

# Place-Based Bias in Environmental Scholarship Derived from Social–Ecological Landscapes of Fear

GABRIEL I. GADSDEN<sup>1</sup>, NIGEL GOLDEN<sup>2</sup>, AND NYEEMA C. HARRIS<sup>3</sup>

*Historical perspectives (e.g., moments of social, political, and economic significance) are increasingly relevant for developing insights into landscape change and ecosystem degradation. However, the question of how to incorporate historical events into ecological inquiry is still under development, owing to the evolving paradigm of transdisciplinary thinking between natural science and the humanities. In the present article, we call for the inclusion of negative human histories (e.g., evictions of communities and environmental injustices) as important factors that drive landscape change and shape research questions relevant to environmental conservation. We outline the detrimental effects of conservationists not addressing negative human histories by likening this social phenomenon to the ecological concept of landscapes of fear, which describes how not acknowledging these histories produces a landscape that constrains where and how research is conducted by scientists. Finally, we provide three positive recommendations for scholars or practitioners to address the manifestation of historic place-based bias in ecological research. What we call the social–ecological landscapes of fear provides a conceptual framework for more inclusive practices in ecology to increase the success of environmental and conservation goals.*

*Keywords:* conservation, environmental justice, history, landscape ecology, political ecology

**P**laces hold legacies derived from historical events that affect the ecology of species. Reprehensible human histories create the sociopolitical equivalent of the ecological concept of landscapes of fear. Identity bias is reflected in landscapes constraining researchers to status quo lines of inquiry. Our term *social–ecological landscapes of fear* implies unequal value affecting the success of conservation goals. We offer tools for researchers seeking to overcome dominant narratives of landscapes.

The conservation movement has invested decades of resources into understanding how changes in the landscape determine changes in ecological processes (Turner 1989, Gustafson 2019, Mendoza-Ponce et al. 2019). Despite the analytical attention paid to quantifying landscape patterns for conservation planning, there is still an outstanding framework for understanding the influence of the socio-historical context of landscapes on conservation decision-making (Meine 1999, Pooley 2018). Changes in landscape pattern and ecological processes are shaped and produced by more than just biophysical attributes; they are also created by the sociocultural interface, including multilateral institutions linked along the axes of money, influence, and control (Grove et al. 2018, Sowman and Sunde 2018). The histories

of landscapes and their resultant identities that influence conservation are poised to increase, given the significance of human–ecology relationships on the efficacy of long-term ecological management in the face of anthropogenic biodiversity loss and nascent international conservation goals (Eken et al. 2004, Dinerstein et al. 2019).

Current examples of conservation and environment-related initiatives considering historical perspectives often include the North American conservation models' focus on Indigenous science and land relationships, the power dynamics of green militarism, and strides in feminist-led conservation (Simlai 2015, Jessen et al. 2022, Parameswaran 2022). Although merging conservation and history comes in a variety of ways; notably, more recent analyses have centered negative human histories by working to contextualize global social unrest after 2020 (Pickett and Grove 2020). Although centering negative human histories is increasing in natural science studies, more work is needed to frame the ways in which these histories drive particular narratives that openly impede conservation aims.

Few landscapes are universally associated with positive identities; most are complex and riddled with negative histories after nineteenth century globalization, modernization,

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and colonization (Francis 1987, Hanlon 2020, Pickett and Grove 2020). Underscoring negative human histories (i.e., systemic racism, prevailing exploitation paradigms, and disparate distributions of power and wealth) is necessary to understand the impact of social conditions on ecological and evolutionary processes, because these negative histories often matriculate into legacy narratives or stereotypes that are dangerous, incomplete, or false (Adamson et al. 2002, Miriti et al. 2020). Without acknowledging these incomplete narratives and proper recourse, deriving landscape identities from negative histories can result in several biases and blind spots, leading to skewed ecological inquiry (e.g., which questions are posed, which methods are used, and where conservation is carried out). For example, Schell and colleagues (2020) highlighted how systemic racism through historic practices of housing discrimination permeates a myriad of ecological and evolutionary processes in urban environments; as a result, ideas of prestige continue to determine biodiversity responses across cities globally. Such studies illuminate why it is unsound to naively assume that ecological function happens devoid of human assumptions and values (e.g., aesthetics and safety) and increasingly shows how representation in whose values are accounted for, a decision that shapes the identity of space, remains problematic (Grove et al. 2014, Grove et al. 2018).

In the present article, we focus on the missed opportunities for biodiversity conservation and ecosystem management due to the exclusion of negative human histories (Tuck 2009, Goodling 2021, Rodrigues 2021). We begin by more concretely defining the concept of negative human histories and its place in landscape ecology as a useful framework to incorporate the relevant natural and human–ecology aspects concerning people living in and shaping spaces. Next, we articulate a familiar by name but dissimilar ecological concept of *landscapes of fear*. Specifically, we describe how particular landscapes lack the same quantity and quality of ecological inquiry because of place-based biases, resulting in diminished scientific importance: what we refer to as the *social–ecological landscape of fear*. We then illustrate the impact of biased identities of space resulting from negative human histories more fully by evaluating examples such as forced removal, environmental degradation, and racialized policies. Finally, we conclude by providing a set of recommendations that addresses biases resulting from social–ecological landscapes of fear to reduce and disrupt the biased dominant narratives of space. Our evaluation of negative human histories and resultant social–ecological landscapes of fear provides a necessary conceptual framework to promote more inclusive scientific practices in ecology, which will benefit environments and communities.

