

## UNDERSTANDING AND AVOIDING MISPLACED EFFORTS IN CONSERVATION

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### ABSTRACT

*Cooperation between various interest groups and the appropriate use of evidence are key components of conservation. Decisions that benefit both people and biodiversity must be made. However, misplaced conservation happens when polarization and false information make it difficult to work together and weigh the evidence. This impedance affects decisions that directly endanger biodiversity, alienate collaborators and undermine collaborative efforts, waste resources, mislead the public, and/or undermine evidence. These acts lead to misdirected conservation consequences, which make it more challenging to achieve beneficial outcomes for biodiversity. Here, we discuss instances where attempts to conserve biodiversity have been undermined by a failure to value cooperation, evidence, or both. These case studies generally show that preventing misguided conservation calls for stricter adherence to procedures that prioritise the use of evidence in decision-making and prioritise the long-term, communal benefits for biodiversity over the immediate interests of individuals or groups. The effectiveness and success of attempts to protect the world's biodiversity while assisting humans will rise with efforts to incorporate human elements, cooperation, and evidence into conservation.*

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**Keywords:** *conservation, Cooperation, Polarization, Biodiversity, Human Elements.*

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### Introduction

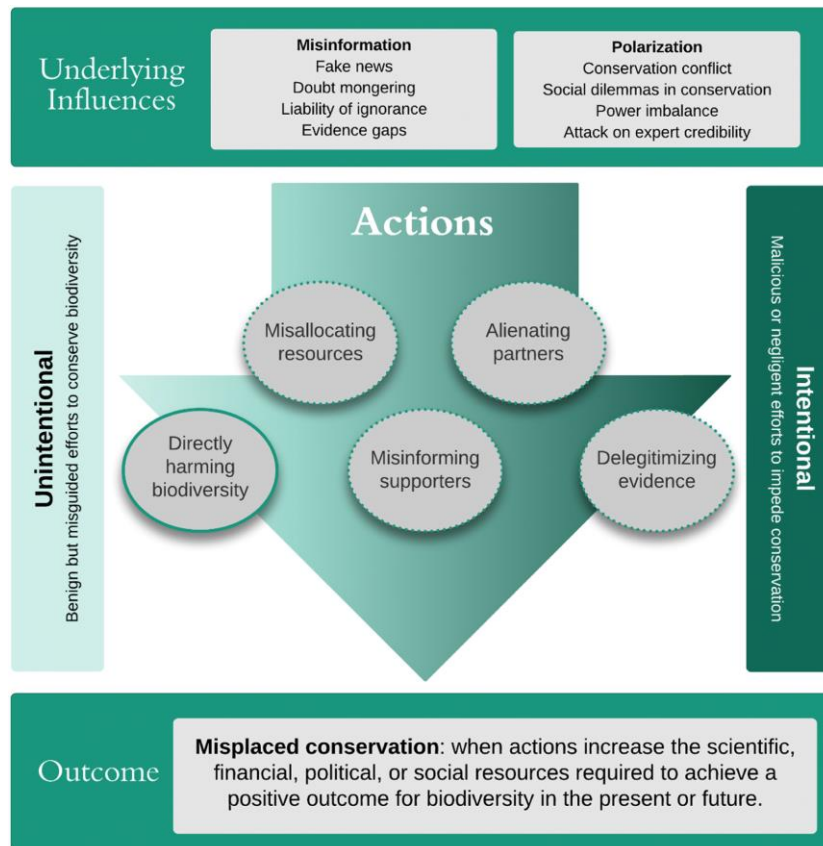
Recent social trends have seen a rise in political polarization and on important issues, as well as the amplification of misconstrued or misleading information in public debate (Bail et al. 2018). (Lazer et al. 2018). Both of these trends could have detrimental repercussions on several facets of politics, research, health, and biodiversity preservation. For instance, the propagation of false information trumped scientific data indicating a relationship between cigarette use and cancer for decades following the 1940s (Proctor 2012). Similar false information on vaccine effectiveness or responses to public health orders (such as the usage of masks to stop the spread of COVID-19) today fuels divisiveness and endangers public health (Lazer et al. 2018). (Paes-Sousa et al. 2020). While misread or incorrect information prevents the public and decision-makers from acting upon urgent requirements and may waste resources in the process, polarization affects cooperative approaches to issue resolution and decision-making (Barber and McCarty 2015; Maher et al. 2018). (Oreskes and Conway 2011; Barnes et al. 2018). The sustainable protection of biodiversity is a major worldwide task that necessitates collaboration and supporting data. However, polarization and false information can affect conservation success by undermining cooperation and evidence.

