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Editorial: Rewilding in practice

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Editorial on the Research Topic

Rewilding in practice

Rewilding, at its core, is not a one-size-fits-all endeavour; its success depends on a range of factors from local ecological dynamics to socio-economic considerations, and it follows that there is a need for grounded, context-specific approaches. The case studies presented in this Research Topic provide a nuanced lens through which to explore the interplay of variables unique to each rewilding project. By focusing on specific examples, researchers and practitioners can glean invaluable insights into what works, what doesn't, and more importantly, why rewilding was the chosen approach. This provides us with essential knowledge for steering future rewilding projects.

Case studies offer a platform for holistic assessment, ranging from the efficacy of monitoring approaches (Cowgill et al.) to broader socio-cultural dimensions (Root-Bernstein and Guerro-Gatica). They illuminate the multifaceted impacts of rewilding on local communities, economies, and cultures, shedding light along the way on both potential benefits and unintended consequences. Such insights are valuable for fostering genuine collaboration, but also for ensuring that rewilding initiatives are not only ecologically sound, but also socially equitable and sustainable.

Understanding the adaptive capacity of rewilding strategies is vitally important. Rewilding is a long-term process, so documenting change over time is important to both monitor change on the ground while providing vital insight to inform rewilding guidelines and frameworks. Here, case studies serve as living laboratories; showcasing real-world responses to evolving environmental, economic and social pressures. Rewilding itself is a changing concept and has adapted over time. As the case studies in this Research Topic demonstrate, the primarily ecological focus of rewilding has expanded to reflect paradigm shifts in wider conservation towards eco-cultural or social-ecological systems approaches. Ecologically, rewilding denotes a paradigm shift from compositional towards functional restoration. The governance and cultural implications of this more indeterminate approach, including adaptive co-management, human dimensions and human-nature connections, are addressed in practice and in theoretical frameworks in many of the contributions to this Research Topic.

Tracking the long-term outcomes of rewilding interventions from the 'spontaneous rewilding' of natural recolonizations to more interventionist translocation approaches—provides invaluable insights for adaptive management, as illustrated by these and other case studies on impacts on ecosystem or social-ecological system persistence and resilience. This is a crucial tool for navigating (and indeed accepting) uncertain ecological futures wherein nature takes more of leading role.

Documenting case studies is not merely a supplement to rewilding initiatives; it is a fundamental component of rewilding success (or failure). By grounding project ambitions in tangible realities, case studies provide the foundation needed for successful project management and in doing so unlock a wilder, more resilient future for all. Rewilding may carry distinct meanings and nuances in different languages and cultures, and below we explore how rewilding is understood across various linguistic and cultural contexts. Understanding these meanings and definitions and how they differ across geographies can help us identify and compare best practices and lessons learned (Hertel and Luther).

The interpretation of rewilding can vary significantly across cultures and languages. The term is associated with the notion of wilderness, which in itself lacks a specific word or translation in many languages, and whose understanding depends on the socio-ecosystems in which it is embedded (Locquet and Héritier, 2024). While it universally implies encouraging the return of autonomous processes within and across ecosystems, the specific approaches, priorities, cultural perspectives, and limitations of rewilding can differ based on local contexts and values. Understanding these diverse meanings is crucial for effective cross-cultural dialogue and collaborative conservation efforts worldwide, and for understanding some of the situated practice explored in the papers in this Research Topic.

In Spanish, the notion of rewilding is translated by the term *resilvestración* (FundéuRAE, 2019), composed of the prefix *re* and the adjective *silvestre*, which refers to natural non-cultivated plants or non-domesticated animals (FundéuRAE, 2019). This term is commonly used to describe rewilding efforts, underscoring the restoration of ecosystems, and focusing on the recovery of natural processes and the revitalization of biodiversity.

In French, rewilding is often translated by "renaturation" or "restoration," which are often used interchangeably (Dehaut, 2023); these notions are based on definitions that are not completely stabilized (Barraud, 2007). The concepts of renaturation and restoration are also generally associated with interventionist practices, or ecological engineering, and with fixed reference states, which differs from rewilding approaches. The concept of "*renaturalisation*" or "*renaturalización*" (also used in Spanish to translate rewilding) is mainly associated with actions carried out in urban environments or on watercourses after phases of major anthropisation to restore natural dynamics (Pech, 2016). Indeed, this term is found in most Latin languages such as '*renaturalização*' (Portuguese) (Pereira et al., 2010) or '*rinaturazione*' (Italian) (Brambilla, 2019). Rewilding can also be translated in French as '*réensauvagement*' (Cochet and Kremer Cochet, 2020; Barraud, 2021; Faure, 2023), which is often understood as the return of 'savage' (i.e., wild) entities and predators. Here it has a negative connotation and is also associated with a form of appropriation of territories by groups of external stakeholders. In Portuguese, rewilding can also be translated as '*refaunação*', referring to wildlife reintroduction.

