept is most succinctly put by Du Toit & Pettorelli (2019) who define rewilding as “promoting the self-reorganization or regeneration of wildness in an ecologically degraded landscape with minimal ongoing intervention” (p. 2468).

Klop-Toker et al. (2020) insist that what distinguishes rewilding practices from restoration is that they result in the creation of novel ecosystems. Novel ecosystems are exactly as they sound, they are newer configurations of ecosystems that have not existed before, typically in relation



to introduced or invasive species (Hobbs et al., 2009; Hobbs et al., 2013).<sup>15</sup> However, Seastedt et al. (2008) argue that novel ecosystems already exist, and that pretending they do not will not make the problem go away, but will only lead to the adoption of more “outlandish” practices (p. 552). As such, I worry less about rewilding’s role in creating novel ecosystems and more about its ability to undertake conservation of ecosystem function within them.

Across all these definitions what comes to the fore is an emphasis on relinquishing human control over nature, and a renewed faith in its ability to regulate itself. This does not mean removing humans or human influence—indeed, rewilding is premised on reweaving “wildness” into the human world, which requires people play a role and make space for non-human autonomy (Prior & Ward, 2016). Further, given the complicated interplay between nature/culture (Cronon, 2003) there is no denying that humans are connected to the land, as much a part of nature as anything else. Rewilding has the potential in its philosophical underpinnings to allow for a reimagining (in concept and practice) of settler relationships to the non-human world. This is what separates it most from a similar concept, restoration ecology.

## *II. Rewilding vs. Restoration Ecology*

Some scholars argue that rewilding is simply part of the already existing field of restoration ecology (Hayward et al., 2019). Others suggest that rewilding is a vague term that has become plastic in its use in popular culture and nonspecific (“signifying everything”) in the litany of conservation practices that are undertaken in its name (Jørgensen, 2015). Indeed, some definitions of rewilding sound rather restorative—consider Carver et al. (2021) above who describes rewilding as restoring the function of ecosystems after human disturbance, or the call from Torres et al. (2018) who describe the need to restore the structure and function of a degraded ecosystem. What emerges here is that, regardless of whether rewilding is part of restoration ecology or something new, the two concepts are undeniably similar, and must be differentiated as a result.

Some restoration ecologists are recognizing the need to change how restoration is conceptualized and approached in practice, including making room for concepts like novel ecosystems under the “big tent” of restoration ecology (Miller & Bestelmeyer, 2016). Some scholars, like Martin (2017), suggest that restoration ecology needs to be reconceptualized for the twenty-first century. Rewilding could be suggested to be such an update (afterall, some suggest it is really part of restoration ecology anyway [Hayward et al.,

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<sup>15</sup> Some critics take issue with the concept of novel ecosystems (Murcia et al., 2014). Others suggest that while there may be need for clarity, there is potential to rectify novel ecosystems with restoration ecology (Miller & Bestelmeyer, 2016). While I retain rewilding as an important term, given novel ecosystems are mostly discussed in relation to invasive species, I similarly argue they can be a helpful concept in emphasizing ecosystem change, if the emphasis on novelty or unprecedented-ness of environmental issues can be problematic (Whyte, 2011)..

2019]), but some scholars insist the two are different, pointing to key philosophical differences and how they play out in practice.

Du Toit & Pettorelli (2019) compare the philosophical underpinnings of restoration and rewilding, dividing their analysis along what they call “distinguishing attributes” (see Table 1). In particular, Du Toit and Pettorelli (2019) describe the goal of restoration as fundamentally different from rewilding and provide the helpful metaphor of classic cars (p. 2469). In essence, restoration would treat a classic car as a wealthy collector would, seeking to restore all the correct parts that were originally part of the car. Rewilding on the other hand, would be how classic cars are utilized in Cuba—the emphasis is on function rather than original components (Du Toit & Pettorelli, 2019, p. 2469). In other words, Du Toit & Pettorelli (2019) describe how restoration and rewilding aspire to a different state of nature—restoration “implies returning something to its former condition or state” whereas rewilding focuses on “returning wildness, which is untamed, imperfect, unruly and always changing in ways that are not entirely predictable” (Du Toit & Pettorelli, 2019, p. 2468). In simple terms, restoration seeks structural restoration, whereas rewilding seeks to ensure ecosystems function.

<b>Distinguishing Attributes</b>	<b>Restoring</b>	<b>Rewilding</b>
Relevance of historical benchmarks	Higher	Lower
Fidelity to taxonomic precedent	Higher	Lower
Predictability of system dynamics	Higher	Lower
Management commitment	Continuous	Tapered
Motivation for translocations	Species composition	Functional type composition
Taxonomic substitutions	Resisted	Accepted
Environmentally driven system transformation	Resisted	Accepted
Emergence of novel ecosystems	Resisted	Accepted
People and nature	More exclusive	More inclusive

**Table 1.** Reproduced from Du Toit & Pettorelli (2019) p. 2468. This table represents their breakdown of the differences between restoration and rewilding according to their “distinguishing attributes.”

Du Toit & Pettorelli (2019) conclude by saying that “Rewilding is a concept that embraces new opportunities and provides a way forward for ecologically degraded landscapes when restoration is not an option.” (p. 2470). The following section explores why restoration is insufficient for the needs of modern conservation. Given the rapid environmental change that is occurring and expected to continue because of climate change, biodiversity loss, and biological invasions, it should be clear that restoration is not an option. Therefore, efforts in conservation ought to turn towards rewilding, which is more adaptable and better able to accommodate change and new species.

### III. *Rewilding as Conservation for Culture, Function, and Practicality in Uncertain Futures*

#### A. *Practicality Given Uncertain Futures*

Between invasive species, climate change, and biodiversity, it seems to many that there is really only one horseman missing. Given the statistics in the background section, it should be clear that we are in uncharted waters. However, rather than get sucked into the whirlpool of urgency (“crisis epistemology”), it is important to maintain a no less urgent, but collaborative/adaptive approach (“coordination epistemology”) to conservation in the age of climate change (Whyte, 2011).

Rewilding is the most promising movement in the field of conservation in dealing with uncertainty. Given the uncertainty of the future, this means change is not only inevitable, but *possible*—and this has important implications for anti-colonial actions, land back, indigenous resurgence, etc. Consider Atchison et al. (2024):

Conservationists could make it clearer that multiple ecological futures are possible. There is no single nature to which a peopled landscape can be restored, and different people, who may also be rights holders, may have different visions or desires for future ecologies. The colonial history and ongoing legacy of conservation means that there are gaps and biases with regards to understanding the past and predicting futures (Fletcher et al., 2021; Kemp et al., 2023). (p. 463)

Contrary to the teleological tradition of western history, from the present perspective of any time in history, no outcome was guaranteed. Any battle, any war, any event could have gone any number of ways. Without straying too far afield, my point is that this is true for ecology as well, generally. Further, as Atchison et al. (2024) point out, the futures imagined or desired by certain people may not be compatible with futures imagined by others. Explicit rewilding experiments/projects are few in number, and much of the empirical literature focuses on trophic rewilding (Svenning et al., 2015). Combined with a relative lack of quantitative data from rewilding experiments (Torres et al., 2018), what emerges is the need to find other methods of determining conservation progress *and* to collaborate with others. If no future is certain, many futures are possible, and given the intimate dialectics between cultural practices and landscape (Cronon, 2003; Hunt, 2014; Bridgewater & Rotherham, 2019), the more collaborators, the better in terms of moving toward an equitable future together. This will require compromise, but it is necessary. In these ways, rewilding is a practical conservation method given ecological change/uncertainty and the need for social change despite it.

#### B. *Cultural Landscapes and Rewilding*

While a lot of the focus on cultural landscapes has been done in Europe (Ex. Ward & Prior, 2020; Prior & Ward, 2016), the idea that it can play a key role

in the revitalization of cultural landscapes is no less applicable in the North American context. Rotherham (2008, 2013, 2014) has written quite extensively about the importance of traditional land management methods and the connection that “cultural severance” (disconnecting traditional culture from land relations) can diminish biodiversity (ref. in Bridgewater & Rotherham, 2019). In the American context, processes of settler colonial erasure/removal of indigenous peoples/practices have had similarly detrimental impacts on the land (Ex: history of diminished cultural burning contributes to scale/prevalence of wildfires today [Schweizer et al., 2019; Vinyeta, 2022; Moura et al., 2019]). In the case of Yosemite, the Ahwahnechee were forcibly removed from their traditional homelands in the Yosemite Valley in order to clear the land for the national park (Johnson, 2014; Spence, 1996; Bacon, 2019, p. 63). As a direct result, the landscape of the valley changed from open meadowland over the small time frame of a few decades (Johnson, 2014).<sup>16</sup> Accordingly, it seems fair to extend Rotherham’s arguments across the Atlantic in principle.

Each of these examples demonstrates the need for “a balanced view on rewilding in culturally saturated landscapes” that include a “human inclusive perspective, a rich understanding of landscape history, and an open eye for the tensions between the different interpretat[ions]” of rewilding (Drenthen, 2018, p. 329). Conflicts in rewilding therefore “require a genuine discussion between stakeholders about their understanding of landscape and self, in which the parties are sincerely interested in each other’s perspectives.” (Drenthen, 2018, p. 329). Drenthen (2018) is driving at a key feature of rewilding that focuses on non-human autonomy or its inverse, “self-regulating ecosystems” (Carver et al., 2021)—at stake for settlers is a deeper philosophical question of what human/nature relationships ought to look like (Carver et al., 2021). In the North American context, this cannot be pursued separately from questions of land back or indigenous resurgence—indeed, given the colonial drive for control, power, and wealth, its systems of domination are all arguably premised on the same idea of humans as separate

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<sup>16</sup> Johnson (2014) writes: “It wasn’t only Muir who was struck by the ordered beauty of Yosemite Valley. Lafayette Bunnell, the New York physician who accompanied Savage on his exploits in 1851, recalled that “the valley at the time of discovery presented the appearance of a well kept park.” Likewise, Galen Clark who was the state guardian of the Yosemite Grant after it was ceded to California, remembered similar conditions when he first visited in 1855. “At the time,” Clark wrote, “there was no undergrowth of young trees to obstruct clear open views in any part of the valley from one side of the Merced River across to the base of the opposite wall.”...However, these conditions didn’t stay that way for long. Forty years later Clark found that Yosemite’s open meadowland had all but disappeared, estimating that it had been “at least four times as large as at the present time.” The reason for this, known in the nineteenth century but little appreciated until recently, were the many ways that Yosemite’s first inhabitants had transformed their environment over hundreds, if not thousands, of years. Chief among these was the strategic use of fire.”

from and superior to nature (Johns, 2019). Therefore, in trying to determine settler relations to land in North America, questions of indigenous relation to land (and settlers) must also be addressed.

### *C. Functional Landscapes and Rewilding*

No less important, and as Bridgewater & Rotherham (2019) suggest, part of the revitalization of traditional cultural landscapes, is the preservation of ecosystem function/processes. In addition to questions of cultural landscapes and social justice, what matters for both settler and indigenous futures are questions of sustainability and “collective continuance” (Whyte, 2018). There is no sustainability or collective continuance if ecosystems are not functioning, self-sustaining and collectively continuing in their own right. Thus we arrive at the crux of why rewilding is an important conservation movement heading into the future—it is premised more on function than structure (du Toit & Pettorelli, 2019; Carver et al., 2021). Rewilding holds more promise than restoration as a conservation practice because it is oriented toward the maintaining function in an uncertain future (du Toit & Pettorelli, 2019; Prior & Brady, 2017). In an era of rapid ecological/environmental change (climate change, biodiversity loss, invasive species, human caused degradation and development), a focus on process is needed over structure.

