



## SHORT COMMUNICATION

# Richard J. Hobbs: how one ecologist has influenced the way we think about restoration ecology

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Professor Richard Hobbs has had a profound influence on the development of the discipline of restoration ecology. With more than 300 publications spanning a broad scope of applied ecological sciences, he has collaborated with hundreds of researchers. His sometimes-provocative insights, balanced by extensive empirical research, will have a lasting impact by encouraging people to think more broadly about the science and practice of ecological restoration. Here, on the eve of his retirement, some of his staff and students, past and present, take a retrospective look at his contributions to restoration ecology both as a scientist and as a mentor.

**Key words:** disturbance, ecologist, fragmentation, intervention ecology, landscape ecology, research significance, science policy gap

### Implications for Practice

- Richard J. Hobbs has coauthored 333 publications since embarking on a career in restoration ecology. Most publications and citations are for his contributions to restoration ecology, conservation biology, disturbance, invasion biology, biodiversity, fragmentation and landscape ecology. In total, his publications have been cited over 21,000 times (Scopus, 27 April, 2020).
- Richard's greatest hits—publications with more than 500 citations—are predominantly reviews and syntheses, yet his body of empirical research has informed these publications.
- While the perils of survivorship bias in science and academia make it difficult to draw lessons from Richard's career, it seems apparent that capacity for life-long learning, collaboration, observation and conceptual thinking have been key to Richard's influence on restoration ecology.

would like to honor his career achievements. Engaging in a retrospective, meaning to look back, is something restoration ecologists do to understand the history of a landscape and how to restore degraded ecosystems (Higgs et al. 2014). Yet rarely do we look back on the careers of living ecologists to assess their scientific, cultural and creative contributions to our young discipline. This article is intended to capture Richard's "greatest hits" in the same way a retrospective album is a compilation of a musician's greatest hits. We also reflect on Richard's approach to research and some of the leadership attributes that have made him so influential.

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### Introduction

Richard J. Hobbs, the most highly cited author in the field of restoration ecology, past president of the Ecological Society of Australia, lifetime member of the Ecological Society of America and past Chief Editor of *Restoration Ecology*, will retire this year. While he will likely keep writing and mentoring through his retirement, we, his past and present students and postdocs

Richard has published 333 journal articles, book chapters and books between 1981 and 2019 (Fig. 1). Reflecting the broad scope and quality of his contributions, his published articles have appeared in over 90 journals, including several of the discipline's most respected journals, such as *Trends in Ecology and Evolution* ( $n = 13$  articles), *Frontiers in Ecology and Environment* ( $n = 10$ ), and *Nature* journals ( $n = 7$ ). With a massive 21,856 citations, he has a particularly loyal following in the United States and Australia (7,372 and 4,099 citations respectively), and his  $h$ -index is 73 (Scopus, 27 April, 2020). The origins and development of the discipline of restoration ecology can be traced and understood through his publication history (Fig. 1).

## Contributions to Restoration Ecology

Solving problems and understanding complex socioecological systems is fundamental to ecological restoration. Restoration ecologists tend to rise to this challenge by working across disciplines. Richard has set a very high benchmark in this regard, drawing on social science, philosophy and economics, as well as exploring the full gamut of complexities within his own discipline of ecology. His ability to integrate across disciplines has led to landmark contributions in the field of restoration ecology, including the incorporation of threshold dynamics, landscape processes and resilience theory into restoration models and the recognition of paleoecological and social perspectives for restoration goal-setting (Fig. 1). He has explored these topics through field-based research in heathlands of his native Scotland, Californian grasslands and the woodlands of south-western Australia (Fig. 2). Additionally, Richard's contributions have been



Figure 2 Richard collecting data at what was to become a long-term experiment at Jasper Ridge Biological Preserve, California. He recently gifted the experiment to Lauren Hallett. Photo provided by Gillian Henderson.

inspired by his observations of landscapes elsewhere and by conversations with people working in these landscapes. He clearly had lots of conversations about restoration ecology, with no less than 221 coauthors over 36 years!