### Negative human histories

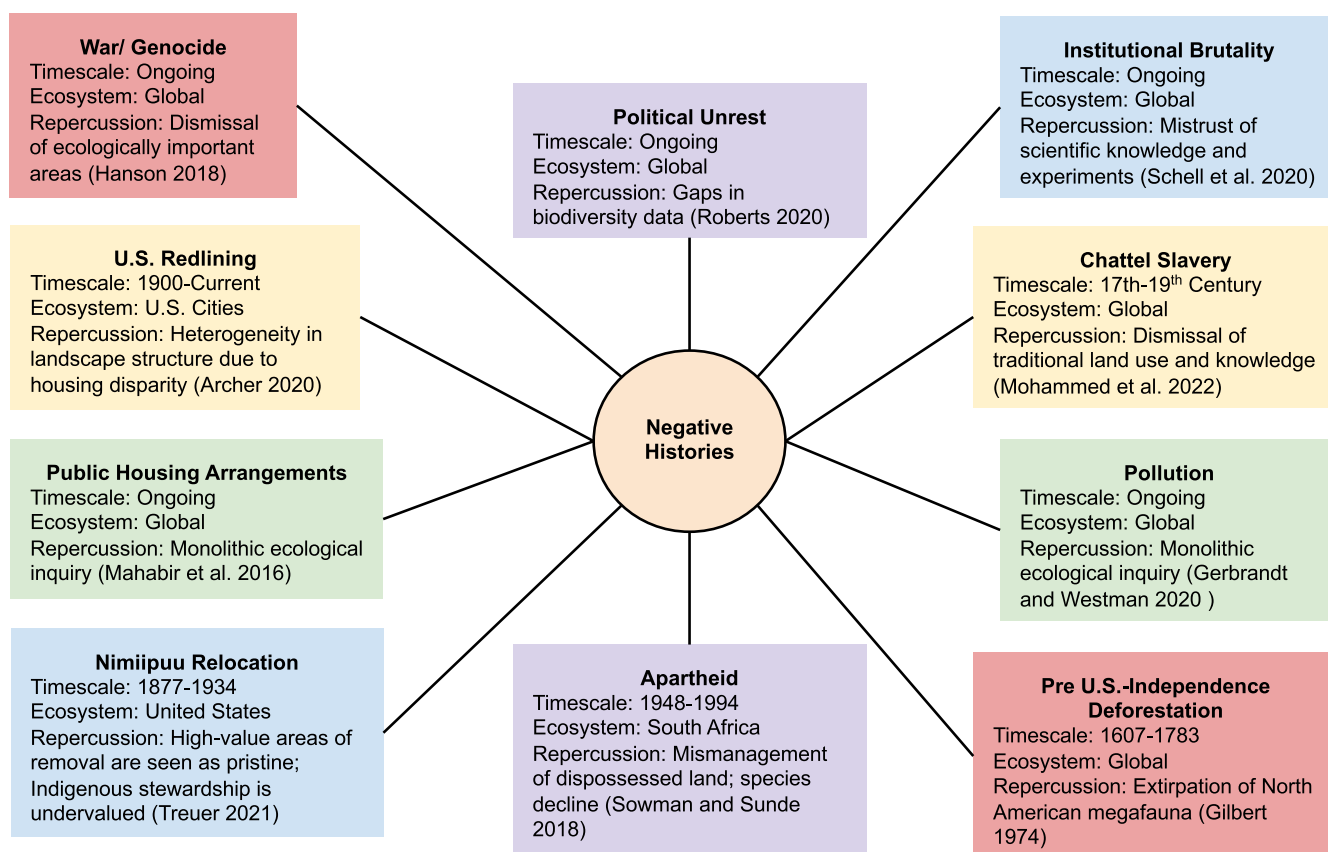
Negative histories occur across ecosystems, with varying consequences and timescales (figure 1). Historicized negative human interactions can be defined as broadly encompassing past, present, and future geotrauma (Pain 2021).

These histories are framed in mortality, extermination, subordination, and dispossession related to ethically controversial conditions, including overpolicing, redlining, racial or ethnic violence, corrupt governments, low social capital, and segregation (Archer 2020). To illustrate, the hyperpoliticization and oversimplification of the US–Mexico border juncture with large-scale migrations advance stigmatizing dominant global narratives such as whole nationalities being poor, violent, and uneducated (Campbell-Staton et al. 2021). In time, these reprehensible histories have fostered cultures, legacies, and stories that govern the structure, function, and activities of research across biophysical landscapes and, therefore, the perceptions of the network of associations between species and habitats (Miriti 2019). The characteristics of place then shape our understanding of past, present, and future changes across the land that either constrain or support conservation inquiry (Rizzello 2004, Gravlee 2009, Biermann and Mansfield 2014).

Too often, negative histories repeat themselves, perpetuating inequities within certain landscapes, particularly in communities of color. Such issues are apparent in the wake of pervasive police brutality against African Americans throughout the United States and beyond, such as police murders of unarmed Black men—George Floyd, Philando Castile, and others—in Minneapolis, Minnesota. Despite more than \$7 million dollars being invested in a new urban long-term ecological research site in this city, these traumas will likely alter how ecologists engage in research there (e.g., restrictions on where community-led research takes place and who is partnered with throughout the city). Similar to the theory of historical trauma, which addresses the long-term public-health implications of marginalization, physical and implicit degradation of landscapes persists long after acute trauma (Akinyemi 2022). Through the perpetuation of media, memorials, and memory, the consequences for implementing ecological research amass (Gurler and Ozer 2013). For instance, oil spills have immediate ecological impact but may persist and detract from the social–ecological health of marine environments decades later, including disrupting Indigenous subsistence hunting and fishing rights (Gerbrandt and Westman 2020, Pulster et al. 2020). As such, the concept of negative human histories and their consequences are a useful framework for understanding an environment when asking ecological questions about heterogeneity, pattern–process relationships, and issues of scale related to conservation efforts (figure 2).

### Landscapes of fear

In ecology, *landscape of fear* refers to the altered behaviors of wildlife on the basis of perceived predation risks throughout their environments (Laundré et al. 2001, Zanette and Clinchy 2019). Typically, landscapes of fear induce responses from wildlife wary of competitors or predators (Swanson et al. 2016, Elbroch et al. 2020). The consequences of fear include reductions in foraging time, increases in energetic demands and stress, and reduced fecundity (Searle et al.