### *D. People are Everywhere (and We Are Part of the Land)*

There are roughly 8 billion people in the world, and counting. Of all the terrestrial land in the world, just 5% is “unmodified” and this land is “concentrated in less productive and remote areas in high latitudes and dominated by inaccessible permanent rock and ice or within tundra, boreal forests, and to lesser extent montane grasslands” (Kennedy et al., 2019, p. 816). Further, “most of the world is in a state of intermediate modification, with 52% of ecoregions classified as moderately modified” (Kennedy et al., 2019, p. 811). Boiling these statistics down, there is one key takeaway—people are everywhere, and more to the point, so is our influence.

This makes Atchison et al.’s (2024) “peopled landscape” concept an especially potent tool for conceptualizing how to approach conservation. In regard to rewilding in human dominated landscapes, Prior & Brady (2017) write:

It follows, then, that we understand that wildness is to be found in humanly populated and cultural landscapes and experienced at a range of spatial scales ‘from gazing at a starry night sky to watching spiders and ants at work in a suburban back yard’ (Mulligan, 2001: 27). Thus **rewilding as a specific form of ecological restoration does not require human abandonment or erasure of cultural landscapes, unlike wilderness management.** It therefore seems appropriate to think of ‘rewilding’ as a **relational** – rather than binary – category, which can be implemented at a range of scales and at different

intensities, and so not always and only homogeneously across the totality of a given landscape. (emphasis added, p. 35)

Importantly, Prior & Brady (2017) describe that rewilding is about managing the wild where we are, rather than removing people and setting wilderness apart. Importantly, both examples of how wildness is experienced come from the human perspective, and can be related to a wide variety of human landscapes (despite light pollution and concrete, even cities have night skies and bugs). This allows for a significant reframing of what the wild is.

Cronon (1996) calls for a similar reconceptualization of the place we live, dismissing wilderness as an idyllic, paradoxical, and damaging ideal. In his words:

Idealizing a distant wilderness too often means not idealizing the environment in which we actually live, the landscape that for better or worse we call home. Most of our most serious environmental problems start right here, at home, and if we are to solve those problems, we need an environmental ethic that will tell us as much about *using* nature as about *not* using it. The wilderness dualism tends to cast any use as *ab*-use, and thereby denies us a middleground in which responsible use and non-use might attain some kind of balanced, sustainable relationship. My own belief is that only by exploring this middle ground will we learn ways of imagining a better world for all of us. (Cronon, 1996, P. 21).

Two things emerge from Cronon's words here. First, the need to recognize the wildness (not wilderness) of the world around us. Rewilding is as much about seeing the wild in the ordinary as it is reintroducing wolves—and importantly, only by recognizing the wild around us (and some say, within us) can we begin to reintegrate our settler selves back into the land. Second, Cronon's call for a sustainable ethic premised as much on “using as not using” nature is compatible with and derived from a reintegration of humans into the environment in settler worldviews. Indigenous people have known this all along—their worldviews, kincentric and radically relational as they are (Salmon, 2000; Martinez et al., 2023), are capable of holding the need for consumption/waste/change as part of life without this leading to an abusive extractive relationship. Rewilding thereby becomes as much about cultural rewilding as land management. As Tamati Kruger (2017) writes, “Te Kawa is about the management of people for the benefit of the land—it is not about land management” (p. 7).

#### *IV. Rewilding as Wildness NOT Wilderness*

One of the critiques raised against rewilding is that it is premised on harmful notions of “wilderness,” thereby linking it conceptually to the long history of human separation from and superiority to nature (Jørgensen, 2015). Indeed, Jickling et al. (2018) say: “The term *wild* itself is not without cultural

baggage...as notions of savagery, danger, primitiveness, and emptiness all spring to mind and have deep colonial implications” (p. 161). Therefore, it becomes necessary to differentiate between “wildness” and “wilderness.”

The traditional settler-colonial (western) conservation model is premised on the idea of wilderness, and through their practices these ideas are further entrenched and reified due to the apparent naturalization of them in the landscape (Hunt [2014] writes of this in regard to legal structures). The issue with wilderness is that it has never existed as such—it is an invention that sees humans as distinct from (separate from and superior to) the rest of nature (Plumwood, 2002; Ward, 2019; Cronon, 1996). Wilderness is positioned as the ultimate nature, Edenistic, free from human disturbance where all species thrive as they were intended (by God or His secular name, nature) (Ward, 2019; Cronon, 1996). As Atchison et al. (2024) point out, the injustice of wilderness as a concept is that it is used to erase indigenous influence from the landscape, which in turn has been weaponized to remove indigenous people from their lands in order to “preserve” them for settler use (Ex. Yosemite [Johnson, 2014]). Not only is this unjust and colonial, but the concept itself is wholly incompatible with the premise of rewilding (Ward, 2019).

Atchison et al. (2024) suggest that accepting “wild” in rewilding is not a direct acceptance of “wilderness.” They write that:

the term ‘wild’ in rewilding is not tacit acceptance of the existence of wilderness. Recognising the cultural history and colonial ‘artefact’ of this term (Ward, 2019), here conservation is less about the search for authenticity and more about ‘controlled decontrolling’ (Keulartz, 2012), using life to manage life to secure and deliver diverse and abundant ecologies (Lorimer, 2020). (p. 460).

In this regard, Atchison et al. (2024) say that it is possible to reclaim the word “wild” without falling into the trap of advocating wilderness preservation. This suggests that there is something else at play with the word “wild,” an alternate usage that is important for the concept of rewilding.

Although writing about “wild pedagogies,” not rewilding itself, Jickling et al. (2018) express “hope” that by using *wild* and “its relatives ‘wildness’ and ‘wilderness’” that the words may be “reconsidered,” thereby framing the use of *wild* as a project of “reclamation, reimagination, and reintroduction” (p. 161). Johns (2019) writes on the origin of the term *wild* in his brief history of rewilding:

Jay Vest (1985) and Rod Nash (1982, 2014) trace the term ‘wild’ to the early German word for ‘will’, which was applied to places or creatures not under human control. Wild-doer-ness (or naess in Old English) was a place of self-willed creatures; it was undomesticated or not under human domination. Wildlands, then, are self-willed lands. (p. 13).

At certain points in history then, whether intentionally or tacitly via cultural development, these wildlands became wilderness, which in the settler mind became a thing to be tamed, to be controlled. Jickling et al. (2018) write that “colonisation...[is] being forcibly controlled by others...or, as Livingston (1994) called it, domesticated” (p. 161). Consider the implications of this culturally—instead of agency becoming something to cherish and protect, it is positioned as an *obstacle*, something which gets in the way of what *I* want. But note—it is not *all* agency that is stymied, but the agency of “the Other,” which is itself associated with wilderness, the savage, etc. (Johns, 2019; Plumwood, 2002; Locke, 1689).

Perhaps, then, it is not that settler society has forgotten the agency of non-humans, any more than we pretend not to notice the agency of marginalized peoples—perhaps this understanding that the world is and ought to be beyond our control has been there the whole time, but perverted, twisted over time as Christian dominion and capitalist extracted wealth corrupted it due to the desire for and convenience of control (White, 1967; ). In this way, I find Jickling et al. (2018) to be very convincing in calling for a “reclamation, reimagination, and reintroduction” of the concept of “wildness” (p. 161).

On Jickling et al.’s (2018) account, in a wild pedagogy a person recognizes themselves as part of a greater whole, a whole in which they are themselves something which they are inextricably linked to. More than this, as a party to the processes of “adaptation, change, and recreation,” (p. 161) the person recognizes themselves as part of the intimate process of biocultural dynamics (interplay between environment and culture [Cronon, 2003; Bridgewater & Rotherham, 2019]). But importantly, the wild is “a place where each is honoured for its uniqueness and contributions” and all things respond to and are shaped by the “determinations” of constituent members (Jickling et al., p. 161). Importantly, utilizing Atchison et al.’s (2024) understanding of agency as “having an effect on the world,” (p. 463), then the ability to play a role in “determining” the environment directly asserts the existence of non-human agency. Taken together with excerpts from Jickling et al. (2018) and Johns (2019), I suggest there is potential for a reclamation of the word ‘wild’ by asserting its definition as more than human agency beyond human control.

#### V. *Non-Human Autonomy as Central to Rewilding in Practice*

Consider the implications these ideas have for respecting non-human autonomy in conservation (Ward, 2019; Prior & Ward, 2016; Ward & Prior, 2020). Although it may not always be stated as non-human autonomy, there is a demonstrated understanding of rewilding as diminished human control (see definitions by Carver et al. (2021) and Torres et al. (2018) above), which is the obverse statement to an increase in non-human autonomy.

What separates rewilding from other calls to improve human/nature relationships in settler society is that rewilding is practicable and has a real-world impact on the land. Indeed, Prior & Ward (2016) say that “existing examples of rewilding acknowledge the implicit entanglement of non-humans



and humans in conservation endeavours, and celebrate non-human autonomy in rewilding as fundamental to the creation of experimental, forward looking conservation futures” (p. 134). By increasing space for non-human autonomy and encouraging self-regulating ecosystems, there becomes reified in the land evidence that humans are not the end all be all of ecosystem management. In line with Cronon (2003), this creates a feedback of “mutual determinism” (p. 13) which overtime leads not only to changes in the land, but changes in the culture as the two essentially “co-evolve” together. Thus, by relinquishing human control over nature by emphasizing allowing non-human agency to work and establish self-regulating ecosystems, the first step is taken toward revising settler relationships to the land.

To demonstrate this non-human autonomy in practice, Prior & Ward (2016) cite two examples, the Scottish Beaver Trial (SBT) and the Oostvaardersplassen Reserve (OVP) in the Netherlands (p. 134) as evidence that “rewilding does not reproduce the aims of anti-human wilderness management” (p. 134). For example, in the case of the beaver in Scotland, Prior & Ward (2016) describe how there were concerns of the impact of the beavers in their “potential to fell trees and build dams” which could have “assumedly deleterious effects on the worked landscape of Knapdale (forestry and agriculture)” and even damage “historic monuments and flood defence regimes” (p. 134). The project was not expressly categorized as “rewilding” but these concerns represent an acknowledgement of the beaver’s autonomy, which Prior & Ward (2016) say “illustrates that beavers are being expected from the outset to co-exist and co-fabricate the landscape along with humans” (p. 134).

More to the point, Prior & Ward (2016) describe how this project shows “the expected entanglements of human and non-human life during the Trial” citing one example from 2009. A landowner said that 20 trees had been taken down by beavers on their land, 3.5 km (just over 2 miles) from the introduction area. The SBT had a licensing agreement under which the SBT “must ‘ensure that local businesses and properties have a clear route to pursue compensation claims for damage caused by the beavers during the period of the Trial’, and so insurance cover and a dedicated compensatory budget was put in place” (p. 134). As a result, 100 willow saplings were planted as compensation. Citing the significance of this example, Prior & Ward (2016) write that:

Far from exposing an initiative that seeks to cleave nature and society, this example highlights the expected entanglements of human and non-human life during the Trial. In the licensing agreement these entanglements have been identified, mitigated for and arguably celebrated, in an effort to afford some level of autonomy to beavers during the Trial. (p. 134).

Not all examples of governance in rewilding practices are as successful in accounting for challenges between non-human autonomy and human desire to

protect livelihoods, land, history, etc. Butler et al. (2019) cite other examples that exemplify difficulties with governance and rewilding. They focus on sea hawk reintroduction to Ireland, Bison reintroduction to parts of Canada, sika deer in Taiwan, and tigers in Cambodia (Butler et al., 2019). Across the board, they found “four common challenges for the governance of rewilding in complex social–ecological systems,” which they say are “the presence of multiple private and public stakeholders; their engagement in decision-making about the reintroduction, and its varied consequences; existing tensions between livelihoods and conservation; and other system drivers” (Butler et al., 2019, p. 392). Taken in conjunction with the beaver in Scotland example, what emerges is the importance of effective governance and management practices in rewilding that are able to tackle conflicts that arise between human and non-human autonomy. Indeed, this is why rewilding is called “controlled decontrolling” by Keulartz (2012)—our world is not set up to respect non-human autonomy yet, so in order to facilitate it, we must manage the human side of the human/non-human relationships. Tamati Kruger (2017) reminds us that we need management for the people, not the land, as we move forward.

