

RESPONSE ARTICLE

# The SER Standards: a globally relevant and inclusive tool for improving restoration practice—a reply to Higgs et al.

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In response to a critique by Higgs et al., this article clarifies the content and intent of the Society for Ecological Restoration's (SER) *International Standards for the Practice of Ecological Restoration*. Higgs et al. expressed concern that the SER Standards are not sufficiently underpinned by principles and risk disenfranchising some practitioners by narrowing what qualifies as ecological restoration. To demonstrate that these concerns are unfounded, we discuss the policy context and principles on which the Standards are based, its organizational structure, the innovative and inclusive approach used for development, and highlight significant errata by Higgs et al.

**Key words:** ecological restoration targets, global restoration policy, reference ecosystems, restoration principles, restoration standards, restorative continuum

## Implications for Practice

- Ecological restoration standards are imperative as restoration funding and implementation are scaled up globally. Standards can reduce uncertainty and increase restoration effectiveness both ecologically and economically.
- The SER Standards emphasize consideration of temporal dynamics of ecosystems, including current and anticipated environmental change, in identifying appropriate native reference models for ecological restoration. This approach optimizes potential long-term persistence of substantial, sustainable, and resilient native ecosystems worldwide.
- Combining high standards for ecological restoration, where native ecosystems are an appropriate target, with acknowledgment of the restorative benefits of all environmental repair efforts along a restorative continuum, promotes an integrated “restorative” effort maximizing benefits and opportunities across biomes and continents. The SER Standards provide a sound framework for global, national, and regional restoration policies.

## Introduction

In December 2016, the Society for Ecological Restoration (SER) launched its *International Standards for the Practice of Ecological Restoration: Including Principles and Key Concepts* (hereafter SER Standards; McDonald et al. 2016a). The SER Standards are a timely response to rapidly increasing

global restoration commitments, such as REDD+ and the Bonn Challenge, necessitating workable frameworks for effective restoration planning, investment, and implementation. To date, many large restoration programs, however well intentioned, have underperformed or failed (Bernhardt et al. 2005; Hajkovicz 2009; Pe'er et al. 2014; Murcia et al. 2016). Without clear, agreed-upon standards underpinning restoration projects, there is substantial risk of collateral damage, globally, to ecosystems and indigenous biodiversity. For instance, without

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clear and rigorous standards, even large-scale monocultural stands of bamboo in South America and Africa (e.g. Rebelo & Buckingham 2015; Faruqi et al. 2018) could be considered ecological restoration. Indeed, such proposals are already emerging in the context of terrestrial carbon sequestration efforts. While the SER Standards are intended to assist restoration practitioners, policymakers can also use them to improve decision-making, including allocation of scarce funding. A 2017 assessment of biodiversity and large-scale restoration efforts indicates that it “is in the self-interest of countries to define appropriate safeguards at the national level and *to mandate the application of respected standards* and certification schemes” and that such standards could reduce risk (Pistorius & Kiff 2017, p 3, emphasis added).

Developed under the auspices of SER’s Science and Policy Committee, the SER Standards were deliberately structured as a living document, to be improved in response to ongoing feedback. This extends to the critique by Higgs et al. (2018), which focuses on two core concerns: (1) the relationship of standards to principles and (2) ensuring that restoration remains open and flexible to encourage innovation and support practitioners. While we do not agree with all the arguments in Higgs et al. (2018), we do share some concerns, including several raised by other stakeholders, and these issues are already being addressed as part of the ongoing revision process. Here, we discuss the concerns, as well as errata, in Higgs et al. (2018).

### The SER Standards Operationalize the Principles of Ecological Restoration

Higgs et al. (2018) assert that principles should come before and underpin standards. Their suggested framework, however, is only one of many ways to present guidance information for ecological restoration. For instance, both the 2030 United Nations Sustainable Development Goals (SDGs) and the Convention on Biological Diversity’s (CBD) 2011–2020 Aichi Targets start with goals, not principles. The SER Standards are currently structured in a modular rather than hierarchical format (e.g. principles, then guidelines, then best practices nested underneath). This modular structure is more easily adaptable based on trial and learning and input from stakeholders.

In addition, Higgs et al. (2018) state that standards and metrics are less useful than general principles that allow the exercise of professional judgment. However, in many cases, metrics are essential to measure progress toward specific targets and agreed upon legal obligations and can lead to important advances in the field. For example, countries receiving external resources for ecological restoration projects must demonstrate evidence of measurable success. Although the Aichi targets and SDGs are soft-law instruments, they nonetheless provide metrics through which progress can be measured. Furthermore, the CBD targets themselves have driven innovation as countries wrestle with the challenges of meeting targets (European Union 2011). Rather than leading to perfunctory “box-ticking” (Higgs et al.