**Figure 1.** To demonstrate the diversity in which violent histories persist we share 10 explicit examples that show the global scale in which violence occurs and the varying and shifting timescales in which the repercussions of negative histories occur.

2008, le Roux et al. 2018, Cunningham et al. 2019). However, people exert similar avoidance strategies of places deemed as risky. Taking inspiration from this ecological application, we expand the perspective of landscapes of fear to the sociopolitical context of scientific inquiry. Drawing on disciplines such as political ecology, public health, and geography, we postulate that certain landscapes that have experienced negative histories have become fear ridden, particularly where power dynamics are threatened or where the locations are inhabited by marginalized communities who have experienced a combination of historic devaluing and stigmatizing because of racial or ethnic identity (figure 3).

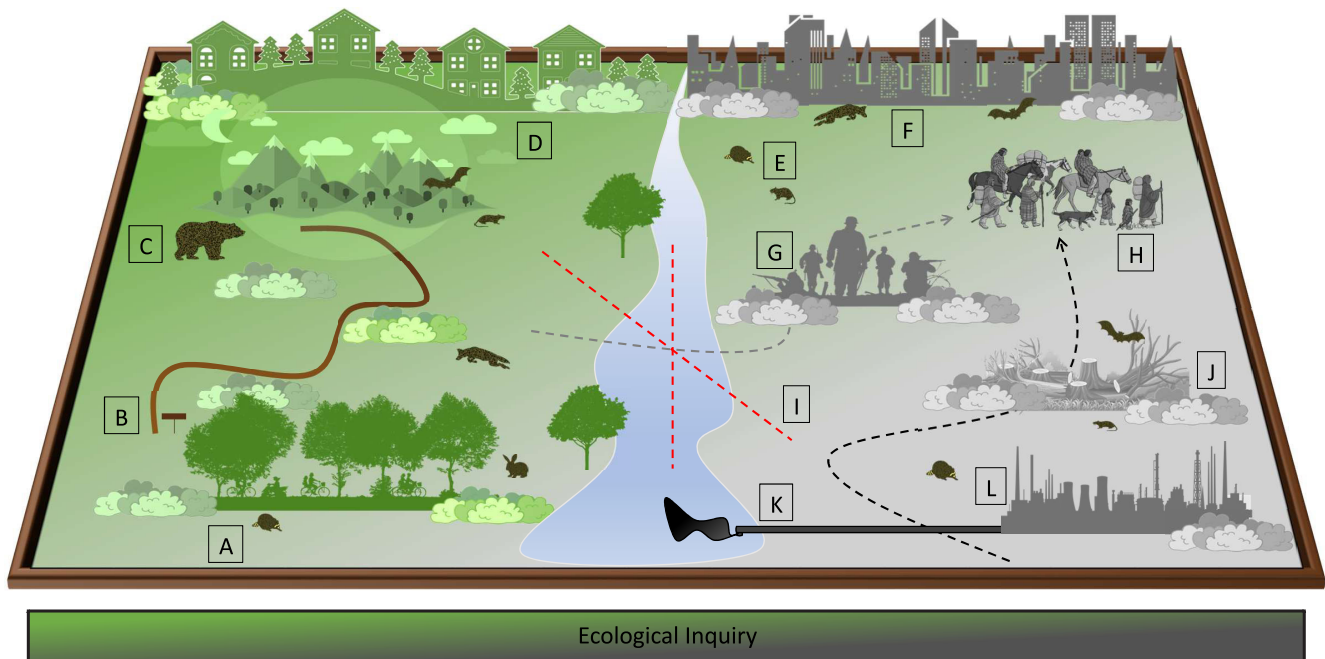
### Fear: A humanities perspective

To better situate the idea of social–ecological landscapes of fear, we should recognize that understanding landscapes as imbued with fear and other emotions is not a new idea. Rather, the idea is borrowed from the social sciences and humanities, including the fields of geography, anthropology, psychology, and history, disciplines that have historically considered the importance of recording and interpreting how space is embodied or remembered (Gustafson 2001). The theory of historical trauma and others born from these disciplines exemplify how collective feelings of traumatic events alter future lived experiences (Brown-Rice 2013).

We also draw on environmental scholars that think about space, relationships to the natural world, and violence to influence conservation (Musavengane and Leonard 2019). Notable inclusions of environmental scholars using social science frameworks in transdisciplinary ways to inform conservation efficacy include Havlick's book *Bombs Away: Militarization, Conservation, and Ecological Restoration*, alongside more recent work that inform how colonial legacies influence biodiversity efficacy throughout the Caribbean and Africa (Havlick 2018, Weldemichel 2020, Mohammed et al. 2022). More recently, the 30 × 30 initiative has provided an increased critique of how social injustice and other histories are not compatible with contemporary conservation paradigms (Dinerstein et al. 2019).

By using the knowledge and frameworks of the humanities, we begin to see how an environment holds not only wildlife, humans, and buildings but also all the social conditioning itself. More aptly put by geographer Yi-Fu Tuan (2013), "*Landscape of fear* refers both to physiological states and to tangible environments." In anthropology, it is even more pronounced that landscape, space, and the body represent important sites for cultural meaning, politicization, and public discourse (Aucoin 2017). In asserting these beliefs and applying them in a socioecological lens, we can then assume that those memories, perspectives, and





**Figure 2.** Conceptual graphic of the problematic framing of landscapes in conventional conservation and environmental scholarship where landscapes are dichotomized between pristine ecologically relevant and degraded landscapes. (a) Green space (b) Nature trails (c) Charismatic megafauna (d) Suburban neighborhood (e) Nuisance wildlife (f) Cityscape (g) War and conflict (h) Forced removal (i) Redlining (j) Land conversion (k) Pollution (l) Industry.