We define "misplaced conservation," which occurs when actions increase the scientific, financial, political, or social resources required to achieve a positive outcome for biodiversity in the present or the future, in order to better understand how polarization and false information affect biodiversity. Misguided conservation is different from other human actions, including habitat loss or overexploitation, that pose direct hazards to biodiversity. The idea of misplaced conservation focuses on activities where conservation resources are used for an improper, inappropriate, or unworthy activity. The intended outcome of such an activity was I to maintain or restore biodiversity, but this outcome was hampered by a lack of cooperation and evidence, and (ii) to purposefully impede the use of cooperation and evidence in the context of doing conservation.

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Due to the underlying effects of polarization and disinformation on conservation efforts, misplaced conservation results as a result. We aim to give a framework to help overcome obstacles to more effective conservation initiatives by defining the concept of misplaced conservation (Fig. 1).



Polarization and misinformation influence people's conservation behaviour and serve as a mediator in interactions between different social groups and between humans and the environment. The ensuing activities may be brought on by well-intentioned but mistaken motives or by something more nefarious and careless. Regardless of the motivation, misdirected conservation results from one direct action (solid oval) and four indirect acts (dashed ovals), which raise the costs associated with achieving beneficial outcomes for biodiversity.

Misplaced conservation can result from sincere efforts to protect biodiversity, at its most benign. These motives might easily result in little, apparent "baby steps" or "awareness-raising" behaviours. Too frequently, the effectiveness of these initiatives is not backed up by data demonstrating how they have a good impact on biodiversity and may instead be used to divert attention or otherwise appease people, giving them a false sense of achievement (Hagmann et al. 2019). For instance, the concept of "nudging" modifies the architecture of choice or the context in which decisions are made to offer options with reduced advantages, lower costs, and faster payoffs (Thaler and Sunstein 2009).

It should not be assumed that these are efficient methods for conservation, even though many significant environmental movements started with smaller, incremental victories, nudges, and awareness campaigns. The effectiveness of such actions must be weighed against the potential expenses associated with complacency's instigation.

Misplaced conservation also happens when efforts are made to obstruct effective conservation. When conflicting lines of evidence are present, this hostile purpose can, for instance, include attempting to undermine the authority of a rival scientist (Horton et al. 2016; Harvey et al. 2018; Loss and Marra 2018). For instance, Hmielowski et al. (2014) discovered that when the mainstream media actively works to enhance public scepticism of scientists, it increases doubt that global warming is occurring.

We consider all of these intentions to be a part of misplaced conservation, regardless of whether persons are driven by genuinely benevolent ends and happen to be misinformed or ignorant in their execution of conservation measures or they are motivated to be actively malevolent or neglectful. Ineffective conservation is often determined by results rather than by intentions. Here, we outline some of the main behaviours that lead to misplaced conservation, with case studies to back up this idea. In order to better comprehend and address it, we first describe five nonexclusive activities. This is an important first step towards biodiversity protection in an era of polarization and deception.

### **The Five Critical Dimensions of Misplaced Conservation**

In general, there are direct (1) and indirect (4) paths through which human behaviour results in inappropriate conservation (Fig. 1). A wildlife population or biodiversity is directly harmed by incorrect direct conservation. In contrast, improper or indirect conservation makes it more difficult for the general public, conservationists, stakeholders, or scientists to carry out conservation. Misplaced conservation has indirect effects due to (i) resource misallocation, (ii) misinformation of supporters, (iii) alienation of partners, and (iv) delegitimization of evidence. These activities can be combined to affect conservation outcomes because they are not mutually exclusive. For instance, this inefficient resource allocation might directly result in a loss of biodiversity (Bottrill et al. 2008; Gilbert et al. 2020), or the improper use of evidence can permanently alienate potential partners (Hodgson).

