John Rombough

The Conservation Social Sciences: What?, How? and Why?

Edited by Nathan J. Bennett and Robin Roth

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The Conservation Social Sciences:
What?, How? and Why?

A report for conservation organizations, foundations, practitioners, agencies and researchers

Edited by Nathan J. Bennett and Robin Roth

With contributions from Michael Barkusky, Nathan J. Bennett, Kai M. A. Chan, Douglas A. Clark, Georgina Cullman, Alia M. Dietsch, Graham Epstein, Sarah C. Klain, Michael J. Manfredo, Michael Paul Nelson, Robin Roth, Richard Stedman, Tara L. Teel, Rebecca E. W. Thomas, John A. Vucetich and Carina Wyborn

Layout: Sarah Klain
Cover graphics: This painting from the wall of artist John Rombough's house shows Tse-kue Theda ("The old lady of the falls"), which is a sacred site and cultural landscape for the Lutsel K'e Dene First Nation in the protected area called Thaidene Nene ("The land of our ancestors"). Used with permission of the artist.

"Conservation problems are social and economic, not scientific, yet biologists have traditionally been expected to solve them" - Schaller, 1992

"Conservation actions are ultimately human behaviors, and it is vital to understand how social factors (e.g., markets, cultural beliefs and values, laws and policies, demographic change) shape human interactions with the environment and choices to exploit or conserve biodiversity" - Fox et al, 2006

"..close involvement of social researchers with their expertise, theories and methods, into conservation biology is a prerequisite for progress in the field"
- de Snoo et al, 2012

"One of the anomalies of modern ecology is that it is the creation of two groups, each of which seems barely aware of the existence of the other. The one studies the human community, almost as if it were a separate entity, and calls its findings sociology, economics, and history. The other studies the plant and animal community (and) comfortably relegates the hodgepodge of politics to "the liberal arts." The inevitable fusion of these two lines of thought will perhaps constitute the outstanding advance of the present century." - Aldo Leopold, 1935

Executive Summary

Each of the fields of conservation social science has made and can make a unique contribution to understanding the relationship between humans and nature and to improving conservation outcomes. Conservation scientists, practitioners and organizations recognize the importance of the conservation social sciences and are increasingly engaging in and funding conservation social science research. Yet conservation organizations and funders often lack a clear understanding of the breadth of the conservation social sciences, the types of questions that each field of conservation social science poses, the methods used by disciplinary specialists, or the potential contribution of each field of conservation social science to improving conservation practice and outcomes. Limited social science capacity and knowledge within conservation organizations may also mean that conservation practitioners and organizations looking to fund conservation social science research do not know where or how to begin defining a social science research agenda.

This report presents a series of papers that were given as part of a workshop titled "The conservation social sciences: Clarifying 'what?', "how?' and 'why?' to inform conservation practice" that occurred at the North American Congress for Conservation Biology in Missoula, Montana in July 2014. The workshop brought together specialists from the breadth of the conservation social sciences to define the contributions of their disciplines and fields to conservation through exploring the 'what?', 'how?' and 'why?' of each area of expertise. The resultant report aims to stimulate dialogue among conservation organizations, foundations, agencies, practitioners and researchers about the role of the conservation social sciences. It is intended to build capacity, promote knowledge and foster engagement with conservation social sciences in order to improve conservation practice and outcomes.

The first chapter of the report introduces the conservation social sciences. The body of the report provides succinct synopses of the different conservation social sciences by specialists in Psychology, Economics, Sociology, Anthropology, Political Science and Governance, Human Dimensions, Political Ecology, Ethics, Education and Communication, Conservation and Development, and Science and Technology Studies. The concluding chapter a) provides a broad overview of the topics explored, questions asked, methods used and contributions made by each field of conservation social science and b) presents a process by which conservation organizations or funders can define and prioritize a conservation social science research agenda. We propose five steps to guide organizations wishing to better employ the conservation social sciences: 1) Recognize and overcome organizational barriers to incorporating conservation social sciences and build support for and understanding of the conservation social sciences; 2) Identify the conservation problem(s) that the organization aims to address and highlight their social dimensions; 3) Partner with social scientist(s) to frame key topics, questions and approach; 4) Brainstorm key topics for investigation or research questions and prioritize them to establish a conservation social science agenda; and 5) Partner with, contract or hire conservation social scientist(s) to carry out the work.

About the Canadian Wildlife Federation

The Canadian Wildlife Federation is dedicated to conserving Canada's wildlife and wild spaces on behalf of all Canadians. The Canadian Wildlife Federation uses a balanced approach to conservation that involves public education, scientific research and co-operation with government and other environmental organizations. The Canadian Wildlife Federation engages groups and individuals through educational, action-oriented programs and initiatives.

About the Social Science Working Group

Comprised of conservation scientists and practitioners from around the world, the Society for Conservation Biology's Social Science Working Group (SSWG) is committed to strengthening conservation social science and improves the integration of this science into conservation practice. The SSWG organizes opportunities for information exchange, dialogue and debate to develop the capacity of conservation practitioners to apply conservation social science.

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- *Nathan J. Bennett & Robin Roth*

Conservation and the social sciences

Conservation research has traditionally been dominated by natural scientists, who, with their methods and tools, have made important discoveries and contributions to conservation knowledge, policies, programs and practice. However, it is broadly recognized that natural science alone cannot solve conservation problems (Chan et al., 2007; Kareiva & Marvier, 2012). For example, Schaller (1992) argues that "Conservation problems are social and economic, not scientific, yet biologists have traditionally been expected to solve them." Conservation frequently occurs in spaces dominated by human uses "…thereby necessitating attention to human values, practices and ambitions" (Wilkie, Adams, & Redford, 2008; Welch-Devine & Campbell, 2010, p. 339). It is also well understood that the social sciences have an important role to play in understanding and overcoming conservation challenges: "close involvement of social researchers with their expertise, theories and methods, into conservation biology is a prerequisite for progress in the field" (de Snoo et al., 2013, p. 5). Over the last few decades, there has been increasing engagement with and development of the conservation social sciences (Mascia et al., 2003). The Social Science Working Group (SSWG) of the Society for Conservation Biology (SCB) was formed in 2003 with representation from nearly 50 countries around the world, it became the second largest group of all sections and working groups within the SCB by 2011. There are an increasing number of conservation social science publications, many conservation organizations have hired social scientists, numerous environmental management bodies have formed social science working groups and foundations are increasingly seeking to fund conservation social science work. Yet, overall, the social sciences have remained somewhat sidelined in conservation work and their role is often misunderstood by conservation organizations, practitioners, researchers and funders. This ultimately means that many of the potential contributions of the social sciences to improving conservation policies and practice are lost.

Challenges to engaging with the conservation social sciences

There are a number of reasons why social sciences may be less integrated into the mandates of conservation organizations and why natural and social scientists often find it challenging to work together in interdisciplinary teams (Christie, 2011; Fox et al., 2006; Moon & Blackman, 2014; Welch-Devine & Campbell, 2010). These barriers can be summarized as follows:

- Philosophy or Ontology – Natural and social scientists may have different theories of how the world works which may lead to distinct understandings of the connections

between nature and humans. This can lead to quite different ways of thinking about a problem or of approaching research.

- Epistemology – Natural and social scientists may view the nature and scope of knowledge differently, particularly what constitutes acceptable methods and valid data.
- Training and experience – The different disciplines and fields of conservation social science require specialist training to understand theories and methods and experience in their application and analysis.
- Language and theories – Conservation social scientists engage with discipline specific language and different theories to understand topics under study, which can be inaccessible to non-specialists.
- Practice – Social scientists often interact with nature and with humans in different ways than natural scientists. For example, social scientists might study human actions to understand impacts on the environment whereas natural scientists would study the environment.
- Tools and methods – Conservation social scientists use different tools and methods, including ethnography, interviews, surveys, focus groups, arts-based methods and participatory methods.
- Organizational Culture – Conservation organizations or funders may have an organizational culture that primarily employs, understands or values either natural or social sciences.
- Capacity - Limited social science capacity within conservation organizations may mean that conservation practitioners and organizations looking to fund conservation social sciences do not know where or how to begin engaging with social sciences.
- Knowledge - Conservation organizations and funders may lack a clear understanding of the breadth of the conservation social sciences, the types of questions that each field of conservation social science poses, the methods used by disciplinary specialists, or the potential contribution of each field of conservation social science to improving conservation practice and outcomes.
- Labels and Traditions – There are different labels that refer to somewhat distinct but overlapping traditions: "conservation social science", "environmental social science", "human dimensions of conservation" and "human dimensions of natural resource management." Those trained in one tradition may not be familiar with other traditions that have a similar emphasis. Furthermore, those trained in a specific discipline may not even be aware of applied areas of study focusing on conservation.
- Different interests – Organizations and individual scientists and practitioners are often simply more interested in nature or humans and motivated by concerns for one or the other.

It is important that both conservation social scientists as well as conservation organizations aiming to engage with social scientists recognize the potential challenges and barriers to collaboration. Working to overcome potential barriers and towards a better integration of the conservation social sciences requires respect, patience, humility, openness, and time. Specific actions may also need to be taken to increase social science capacity within conservation organizations. For example, engaging with social sciences may require hiring or partnering with

trained and experienced conservation social scientists. At the very least, conservation organizations require knowledge of the what, how, and why of the different conservation social sciences.

Overview fields of conservation social sciences

A basic understanding of the fields of conservation social science, including their focal areas, histories, theories, methods, and contributions, is a pre-cursor for organizations aiming to engage with or fund conservation social science research. Yet, even conservation social scientists are challenged to describe what it is that our colleagues in other fields of conservation social science do and contribute. In order to address knowledge shortcomings regarding the conservation social sciences, the editors of this report convened a workshop titled "The conservation social sciences: Clarifying "what?", "how?" and "why?" to inform conservation practice" at the North American Congress for Conservation Biology in Missoula, Montana in July 2014. The workshop brought together specialists from the breadth of the conservation social sciences to define and communicate the contributions of the different disciplines to conservation through exploring the "What?", "How?" and "Why?" of each area of expertise.