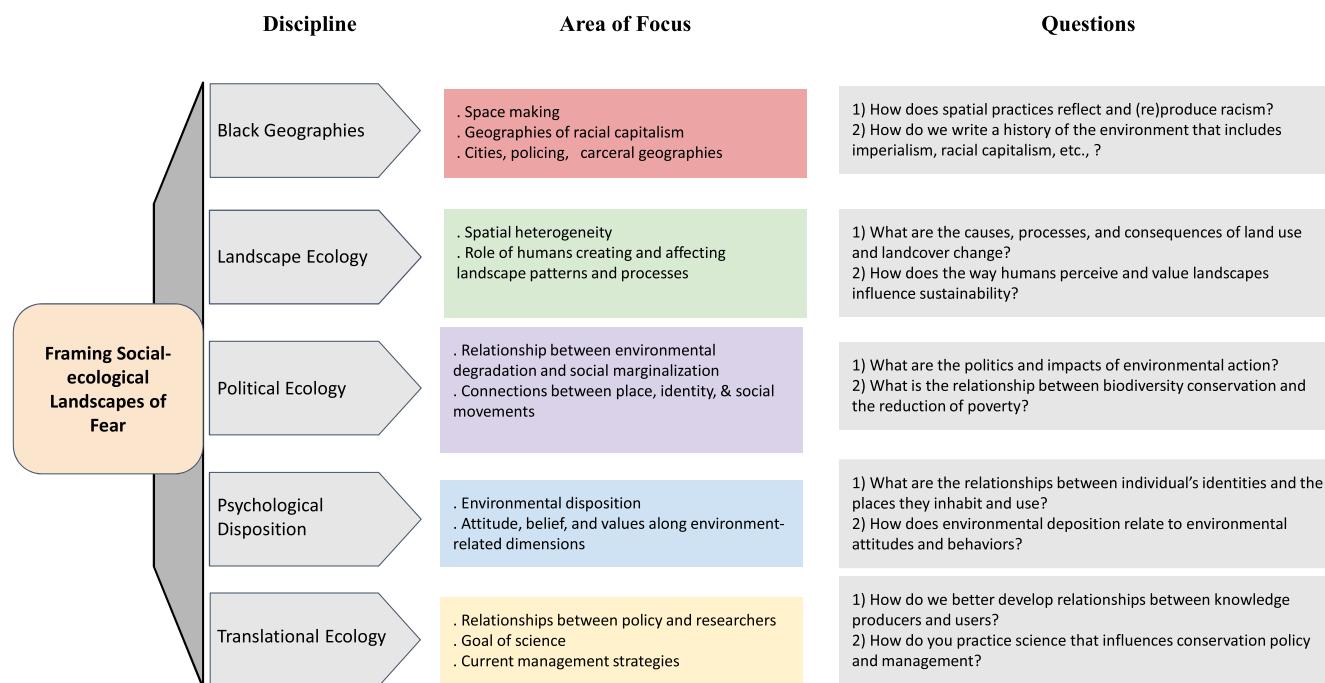
labeling of place from historical events can have a myriad of outcomes and consequences depending on whose memories and perspectives are reproduced. To compare, where fear in free-ranging wildlife acts to constrain their behavioral patterns, fear as a product of negative histories can have similar influences by suppressing ecological inquiry in researchers who then avoid particular physical and intellectual zones (Szabó and Hédl 2011). By articulating the landscapes of fear theory in a social–ecological context, we take the theories born out of the humanities and the discourse of human–nonhuman relationships to create a path for critical thinking about the equitability and rigor of current and future conservation goals.

### Manifestations of social–ecological landscapes of fear

In conservation, the failure to contextualize negative human histories often materializes in different ways, both separately and simultaneously, and with varying consequences to science (Petts 2007). The first manifestation of social–ecological landscapes of fear is the devaluation or exclusion of certain geographic areas, ideas, or species on the basis of spatialized and place-based misconceptions. The second manifestation is evidenced by disproportionately low knowledge within the discipline about certain conservation problems and species, which results in ill-informed conservation decisions (Meek et al. 2015, Buxton et al. 2021). Finally, the failure to fully consider a landscape's history can result in the

erasure of perspectives and histories that do not align with dominant narratives.

**Dismissal.** Often, the stories told in ecological literature gloss over negative histories or frame negative histories as dichotomies of landscapes rather than as complex and evolving. Examples include how violence and turbulent governance can impede effective research and conservation efforts (Santangeli et al. 2019) and gaps in the data collection of terrestrial biodiversity in areas of lower resources, which potentially mislead scientific understandings of natural phenomena (Oliveira et al. 2016, Callaghan et al. 2019). In essence, sites of negative perceptions become the “wrong” sites for science. As was seen in Warren County, North Carolina, polychlorinated biphenyl protests failed to stop a toxic waste dump being zoned in a predominantly Black and low-income area (McGurty 1997). The fear-based dismissal of landscapes then manifests in the ways scholars recognize what are considered intact environments (Plumptre et al. 2021). Similar dismissals negatively shape the complexities of global landscapes. South Africa contains roughly 10% of the world's plant species and numerous species of endemic mammals, birds, and reptiles with levels of extinction risk (Cherry 2005, Curveira-Santos et al. 2021). However, research conducted to address this biodiversity crisis can often dismiss and underemphasize the potential legacy effect of racial conflicts during and after legalized Apartheid, too often focusing instead



**Figure 3.** To formulate the argument of social–ecological landscape of fear five primary disciplines and areas of expertise were used as a framework. Subsequent questions arose as major points of interest in guiding the final outline and basis of the toolkit presented in the article.