In German, rewilding is translated as "Wiederansiedlung von Wildtieren" or "Wildnisentwicklung." These terms emphasize the reintroduction of wild animals and the promotion of wilderness development. In Japanese, rewilding can be interpreted as "自然再 生" ('shizen saisei') or "野生復帰" ('yasei fukki'), where these terms emphasize the regeneration of nature and the return of wildness to landscapes. Although there are terms in different languages to try and translate rewilding, the word is often found as it is, in English, in scientific literature, regardless of the language employed.

In China, the term eco-civilization refers to the sum of material, spiritual, and institutional achievements made by human beings for protecting and building a beautiful ecological environment, and it is a social form in which people and nature, environment and economy, and people and society coexist in harmony (Zhou, 2012; 2021). Cao et al. (2023) note that there are 'well-documented social, economic, cultural, and ecological benefits of rewilding that align with eco-civilization and the broader sustainable development agenda' while also noting the challenge of effectively communicating, translating, and integrating the philosophy and science of rewilding and eco-civilization, while also staying true to the ethos and origins of both concepts.

Over the years, rewilding has been adopted and adapted in various contexts, earning it the label of a "plastic word" due to its broadened scope beyond the initial meaning of "to make wild again" (Jørgensen, 2015). Language naturally evolves, with words often retaining old meanings while acquiring new ones (Jørgensen, 2015). Specifically for rewilding, its usage now spans wider ecological and cultural dialogues, resonating with numerous viewpoints from scientists to environmental advocates.

Rewilding has largely focused on Europe and North America, but there are continental differences in rewilding thinking and practice. The social context for conservation and land management is significantly different between continents; thus, issues related to governance, Indigenous rights, and traditional land uses that are place-specific should be taken into account, as well as how rewilding in itself is defined and understood (Root-Bernstein et al., 2017).

Rewilding in Australia, for example, has developed a distinctive approach, shaped by the continent's unique ecosystems, biodiversity, and historical context. Here rewilding focuses on restoring small to medium-sized native mammals rather than apex predators, reflecting its ecological challenges. Species like bilbies, bettongs, and numbats have declined due to predation by invasive species (e.g., foxes, cats), habitat loss, and altered fire regimes. Rewilding projects address these issues by creating predator-free reserves and reconnecting fragmented habitats. Initiatives by organizations like Australian Wildlife Conservancy (AWC) and Arid Recovery have reintroduced species such as the western quoll (*Dasyurus geoffroii*) to areas like the Flinders Ranges, helping restore ecological balance. In Australia, as elsewhere, few Indigenous community-led restoration projects are identified as rewilding, which might imply a withdrawal of people or their practices from traditional lands (Bartel et al., 2021). More often, such restoration projects are described in terms of healing Country or caring for Country, emphasizing the reliance of such places on the people that belong to them (Rose, 1996). Conservation best practice demands that ecologists partner with Indigenous communities to integrate traditional land management practices, like cultural burning, to maintain habitat diversity and reduce wildfire risks.

This blend of conservation science and Indigenous knowledge highlights a unique approach, emphasizing ecosystem resilience and sustainability. Perceptions of rewilding as 'hands off' or promoting human withdrawal conflicts with Indigenous Australians' ecological custodianship (Bartel et al., 2021), and therefore aligns more with rewilding as more-than-human collaboration and coexistence (Hawkins et al., 2023).

Africa stands out for its rich variety of large herbivores and predators, which are crucial in maintaining its ecosystems. However, rapid human population growth has caused a surge in the encroachment of wildlife habitat, hunting/poaching for 'bushmeat,' and intensified human-wildlife conflicts, presenting significant challenges for conservation and rewilding efforts. African rewilding initiatives focus on expansive ecosystems and iconic species, such as elephants, rhinos, big cats, and wild dogs. These large animals require extensive, wellconnected habitats; thus, rewilding emphasizes restoring and protecting vast, interconnected landscapes, like the Niassa-Selous wildlife corridor, which links major conservation areas in Mozambique and Tanzania (Niassa-Selous Transfrontier Conservation Area, n.d.)