So, what are the conservation social sciences? We take a broad view of the conservation social sciences that embraces the environmental humanities (Castree et al., 2014). The conservation social sciences draw on such diverse disciplines as anthropology, sociology, political science, economics, psychology, human geography, education and communication studies and law. Many disciplines have applied sub-disciplines 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, and political ecology, draw upon various social sciences or both social and natural science. Though not considered social sciences, the environmental humanities, including environmental history, environmental ethics and philosophy, eco-literary studies and eco-cultural studies, and the arts can also help us to better understand and communicate about historical, current and envisioned relationships between humans and nature.

Role of the conservation social sciences

Just as there is often a dichotomy between the natural and social sciences, there are a number of divergent ways of understanding the purpose and role of the social sciences in contributing to conservation. For example, there are divergent perspectives and opinions among natural scientists about whether social sciences should serve an instrumental role (e.g., communication and policy translation, facilitation of environmental management) or a non-instrumental role (e.g., understanding human values and interests, understanding human actions and impacts) (see Lowe, Whitman, & Phillipson, 2009). Many social scientists differ on whether their role is to conduct research *for conservation* or research *on conservation* (Sandbrook, Adams, Büscher, & Vira, 2013). Sandbrook et al (2013) explain that research for

conservation "is a response to the recognition that the natural science methods of conservation biology are insufficient to find solutions to complex conservation problems that have social dimensions" (p. 1488). Research on conservation "…seeks to increase understanding of the practice of conservation" (p. 1488). Potentially divergent understandings and opinions include that the conservation social sciences:

- … should focus on basic or applied research.
- … should contribute to theory or policy.
- … must be descriptive or prescriptive.
- … should be constructive or critical and disruptive.
- … need to support management effectiveness or social equity considerations.
- … are the purview of practitioners or academics.
- … should employ quantitative or qualitative methods.
- … need to be guided by normative, instrumental or non-instrumental beliefs.
- … ought or ought not to lead to advocacy (for humans or for nature).

Of course, conservation social science is all of these things and it can serve overlapping and complementary purposes. This complexity makes it all the more important that organizations seeking to engage the social sciences have a clear idea of the type of approach that suits their needs while recognizing that engaging with all manner of and approaches to conservation social sciences can aid in improving conservation policies and practice (Redford, 2011). There is one common misperception that needs to be dispelled – social scientists are not merely meeting facilitators, public educators, behavior changers or implementers (Welch-Devine & Campbell, 2010). Conservation social scientists are data collectors and analysts who can, however, provide insights that will help to improve these processes.

Overview of the report

Each of the fields of conservation social science, as well as the environmental humanities and arts, has made and can make a unique contribution to understanding the relationship between humans and nature and to improving conservation practice. The body of this report provides conservation organizations, practitioners, agencies and academics with succinct overviews of different conservation social sciences by specialists in each field (Table 1.1). In conclusion, we review the conservation social sciences and propose a process by which conservation organizations or funders can define and prioritize a conservation social science research agenda.

Table 1.1 - Speakers who presented on different fields of conservation social science

Disciplines and Fields of Conservation Social Science	Speaker
Anthropology (Environmental Anthropology)	Georgina Cullman (American Museum of Natural History)
Sociology (Environmental Sociology)	Richard Stedman (Cornell University)
Economics (Ecological Economics)	Kai Chan (University of British Columbia), Michael Barkusky (Pacific Institute for Ecological Economics), Sarah Klain (University of British Columbia)
Psychology (Environmental Psychology)	Tara Teel (Colorado State University), Alia Dietsch (The Ohio State University), Michael J. Manfredo (Colorado State University)
Political Science (Environmental Governance)	Graham Epstein (Indiana State University)
Philosophy (Environmental Ethics)	Michael Paul Nelson (Oregon State University), John A. Vucetich (Michigan Technological University)
Science and Technology Studies	Carina Wyborn (University of Montana)
Environmental Education and Communication	Rebecca Thomas (Colorado State University)
Conservation and Development	Nathan Bennett (University of British Columbia)
Political Ecology	Robin Roth (York University)
Human Dimensions of Conservation and Natural Resource Management	Douglas Clark (University of Saskatchewan)

*Notably absent from the workshop and this report are summaries of human geography, environmental law, environmental history, and environmental humanities.

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2. A Primer on Environmental Anthropology for Conservation Biologists
- Georgina Cullman

Environmental anthropology is the study of the relationships between human societies and the physical, biotic, built, and cognitive environments. Environmental anthropology investigates how culture mediates the relationships between people and their environment. The specialty arose when anthropologists were confronted with the widespread environmental changes occurring in their study sites; thus, environmental anthropology research is often applied. Environmental anthropology encompasses the full disciplinary breadth of anthropology: biological anthropology, cultural anthropology, linguistic anthropology, and archaeology. The roots of environmental anthropology can be found in other anthropological traditions, including cultural ecology (later ecological anthropology) and cognitive anthropology. Cultural ecology, pioneered in the 1920s-30s by Julian Steward and others, explores human adaptations to the environment. John Bennett, Roy A. Rappaport, Andrew P. Vayda, and others applied a systems perspective to cultural ecology and transformed it into ecological anthropology in the 1960s-1980s (Sponsel, 2007). Cognitive anthropology examines the relationship between thought and society; for example, a cultural model from the Western tradition is the nature-culture dichotomy, in which nature and culture are separate and opposing spheres, which shapes the way that people living in Europe perceive their environment. While environmental anthropological research began much earlier, the Anthropology and Environment Society of the American Anthropological Association was founded in 1996 and in 2011 had 695 members (Anthropology & Environment Society, 2014).

To give a taste of the diversity of environmental anthropological research, I provide examples of research topics within each anthropological subfield of environmental anthropology. In archeology, the main focus has been uncovering the historical evidence of human impacts on the environment in order to help put current impacts in context. One example is work documenting the presence and distribution of archeological dark earth soils across the Amazon, pockets of enriched soils that are both evidence and product of a large-scale civilization in the period 1250-1650 (Heckenberger et al., 2007). While in the popular imagination, the Amazon is a pristine environment, this archeological work shows that the current landscape is a product of past human use, which has important implications for conservation approaches in the area. Biological anthropologists have worked to advance primate conservation as well as to show the evolution of the human species in relationship to environmental change. Linguistic environmental anthropologists explore how languages reflect their speakers' biotic and physical environment. Recent work in linguistic environmental anthropology has explored and begun to explain the global distribution and co-occurrence of biological and linguistic diversity (Smith, 2001). Cultural anthropologists have revealed the complex social dynamics that can make conservation initiatives thrive or fail (see below for an example from Namibia). Cultural anthropologists have also been at the forefront of research examining issues relating to environmental justice. Ethnoecology, a concentration that lies at

the intersection of linguistic and cultural anthropology, parallels and intersects with environmental anthropology. Research in ethnoecology, with foundational work in the 1950s-60s by Brent Berlin, Harold Conklin, Charles Frake and others. focuses on how people understand, identify, and classify parts of their environment (e.g., plants, birds, or fish) (Sponsel, 2007). Political ecology is another important approach and is an academic tradition that emerges from interaction between geography and environmental anthropology (treated separately in this report).

A major method of environmental anthropology is ethnography, which includes participant observation and interviews. Historically, anthropology's scale of analysis focused on small-scale communities and the smallholder households that made up these communities but connecting local-scale dynamics with broader political and economic forces became more common starting in the 1990s. Today, multi-site ethnography is an increasingly popular methodology for portraying local-to-global connections. For instance, in her ethnography *Friction*, Anna Tsing (2007) told the story of the different impinging interests on an Indonesian rainforest to explain why some interests gain traction through the invocation of universals and advance at the expense of others – in this case, logging companies at the expense of the indigenous Meratus Dayaks – by presenting data from the rainforests of Borneo as well as from the boardroom of the Ford Foundation in New York City. Discourse analysis (Mühlhäusler and Peace, 2006) and methods from cognitive anthropology such as freelists, pile sorts, ranking and trial sorts are also used in environmental anthropology (Bernard, 2011). Many environmental anthropologists collect biophysical data themselves or collaborate with natural scientists to incorporate biophysical data in their analyses.

An ongoing tension in environmental anthropology (that also reflects tensions within the broader discipline) is the validity and appropriateness of quantitative research methods for exploring cultural phenomena relating to the environment. Given the dominance of the natural sciences and economics in environmental management and politics, some environmental anthropologists argue for wider adoption of quantitative methods to improve the reception of anthropological research findings (Charnley and Durham, 2010). Others argue that the quantitative approaches may conceal more than they reveal (Satterfield, 2013) and that the conclusions arrived at by qualitative research are unique contributions that anthropology can make to addressing environmental problems (West, 2005).

Environmental anthropologists have provided insights of value to conservation practice and policy. In particular, they have elucidated the pitfalls, for conservation initiatives, of the inappropriate application of Western paradigms (e.g., the nature-cultural dichotomy) to diverse cultural contexts (West & Brockington, 2006). Conservation practitioners may be unaware of how these paradigms affect their work, but these paradigms shade what is understood, what kinds of interventions are applied, and what goals are set for a project. For example, the understanding of nature as being restricted to pristine or unpopulated areas has been shown to be false. While there are undoubtedly many examples where people have converted natural cover and have contributed to biodiversity loss, in some places people have cultivated forests, nurtured regenerating forests, (Fairhead & Leach, 1995) and protected forests from encroachers who would cut down the forest (Nepstad et al., 2006).

Environmental anthropologists and ethnoecologists have been at the forefront of documenting and advocating for the better recognition of what is sometimes known as

traditional ecological knowledge (Davis and Wagner, 2003; Tengö et al., 2014).). They have critiqued the evaluation of indigenous knowledge systems through the lens of scientific knowledge because this process results in the loss of nuance and context. For example – the Wounaan, indigenous people living in what is now eastern Panama – have made strategic alliances with conservationists in support of their land claims. Conservationists, however, have emphasized a dualism in the landscape between forest and nonforest, a dualism that polarizes the forest as cultureless and the nonforest as natureless. This contrasts with Wounaan river-oriented, rhizomic cosmologies, which characterizes the landscape through dynamic waterways. This arborescent emphasis has material as well as symbolic consequences: water conservation is sidelined in favor of forest and tree conservation and environmental education for Wounaan children also emphasizes trees and forests (Velasquez Runk, 2009). In this case, the exclusion of traditional ecological knowledge and worldviews from a broader conservation framework has led to problematic conservation practices with long-ranging consequences for the persistence of that traditional ecological knowledge and for Wounaan wellbeing.

