

Essay

Mainstreaming the social sciences in conservation

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Abstract: *Despite broad recognition of the value of social sciences and increasingly vocal calls for better engagement with the human element of conservation, the conservation social sciences remain misunderstood and underutilized in practice. The conservation social sciences can provide unique and important contributions to society's understanding of the relationships between humans and nature and to improving conservation practice and outcomes. There are 4 barriers—ideological, institutional, knowledge, and capacity—to meaningful integration of the social sciences into conservation. We provide practical guidance on overcoming these barriers to mainstream the social sciences in conservation science, practice, and policy. Broadly, we recommend fostering knowledge on the scope and contributions of the social sciences to conservation, including social scientists from the inception of interdisciplinary research projects, incorporating social science research and insights during all stages of conservation planning and implementation, building social science capacity at all scales in conservation organizations and agencies, and promoting engagement with the social sciences in and through global conservation policy-influencing organizations. Conservation social scientists, too, need to be willing to engage with natural science knowledge and to communicate insights and recommendations*

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clearly. We urge the conservation community to move beyond superficial engagement with the conservation social sciences. A more inclusive and integrative conservation science—one that includes the natural and social sciences—will enable more ecologically effective and socially just conservation. Better collaboration among social scientists, natural scientists, practitioners, and policy makers will facilitate a renewed and more robust conservation. Mainstreaming the conservation social sciences will facilitate the uptake of the full range of insights and contributions from these fields into conservation policy and practice.

Keywords: conservation biology, conservation planning, conservation science, conservation social science, environmental social science, human dimensions, natural resource management, social-ecological systems

Incorporación de la Perspectiva de las Ciencias Sociales a la Conservación

Resumen: *A pesar del reconocimiento general del valor de las ciencias sociales y los crecientes llamados por un mejor compromiso con el elemento humano de la conservación, las ciencias sociales de la conservación siguen siendo malentendidas y poco utilizadas en la práctica. Las ciencias sociales de la conservación pueden proporcionar contribuciones únicas e importantes para el entendimiento de la sociedad de las relaciones entre los humanos y la naturaleza y para la mejora de las prácticas de la conservación y sus resultados. Existen cuatro barreras – ideológicas, institucionales, de conocimiento y de capacidad – para la integración significativa de las ciencias sociales dentro de la conservación. Proporcionamos una guía práctica sobre cómo sobreponerse a estas barreras para incorporar la perspectiva de las ciencias sociales a la ciencia, las prácticas y las políticas de conservación. En general, recomendamos promover el conocimiento sobre el alcance y las contribuciones de las ciencias sociales para la conservación, incluir a los científicos sociales desde el origen de los proyectos de investigación interdisciplinaria, incorporar la investigación de las ciencias sociales y las percepciones durante todas las fases de la planificación y la implementación de la conservación, construir la capacidad de las ciencias sociales en todas las escalas de las organizaciones y agencias de conservación y promover el compromiso con las ciencias sociales en y a través de organizaciones de conservación con influencia política. Los científicos sociales de la conservación, también, necesitan estar dispuestos a involucrarse con el conocimiento de las ciencias naturales y a comunicar percepciones y recomendaciones de manera clara. Le urgimos a la comunidad de la conservación que vaya más allá del compromiso superficial con las ciencias sociales de la conservación. Una ciencia de la conservación más incluyente e integradora – una que incluya a las ciencias sociales y naturales – permitirá una conservación más justa socialmente y más efectiva ecológicamente. Una mejor colaboración entre los científicos sociales, los científicos naturales, los practicantes y quienes elaboran las políticas facilitará una conservación más renovada y más sólida. Incorporar la perspectiva de las ciencias sociales de la conservación facilitará la absorción de la extensión completa de conocimiento y contribuciones de estos campos a la práctica y las políticas de la conservación.*

Palabras Clave: biología de la conservación, ciencia de la conservación, ciencia social de la conservación, ciencia social ambiental, dimensiones humanas, manejo de recursos naturales, planificación de la conservación, sistemas socio-ecológicos

Calls for a More Social Conservation Science and Practice

Pointing to the critical importance of the social sciences to the global conservation agenda is now routine. Everyone working in conservation, it seems, recognizes that natural science alone cannot solve conservation problems (e.g., Mascia et al. 2003; Chan et al. 2007; Schultz 2011; Kareiva & Marvier 2012; Hicks et al. 2016). Sandbrook et al. (2013:1488) argue that “. . . the natural science methods of conservation biology are insufficient to find solutions to complex conservation problems that have social dimensions.” De Snoo et al. (2013:68) suggest “close involvement of social researchers with their expertise, theories and methods, into conservation biology is a prerequisite for progress in the field.” Most recently, at the 2015 International Congress for Conservation Biology of the Society for Conservation Biology

(SCB) in Montpellier, France, incoming SCB president James Watson announced that “Conservation science is evolving . . . both natural and social sciences are crucial to solve conservation problems.” Similar declarations about the need for greater consideration of the human dimensions are now common in conservation meetings around the world.

