Environmental Conservation

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Cite this article: Montana J, Elliott L, Ryan M, Wyborn C (2020) The need for improved reflexivity in conservation science. *Environmental Conservation* **47**: 217–219. doi: 10.1017/S0376892920000326

Received: 25 May 2020
Revised: 10 August 2020
Accepted: 12 August 2020
First published online: 8 September 2020

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CAMBRIDGE UNIVERSITY PRESS

The need for improved reflexivity in conservation science

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Introduction

Despite decades of research, biodiversity continues to deteriorate. We argue that improving reflexivity is a powerful means to reconcile conservation science with the concerns of the diverse communities that depend upon and care about the natural world.

The concept of reflexivity has diverse meanings across scholarly traditions (Rose 1997, Lynch 2000, Boström et al. 2017). Reflexivity can mean taking a step back to critically assess one's own assumptions. It can mean looking inward at one's own identity and actions, but also outward to the relationships a researcher develops in the contexts in which they work. It can mean looking forwards to anticipate possible futures, or backwards to learn from the past. As such, scholars largely agree that there is no one way in which to 'do reflexivity'. However, the concept signifies an approach to research that is self-critical, responsive and adaptable.

In this comment paper, we suggest that the frontiers of conservation science should be less concerned with finding ever-more precise facts about nature and more focused on cultivating research that serves the diverse communities that it seeks to inform, thereby improving utility and contribution of the research to the challenge of addressing the biodiversity crisis. We suggest that improving reflexivity is important to this endeavour and present some practical suggestions of how it can be done.

An allegory for reflexivity

The National Gallery in London may seem an unlikely place to look for lessons about the future of biodiversity research, but it houses a painting that provides an allegory that illustrates the multiple perspectives needed for reflexive research. The painting is Joseph Wright of Derby's depiction of *An Experiment on a Bird in the Air Pump* (Fig. 1), painted in the 1760s. In this painting, a natural philosopher – an early predecessor of the modern scientist – conducts an experiment in which a bird is placed inside a glass vessel. Air is extracted, and the bird – unable to breathe – drops lifeless from its perch. This early experiment was intended to help us understand the function of air in sustaining life. However, it was also foundational to the development of today's research approaches (Shapin & Schaffer 1985). The painting reminds us that science is an evolving social practice. This allegory illustrates the value of reflecting upon our own histories, identities, methods, philosophies and possible consequences of the knowledge that we produce.

At the centre of the painting, we see the bird, the air pump and the natural philosopher. This viewpoint highlights the social process underpinning scientific research and the position of researchers in the systems they study (Beers & van Mierlo 2017). Fostering a reflexive self can mean being self-aware of this position, alongside evaluating and questioning one's own actions, values and preferences and creating opportunities to revise them appropriately.

Expanding our view, we see the social context of the experiment. This includes the audience and the room in which it is performed. This view reveals the faces of the audience, which have been interpreted as expressions of awe and revulsion, demonstrating alternative reactions to the relationship between science and human progress (Helmers 2001). From this vantage point, we are reminded that science has diverse audiences whose values and concerns are themselves valid and worthy of our attention (Boström et al. 2017). The scene, perhaps a depiction of a travelling scientific lecture, shows that science takes place in differentiated spaces. The young assistant and birdcage in the background remind us of the capacities that must be built to navigate between the frontstage and backstage elements of science in order to contribute authoritative knowledge in the public eye (Hilgartner 2000).

Finally, the frame that contains the painting reminds us that our understanding – of our objects of study, ourselves and the social contexts in which we work – is ultimately partial



Fig. 1. Joseph Wright 'of Derby'. *An Experiment on a Bird in the Air Pump*. 1768. © The National Gallery, London. Presented by Edward Tyrrell, 1863.

and particular. Like the undoubtedly romanticized scene of the painting, our views of the past, present and future are shaped by our values, ideals, disciplinary training, culture and position in society. Acknowledging the existence of the frame reminds us that focusing on one thing omits or obscures others. Technocratic frames, for example, can exclude social, political and cultural considerations (Boström et al. 2017). This can be mitigated by inter-frame reflection, which examines both one's own frame and the frames that other relevant actors bring to a particular issue (Boström et al. 2017). Opening research up to being challenged by others can foster the kind of reflexivity that improves environmental and social outcomes (Whatmore 2009).

What could improved reflexivity mean for conservation science?