Another productive insight has emerged from critiquing the use of economic models to describe human interaction with the environment. While the use of these models is warranted in specific contexts, they do not work well universally – neither at all times in the developed world, nor in all parts of the globe. Good economic models do include factors beyond the narrowly utilitarian or financial when describing what motivates human behavior. At the scale of an individual conservation project, however, improperly applied economic models can serve to obscure more than they illuminate. In particular, important non-economic values are lost when aspects of the natural environment are objictified as economic resources (West, 2005; Sullivan, 2006). In describing why hunting continues in a community-based natural resource management area in Namibia despite meat handouts by the conservation agency, Sullivan writes, "in the hunt, the process and act of hunting is not reducible to the consumption of meat at the end of it, although this, of course, is important. It also is about moving bodily through a landscape, which itself is the embodiment of multilayered meanings and sources of memory" (Sullivan, 2006, p. 119).

Through its history, environmental anthropology has engaged productively – if at times contentiously – with conservation communities. For instance, conservation practitioners have contended that the critique that environmental anthropology has provided of conservation practice and ideology has been unproductively damaging. They argue that environmental anthropologists critique conservation projects but do not provide concrete suggestions about how to improve the work (Redford, 2011). In more recent years, however, there are a growing number of collaborations between conservation initiatives and environmental anthropologists with longtime research in sites of conservation concern. Increasing interdisciplinary training opportunities (e.g., University of Georgia's Integrative Conservation program was founded by environmental anthropologist J. Peter Brosius and others) has also led to better collaboration and insight between conservation practitioners and environmental anthropologists. Whether working directly in partnership with conservation practitioners or providing analysis relevant to conservation work, environmental anthropology continues to play an important and distinctive role in the social science of conservation.

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3. Conservation and Sociology
- *Richard C. Stedman*

Prologue

"We now know that animal populations have behavior patterns of which the individual animal is not aware but which he nevertheless helps to execute. Thus, the rabbit is unaware of cycles, but he is the vehicle for cycles. We cannot discern these behavior patterns in the individual, or in short periods of time. The most intense scrutiny of an individual rabbit tells us nothing of cycles. The cycle concept springs from a scrutiny of the mass through decades." - Aldo Leopold, Sand County Almanac, 1935

Introduction: Definition and Perspectives

Sociology studies the cycles of rabbits (or their equivalent within human populations) rather than individual rabbits. Conservation occurs across a wide range of social contexts and structural forces; understanding the impact of context and the factors embedded therein is crucial to successful conservation efforts. Sociology stresses the social contexts in which people live, how they are influenced by society/social structure and how they in turn reshape their society (Stedman 2013). This paper presents some central tenets and tensions within sociology, briefly introduces methodological considerations, and offers a few key considerations for future work. Until quite recently, sociology as a discipline has not emphasized the relationship between social behaviors and the natural world. Environmental and natural resource sociology (Dunlap and Catton 1979) focuses on elements of the material world as driving behavior, moving away from the perspective that humans are somehow "exempt" from the laws of nature. Environmental sociology is still relatively underrepresented compared to many approaches.

As a social *science*, sociology is concerned with prediction of persistent patterns of regularity in social life (Babbie 2007). The question "how much freedom do people have to act" (and how much regularity *is* there in human behavior) is an on-going topic of discussion in the social sciences. This question involves the relationship between structure-- the enduring, orderly patterns of relationships between elements of society--and "agency" as the capacity of individuals to act. Sociology tends to emphasize social structure, while psychology and economics argue that individuals have a great deal of agency to behave as they choose. An intermediate perspective is that social structure is created through the interaction of people, and is constantly in the process of being re-negotiated (Giddens 1990). Both individual and societal level factors are at work in most issues of concern to conservation.

Sociology emphasizes social facts: values, norms, and structures *external to the individual* (Durkheim 1951). Sociology enables an awareness of the relationship between our own experience and our context. Mills (1959) distinguishes between "troubles" and "issues:"

troubles are the experience of an individual, issues refer to how these troubles come to be widespread. For example, in the conservation realm, a Laotian villager's decision to engage in illegal hunting can be interpreted using the "troubles versus issues" framework. One's hunting behavior can be analyzed via individual attitudes toward conservation but also, his perceived risk of getting caught, economic benefits, and many others. The *distribution* of these attitudes and where they come from invites a sociological analysis: what other economic choices are present and why? What is the legal system that creates relative risk and relative benefit? Here, the arrangement of social, ecological, and economic realities is analyzed as producing these individual attitudes and behaviors.

Sociological Perspectives

Three theoretical approaches underlie more specific sociological analyses that apply to conservation. *The Functionalist Perspective* emphasizes that each component helps maintain social systems that trend toward equilibrium. Here, shared values hold society together. Individuals are taught these basic values and are rewarded for "learning the rules." As rules are learned, they are reinforced, thus strengthening the social order. Much of the human dimensions work that emphasizes values, socialization, and norms, is—at least implicitly--based in the functionalist perspective. For functionalists, power is benign; the role of management is simply to define into law public goals that emerge from collective agreement. Therefore, resource management reflects the will of the people (broadly construed), rather than particular interest groups. Functionalist theories have fallen out of favor because they are less able to account for instability and conflict. In periods of acute social change, taken-for-granted rules are more likely to be challenged.

Conflict Perspectives suggest that social organization emerges from battles over resources. Society has winners and losers; research asks who are they and how do they emerge? Particularly influential are Weber's (1958) notion of power and Marx's treatment of class (Marx and Engels, 1986). Marx defined class via the relationship people have to the production of goods in society. He divided society into two classes: property owners and labor. This original meaning has been recast in basic monetary terms (those with more wealth are of a 'higher class' than those with less). Power is defined as the ability of individuals or groups to achieve their goals or impose their will over the wishes of another. Social organization is created as society becomes dominated by those who gain and maintain control against the will of others. For example, conservation agencies are influenced by powerful interests that provide crucial political or financial support. This puts stakeholder groups and management authorities in a very different light; resource management would not necessarily be expected to reflect the broader interests and will of society, but the interests of a particular group. Context matters. Weber believed that the use of power would become more transparent in periods of rapid social change, as consensus-based power declines. Here, organizations would either lose power or have to revert to more obvious forms of control. For example, as perspectives on conservation diversify, previously taken for granted assumptions may be questioned.

In contrast to functionalist and conflict perspectives that see the creation of social order as unfolding more or less "automatically," *Symbolic Interactionism* emphasizes people as actively creating and assigning meaning to phenomena through social interaction (Blumer 1969). Our

behavior depends on how we define ourselves and others, and how we interpret the particular context we are in. These definitions and interpretations are shared by members of a society or cultural group, but differ between groups.

Sociological Methods

Sociology engages a wide array of quantitative and qualitative methods. Traditional quantitative approaches have emphasized survey methods that focus on attitudes and behaviors. Although these approaches closely align with social-psychological approaches, more sociological analyses tend to focus on how responses differ by key structural factors: place, time, respondent characteristics, etc. Secondary data analysis (i.e., through census or other sources) can reveal aggregate patterns and larger trends, but in general, such approaches are challenged by the lack of 'social monitoring' that allows researchers to look at trends over time or compare across context. Qualitative approaches such as interviews, focus groups, and participant observation are often used to reveal deeper rationales underlying behavior, but researchers should keep in mind that many people lack a sociological imagination to recognize how they are being affected by their context.

Changing Contexts: Considerations in Conservation

Generally, sociological perspectives argue that "context matters" and that particular behaviors – rather than being based in quasi universal "rules" – will manifest differently in different contexts. It thus becomes crucial to understand some of the key social changes occurring in the location targeted for a conservation initiative that comprise this "context". A few such trends for the United States are described below, some of which equally apply to many other locations throughout the world.

Change and Diversification, due to differential rates of immigration and reproduction across racial and ethnic groups, creates challenges and opportunities. These diverse populations present managers with new and different conservation understandings/traditions. This almost certainly will pose interesting opportunities for managers to develop novel programs in coming years as the configuration of stakeholder groups changes substantially, and traditional assumptions may be challenged.

Population redistribution and urbanization. Growth is not distributed evenly across class, region, or type of place. Growth rates are fastest among lower income groups, and migration patterns demonstrate an exodus from the Midwest and Northeast to the South and Southwest. Substantial outmigration from urban city centers and towards higher amenity rural places adjacent to these cities is another key trend. Thus, despite a de-concentration of population density, the footprints of most urban areas continue to expand. Coupled with this is a decline of more "traditional" (i.e., resource extractive) rural places. Those that are located proximate to thriving urban centers or that have amenities such as water, favorable climate, scenery, and or abundant public land – are transforming from landscapes characterized by forestry and farming to landscapes characterized by tourism or second home development. Again, challenges and opportunities to conservation are embedded in these changes. From the symbolic interactionist

perspective, new urbanites are actively negotiating and creating new meanings about nature. The power relations articulated in the conflict perspectives suggest that these newer meanings are likely to proliferate, challenging established rural norms, in places undergoing rapid change.

Globalization. Globalization and mobility of ideas and resources, makes conservation far more difficult, by fostering cause/effect relationships that are complex, non-linear, spatially and temporally distant, and characterized by uncertainty. Resource managers cannot have regulatory authority over these systems. As the demands of management become more complex, governmental wildlife management agencies in many states (and nations) find they have inadequate capacity. Much of this capacity to manage wildlife resources and their uses is being taken up by NGOs and other private citizen groups and/or partnerships between government and the private sector.

Inequality, or disparities in the distribution of assets (e.g., wealth, but also opportunity), is increasing over time, in the United States and in most other countries. The unequal distribution of resources affects conservation capacity. Conservation actions can have disproportionate impacts on certain segments of the population. Boyce (1998) suggests that greater inequality produces environmental degradation because environmental degradation entails winners and losers. Greater inequality implies greater ability of winners to impose power on losers and with greater resulting degradation that will result. This phenomenon underlies attempts at international conservation where vast inequalities exist between developed nations and the local systems – often in developing nations in the global south – in which they are attempting to practice conservation (e.g. Brechin et al. 2003).