The conservation social science fields have grown significantly over the last few decades. This is evidenced by the growing application of different social science fields to understand and ultimately improve conservation practice and an increasing institutionalization of the social sciences in conservation organizations. Formed in 2003, SCB’s Social Science Working Group (SSWG) became the second-largest group of all sections and working groups by 2011. Conservation social science publications and textbooks are growing in number (e.g., Vaccaro et al. 2010; Newing et al. 2011; Decker et al.

2012; Manfredo et al. 2014; Bennett & Roth 2015); natural resource departments in universities increasingly include social science in their curriculum; many conservation organizations and agencies have hired social scientists; numerous environmental management bodies have formed social science working groups; a growing number of funders support conservation social science; and international conservation bodies are creating social science units. For example, the International Union for the Conservation of Nature (IUCN) has recently created a Global Economics and Social Science Programme (GESSP) that is aiming to further promote and develop the use of the social sciences in conservation.

Yet, we assert that the social sciences have not yet achieved the same level of recognition and acceptance in conservation science, practitioner, and policy circles as the natural sciences. This is evidenced, for example, by the relative imbalance of social to natural science presentations at conservation conferences and the imbalance of articles on social versus natural sciences in conservation-focused journals. Further, it is the norm for conservation organizations and agencies to employ natural scientists, whereas it is less common for such organizations to hire social scientists and, when present, they are often in the minority. On the ground, far too often, social science is not embedded in the design, implementation, monitoring, and assessment of conservation interventions (Sievanen et al. 2012). Underpinning all this is that the breadth and role of conservation social science are often not clear to conservation scientists, organizations, practitioners, and funders. In short, we claim that the social sciences are still far from mainstream in conservation and as a result their potential contributions to improving conservation policies and practice are not being realized fully.

Building on the momentum and increasing interest in the human dimensions of conservation, we urge the conservation community to move beyond a superficial engagement with the conservation social sciences toward a true mainstreaming of the social sciences in conservation science, policy, and practice. Drawing on the results of a focus-group meeting at the North American Congress for Conservation Biology in July 2014, we outline barriers to meaningful integration of the social sciences in conservation and provide practical guidance for mainstreaming the breadth of the social sciences with the aim of building a renewed, integrated, and more robust conservation science and practice.

The Conservation Social Sciences

A useful starting point for a discussion of mainstreaming the conservation social sciences is an appreciation of the breadth of the field and its purposes. The term *conservation social sciences* refers to diverse traditions of using social science to understand and improve conservation

policy, practice, and outcomes. We take a broad view of the conservation social sciences. The conservation social sciences draw on the classic disciplines, such as anthropology, sociology, political science, economics, psychology, human geography, and on applied disciplines such as education, development studies, marketing, communication studies, and law. Many of these disciplines have subfields that focus specifically on the environment or conservation (e.g., environmental anthropology, environmental sociology, environmental governance, ecological economics, conservation psychology, environmental education, environmental geography, and environmental law). Interdisciplinary fields, such as science and technology studies, conservation and development, human dimensions of natural resource management, human ecology, ethnoecology, and political ecology, draw upon various social sciences or both social and natural science. There are also strong traditions of conservation social science and interdisciplinary conservation science that have emerged from non-Western and non-English language academic traditions, for example, from European and Latin American scholars (e.g., Leff 1994; Escobar 1998; Reyes-García et al. 2006; Pascual et al. 2014) and indigenous scholars (Kimmerer 2013; Augustine & Dearden 2014). Although qualitatively different, we recognize the importance of the environmental humanities (Castree et al. 2014), including environmental history, environmental philosophy and ethics, ecoliterary and ecocultural studies, and the arts to improving our understanding of, encouraging reflection upon and communicating about historical, current, and envisioned relationships between humans and nature. For overviews of the conservation social sciences see, for example, Vaccaro et al. (2010), Newing et al. (2011), and Bennett and Roth (2015).

The social sciences ask numerous questions that can improve our understanding of conservation policy and practice, from the individual, to the community, to the international scale (Table 1). In doing so, the conservation social sciences can serve vastly different purposes (Lowe et al. 2009; Sandbrook et al. 2013), which we categorize as instrumental, descriptive, reflexive, and generative. The conservation social sciences might serve an instrumental role, for example, in determining what constitutes effective management, governance, or communications strategies for conservation. They can also serve a descriptive role, for example, by providing a historical account or describing the diverse ways in which conservation occurs in different contexts. The social sciences may also play a reflexive role, for example, by asking critical questions about the way different conservation models are framed, justified, and determined to be culturally appropriate. Finally, the conservation social sciences have a generative role, for example, when they produce innovative conservation concepts, policies, practices, and models. Of course, individual projects that apply conservation

Table 1. Conservation problems at different scales and relevant fields of social science.