### **Directly Harming Biodiversity**

When a measure designed to increase biodiversity has a direct and detrimental effect on a natural population, species, or ecological community, it is known as misplaced conservation. One private ranch, for instance, had its domestic sheep (*Ovis aries*) removed before the area was designated as Patagonia National Park, Chile (Wittmer et al. 2013). The protection of huemul deer numbers was a major driving force behind the establishment of this protected area (*Hippocamelus bisulcus*). The removal of sheep, a significant source of prey for neighbourhood carnivores like *Vulpes* spp. and *Puma concolor*, increased predation rates on local deer species. Humel deer's decline was hastened by the well-intentioned move to improve their "pristine" environment.

Another instance of direct harm occurred when citizens planted a type of milkweed to aid in the habitat creation for monarch butterflies (Wade 2015). However, some people utilised a milkweed species that is not indigenous to the monarch butterfly's range of temperate species. Monarchs had to stop their migration as a result, and they were more frequently exposed to egg parasites. Exposure to this invasive milkweed put monarch butterflies at risk (Satterfield et al. 2015). Last but not least, through the 1950s, kokanee salmon (*Oncorhynchus nerka*) stocks in Okanagan Lake, British Columbia, were falling (Shepherd 1999). Mysis relicta, an exotic mysid shrimp, was meant to be introduced in 1966 in order to expand the fishery by providing productive feed for native salmon.

However, through diurnal migration through the water column, shrimp were able to avoid salmon predation and then compete with young kokanee for plankton. Mysid shrimp were consequently introduced, which decreased the food available to young salmon, decreased recruitment, and accelerated the demise of the salmon fishery. In order to reduce the quantity of mysids, there have been requests for the implementation of extra, expensive control measures (Shepherd 1999).

The well-intended but misguided attempt to preserve biodiversity could make reductions worse. To reduce the prevalence of direct misplaced conservation, efforts must be made to strengthen the evidence through pilot studies and adaptive management and to promote the absorption of the evidence in policy through cooperative methods to decision-making.

### **Misallocating Resources**

People who work in conservation frequently have to make do with inadequate funding. Funding, time, volunteer work, media attention, and social or political capital are a few examples of these resources. When such fixed and constrained resources are misapplied to problems with negligible gains for biodiversity, misplaced conservation takes place. Because of this inefficient resource allocation, it is harder to carry out higher priority actions because fewer resources are available. When conservation organisations choose which species to target for recovery or improved management, resources are sometimes allocated incorrectly. The focus of species recovery efforts is frequently on a subgroup of threatened species that may be more charismatic and have a lower threat profile than other species.

Therefore, species with a lesser level of public awareness are under-resourced (Donaldson et al. 2016). In some instances, attempts to restore biodiversity that only target high-profile species may not be as cost-effective as those that safeguard habitat for less charismatic species (Neeson et al. 2018).

Similar to this, the rise of "compassionate conservation," or conservation outcomes that are focused on individuals, diverts resources away from less direct causes of species or population decline to support the welfare outcomes of specific animals, typically from a small subset of large charismatic species (Hayward et al. 2019; Oommen et al. 2019). Although many parts of wildlife management and study incorporate animal welfare, it is frequently unclear how giving thought to an individual's destiny raises the conservation of a species, population, or community. For instance, even though many people were outraged when "Cecil" the lion was killed by a hunter in 2015, little progress has been made since then in terms of policy changes to help lion conservation (Carpenter and Konisky 2019). The legacy of Cecil's passing is still a rallying cry for certain conservation organisations (Darimont et al. 2020). Some of the most affordable and effective instruments created to protect and restore biodiversity might become inaccessible if attempts were made to alleviate the negative effects of habitat loss, invasive species, or human-wildlife conflict through compassionate conservation approaches (Callen et al. 2020).

Better utilisation of current allocations or more resources, ideally both, are required to reduce resource misallocation (Bonebrake et al. 2019). Conservationists have proposed prioritisation approaches to quantify trade-offs in decision-making in order to improve utilisation of existing allocations (Martin et al. 2018). In some circumstances, such prioritisation may result in the loss of some biodiversity components while preserving a bigger, more valuable component (Gilbert et al. 2020). There has been considerable controversy about this so-called "conservation triage" (Bottrill et al. 2008), although allocations will probably still need to be prioritised in a world with limited resources. Although we contend that there is no one "most correct" conservation measure that automatically merits top priority resource allocation, a more open, evidence-based, and collaborative decision-making process ought to at least make resource use choices more obvious. To resolve allocation in a reasonable and equitable manner, it is crucial to address the questions of whose priority matters the most. As a result, mobilising collaborative methods to evidence-based decision-making depends heavily on the underlying human components of conservation governance (Decker et al. 2016).