Conclusion

This paper has briefly outlined the application of sociological theory and research to conservation. The context surrounding conservation is variegated and changing rapidly. Sociological perspectives help us to respond to the complexity of conservation by helping us to f understand myriad contextual factors that affect the behavior of individuals, groups, and institutions. It is difficult to consider fully the complex suite of factors that lie at the heart of sociological analyses. Individuals are easier to study and manage than groups. Moreover, seeing individual behavior as rooted in larger societal issues may be unsettling to conservation practitioners because the scale and complexity of intervention needed to influence social forces often are beyond the reach of their authority and expertise. Addressing these larger issues might require partnerships with other organizations—including those not identified as "conservation" organizations. Although such partnerships that are difficult to establish and maintain, interest in partnering to influence broader social phenomenon affecting conservation has been growing and will continue to grow in the future.

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4. Ecological Economics and Its Potential Role in Conservation
- *Kai M. A. Chan, Michael Barkusky & Sarah C. Klain*

Definition and History

Ecological economics ("EE") is an eclectic interdisciplinary body of scholarship that seeks to understand the interdependence of economies and ecosystems. In contrast to specialists within economics, ecological economists approach the challenge of economic analysis with a different set of assumptions and perspectives, mainly related to scale, efficiency and equity. EE is sometimes seen as an outgrowth of environmental and resource economics, with a hybrid past including ecosystem ecology. This characterization, however, would be rejected by others who trace EE back much further to various economic theorists. For example, EE draws insights from the late classical economist John Stuart Mill (Mill 1848), who also advanced self-improvement, individual freedom, and utilitarianism (a theory in normative ethics that strives to maximize net benefits including by reducing suffering).

EE is often contrasted with more 'mainstream' economics, including environmental economics (Faber, 2008; van den Bergh, 2001). EE explicitly considers the economy as a subsystem of ecosystems and so subject to certain biophysical limits, including the imperfect substitutability of human-made capital for natural capital. Human-made capital includes infrastructure, knowledge and labor such as a water filtration plant. Natural capital is the stock of environmental assets that provides a flow of ecosystem goods and services, such as a forest that filters water, provides timber and habitat for other species (van den Bergh, 2001). This imperfect substitutability is in contrast to the general substitutability often assumed either explicitly or implicitly in mainstream economic analysis. That economic growth is good is certainly *not* taken for granted. Ecological economics also has a greater concern for distributive justice, defined as a socially just distribution of goods, and temporal dynamics, especially irreversibilities associated with ecological degradation and economic development (Faber, 2008).

Modern EE was effectively born in the 1980s (although its gestation began earlier with works by Kapp, Polanyi, Mishan (1966), Georgescu-Roegen (1971), Schumacher (1973) Boulding (1978) and Daly (1977)). Ecological economists vigorously debate many important issues, including the appropriate role of valuation, which is the estimation of what something is worth, in monetary or other measures. Another debated topic is the pervasiveness of externalities, which occur when the *social* costs or benefits involved in the production or consumption of a good or service differs from the *private* costs or benefits to the producers or purchasers of a good or service. For example, air pollution from a coal plant is considered a negative externality whenever detrimental health impacts, medical costs, *etc.* occur as a result of its operations. Orchardists, in contrast, typically provide a positive externality to bee keepers since their trees

provide nectar to the bees. Ecological economists debate the implications of framing these phenomena as "externalities" (i.e., conveying implicitly that things not already traded in markets ought to be incorporated into markets) as well the extent of the need for transformative changes to economic systems (Spash, 2013).

Focus

Ecological economists examine a range of topics at the intersection of ecosystems and economic activity. Researchers examine the human (and specifically, economic) dependency on ecosystems via the concept of 'natural capital', although the appropriateness of advancing notions of capital or valuing it in monetary terms is debated internally. Other ecological economists investigate the ways in which prosperous and just outcomes might be better achieved through ecological protection, social inclusion, and more sustainable approaches to development (e.g., renewable energy). They ask, for example, What is the contribution of ecosystems and ecosystem services to human well-being (Daily, 1997)? How ought we to account for the interests of future generations via discounting (Sumaila & Walters, 2005)? What would be an appropriate cost for a product or service given the externalities associated with its production and distribution? How might landscapes, biological populations, and ecosystems respond in an ecological-economic system? What are appropriate responses to the complexity of such systems (Norgaard, 2010)? What is the optimum scale of the economy given the reality of ecological constraints (Victor, 2008)? And generally, how to best allocate and distribute resources for efficient, just, and ecologically sustainable outcomes?

Methods

To answer such questions, ecological economists employ the methods of mainstream economics as well as other disciplines. In addition to various methods of economic valuation and economic modeling, ecological economics also includes energy accounting (including energy return on energy invested (EROEI), thermoeconomics, and exergy analysis), and various specialized forms of modeling (including bioeconomic, thermodynamic, and system dynamics). Alongside model results, acceptable evidence might include changes or differences in prices, or in stated or revealed willingness to pay.

Contributions to Conservation

Conservation can make use of ecological economics in both well-recognized and less prominent ways. Ecological economics includes making the case for protected areas and other forms of conservation, most famously (or infamously) by valuing ecosystem services (Balmford et al., 2002; Costanza et al., 1997). This can be strategic when—as so often the case— conventional economic analysis leaves out important considerations. Well-cited tangible examples include demonstrating that conservation of natural vegetation in watersheds can pay off via enhanced hydropower production (Guo, Xiao, & Li, 2000) or reduced water filtration costs (Chichilnisky & Heal, 1998), and that natural habitats can "pay their way" via pollinators

enhancing coffee production (Ricketts, Daily, Ehrlich, & Michener, 2004). Ecological economics can also help identify policies, management and incentive systems (e.g., some payments for ecosystem service schemes), and developments that are more sustainable biophysically, more responsive to ecological complexity, and more conducive to long-term human well-being (Power, 2001). Ecological economic research can also strengthen arguments for ecological restoration (Loomis, Kent, Strange, Fausch, & Covich, 2000).

As a diverse field, the future challenges are myriad. The field continues to struggle to appropriately integrate the diversity of ways in which nature is important to people, particularly in decision-making contexts (Chan, Satterfield, & Goldstein, 2012). An additional challenge is the integration of biophysical and economic dynamics simultaneously into models relevant to decision-making without introducing overwhelming complexity. It will continue to strive to make the case for economic development without growth, and to assist the transition towards that goal. EE will continue to seek to understand in more general terms the conditions under which, and to what extent, human-made capital is substitutable for natural capital.

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5.   A (Social) Psychology Approach in Conservation
- Tara L. Teel, Alia M. Dietsch & Michael J. Manfredo

Introduction

Social psychology has made important contributions to human dimensions research, which employs concepts and methods from the social sciences to inform conservation decision-making (Manfredo, 2008; Vaske & Manfredo, 2012; see also Clark, this report). This sub-discipline of the broader field of psychology recognizes that humans are "social animals" who are influenced by their surroundings. The focus is on the *individual* in the context of social groups, and its application to conservation has typically centered around the following key questions:

1. What are people's thoughts and behaviors regarding the natural environment, and conservation issues more specifically?
2. Why do people think and behave the way they do in that context?

Prior research aimed at addressing these questions can be categorized into two main topical areas. First, research has examined the behavioral dimensions of *impacts* that people have on the environment. Studies in this area have focused on determining what behaviors lead to undesirable impacts, why they occur, and behavior-change strategies for minimizing those impacts. Included in this category are investigations of how values shape human relationships and interactions with the natural world as well as studies exploring the impacts of conservation and management decisions on local communities. A second body of research has explored people's *preferences* regarding a host of conservation-related topics. This would include studies on attitudes toward conservation issues, species, and management actions, preferences for services or programs (e.g., outdoor recreation opportunities, tourist experiences) that conservation organizations could provide, and broader perceptions of conservation goals.

Much of the early human dimensions work in the U.S., which had a strong social psychology emphasis, developed largely out of a concern about the impacts of outdoor recreation on natural resources. This occurred following World War II when there was a rising trend in recreation participation corresponding to economic growth and increased leisure time. Research stemming from this tradition was very applied and driven primarily by public land management agencies interested in dealing with the growing "people problems" in natural resource management (Manfredo, 2008). While this early work was mostly descriptive in nature and narrowly focused on recreation topics, the tradition has evolved to include a greater emphasis on theory and a wider array of natural resource issues. A second tradition that has played an important role in the growth of human dimensions, more globally, developed from increased attention to conservation-related topics *within* the social science disciplines. Conservation psychology, an emerging and applied sub-discipline within psychology, is one of several fields falling within this tradition that have arisen out of a need for understanding human behavior in a conservation context (Clayton & Meyers, 2009).

Key Conceptual Domains

   A commonly-applied theoretical framework, used to organize key concepts from social psychology, is the cognitive hierarchy, or value-attitude-behavior (VAB) framework (Homer & Kahle, 1988; Figure 5.1). According to this model, individual behavior is guided by a series of interrelated cognitions arranged in a hierarchical fashion, each of which is described briefly below.
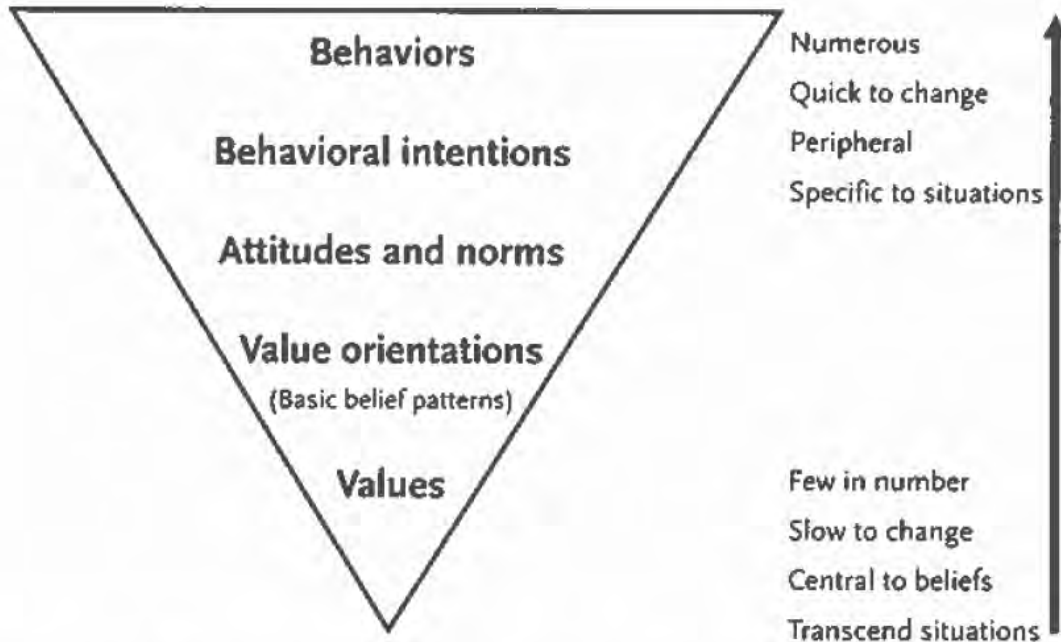
Figure 5.1 - The cognitive hierarchy model of human behavior. Figure adapted from Manfredo (2008), reproduced with kind permission of Springer Science + Business Media.