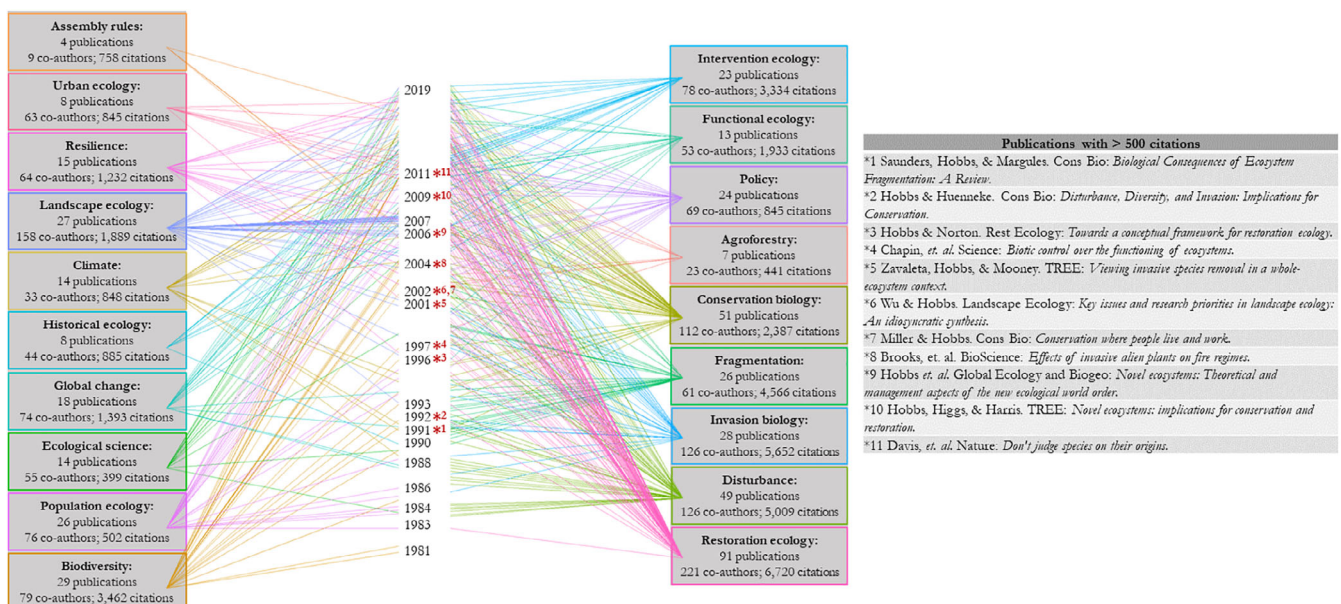


Figure 1 Richard J. Hobbs' 333 publications between 1981 and 2019 categorized by key topics (left) and his 11 greatest hits (publications with more than 500 citations; right). Red asterisks and numbers on the timeline indicated when the greatest hits were published. Data retrieved from Scopus on 31 January, 2020. Key words that define each topic are listed in Table S1.





Figure 3 Richard and his daughter Katie protesting the clearing of native banksia woodland for a new road near their home. Photo provided by Gillian Henderson.

### Data From Down Under

In addition to restoration ecology, Richard has made significant contributions to the allied topics of conservation biology, disturbance, invasion biology, landscape ecology and fragmentation (Fig. 1). These contributions were heavily informed by his