| <i>Locus and scale of problem</i> | <i>People and groups or topics of study</i> | <i>Examples of problems or questions at this scale</i> | <i>Possible fields of social science</i> |
|--|--|--|---|
| Society at national and international scales | general public, advocacy groups, international NGOs and ENGOs, national agencies, international bodies such as the IUCN ideas, metaphors, philosophies, narratives, beliefs, ethical stances | How do different groups in society understand and relate to nature? What ways of thinking inform particular conservation practices or resistance to them? What broad social and material factors shape the way society approaches conservation? What are the social, ecological, behavioral, and cognitive outcomes of conservation education efforts? In what ways might ethics guide conservation actions? | sociology, anthropology, history, conservation education, science studies, political ecology, humanities and ethics |
| Federal or state laws and policies | politicians, legislators, policy makers, scientists laws, governance, incentives, regulations, knowledge building | Are laws efficient and effective at supporting conservation? How do science and other factors guide conservation decision making? What is the impact of a proposed environmental law or policy on conservation or society? Do existing educational policies facilitate learning environmental science and knowledge effectively? How might law and policy support conservation while fostering sustainable prosperity? | environmental law, political science, science studies, conservation education, ecological economics |
| Midlevel multijurisdiction management unit | tribes, NGOs, management boards planning, regional policy creation, brokering of management actions | How does decision making occur in management boards? Who is involved in environmental governance? What is the role of science in management? How and by whom has an area been used historically? What are the main conflicts over resource management and why do these conflicts occur? How do different funding models—e.g., corporate funding, national funding—influence the conservation agenda? | human geography, political science, science studies, anthropology, sociology, history, human dimensions, political ecology |
| Local governments | elected leaders, planning departments, technical agencies political grounding, best practices, applied technologies managers, comanagement boards, adjacent communities best practices, participation, governance | Is environmental conservation a local-election issue? How might cities plan their green space and parks for the health of both nature and people? | political science, ecological economics, planning |
| Management initiative, e.g., protected area | | What management actions are being taken? By whom? How? How are community livelihoods and economics impacting or being impacted by a protected area? How is a management initiative being received or resisted? What cultural models are being employed to shape conservation policy and practice? | anthropology, political science, psychology, conservation and development, ecological economics, political ecology, science studies |
| Private sector and businesses | resource-dependent corporations, local businesses and sectors best practices, goods and services, sustainability programs | What governance or economic mechanisms might be used to guide corporate behavior? How can environmental messaging be used to guide consumer behavior? | conservation and development, ecological economics, education, psychology |

Continued

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| <i>Locus and scale of problem</i> | <i>People and groups or topics of study</i> | <i>Examples of problems or questions at this scale</i> | <i>Possible fields of social science</i> |
|-----------------------------------|---|--|--|
| Community, neighborhood, or group | resource-dependent communities, civic organizations, associations, schools, livelihood group civic engagement, social networking, place making, social norms | How do local social practices or cultural norms and social identities affect conservation behaviors? What factors give rise to different levels of civic engagement? What competing visions for conservation exist among local people or between local people and outside organizations? How can outreach be improved through understanding social networks? How do cultural practices relating to the environment figure in resource use conflicts? | anthropology, conservation and development, conservation education, communication and marketing, psychology, history |
| Household or individual | residents, individual resource users, homeowners, visitors/tourists, private landowners, recreationists awareness, knowledge, attitudes, values, personal norms, emotions, behavior, stewardship, conflict | How are individuals likely to respond to a particular conservation initiative or management action? How can we develop effective communications to build local support for conservation efforts? How can we change consumer decisions to reduce environmental impacts? How can we facilitate knowledge development and behavior change of resource users? | psychology, ecological economics, conservation education, political science, history, communication and marketing |

Abbreviations: NGO, nongovernmental organization; ENGO, environmental nongovernmental organization; IUCN, International Union for Conservation of Nature.

social science can serve overlapping and complementary purposes.

We contend the role of social science is often misunderstood. Conservation social scientists are often employed as meeting facilitators, planners, public educators, survey designers, project evaluators, behavior changers, or implementers (Welch-Devine & Campbell 2010). However, even in the most applied aspects of the tradition, conservation social scientists are problem formulators, data collectors, analysts, and theory developers who can provide insights that can guide the social processes associated with conservation. Furthermore, although there is increasing attention to interdisciplinarity (e.g., Campbell 2005; Fox et al. 2006; Christie 2011; Sievanen et al. 2012), the social sciences should not be just an add on to interdisciplinary conservation research projects after the project has already been conceived (Viseu 2015:291). This misunderstanding and lack of early involvement in projects undermines the potential contributions of social science and interdisciplinary conservation science to produce better science or provide more complete solutions.

Barriers to Engaging with the Conservation Social Sciences

To realize their full contribution, we assert that the social sciences need to be mainstreamed in conservation policy and practice. By arguing for this mainstreaming, we seek to draw consistent and prioritized attention to the social dimensions of conservation in all social and ecological contexts and at all organizational levels with the ultimate goal of achieving a more robust, effective, and socially just conservation practice. This is a momentous but essential task.

