



Publishing social science research in *Conservation Biology* to move beyond biology

Historical Context of Conservation Biology and *Conservation Biology*

Conservation biology arose as a field of academic science and management practice to intervene in what biologists and related professionals identified and perceived as a biodiversity extinction crisis (Soulé 1985). Although it has earlier foundations (e.g., *Biological Conservation* began to be published in 1968), the new discipline was consolidated in the 1980s and 1990s under the leadership of a group of eminent biologists, who institutionalized this paradigm via their seminal writings, with the creation of the Society for Conservation Biology in 1987, the founding of the journal *Conservation Biology* in 1988, and the proliferation in the number of conservation biology graduate programs during the early 1990s (Meine et al. 2006). Initially focused on critical biological aspects of conservation, such as genetics, systematics, ecology, and evolution, conservation biology professionals increasingly recognized that the human dimensions of biodiversity are requisite components to the field's overall success (Meine et al. 2006). However, given its personal, epistemological, and institutional roots in the natural sciences, less attention has been paid to the social aspects until relatively recently (e.g., see Fig. 1 in Soulé [1985], Mascia et al. 2003).

Over time, conservation biology's traditional understanding of humans as external drivers of change (e.g., humans as a cause of biodiversity loss) has expanded to include humans as beneficiaries of ecosystems (e.g., humans benefit from the services ecosystems provide) and even humans as participants in nature (e.g., the multidirectional and reciprocal relationships of social-ecological systems) (Mace 2014). This reconceptualization of the human-nature relationship, evident today in concepts such as the Anthropocene, social-ecological systems, novel ecosystems, sustainable development, and globalization, has pushed conservation biology to seek a better understanding of and interaction with the full depth and breadth of human relationships with the natural environment. This push in turn has prompted efforts to formalize and institutionalize integrated approaches that more explicitly acknowledge and value the varied contributions of the social sciences (Kareiva & Marvier

2012; Bennett et al. 2017a). Based on this historical evolution, now there is no question that the social sciences are integral to biological conservation; indeed, there is clear consensus on the importance of integrated approaches to address the inherently social nature of most conservation problems (Martin et al. 2016). However, there is still work to be done regarding how to incorporate this extremely broad and diverse area of inquiry (Bennett et al. 2017b). Here, it is important to point out that we purposely did not consider conservation biology's relationship with the arts and humanities, but we recognize their role and value to the field. They require, however, specific treatment elsewhere to give appropriate attention to their particular histories, epistemologies, and methodological approaches.

In this context, *Conservation Biology's* editorial board initiated an internal discussion in 2015 to better formulate and communicate guidelines for social science articles. Given the journal's pivotal role in communicating conservation science and practice more broadly and that it is a venue increasingly being sought out by social scientists, we believe such guidelines are necessary to achieve uniform, adequate, and fair treatment of manuscripts by editors and reviewers and to inform the journal's authors and readers of policies regarding social science contributions. With these overarching goals in mind, we sought to elucidate the two primary criteria on which submissions are judged appropriate for *Conservation Biology*: the relevance of the social science contributions to conservation, considering both the objectives of the journal and the broader needs of the field, and the importance of specific contributions to conservation, as determined by their quality, geographic and situational transcendence, and novelty.

Guidance on Relevance of Social Science Contributions

We strongly encourage prospective authors to submit work that advances the frontiers of conservation social science (e.g., multilevel systems approaches) to consolidate its position beyond simply playing a supporting role to biophysically oriented conservation research. Accordingly, social science contributions to *Conservation Biology* should satisfy the same primary journal objectives as

submissions with a purely biological or natural-science focus. Specifically, they should provide meaningful insights (e.g., identify a significant problem, approach, or solution) and data (e.g., obtained through emerging technologies), and furthermore they should encompass meaningful scales (e.g., scaling up from local to global or multiscale) or syntheses that have broad relevance to conservation beyond specific situations or contexts. Tied to these objectives, relevant social science papers should have clearly articulated implications for conservation and, in general, should be linked to a tangible conservation-related outcome, which can be biological (e.g., recovery of an endangered species), social (e.g., impacts of conservation on human well-being), or both. Studies with a less direct conservation result, or those that do not fully evaluate the conservation outcome as part of the investigation, need to meet other dimensions of relevance outlined below.

