



Perspective

Reintroducing rewilding to restoration – Rejecting the search for novelty

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ABSTRACT

Rewilding is emerging as a major issue in conservation. However, there are currently a dozen definitions of rewilding that include Pleistocene rewilding, island rewilding, trophic rewilding, functional rewilding and passive rewilding, and these remain fuzzy, lack clarity and, hence, hinder scientific discourse. Based on current definitions, it is unclear how the interventions described under the rewilding umbrella differ from those framed within the long-standing term 'restoration'. Even projects held up as iconic rewilding endeavours invariably began as restoration projects (e.g., Oostvaaderplassen; Pleistocene Park; the return of wolves to Yellowstone, etc.). Similarly, rewilding organisations (e.g., Rewilding Europe) typically began with a restoration focus. Scientific discourse requires precise language. The fuzziness of existing definitions of rewilding and lack of distinction from restoration practices means that scientific messages cannot be transferred accurately to a policy

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1. Introduction

Definitions are central to the scientific method. They clarify thought processes and ensure transparent, structured and unambiguous communication about the phenomena under study. Good definitions should be complete, concrete and universally accepted. They should avoid being so broad and inclusive that they lack intelligible meaning. Ideally, definitions should be operational, that is, they should refer to entities that can be measured. Without clear definitions, researchers run the risk of falling into pitfalls where the same phenomenon is studied repeatedly under different terms, wasting scant research resources, or where opportunities for joint efforts are overlooked because people pursuing the same problems perceive themselves to be working on different ones. Poor definitions hinder the integration of scientific work because data sets are scattered through the literature under a variety of different terms. Yet the risk of vague definitions is not restricted to scientific endeavours. Variable use of the terms *translocation* and *reintroduction* ultimately led to the creation of clear definitions because it was often impossible to determine what actions practitioners had instigated and what the intended outcomes were (Seddon et al., 2007). In the same way, it is critical for conservation practitioners, non-government organisations and community groups to be clear about their activities via the use of clear and explicit terminology. To constrain these risks, it is at times necessary to evaluate whether certain terms advance or hinder progress.

Here, we scrutinize the term ‘rewilding’, a buzz-word that has recently injected a new and much-needed wave of public enthusiasm into conservation optimism. While the term has been broadly applied in the public domain, we find that within the scientific literature rewilding is the subject of a dozen different definitions (Jørgensen, 2015). There is confusion over whether the term and its composites (e.g., ‘Pleistocene/island/trophic/passive rewilding’) define a novel set of phenomena not previously considered, or whether they merely serve to effectively re-brand a more conventional, but perhaps old-fashioned term: ‘restoration’. As congruity in scientific terms is vital for clear communication of scientific principles and philosophies, we debate the novelty of the term rewilding, including its most recent definitions, and then consider the value of using this term in scientific discourse.

Some might argue that the use of ‘wild’ in the original terminology itself makes the term fundamentally flawed. After all, preconceived notions relating to the terms nature, wilderness, and wild have been extensively scrutinized particularly in the fields of the history and philosophy of science (Cole and Yung, 2012; Nelson and Callicott, 2008). Thus, the definition suggests that ‘wild’ is the ideal ecosystem state and that the objective is to return to that state. The emerging consensus from the conservation perspective is that there is a continuum of ‘wild-ness’ and viewing this as an ‘either/or’ dichotomy is not useful, and a more nuanced view of the levels of restoration intervention required is necessary (Mallon and Stanley Price, 2013; Redford et al., 2012). This challenges the notion of humans as an intrinsic part of natural wild social-ecological systems. Thus, while humans are essential actors in facilitating re-wilding initiatives, they are likely not viewed as a fundamental part of the resultant systems should it be considered to be “rewilded”. It is important to note that these same epistemological notions are not inherent to the term restoration. Nonetheless, we acknowledge that the term ‘restoration’ does still face problems in light of altered community structure (Hobbs et al., 2006), the ethics of ‘turning back the clock’ (Katz, 2009), and appropriate baselines to use as objectives (Caro, 2007; Hayward, 2012).