Is conservation ready to mainstream social science? Simply doing more social science will not necessarily lead to better conservation unless that social science is assimilated into a hospitable environment. By ready we do not simply mean willing. Rather, are conservation organizations, institutions, and associations capable of truly integrating diverse insights from the social sciences? In practice, social science may be watered down and potential insights ignored resulting in policy evaporation, meaning a supportive high-level policy environment yields little implementation on the ground (Moser & Moser [2005] for similar concerns relative to gender mainstreaming). Many conservation scientists, organizations, and funders currently employ an ad hoc approach to engaging with the conservation social sciences. Realizing the full value of the conservation social sciences requires knowledge of and commitment to social sciences across scales. For example, high-level offices to field practitioners in conservation organizations need adequate social science expertise to inform all aspects of their operations. Fulfilling the need for more and better social science in conservation may require a

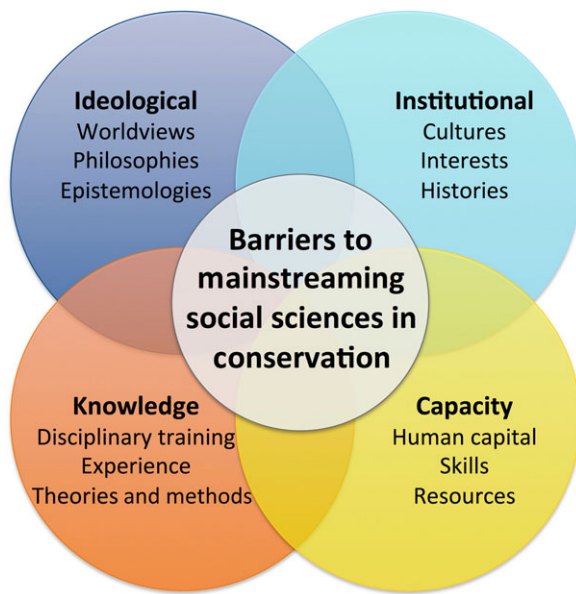


Figure 1. Barriers to mainstreaming the social sciences in conservation.

transformation of the entire approach, agenda, culture, and ethos of the conservation community.

Thus, prior to suggesting steps for mainstreaming at various scales, we acknowledge some perceived or real barriers to integrating social and interdisciplinary sciences as a means of explaining how it is, after more than a decade of calls to better integrate the social sciences (Mascia et al. 2003), that the conservation community still struggles with exactly how to make that happen. We draw from the results of a focus-group workshop on the conservation social sciences at the North American Congress for Conservation Biology in 2014 and the literature on interdisciplinary research (e.g., Fox et al. 2006; Welch-Devine & Campbell 2010; Christie 2011; Clark et al. 2011; Moon & Blackman 2014). We summarize the barriers to social science mainstreaming under the following 4 categories: ideological barriers, institutional barriers, knowledge barriers, and capacity barriers (Fig. 1). Successful mainstreaming requires directly addressing all barriers simultaneously.

First, natural and social scientists often think quite differently about how the world operates and how scientists should engage with it. Such ideological barriers include differing philosophies, worldviews, or epistemologies (also called “theories of knowledge” [Moon & Blackman 2014]). Differing worldviews may produce distinct understandings of the connections between nature and humans. This can lead to incompatible ways of thinking about a problem or of approaching research. For example, social and natural sciences may prioritize different scales and units of analysis. A study of environmental change, for instance, may start with human action for the social scientist but ecological indicators for the natural

scientist. Natural and social scientists may also view the nature and scope of knowledge differently, particularly what constitutes acceptable methods and valid data. As a result, social scientists often interact with nature and with human communities in different ways than natural scientists.

Second, conservation organizations and institutions are often configured for natural sciences, not social sciences. Such institutional barriers include organizational cultures, interests, and histories, as well as decision-making structures such as laws and regulation. Conservation organizations or funders may have an organizational culture that primarily employs, understands, or values the natural sciences. Historically, many conservation organizations and funders have focused solely or primarily on natural sciences, leading them to privilege studies that utilize deductive rather than inductive reasoning. There is often a resistance to changing this focus to include and fund more social science perspectives. Some individuals or organizations may even feel threatened by the insights social scientists provide, particularly when those insights challenge entrenched practices and narratives. Beyond individual organizations, structural institutions that shape how the environment is governed, such as law, often impede integrative conservation practice.

Third, all fields are steeped in disciplinary assumptions, theories, and methods. The ensuing knowledge barriers include training, experience, and knowledge of theories and methods. Conservation social scientists engage with discipline-specific language and different theories to understand topics under study, which can be inaccessible to nonspecialists, just as the language of natural sciences can be impenetrable to nonexperts. The application of conservation social science may also require training in social science theories and methods and experience with method application and analysis of results or, equally important, training in integrative approaches that can provide a platform for natural and social scientists to engage effectively without having to relinquish their own disciplinary expertise. The value of the range of social science methods (e.g., qualitative, quantitative, spatial, planning, evaluative, historical, meta-analytical, arts-based, and participatory methods) and related analytical techniques may not be immediately apparent to natural scientists, practitioners, or policy makers.