The journal's editors recognize that the social sciences can play various roles with respect to conservation-related outcomes. These include informing a specific policy, decision, or intervention. But there is also relevance, for example, in assisting with general problem framing and planning, providing a better understanding of the social context of conservation activities, and contributing to communication, education, and outreach efforts (Bennett et al. 2017a). Further, aspiring authors would be well served to consider whether their work is social science for conservation, social science on conservation, or both (Sandbrook et al. 2013). This distinction may help authors better identify specific outcomes and make explicit why and how their contribution is germane to the broader field of conservation biology.

Guidance Regarding the Importance of Social Science Contributions

Social science research in *Conservation Biology* should be evaluated based on discipline-specific standards to determine its importance in terms of scientific merit and be held to the same level of scrutiny applied to natural-science submissions (e.g., St. John et al. 2014). Therefore, studies should demonstrate technical and methodological excellence based on internally consistent theoretical structures, which is accomplished by being grounded in established theory and by clearly defining concepts and using appropriate methods (Gelcich & O'Keeffe 2016). To illustrate this point, cognitive constructs, such as attitudes, values, and risk perceptions, can be understood through multiple conceptual frameworks (e.g., communication theory, social psychology, social-systems theory) with different implications, but often within the realm of conservation biology they are used as synonyms due to a lack of theoretical grounding and consistency within a study (Manfredo 2008).

In short, assuring that social science standards have been applied and made evident in a study is crucial for determining a manuscript's quality. For example, social science methodological rigor is especially important when applying results to broader contexts, and appropriate procedures are required for both quantitative (e.g., sampling, nonresponse checks, representativeness evaluations, reliability, validity, and data weighting) and qualitative studies (e.g., using mixed methods to triangulate findings as an alternative to replication or sampling until theoretical saturation has been reached as an alternative to statistical methods of inference). Finally, all social science contributions must reflect the journal's ethical standards regarding the collection, use, and storage of data on human subjects (SCB 2004).

Social Science and the Conservation Community

Highly relevant and high-quality research in the social sciences is needed for conservation, and *Conservation Biology* plays a central role in defining and advancing this work. Therefore, this editorial and other strategies, such as enhancing the diversity of the editorial board (Burgman et al. 2015), are meant to play a constructive role in reconceiving conservation's study units as integrated social-ecological systems, which requires implementing epistemological, methodological, and institutional adjustments (Anderson et al. 2015). The complexity of conservation problems is, and always has been, greater than the purview of a single discipline or method, and as a mission-driven discipline, conservation biology's inherently normative basis (Callicott et al. 1999) should incentivize its researchers and practitioners to cultivate a culture that facilitates a continual reevaluation of its scientific objectives, approaches, and outcomes, as well as its institutional membership, inclusiveness, and practices. It is only through self-awareness and willingness to work outside the bounds of narrowly defined paradigms and approaches that the conservation community will be able to push its research and practice toward new areas of inquiry and insight to inform effective solutions.

Social science contributions that do not attend to the guidelines mentioned above will not be considered suitable for publication in *Conservation Biology*. It is our hope that the emphasis on disciplinary rigor will also help address the misconception that any biologist can do a social survey or that personal musings constitute a rigorous exploration into the human domain of conservation. At the same time, we do not want to discourage new interdisciplinary or transdisciplinary efforts that fall outside the scope of our recommendations; rather, we seek to incentivize specific contributions that acknowledge and incorporate the high standards that social science traditions have developed and that are so needed to advance effective conservation research and practice.

We have sought to provide guidance, not prescriptions, for evaluation. By communicating these criteria, we hope to ensure greater transparency and consistency in the evaluation process and aid editorial decisions by providing a more unified set of criteria. Nonetheless, to fully achieve this goal, more editors and reviewers with social science expertise, who can thoroughly assess the theoretical and methodological consistency and rigor of manuscripts, need to be recruited. As such, more explicit guidance for social science contributions also is meant to help foster an inclusive environment for diverse scientists and practitioners, who may not currently see themselves as part of the conservation biology community, so that they will want not only to submit their manuscripts but also to collaborate with the journal as editors and reviewers.

Tara L. Teel,¹ * Christopher B. Anderson,^{2,3} * Mark A. Burgman,⁴ Joshua Cinner,⁵ Douglas Clark,⁶ Rodrigo A. Estévez,⁷ Julia P.G. Jones,⁸ Tim R. McClanahan,⁹ Mark S. Reed,¹⁰ Chris Sandbrook,^{11,12} and Freya A.V. St. John⁸

¹Department of Human Dimensions of Natural Resources, Colorado State University, Fort Collins, CO 80523-1480, U.S.A.