### **Misinforming Supporters**

When the public is misinformed regarding which dangers are most urgent, which species are a priority for action, and/or which activities are most beneficial for biodiversity, misplaced conservation outcomes may result (Table 1). Additionally, a misinformed public directs resources away from conservation-friendly initiatives. As an illustration, a number of amateurish internet petitions to outlaw shark finning in Florida (USA) garnered tens of thousands of signatures in the 2010s. However, Florida outlawed shark finning in 1994, making it impossible for these petitions to succeed in their stated objectives. By falsely claiming that the trade in shark fins is the only threat facing sharks, these "finning" campaigns also contribute to the public's misunderstanding of those threats (Shiffman and Hueter 2017).

Similar to how non-native milkweed was exploited to benefit monarch butterflies, modern pollinator conservation advocacy has mostly centred on initiatives to "rescue the bees." The confusion between managed, non-native bees and native pollinators has nonetheless made it difficult to determine the optimum way to achieve this (Dicks 2013). Managed bees compete with natural species for floral nectar and spread pathogens, which reduce native biodiversity (Colla and MacIvor 2017). Large-scale conservation initiatives, like the Pollinator Partnership Action Plan from the US, concentrate on land use and chemical restrictions that will favour non-native honey bee species at the expense of native bumblebee species (Nicholls et al. 2020).

The issue of ocean plastics has become crucial to marine conservation. For instance, "straw shaming" is one extreme result of the response to plastic pollution—even at the expense of disregarding the requirements of those who have physical limitations (Krueger 2019). However, technical approaches to cleaning up the ocean's trash (such as surface skimming) might not focus on the depths of the ocean, where the majority of pollution occurs (Stafford and Jones 2019). Modern responses to plastic pollution may have produced a "convenient fact to divert environmental policy from more significant and urgent challenges," similar to the pushing of decarbonization policy (Hagmann et al. 2019, 2019). (Stafford and Jones 2019). Effective science and knowledge dissemination to support behavioural changes will be required to overcome these diversionary discourses in conservation, in addition to effective science.

When evidence is not presented or handled properly, supporters are misled, just like with the other aspects of misdirected conservation. Such erroneous support may result from conservation leadership failing to "do their homework" regarding how to appropriately concentrate the efforts of those invested in biodiversity-friendly outcomes. For supporters to receive clear and accurate information, efforts to better integrate conservation biology and conservation social science (including communication science) are essential (Kareiva and Marvier 2012; Bennett et al. 2017).

### **Delegitimizing Evidence**

When the sources (i.e., facts) and producers (i.e., scientists) of evidence are delegitimized in the political or decision-making sphere, misplaced conservation can result (Table 1). We acknowledge that there are other systems that create, hold, and share knowledge (such as Indigenous knowledge), which also make significant contributions to conservation but are also subject to delegitimization (Garnett et al. 2018), and we refer to evidence in the context of biological and social "western science" in this context.

When scientists with various worldviews or data interpretations disagree about a policy, delegitimization may result. Then, in order to undercut conservation outcomes, the perception of scientific ambiguity is used.

The usefulness of evidence and confidence in evidence-based decision-making are undermined when decision-makers or the general public perceive there to be a lack of scientific consensus (Lewandowsky et al. 2013). For instance, special interest organisations may exaggerate perceptions of uncertainty through doubt mongering, a tactic that has been observed in discussions of climate change, free-ranging cats' effects on biodiversity, and polar bear protection (Harvey et al. 2018, Loss and Marra 2018). (Oreskes and Conway 2011).

These discussions have been noted in the conservation of raptors (Hodgson et al. 2019), management of deer (Freddy et al. 2004), bear hunting (Maji et al. 2011), and climate change (Hodgson et al. 2019). (Hayhoe 2018). Because conservation conflicts may entice individuals to utilise agenda-driven science to win a conflict, Peery et al. (2019) discussed the difficulty of agenda-driven science in conservation. Last but not least, scientists can discredit their own contributions to successful conservation outcomes. Conservation sciences actively advocate the merging of curiosity-driven basic research with goal-oriented applied research and advocacy, in contrast to fundamental scientific fields (Horton et al. 2016; Smol 2018). The dissemination of information to the public, stakeholders, and decision-makers is a crucial task for conservation scientists who frequently participate in public debate (Chan 2008; Smol 2018).

