PERSPECTIVES

Bridging science and practice in conservation: Deficits and challenges from a research perspective

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Abstract

Biodiversity is being lost at alarming rates in spite of efforts to conserve ecosystems, species and genetic diversity. There is broad consensus that biodiversity conservation needs to become more effective, and this requires an analysis of the causes that have prevented previous efforts from reaching their goal. A lack of knowledge exchange and cooperation between science and practice has been identified as a key issue in this context. Scientific knowledge frequently does not find its way into conservation practice, and information requirements by practitioners are often not considered appropriately by scientists. Here, we summarize deficits and challenges in the relationship between science and practice in conservation and outline approaches to achieving more effective knowledge exchange and collaboration at the interface between both. We propose that existing platforms for communication need to be complemented by independent institutions in particular at national and sub-national levels to facilitate successful co-production of knowledge as a prerequisite for effective conservation measures.

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Rationale

Recent biodiversity assessments have documented an ongoing decline in population sizes of most wild species and accelerating rates of local extinctions as well as losses in the extent, quality and connectivity of many habitats (Butchart et al. 2010; WWF Living Planet Report 2016). Ethical reasons and utilitarian considerations related to the role of biodiversity in providing ecosystem services have been put forward to argue that further loss of biodiversity should be prevented (Hooper et al. 2012).

Numerous efforts such as the Biodiversity Convention Countdown Target have aimed at significantly reducing the rate of biodiversity loss by 2010 (Rands et al. 2010). Despite some local successes and increasing societal responses to global change drivers, this target was not achieved (Global Biodiversity Outlook 4; www.cbd.int/GBO4). The conclusions drawn from these observations are that political, economic and societal interests interfere with internationally agreed goals of biodiversity conservation (e.g. Perrings et al. 2011; Pouzols et al. 2014), increasing the risk that e.g. the Aichi Targets may not be met by 2020 unless progress can be significantly sped up (Tittensor et al. 2014).

A lack of exchange between science and practice in conservation has been identified as a key issue that hampers the effectiveness of measures taken to conserve and restore biodiversity (e.g. Fazey et al. 2013; Laurance et al. 2012; Young et al. 2014). Different definitions have been put forward to clarify the types of relevant knowledge in a biodiversity conservation context (see Fazey et al. 2013), sometimes including the distinction between "knowledge producers" and "knowledge users" (Mitton, Adair, McKenzie, Patten, & Perry 2007), although these roles become less pronounced in transdisciplinary approaches (Tomich et al. 2010). Insufficient exchange of relevant knowledge has been observed between academics and practitioners in the field of conservation as well as between the groups with a traditionally strong interest in biodiversity issues (ecologists in academic institutions, administrative offices and environmental NGOs) and parts of the society that do not share the same level of concern for biodiversity (stakeholders who tend to focus more on opportunities for exploiting natural resources; Cvitanovic et al. 2015).

The aim of this 'perspectives' article is to outline how **knowledge exchange** and **collaboration** across the divide between science and practice in conservation can be improved in order to make joint efforts for the conservation of biodiversity more successful. We summarize key deficits and challenges that have been identified in the relationship between conservation science and practice (see also Box 1) before moving on to the discussion of possible solutions. We argue that new institutions are needed to enable different stakeholder groups to interact successfully, ensuring that research can generate the knowledge which is necessary to implement measures that have a high probability of delivering

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Box 1: Science and its implementation in conservation.

Conservation science comprises a continuum from basic to applied research (Simberloff 1988) and from a researcher's perspective all approaches are valid. From a societal point of view, however, there may be disparities in the evaluation of these approaches given that those approaches with direct benefits for human well-being may be seen most valuable such as applied research on ecosystem services. While the potential for implementation of basic research may frequently not be immediately apparent, the combination of basic and applied approaches often enhances scientific progress. In particular, many findings from basic research have been vital for the technological progress of society.

Measures and actions that ensure the unconfined knowledge exchange is a relevant part of the practical implementation process in conservation management. Successful knowledge exchange requires continuous dialogue between scientists, decision-makers and practitioners in nature conservation management in order to develop assessment reports, handbooks and guidelines, as well as incorporating such recommendations into legal regulations and practical action.

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conservation goals. The views presented here are primarily based on a research perspective.

Deficits and challenges

Currently, most conservation activities are not based on the full range of evidence available but rather on expert knowledge, individual experience and traditional land management practices (Pullin, Knight, Stone, & Charman 2004; Cvitanovic et al. 2015; Russell-Smith et al. 2015; Toomey, Knight, & Barlow 2016). The need for integrating scientific evidence concerning biodiversity and its role for ecosystem functioning (Hooper et al. 2012) into decision-making processes is increasingly recognized (reviewed in Fazey et al. 2013; Cvitanovic et al. 2015). Conservation scientists and practitioners alike are striving to develop sustainable forms of biodiversity conservation and ecosystem management (Millar, Stephenson, & Stephens 2007) and often have similar research interests (Cvitanovic et al.