   Values. At the base of the hierarchy are values, which are foundational cognitions that shape the formation of many attitudes that form within an individual. They represent people's fundamental beliefs about how the world should be and define appropriate modes of conduct. Broad examples reflective of underlying human needs include self-expression, egalitarianism, belongingness, and being humane toward other living things. Values are slow to form, transcend specific actions and situations, and are typically limited in number compared to other types of cognitions such as attitudes (Rohan, 2000; Schwartz, 2006). Values are formed at an early age through socialization and accumulation of experience and tend to remain stable within individuals over time. While values are shown to vary more across cultures as opposed to within cultures, more specific cognitions known as *value orientations* can play an important role in explaining individual variation in conservation-related attitudes and behaviors. Value orientations consist of networks of basic beliefs that organize around values and provide

contextual meaning to those values in relation a particular domain such as wildlife or the natural environment (Teel & Manfredo, 2009).

Attitudes. Attitudes are defined as the association of a positive or negative evaluation and an object (e.g., issue, entity, behavior) in memory (Eagly & Chaiken, 1993). As an example, if someone feels that hydraulic fracturing is a bad thing, he/she would be characterized as having a negative attitude toward this energy development practice. Compared to values, attitudes are the faster-forming cognitive processes of individuals that are ongoing and highly adaptive. They vary in terms of salience, importance, strength, and certainty and are often rooted in beliefs about the outcomes of a given issue or behavior (Ajzen & Fishbein, 1980). Following on the above example, it may be that the person's negative attitude stems from the belief that fracturing will have detrimental impacts on the environment. While early research raised concerns about the utility of the attitude concept, showing a lack of correspondence between attitudes and behaviors, attitude theory in social psychology has made significant advances in recent decades. Later research has revealed, for example, that certain kinds of attitudes – those that are stronger and more accessible from memory – are more likely to guide behavior; certain factors (e.g., behavioral intentions, ability to perform the behavior) may intervene between attitudes and behaviors; and that consistency is greatest when attitudes and behaviors are measured at the same level of specificity. As an example, if a conservation organization is interested in predicting levels of support among the public for a species reintroduction in an area, it would be important in attitude measurement to be clear about the specific context of the reintroduction (e.g., timing, location, purpose). As another example, studies have shown that while the public tends to be less supportive, in general, of lethal control strategies for managing wildlife in North America, there are specific contexts (e.g., occurrence of a human or pet attack) in which attitudes are more favorable. In light of these advancements, attitudes remain one of the most highly studied concepts in human dimensions research given their role in being able to understand, predict, and affect behavior as well as to simply describe how people feel about a given conservation issue (Manfredo, 2008).

Norms. Norms signify the social or group-level influences on individuals and are defined as beliefs about how one *ought* to behave or think. They represent ideal or prototypical thoughts or behaviors that serve to unify and ensure compliance among group members. Norms typically involve sanctions that help give "rights" to the group to control others if they deviate from expected group behaviors. Similar to attitudes, norms can vary based on the context or specifics of a given situation, and for certain behaviors, they can have a powerful influence and can also be a useful tool in behavior change attempts (Cialdini, 2003).

An important contribution of the VAB framework lies in its ability to differentiate among key concepts that may have different implications for conservation. As an illustration, the terms attitudes and values often get used interchangeably in the literature, and yet they are delineated as unique concepts in social psychology. Values are not likely to be influenced readily at an individual level, as values are formed early on in youth and stable over time. However, values can be very effective in organizing people to action if appropriately applied through "values framing" strategies in communication (Clayton, Litchfield, & Geller, 2013; McKenzie-Mohr, Lee, Schultz, & Kotler, 2012). In comparison, attitudes, which are the more immediate antecedents to behavior, are more transient and therefore easier to affect than values.

Attitude-Behavior Change. Another domain of interest in social psychology with important implications for conservation is attitude-behavior change. While behavior change is often perceived as the ultimate solution to many conservation problems, developing effective communication programs to achieve this goal is extremely difficult. Research has revealed time and again that information provision alone is not enough to promote a certain way of thinking or action and that various factors can influence communication success. The extent of attitude-behavior change may depend, for example, on the channel of communication, message source, strength of arguments presented, recipients' prior knowledge, beliefs, and attitudes, and barriers to adoption of alternative behaviors. The persuasion literature in social psychology provides evidence of this complexity and offers general guidance in the form of key considerations for designing effective communication campaigns (Schultz, 2011; Wood, 2000). Lessons learned highlight the importance of understanding target audiences, which can be facilitated by social science research, and engaging people's motivation and ability to process informational messages. Tied to this area of investigation is a growing emphasis on community-based social marketing in conservation, which has its roots in social psychology and marketing principles (McKenzie-Mohr et al., 2012).

Conclusions and Future Directions

As conveyed in the title of a recent article in *Conservation Biology* by Wesley Schultz (2011), "conservation means behavior", highlighting the significance of human behavior in contributing to conservation problems and the need for behavior change solutions. Psychology, and more specifically social psychology that takes into account one's social surroundings, holds the promise of addressing this need given its emphasis on understanding how and why individuals behave the way they do. To improve the utility of social psychology research in conservation in the future, there is a need for greater integration with the ecological sciences as well as other social science disciplines. In particular, research is needed that considers the individual as part of a multi-level social-ecological framework (Manfredo, Teel, Gavin, & Fulton, 2014). This would expand the focus on individual thought and behavior to include an understanding of how individuals interact with and are impacted by broader cultural and societal forces (e.g., urbanization, globalization), environmental factors, institutions and governance structures, and social networks. Another area recommended for future research is in the study of emotions. Social psychology applications have largely focused on cognitive factors such as attitudes and values, and yet emotions can also have a strong influence on behavior and play a role in behavior-change strategies (Manfredo, 2008).

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6.   Political Science, Environmental Governance and Conservation
- *Graham Epstein*

Introduction

The relationship between conservation and political science is organized around the topic of environmental governance. Environmental governance refers to the process by which individuals and organizations create rules and policies to influence behavior and environmental outcomes (Lemos & Agrawal, 2006). Jones, De Santo, Qiu, and Vestergaard (2013) elaborates upon this definition to suggest that governance is ultimately about the set of social, economic and legal incentives that are used to achieve conversation objectives. These incentives can range from the creation of laws that forbid undesirable activities, to education campaigns that provide knowledge connecting conservation to social and economic benefits. However, governance is clearly distinguished from approaches such as privatization, state control, and community management to recognize that conservation depends upon a complex interplay of multiple stakeholders, activities, and policies at the local, national and international level. Therefore when political scientists consider questions about conservation they begin by conceptualizing them as governance problems, and consider the ways in which environmental governance systems can be designed to increase prospects for ecological and social success.

Although political scientists have studied conservation and environmental management over many years (Berkes, 1977; Johannes, 1978), research took off rapidly with the work of Elinor Ostrom (1990) on small-scale environmental governance and Oran Young (2002) on international environmental regimes. Scale is thus one of many issues of contention for political scientists, as scholars seek to reconcile the effects of policies across levels of social and biological organization. Further debates center on the relative influence of power and how it affects prospects for meaningful policy change (Clement, 2010; Ribot, Agrawal, & Larson, 2006), how to account for social and ecological dynamics (Janssen, Anderies, & Ostrom, 2007), and the extent to which democratic values or performance criteria should be used to evaluate success (Agrawal, 2003).

Focus

Political science and conservation tend to intersect around two sets of questions. First many adopt a policy analysis orientation to ask questions about the performance of environmental policies. These studies typically seek to identify policies associated with desirable social and ecological outcomes. Definitions of success vary widely, to include measures of ecological performance (i.e. resource conditions, sustainability), social performance (i.e. livelihoods), and social justice (i.e. participation, equity) (Pagdee, Kim, & Daugherty, 2006). It must be noted that many political scientists would agree with the statement "that the people can be unwise but cannot be wrong" (Finer, 1941, p. 339), meaning

that the subjective evaluations of success by local communities may be more important than researcher defined objective measures. Second many political scientists ask questions about the design and administration of environmental policies (Berkes, George, & Preston, 1991; Sen & Nielsen, 1996). For these studies, the central question is not directly about performance, but rather about the distribution of authority and responsibility between states and communities on a variety of governance activities such as rulemaking and monitoring. Once again evaluation takes place along several dimensions including the efficiency, effectiveness, equity and legitimacy of a governance system.

Methods

Methodological pluralism is an important feature of the literature on environmental governance (Poteete, Janssen, & Ostrom, 2010). The methods used range widely from agent-based models, lab and field experiments, to case studies and statistical analysis to leverage their respective strengths and triangulate research findings. Experiments are used to uncover the behavioral micro-foundations of conservation, and have repeatedly demonstrated that human beings are far more cooperative than economic theory predicts provided they are given opportunities to freely communicate and build trust (Cardenas, Stranlund, & Willis, 2000; Janssen, Holahan, Lee, & Ostrom, 2010). Although experiments have become increasingly complex they remain highly abstract when compared to the rich real-world context of conservation. Thus case studies feature prominently in this literature and are used to uncover details regarding the ways in which actors interact with each other and the environment, and the formal and informal rules that govern these interactions.

Case studies have demonstrated that the effects of conservation policies vary across context and that one-size-fits-all policies are rarely successful (Basurto & Ostrom, 2009). For instance, community-based policies are less likely to be (immediately) successful in the context of large communities with competing interests (Vedeld, 2000); while state-based policies often fail when a single policy is implemented across variable social and ecological landscapes (Acheson, 2006). Notwithstanding the importance of context, statistical methods are used to assess the effects of environmental policies across multiple cases. In general, the results of a number of studies suggest that success is more likely when communities play some role in rulemaking and monitoring processes (Coleman, 2009; Persha, Agrawal, & Chhatre, 2011).