Fourth, it takes capacity to engage with the social sciences. The capacity barriers to a deeper integration of social sciences can include human capital, skills, and resources. Limited social science capacity within conservation organizations may mean conservation practitioners and organizations looking to fund conservation social sciences do not know where or how to begin engaging with social sciences. Without a clear understanding of the breadth of the conservation social sciences, the types of questions that each field of conservation social science poses, and the methods used by disciplinary specialists,

conservation organizations and funders may not appreciate the potential contribution of each social science field to improving conservation practice and outcomes. This may also mean the necessary skills to carry out social science research projects or the necessary connections to social science expertise in other organizations may often be lacking within organizations. Finally, financial resources are almost always limited, and, when science is prioritized, it is often earmarked for natural science research. It is important that conservation scientists, organizations, and agencies aiming to integrate social sciences into their scope and work recognize and address these potential challenges and barriers to integration.

Mainstreaming the Conservation Social Sciences

Mainstreaming of the conservation social sciences will need to occur at different scales and in different communities of practice. We consider 3 different mainstreaming entry points (i.e., within the conservation science community, within conservation agencies and organizations, and within global conservation policy-influencing bodies) and outline a number of steps that might be taken at each level.

First, regarding mainstreaming in conservation science, our initial suggestion is the least bold, but it may be the most contentious. Perhaps it is time for applied and mission-driven professional conservation organizations to signify a move away from isolated areas of conservation science toward a community of practice united in its desires to improve conservation using all available approaches and methods. Because the conservation sciences include the natural sciences, the social sciences, and interdisciplinary endeavors, we propose that the SCB consider rebranding itself as the Society for Conservation Science. Significant steps are needed within the conservation science community to increase knowledge of the definitions, focal areas, theories, methods, and contributions of the diversity of conservation social sciences, not just those that are instrumental to conservation. This includes a deeper understanding of the philosophical differences underpinning social and natural sciences and the implications of these differences (Moon & Blackman 2014). For example, it is important to understand that the potential insights of social science are not always amenable to quantitative methods or models (Drury et al. 2011). Such knowledge, however, is not enough. Specific actions need to be taken to overcome institutional and capacity barriers within the conservation science community. Suggested steps include increasing the breadth of social science content within undergraduate and graduate conservation biology and environmental management (e.g., forestry, fisheries, and agriculture) programs; ensuring that conservation journals equally support the publication of natural, social, and interdisciplinary articles

and that these journals have social science editors and reviewers; improving the representation of social scientists in conservation-related departments and research institutes, including in leadership positions (e.g., department heads, deans); rethinking funding structures so that there is greater financial support for the social sciences (commensurate to the need); taking steps to ensure greater participation, better exposure, and more comprehensive treatment of the social sciences at conservation conferences; selecting natural and social scientists equally for conservation fellowship programs; and placing social science on an equal footing in interdisciplinary research projects by ensuring that social scientists are not an afterthought and are equally represented at all stages of project design, implementation, analysis, and writing.

Because capacity begets capacity, taking steps such as these will stop the chicken-or-egg phenomenon currently occurring in conservation science. However, changing the ideologies and culture of the conservation science community may be more challenging than simply changing a name or the membership. Conservation science will increasingly need to make room for different worldviews, opinions, and approaches and for deliberations on results that conflict with each other (Green et al. 2015). Yet as Viseu (2015:291) argues, “We must insist on the value of complexity, so that divergent thinking is not eclipsed in the effort to speak with one voice. We must make room for the disputes that are at the center of knowledge production.” Fundamental to this process will be open-mindedness, patience, humility, honesty, listening, willingness to differ, and clear communication (Winowiecki et al. 2011).

Second, conservation organizations often recognize the importance of the social sciences and are increasingly engaging in and funding conservation social science research. Government conservation agencies are also taking into account social science research when making decisions about the environment, for example, when evaluating an environmental assessment or the potential of creating a new national park. Yet at some level, many agencies and organizations are still grappling with the what, how, and why, which requires considerable evidence of the distinct value proposition of specific conservation social sciences to key aspects of their missions in order to contemplate the path to incorporating or mainstreaming. Thus, developing an understanding of the social sciences and their organizational and conservation benefits is an important first step for many conservation agencies and organizations. Once the case has been made, specific actions are needed to strategically increase social science capacity within conservation organizations and agencies. We propose 6 practical steps: recognize agency, organizational, and financial barriers to incorporating conservation social sciences; take steps to overcome these barriers by building understanding of and support for the conservation social sciences within

the organization; identify the conservation problem or problems that the agency or organization aims to address and highlight their social dimensions, partnering with social scientists from the beginning of the process to frame key topics, questions, and approaches; brainstorm key topics for investigation or research questions and prioritize them to establish a conservation social science agenda; partner with, contract, or hire conservation social scientists to carry out the work; and appoint one person to be accountable for ensuring social science is continually incorporated into projects and that results will inform decision making (Bennett & Roth 2015).

