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Title: The Evolution of SER's (Principles) and Standards – Reply to Gann et al.

Running head: Reply to Gann et al.

Authors:

Eric Higgs, University of Victoria, School of Environmental Studies, Victoria, BC, CAN; and Groningen Institute for Evolutionary Life Sciences, University of Groningen, NL

Jim Harris, Cranfield University, Cranfield Institute for Resilient Futures Cranfield, UK

Steve Murphy, University of Waterloo, School of Environment, Resources, and Sustainability, Waterloo, ON, CAN

Keith Bowers, Biohabitats, Inc., Charleston, SC, USA

Richard Hobbs, University of Western Australia, Plant Biology, Perth, WA, AUS

Willis Jenkins, University of Virginia, Charlottesville, VA, USA

Jeremy Kidwell, University of Birmingham, Department of Tehology and Religion, Birmingham, UK

Nik Lopoukhine, Ottawa, CAN

Bethany Sollereder, Faculty of Theology and Religion, University of Oxford, UK

Katie Suding, University of Colorado, Boulder, Institute of Arctic and Alpine Research, Boulder, CO, USA

Allen Thompson, Oregon State University, School of History, Philosophy & Religion Corvallis, USA

Steve Whisenant, Texas A&M University, Ecosystem Science and Management, College Station, TX, USA

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Author contributions

EH, SM, JH, and RH conceived and wrote the article; KB, WJ, JK, NL, BS, KS, AT, and SW contributed content and edited the article.

Abstract

In response to our recent article (Higgs et al. 2018) in these pages George Gann and his co-authors defended the SER International Standards, clarified several points, and introduced some new perspectives. We offer this counter response to address some of these perspectives. More than anything, our aims are in sharpening up the field of restoration in a time of rapid scaling up of interest and effort, and support further constructive dialogue going forward. Our perspective remains that there is an important distinction needed between "Standards" and "Principles" that is largely unheeded by Gann et al. (2018). We encourage SER to consider in future iterations of its senior policy document to lean on principles first, and then to issue advice on standards that meet the needs of diverse conditions and social, economic, and political realities.

Implications for practice

- Constructive dialogue, extensive and diverse consultation, careful assessment of scientific evidence, detailed reviews, and transparent process, are essential in guiding restoration policy and practice especially during a time of rapid change and scaling up of restoration effort.
- A principles-first approach can be consistent with a standards approach, and offers a clear moral structure to restoration guidance.

- International agreements such as the Convention on Biological Diversity, the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services, and the Land Degradation Neutrality Framework of the UN Convention to Combat Desertification depend on restoration guidance that accounts for ecosystem and landscape legacies, and open and flexible approach to future trajectories across a wide variety of ecosystems and cultural perspectives.

Keywords

global restoration policy, ecological restoration targets, reference ecosystems, restoration standards, restoration principles

In response to our recent article (Higgs et al. 2018), Gann et al. (2018) defended the SER International Standards, clarified several points, and introduced some new perspectives. We offer this counter response with the aim of sharpening the field of restoration in a time of rapid scaling up of interest and effort.

We learned from Gann et al. that McDonald et al. (2016) was meant to be the first version of a living document. This was not clear to many of us, and Higgs et al. (2018) was written with the notion that revisions were needed. Strategically, we would have preferred there to be more discussions and internal reviews about such an important SER document before it was released. Indeed, we think the two years of international effort producing the IUCN restoration guidance on protected areas on which SER was a co-signatory (Keenleyside et al. 2012), might have been

leveraged more extensively, and SER's own Code of Ethics figured prominently. While vastly more complicated, international peer-reviewed processes such as the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES 2018), validated both by experts and governments, point the way to closer links between the best that restoration science can offer alongside advances in diverse practices. There is so much that can be gleaned from advances in our knowledge and techniques across the full interdisciplinary range that informs restoration, and this is how the field will evolve to meet existing and new responsibilities, challenges, and opportunities.

We acknowledge that the groups still seem to disagree on some points.

Our perspective remains that there is an important distinction between "Standards" and "Principles" that is largely unheeded by Gann et al. (2018). That distinction is consequential for how the responsibilities of restoration are understood, yet it is not addressed fully in the ambiguity over the "effective, efficient, and engaging" principles from Keenleyside et al. (2012) and the six new key concepts. We note that there was no serious consideration of our five recommendations (Higgs et al. 2018).

We remain unconvinced that the 2016 version avoids the temptation to bin ecosystems. Intriguingly, Gann et al. (2018) state "… measurable standards may be required to prevent governments or practitioners from merely 'ticking the box' to reach international commitments or legal obligations." However, this contradicts the original document it tries to defend. McDonald et al. (2016) created a series of what are, effectively, tick boxes—a 5-star system, a

recovery wheel, and a Restoration Continuum—that makes a clear break between 'Restorative Activities' and actual *bona fide* 'Ecological Restoration', and thus parting company with the 2004, internationally agreed, definition by changing ecological restoration from a *process* (a means) to a *product* (an end). We contend the messages in McDonald et al. (2016) and Gann et al. (2018) send mixed signals. The above-mentioned variants on the tick box scheme reinforce a prescriptive approach. And, for example, our perspective is that an erratum noted by Gann et al. (2018) – the Orr et al. (2017) and Cowie et al. (2018) conflations – arose because of those mixed messages.

A 5-star system suggests restoration puts an ecosystem on a pre-defined path rather than a trajectory of change. It is why Suding et al. (2004), Suding and Hobbs (2009), Standish et al. (2014), Suding et al. (2015), and Murphy (2018) focus on moving the measurement and management goals in restoration ecology to approaches that explicitly focus on proxy variables for resilience or alternative stable states because those better reflect open-ended trajectories where management choices must be made and must be explicit. It better reflects reference ecosystems that are not going to be 'historical' in any strict sense as a consequence of human caused climate change, development, or economics, because reference ecosystems can have multiple natural and culturally-driven stable states.

Because of the variation in context, the Standards should speak more to professional competencies expected rather than – as Aronson and Clewell (2013) cautioned against – trying to anticipate or compare and rank endpoints. We can see some regional value in setting more specific professional goals, but beyond that scale, any comparisons will fail because, for

example, what is relevant to northern Australia is not going to be relevant to northern Canada. Indeed, the Bonn Challenge, one of the main global policy drivers for restoration, explicitly acknowledges that "There is more than one way to restore," and works with a different perspective on what restoration is than that contained in the SER Standards. Similarly, the Convention on Biological Diversity's 2016 decision recommends the adoption of a "short-term action plan on ecosystem restoration as *a flexible framework and adaptable to national circumstances and legislation* [emphasis ours]."

The strong debate over SER Standards reflects the rapid, extensive, and exciting innovations across the entire field of ecological restoration. The conceptualization of what restoration is, what it can be, and what it should be has been challenged and shaken.

That's cathartic.

And, by definition, what follows catharsis?

Renewal and Restoration.

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Higgs, Eric

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