Rewilding literature has a tendency to focus largely on trophic rewilding (Svenning et al., 2015), the reintroduction of keystone species or their surrogates (in the case of the OVP), such as the beaver example. Another example of relative success include reintroductions of gray wolves to Yellowstone (Svenning et al., 2015). However, there are other examples where human intervention was less direct and more passive. For this, I offer the reforestation of New England as an example of passive rewilding that respects non-human autonomy.

Early European settlers cleared forestland to make room for agriculture and development (Cronon, 2003). By 1830-1880, 60-80% of the land had been cleared, with only small woodlands remaining (and even these were used for fuel and wood) (Harvard Forest, 2024). After this period, farm abandonment began, largely as a result of industrialization, urbanization, and the cultural changes that accompanied (Bell, 1989). As a result, fewer people were farming, and fields were abandoned.

Abandonment led to white dominated forests as preliminary succession, which when clear cut for lumber by settlers, gave way to hardwoods (Harvard Forest, 2024). Today, what is notable about New England is that despite millions of people living there, it is one of the most densely forested areas in the United States (Foster et al., 2008). However, the new forest is not the same as the old— “One important pattern throughout was the reduction of late successional species in favor of early successional species. Additionally, the modern forest is more homogeneous and less coupled to local climatic controls.” (Thompson et al., 2013). Despite this, Thompson et al. (2013) say:

The northeast is once again a predominantly forested landscape, but today's forest is not a facsimile of its predecessor. We find this to be at

once disheartening and encouraging. On the one hand, the modern expense of forest is diminished in so many of the components and processes that once characterized the regional ecosystem; on the other, given the extent and magnitude of land use it is remarkable that native species predominate and the forests looks in many ways as it has for millennia.

Three key things emerge from this example. First, the recovery of New England forests despite dense populations and continued human activity is nothing short of miraculous. Clearly, respecting the agency of non-humans (in conjunction with human agency—clearing pine forests for lumber gave way to new hardwoods) plays a critical role in returning some semblance of a functioning ecosystem to one so heavily changed due to agriculture. Second, the forests today are diminished versions of the pre-colonial forests, and lack many “components and processes”—this suggests that perhaps humans can play a role in rewilding of the forests, with forest management practices oriented toward increasing biodiversity and maintaining function (Thompson et al., 2013). Third, the majority of the forest was obliterated—the fact that New England is as heavily forested as it is now is remarkable (Thompson et al., 2013). Rewilding is not about a return to a past idealized state, but about moving toward the future with the aim of ensuring functioning ecosystems in which both humans and non-humans can express their autonomy, and in this example, this is now possible. In these ways, the abandonment and subsequent reforestation of New England is a prime example of rewilding in that it represents the emergence of wildness among humans, the return of self-willed lands in densely populated human spaces.

While this clearly was not considered a rewilding example at the time, it has been seized upon as an example of successful rewilding by a number of rewilding organizations (Northeast Wilderness Trust, Rewilding Earth, for example). Passive rewilding is when people let the land be—Svenning et al. (2015) say that it involves no human management. While this may have problematic connotations of removing humans from nature, it is also viewed as an important tool for “increasing woodland cover and restoring biodiversity” (Broughton et al., 2022). Additionally, Wang et al. (2023) explore the capacity of rewilded agricultural land to be more sustainable than afforestation.

Just as with the rewilding examples of animal reintroduction, there emerges the need for human management of human activities that involve our relationships to the land. Respecting non-human autonomy does not necessitate human/nature separation—it requires its interconnection. For this reason, rewilding has potential to weave together not only humans and non-humans, but settlers and the indigenous people whose land they stole by virtue of rewilding being more compatible with their worldviews than “command and control” style conservation.

## **2. Indigenous Knowledges (IK) and Worldviews**

### *I. Indigenous Cosmologies*

While indigenous communities are not monolithic, there are certain general commonalities regarding human relationships to the land. Unlike settler cosmologies, indigenous ones recognize an inherent biocultural framework (Wehi et al., 2023)—the people and their culture are as much part of the land as any other being. Settler societies are only realizing the importance of these biocultural frameworks. Consider the following examples from North America, and the implications of how the selections from indigenous communities across North America impact one's relationship to the world:

#### **Haudenosaunee**

We must never kill the first animal that we see, for it may be the last of its species or it may be needed by some other animal or person. We must always show that we are humble and not act greedy. (98, Arquette).

#### **Anishinaabe**

In our discussions, we heard repeatedly the importance of turning to animals for better understanding. For Anishinaabe, animals are teachers. Hemingway used the example of how swarms of biting insects will alert a plant harvester that they have picked enough medicine. (p. 1448, Reo & Ogden).

#### **Yupik**

Creator put the first yuk, the first human, in the qayaq. The idea of the kayak came from us. We say "qayaq." And the qayaq washed up on the beach. The animals were curious. They pulled in the qayaq and inside they saw a creature, he was sleeping. And the caribou says, "Look at this creature. He's not going to be able to survive. He's going to freeze to death. He doesn't have fur like us." And the polar bear says, "He can't hunt like us. He doesn't have claws or teeth like us. He's certainly not going to make it. And we're going to call him 'yuk.' That's right, he's human. We must give ourselves to this human because without us, he won't be able to survive. As long as he respects us." You cannot take more than what you need. You must not waste and you must share. And that's why Alaska Native people when we hunt and we gather, we try to utilize everything as much as we possibly can.

(Transcript I typed based on subtitles in the Youtube video. Told by Yaari Walker as part of Fine Arts Museums of San Francisco exhibit on Alaskan Native Art. Walker, Yaari (2023). "Creator put the first yuk in the qayaq.")

Despite being geographically disparate and culturally distinct, there is undoubtedly a common way of viewing one's place in the world. Reo & Ogden (2018) write that "kinship with more-than-human beings is

foundational to many indigenous societies” and it is kinship structure that “shap[es] their stewardship ethics and practices” (p. 1444, 1447, 1450). For example, consider how different the story of the first yuk is from the idea of human dominion in Genesis—while the former places humans as equal (even indebted to) the animals, the latter places humans above all of nature, which he can use to his heart’s extent.

Further, the Haudenosaunee and Anishinaabe examples are of what kind of ethical behavior can arise from these relational cosmologies and different origin stories—consider how different this is from settler concepts like manifest destiny—literally, the world exists for you, all you need do is take it (Dobson, 2013). What emerges here is the connection between indigenous people, their lands, their stories, etc. In the Australian context, “country describes an indigenous place of origin—literally, culturally, spiritually” and is “shorthand for all the values, places, resources, stories, and cultural obligations associated with indigenous people’s rights and identity” (p. 1386 ref. Smyth 1994; Baker et al. 2001). The connection between a people, place, culture, and ethical action is clearly not limited to the North American continent.

Wildcat & Voth (2023) say that there are commonalities between indigenous people regarding the concept of relationality across the globe. They state that “Indigenous relationality takes as its starting point to be the multiplicity of relationships that humans have with each other and the natural world” and that “Understanding how [they] are situated within a dense series of relationships is a way of both describing and understanding the world (Dudgeon & Bray, 2019)” (p. 476). Citing examples of indigenous people’s responses to extractive activities on their lands in North America and Australia, Wildcat & Voth (2023) effectively exemplify similar concepts of relationality among them. Wildcat & Voth (2023) write:

[Al]though the Dene, Bardi, Kija and Jaru are separated by time and space, their notions of relationality are not separated by reasoning... They both demonstrate a similar pattern of understanding the world, the land and relationships between the two... [W]hat is of utmost importance when making decisions is the consideration of how our decisions will affect relationships along various registers. In both cases, their orientations are not guided by an outright opposition to industrial development regardless of context. Nor are they primarily concerned with individual or an Indigenous nation’s self-interest. Rather, their reasoning process is guided by concern for the well-being of others in situations of scarcity and managing unique but overlapping relationships (p. 477).

Both speakers, one from North America and one from Australia, mentioned that if the other person coming in were in “need,” they would happily share with them—however, it was not the needy coming to their lands for their resources, but those grown exorbitant wealthy off stolen lands and resources

(Wildcat & Voth, 2023, p. 476-477). This note aside, what stands out from this quote is the similarity between geographically separated people in regard to the overarching importance of relationality in governing one's actions.

## II. *Key Indigenous Concepts*

Before going further, it is important to clarify a few terms. For this paper, I will focus on “collective continuance,” relationality, kinship, and reciprocity. Each of these concepts is derived from the type of indigenous relational cosmology described above.

To begin, the basic premise of *relationality* is that all beings are in relationships with all other beings, human and non, and each is recognized as “*kin*” (Kimmerer, 2013). Each relationship denotes responsibilities that each being must another, and these mutual responsibilities are the basis of the concept of *reciprocity* (Whyte, 2018, p. 131; Kimmerer, 2013). Ethical actions therefore are dictated by respect for other beings and upholding one's “end of the bargain” in their relationship (although the ends may not be equal) (Whyte, 2018, p. 131). In regard to the Saugeen Ojibway Nation, LaRiviere & Crawford (2013) researched the “principles of wild harvest and management.” For the Ojibway, LaRiviere & Crawford (2013) broke responses into 5 categories; sharing, wasting, thanks, needs, and seasons, and provided examples of each. For example, giving thanks often involves a gift, a recognition of the generosity and sacrifice of the animal and nature (LaRiviere & Crawford, 2013). Indeed, interspecies relationships with more-than-human beings (Ogden et al., 2013; Whyte, 2013) are premised on the concept of gratitude (Kimmerer, 2013). This gratitude extends to all kinship relationships with all beings, and arguably forms the basis of reciprocal practices. Given that these beings are essential to and provide for the “collective continuance” (Whyte, 2018) of the people and all beings, this makes sense.

Collective continuance “refers to a society's capacity to self-determine how to adapt to change in ways that avoid reasonably preventable harms” (Whyte, 2018, p. 131). It is premised on reciprocal relationships premised on gift-giving/receiving, and “responsibilities are organized into interdependent systems [to] facilitate the adaptive capacity of collective continuance” (Whyte, 2018, p. 131). Whyte (2018) describes a key stipulation—“to become a party in a relationship, one must be transformed into a relative with reciprocal obligations” (p. 131). Importantly, Whyte (2018) describes “emerging responsibilities” which are “those that societies create through innovation to respond to new issues” (p. 131). The idea of “being transformed into a relative with reciprocal obligations” fits quite well with “emerging responsibilities” in the context of invasive species.

## III. *Invasive Species—Incorporating New “Relatives”*

Reo & Ogden (2018) state that it is the “responsibility of humans” to determine the relationship with new species in their “territories” (pp. 1446-1447). In this way, they are to treat them as new relationships, or as Hernandez et al. (2022) puts it, “displaced relations” (p. 215). In this way,

indigenous cosmologies overcome simplistic binaries between “alien” and “native”—indeed, referencing Warren (2007), Reo & Ogden (2018) say that these categories “stand in stark contrast” to an indigenous “land ethic” and that it actually “interferes with Anishinaabe connections to place and their social relations with non-humans” (p. 1449).