Contributions & Recommendations for Conservation Policy

The first generation of environmental governance scholarship refuted the inevitability of Hardin's (1968) tragedy and demonstrated the viability of community self-governance. These findings have contributed to the adoption of collaborative, participatory or community driven conservation policies around the world (Agrawal, Chhatre, & Hardin, 2008; Naughton-Treves, Holland, & Brandon, 2005). Examples include fisheries co-management in East Africa, the Caribbean and Southeast Asia (Hara & Nielsen, 2003; Pomeroy, Katon, & Harkes, 2001); decentralized forest governance in Asia, Africa and Latin America (Larson & Soto, 2008) and community-based wildlife conservation in Eastern and Southern Africa (Gibson & Marks, 1995).

Overall the effects of these policies have been mixed, with some notable successes; but also a number of cases where policies failed to achieve their intended social, ecological and democratic objectives. These failures have been linked to cultural and economic differences in groups that undermine trust and the sense of collective identity (Lam, 1998; Singleton & Taylor, 1992); a failure to to transfer real power to communities despite a rhetoric of reform (Ribot et al., 2006), and dominance by corrupt local elites (Blaikie, 2006).

The literature on environmental governance has, however, produced a wide range of knowledge to support the design and implementation of successful conservation policies. The first, and perhaps most important of which is that environmental policies perform differently when applied to different contexts or environmental problems (Acheson, 2006; Dietz, 2005). This has been labeled the 'concept of contingency' by some and stands as a direct challenge to 'one-size-fits-all' policies. Therefore many political scientists recommend that conservation programs provide opportunities for meaningful local participation or outright control to enhance the fit between policies and the social-ecological context in which they operate (Chhatre & Agrawal, 2009; Lockwood, Davidson, Curtis, Stratford, & Griffith, 2010). For instance traditional fishing communities successfully managed fisheries for many years by relying upon local knowledge to select conservation rules that regulate the timing, place or methods used to capture fish, rather than Western quota-based approach (Johannes, 1978, 2002).

Second, political scientists draw attention to the role and prominence of conditional cooperation in human society (Rustagi, Engel, & Kosfeld, 2010). In its most general sense conditional cooperation implies that individual pro-conservation behavior depends upon a belief that: (1) one's peers will conserve and (2) that conservation will yield long-term benefits. Therefore when local communities are allowed to take an active role in governance, they may indirectly motivate conservation by building a sense of community, trust and social capital (Chhatre & Agrawal, 2009; Coleman, 2009). Perceptions of net benefits can be influenced through a variety of approaches, including educating local resource users about the benefits of conservation (Jones, Qiu, & De Santo, 2013), and clearly defining eligibility to participate and benefit from conservation activities (Ostrom, 1990). Finally, although the role of local actors is often highlighted, state agencies and NGO's can increase prospects for successful conservation by providing resources for costly conservation activities, building social capital and capacity, and coordinating activities across multiple communities (Jones, Qiu, et al., 2013; Pomeroy & Berkes, 1997). For instance, Basurto and Ostrom (2009) describe the collapse of a community-based benthic fishery in Mexico which resulted from the arrival of migrant fisherman, and a state agency that was unable or unwilling to assist local fishers in protecting their resource. Finally, in the context of global climate change evidence suggests that communities are more likely to successfully adapt to change when governance involves diverse stakeholders including local actors, governments, scientists and NGO's to leverage their unique set of resources, knowledge and capabilities to devise effective and sustainable solutions (Armitage et al., 2008).

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7.   Conservation Ethics as a Conservation Social Science
- *Michael Paul Nelson & John A. Vucetich*

It is useful and common to speak about the "human dimensions" of conservation, and to think of human dimensions as a multifaceted collection of academic perspectives, including for example policy, sociology, and ethics. By contrast, to think about ethics as a component of "social science" reveals a fundamental (and, we think, widespread) misunderstanding about the nature of both social science and ethics. While both modes of academic understanding are focused on values, social science is interested in describing how and why people hold and manifest the values that they do. By contrast, ethics aims to use reason to understand what values we *ought* to hold and how we *ought* to manifest those values (Vucetich and Nelson 2012). That is, social science is, like all sciences, a descriptive endeavor, while ethics is a prescriptive endeavor. The need to understand the prescriptive or ethical aspect of conservation is essential, and inherited from the fact that conservation is ultimately founded on ethical premises about how we ought to relate to nature.

While discourse in ethics is more than 2,500 years old, the subdiscipline of environmental ethics is just 40 years old. Until recently, environmental ethics has been dominated by rigorous and systematic (yet quite ethereal) conversations about theories of value. Essentially, environmental ethicists have been interested in two basic questions: what aspects of nature deserve our direct moral consideration?, and why, on what basis? Over those 40 years, environmental ethicists have developed a sophisticated taxonomy of ethical positions.

Conservation ethics might be seen as a more recent attempt to ground-truth environmental ethics, to tie environmental ethics to other environmental disciplines, and to employ the rigorous intellectual tools of environmental ethics and philosophy to real efforts to understand and solve environmental problems (Nelson and Vucetich 2012, sometimes scholars use the term "ecological ethics", see Minteer and Collins 2005).

For conservation ethics, two of the most basic modes of operation are:

First, conservation ethics employs argument analysis – a tool for natural resource decision-making. Argument analysis is the process of evaluating the soundness of premises and the validity of arguments that underlie any particular ethical claim. This is perhaps best explained with an example.

Consider the question of whether or not we should hunt wolves. Of the various reasons that advocates of wolf hunting have offered for why we should hunt wolves, one reason is that doing so would promote wolf conservation. One expression of the formal argument (where P=premise and C=conclusion) associated with this reason for hunting wolves is:
>   P1. Wolf conservation requires that a critical minimum number of citizens have positive attitudes about and behaviors toward wolves.

P2. Wolf hunting would positively affect attitudes and behaviors of many who hate wolves.
P3. We ought to promote wolf conservation.
C. Therefore, we ought to hunt wolves.

When expressed this way, it becomes clear that this general argument represents two distinct, but related, arguments – an attitudinal and a behavioral version.

The behavioral version of the argument is:
P1. Wolf conservation requires that a critical minimum number of citizens behave favorably toward wolves, especially by not killing them.
P2. To allow wolf hunting would prevent an otherwise inevitable public backlash against wolves that would result in rates of poaching and loss of political support that would threaten the viability of wolf populations.
P3. We ought to promote wolf conservation.
P4. It is wrong to kill a living creature without an adequate reason.
P5. Conserving wolf populations is an adequate reason to kill individual wolves.
C. Therefore, we ought to allow wolf hunting.

One might begin to critique that argument in any number of ways: by pointing out that there is no evidence to suggest that poaching has prevented wolf populations from expanding in the western Great Lakes or Northern Rockies; or by pointing out that the best available social science suggests that provisions for killing wolves do not tend to promote tolerance for wolves; or by pointing out that people who threaten to poach wolves unless wolf killing is legalized are engaged in a kind of ecological blackmail by threatening harm against individual organisms and ecosystems unless their demands to kill are met, and that those of us who advocate for this argument unwittingly abet their blackmail. If one were to effectively demonstrate that any one of the premises is inappropriate, then the conclusion is not supported by the argument. That is, the reason that is represented by the argument is irrational in the sense that the reason does not adhere to the rules of logic.

The attitudinal version of this argument is:
P1. Wolf conservation requires a critical mass of people who respect wolves.
P2. There is a risk of losing that critical mass.
P3. Many people who do not respect wolves desire to hunt them.
P4. Hunting an animal generates respect for that animal.
 C1. Allowing people to hunt wolves is necessary for wolf conservation.
P5. We ought to promote wolf conservation.
P6. It is wrong to kill a living creature without an adequate reason.
P7. Conserving wolf populations is an adequate reason to kill individual wolves.
 C2. We ought to allow wolf hunting.

In this argument, C1 is a conclusion rising from P1 through P4. C1 then serves as the first premise in an argument that also includes P5, P6, P7, and C2. This argument might be critiqued

in many ways – but just one example. We might point out that P4 is a perverse misinterpretation of the relationship between respect and hunting. Hunting reinforces or deepens respect for the deer because the hunter knows the deer sacrificed his life for the sustenance of the hunter. In this relationship, respect exists before the hunting; the hunting did not generate respect, *ex nihlo*. In other words, the hunter respects the deer in spite of killing him, not because she killed him. The wolf-hater's *a priori* attitude, by contrast, is hatred, not respect. Her killing the wolf is thus an exercise of hatred – she would likely celebrate the killing. Without moral concern for the wolf, the wolf's sacrifice cannot be recognized. For hunters, recognition of sacrifice is necessary for the realization of respect. Other premises in this argument could likewise be inspected and critiqued. This example is summarized from Vucetich and Nelson 2014. Another example on the topic of whether scientists should be advocates can be found in Nelson and Vucetich 2009. Given the scarcity of formal training in logical and critical thinking, the use of argument analysis as a tool for formal decision-making is nearly non-existent. In sum, a fundamental purpose of conservation ethics is to use argument analysis as a means of evaluating the robustness and rationality (or irrationality) of claims about the values we ought to hold and manifest.

A second operational mode of conservation ethics is to synthesize knowledge from ethical theory and social sciences. For example, an environmental value orientation is a concept in social sciences that attempts to systematically categorize the ways in which humans value nature. That concept rests on a taxonomy of values that happens to bear very little relationship to the taxonomy of values that form the foundation of environmental ethics. For example, anthropocentrism and non-anthropocentrism are concepts that environmental ethicists have crafted. Social scientists have tended to assign meanings to those words that ethicists have shown to be conflations. For example, a recent analysis of basic environmental value orientations revealed that only 16% of survey questions designed to distinguish an anthropocentrist from a non-anthropocentrist were likely to accurately classify people as belonging to those two groups (Vucetich et al., forthcoming). Approaches like this have already been used to gain insight pertaining to what people think about whether we should genetically rescue an endangered population of wolves *and* why people think what they do, i.e., what is the ethical and perhaps metaphysical foundation upon which their beliefs are built (Gore et al. 2011).

Though yet unexplored in conservation ethics, there is an emerging interest in ethical thresholds. The social scientist or psychologist might help us in understanding not only what entities people associate with intrinsic value, but how strong or weak those commitments might be. The conservation ethicist would be able to apply well-developed theories in ethics to understand how we ought to handle those thresholds and dilemmas.