As a 'crisis discipline' (Soulé 1985), conservation science has been self-aware since its origins. Today, scholars have an interest and appreciation of the field's development (e.g., Mace 2014), including the negative social impacts and injustices that it has sometimes facilitated, such as the displacement of indigenous peoples and racial inequalities (see, for example, Mollett & Kepe 2018). Scholars are experimenting with transdisciplinarity and democratization to navigate conflicts and power imbalances in conservation research, practice and policy (Peterson et al. 2010, Salomon et al. 2018). There is a growing recognition of the way distinct philosophies of science shape our research practices (i.e., Moon & Blackman 2014, Montana et al. 2019), and recent efforts have catalysed interactive agenda setting for conservation research, such as Convivial Conservation (Büscher & Fletcher 2019) and the Biodiversity Revisited Initiative (Wyborn et al. 2020).

However, scholars have also noted that there is room for improvement. Game et al. (2014) called for conservation researchers to recognize the limits of their capacity to identify absolute answers for conservation problems, which typically do not have clear cause-and-effect relationships and involve political trade-offs. Others describe a need for researchers to be more attentive to the specific needs, perspectives and capacities of local contexts, working with local actors to bring about lasting positive change rather than deliver short-term research projects (Hind et al. 2015). There have also been calls to learn from failure, including documenting and sharing experience when interventions have not gone according to plan (Catalano et al. 2019) and to fill gaps in skills development that support more integrative, interactive and inclusive approaches to conservation (Elliott et al. 2018). Meanwhile, scholars have called on organizations such as the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) to further institutionalize reflexivity in transformative learning (Borie et al. 2020).

While these noted shortcomings support the assertion that conservation science has a 'reflexive gap' (Pasgaard et al., 2017), it is insufficient to simply call for 'more reflexivity' (Boström et al. 2017). Attention needs to be given to the enabling conditions for reflexivity and the practical steps that can be taken to enact forms of reflexivity that are appropriate within the existing frameworks of conservation science.

Individuals can:

- Develop a mind-set that is inquisitive, humble, brave and open to uncertainty;
- Invest in communication skills, interpersonal skills and boundary-crossing skills;

https://doi.org/10.1017/S0376892920000326 Published online by Cambridge University Press

- Partner with researchers from other disciplines, including those with appropriate expertise in the design and facilitation of collaborative partnerships;
- Be willing to ask difficult questions of themselves and others and sit with tension, disagreement and discomfort where necessary;
- Be mindful of the ways in which people are different, including different values, ideals, disciplines, cultures and positions in science and society more broadly;
- Take time to understand the contexts of research before launching into data collection on predefined problems;
- Engage non-researchers in research (i.e., citizen science), so that they can observe, question and challenge research practices and contribute vital knowledge and perspectives to research processes;
- Write a journal to build self-awareness and engage in learning, providing space to think about one's assumptions, ways of acting and ways of being.

Communities and organizations can:

- Support learning and teaching in different philosophies of science;
- Design and create spaces for new and marginalized voices to be heard, which can facilitate inter-frame reflection;
- Invest in collective adaptive learning processes, such as inviting outsiders to actively study research processes, holding meetings to unpack assumptions, discuss lessons learned and inform future efforts;
- Create a safe place to experiment (and get things wrong) through building a trusting, supportive culture that rewards and incentivizes experimentation and taking calculated risks;
- Promote funding structures that provide the time and freedom to step back and review the bigger picture, even when issues are considered to be urgent;
- Provide flexible funding that enables an initiative to redirect its course based on learning, reflection or changes in context.

Conclusion

In this comment paper, we have argued for the potential to improve reflexivity in conservation science. We are not claiming that conservation is currently 'unreflexive' (following Lynch 2000). Rather, we suggest that there is a need for conservation science, as an evolving social practice, to experiment with enabling conditions and practical actions to further develop the kind of reflexivity that aligns with the nature of contemporary conservation challenges. Such reflexivity can support renewed visions of progress for conservation science, whereby the values and concerns of the diverse communities that we seek to inform can be harnessed to help us to ask and frame better questions. The types of reflexivity outlined above are more critical than ever to sustain a more just and diverse future for life on Earth.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/S0376892920000326

Acknowledgements. The authors would like to acknowledge the participants and contributors to the Biodiversity Revisited Initiative for sparking the conversations that led to this comment paper.

Financial support. This work was supported by an Early Career Fellowship from the Leverhulme Trust (JM).

Conflict of interest. None.

Ethical standards. None.

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https://doi.org/10.1017/S0376892920000326 Published online by Cambridge University Press