Consider the example of how some indigenous Australians respond to introduced species. Warren (2007) says that “Australian Aborigines often resist eradication programmes of feral species” because they “believ[e] that the worth of a species lies in its ability to flourish in an environment, not in its claim to being an original inhabitant” (p. 434, ref. Rose, 1995). Indeed, Robinson et al. (2005) describe how the Jawoyn people categorize three introduced species (water buffalo, horses, and pigs) as bush “tucker” (meat), bush pet, and bush threat, respectively, based on their relationships to and observations of the animals and their impacts on the land. Robinson et al. (2005) describe one senior Jawoyn man who said, “Buffalo belong here, as long as he doesn't do too much damage, he can stay” (p. 1386).

In these examples, what is noteworthy is not only the respect for non-human invasive species held by some indigenous people, but also the emphasis on relating to the species and seeing how things play out. In the case of the Jawoyn people, they determined which species (the pig) to be wary of and want to manage heavily not because it is non-native, but because it damages the land. Species they enjoyed having around (horses) or species they could eat (buffalo) were determined to belong as part of their “country” due to their relationship to the people and the land (Robinson et al, 2005). Taken together with the concepts above, it becomes clear that indigenous people are more effectively considering how to incorporate introduced/invasive species into a “kincentric worldview” (a project called for by Reo & Ogden [2018] using terminology from Salmon [2000]).

While indigenous cosmologies are better able to accommodate introduced species and environmental change than settler ones premised on dominion and control, by virtue of the ongoing process of settler colonialism they are relegated to fractions of their original lands with limited political power in the face of wealthy and powerful settler states (Whyte, 2017). As a result, there needs to be an increase in respect for indigenous agency in invasive species management (per Reo et al., 2017; Wehi et al., 2023), and concurrent improvements in co-management between indigenous people and settler states. Rewilding is promising in its ability to improve co-management given its reliance on non-human autonomy and decreasing human control over management projects.

## **Discussion**

### **1. Rewilding as a Framework for Improved Settler/Indigenous Collaboration and Knowledge Sharing**

#### *I. Relationships—Collaboration as Essential to Collective Continuance*

More than anything, this example shows that, to mix metaphors, two eyed seeing goes both ways in a partnership—only if both parties use both

eyes can they see clearly.<sup>17</sup> While the two eyed seeing concept arose to emphasize the importance of blending Indigenous knowledge (IK) and science for indigenous communities (Hatcher et al., 2009), the discussion here posits IK as quite fruitful for helping strengthen rewilding practices in ecology in regard to key concepts and research methods.

Knowledge sharing and collaborative research can only be cultivated via relationships. However, given the connection of indigenous knowledge to indigenous spirituality/ways of life/cultural practices (Hatcher et al., 2009; Ban et al., 2018), and the long history of colonial abuse (Winter et al., 2021, p. 338), there is likely to be hesitancy to share with settlers no matter how good their intentions are. Indeed, Ban et al. (2018), says “ it takes time to build relationships. A fast pace of research expected by many in academia may be unrealistic, at least initially while those relationships are being built.” However, relationships of quality are not to be rushed—patience and their development will pay off in the long run.

Importantly, Ban et al. (2018) has two key suggestions for ecologists building relations with indigenous people:

**First**...find out on whose territory or territories their research takes place and reach out to local Indigenous resource management organizations. [They] may already have publicly available guidelines for researchers. It is imperative to study these guidelines prior to initiating communications, and to understand that relationship-building will take time. **Second**, abide by the principle of “free and prior informed consent” stated in the UNDRIP, and other ethical guidelines...before implementing projects in Indigenous territories, especially if these involve invasive field techniques such as manipulative experiments, tranquilizing and radio-collaring animals or specimen collections. Follow Indigenous protocols for developing research partnerships.

What is imperative to recognize from these instructions is that the burden is placed on the researcher rather than the indigenous people—research and find protocols beforehand, reach out, etc. It is also important to check entitlement—indigenous people do not owe you anything. Lastly, and perhaps most importantly, respect the indigenous protocols and wishes—you are on their land, so respect their desires, and ask how your research can help them (or better yet, what research can you do in your field that would be beneficial to them).

In addition, there are several complicating factors for indigenous collaboration with ecologists. First, the pace of research may be slowed due to the time it takes to build relationships, which may not feel productive given the pressing nature of environmental issues but is essential to justice concerns (Ban et al., 2018; Whyte, 2020). Second, “Indigenous resource management offices are generally understaffed” (Ban et al., 2018)—in other words, it can

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<sup>17</sup> I acknowledge the ableist nature of this metaphor, but it is useful nonetheless.



take a while to contact indigenous resource management offices. Here again is an opportunity to emphasize indigenous justice—these offices exist for the indigenous people and *should* focus on what in their constituency is viewed as most pressing (Ban et al., 2018). Third, “not all information is appropriate to share”—while scientists “publicly disseminate their findings” there are some things that should not be disclosed to protect “locations of ecologically and culturally important areas...where [for example] traditional foods are harvested, as they may reveal ‘hotspots’ for potential exploitation by others” (Ban et al. 2018). Fourth, indigenous knowledge contains more than just “ecological knowledge”—it is inextricably linked to ceremony, spirituality, etc. (Fenton & Playdon, 2022; Ban et al. 2018). As such, it is important that collaboration and learning does not become appropriative (Fenton & Playdon, 2022).

Despite these complications, I maintain that rewilding holds great potential for improved settler understanding of concepts key to indigenous cosmology (that originate from within our cultural tradition, thereby leading to conceptual blending rather than appropriation) and therefore can lead to improved settler/indigenous relationships and co-management. Particularly fruitful is the potential to use the connotation of wild to our advantage, such that whenever it is brought up it is framed as a good thing, as *agency*.

## II. *IK and Western Science— “Two-Eyed Seeing” Goes Both Ways*

In their review of using trophic rewilding to address biological invasions, Derham et al. (2018) conclude that “Trophic rewilding can work to prevent biological invasions, mitigate their impacts and promote the coexistence of newcomer species with long-time residents” (p. 6). However, they caution against overapplication of general trends, and stress that “local conditions and proximate causes must be understood in detail before predictions can be made about rewilding and invasions” (p. 6). The sentiment reflected here is that our western science is too young, and resting on quantitative data, essentially blind when it comes to how best to rewild and how to best manage invasive species (Ban et al., 2018). Although they do not state it directly, Derham et al. (2018) effectively make the case for elevating indigenous knowledge (IK) as a necessary component of both rewilding and invasion biology (invasive species management). After all, who has a more intimate understanding of the ecological goings on of their homelands than indigenous people whose knowledge of the land stretches back thousands of years?

In a sense, what is needed in ecology, and what rewilding makes space for is “two-eyed seeing.” Two-eyed seeing is a concept described by Albert Marshall, a Mi’kmaq Nation elder, who says that it arose in Atlantic Canada because the Mi’kmaq Nation “have had the longest experience of living side by side with the newcomers from Europe” (Hatcher et al., 2009). Two-eyed seeing is derived from the Mi’kmaq “Toqwa’tu’kl Kjjijitaqnn,” or Integrative Sciences, and represents the idea that it is important “to see from one eye with the strengths of Indigenous ways of knowing and from the other eye with the

strengths of Western ways of knowing and to using both of these eyes together” (Hatcher et al., 2009). Hatcher et al. (2009) write:

The guiding principle of Two-Eyed Seeing in Integrative Sciences allows the Indigenous Sciences sense of the whole “to dance with” the Western Science sense of the parts. (Hatcher et al., 2009).

Even this sentiment gets at the need for IK in ecology, and suggests the strengths of ecology too. IK is dynamic, relational, process and landscape oriented, whereas western science is more compartmentalized, examining the subject as a collective of parts that can be observed by an impartial viewer (Hatcher et al. 2009). However, despite their strengths, both IK and ecology are limited when it comes to invasive species management.

Now, it is also true that the environment has changed over time (Ellis et al., 2021), that much recent (4-5 centuries) environmental change has been brought via the ongoing violences of settler colonialism (Whyte, 2017; Wolfe, 2006), and that indigenous people have been erased, removed, and translocated from their homelands throughout the process (Whyte, 2017; Wolfe, 2006; Johnson, 2014). Further, contemporary issues like invasive species and climate change are contributing to increasingly novel ecosystems (Hobbs et al., 2009). Given these complications, it is necessary to point out that the world in which much IK was rooted is gone, or at least radically transformed to a point it is hard to recognize “anything indigenous about it” (Whyte, 2017).

This by no means diminishes the importance or validity of indigenous knowledge and IK. For example, part of indigenous knowledge is a very specific process of research and knowledge development. Wilson (2001) describes indigenous knowledge as “relational,” as opposed to western concepts of “individual knowledge” (p. 176). In discussing the importance of relationships to indigenous research, Wildcat & Voth (2023) quote Wilson (2008) as saying that on the topic of indigenous research, “The importance of relationships, or relationality of an Indigenous ontology and epistemology, was stressed by many of the people” (p. 80)” (p. 479).

Given the key concepts identified above (relationality, reciprocity, respect for non-human agency, etc.), indigenous peoples are often more aware of landscape scale interactions (Ban et al., 2018) and focus on approaching new species as “displaced relatives” with whom they must build relationships (Hernandez, 2022; Reo & Ogden, 2018). While specific invasive species are new for them as well, they have been dealing with settler-caused environmental change for centuries (Whyte, 2017). If anyone has ideas on how to thrive despite rapidly changing environmental circumstances, it will be indigenous people.

Rewilding is a promising conservation framework/philosophy for responding to the rapid environmental changes caused by settler-induced climate change, settler facilitated biological invasions, and subsequent creation of novel ecosystems and biodiversity loss. However, there is little

quantitative data that exists, and a recent effort to create a way of determining rewilding progress relied on qualitative data as a result (Torres et al., 2018). Given that indigenous research methods are premised on relationality (Ban et al., 2018; Wilson, 2001; Hatcher et al., 2009), and rewilding attempts to encourage functioning ecosystems in lieu of quantitative data (Torres et al., 2018), there emerges a clear avenue for collaboration. Rewilding needs relational/qualitative data, especially in its beginning stages, while the quantitative data banks are being built up (Torres et al., 2018).

Indeed, Ban et al. (2018) say that “Indigenous peoples generally focus on qualitative signals indicating directional or relative changes in the state of ecosystem components” and that this could be helpful to western scientists because while “quantitative measures...are difficult..., expensive...and fragmented in space and time,” indigenous research can be collected “continuously” by “networks” of “socially connected” people. Given the scale of the environmental issues being researched today (invasive species, biodiversity loss, climate change, etc.), this form of data collection is not only cost effective, but collaborative. More people can partake in research of this method and can thereby report back as to the condition of the landscape.

Indeed, as with dogs and royalty, it is arguable that any pure-bred western body of knowledge will have...issues. Consider the following example:

...[I]n the 1970s scientists estimated that bowhead whales in Arctic Alaska had a small population that could no longer withstand the traditional Iñupiat hunt. Iñupiat hunters disagreed, asserting that whales were abundant and their whale hunt sustainable. Over time, the disagreement led to collaborative research and the revised population estimates — which were greatly improved by integrating Iñupiat traditional knowledge with scientific tools — supported the hunters’ assertions. (Ban et al. 2018).

Not only is this a story with a great twist, but a key lesson—western ecological science can be flawed due to its emphasis on quantitative data (Ban et al., 2018) over qualitative/relational data (Ban et al. 2018; Wilson 2001; Wildcat & Voth, 2023) and thereby can miss the bigger landscape scale picture. Additionally, this is an example of the hubris of scientific superiority—other ways of knowing, like IK, may be more accurate than science at times. Given the changing nature of the world today (i.e climate change, biodiversity loss, invasive species, etc.) it must be stressed that in looking to the future, two eyes are better than one.