Finally, one should detect a relationship between the first and second operational modes of conservation ethics. A number of premises in arguments that influence environmental policy and decision-making are of themselves of an ethical/value nature. Clearly premises 4, 5 and 6 of the last argument are ethical in nature. Also, for example, consider the attention received, and the influence seemingly had, by the so-called "New Conservation" movement. The basic thesis

of New Conservation suggest that for conservation to thrive, we need to appeal to the values that people actually hold with regard to biodiversity – which New Conservationists assume to be largely anthropocentric values. That thesis is, *prima facie* an ethical proposition. Nevertheless, it may be an ethical proposition that can be evaluated, in part, with sociological tools, such as values-orientation assessment. Conservation ethics might provide us with a unique ability to assess the merits of this position.

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8.   Beyond 'the Gap': Connecting Conservation Science with Policy and Practice
- Carina Wyborn

Conservation biology has a mission to prevent biodiversity decline through scientifically informed conservation policy and practice. Despite many years of excellent science and some successes, lists of endangered species continue to grow. Conservation biology must now ask why and how to overcome this apparent contradiction. Science studies can help answer these questions.

Science studies focuses on the role of scientific knowledge and expertise in social and policy change. Key insights are as follows:

1. Research and scientific knowledge are not neutral, rather they reflect a particular time, place, and set of values (see Jasanoff and Wynne 1998);
2. The relationship between science, policy, and practice is not linear, 'the gap' is more aptly characterized as a complex interface of multiple competing agendas, perspectives, and types of knowledge (see van Kerkhoff and Lebel 2006);
3. Changing public opinion is not enough. Building effective relationships between science, policy, and practice requires changes to the institutions of democracy (Jasanoff 2012)
4. Knowledge is more likely to be used when it is credible, salient, and legitimate. Credibility concerns the scientific adequacy of technical evidence and arguments; salience refers to the relevance of knowledge to decision-makers needs; and legitimacy relates to perceptions of whether information is generated in fair and unbiased processes respectful of actors' divergent beliefs and values (Cash et al. 2003, Clark et al. 2011).
5. Connecting knowledge, policy, and practice requires dedicated resources and mechanisms to support communication between diverse actors, mediation between different perspectives, and translation of terminology into a common language (Cash et al 2006);
6. Co-produced knowledge, where the users of scientific knowledge are engaged from the outset, through the design and conduct of research, is more likely to be applied in policy and practice (Mansuer et al 2013).

These insights are relevant across the spectrum of conservation scientists, policy makers, practitioners, and funders. In particular, this research can show how to support more effective relationships between these groups of people to sustain lasting conservation outcomes.

Science studies began asking questions about the nature of science, how scientific knowledge is produced, and what distinguishes science from other types of knowledge. This work highlighted the broader social, intellectual, and political processes shaping the progression of scientific knowledge (Kuhn 1962). Science studies showed us that scientific knowledge is "socially constructed" – science does not discover the "truth" but rather it produces knowledge that reflects the particular time, place, and individuals involved in its development (Jasanoff 2004). While this lead to critiques of science studies as being anti-

science, many within the discipline argue that this critical stance is compatible with recognizing and addressing real environmental problems in the world (Forsyth 2003). Moreover, this work set the stage for a more inclusive science, which values many types of knowledge in addressing complex environmental challenges in both policy and practice.

More recently, science studies has turned to the mechanisms and processes that shape the "boundaries" between science, policy, and practice (Gieryn 1999, Clark et al. 2011). Originally focused on demarcating what is or is not science, "boundary work" shows that "the gap" between science and policy is actually a space of negotiation and communication (van Kerkhoff and Lebel 2006). This work also highlighted competing interpretations of reliable or useable knowledge, demonstrating that peer reviewed science alone is insufficient to bring about change in the world. The groundbreaking work of the Consultative Group on International Agricultural Research highlighted the variety of ways scientific knowledge can more effectively be used to change policy and practice across local to regional to global scales (Clark et al. 2011). Through global partnerships between researchers, policy makers, practitioners, community organisations and rural landholders, they have demonstrated that efforts to actively bring together these different actors lead to the creation and use of knowledge relevant to policy and practice. Boundary work provides critical insight into understanding and improving the connections between science, policy, and practice.

Science studies is a transdisicplinary endeavor that engages across diverse scientific fields while working with decision-makers, practitioners, and the public. Science studies researchers study what happens at the interface between science, policy, and practice, largely focused on what people "do" when developing and using scientific knowledge, and how scientific knowledge changes how decisions are made. The theoretical questions of science studies are largely explored through empirical case studies and historical analysis of the processes of knowledge production, policy making, and social change. For example, Clark Miller (2004) documents how the shifts from local to global climate models inspired a very different mode of global climate governance through the Intergovernmental Panel on Climate Change (IPCC). What was once a local phenomenon - weather - came to be understood as a global phenomenon – climate – in need of a global institutional response. This type of analysis illustrates the ways in which scientific framings of environmental problems create different ways of governing and managing the environment.

Empirical research in science studies utilizes diverse qualitative and quantitative social research methods. Primary data includes interviews, focus groups, ethnographic studies, quantitative surveys, while secondary data usually draws on policies, scientific studies, newspapers and other historical documents. Rich descriptive analysis and comparative case studies illustrate differences in how science is used and interpreted across cultures, countries, and contexts. Science studies scholars often focus analysis on the ways that scientific knowledge, expertise, or methods shape the relationships between people and nature in a given place. For example, Leach and Scoones (2013) combine an analysis of scientific and technical documents with interviews in case studies of carbon forestry in Ghana and Sierra Leone. Their study shows how carbon accounting methodologies, protocols and requirements shape the way in which carbon forestry projects are implemented on the ground. They conclude that despite efforts to support community-based carbon forestry, the level of expertise required to implement carbon accounting methods leads to state or private control

because the methods require a particular level of expertise. Analysis of the social and political implications of scientific methodologies shows that approaches to modeling and measuring practices enable or constrain particular pathways for conservation and development. As such, these types of studies highlight the importance of including diverse voices in the design, implementation, and dissemination of scientific research.

The turn from theoretical questions towards ways to improve the uptake of scientific knowledge in practice brought more participatory research methods. From local to global scales, the scientific community is increasingly emphasizing the importance of "knowledge co-production", where diverse scientific and non-scientific actors collectively design and conduct research. For example, Armitage et al (2011) examine the mechanisms to bring together local, traditional, and scientific knowledge to support co-management in the Canadian Arctic. They found the following important insights around the structure of co-management efforts to support knowledge co-production and learning:

1. Long-term commitment to support on-going institutions and learning;
2. Recognition that co-management requires continual cultivation;
3. Promotion of multi-layered institutional arrangements to link local actors, government officials and scientists;
4. Use of co-management institutions as clearing houses for information and to negotiate conflict;
5. Use of various modes of communication, deliberation and group interaction to encourage formal and informal relationships;
6. Existence of an enabling policy environment with commitment from higher order institutions;
7. Sensitivity to power dynamics and historical relationships that constrain trust building;
8. Fostering 'collective ownership' of problems through collaboration;
9. Recognizing crisis as windows of opportunity to rethink knowledge and learning processes for adaptation.

These types of institutional arrangements have high transaction costs however they also can provide triggers for positive social and ecological outcomes for groups negotiating the implications of environmental change (Armitage et al. 2011). Like boundary work, co-production assumes that scientific and other types of knowledge are more likely to be used by decision-makers when they are involved in the scientific process from the outset to address the challenges they face.

There are social, political, and ethical questions at the interface of science, policy, and practice regardless of scale. Questions about how to include more diverse types of knowledge in biodiversity governance is a common area of study, with researchers working at various scales, from the Intergovernmental Platform on Biodiversity and Ecosystem Services, to protected area design and management at local or national scales. The mechanisms to connect local knowledge with global science through ethical and effective governance remain a critical area for future research. In their comparative analysis of the IPCC and IPBES, Beck et al (2014) highlight differences between the two the institutional structure of the two global expert organisations, and the ways in which these structures shaped the ability for the process to integrate diverse knowledges beyond formal academic science. Their study also highlights the

importance of ongoing learning, reflectivity and institutional change to enable evolution of the governance of expertise.

The relationships between knowledge and power are foundational to science studies, leading to a large body of work focused on the role of scientific expertise within democratic decision-making processes. Swedlow (2011) examines how the concept of "old growth forests" emerged through the actions of conservation biologists and environmental lawyers to transform forest and wildlife science and management in the Pacific Northwest. Building on this analysis, Swedlow highlighted the conditions under which scientific, cultural and policy change are likely to occur. Other studies focus on the design of participatory processes that "open-up" conservation science and practice to be more inclusive of diverse perspectives. However, after many years critiquing the tight connections between knowledge and power, science studies faces an ongoing challenge in balancing critical analysis with more constructive guidance about how to reconfigure science, policy, and practice.

Conservation biology operates on the premise that science is critical to effective conservation practice. However, conservation as a science and a practice is increasingly realizing that science alone is insufficient to bring about change. As a discipline dedicated to understanding and improving the uptake of scientific knowledge in policy and practice, science studies has a lot to offer conservation biology. Like many other perspectives within the conservation social sciences, science studies offers a lens through which to value and integrate the contributions of non-academic knowledge into conservation science and practice. Science studies can inform the design of research, conservation programs, decision-making processes, and policy to be more inclusive of diverse perspectives. Through constructive critique and theoretically informed guidance, science studies can play a vital role in connecting conservation science with conservation outcomes.

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9. Informing Conservation Practice Through Environmental Education: The "What", "How" and "Why"
- Rebecca E. W. Thomas

It is increasingly clear that changing human behavior is a necessary precursor to achieving conservation goals (Schultz, 2011). Forces of modernization such as population growth, urbanization and rising levels of income and education have contributed to a general disconnect between humans and the natural world. At the same time, learning about nature often occurs in indirect ways (e.g., through television programming) as opposed to through direct experience, particularly among children (Louv, 2008; Kellert, 2002). Because the success of conservation initiatives hinges in part upon effectively communicating with diverse and increasingly disconnected audiences in a way that leads to changes in human behavior, environmental education (EE) and communication campaigns should be grounded in a theoretical understanding of behavior change. This paper will focus broadly on the role of communication and outreach within the field of EE, beginning with a brief history of the field and working definition, followed by several primary lessons learned over the last several decades. Additionally, the methods used by researchers in this field to evaluate EE efforts will be described and an emerging framework for applying behavior change theory to conservation issues will be discussed.