2. Why debate a definition?

Debating the definition of rewilding may seem an arcane indulgence, however the implications of policy makers and funders embracing some of the more hands-off notions of rewilding may not be benign, but dangerous if the goal of conservation is to achieve the maximum level of pre-existing biodiversity in systems. The Society for Ecological Restoration now encourages a stricter use of the vocabulary around restoration (Society for Ecology Restoration International Science and Policy Working Group, 2004). This recommendation is important because conservation has long suffered from fads where concepts or approaches are enthusiastically promoted for a period before being discarded to make way for the next fad that comes along (Mace, 2014; Redford et al., 2013). These new concepts often look “substantially like the old one but with a snappy new name”, and “regularly rejecting, reinventing and repackaging approaches”, and this is detrimental for three key reasons: firstly, we fail to learn the lessons from the failures of previous approaches (Jones, 2018); secondly, funders withdraw support for established work in favour of more exciting sounding projects; and thirdly, fuzzy definitions are more open to broad interpretation and can therefore be easily manipulated, allowing poor conservation decisions to sit under the umbrella of a popular, but ill-conceived term. Consequently, unclear or duplicated definitions encourage a meaningless fragmentation of the scientific literature, making a global assessment of a body of work more difficult, creating yet more barriers to progress. For example, a controlled vocabulary is acknowledged as fundamental to the statistical sciences as it facilitates easier access to information on a specific topic (OECD statistics portal: <https://stats.oecd.org/glossary/detail.asp?ID=6260>). The importance of precise definitions was recognised by the IUCN Reintroduction Specialist Group (now Conservation Translocation Specialist Group) (Dalrymple and Moehrensclager, 2013; IUCN/SSC, 2013), which clearly describes distinctive conservation translocations as reintroduction, reinforcement, assisted colonisation or ecological replacement depending on the existence of extant populations, release sites within or outside indigenous range, and desired ecological roles (Armstrong et al., 2019). The IUCN Guidelines for Reintroductions and Other Conservation Translocations have already been incorporated into policy by the Council of Europe and by national governments such as Scotland, Spain, and Canada (Armstrong et al., 2019). These precedents can serve to inform current debates on definitions within the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (Jones, 2018).

3. The evolution of rewilding

The term rewilding was arguably conceived to promote the original authors’ view of conservation via cores [habitats], corridors, and carnivores (Soulé and Noss, 1998), although that ignores the long held use of the term in India and Africa to describe the process of rehabilitating captive predators to life back in the wild (YJ, KR, KM *pers. obs.*). In the Soulé and Noss (1998) context, ‘rewilding’ referred to conservation and management interventions that focused on reintroducing keystone predators and ensuring that they had sufficient interconnected space to live. The authors emphasized within their original work that rewilding was “one essential element in most efforts to *restore* fully functioning ecosystems” (Soulé and Noss, 1998). As such, it is clear that rewilding was originally aimed to be a term that referred to one component of ecological restoration.

Since its original conception, the use of ‘rewilding’ has changed with

the development of more specific definitions tailored to fit particular ecological scenarios. One of the first of these changes was the emergence of the concept of Pleistocene rewilding (Donlan et al., 2005). “Pleistocene rewilding” (the restoration of ecological processes lost in the late Pleistocene via the translocation of extant, ecologically equivalent species; Donlan et al., 2006) evolved from the original use of ‘rewilding’ because the original Pleistocene species have often become extinct, and therefore Pleistocene rewilding relies on introducing substitute species into novel environments (Caro, 2007).

As in Pleistocene rewilding, translocating substitute species to fill vacant ecological niches left by extinct species is also a cornerstone of another composite term - ‘island rewilding’ (Hansen, 2010). In contrast, “passive rewilding” emerged in Europe following rural land abandonment when novel land management without expensive human investment was needed (Navarro and Pereira, 2012). Here, the term referred to a strategy whereby natural succession was allowed to follow its own course with the unaided colonisation of wild species. Used in this context, rewilding does not refer to the process of translocating substitute or locally extinct species to fill vacant ecological niches left by extinct or exterminated species, as it did in both Pleistocene rewilding and island rewilding. The term had also lost its original reference to restoring predators. “Trophic rewilding” (restoring top-down trophic interactions and cascades via translocations; Svenning et al., 2016) and “ecological rewilding” (restoration of ecological processes; Corlett, 2016) are also types of rewilding described in the literature. Clearly, the use of ‘rewilding’ in such a vast range of contexts causes its meaning to shift. As Jørgensen (2015) summarised, “The original specific meaning of rewilding as ‘cores, corridors, and carnivores’ has been replaced with a focus on species reintroduction or taxon replacement, often of herbivores” and this problem of vague definition and weak scientific basis has been highlighted elsewhere (Nogués-Bravo et al., 2016).