However, if values and facts are mixed up, conservation scientists run the risk of lowering the credibility of the research community as a whole (Horton et al. 2016; Redpath et al. 2017). Trustworthiness of intervenors is in fact recognised as a crucial predictor of collaboration in conservation, with integrity ranking as a critical feature of how trust is created, as Baynham-Herd et al. (2020) demonstrated. This calls for a clear articulation of the facts (i.e., scientific consensus) versus the stated values of the scientist. Chan (2008) suggested that in order to avoid abusing the public's goodwill and faith in science and its practitioners, conservation scientists must be able to articulate where the facts end and their own ideals begin.

### **What People can do to Avoid Misplaced Conservation**

We advise putting more effort into adopting a deliberate, transparent decision-making process that accounts for the gains and losses to both collaboration and biodiversity in order to prevent or reduce misdirected conservation efforts (Saunders et al. 2006). Although this endeavour may initially seem to be conservation dogma, we stress that cooperation has far too frequently been sacrificed for immediate advantages in biodiversity. Despite knowledge gaps and disparities in attitudes or views, collaboration is nevertheless an important and understudied instrument in formal conservation education and training (Cinner 2018).

Finding alignment with current conservation partners' ideals is typically more beneficial than attempting to undermine or change their values (Decker et al. 2016; Manfredo et al. 2017; Hayhoe 2018). One strategy to counteract the harmful impacts of polarization and misinformation is to view conservation efforts as a drive for better cooperation and the use of evidence.

Scientists and management should make an investment in attempts to track the results of conservation activity, then analyse, disseminate, and act accordingly as new data becomes available. In conservation, this type of "adaptive management" strategy is frequently advocated but poorly implemented (Keith et al. 2011).

While reducing uncertainty is a key objective of evidence-based decision-making, scientific advancement is frequently unpredictable and nonlinear.

The scientific method involves debate and paradigm shifts, both of which are common and significant (Kuhn 2012). The state of some arguments in conservation science is no different, even after decades of investigation (Young et al. 2010). As a result, we do not advocate that conservation scientists stop having fruitful and civil discussions about science in general or conservation in particular, but we do

hope that these discussions will instead centre on a critical and transparent analysis of data, analyses, techniques, and interpretations, as opposed to a criticism of scientists or the presumed motivations or values of potential conservation partners. A sense of urgency and thoughts of shortage are frequently used to inspire conservation efforts. The moment to act is "now."

Promoting the value of biodiversity and taking action to prevent its loss is the responsibility of numerous parties, including the general public, specialists, scientists, governments, and conservation organisations. Because of this, it is not required for every concerned member of the public to be knowledgeable about every technical aspect and subtlety of complicated environmental issues, as well as the laws and regulations that can be used to solve them. Nonexperts can contribute by participating in or assisting with the promotion of expert-led and fact-based conservation efforts. Nonexperts can write to decision-makers to show support for (or opposition to) the policies advised by experts, as well as donate their time or money to initiatives that are driven by experts. In the end, individuals should take into account that if inadequate solutions are promoted to handle complicated problems, there are genuine risks to people and biodiversity without specific knowledge, training, or experience. Along with cooperation across "expertise levels," initiatives to foster cooperation across backgrounds and identities have produced favourable results for research. The best results should come from conservation efforts that are the result of broad and inclusive processes that encompass a range of perspectives and experiences. For instance, more gender diversity on research teams contributes to more fruitful scientific findings in addition to the advantages of more equal work environments (Nielsen et al. 2017).