This entire process may require organizations to revisit their theory of change and, while doing so, to examine where social science insights may be useful. Doing so with social scientists could generate new insights into unquestioned assumptions about values, mental models (including about history), cognition, human or organizational behavior, and social dynamics and help identify where conservation efforts are likely to yield unintended side effects because of individual, collective, or organizational realities or responses that were previously unforeseen by the organization. Pragmatically, conservation organizations could establish dedicated funding streams for social science programs or personnel or create mechanisms to fund external social science research. Organizations seeking to engage the social sciences should develop a clear idea of the social science approach that suits their needs and recognize that engaging with all manner of and approaches to conservation social sciences can improve conservation policies and practice. It makes sense to start with a pilot social science initiative before scaling up.

We recognize that there are a number of conservation organizations and agencies that actively incorporate the social sciences at various levels in the organization as part of monitoring and evaluation processes or throughout the project cycle (e.g., The Nature Conservancy, Conservation International, Wildlife Conservation Society, Rare, Ecotrust, the U.S. Fish and Wildlife Service and National Park Service). Yet the scope and scale of engagement within these large and well-known organizations is not readily apparent. A review of how, at what stages, and the extent and efficacy with which conservation organizations of different sizes use the social sciences is beyond the purview of this paper, but it would be an insightful endeavor.

Third, in the global conservation policy arena, mainstreaming would be supported by promoting social sciences in and through global conservation policy-influencing organizations such as the United Nations Environment Program and the IUCN, which can uniquely advance a global community of practice around the conservation social sciences. Although the SSWG of the SCB plays an important role as a professional organization, there is also a need for better integration of the

conservation social sciences in policy development. The IUCN GESSP may take a leading role in promoting and highlighting the role of the social sciences in improving the policy and practice of conservation. A promising recent initiative of the IUCN GESSP is to launch the IUCN Social Science for Conservation Fellowship Program to investigate and demonstrate where and how social science perspectives, methods, and approaches can improve understanding of and address challenges related to the human dimensions of conservation. Additional steps that could be taken by such organizations for the conservation social sciences are writing and distributing position papers or policy briefs that demonstrate the value of applying the social sciences in conservation; leading the way in demonstrating and documenting the role of the social sciences through codeveloping or facilitating interdisciplinary, multibenefit, high-impact partnerships with global development organizations and agencies (e.g., United Nations, Oxfam, or U.S. Agency for International Development); collaborating with the Global Environment Facility and other global conservation financing agencies to guide and incentivize conservation organizations and government agencies to use the social sciences to understand, improve, and document the human context and impact of interventions; advocating for enhanced social science integration in future global sustainability agreements (e.g., Convention on Biological Diversity); using conservation meetings such as the World Conservation Congress, World Parks Congress, and International Congress for Conservation Biology to promote a better understanding of the role of social sciences in conservation; and providing practical guidance for how conservation organizations can integrate methods, practitioners, and approaches from the social sciences into their mandates, projects, capacity, and funding streams to design more effective conservation, better understand impacts of conservation, etc. Such a body could support broad and systematic reviews of social science perspectives on different pressing or emerging conservation challenges (e.g., wildlife crime, social conditions for conservation success, large scale marine protected areas) to identify lessons learned, make recommendations, and propose directions for future research. At the same time, central hubs or bodies that might support the integration of social sciences into conservation need adequate seed and core funding and sufficient capacity to persist and successfully promote this mandate. The conservation funding community thus has a clear role in enabling such a global conservation social science initiative; the IUCN GESSP is only one such example.

Finally, we turn the mirror on ourselves and highlight the important role social scientists must play in the mainstreaming process. Conservation social scientists need to be willing and able to better engage with natural scientists and conservation practitioners. Academic training can produce social scientists who are challenged

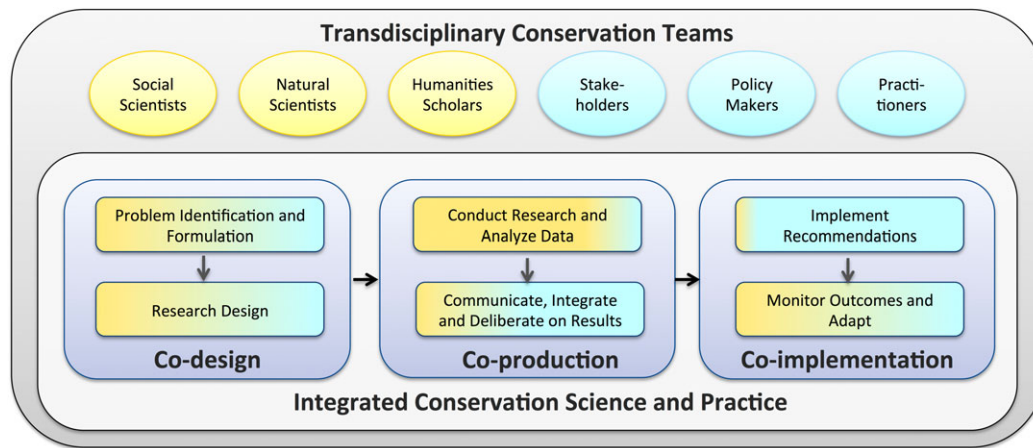


Figure 2. Framework for a collaborative and integrated conservation science and practice.