The latest definition of rewilding comes from Pettorelli et al. (2018) as “the reorganisation of biota and ecosystem processes to set an identified social–ecological system on a preferred trajectory, leading to the self-sustaining provision of ecosystem services with minimal ongoing management”. The more inclusive linking of nature and society is an important feature of this new definition that acknowledges Jørgensen’s (2015) work on defining rewilding. However, as we argue below, just as the original definition of rewilding is, at its core, another term for restoration, so too is the definition from Pettorelli et al. (2018).

4. No change from restoration?

Despite the evolution and expansion of the term ‘rewilding’, this term in all its forms is arguably indistinguishable to the preceding terms, restoration or translocation. Early definitions of restoration describe the practice as “the process of repairing damage caused by humans to the diversity and dynamics of indigenous ecosystems” (Jackson et al., 1995). Although at the time of this definition, restoration science was still developing, it was clear that it had established itself under the broad banner of repairing damaged ecosystems. The International Standards for the Practice of Ecological Restoration specifies the principles and key concepts of restoration. When the early rewilding definitions were created, restoration was defined as “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed” (Society for Ecology Restoration International Science and Policy Working Group, 2004). This is clearly sufficiently broad to encompass virtually all existing rewilding definitions. More recently, restoration has been defined as “any activity whose aim it is to ultimately achieve ecosystem recovery, insofar as possible and relative to an appropriate local native model (termed here a reference ecosystem), regardless of the period of time required to achieve the recovery outcome” (McDonald et al., 2016).

Close scrutiny reveals that Pettorelli et al.’s (2018) new rewilding definition is no different in principle from that of ecological restoration. Restoration requires a justification of the need and is thereby akin to

Pettorelli et al.’s rewilding definition of setting an ecosystem on a preferred trajectory. Restoration often uses an ecological approach that “concentrates on processes”, which is akin to rewilding involving the reorganisation of biota and ecosystem processes (Jackson et al., 1995). Finally, restoration has long recognised that a ‘species-only’ approach will likely fail (Jackson et al., 1995). Hence rewilding’s multi-species focus on the ‘biota and ecosystem processes’ is again not new (e.g., Armstrong et al., 2019).

Another useful approach to evaluating whether rewilding offers a novel heuristic is to examine whether the objectives and practices of rewilding projects are distinguishable from those of restoration projects. Pettorelli et al. (2018) list a suite of projects they claim as falling within the definition of rewilding, but close scrutiny of this list (below) reveals that the vast majority did not start out under the term ‘rewilding’. The reintroduction of wolves *Canis lupus* to Yellowstone was originally justified “because the US Endangered Species Act of 1973 called for their restoration, and the US National Park Service policy called for restoring natural conditions” (Smith and Bangs, 2009). The Pleistocene Park in Siberian Russia hoped to “see the ecosystem restored over much larger areas in an effort to stave off what otherwise could be a massive release of carbon that now is sequestered in the permafrost” (Zimov, 2005). Frans Vera’s Oostvaardersplassen experiment was designed to test the prevailing view of the closed nature of the original European broadleaved forests, and aimed for “a more complete ecosystem” by restoring species missing from an artificially created area using extant species or ecological substitutes (Vera, 2009). Although Burney and Burney (2007) define their project as ‘island rewilding’, the study itself is framed as one in restoration and their proposals to move plant species beyond their existing distributions to areas where they occurred in the Pleistocene are essentially reintroductions (as defined by the IUCN Reintroduction Specialist Group; Armstrong et al., 2019; IUCN/SSC, 2013; and Seddon et al., 2014). Any project supported by Rewilding Europe has been rebranded as rewilding following the organisations’ reincarnation from the Wild Europe Field Programme that originally (i.e., in 2009) aimed to restore Europe’s variety of life in abandoned fields by excluding human infrastructure and extractive industries (<https://www.wildeurope.org/index.php/restoration/rewilding-europe-programme>). The Devon Beaver Project consists of two elements, namely a small fenced enclosure with a pair of beavers *Castor castor* and two families of illegally translocated beavers being allowed to remain in the River Otter (Devon Wildlife Trust, Undated). The project has been reframed *post hoc* as a rewilding project (Pettorelli et al., 2018), but could have been categorised equally readily as a species reintroduction within an ecological restoration project.