response to the hyper-diverse yet highly modified native ecosystems he encountered on arrival in south-western Australia in 1984. Here, he started research on familiar topics—fire and weeds (Hobbs & Atkins 1988, 1990, 1991) and, as his ecological knowledge expanded, he tackled the pressing environmental issues devastating the landscape and its people—fragmentation (Saunders et al. 1991; Hobbs 1993), secondary salinity (Cramer & Hobbs 2002, 2005), lock-in traps (Allison & Hobbs 2004) and land use legacies (Standish et al. 2006, 2008). In the beautiful yet imperiled wheatbelt landscape of south-western Australia he had found his muse. He shared some of these findings with the lucky undergraduate students who took his classes in restoration ecology at Murdoch University between 2000 and 2005. More broadly, his collaborative datasets from Down Under provided some unique tests of ecological theory (e.g. Hobbs & Mooney 1998; Hobbs 2001; Craig et al. 2012) and provided new insights to the rapidly developing field of restoration ecology (e.g. McIntyre & Hobbs 1999; Suding & Hobbs 2009).

### From Data to Conceptual Frameworks

Indeed, over time, Richard began to increase his contributions to the conceptual development of restoration ecology. The depth and breadth of his empirical research provided a solid foundation from which to make conceptual advances including synthetic articles on restoration and conservation (e.g. Hobbs & Harris 2001; Hobbs et al. 2018), wilderness stewardship (Hobbs et al. 2010) and novel ecosystems (Hobbs et al. 2006, 2009). Whom among restoration ecologists has not read his first paper to be published in *Restoration Ecology* (Hobbs & Norton 1996) on a conceptual framework for the discipline? Richard has an ability to distill key findings and perspectives from seemingly

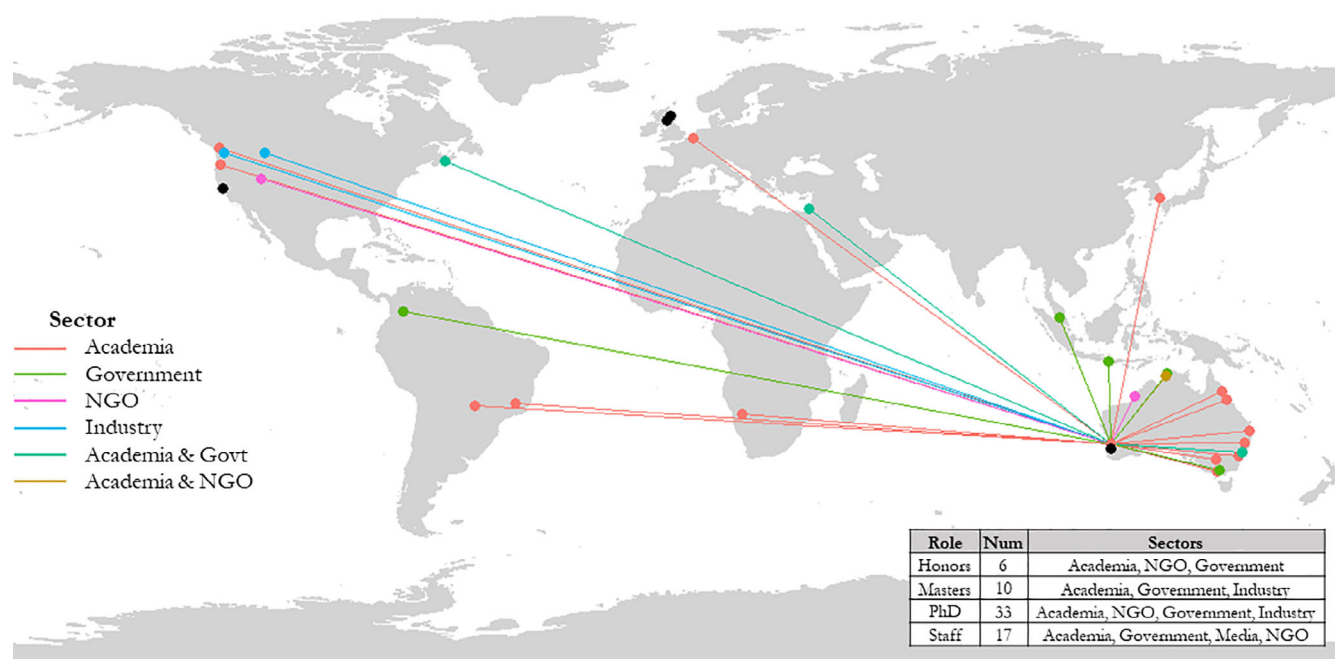


Figure 4 Map showing places where Richard has lived and worked (in black) and the current locations and vocations of his former staff and students.



