

# The Decade on Ecosystem Restoration is an impetus to get it right

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Cooke, Bennett, and Jones (2019) raise valid concerns about the current state of the (in some ways) nascent field of ecological restoration. They are particularly concerned that monitoring for measurable restoration achievements (evidence-based science) has lagged behind other aspects of restoration practice. They suggest that a decade focused on restoration could lead to wasted resources, continued habitat destruction, and perceptions of conservation failure. They offer a series of proposals designed to improve learning and outcomes. We applaud Cooke et al. (2019) for these proposals, which are sound advice. However, we take exception to their pessimism and narrow view of restoration.

We largely agree with Cooke et al. (2019) that the current success rate for restoration is often not as high as we might like. However, we disagree that the world is not ready for the UN Decade on Ecosystem Restoration. A Decade on Ecosystem Restoration can serve as the critical incentive to improve on the shortcomings of restoration practice highlighted by Cooke et al. (2019), establish more realistic goals regarding what gains we might achieve through restoration, and broaden the scope of restoration.

There is a certain amount of puffery in the UN declaration that the Decade “aims to *massively* scale up the restoration of degraded and destroyed ecosystems as a *proven* measure to fight climate change, and enhance food security, water supply and biodiversity” (italics ours). This should not be taken to mean that we can simply apply current levels of knowledge and techniques.

Nevertheless, as humans impact every corner of our planet, what choice do we have but to engage in restoring nature? Protection efforts and restoration are critical partners in the conservation of nature. Conservation often focuses on protecting as much nature as possible under the threat of habitat loss and degradation. Restoration seeks to advance conservation by rebuilding nature (Figure 1). Opportunities to restore nature arise as humans increasingly impact nature. Increasing fractions of the world are past the stage where protecting intact natural systems is the primary mode of conservation and into one where restoring ecological composition, structure, and function provides the greatest hope for nature. Further, we need to broaden participation to include restoration ecology as part of a restorative culture (Cross, Nevill, Dixon, & Aronson, 2019).

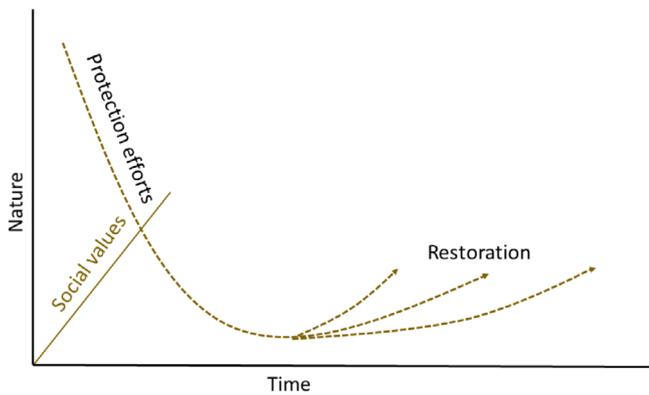
We focus on three, more hopeful, points: (a) although far from perfect, ecological restoration has made great headway as a science, with and sometimes without formal measures of evidence-based success; (b) partial restoration success is common and is not necessarily a failure; and (c) we ought not allow imperfections in knowledge and execution preclude what the planet needs, and that is serious dedication to restoring degraded systems.

Cooke et al. (2019) suggest that restoration is as much an art as it is a science. We suggest that creative exploration (art) is at the heart of science. Art and science are both blends of judicious use of creativity, judgment, and experimentation to improve understanding. However,

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**FIGURE 1** A caricature of the changing focus of conservation effort through time. Beginning from an initial point of high abundance of natural habitat humans drive the loss of nature (genetic variation, species, ecosystems, ecosystem functions). Conservation efforts during this period of loss are dominated by efforts to protect important components of nature. Restoration comes to dominate after local saturation of human impact. Restoration requires a socially recognized desire to regain aspects of nature that protection efforts have failed to provide. Restoring natural structure, composition or function of ecosystems interacts with social values to produce several different potential objectives of restoration

there is a subjectivity in art that becomes uncomfortable when evaluating restoration success. We agree that better monitoring for restoration effectiveness (and *cost-effectiveness*) is a top priority. But this should not justify putting a pause on large-scale commitment to restoration at this critical moment in human history.

It is true that many restoration projects lack meaningful long-term assessment, and this slows progress toward more effective restoration. However, there are guidelines to help with improve the practice of monitoring (e.g., Gann et al., 2019). Furthermore, careful planning of the social context and perceived benefits of monitoring is required (Sanchirico, Springborn, Schwartz, & Doerr, 2014). Engaging people in restoring and monitoring their habitats is essential to scale to the magnitude envisioned by the UN declaration (Cross et al., 2019).

There has been considerable progress in understanding what works to improving the social and institutional context to facilitate restoration success. Based on our experience from the United States, we can report that from coniferous reforestation efforts of private companies and the U.S. Forest Service, to projects by Trout Unlimited and Ducks Unlimited, we now have solid examples of accountable restoration, albeit often with limited (species-specific, anthropocentric) goals. Mitigations mandated by the U.S. Endangered Species Act have been plagued by less-than-impressive success rates, but these

are improving as regulatory agencies raise the bar of evidence-based results. We agree with Cooke et al. (2019) there remain too many examples of projects lacking objectives and accountability, resulting in achievements that fall short of expectations. We suspect that this is as often due to social factors, such as limited budgets and short contract periods, as to limited scientific knowledge. Nevertheless, restoration is moving in the right direction at a steady (if patchy) pace. We have personally seen steady increases in the effectiveness of grassland restoration in California and Missouri.

A related issue is the labels we use in assessing restoration projects. There is a tendency to label as failures restoration projects that achieve some but not all of their goals. This underestimates restoration success. Do tallgrass restorations that establish 50% of the species of an original (remnant) prairie (Sluis, Bowles, & Jones, 2018) or achieve 50% of mitigation goals for wetlands (Van den Bosch & Matthews, 2017) represent a (50%) success or a (50%) failure? How much should restoring natural functions within working landscapes count? If it is not possible to restore all elements of an ecosystem, should we not bother to restore the components of ecosystems that we can? Even partial restoration can achieve critical ecosystem goals (increasing native species, reducing soil erosion, improving water quality, increasing livestock forage, sequestering carbon, increasing connectivity among critical populations).

The “Decade on Ecosystem Restoration” need not presuppose that we already know how to get it right. Rather, it can be the spur to incentivize better establishment of objectives, jump-start implementation, demand smarter monitoring and better accountability, further research and analysis into restoration effectiveness, and create better integration among society, practitioners, and scientists. Even now, the leading restoration journals (e.g., *Restoration Ecology*) contain papers each issue demonstrating improved techniques for outcomes and assessments. But yes, these are often presented in isolation; integration and syntheses are needed.

If not now, when? Do we need to get the treatment of cancers “right” before we engage in a concerted effort to make the world cancer-free? A sizeable fraction of the world has transitioned away from a dominant focus on conservation strategies emphasizing the prevention of losses in the natural world. The declaration of a Decade on Ecosystem Restoration focuses our attention on that component of conservation that seeks to improve the condition of nature in compromised ecosystems (Figure 1).

There will always be limits to our ability to fully restore ecosystems. Defining objectives and assuring accountability might always be a challenge. Delaying

concerted restoration efforts until we meet a potentially unachievable threshold of certainty undersells our capacity and potential. Is there a restoration need? Yes, as never before. Should we use this decade to improve and step up our efforts? Yes. We have already delayed longer than we should.

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