Addressing human-wildlife conflict and encouraging coexistence is essential. Such conflicts frequently stem from crop damage, livestock losses, and risks to human safety. In Kenya's Maasai Mara region, strategies to mitigate conflicts with elephants include engaging local communities, establishing barriers, monitoring elephant movements, and deploying rapid response teams. These initiatives seek to minimize retaliatory killings and promote coexistence between humans and wildlife (Mara Elephant Project, n.d.).

Where wildlife has been depleted, reintroduction is a key rewilding strategy. In Mozambique's Gorongosa National Park, large mammals that were totally or nearly extirpated by years of civil conflict, such as wildebeest, buffalo, leopards, and wild dogs, have been successfully reintroduced, helping to restore the park's ecosystem (Pringle and Gonçalves, 2023).

Rewilding can also involve the restoration of lost abiotic processes. For example, the Waza-Logone floodplain (Moritz et al.) was reflooded to benefit humans and wildlife. Nonetheless, despite its promising potential, insufficient security and investment in Waza National Park have hindered the recovery of wildlife populations, although local communities have benefited.

Many African conservation and rewilding projects integrate local communities, addressing human and ecological needs within a socio-ecological framework. Initiatives like Kenya's Northern Rangelands Trust involve local communities in habitat restoration, ensuring socio-economic benefits alongside ecological gains (Northern Rangelands Trust, n.d.). Indigenous knowledge, including traditional fire and grazing management, is increasingly integrated to maintain ecosystem health. This combination of restoration and community engagement presents rewilding as not only an ecological goal but also a strategy for sustainable development, conflict resolution, and cultural preservation.

Rewilding in South America is defined by the continent's vast and diverse ecosystems, ranging from rainforests and savannas to wetlands and grasslands. The distinction between rewilding and species reintroduction, however, is not always clear (Root-Bernstein et al., 2017). Efforts primarily focus on restoring native species and ecosystems that have been impacted by deforestation, habitat fragmentation, and agricultural expansion. A prominent example is the Iberá Rewilding Project in Argentina, where species such as jaguars, giant anteaters, and red-and-green macaws have been reintroduced to revive the ecosystem after decades of degradation. This project, led by Rewilding Argentina, highlights the potential of rewilding to restore apex predators and keystone species, which help maintain ecological balance.

A unique aspect of South American rewilding is the emphasis on large-scale, landscape-level restoration. For instance, rewilding projects in Chilean Patagonia, like the Pumalín and Patagonia National Parks, have focused on restoring ecosystems affected by overgrazing and unsustainable logging practices. In Brazil, Refauna is a network of universities, organizations, zoos, and breeding facilities, working together since 2010 on the Atlantic Forest's restoration through reintroduction of key species like the tapir, the howler monkey, the tinga tortoise, and the red agouti. The network is currently present in more than 120 protected areas in the biome. Significant efforts have been directed to restoring (or rewilding) the Tijuca urban Forest in Rio de Janeiro. Rewilding in South America often involves collaboration with local and indigenous communities, and small-scale farmers. Projects like these not only seek to restore biodiversity but also aim to create sustainable economic opportunities through ecotourism, reinforcing the connection between ecosystem health and community well-being.

Rewilding in Asia takes diverse forms, reflecting the continent's vast range of ecosystems, cultural landscapes, and conservation challenges. For example, the success of various tiger (Panthera tigris) translocation initiatives in India has not only protected the tigers but has also reinforced the entire ecological web that depends on them, leading to healthier forests and increased biodiversity. Dutta and Krishnamurthy (2024) report on the Panna Tiger Reserve in Central India and note that (a) the presence of tigers helps regulate prey populations and contributes to overall ecosystem stability; (b) tiger conservation necessitates the protection of large, contiguous habitats, benefiting many other plant and animal species; (c) healthy ecosystems are able to provide ecosystem services such as water purification, carbon sequestration, and climate regulation; and (d) tiger conservation can also stimulate ecotourism, generating economic benefits for local communities and supporting further conservation efforts.

Lamperty et al. (2023) view Singapore as 'a natural rewilding experiment as large mammals that were extirpated in the last century have begun to recolonize the island, partly due to Singapore's successful regreening efforts.'