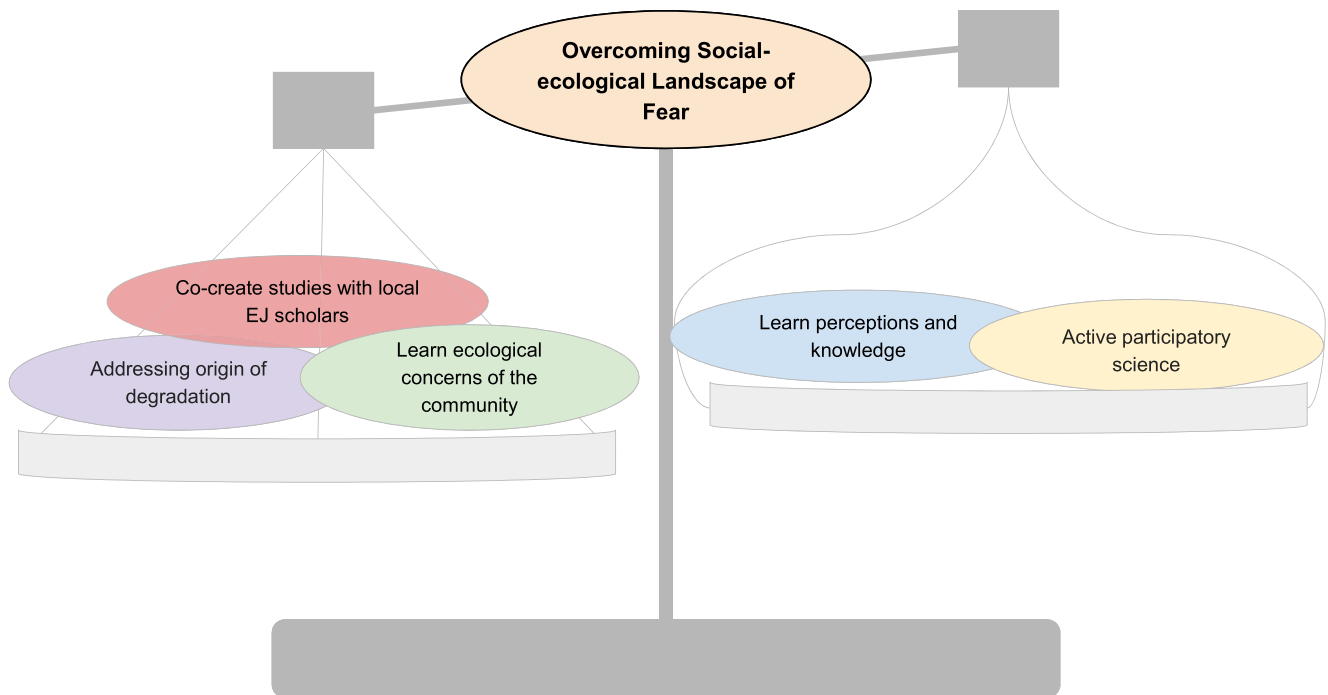
on ensuring national parks for wildlife protection (Skelcher 2003, Cadman et al. 2010).

**Fixation.** Beyond the dismissal of certain spaces, there is an outsized fascination for specific species or places in conservation work, what we refer to as *fixation*. The traditional prioritization of “pristine” areas to conduct investigations and experiments is a deeply entrenched bias in ecology (Fletcher et al. 2021). Early conservation movements (e.g., twentieth century Sierra Club) reflect this bias, at which time research was conducted in “untouched” wilderness or areas of concern by the White upper- or middle-class people (Taylor 2000). In contrast, areas of high poverty housing arrangements (i.e., “slums” and “ghettos”) were commonly relegated as ecologically unimportant and were therefore understudied (Mahabir et al. 2016). The resultant ecological consequences of fixation on singular issues or species have included less funding to conduct studies in particular areas, such as urban environments, undermining the legitimacy of environmental injustice concerns (Bond 2017). Other examples of fixation include how certain conservation disasters are disproportionately covered. For instance, the *Ixtoc-1* and *Deepwater Horizon* oil spills in the Gulf of Mexico, like all catastrophic oil spills, had initial ecological repercussions. Their notoriety assured that both received a disproportionate number of resources and attention (Murphy et al. 2016). Meanwhile, oil spills such as the ongoing Peruvian spills that have occurred since 2000 have failed to gain traction in mainstream conservation

and media outlets (Chong and Srebot 2019, Mega 2022). Moreover, the relative absence of people from non-White backgrounds in ecology also creates a context in which both the conservation movement and the practice of ecology deprioritizes issues and locations in certain landscapes until upheaval forces the acknowledgement of their relevance (Yeeles 2015).

Similarly, social unrest throughout South America is known to increase human migration in biodiversity hotspots but has received comparatively less attention in ecology (Aide and Grau 2004). War can also have profound impacts on landscapes, reshaping land structure in unconventional ways (Hanson 2018). In Colombia, 79% of protected areas have experienced an increase in deforestation because of peace deals following decades of armed conflict (Clerici et al. 2020). However, through incomplete framing or exclusion, certain histories are deemed unimportant, and issues are ignored. As a result, slow violence, the gradual progression of hazards, persists globally as investment is delayed or deterred and knowledge production is diminished (Butchart et al. 2012, Gamu and Dauvergne 2018, Davies 2019).

**Erasure.** Erasure, or the deletion of histories and negative identities of spaces, is another consequence of conducting conservation under a social–ecological landscape of fear. As an adaptation, erasure rewrites one history for another that better aligns with the dominant political paradigms, a powerful driver of landscape identity (Eley 2011). Erasure



**Figure 4.** A guide designed as a catalyst to overcome social–ecological landscapes of fear in environmental scholarship. The scales of justice are used both literally and metaphorically. Literally, given the constraints on scientific endeavors (i.e., resources and funding), scholars have to weigh which tools best fit the particular circumstances and what combination yields the greatest benefit. Metaphorically, the scales represent the justice that is being granted by using tools and being aware of place-based bias. There is no implicit hierarchy in the suggestions we make to overcome place bias.

may also result from negative histories that compound into a single place-based narrative. For instance, Serengeti National Park, in Tanzania, is often touted as a “wild space” with hard boundaries, a narrative that juxtaposes the dynamic human conflict that takes place between stakeholders over land rights and wildlife use (Shetler 2007, Weldemichel 2020). Although scholars have grappled with the consequences of erasure and have highlighted the unique human–wildlife coexistence and the success of conservation initiatives globally, erasure persists within particular spaces, reifying dominant ideologies (Hopcraft et al. 2015, Green et al. 2019).