to communicate their research outcomes with diverse nonspecialist audiences or to provide politically realistic and action-oriented recommendations. The way social scientists communicate may be too academic or theory laden to be accessible, which will likely interfere with initial and ongoing engagements with natural scientists, conservation organizations, and policy makers. The academic focus on research and publications may also interfere with conservation social scientists' abilities to take sufficient time to collaborate meaningfully and to make efforts to influence conservation practice. Finally, conservation social scientists often neglect to integrate ecology into their training programs and their research—often relying instead on proxies such as perceptions or behaviors—leaving natural scientists and others wondering about the real-world ecological implications of this research. To connect and gain traction, social scientists may need to reflect on their outreach strategies (e.g., explaining their theory and methods, communicating clearly in outputs, translating insights into understandable and actionable recommendations) and grapple with how their work links to conservation biology and ecological outcomes throughout the research process. This does not mean the theory and language of social science should be abandoned; rather, it means social scientists need to learn to communicate for different audiences and purposes. Specifically, we propose that social scientists would benefit from science communication courses. In short, conservation social science remains an emerging field of practice that will need to meet natural science and practitioner colleagues part way in order for more effective integration to take place.

Toward a Collaborative and Integrated Conservation Science and Practice

Conservation science needs to be inclusive, integrative, and collaborative in order to understand and address the conservation challenges of the 21st century. We argue

that the social sciences play a critical role in improving marine and terrestrial conservation and more broadly in the theory and practice of environmental management. We are not suggesting that conservation social science alone can solve conservation problems or that social and natural scientists with their tools and methods should sit side by side and use research to solve conservation problems. Conservation as a practice is necessarily multi- and interdisciplinary; that is, it requires an understanding of both natural and social systems and collaboration between natural and social scientists. It is also transdisciplinary, meaning it requires collaboration among researchers, practitioners, policy makers, and stakeholders (Fig. 2). We assert that good interdisciplinary and transdisciplinary conservation scholarship requires a solid understanding of and attention to disciplinary differences and contributions. Discussions across disciplinary and science-to-action boundaries are challenging but worth undertaking because these efforts, at the very least, will lay the groundwork for better mutual understanding and, at best, will contribute to better conservation outcomes. This disciplinary and real-world integration should be done at all stages in the conservation research-to-action cycle while making allowances for the need to balance feasibility, efficiency, and effectiveness.

The time is right to take active steps to mainstream the social sciences in conservation at all scales, from individual initiatives to national or global policies, and in different types of organizations and projects. There is widespread recognition of the need to understand social dimensions and support for engaging the conservation social sciences. Although each subfield of the conservation social sciences has a distinct contribution to make, they remain underutilized and their potential contributions largely unrealized. There is thus a need to intentionally and carefully increase knowledge of the diversity of the social sciences and to build social-science capacity in the conservation science, practice, and policy arenas. We suggest a number of actionable steps to mainstream the

social sciences in conservation in order to overcome ideological, institutional, knowledge, and capacity barriers to integration. Yet, there is still much to learn. We recommend a review of past successes and failures in integrating social science into real-world conservation projects (i.e., not just into interdisciplinary research projects) and organizations and documentation of best practices to facilitate better incorporation in the future. This would promote learning and help social scientists have a more meaningful impact in the future of conservation. It would also be worthwhile to document strategies to balance feasibility, efficiency, and effectiveness in integrated conservation science projects. A productive engagement with the conservation social sciences will likely require long-term ongoing partnerships, knowledge and capacity building, open dialogue, clear communication, reflection on past and present practice, and a willingness to adapt programs of work. A more inclusive conservation science (i.e., one that includes methods and insights from the natural sciences, the social sciences, and the humanities) will enable the conservation community to produce more ecologically effective and socially just conservation. Mainstreaming the conservation social sciences will facilitate the uptake of the full range of insights and contributions from these fields into conservation policy and practice.