### *III. Respect for Non-Human Autonomy as Compatible With Settler/Indigenous Relationality*

Given the emphasis of respecting non-human autonomy, I argue that rewilding has potential to lead to increased respect for agency of all beings, which in regard to human relationships includes culturally-specific knowledge

and self-determination of peoples. For example, Derham et al. (2018) says “Agency, in particular autonomous agency, can entail an ethic of respect (e.g. Taylor, 1986)” (p. 2). They continue to say:

Rewilding advocacy often includes an assumption that coexistence of disparate groups is possible and even preferable to exclusion, for example, coexistence between humans and large predators...An ethic based on coexistence may be a viable alternative to exclusion-based approaches to conservation... (p. 2)

The key takeaway from this quote is that rewilding, counter to exclusionary (read: colonial [Plumwood, 2002]) approaches to conservation, fosters an “ethic of coexistence” (Derham et al., 2018). While Derham et al. (2018) (and many who discuss rewilding from the perspective of science) typically mean to suggest the coexistence of humans and animals, I argue that this coexistence based on autonomy can be extended to Indigenous people in the coexistence of different cultures and land relations, which would increase biocultural diversity. Biocultural diversity refers to WHAT, which necessarily entails conservation approaches premised on respect and collaboration between different human groups. In order to demonstrate the applicability of “biocultural diversity” between humans groups, I will use a metaphor to extend it to different non-humans

For this metaphor, I will focus on beavers and trees near streams. Beavers are often covered as an example of trophic rewilding given their status as “keystone species” (Crowley et al., 2017). In other words, the species is selected given its penchant for engaging its environment (utilizing its agency) and shaping it to its desires.

For example, once a beaver cuts the trees, builds a dam, it then must maintain the dam, build a lodge, gather leaves at the bottom of the lake, etc. further shaping the environment based on how the environment responds to the beaver's actions. Not that I can speak to the existence of beaver culture, but what is clear to me is that there are strong connections between the type of landscape desired by the beaver for the future and its actions, which are only possible if it is present *and* able to enact its agency. A beaver lodge is useless as a defense from predators if it is built on land and storing leaves at the bottom of a pond for easy winter access (a form of “beaver refrigeration”, since the water keeps them cool and slows decay [Wohl, 2019, p. 23]), is hard to do in the absence of a pond. To extend biocultural diversity as a concept to beavers helps to demonstrate how interconnected the concept is between humans and non-humans.

However, in a landscape shaped by multiple agencies, consider the fate of trees near the stream as beaver dams. They do not desire to be living in a pond—if, as the Anishinaabe do for example, you consider the tree as having agency (Reo & Ogden, 2018), it becomes clear that the future brought about by the beaver’s actions and desires are not compatible with those of the tree. In this way, rewilding beavers into the landscape not only has immense

ecological effects but demonstrates that there are conflicting desires for future landscapes and varying degrees of agency to enact them among non-humans. If only the trees and the beaver talked to one another.

Using this metaphor, I mean to draw connections between how optimum future landscapes may be different for different peoples, and I used non-human beings in order to show the compatibility of rewilding aims of respecting the autonomy of nonhumans extends well to individual humans and the self determination of sovereign groups, particularly given their suppression by similar settler systems of domination that destroyed the land (Whyte, 2017). Massenberg et al. (2022), in their search for a “holistic approach” to rewilding in cultural landscapes, say:

...[T]aking rewilding seriously may go beyond the assessment of ecological, economic and social impacts and involve more fundamental question such as what landscapes do we value and in which future landscapes do we want to live in. In practice, these questions can be addressed by means of participative approaches... (p. 51-52).

Here lies the biocultural connection for humans—just as any other being, humans possess agency and use it in an attempt to obtain desired futures (Prior & Brady, 2017). However, the futures imagined by people from different cultures, especially those premised on different cosmologies, are likely divergent (although not incompatible). For this reason, whenever questions of future land relations are raised (conservation, for example), there must be conversations among the different parties present, within and between cultures. Only then can the highest level of biocultural diversity be ensured, which would bring about an increase in indigenous self-determination over their land relations, thereby remedying some settler imposed injustices.

Contemporary conservation must collaborate with indigenous people as a matter of justice—failure to do so will only retrench settler power dynamics/land relations (Atchison et al., 2024) and maintain Indigenous “ancestors’ dystopias” (Whyte, 2017). Indeed, Wehi et al. (2023) say that since “Indigenous peoples have been blocked from enacting their knowledge of biodiversity conservation, Indigenous-led protection of biodiversity, including IAS [invasive alien species] management, is a matter of justice” (p. 1404). In this regard, respect for agency and autonomy in rewilding can extend beyond nonhumans, to include indigenous self-determination in conservation practices. This opens the door to explore new concepts in conservation, like the premise of “self-same land” (Tuck et al., 2014). There is sufficient evidence that this should be done, given the efficacy of indigenous conservation practices around the world in spite of ongoing colonial oppression (Kennedy et al, 2023; Brondizio & le Tourneau, 2016; Walker et al., 2020; Sze et al., 2021; Garnett et al., 2018; Estrada et al., 2022).

## **2. Rewilding as Essential for Invasive Species Management**

Rewilding is uniquely positioned among conservation concepts currently in being able to adapt to the connected challenges of invasive species, biodiversity loss/ecosystem function, and climate change. In emphasizing function over structure, it can adapt to new challenges of novel ecosystems, invasive species, and changing climate better than approaches which aim to restore specific ecosystems states.

Invasive species management is one of the most important aspects of contemporary conservation, and while the knee-jerk reaction from many settler states and agencies is to eradicate them (USDA, 2024), as Wehi et al. (2023) state, “may be neither satisfactory nor sufficient” (p. 1404). Rewilding offers a framework for addressing invasive species that is not premised on “command and control” (Holling & Meffe, 1996), which is more in line with restoration than rewilding (du Toit & Pettorelli, 2019). Given the discussion of restoration previously, it should be noted that there is little room for introduced species or novel ecosystems in restoring a system structurally (du Toit & Pettorelli, 2019). Thus, removal of introduced species (be they invasive or otherwise) is a management priority.

However, there are complicating factors—once an introduced species is established, it is nearly impossible to eradicate, and not all introduced species become invasive (DOI, 2024). As such, there is a recognition that not all non-native species need to be removed, and much invasive species management is going to need to shift to long term management (Green & Grosholz, 2022; Davis et al., 2011). Indeed, in accordance with Head et al.’s (2015) aptly titled article, the reality is that we will be “living with invasive plants.” There is growing recognition that eradication is not feasible, especially for introduced plant species due to the complicating factors of seed banks (Genovesi, 2008, p. 389). However, this recognition feels burdensome to some weed managers. Take the example provided by Head et al. (2015):

One weed manager from Western Australia used the metaphor of “bashing [his] head against a brick wall” to explain his persistence and perseverance, and the contingency of the ‘wins’ that he thinks are possible: “this job will go on forever, whether it’ll be me or someone else, and in 200 years’ time your descendant will be interviewing my descendant about weed control. (P. 314)

Such feelings of burnout, of fighting an uphill battle, are likely derived from understandings of human/nature relationships in which humans are separate from and superior to nature, and therefore must be in control. The manager here is saying that this effort of trying to control the invasive species in question will never be finished. To a settler, this sounds exhausting, and one can sympathize with him. However, indigenous cosmologies, while no less labor intensive in dealing with problematic invasive species, might laugh at the exasperation of the settler at the prospect of eternal relationship, because their cosmology takes long-term relationships as given. It is not to say invasive species are no less of a problem for indigenous people—rather, this is

to suggest that their understanding of relationality and non-human agency allow them to adapt and adjust better than settler colonial cosmologies based on control.

This is why rewilding holds so much potential as a conservation framework for invasive species—it can allow for non-human agency and attempts to let ecosystems manage themselves. Given the cost of current practices (IPBES, 2023), the dearth of invasive species labor (Head et al., 2015), and the sheer scale of biological invasions (IPBES, 2023), it is clear that there is a need to change invasive species management as currently practiced. Premised on notions of “wild” as non-human autonomy (Prior & Ward, 2016), rewilding is compatible with indigenous cosmologies premised on non-human agency and relationality. “Wildness” as agency of non-human beings/ecosystems can communicate to settlers from within their cultural inheritance a similar message to that of indigenous cosmologies (that all beings are in relation to each other and ought to be respected). Given this, the focus of management shifts from removal and destruction of invasive species to one of long-term management (relationship building). While it may not be possible nor appropriate for settlers to utilize language of “displaced relatives” (Hernandez, 2022), it is absolutely possible for settlers to recognize that “wild” means an uncontrollable will that must be respected, particularly if it is framed as a necessary component of maintaining functioning ecosystems.

However, two things can be true at once—it is undoubtedly necessary to relinquish control and allow for increased non-human agency, but it is equally important that ecosystems continue to function. This has philosophical and practical implications.

Philosophically, this boils down to preventing the agency of any organism from damaging the ability of others to express their agency. The Invasive Species Advisory Council (ISAC) defined “environmental harm” as “biologically significant decreases in native species populations, alterations to plant and animal communities or to ecological processes that native species and other desirable plants and animals and humans depend on for survival” (2006). In this regard, environmental harm is that which limits the ability of humans and non-humans to survive, which is the basic activity in which one exercises their agency. In this regard, this almost draws on Mill’s “harm principle” (Mill, 1978) or the idea of “negative rights,” as in the adage by Supreme Court Justice Oliver Wendell Holmes, Jr., “Your freedom to swing your fist ends where my nose begins.”<sup>18</sup> What emerges from this discussion is that a philosophy like rewilding premised on respect for non-human autonomy does not mean the relinquishment of human autonomy—it also certainly does not mean the exercise of one species’ autonomy at the expense of another, or more appropriate for rewilding, at the expense of ecosystem function.

In practice, this means aiming for “functional eradication,” or “reducing local densities below levels that cause unacceptable effects on

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<sup>18</sup> Mill (1978) wrote, “the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others” (p. 9).

recipient ecological communities in high-priority habitats” (Green & Grosholz, 2020). Alternatively, this could be thought of as respecting invasive agency until the point it infringes upon the ability of another non-human being to enact its own agency. This fits well with rewilding, as it respects the autonomy of the species while balancing it with the autonomy of humans and other nonhumans (and thereby, maintains the functioning of the ecosystem). In essence, it is a framework which suggests saying, “look, you can be here, but you cannot take over” (which clearly has problematic implications, given its connection to settler science who very much are operating above our own “functional eradication” levels).

One drawback of the functional eradication approach is that it is premised on utilizing data which by and large does not exist yet. Green & Grosholz (2020) say that functional eradication is based on:

- (1) quantification of the mechanisms by which invaders negatively affect native communities (ie predation, competition, habitat engineering, and so forth)...
- (2) identification of invasive population levels that elicit unacceptable effects (i.e. identifying the shape and magnitude of density–impact functions); and
- (3) combining the products of steps (1) and (2) with data on repopulation rates following suppression.

While quantitative data may not be immediately available (Green & Grosholz, 2020), relational data may be: (1) translates to what are the relationships between the invader and other species. (2) may be more difficult to translate due to its quantitative nature, but (3) repopulation rates can also be documented relationally. This harkens back to the importance of “two-eyed seeing,” or collaboration between indigenous and settler people utilizing IK and western science.

Despite a lack of data, Green & Grosholz (2020) effectively make the point that “identifying targets for suppression allows managers to estimate the degree of removal required to mitigate ecological impacts and the management resources needed to achieve sufficient control of an invader”—in other words, using functional eradication allows for more cost effective and practicably effective management. While functional eradication hold promise as a framework, in the absence of much of the quantitative data needed (Green & Grosholz, 2020), there is a need to try and use relational methods to identify these thresholds in the meantime.