Others have attempted to push back on the negative paradigm that places of modernity, such as cities, are places of collateral trauma that hurt biodiversity, showing instead how urban spaces can, in fact, aid species diversity and that even historically avoided spaces can harbor impressive and resilient biodiversity (Ives et al. 2016, Oke et al. 2021, Spotswood et al. 2021). Despite this, scientific inquiry is still diminished in places afflicted with negative histories and biased identities, weakening our ability to mitigate the consequences of biodiversity loss and climate change more broadly (McPhearson et al. 2016, Turo and Gardiner 2020, Shackleton et al. 2021). Intentional or not, land that bears the aftermath of conflict or disenfranchisement continues to face bias and is deemed unworthy of broader scientific

endeavors (Cronin et al. 2021). In turn, overcoming the repercussions of landscapes of fear to achieve conservation goals and expand the efficacy of justice, equity, diversity, and inclusion principles in ecology becomes an ever-pressing endeavor.

### Overcoming place-based bias

Without thoughtful intervention, negative human histories will continue to produce landscape identities associated with fear, obfuscating the importance of certain natural environments and species. To combat the pervasiveness of the social–ecological landscapes of fear, we offer insight into three common practices for scholars and practitioners to recognize and deconstruct the biases that result from racist ideologies and histories that influence inquiry and practice: recognition, community collaboration, and cocreation (figure 4).

**Recognition of histories.** To address biased inquiry, it is important for researchers to educate themselves about the negative human histories that occurred in their study region to inform conservation work and guide best practices (Trisos et al. 2021). Situating research in a landscape’s full history undoubtedly incurs a greater impact by removing the veil of White patriarchal paradigms and revealing the pluralism in the identity of a space (Morrissey 2015, Grove et al.



2018). For example, Yellowstone National Park is touted as a national jewel and a “pristine wilderness” where ecologists can study several natural phenomena while lauding conservation success stories. However, this dominant narrative fails to recognize the violent historical events that shaped this landscape. Colonial ideologies justified the forced eviction of Indigenous tribes of North America for the formation of protected areas, policies that also facilitated the extirpation of grey wolves (*Canis lupus*; Coleman 2004, Robinson 2005, West et al. 2006, de Lange et al. 2016). As Native American anthropologist and writer David Treuer (2021) stated, “Viewed from the perspective of history, Yellowstone is a crime scene.” Similarly, when the Ahwahneechee people were forcibly removed from Yosemite in 1850–1966 with the barring of their traditional practices, the ecosystem also became more vulnerable to forest fires (DeLuca and Demo 2001). In this important case, ecological management benefits from adhering to precolonial benchmarks and prescribing historic fire regimens.

Recognition also helps check the formation of hurried management strategies by discerning the nuanced processes through which species become threatened and shedding light on many understudied species. For instance, mainstream conservation narratives that blamed white tailed deer (*Odocoileus virginianus*) and an endoparasite (*Parelaphostrongylus tenuis*) for reduced moose (*Alces alces*) populations failed to recognize the impact of European-led clear-cutting of North American forest and poor land management practices (Gilbert 1974, Lankester 2010). In advancing the formation of protected areas, adequate historical analysis might have revealed these environments selected for protection were strongly influenced by trauma and, more importantly, that centuries of land modification and traditional practices by Indigenous communities was far more successful at species and habitat conservation than erecting fencing and arbitrary boundaries (Farrell et al. 2021). More broadly, the omission of stewardship by a group sets precedent for the present-day lack of awareness, oversimplification of issues, and the erasure of voices in decision-making (Wilson 1999).

Using land acknowledgements in publications and other techniques of disseminating knowledge offers another example of explicit recognition. Land acknowledgments, although they are becoming more prevalent, are still not ubiquitous in academic publications, especially within literature that does not explicitly address socioecological concepts (Melanie 2019). We argue that centering indigeneity by including land acknowledgements, regardless of the scientific content, is a simple and effective way to recognize sovereignty and autonomy. However, too often, land acknowledgments remain generic or superficial. Some academics are hesitant to include them altogether, because they can be seen as performative or as an example of “white-washing,” which defeats the purpose of genuinely honoring Indigenous land stewardship. However, there are several elements to a land acknowledgment that can enhance their

significance. First, we recommend going beyond your institution’s prewritten land acknowledgments if they were not crafted with Indigenous partners (Wark 2021). Second, land acknowledgments do not have to be solely related to Native American stewardship. Land acknowledgments should be tailored to the community in which you are working and should address multiple layers, including past and present stewardship efforts, in addition to the explicit recognition of the historical and ongoing harms within that place (Blenkinsop and Fettes 2020). Researchers can, for example, address Indigenous groups and environmental stewards by amplifying their efforts in places that face current political conflict associated with land ownership (Ortiga 2004, Sánchez 2021, Trisos et al. 2021).