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Literature Cited

- Augustine S, Dearden P. 2014. Changing paradigms in marine and coastal conservation: a case study of clam gardens in the Southern Gulf Islands, Canada. *The Canadian Geographer/Le Géographe Canadien* **58**:305–314.
- Bennett NJ, Roth R. 2015. The conservation social sciences: What? how? and why? Canadian Wildlife Federation and Institute for Resources, Environment and Sustainability, University of British Columbia, Vancouver, British Columbia.
- Campbell LM. 2005. Overcoming obstacles to interdisciplinary research. *Conservation Biology* **19**:574–577.
- Castree N, et al. 2014. Changing the intellectual climate. *Nature Climate Change* **4**:763–768.
- Chan KMA, Pringle RM, Ranganathan J, Boggs CL, Chan YL, Ehrlich PR, Haff PK, Heller NE, Al-Khafaji K, Macmynowski DP. 2007. When agendas collide: human welfare and biological conservation. *Conservation Biology* **21**:59–68.
- Christie P. 2011. Creating space for interdisciplinary marine and coastal research: five dilemmas and suggested resolutions. *Environmental Conservation* **38**:172–186.
- Clark SG, et al. 2011. College and university environmental programs as a policy problem (part 1): Integrating knowledge, education, and action for a better world? *Environmental Management* **47**:701–715.
- Decker DJ, Riley SJ, Siemer WF. 2012. Human dimensions of wildlife management. JHU Press, Baltimore, Maryland.
- de Snoo GR, et al. 2013. Toward effective nature conservation on farmland: making farmers matter. *Conservation Letters* **6**:66–72.
- Drury R, Homewood K, Randall S. 2011. Less is more: the potential of qualitative approaches in conservation research. *Animal Conservation* **14**:18–24.
- Escobar A. 1998. Whose knowledge, whose nature? Biodiversity, conservation, and the political ecology of social movements. *Journal of Political Ecology* **5**:53–82.
- Fox HE, Christian C, Nordby JC, Pergams ORW, Peterson GD, Pyke CR. 2006. Perceived barriers to integrating social science and conservation. *Conservation Biology* **20**:1817–1820.
- Green SJ, Armstrong J, Bogan M, Darling E, Kross S, Rochman C, Smyth A, Veríssimo D. 2015. Conservation needs diverse values, approaches, and practitioners. *Conservation Letters* **8**:385–387.
- Hicks CC, et al. 2016. Engage key social concepts for sustainability. *Science* **352**:38–40.
- Kareiva P, Marvier M. 2012. What is conservation science? *BioScience* **62**:962–969.
- Kimmerer R. 2013. Braiding sweetgrass: indigenous wisdom, scientific knowledge and the teachings of plants. Milkweed Editions, Minneapolis, Minnesota.
- Leff E. 1994. *Ciencias sociales y formación ambiental*. Gedisa, Barcelona, Spain.
- Lowe P, Whitman G, Phillipson J. 2009. Ecology and the social sciences. *Journal of Applied Ecology* **46**:297–305.
- Manfredo MJ, Vaske JJ, Rechkemmer A, Duke EA, editors. 2014. Understanding society and natural resources. Springer, Dordrecht, the Netherlands. Available from <http://link.springer.com/10.1007/978-94-017-8959-2> (accessed October 1, 2015).
- Mascia MB, Brosius JP, Dobson TA, Forbes BC, Horowitz L, McKean MA, Turner NJ. 2003. Conservation and the social sciences. *Conservation Biology* **17**:649–650.
- Moon K, Blackman D. 2014. A guide to understanding social science research for natural scientists. *Conservation Biology* **28**:1167–1177.
- Moser C, Moser A. 2005. Gender mainstreaming since Beijing: a review of success and limitations in international institutions. *Gender & Development* **13**:11–22.
- Newing H, Eagle CM, Puri R, Watson CW. 2011. Conducting research in conservation: social science methods and practice. Routledge, London.
- Pascual U, Phelps J, Garmendia E, Brown K, Corbera E, Martin A, Gomez-Baggethun E, Muradian R. 2014. Social equity matters in payments for ecosystem services. *BioScience* **64**:1027–1036.
- Reyes-García V, Huanca T, Vadez V, Leonard W, Wilkie D. 2006. Cultural, practical, and economic value of wild plants: a quan-

- titative study in the Bolivian Amazon. *Economic Botany* **60**:62–74.
- Sandbrook C, Adams WM, Büscher B, Vira B. 2013. Social research and biodiversity conservation. *Conservation Biology* **27**:1487–1490.
- Schultz PW. 2011. Conservation means behavior. *Conservation Biology* **25**:1080–1083.
- Sievanen L, Campbell LM, Leslie HM. 2012. Challenges to interdisciplinary research in ecosystem-based management. *Conservation Biology* **26**:315–323.
- Vaccaro I, Smith EA, Aswani S, editors. 2010. *Environmental social sciences: methods and research design*. Cambridge University Press, Cambridge. Available from <http://ebooks.cambridge.org/ref/id/CBO9780511760242> (accessed October 2015).
- Viseu A. 2015. Integration of social science into research is crucial. *Nature* **525**:291–291.
- Welch-Devine M, Campbell L. 2010. Sorting out roles and defining divides: social sciences at the World Conservation Congress. *Conservation and Society* **8**:339–348.
- Winowiecki L, Smukler S, Shirley K, Remans R, Peltier G, Lothes E, King E, Comita L, Baptista S, Alkema L. 2011. Tools for enhancing interdisciplinary communication. *Sustainability: Science, Practice, & Policy* **7**:74–80.