2018), the SER Standards juxtapose high aspiration, realistic goal-setting, and transparent reporting. For example, restoration projects, including those at severely modified sites where full recovery is most often not an appropriate goal, have benefited from the improved capacity to define and evaluate their ecosystem’s attributes (McDonald et al. 2016b; McDonald & Dixon 2018).

The SER Standards are voluntary and aspirational. This does not preclude, however, their use in the future for deciding what qualifies as ecological restoration for legal or regulatory purposes (e.g. Telesetsky et al. 2017). As the restoration sector, both public and private, matures and as economic and social stakes increase, measurable standards may be required to prevent governments or practitioners from merely “ticking the box” to reach international commitments or legal obligations.

Higgs et al. (2018) argue that the principles underpinning ecological restoration standards should be those published in the joint World Commission on Protected Areas-SER *Ecological Restoration for Protected Areas* (Keenleyside et al. 2012). These principles, which state that to be successful ecological restoration should be *efficient*, *effective*, and *engaging*, are fully endorsed and highlighted in the SER Standards (Introduction, Appendix 1) and were used to develop the SER Standards’ six key concepts, along with a rich collection of other sources including the SER Primer (Society for Ecological Restoration International Science & Policy Working Group 2004), Clewell (2009), and Clewell and Aronson (2013). The six key concepts encompass and expand the three principles in Keenleyside et al. (2012). The SER Standards key concepts also draw heavily from advances in the field of restoration ecology, including increased recognition that restoration activities and targets must be consistent with the inherently dynamic nature of ecosystems. SER is in the process of reviewing all existing principles (e.g. Suding et al. 2015) along with all comments received, to improve subsequent editions of the SER Standards.

Higgs et al. (2018) also recommend greater incorporation of SER’s Code of Ethics (SER 2013) in the SER Standards. We agree that SER’s Code of Ethics encourages “a culture of practice that rests on best-available knowledge and techniques, sensitivity to the human communities engaged with the ecosystems being restored, and humility” (Higgs et al. 2018). Although the SER Standards do address ethical underpinnings of ecological restoration, additional elements from this document could be added.

### The SER Standards Clarify the Concept of Ecological Restoration in a Changing World

Higgs et al. (2018) express concern that the SER Standards model of ecological restoration risks “... disenfranchising restoration practitioners and allowing a growing range of practices to lie outside the ambit of restoration” and that “much of what is practiced as restoration in heavily transformed landscapes” in places like Europe, Australia, and Africa would fall outside of ecological restoration. However, the SER Standards

encourage recovery “insofar as possible” and emphasize that native reference ecosystems are *models* that take environmental change into account (see key concept 1, p. 11), thereby aligning with principle 1 in Keenleyside et al. (2012) and principle 1 in Suding et al. (2015). The concept of native ecosystems in the SER Standards includes well-recognized cultural ecosystems that evolved with and rely on traditional ecological knowledge and management. Where change is extreme, the SER Standards recommend readiness to redirect the trajectory of ecosystems along with changing environmental conditions (Falk 2017). This flexibility and openness to change are contrary to the characterization by Higgs et al. (2018) of the SER Standards as narrow and prescriptive.

### The SER Standards Facilitate Innovation

Higgs et al. (2018) argue that “innovation in restoration practice . . . may well be suppressed by increasingly defined and rigid performance standards.” We consider the contention that having clear standards suppresses innovation as wholly without evidence or foundation. On the contrary, many areas of recent technological development (e.g. vehicle fuel economy and pollution reduction, solar panel and wind turbine efficiency, aircraft safety) have been stimulated precisely by the need to meet new and emerging standards. Furthermore, the SER Standards include three new conceptual tools designed to facilitate innovation in restoration planning, implementation, and monitoring: the restorative continuum, the five-star scale, and the recovery wheel.

#### The Restorative Continuum

We agree with Higgs et al. (2018) that native ecosystems may not always be an appropriate target for environmental repair and that a mix of activities is generally needed across degraded and fragmented landscapes (Aronson et al. 2017). This perspective is emphasized in the SER Standards, which utilize a “restorative continuum” to articulate the relative and complementary benefits of a broad range of environmental repair activities (e.g. agroforestry and regenerative agriculture in degraded lands). Ecological restoration and these activities, working together, allow for cumulative positive feedbacks for delivery of both biodiversity conservation and ecosystem services. It is important, however, to clarify that intentional activities that are not restorative at all (e.g. afforestation of native grasslands or replacement of species-rich forests with monospecific plantations; see Faruqi et al. 2018) should not be included on the continuum. While Higgs et al. (2018) argue that the SER Standards narrow the field of restoration, the restorative continuum actually profoundly expands the types of activities and projects that can be considered to be related and allied to ecological restoration.