Likewise, acknowledging the variety of power, scope, and governance structures that influence biodiversity requires combining local and large-scale organisations (Berkes 2007; Popp et al. 2019). Participating in decision-making gives locals more control over resources and should boost their willingness to accept any changes to their way of life brought on by conservation efforts. Likewise, stakeholders are more likely to disregard the emerging regulations if they believe that they and their concerns are being disregarded (Suman et al. 1999; Freddy et al. 2004). Shiffman (2020) provided evidence of how effectively disseminating important scientific information and science-based policy solutions led to the adoption of new environmental rules while reducing stakeholder conflicts. When used effectively, social media can also be used to push back against false information and introduce expert-supported conservation strategies into public conversation (Thaler and Shiffman 2015; Shiffman 2020). Additionally, scientists may now hear people's worries about policies relating to biodiversity on social media, which can help them create more cooperative methods to conservation and sophisticated communication techniques. Naturally, this understanding needs to be put into context because the media outlets that are available to scientists are built using the same biased algorithms as the information that leads from the scientist to the general public.

### **The Liability of Misinformation in Conservation**

More while there are helpful actions people may take to lessen inappropriate conservation, doing the wrong thing might make a bad situation even worse. The requirement for conservation scientists to realise that good intentions do not justify harm that can be foreseen or managed is that people trying to help is not the same as helping. People who meant to help but may not have anticipated the numerous consequences of their actions are frequently highlighted in case studies of misguided conservation. However, because judgments on conservation have an impact on people's livelihoods, the survival of species, or the continuity of cultures, there is little space for error (Foote and Wenzel 2009). Misplaced conservation calls on researchers and other interested parties to understand that conservation success is decided by results rather than intentions. The idea of negligence has been codified into legislation to help promote responsible behaviour when the results were foreseeable. For instance, driving under the influence is illegal in many jurisdictions because it poses a clear and well-established risk to public safety; the driver's motivations (such as making it home) are irrelevant. Environmental restrictions are frequently excluded from laws that protect against inappropriate conservation, thus this is unlikely to happen. However, there is a need to more effectively hold those responsible for conservation-related decisions accountable for their part in inflaming polarization and spreading false information.

### **Conclusion**

The advantages of collaborative and evidence-based conservation strategies are well-known and widely acknowledged as necessary for attaining conservation objectives (Keith et al. 2011). These methods incorporate holistic aspects of conservation practise, such as the roles of governance, politics, social justice, and basic ecology, and they construct policy on the basis of data. The use of these ideas is not, however, a widespread practise. The practises that conflict with the body of knowledge that has described pathways to effective conservation practise must first be better understood, after which they must be addressed (Table 2).

Theme	Understanding the Causes of Misplaced Conservation	Mitigating the Occurrence of Misplaced Conservation
Evidence-related process	<p>How does false information about conservation-related issues start and grow?</p> <ul style="list-style-type: none"> <li>• How much information, and of what calibre, is required to produce reliable decisions?</li> <li>• What motivates people and organisations to make conscious attempts to obstruct conservation efforts?</li> </ul>	<ul style="list-style-type: none"> <li>• How can scientists present conflicting lines of evidence to the public without jeopardising their authority or "doubt mongering"?</li> <li>• How can we communicate conservation failures and uncertainties without losing credibility?</li> <li>• What steps may be taken to stop or stop the dissemination of false information?</li> <li>• How can researchers improve social and ecological "pilot studies" to reduce the chance of unintended consequences for biodiversity?</li> </ul>
Cooperation-related processes	<p>How can the psychology of division and false information affect the way we make decisions?</p> <ul style="list-style-type: none"> <li>• What hinders people from using the most recent or suitable evidence when making decisions?</li> <li>• Where does primary and final accountability for making decisions in complex, multi-actor processes reside?</li> </ul>	<ul style="list-style-type: none"> <li>• What are the most effective means of gaining agreement or a fair compromise in regards to conservation issues?</li> <li>• Given that not all organisations have the same level of legitimacy in decision-making, what are the best methods for protecting partners from alienation?</li> <li>• How might various ethical and moral aspects of conservation be brought together for a shared success vision?</li> </ul>

In reaction to the COVID-19 epidemic, society is experiencing one of the largest and fastest mobilizations of scientific attention and public policy in history. Lessons concerning the crucial role of scientific integrity and accountability, as well as the necessity of correct communication between research, policy, and the public, are developing swiftly along with the severity and breadth of this catastrophe (Piller 2020). As humanity continues to adjust to the speeding up of global extinctions, conservation science will profit from these lessons. It will be easier to assure the success of efforts to restore and maintain biodiversity if the mechanisms behind them are clearly understood, as well as the remedies to misdirected conservation.

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