Finally, one can go beyond land acknowledgements to incorporate land-back acknowledgements. The essence of Land Back, the campaign to increase the sovereignty and power of native peoples, can be tailored to different geographic regions and ecosystems. For example, African wildlife conservation in protected areas is directly tied to land dispossession and Eurocentric ideologies of what constitutes environmentally significant (Garland 2008). In time, aligning ecological work to grapple with all contemporary socio-political thought potentially diminishes the significance of colonial scientific narratives (Pieratos et al. 2021). Although repossessing stolen land should not be contentious, whether through protest or retaliatory violence, the Land Back campaign is nevertheless still debated between Indigenous activist and government structures. Not only does a land-back acknowledgement signal a paradigm shift, but it also begins to restructure power dynamics by suggesting that decision-making about the environment should not predominantly reside with Western sciences. In addition, by asking that land not only be looked at as a commodity but as cultural and life sustaining helps increase Indigenous leadership in knowledge and decision-making (Scobie et al. 2021). Beyond the recognition of the multiple and subversive narratives, it is important that researchers go the extra step to learn the perspectives of those living on or near their study sites (Sultana and Selim 2021). Environmental scholars must put in real effort to join the communities in which they work to achieve holistic knowledge production.

**Community collaboration.** Community inclusion is another tool to combat place-based bias in conservation scholarship. This approach is particularly salient when working on ecological conservation areas that have been deemed risky, dangerous, and degraded, often in ways that are at odds with peoples’ perceptions of their own communities and spaces (Nunes and Veloso 2018). Exemplary community inclusion involves early collaboration between natural and social scientists to study perceptions, knowledge, and attitudes in chosen geographies. Such studies reveal the identity of people who live and work in the landscape and any evolution in their connections to the natural world (Ives and Kendal 2014, Weber 2016). Pereira and colleagues (2021) found that employing

interviews to understand local knowledge was paramount to creating the best plan to manage the endangered parrotfish (*Scarus trispinosus*) in Brazil. Other studies show that there are likely trade-offs in the efficacy of marine protected areas on the basis of standards of equitable decision-making (Gill et al. 2019). To avoid place-based bias, we encourage scientists to deliberately frame interactions from the perspectives of communities and natural surroundings. These actions also refute stereotypes and build connections that authenticate the different identities, knowledge systems, and roles particular environments play within a society. Accordingly, there have been renewed calls for such meaningful collaborations, because these early studies of perceptions and knowledge essentially help show key insights into purely ecological questions (Maskrey et al. 2016, Mielke et al. 2016). Moreover, interdisciplinary collaborations are increasingly necessary, given that wildlife are intertwined with society and that social scientists share study sites with environmental scholars (Soga and Gaston 2020).

We should caution, however, that early collaborations are not a guarantee to success. Improper evaluation of success and nonholistic collaborations can worsen wildlife vulnerability despite much involvement from communities to create work plans with conservation organizations (Bettinger et al. 2021). Without genuine remorse and introspection for violence by colonial power paradigms, community collaboration and the insensitivity of negative legacy effects can reproduce harm, especially in areas where high conservation is abutted by colonialism-induced poverty (Petts 2007). To that end, building community partnerships can provide a path forward to help repair harm that results from negative human histories, ensure that stories are not lost, and offer beneficial platforms to disseminate relevant community topics to various audiences.

Partnerships with champion stakeholders offer another promising way to forge productive collaborations. A champion stakeholder is not just someone who supports the research but who helps create buy-in from other community members, addressing the complexity that arises when unfamiliar scientists enter a community (Barot et al. 2019). These individuals investigate new lines of inquiry and, perhaps most importantly, can speak to the cultural attitudes that underlie community structure and values. We also challenge researchers to move beyond the idea that a champion stakeholder is a singular person; rather, they can be a voice that echoes the concerns and sentiments of community organization and scale. In essence, champion stakeholders become akin to an anthropologist's interlocutors, a network of complex relationships with humans and nonhumans that provide diverse perspectives on land-based trauma and conservation agendas (Unks et al. 2021). Genuine involvement of community stakeholders acknowledges the power that communities have for influencing the objectives and impact of a study. Instead of researchers relying on antiquated opinions and framing that are detrimental to knowledge production, stakeholders can challenge scientists to ask relevant questions, advance new

methods, and deconstruct normative language barriers for more effective dissemination of results (Barot et al. 2019). The incorporation of community partners is especially salient in environmentally degraded neighborhoods, where the focus is typically on exposure to pollutants and nuisance species rather than holistic biodiversity concerns (Ramalho and Hobbs 2012, Elmqvist et al. 2013). Although working with vested community partners is lauded, it too requires adequate preparation through training on managing partnerships, conflict resolution, facilitation, and assessment, which often results in an extended project development phase (Sterling et al. 2017, Karasik 2020).

Beyond seeking a champion stakeholder, conservationists, ecologists, and environmentalists can emulate those same principles of collaboration and openness to readily position themselves to partner with stakeholders. Researchers should look inward to ask themselves if they have historically silenced champion stakeholders by relying on and reproducing dominant landscape narratives, depriving the world of richer understandings of the landscapes in which they move and work (Hall 2003). In an ecological sense, one generally would not venture into the jungle without first building a relationship with a local guide. Why then is it acceptable to undertake research in urban environments or carry out so-called nonremote fieldwork without the same due diligence? In these cases, researchers too often impede themselves and approach communities and landscapes with an incomplete view of their site's identity, history, and drivers of ecological change. In summary, these shortcomings stifle efforts to tackle environmental problems even with the suite of interdisciplinary tools available (Shea 2021). The added complexity of combating place-based bias highlights the inherent necessity of employing the expertise of the humanities and social sciences.