#### Five-Star Scale and the Recovery Wheel

Higgs et al. (2018) posit that “The peril of trying to convert qualitative ideas into quantitative measures is a central problem in

the SER Standards. For example, Table 3 of the SER Standards leads to what might look like an ordination.” The caption of table 3 (p. 21), however, states that it “provides a generic framework only; requiring users to develop indicators and a monitoring metric specific to the ecosystem and sub-attributes identified.” Opposite of being an ordination, the five-star scale and the recovery wheel described in tables 2 and 3 are “generic in nature and should be interpreted more specifically by managers to suit their specific ecosystem or project.” They are not intended as a formal research tool to compare data from a large number of sites or projects. Instead, the recovery wheel and five-star scale are used to identify the appropriate level of recovery that might be attempted at a site (relative to its reference model) and to track the level of recovery with project maturation.

### The SER Standards Are Global, Inclusive, and Evolving

The SER Standards were launched in 2016 at the CBD Conference of the Parties (COP13) in Cancún, Mexico. This event brought together key stakeholders, many of whom had been instrumental in driving the global initiatives to implement large-scale “restoration” (Gann 2017). The launch included an open invitation for input from stakeholders, both to improve the document and to promote acceptance. Since the launch, SER has engaged in important activities to ensure that the SER Standards would be a “living document.” Key stakeholders were contacted for comment (e.g. the secretariats of CBD, Global Environment Facility, and the World Bank; and members of the Global Partnership on Forest Landscape Restoration). In 2017, SER partnered with IUCN’s Commission on Ecosystem Management to deliver an invited Forum on Biodiversity and Global Forest Restoration at which the SER Standards were reviewed (SER and IUCN-CEM 2018). SER also organized a symposium and an open Knowledge Café on the SER Standards at its 2017 World Conference. SER invited feedback via its website and an online survey sent to more than 21,000 SER members, affiliates, and stakeholders. As a result, SER has identified four key thematic priorities for the first revision: (1) improving the restorative continuum with respect to the ecosystem-landscape nexus, (2) clarifying and expanding the text related to restoration targets so that readers better understand the need to allow for temporal change, (3) strengthening the discussion of cultural-social elements including traditional cultural ecosystems and seminatural ecosystems, and (4) considering provenance issues for seeds and other propagules. In addition, SER is working on complementary products, including translations in multiple languages, and the development of standards tailored to specific biomes, nations, and regions.

### Higgs et al.’s (2018) Errata: Definition of Restoration and Conflation of Standards with Rules

Higgs et al. (2018) suggest that recent policy guidance from the United Nations Convention to Combat Desertification (Orr

et al. 2017; Cowie et al. 2018) is based on the SER Standards. However, a careful reading indicates this is not the case. Rather, Orr et al. (2017) cite the SER Standards along with the SER Primer in their presentation of definitions of restoration and rehabilitation, neither of which match the definitions in the SER Standards. The phrase quoted by Higgs et al. (2018) that restoration seeks to reestablish “pre-existing biotic integrity, in terms of species composition and community structure” was extracted from a discussion of rehabilitation in the SER Primer and is unrelated to the SER Standards. Unfortunately, Cowie et al. (2018), in their discussion of the difference between restoration and rehabilitation, cited the SER Standards in error, which was subsequently amplified by Higgs et al. (2018).

In addition, Higgs et al. (2018) cite a debate within the Institute of Chartered Accountants of England and Wales about principles versus standards (ICAEW 2018). In fact, the conversation within ICAEW is about principles versus *rules*. Bagshaw (2006) recommended principles-based (versus rule-based) financial auditing *standards*. ICAEW does not argue that principles alone are adequate for the financial auditing industry, nor that these alone will lead to favorable professional behavior. Many of the other criticisms of standards in Higgs et al. (2018) are based on this conflation between rules and standards; as the SER Standards are based on and consistent with principles (not rules), those criticisms must be set aside.

## Conclusion

The SER Standards clarify the concept of ecological restoration in a changing world and the need to design reference models that are consistent with the temporal dynamics of ecosystems. Guidelines in the SER Standards support continued improvement in the practice of ecological restoration, allowing practitioners to navigate future environmental conditions. In addition, the SER Standards reassert the relevance and importance of native ecosystems as models for their intrinsic and human values. Rather than stifling innovation, the SER Standards are organized in a modular fashion to both promote and accommodate changes in understanding, stakeholder feedback, and real-world experience.

## Acknowledgments

We thank J. Jonson, D. Simberloff, A. Ricciardi, and N. Goodwin for helpful comments on early drafts of this article.

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*Coordinating Editor: Margaret Palmer*

*Received: 22 March, 2018; First decision: 29 March, 2018; Revised: 4 April, 2018; Accepted: 6 April, 2018*