Drawing on a case study of rewilding and avian diversity and endemism in the Sanjiangyuan region of the eastern QinghaiTibetan Plateau, Li et al. (2018) challenge the assumption that reducing human impact invariably leads to biodiversity gains. Whilst rewilding can (depending on context) support high avian species abundance and diversity, rewilding outcomes are not always predictable and depend on the specifics of the landscape and the species involved. Passive rewilding does not necessarily guarantee positive biodiversity outcomes. They conclude that rewilding efforts should carefully review ecosystem service and biodiversity objectives, emphasizing the need for a nuanced, site-specific approach that considers the historical interaction between humans and the landscape, maintaining a balance between ecosystem services and the protection of unique biodiversity.

In China, while the concept of "rewilding" is still developing, many conservation practices already align with the 3C model. The establishment of national parks exemplifies core area conservation, with strict management ensuring ecological integrity (Zhao, 2022). The Giant Panda National Park is a prime example of connectivity conservation, linking numerous nature reserves into a vast habitat network, with a dedicated corridor plan to enhance connectivity (Swaisgood et al., 2023; Yang et al., 2020). Efforts also focus on reintroducing key species, such as the snow leopard (Alexander et al., 2016) and North Chinese leopard (Yang et al., 2021).

In Southeast Asia, rewilding is often linked to rainforest restoration, where reforestation projects work to rehabilitate ecosystems damaged by palm oil plantations, logging, and agricultural expansion. The Hutan Harapan Ecosystem Restoration Concession (ERC) in Sumatra, Indonesia is a potential model for 'rewilding lite' approaches for restoring degraded lowland rainforests (Utomo and Walsh, 2018). Hutan Harapan has been significantly degraded by past logging, but still retains high biodiversity value, including globally threatened species. The ERC framework legally designates production forests for restoration and conservation, rather than just timber extraction, while also restoring degraded areas through sustainable practices like agroforestry and non-timber forest product harvesting. This holistic approach addresses both ecological and socio-economic goals and demonstrates that areas managed for multiple objectives can contribute significantly to biodiversity conservation. As a note of caution, however, the Indonesian Omnibus Law of 2021 has changed the role of Ecosystem Restoration Concessions, and they are now treated the same as forest licenses that are not intended for conservation, and challenges such as illegal encroachment (e.g., oil palm plantations), forest fires, and financial sustainability continue to be a problem.

In addition to the difficulties of translating and understanding the term "rewilding," it appears that not all stakeholders use this word. It is mainly used by international organizations (e.g., Rewilding Europe or the Global Rewilding Alliance), which contribute to spreading a model of practice, and in scientific literature. For example, in France, the word is rarely used by managers, either in its French or English versions, and because of the diversity of socio-ecological contexts, other concepts are emerging. Here it is the notions of "*libre évolution*" and "*naturalité*" that are most commonly used.

The examples of rewilding in this Research Topic range from Community Case Studies focusing on consensus and alliance building (Root-Bernstein and Guerro-Gatica), reflooding and its different impacts on human and wildlife populations (Moritz et al.), and the integration of Indigenous knowledge, ceremony, and cultural monitoring in reintroduction efforts (Heuer et al.), to Systematic Reviews on trends for monitoring terrestrial rewilding with environmental metabarcoding (Cowgill et al.) and the evolution of the Yellowstone to Yukon initiative (Hilty et al.). Hertel and Luther argue that rewilding success hinges on both ecological and sociopolitical factors. Local awareness, proof of concept, and recognizing species' intrinsic value are crucial for maximizing success in future projects. In the Original Research section, we delve deeper to develop learning from a broad set of case studies into rewilding guidelines and a theory of change for rewilding application (Hawkins et al.), while a case study of a cheetah reintroduction in Namibia highlights the importance of understanding environmental settings and animal history and behavior for rewilding and ecosystem restoration (Dimbleby et al.). Finally, Jones and Jones, in the Policy and Practice Reviews, provide a comparison of the principles for rewilding as an approach to ecological restoration with IUCNs principles for Nature-based Solutions in the context of beaver reintroductions in the UK.

This Research Topic underscores the vital role of meaning and context within rewilding efforts. The diverse range of topics, highlighted by examples from various continents, illustrates that rewilding is a complex undertaking shaped by socio-economic and cultural factors, in addition to ecological considerations. As rewilding continues to advance and transform, documenting and learning from these experiences remains crucial. As Eileen Crist (2024) recently observed, the focus has shifted beyond 'the great wilderness debate' to confronting a world increasingly characterized by a 'human monoculture' on a trajectory toward a 'profitable apocalypse.' Around 75% the planet's land surface is experiencing measurable human pressures (Venter et al., 2016). Now, more than ever, it is essential to advocate for a hopeful and positive vision of rewilding to safeguard the future of our planet.

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Conflict of interest

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