²Centro Austral de Investigaciones Científicas (CADIC), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Houssay 200, Ushuaia, Tierra del Fuego 9410, Argentina
email canderson@alumni.unc.edu

³Instituto de Ciencias Polares, Ambiente y Recursos Naturales, Universidad Nacional de Tierra del Fuego, Onas 450, Ushuaia, Tierra del Fuego 9410, Argentina

⁴Centre for Environmental Policy, Imperial College London, 13 Prince's Gardens, South Kensington Campus, London, U.K.

⁵ARC Centre of Excellence for Coral Reef Studies, James Cook University, Townsville QLD 4811, Australia

⁶School of Environment and Sustainability, University of Saskatchewan, Saskatoon, SD 27N 5C8, Canada

⁷Center of Applied Ecology and Sustainability (CAPES), Departamento de Ecología, Pontificia Universidad Católica de Chile, O'Higgins 340, Santiago, Chile

⁸School of Environment, Natural Resources and Geography, Bangor University, Deiniol Road, Bangor, Gwynedd LL57 2UW, U.K.

⁹Marine Programs, Wildlife Conservation Society, 2300 Southern Boulevard, Bronx, NY 10460, U.S.A.

¹⁰Centre for Rural Economy and Institute for Agri-Food Research & Innovation, School of Natural and Environmental Sciences, Newcastle University, Agriculture Building, Newcastle upon Tyne NE1 7RU, U.K.

¹¹UN Environment World Conservation Monitoring Centre, 219 Huntingdon Road, Cambridge CB3 0DL, U.K.

¹²Department of Geography, University of Cambridge, Downing Place, Cambridge CB2 3EN, U.K.

*Both the authors contributed equally.

Literature Cited

- Anderson CB, Pizarro JC, Estévez RA, Saposnikow A, Pauchard A, Barbosa O, Moreira-Muñoz A. 2015. Estamos avanzando hacia una socio-ecología? Reflexiones sobre la integración de las dimensiones 'humanas' en la ecología en el sur de América. *Ecología Austral* **25**:263-272.
- Bennett NJ, et al. 2017a. Conservation social science: understanding and integrating human dimensions to improve conservation. *Biological Conservation* **205**:93-108.
- Bennett NJ, et al. 2017b. Mainstreaming the social sciences in conservation. *Conservation Biology* **31**:56-66.
- Burgman M, Jarrad F, Main E. 2015. Decreasing geographic bias in *Conservation Biology*. *Conservation Biology* **29**:1255-1256.
- Callicott JB, Crowder LB, Mumford K. 1999. Current normative concepts in conservation. *Conservation Biology* **13**:22-35.
- Gelcich S, O'Keefe J. 2016. Emerging frontiers in perceptions research for aquatic conservation. *Aquatic Conservation: Marine and Freshwater Ecosystems* **26**:986-994.
- Kareiva P, Marvier M. 2012. What is conservation science? *BioScience* **62**:962-969.
- Mace GM. 2014. Whose conservation? Changes in the perception and goals of nature conservation require a solid scientific basis. *Science* **345**:1558-1560.
- Manfredo MJ. 2008. Who cares about wildlife? Social science concepts for exploring human-wildlife relationships and conservation issues. Springer, New York.
- Martin JL, Maris V, Simberloff DS. 2016. The need to respect nature and its limits challenges society and conservation science. *Proceedings of the National Academy of Sciences* **113**:6105-6112.
- Mascia MB, Brosius JP, Dobson TA, Forbes BC, Horowitz L, McKean MA, Turner LA. 2003. Conservation and the social sciences. *Conservation Biology* **17**:649-650.
- Meine C, Soulé M, Noss RF. 2006. A mission-driven discipline: the growth of conservation biology. *Conservation Biology* **20**:631-651.
- Sandbrook C, Adams WM, Buscher B, Vira B. 2013. Social research and biodiversity conservation. *Conservation Biology* **27**:1487-1490.
- Society for Conservation Biology (SCB). 2004. Code of ethics. SCB, Washington, D.C. Available from <https://conbio.org/about-scb/who-we-are/code-of-ethics> (accessed August 2017).
- Soulé ME. 1985. What is conservation biology? *BioScience* **35**:727-734.
- St. John FAV, Keane AM, Jones JPG, Milner-Gulland EJ. 2014. Robust study design is as important on the social as it is on the ecological side of applied ecological research. *Journal of Applied Ecology* **51**: 1479-1485.