Figure 5 Richard's research group at its peak in 2014, at The University of Western Australia. Front row: Rebecca Campbell, Tanya Hevrøy, Hilary Harrop-Archibald, Juan Garibello Peña, Mandy Trueman, Keren Raiter, Peter Grose, Kris Hulvey. Back row: Sueli Amprino, Mike Wysong, Christine Allen, Maggie Triska, Simon Kilbane, Melinda Moir, Sue Yates, Leonie Valentine, Michael Craig, Richard, Joanna Burgar, Jodi Price, Todd Erickson, Rachel Standish, Mark Gardener, Tim Morald, Lori Lach and Mike Perring.

complicated datasets or disparate viewpoints. This ability sets him apart from most as an effective science communicator. He writes well (particularly when unconstrained by the traditional bounds of scientific writing, for example, his contributions to the *Bulletins of the British Ecological Society* as their Southern Correspondent and more recently, his blogs at <https://www.the-nature-of-music.com/>). He uses the same storytelling style for oral presentations, using clever word play and strong take home messages to communicate ecology in a manner that invites rich discussions and inspires the audience to do great science.

### Environmental Policy

Effective science communication has paved the way for his more recent influence on environmental policy (Fig. 1). While Richard recognized early on in his career the need to bridge the gap between science and policy to make gains in biodiversity conservation, he believed politicians would be more likely to listen to a scientist with a body of evidence and lifetime experience than to one without (R.J. Hobbs 2005, personal communication). So, he focused on data first and policy later in his career. Over time, the data he collected made him acutely aware of the rapidly changing nature of the world (Hobbs & Hopkins 1991; Hobbs 1994; Harris et al. 2006; Hobbs et al. 2011; Weins & Hobbs 2015). For Richard, “doing something about it” involved applying science to inform management interventions and policy (e.g. biodiversity offsets; Thorn et al. 2018). No doubt the birth of his children and his involvement in local environmental issues provided impetus too (Fig. 3). A decidedly pragmatic response to an escalating crisis.

### Richard as Collaborator and Mentor

Richard leads his staff and students by example. Generous with his ecological insights, he explores the world by conducting

inclusive scientific research with integrity, compassion and humor. Most of Richard's contributions are collaborative efforts (88%), and his role as a mentor has shaped a global network of former staff and students (Figs. 4 & 5). Richard has broad visions of the power of scientific ideas and he encourages thinking about “the big picture.” He has demonstrated that there is no “one way” to do science, encouraging researchers to tread their own path, an exhilarating experience for early career researchers. Richard values the power of “new eyes” critically examining old concepts and beliefs. One of the first things you notice when working with Richard, apart from his humility, is his warmth. He is unflappable in his support of staff and students. He generously shares scientific connections with his mentees and supports emerging scientists when they tackle leadership roles. Richard values a fulfilling life outside of work and recognizes the importance of maintaining a healthy work-life balance. This makes him compassionate when life does not go according to plan.

### Last Words

As a highly cited researcher, Richard has had a disproportionately large effect on the field of restoration ecology, helping to shape and advance the concepts of this discipline. Indeed, if restoration ecology were an environment, Richard may well be one of its keystone species. On the eve of his retirement, he leaves a lasting legacy of pertinent ecological ideas for future restoration ecologists to build upon. Moreover, Richard, you have inspired all who have worked with you to adopt your considered, encouraging and collaborative approach to science. For this we thank you.

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## Supporting Information

The following information may be found in the online version of this article:

**Table S1.** Key words that define key topics in Figure 1.

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