### 3. Pitfalls

#### *I. Recall the Wildness vs. Wilderness Distinction*

Rewilding that does *not* take “non-human autonomy” (Prior & Ward, 2016; Ward, 2019; Ward and Prior, 2020) or “more than human agency” (Prior and Ward, 2016) as its central component is not rewilding at all, but a co-option of the concept to cover up traditional conservation methods of command and



control (Holling and Meffe, 1996). As such, I do not see the need to include the wildness v. wilderness distinction as a potential pitfall to avoid, given its discussion previously and the fact that, to my understanding in line with Ward (2019), if one is considering “wilderness” as a valid concept, they are not pursuing rewilding. I place this distinction here to reemphasize its importance, but I will not belabor this point further.

## *II. Wild as Will—Is Respect for Non-Human Autonomy Enough?*

One potential shortcoming of “wildness as self-willed” beings/land is that while it holds promise for building relationships of respect for non-humans, it may lack the indigenous concept of reciprocity. Indigenous views of relationship building with invasive species are premised on ideas not only of respect for non-human agency, but reciprocity as part of relationships (Kimmerer, 2013; Wehi et al., 2023; Reo & Ogden, 2018). For example, in writing about invasive species, Reo & Ogden (2018) say:

[I]t is the responsibility of humans to determine the reason why new plants or animals have arrived in their territories, and actively determine the nature of novel human–animal or human–plant relationships. (pp. 1446-1447).

One area for further exploration therefore is how from within a settler framework reciprocity can become part of the conversation. Letting go of notions of “command and control” and transitioning towards relational understandings of introduced, invasive, and native species is important, but only part of the process. I fear that allowing for non-human agency may not be enough to prevent the retrenchment of colonial ideals—for example, we respect non-human autonomy over there, but here, where the people are, we do not. While examples from Europe like the reintroduction of beavers to Scotland offer hope that there is potential to bring wildness back to human dominated spaces (Prior & Ward, 2016), in the North American context I think that there needs to be work to make reciprocity part of the conversation. To establish reciprocity, I think there needs to be more work done in establishing intimate relationships with land, beyond the scale of management. For example, consider the following examples:

- Some land trusts hold events where harvest of an invasive plant is utilized for making baskets, or Christmas ornaments, or other things (York Land Trust, ME).
- Many cultivated or crop plants are not native to areas they are grown (Khoury et al., 2016) yet people care for them and harvest what Kimmerer (2013) would call their “gifts.”
- Earthworms are taken as signs of healthy soil, and gardeners/fishermen appreciate them. However, the earthworm is invasive to North America, and has significantly altered the soil composition (Reo & Ogden, 2018, p. 1447). Despite this, some people keep and feed worms for vermiculture and love seeing them in the soil.

- In urban areas, there is potential for collaboration between greenspace managers and foraging communities in managing invasive species, particularly if the species has a use that makes it desirable for foraging (Arrington, 2021).

Each of these represent potential relationships at the individual level that can be enacted or experienced by anyone. This is the cultural challenge of our era—how can settlers reweave themselves into the land in a way that does not gloss over the history of colonial violence? How can this be done in ways which collaborate with and learn from indigenous people without co-opting their knowledge or appropriating their practices? These questions go beyond the scope of this paper but are important to keep in mind.

### *III. Presentism: Move on From Here Without Considering History of Colonialism*

While it is important to not ignore the history of colonialism to avoid appropriative practices in aspiring to reciprocal relations, it is also essential that while focusing on relationship building one does not lose track of the past, how things came to be the way they are.

There is a Maori proverb, "Kia whakatomuri te haere whakamua" that translates loosely to "I walk backwards into the future with my eyes fixed on my past" (Rameka, 2016) In other words, the future is shaped by the past—this is similar to European concepts like historicity, especially from Heidegger's understanding of "the past coming back at you from the future." Taken in conjunction with Wolfe (2006) who says that settler colonialism is not an event, but a structure/process (ref. Wolfe, 1999), the repercussions are clear—until the history/present of colonialism is addressed and repaired, the future will always be colonial.

What this idea gets at is that nothing comes from nowhere—the current state of affairs came to be as a result of certain actions. The more trauma-inducing, violent, unjust, and vile the actions, the more important it is never to forget them (and to acknowledge their ongoing legacy). Settlers cannot possibly hope to approach indigenous people intent on building/repairing/improving relationships with them if they are not willing to acknowledge, sit with, and work through how themselves and their forefathers have benefitted from systems of oppression that have caused irreparable damage to indigenous people, ways of being, and land (Yukich et al., 2022; Tuck & Yang, 2013, p. 9). As Atchison et al. (2024) say that given the intimate connection between settler colonialism, environmental change, and indigenous erasure/suffering (Whyte, 2017; Whyte, 2018) is it as just as important that rewilding tackle the history of colonialism, different landscape values, questions of power and justice as questions of invasive species (p. 467).<sup>19</sup>

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<sup>19</sup> "...[A]ttempts at ecological renewal, including invasive plant management and rewilding, are innately social questions that require biodiversity conservation to engage with issues of justice, politics and power. This requires engagement with the specifics of landscapes (and therefore of history, colonialism, uneven

#### *IV. Appropriation of Indigenous Knowledge/Culture*

On the subject of recalling history's role in creating the present so as not to repeat it, it is important that when collaborating with and learning from indigenous people one does not co-opt or appropriate their culture. Regarding rewilding, there is some precedent here, best characterized by the mostly settler descended "wildtenders" and their "sacred Hoop" based on historical indigenous seasonal rounds (Seraphin, 2016; Seraphin, 2017). Additionally, there is a long history of settler states appropriating indigenous knowledge they found useful and rejecting the people as "savage" (Fenton & Playdon, 2022, p. 124). There is also precedent for early settlers using indigenous knowledge of foods for survival, adopting some (like blueberries and strawberries) and abandoning others (Turner & von Aderkas, 2012). By the process of settler colonial suppression of culture, much of indigenous knowledge of food (with the exception of what was appropriated) was virtually lost and is only beginning to make a resurgence (Turner & von Aderkas, 2012). Unfortunately, this does not just go for food—settler states have a long history of abandoning or ignoring their responsibilities to indigenous people (Scott, 2018).

It is as a direct result of these inequitable power dynamics and histories of appropriation and extractive relationships that I emphasize partnership without appropriation. This is why I hammer so heavily on rewilding as "wildness" as self-willed beings/lands, because it comes from older European ways of understanding nature that can be reclaimed to improve settler relationship to land and (especially indigenous) people (Ward, 2019; Johns, 2019; Jickling et al., 2018).

#### *V. Leaving it to the Experts—Rewilding is Collective*

While appropriation is inappropriate, learning from indigenous people is acceptable. Indigenous relationality and approaches to research can teach settlers much about the role of experts in relation to the land.

Indigenous relationality refers to the relationships between all beings—but importantly, under such a cosmology, every individual person has a particular set of relationships to their community, as well as to the land/non-human beings (Whyte, 2013; Whyte, 2017; Whyte, 2018). Following this, indigenous research is collaborative, based on the same concept of relationality. Ban et al. (2018) describe how data collection is collective, and many individual people can gather data about the landscape simultaneously and continuously. This relational data is acquired through indigenous people's lifeways—there is little difference between research and way of life (Hatcher et al., 2009).

Settlers can learn from this in regard to collective action and improving relationships with "wildness." Tallamy (2020) suggests "bringing

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ecosystem baselines and conflicting generational memories and landscape values), with nonhuman agency and with what is practically possible for those deemed responsible." (p. 467)

nature home,” or in other words, replacing lawn with native plantings and making room for wildlife. While this call is instructive, Tallamy misses three key points. First, he describes this effort of “backyard conservation” as the creation of a “Homegrown National Park,” which is problematic given the colonial history of removal of indigenous people from their land to create national parks and given its clear support of a division between nature/human. Second, he advocates more from a restoration than a rewilding perspective, and fails to recognize the reality of novel ecosystems. Third, he fails to account for human activities that can be part of these activities, like food production and creating an agricultural matrix. While imperfect, Tallamy’s (2020) call for everyone to participate in “backyard conservation” is instructive because it can fit into frameworks emphasizing human relationships to non-human beings, and it is pragmatic in that it recognizes that the scale of conservation issues are too big to leave to the experts on public land.

*VI. Limits to Rewilding—Instrumental Agency as Potential Settler Misunderstanding*

Despite the promise of rewilding as a philosophy and conservation framework capable of respecting non-human autonomy, there is potential for some instrumentalism to creep in. For example, reintroducing animals is done with the hope that the animal will enact their agency and will improve ecosystem function as a result (Prior & Ward, 2016). There is potential that if we are not careful, this respect for non-human autonomy can become a valuation of it based on “what they can do for us.” Other complications are that even if you respect the animals’ agency more once they are introduced to an area, it is important to note that their agency is already constrained by the reification of human agency on the landscape (territorial limits, disconnectivity, roads, etc.) and the fact that arguably, the reintroduction itself was a violation of their agency.

However, while imperfect, we must start somewhere, and I think this concept holds a lot of promise in simultaneously unsettling settler conservation conceptually via intervention of the concepts of non-human agency and can also strengthen respect for agency of humans who have been “othered.” Subsequently, this can lead to more conceptual compatibility between conservation practice and indigenous cosmology, and thereby can contribute to an elevation of indigenous agency in conservation endeavors/partnerships.

**Conclusion**

Despite these identified pitfalls to avoid in rewilding (conceptually or in practice), I retain it as the most promising conservation framework moving into the future, if not for its empirically demonstrated efficacy (the oldest rewilding experiment is OVP and it is only about 50 years old), then for its philosophical underpinnings and compatibility with indigenous worldviews and concepts and the promise this holds in developing socially just, relation

based conservation frameworks. Despite the relative lack of widely applicable empirical data for developing invasive species conservation plans, there is opportunity to learn from indigenous research methods based on qualitative data and relationality to gather more data on landscape scale effects of invasive species more rapidly.

Further, rewilding, premised as it is on the concept of “non-human autonomy” (Prior & Ward, 2016) (and its inverse, “decreased human management” or “self-regulating ecosystems” (Carver et al., 2021)), grants settlers the ability to develop a new appreciation of indigenous concepts like relationality, kinship, reciprocity, and “collective continuance” (Whyte, 2018) from within our own cultural framework (Johns, 2019; Jickling et al., 2018). Due to cultural connotations of “wild” as self-willed or uncontrollable (Johns, 2019; Jickling et al., 2018; Prior & Ward, 2016), rewilding translates well into putting these ideas into practice. Additionally, the focus of rewilding on relinquishing control has implications for elevating indigenous agency and self-determination in conservation, which itself has implications for increasing biocultural diversity, reifying multiple cultures in the landscape, and thereby creating more diversified landscapes (Bridgewater & Rotherham, 2019). Further, given the uncertain futures we face due to climate change, biological invasions, biodiversity loss, and more, there is a need for all people to have a say in what our future land relations look like—we must work with and respect the agency of our fellow humans. In this way, there is potential for increased collaboration and justice within settler conservation under a rewilding framework given its focus on settlers “relinquishing control.”

Specifically, I hold that rewilding as a philosophy and as a framework for practice holds great potential in managing invasive species and the novel systems they create. Respecting agency does not mean doing nothing—it means protecting the “quality of relationships” or ecosystem function such that each being, human and non, is able to enact their agency without infringing upon the agency of others. In this way, I draw upon Invasive Species Advisory Committee (ISAC) definitions of environmental harm (2006) and Mills’ “harm principle” to suggest that “functional eradication” (Green & Grosholz, 2020) holds great potential to manage invasive species recognizing the reality that they are not going anywhere (eradication is nearly impossible) and respecting their agency (allowing them to live here and learn to weave themselves into the broader ecological community).