**Cocreation.** To ensure that science reflects the full identity of an ecosystem rather than the identity fear portrays, it is imperative ecologists become comfortable recognizing the political ecology paradigm, which, in the words of environmental anthropologist Jason Roberts (2020), "are the economic structures and power relations that drive environmental change." As such, an initial step would be to cocreate knowledge with local environmental justice and political ecology scholars (Norris et al. 2016, Bowser and Cid 2020). Political ecology helps scrutinize who has the power and the effects of inequitable distribution of power (Roberts 2020). For example, in some cases, the imbalance of power dynamics between Indigenous communities and conservation and environmental nongovernmental organizations often leaves people dispossessed of land and unable to actualize their rights (Rubis and Theriault 2020). The mission of environmental justice is to distribute power and reduce inequities in beneficiaries and burdens (Taylor 2000, Agyeman et al. 2016). Proper environmental justice scholarship is rooted in communities' feelings, perceptions, attitudes, and values. Partnering with groups that conduct long-term community-focused research will be valuable



when designing conservation and ecology-focused studies within an area (Galafassi et al. 2018, Massé and Margulies 2020, Menton et al. 2020). These assessments elucidate the dominant power narratives that drive the social–ecological landscape of fear framework and, in doing so, create paths for conservation where just societal goals are met in tandem with conservation initiatives (McInturff et al. 2021).

Collaborations among ecologists, with environmental justice scholars, political ecologists, social scientists, historians, linguists, and community experts reveals the full identity of space. The inclusion of environmental historians, social scientists, and linguists into the practice of ecology will bolster dynamic participatory science research by bridging communication gaps and leverages applied and theoretical ecology. Simultaneously, research groups must foster an atmosphere that allows for the authentic self-presentation of community members via potential differences in mannerisms and sentiments (He et al. 2019, Golden et al. 2021). Beyond an inclusive atmosphere that merely tolerates the presence of different identities, which constitutes intellectual avoidance, a scientific environment that allows for authentic cocreation welcomes, anticipates, and grapples with, rather than fears, the differences of opinion and historical traumas that make an environment (Weir et al. 2019). As a result, the stories of those affected by negative histories are elevated, knowledge systems are broadened, and new agendas that govern project objectives are set (Hill et al. 2020, Svarstad and Benjaminsen 2020). Notably, there are many pathways of cocreation and that depending on the project scope and timeline will likely dictate to what extent cocreation is possible (Chambers et al. 2021). Furthermore, by employing hands-on participatory experiences, bilateral pathways of knowledge sharing are strengthened. Science not only affects individuals, but individuals affect science and scientists (Charles et al. 2020). Therefore, reciprocity, in theory, invigorates intergenerational learning and our understanding of changes in generational landscape identity.

## Conclusions

Although there are many resources to understand landscape patterns and processes, within ecological research, less attention has been afforded to spaces that are inflicted with negative histories and to the ways in which those histories shape conservation activities and goals. Without first understanding the historical associations of people living in the middle of trauma (e.g., witnessed removal of people, degradation of land, and legacy of colonial mindsets), there remains a veil over the character of spaces that fosters place-based bias in natural science research. The resultant bias, what we call social–ecological landscapes of fear, affects the type, duration, and scope of resultant ecological inquiry. The incomplete framing of landscapes stems from dominant historical narratives that portray particular places as being degraded, segregated, or exploited, and separate from idealized landscapes to where ecological research and conservation take place (Skandrani 2018). In turn, ecological inquiry

in a landscape is impeded and unequal, compared with other areas deemed key to the frontiers of ecology (Meijaard et al. 2015). Not only are these biased identities placed on study areas often outright false, but they also are derogatory and do unmeasured damage to the knowledge creation within environmental fields. More broadly, they contribute to the divide of science and public at large, which has implications for livelihoods, health, sustainability, and cultural heritage (Baden et al. 2007).

There is a need to tell and understand the stories of negative histories because, without them, our ability to study and conserve will be limited. Recognizing the harm enacted on communities and the deficiency of scientific advancement by looking at spaces through a singular lens, we provide recommendations for future research from evaluation to action that will allow the varied identities of study sites to positively influence scholarship. These tools build on past work that brings forth principles of coalition, collective knowledge building, and addressing personal partisanship (Kim 2009, Aceves-Bueno et al. 2015). Actionable items include formal recognition of how negative historic actions such as forced removal, stigmatization, and racism have influenced the narratives of particular ecosystems. In addition, we argue for the explicit cocreation of knowledge with political ecologists to understand systematic drivers abetting fear into our work (Lowe et al. 2009). Although we focus on political ecology, there is a need for increased collaboration with historians, geographers, ethnographers, and cultural anthropologists to address combatting fear in the practice of ecology (Norris et al. 2016). Because knowledge disrupts fear, we must understand the narratives of space through the lens of the people living and working in an ecosystem, which requires the expertise of social scientists and increased willingness of ecologists to promote dialogue with local communities and investment in relationship building. Other techniques to overcome bias involve active participatory science and understanding community perceptions and environmental concerns (Martin 2020).

Fear on the physical landscape constrains an individual's behavior. Hesitancy to grapple with cruel pasts and alternate relationships with landscapes diminishes scientific rigor. In describing the social–ecological landscape of fear and its manifestations, we do not intend to chastise or draw ire by projecting ecological theory onto human behavior. Rather than simply highlighting this problem, we illuminate practices that allow researchers to reconsider and be more critical to the ways in which interpretations of places shape scientific inquiry. In doing so, we recognize how our own identities perpetuate implicit biases that shape scholarship. In response, we call for increased discussion about self-awareness in science and how to share our work within the discipline and broadly with other groups (Yitbarak et al. 2021, Zvereva and Kozlov 2021). We view these recommendations as catalysts in conjunction with other disciplines (e.g., anthropology, geography, law, women and gender studies) to carry out science that recognizes and addresses bias

in landscape identity. Ultimately, our efforts aim to ensure science operates fairly and equitably, and that the scope of questions is not abbreviated because of the status quo ideologies of particular environments.

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Gabriel I. Gadsden ([gabriel.gadsden@yale.edu](mailto:gabriel.gadsden@yale.edu)) and Nyeema C. Harris, PhD are affiliated with the Applied Wildlife Ecology (AWE) Lab, in the School of the Environment at Yale University, in New Haven, Connecticut, in the United States. Nigel Golden, PhD is affiliated with the Woodwell Climate Research Center, Woods Hole, in Falmouth, Massachusetts, in the United States.