Given that proponents of rewilding regularly rebrand historical restoration projects (as shown above), it is worth considering which other restoration projects could be relabelled as rewilding. Four come to mind. South Africans set out to create new national parks at Pilanesberg and Madikwe by reintroducing thousands of animals from dozens of species, and while they referred to them as restoration projects, they could be potentially relabelled as rewilding projects (Hofmeyr, 1997; Hofmeyr et al., 2003). The same applies to the reintroduction of large predators to South Africa’s Eastern Cape, which was conducted simply to restore the top-down regulatory roles these species perform and improve threatened species conservation (Hayward et al., 2007). The eradication of introduced eastern grey squirrels *Sciurus carolinensis* on the Isle of Anglesey (U.K.) and the subsequent reintroduction of native red squirrels *S. vulgaris* by the Red Squirrel Trust Wales could be rebranded as a rewilding project. Finally, in Australia, the Australian Wildlife Conservancy has restored thousands of hectares of land by reintroducing missing faunal components, yet only mentions the term ‘rewilding’ on three occasions within its extensive website (www.australianwildlife.org @ 1/11/2018).

Given the lack of clear differences between rewilding and restoration in both definition and practice, we see little need for these competing terms within scientific discourse. Pettorelli et al. (2018) state

that much more work and research is required to make rewilding useable in government policy. While we agree that further research and reassessment of all restoration projects is needed (as it is a growing and evolving field that seeks continual improvement), we caution against the introduction of a new vocabulary into policy, when the fields of restoration and translocation are already so heavily established and professionalised (i.e., over 30 years ago) and the distinction between each of these and rewilding is unclear.

5. It's in the values, not the ecology

While we see little difference in the explicit ecology or practice of rewilding and restoration, there is an apparent difference in the underlying social values that are implicit in the different approaches. Restoration ecology is very clear about being a human action to reach a human determined goal. Restoration aligns with the ecosystem services or nature-based solutions discourses that focus on delivering tangible or intangible benefits to humans and therefore implicitly acknowledges that humans are active participants in a linked social-ecological system. While rewilding is very fuzzy and contradictory about most aspects of its ecological goals and practices, one consistent aspect is that it aims to exclude ongoing human intervention from the resulting state, thus not recognising human agency as a legitimate part of the resulting “rewilded” system. As such, rewilding aligns more closely with various animal rights or emerging compassionate conservation discourses, and in some contexts is used as an ecological justification of these approaches that have previously been fronted as ethics-based ideas. This makes it a highly controversial approach, especially with rural stakeholders and traditional users of the lands that are being targeted for rewilding.

The attraction of the term rewilding can also be seen as a failure of restoration science. The concept of rewilding was borne out of a response to the tendency for restoration science to mainly focus on vegetation and ignore the fauna that is such an important component of understanding and restoring functional ecosystems (Catterall, 2018; Pausas and Bond, *In press*). Rewilding is clearly centred on the roles that fauna (especially large mammals) play in ecosystem function in the absence of human intervention (i.e., ignoring the role humans have played in structuring ecosystems since our evolution, or the ecosystem services that we need to continue exploiting for our future survival). Nonetheless, restoration's focus on vegetation is an artefact of the individual practitioner/scientist focus rather than a consequence of its disciplinary structure definition. The definitions of restoration have always been broad enough to incorporate fauna. Therefore, rather than adopting a new term with copious definitions that lack clarity, this debate can be used as an opportunity to adaptively improve current restoration practice by incorporating a more equal focus between flora and fauna.

6. Conclusion

Rewilding is a term with the potential to excite and engage the masses with its links to wolves, mammoths and mastodons; and because the call for re-establishing “wild” places fits to a perception of nature that many modern day humans can relate to (e.g., Kirchhoff and Vicenzotti, 2014). However, the confusion that arose with imprecise definitions of translocation and reintroduction (described in Section 1; Seddon et al., 2007) illustrates the problems of imprecise definitions for both the scientific community, conservation practitioners and the general public. Hence, the fact that so many definitions of rewilding exist illustrate its lack of validity within scientific discourse and, without clarity, scientific messages cannot be transferred accurately to formal policy frameworks or conservation practice. As it stands, rewilding is, at best, a faunal-focused form of ‘hands-off’ restoration, on average a synonym for restoration itself, and at worst a highly controversial and unattainable policy dead-end and distraction from more

realistic alternatives. If ‘rewilding’ projects fail because they are not undertaken with the rigour and scientific policy afforded to restoration projects, then this term risks driving away public support for all ecological restoration, not just those projects involving fauna, and the lessons of Jørgensen (2015) have not been recognised.

The principals of restoration or reintroduction science are already well-established and underpinned by a clear understanding of best practice (involving clear goals, monitoring and an acknowledgement of humanity's role in environmental structuring). To introduce a new, poorly defined term that has the potential to replace well-established scientific practice, is counter-productive to achieving successful conservation action. Consequently, we suggest that the term rewilding should not be accepted within scientific, policy or conservation discourse, and instead urge the retention of the long-established term restoration.

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