For these reasons, I argue that rewilding holds great promise for the future of conservation in its ability to link people and knowledges across cultures, respect agency of humans and non-humans, and move toward a future where conservation is less fear oriented and more premised on ensuring ecosystems function for the good of all members of the biotic and abiotic communities. It opens the door for settler to challenge historically inherited ecologies of severance and extraction and provides avenues of collaboration with and learning from indigenous peoples to rekindle our relationships with non-humans (in culturally appropriate and thereby non-appropriative ways).

## References

1. Arquette, M. (2000). *The Animals*. In Haudenosaunee Environmental Task Force (eds.) *Words That Come Before All Else Environmental Philosophies of the Haudenosaunee*. Native North American Travelling College.
2. Atchison et al. (2024) Peopled landscapes: Questions of coexistence in invasive plant management and rewilding. *People and Nature*. Vol 6 Iss 2, pp. 458-473 <https://doi.org/10.1002/pan3.10598>
3. Ban et al. (2018) Incorporate Indigenous perspectives for impactful research and effective management. *Nature ecology & evolution*.
4. Bridgewater, P. & Rotherham, I. (2019). A critical perspective on the concept of biocultural diversity and its emerging role in nature and heritage conservation. *People and Nature*. Vol 1, Iss 3, pp. 291-304. <https://doi.org/10.1002/pan3.10040>
5. Broughton et al. (2022). Slow development of woodland vegetation and bird communities during 33 years of passive rewilding in open farmland. *PLoS One*. Nov 11;17(11):e0277545. doi: 10.1371/journal.pone.0277545. PMID: 36367885; PMCID: PMC9651571.
6. Carver et al. (2021). Guiding principles for rewilding. *Conservation Biology*. Volume35, Issue6, pp. 1882-1893. <https://doi.org/10.1111/cobi.13730>
7. Colautti, R. & MacIsaac, H. (2004). A neutral terminology to define 'invasive' species. *Diversity and Distributions*. Vol 10, Iss 2, pp. 135-141. <https://doi.org/10.1111/j.1366-9516.2004.00061.x>
8. Cronon, W. (1996). The Trouble with Wilderness: Or, Getting Back to the Wrong Nature. *Environmental History*, Vol. 1, No. 1, pp. 7-28. <http://www.jstor.org/stable/3985059>
9. Cronon, W. (2003). *Changes in the Land: Indians, Colonists, and the Ecology of New England*, Revised Edition. Hill and Wang.
10. Derham et al. (2018). Hope and caution: rewilding to mitigate the impacts of biological invasions. *Phil. Trans. R. Soc.* B37320180127, <http://doi.org/10.1098/rstb.2018.0127>
11. Diez et al. (2012). Will extreme climatic events facilitate biological invasions? *Frontiers in Ecology and the Environment*. Volume10, Issue5, pp. 249-257. <https://doi.org/10.1890/110137>.
12. DOI. (2024). Invasive Species: Finding solutions to stop their spread. DOI. Accessed via: <https://www.doi.gov/blog/invasive-species-finding-solutions-stop-their-spread>
13. Drenthen, M. (2018). Rewilding in Layered Landscapes as a Challenge to Place Identity. *Environmental Values* 27 (4):405-425.
14. Du Toit, J. & Pettorelli, N. (2019). The differences between rewilding and restoring an ecologically degraded landscape. *Journal of Applied Ecology*. Volume56, Issue11, pp. 2467-2471. <https://doi.org/10.1111/1365-2664.13487>.

15. Fenton & Playdon (2022) Rewilding ‘knowledges’: Blending science and Indigenous knowledge systems. In Sally Hawkins, Ian Convery, Steve Carver, Rene Beyers (eds). *Routledge Handbook of Rewilding*. Routledge.
16. Foster, D. R., et al. (2008) New England’s Forest Landscape: Ecological Legacies and Conservation Patterns Shaped by Agrarian History. In *Agrarian Landscapes in Transition: Comparisons of Long-Term Ecological and Cultural Change* (pp. 344-389).
17. Genovesi, P. (2008). Limits and Potentialities of Eradication as a Tool for Addressing Biological Invasions. Ch. 22 in Nentwig, W. (eds). *Ecological Studies*, Vol. 193. Springer.
18. Green & Grosholz (2020). Functional eradication as a framework for invasive species control. *Frontiers in Ecology and the Environment*. Volume 19, Issue 2, pp. 98-107. <https://doi.org/10.1002/fee.2277>
19. Hatcher et al. (2009). Two-Eyed Seeing in the Classroom Environment: Concepts, Approaches, and Challenges. *Canadian Journal of Science, Mathematics and Technology Education*, 9(3), 141–153. <https://doi.org/10.1080/14926150903118342>
20. Hayward et al. (2019). Reintroducing rewilding to restoration – Rejecting the search for novelty. *Biological Conservation* Volume 233, May 2019, pp. 255-259. <https://doi.org/10.1016/j.biocon.2019.03.011>
21. Head et al. (2015). Living with Invasive Plants in the Anthropocene: The Importance of Understanding Practice and Experience. *Conservation and Society*, 13(3), 311–318. <http://www.jstor.org/stable/26393209>
22. Hernandez, J. (2022). *Fresh Banana Leaves: Healing Indigenous Landscapes Through Indigenous Science*. North Atlantic Books.
23. Hobbs et al. (2009). Novel ecosystems: implications for conservation and restoration. *Trends Ecol Evol*. 2009 Nov;24(11):599-605. doi: 10.1016/j.tree.2009.05.012. Epub 2009 Aug 14. PMID: 19683830.
24. Hobbs et al. (2013). Defining Novel Ecosystems. In *Novel Ecosystems* (eds R.J. Hobbs, E.S. Higgs and C.M. Hall). <https://doi.org/10.1002/9781118354186.ch6>
25. Holling, C. & Meffe, G. (1996). Command and Control and the Pathology of Natural Resource Management. *Conservation Biology*. Vol 10, Iss 2, pp. 328-337. <https://doi.org/10.1046/j.1523-1739.1996.10020328.x>
26. Hunt, S. (2014). Witnessing the Colonialscape: lighting the intimate fires of Indigenous legal pluralism. PhD Thesis. Simon Frazier University.
27. ISAC (2006). Invasive Species Definition Clarification and Guidance. e Definitions Subcommittee of the Invasive Species Advisory Committee (ISAC). [https://www.doi.gov/sites/doi.gov/files/uploads/isac\\_definitions\\_white\\_paper\\_rev.pdf](https://www.doi.gov/sites/doi.gov/files/uploads/isac_definitions_white_paper_rev.pdf)

28. Jickling et al. (2018). Wild Pedagogies: Six Initial Touchstones for Early Childhood Environmental Educators. *Australian Journal of Environmental Education*, 34(2), 159–171. doi:10.1017/ae.2018.19
29. Johns, D. (2019). History of rewilding: ideas and practice. In: Pettorelli N, Durant SM, du Toit JT, eds. *Rewilding. Ecological Reviews*. Cambridge University Press.
30. Jørgensen, D. (2015). Rethinking rewilding. *Geoforum*, Volume 65, pp. 482-488. <https://doi.org/10.1016/j.geoforum.2014.11.016>
31. Kennedy, P. et al. (2018) Do novel ecosystems provide habitat value for wildlife? Revisiting the physiognomy vs. floristics debate. *Ecosphere: An ESA Open Access Journal*. Volume9, Issue3, e02172. <https://doi.org/10.1002/ecs2.2172>
32. Kennedy et al. (2019). Managing the middle: A shift in conservation priorities based on the global human modification gradient. *Global Change Biology*. Volume25, Issue3, pp. 811-826. <https://doi.org/10.1111/gcb.14549>
33. Keulartz, J. (2012). The Emergence of Enlightened Anthropocentrism in Ecological Restoration. *Nature and Culture*. 7. 48-71. 10.3167/nc.2012.070104.
34. Kimmerer, R. (2013). *Braiding Sweetgrass: Indigenous Women, Scientific Knowledge, and the Teachings of Plants*. Milkweed Editions.
35. Lariviere, C. M., Crawford S. S. (2013) Indigenous Principles of Wild Harvest and Management: An Ojibway Community as a Case Study. *Hum Ecol Interdiscip J*, 41(6):947-960. doi: 10.1007/s10745-013-9568-x.
36. Linders et al. (2019). Direct and indirect effects of invasive species: Biodiversity loss is a major mechanism by which an invasive tree affects ecosystem functioning. *Journal of Ecology*. Volume107, Issue6, pp. 2660-2672. <https://doi.org/10.1111/1365-2745.13268>
37. Locke, J. (2008). The Second Treatise of Civil Government. In Wootton, D. (eds). *Modern Political Thought: Readings from Machiavelli to Nietzsche*. Second edition. Hackett Publishing Company, Inc.
38. Martinez et al. (2023). Back to the future: Indigenous relationality, kincentricity and the North American Model of wildlife management. *Environmental Science & Policy*. Vol 140, pp. 202-207. <https://doi.org/10.1016/j.envsci.2022.12.010>
39. Massenberg et al., (2022). Towards a holistic approach to rewilding in cultural landscapes. *People and Nature*. Volume5, Issue1, <https://doi.org/10.1002/pan3.10426>.
40. Mill, J.S. (1978) *On Liberty*. Elizabeth Rapaport (ed.) Hackett Publishing Co.
41. Ogden, L. A., Hall, B., & Tanita, K. (2013). Animals, plants, people, and things: A review of multispecies ethnography. *Environment and Society*, 4, 5–24.



42. Plumwood, V. (2002). Decolonising relationships with nature. *PAN: philosophy activism nature*, 2, pp. 7-30
43. Prior, J., & Brady, E. (2017). Environmental Aesthetics and Rewilding. *Environmental Values*, 26(1), 31–51.  
<http://www.jstor.org/stable/44132332>
44. Prior, J. & Ward, K. (2016). Rethinking rewilding: A response to Jørgensen. *Geoforum*, Volume 69, pp. 132-135.  
<https://doi.org/10.1016/j.geoforum.2015.12.003>
45. Reo et al. (2017). Invasive Species, Indigenous Stewards, and Vulnerability Discourse. *American Indian Quarterly*, Vol. 41, No. 3, pp. 201-223.  
<http://www.jstor.org/stable/10.5250/amerindiquar.41.3.0201>
46. Reo, N. & Ogden, L. (2018) Anishnaabe Aki: an indigenous perspective on the global threat of invasive species. *Sustain Sci* 13, pp. 1443–1452. <https://doi.org/10.1007/s11625-018-0571-4>
47. Roberts et al. (2013). What is the evidence that invasive species are a significant contributor to the decline or loss of threatened species? A systematic review map. *Environ Evid* 2, 5.  
<https://doi.org/10.1186/2047-2382-2-5>
48. Robinson et al. (2005). Bush Tucker, Bush Pets, and Bush Threats: Cooperative Management of Feral Animals in Australia’s Kakadu National Park. *Conservation Biology*. pp. 1385–1391. DOI: 10.1111/j.1523-1739.2005.00196.x
49. Salmon, E.. (2000). Kincentric Ecology: Indigenous Perceptions of the HumanNature Relationship. *Ecological Applications - ECOL APPL*. 10. 1327-1332. 10.2307/2641288.
50. Scott, X. (2018). Repairing Broken Relations by Repairing Broken Treaties: Theorizing Post-Colonial States in Settler Colonies. *Studies in Social Justice*, Vol 12, Iss 2, pp. 388-405.
51. Seraphin, B. (2016). “The Hoop” and Settler Apocalypse. *The Trumpeter*. ISSN 0832-6193. Volume 32, No. 2
52. Seraphin, B. (2017). “Paiutes and Shoshone Would Be Killed For This”: Whiteness, Rewilding, and the Malheur Occupation. *Western Folklore*, 76(4), 447–478. <http://www.jstor.org/stable/44790988>
53. Tallamy, D (2019). *Nature’s Best Hope: A New Approach to Conservation That Starts in Your Backyard*. Timber Press Inc.
54. Te Urewera Board (2017). Te Kawa o Te Urewera. Te Urewera Board Accessed via: <https://www.ngaituhoe.iwi.nz/te-kawa-o-te-urewera>
55. Torres et al. (2018). Measuring rewilding progress. *Phil. Trans. R. Soc.* B373: 20170433, <http://doi.org/10.1098/rstb.2017.0433>
56. Tuck E., & Wayne Yang K. (2012) Decolonization is Not a Metaphor. *Decolonization: Indigeneity, Education & Society*. 1(1) 1-40.
57. Turner, N & von Aderkas, P. (2012). Sustained by First Nations: European newcomers' use of Indigenous plant foods in temperate North America. *Acta Societatis Botanicorum Poloniae*. 81. 295-315. 10.5586/asbp.2012.038.

58. USDA. (2024). Control Mechanisms. USDA National Invasive Species Information Center. Accessed via: <https://www.invasivespeciesinfo.gov/subject/control-mechanisms#:~:text=The%20most%20economical%20and%20safest,t o%20control%20and%20management%20efforts>
59. Tuck et al. (2014). Not nowhere: Collaborating on selfsame land. *Decolonization: Indigeneity, Education & Society*.
60. Valéry et al. (2009). Invasive species can also be native... *Trends in Ecology and Evolution*. Vol 24, Iss 11, pp. 585
61. Walker, Yaari (2023). "Creator put the first yuk in the qayaq." - Yaari Walker. *YouTube*. Uploaded by Fine Arts Museum of San Francisco, 23 May 2023. Accessed via: [https://www.youtube.com/watch?v=znFlp\\_bdhV0](https://www.youtube.com/watch?v=znFlp_bdhV0)
62. Ward, K. (2019). For wilderness or wildness? Decolonising rewilding. Ch. 3 in Nathalie Pettorelli, Sarah M. Durant, Johan T. du Toit (eds.). *Rewilding*. Cambridge University Press.
63. Ward, K. J., & Prior, J. (2020). The Reintroduction of Beavers to Scotland: Rewilding, Biopolitics, and the Affordance of Non-human Autonomy. *Conservation & Society*, 18(2), 103–113. <https://www.jstor.org/stable/26937285>
64. Warren, C. R. (2007). Perspectives on the 'alien' versus 'native' species debate: a critique of concepts, language and practice. *Progress in Human Geography*, 31(4), 427-446. <https://doi.org/10.1177/0309132507079499>
65. Wehi et al. (2023). Contribution of Indigenous Peoples' understandings and relational frameworks to invasive alien species management. *People and Nature*, 5, pp. 1403–1414. <https://doi.org/10.1002/pan3.10508>
66. Whyte, K. P. (2013). Justice forward: Tribes, climate adaptation and responsibility. In *Climate change and Indigenous peoples in the United States* (pp. 9–22). Springer.
67. Whyte, K.P. (2017). Our ancestors' dystopia now: indigenous conservation and the Anthropocene. Ch. 21 in Heise, U., Christensen, J., & Niemann, M. (Eds.). *The Routledge Companion to the Environmental Humanities* (1st ed.). Routledge. <https://doi-org.proxy.lib.umich.edu/10.4324/9781315766355>
68. Whyte, K. (2018). Settler Colonialism, Ecology, and Environmental Injustice. *Environment and Society*. Vol. 9, pp. 125-144. <https://doi.org/10.3167/ares.2018.090109>
69. Whyte, K. (2020). Too late for indigenous climate justice: Ecological and relational tipping points. *WIREs Climate Change — Special Issue: Is it too late (to stop dangerous climate change)? Volume 11, Issue 1*. First published (2019). <https://doi.org/10.1002/wcc.603>
70. Whyte, K. (2020). Against crisis epistemology. In Brendan Hokowhitu, Aileen Moreton-Robinson, Linda Tuhiwai-Smith, Chris

- Andersen, Steve Larkin (eds.) *Routledge Handbook of Critical Indigenous Studies*. Routledge.
71. Wildcat, M., & Voth, D. (2023). Indigenous relationality: definitions and methods. *AlterNative: An International Journal of Indigenous Peoples*, 19(2), 475-483. <https://doi.org/10.1177/11771801231168380>
  72. Wilson, S. (2001) What Is an Indigenous Research Methodology?. *Canadian Journal of Native Education*, v25 n2 p175-79
  73. Wynne-Jones et al. (2020). Rewilding – Departures in Conservation Policy and Practice? An Evaluation of Developments in Britain. *Conservation & Society*, 18(2), 89–102. <https://www.jstor.org/stable/26937284>
  74. Johnson, E.M. (2014). How John Muir's Brand of Conservation Led to the Decline of Yosemite. *Scientific American*. <https://www.scientificamerican.com/blog/primate-diaries/how-john-muir-s-brand-of-conservation-led-to-the-decline-of-yosemite/>
  75. Leatherberry, E.C. and J.S. Spencer, Jr. (1996). Michigan Forest Statistics. *Resource Bulletin NC-170*. St. Paul, MN: USDA, Forest Service, North Central Forest Experiment Station. 144 pp.
  76. National Invasive Species Information Center. (2024) *Invasive Species Resources by Subject or Type: Control Mechanisms*. USDA. <https://www.invasivespeciesinfo.gov/subject/control-mechanisms#:~:text=The%20most%20economical%20and%20safest,t o%20control%20and%20management%20efforts>
  77. Schweizer, D., et al. (2019) Wildland Fire, Extreme Weather and Society: Implications of a History of Fire Suppression in California, USA. In: Akhtar, R. (ed) *Extreme Weather Events and Human Health* (pp. 41-57). Springer Link. [https://doi.org/10.1007/978-3-030-23773-8\\_4](https://doi.org/10.1007/978-3-030-23773-8_4)
  78. [https://link.springer.com/chapter/10.1007/978-3-030-23773-8\\_4](https://link.springer.com/chapter/10.1007/978-3-030-23773-8_4) schweizer et al 2019
  79. Moura, L.C., et al. (2019). The Legacy of Colonial Fire Management Policies on Traditional Livelihoods and Ecological Sustainability in Savannas: Impacts, Consequences, New Directions. *Journal of Environmental Management*, 232, pp. 600-606. <https://doi.org/10.1016/j.jenvman.2018.11.057>
  80. Wang, L., Pedersen P.B.M., & Svenning, J.C. (2023) Rewilding Abandoned Farmland has Greater Sustainability Benefits than Afforestation. *Nature Portfolio Journal: Biodiversity*, 2(5). <https://doi.org/10.1038/s44185-022-00009-9>
  81. Dobson, A., Barker, K. & Taylor, S. L. (Eds.). (2013) *Biosecurity*
  82. *The Socio-Politics of Invasive Species and Infectious Diseases*. Routledge.
  83. Davis, M. A., et al. (2011). Don't Judge Species on Their Origins. *Nature*, 474, 153-154. <https://doi.org/10.1038/474153a>.

84. Thompson, J. R., et al. (2013) Four Centuries of CHange in Northeastern United States Forest. *PLoS One*. 8(9): e72540. [10.1371/journal.pone.0072540.](https://doi.org/10.1371/journal.pone.0072540)
85. Bell, M. M. (1989). Did New England Go Downhill?. *Geographical Review*, 79(4) pp. 450-466. [http://www.jstor.org/stable/215118.](http://www.jstor.org/stable/215118)
86. Whyte, K. P. (2013). Justice forward: Tribes, climate adaptation and responsibility. In *Climate change and Indigenous peoples in the United States* (pp. 9–22). Springer.
87. Ogden, L. A., Hall, B., & Tanita, K. (2013). Animals, plants, people, and things: A review of multispecies ethnography. *Environment and Society*, 4, 5–24.
88. Harvard Forest. (2021) *Landscape History of Central New England*. Accessed via: <https://harvardforest.fas.harvard.edu/diorama-series/landscape-history-central-new-england>
89. Northeast Wilderness Trust. (2024) *Home Page*. <https://newildernesstrust.org/>
90. Rewilding. (2023, August 16) Wildlands in New England: Past, Present, and Future. *Rewilding Earth*. <https://rewilding.org/wildlands-in-new-england-past-present-and-future/>
91. Winter, K.B. , et al. (2017) Empowering Indigenous agency through community-driven collaborative management to achieve effective conservation: Hawai‘i as an example. *Pacific Conservation Biology*, 27, 337–344. <https://doi.org/10.1071/PC20009>
92. Khoury C.K., et al. (2016) Origins of food crops connect countries worldwide. *Proceedings of the Royal Society B: Biological Sciences*. 283: 20160792. <https://doi.org/10.1098/rspb.2016.0792>
93. The York Land Trust. (2023) *Events: Bittersweet Wreath Making*. <https://www.yorklandtrust.org/event/bittersweet-wreath-making/>
94. Arrington, A. (2021). Urban foraging of five non-native plants in NYC: Balancing ecosystem services and invasive species management. *Urban Forestry & Urban Greening*. 26. <https://doi.org/10.1016/j.ufug.2020.126896>
95. Crowley, S. Hinchliffe, S. & McDonald R. A. (2017). Nonhuman citizens on trial: The ecological politics of a beaver reintroduction. *Environment and Planning*. 0(0) 1-21. DOI: 10.1177/0308518X17705133
96. Wohl, E. (2019). *Saving the Dammed: Why We Need Beaver-Modified Ecosystems*. Oxford University Press.
97. Bell, A., Yukich, R., Lythberg, B., & Woods, C. (2022). Enacting settler responsibilities towards decolonisation. *Ethnicities*, 22(5), 605-618. <https://doi.org/10.1177/14687968211062675>
98. Murcia, C., et al. (2014). A Critique of the ‘Novel Ecosystem’ Concept. *Trends in Ecology & evolution*, 29(10) 548-553. [https://doi.org/10.1016/j.tree.2014.07.006.](https://doi.org/10.1016/j.tree.2014.07.006)
99. Miller, J.R. & Bestelmeyer, B.T. (2016). What’s Wrong with Novel Ecosystems, Really?. *Restoration Ecology*, 24(5) 577-582.

[http://millerlab.nres.illinois.edu/pdfs/Miller\\_2016\\_What's%20wrong%20with%20novel%20ecosystems,%20really.pdf](http://millerlab.nres.illinois.edu/pdfs/Miller_2016_What's%20wrong%20with%20novel%20ecosystems,%20really.pdf)

100. Martin, D.M. (2017). Ecological restoration should be redefined for the twenty-first century. *Restoration Ecology*, 25(5) 668-673. doi: 10.1111/rec.12554
101. Hayward, M.W., et al. (2019). Reintroducing rewilding to restoration – Rejecting the search for novelty. *Biological Conservation*, 233, pp.255-259.  
<https://doi.org/10.1016/j.biocon.2019.03.011>.
102. Svenning, J.C., et al. (2015). Science for a wilder Anthropocene: Synthesis and future directions for trophic rewilding research. *PNAS*, 113(4) 898-906.  
<https://doi.org/10.1073/pnas.1502556112>.
103. Rameka, L. (2016). "Kia whakatomuri te haere whakamua": "I Walk Backwards into the Future with My Eyes Fixed on My Past". *Contemporary Issues in Early Childhood*, 17(4) pp. 387-398. ISSN-1463-9491
104. Bacon, S. et al. (2023). Visitors to national parks show positive attitudes towards recolonising wolves in the Bohemian Forest Ecosystem. *Biological Conservation*, 288(110349).  
<https://doi.org/10.1016/j.biocon.2023.110349>.
105. Butler et al. (2019). Adaptive co-management and conflict resolution for rewilding across development contexts. In N. Pettorelli, S. M. Durant, & J. T. du Toit (Eds.), *Rewilding* (pp. 386–412). chapter, Cambridge: Cambridge University Press.