The evolution of the field of EE can be traced to two founding documents. The Belgrade Charter described the goal of EE as developing "a world population that is aware of, and concerned about, the environment and its associated problems…" (UNESCO-UNEP, 1976; p. 2). Two years later, the Tbilisi Declaration built upon this definition to suggest that EE should aim to understand individuals' values and attitudes in order to facilitate effective stewardship of the natural environment through development of individual skills. In other words, EE teaches people *how* to think as opposed to *what* to think by facilitating the establishment of an ecological foundation upon which people can base decisions about their behaviors and opinions (NAAEE, 2014). Over time, these fundamental goals and definitions have undergone critique and refinement, but the basic goal of EE remains one of environmental literacy, and ultimately, behavior change in terms of making informed decisions regarding natural resource stewardship. As such, several key lessons learned have emerged from researchers in this field who have sought to understand how to more effectively generate conservation behavior change.

First, knowledge alone is unlikely to lead to behavior change. Hungerford and Volk's (1990) seminal paper on affecting behavior change through EE prompted widespread thinking on gaps in conventional wisdom that merely providing people with information would lead to changing awareness or attitudes and that this in turn would lead to environmental action. In fact, biased processing can occur when new information contradicts an individual's broader values, attitudes and self-interests (Schultz, 2011). In order to increase the likelihood that positive behavior change will result from communication strategies, messages should be linked to individual values, beliefs and attitudes (Clayton, Litchfield & Geller, 2009; Schweizer, Thompson, Teel & Bruyere, 2009) and should take into account barriers to engaging in desired

behaviors (McKenzie-Mohr, 2012). This strategy recognizes that the so-called "general public" does not exist and therefore outreach and communication campaigns should incorporate tailored approaches that consider the plurality of cognitions, values, attitudes and prior experiences that might be represented across given segments of a target audience.

Secondly, doom and gloom strategies for communicating about natural resource issues are ineffective, particularly when the link between a behavior and a desired outcome is unclear due to a mismatch in scale between the issue and the action. Though these kinds of messages may serve to raise awareness about a global issue (e.g., climate change), they can discourage people from acting on that issue at a local level (Schweizer et al, 2009). In *Beyond Ecophobia*: *Reclaiming the heart in nature education,* David Sobel (1996) posited that instead of overwhelming young children, for example, with information related to environmental problems before they have the cognitive abilities to effectively process that information, the focus should instead be on nurturing a bond with the natural world. For older youth and adults, outreach and communication should involve a strong place-based component with a clear message that empowers the audience to take a specific action at a local level (Schultz, 2011; Schweizer et al, 2009; Sobel, 1996).

Finally, childhood experiences matter. Given the well-established relationship between time spent outdoors as a child and future commitment to natural resource stewardship (Chawla, 1999), a decrease in direct interaction with nature raises concerns about whether future generations will be interested in the management and conservation of natural resources. Furthermore, time spent in nature has been linked to psychological, spiritual and physical well-being (Louv, 2008). Research on environmental education can highlight ways to better connect an increasingly urbanized and distanced generation with nature and to explore the how technology can facilitate this connection.

Though evaluation of communication campaigns is needed to ensure that program objectives have been met, evaluation has historically been insufficiently applied in the field of EE (Heimlich, 2010). This is problematic given that the primary goal of many communication programs centers upon changing how people think about and engage with the natural environment (Hungerford & Volk, 1990). Without rigorous evaluation beyond simplistic pre- and post-measures, understanding broader conservation impacts of programs will be difficult. Specifically, follow-up measures conducted immediately after communication efforts take place may be inadequate to understand whether the program impact endures into the future. Establishing clear criteria for program evaluation is necessary for environmental educators who seek funding for future program support and to facilitate better collaboration between formal and informal educators (Heimlich, 2010). Situating evaluations within a larger body of theory exploring human behavior change within the context of EE is key to developing robust evaluations that can be scaled to other areas. However, because evaluations are often designed with the needs of the stakeholders in mind and used to improve upon existing programs, samples often lack internal validity (Mertens & Wilson, 2012). If EE evaluation is to be taken seriously and if we are to learn something from it, more rigor is needed (e.g., mixed methods and longitudinal data) and behavior change should be more explicitly linked with conservation outcomes.

Application of social marketing theory to conservation issues represents one approach that has achieved success in bringing about behavior change through a clear focus on metrics and

evaluation that links the effects of a well-defined target behavior on specific biodiversity outcomes at a local level. Specifically, this approach first defines behaviors and identifies barriers to engagement in these behaviors, followed by the development of a targeted communication strategy that is implemented in a pilot location. Then, unlike other evaluation strategies that use attitudes as a proxy to behavior, engagement in the target behavior itself is evaluated for effectiveness (MacKenzie-Mohr, 2012). Application of behavior change theory rooted in social marketing has achieved success in a number of conservation contexts around the globe. For example, this strategy was found to increase fuel-efficient stove adoption in China (DeWan, Green, Xiaohong & Hayden, 2013), increase enforcement of sanctions and thereby decrease destructive fishing practices in Madagascar (Andriamalala, Peabody, Gardner, & Westerman, 2013) and bolster local capacity for watershed conservation in Mexico by motivating landowners to join a network of private conservation areas (Green, K. M., DeWan, Arias, & Hayden, 2013).

In conclusion, researchers in the field of EE can apply qualitative and quantitative methods (e.g., surveys, focus groups or interviews) to better understand target audience values and attitudes that might influence receptivity to the message at the outset of program development. This information can be used to develop more effective communication campaigns with empowering messages and a clear call to action at a local level. Additionally, scholars and practitioners in this field have contributed evaluation methodologies to ensure program objectives are met through measurement of human behavior change. The contributions of EE, communication and outreach to improving conservation policy and practice are broad and varied with global implications for stewardship of natural resources both now and in the future.

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10.   Win-Win or Trade-Offs?: The Study of Conservation and Development at Local, National and Global Scales
- *Nathan J. Bennett*

Questions related to environment, population and development at all scales from the local to the global and over short and long time frames have always engrossed researchers and challenged society (Brown, Gardner, Halweil, & Institute, 1999; Malthus, 1798; Meadows, Meadows, Randers, & Behrens III, 1973). The academic field of conservation and development focuses on these issues as it pertains to species, habitat and biodiversity management, restoration and preservation initiatives. Conservation and development research asks whether and under what conditions a) development enables or undermines conservation outcomes, b) conservation supports beneficial development outcomes, c) win-win conservation and development outcomes are possible and d) trade-offs between conservation and development are required. This interdisciplinary field of study draws primarily on development studies, geography, anthropology, sociology, economics, political science, as well as ecology and conservation biology.

The academic field of conservation and development emerged during the 1980s and has grown steadily since. This was driven in part by early critiques of anthropologists and others of the negative impacts and inequitable distribution of costs and benefits of conservation for local communities (Wells, 1992; West & Brechin, 1991; West, Igoe, & Brockington, 2006). The field also emerged alongside a number of significant international events, movements and policy instruments that caused conservation and development considerations to converge in practice. The World Parks Summit in 1982 and the World Parks Congress in 1992 both brought equity and local development considerations to the forefront in conservation policy and practice (Bushell & Eagles, 2007; McNeely & Miller, 1985). During this same time period, the indigenous environmental rights movement was surfacing (Kemf, 1993) and these rights were increasingly being recognized in international policy documents of conservation organizations (Borrini-Feyerabend, Kothari, & Oviedo, 2004; WWF, 2008). The Convention on Biological Diversity also materialized emphasizing the importance of equity, benefit sharing and sustainable use alongside the protection of biodiversity (CBD, 2010). Over the same period of time, the World Commission on Environment and Development and the resulting Brundtland Report (WCED, 1987), the United Nations Conference on Environment and Development in Rio in 1992, and the World Summit on Sustainable Development in 2002 all sought to mainstream sustainable development and environmental concerns in development practice (see Fisher et al., 2008). More recently, the Millennium Ecosystem Assessment recognized that, if unaddressed, the degradation of ecosystem services would undermine the development mandate (Millennium Ecosystem Assessment, 2005) and the Millennium Development Goals committed world leaders to ensure environmental sustainability (Goal 7) as part of a broader poverty reduction mandate (Roe, 2004; UN, 2005). These converging themes have lead to global concern with and programs of work by multilateral agencies, governments and ENGOs that have attempted to balance conservation and development in communities near protected areas - e.g.,

Community-Based Conservation (CBC), Community-Based Natural Resource Management (CBNRM), Integrated Conservation and Development Projects (ICDPs), Payments for Ecosystem Services (PES) and Eco-Tourism Development (Brosius, Tsing, & Zerner, 2005; McShane & Wells, 2004; Pagiola, Bishop, & Landell-Mills, 2002; Russell & Harshbarger, 2003; Spenceley, 2008). Like the practice of conservation and development, the field of study is based on a normative commitment to the ideals of sustainable development and a belief that conservation should not lead to inequitable outcomes for local people. This is often coupled with instrumental rationales that beneficial local development will lead to successful conservation through creating positive incentives and thus support for conservation of nature or that environmental conservation will lead to benefits for local communities.

Research on conservation and development is concerned with the relationship between environmental management, restoration and preservation initiatives and social and economic development outcomes in different contexts and at different scales, with the factors – e.g., institutions, processes, livelihoods, ecologies, context - that mediate that relationship, and with the processes and outcomes of conservation and development projects. Common topics of study are poverty, well-being, equity, socio-economic development, sustainable livelihoods, tourism, PES and REDD projects, ICDPs, vulnerability, governance, CBC, CBNRM, and human-wildlife interactions. Focal questions asked by researchers in this field are:

- Do traditional (fisheries, agriculture, hunting) and market-based (e.g., tourism, PES) livelihoods support or undermine ecological and conservation outcomes?
- Does poverty or wealth support or undermine environmental outcomes and conservation initiatives? (Cinner et al., 2009)
- How do biodiversity conservation initiatives impact the socio-economic development of local communities? Does biodiversity conservation lead to poverty? (Roe, Elliott, Sandbrook, & Walpole, 2012; Walpole & Wilder, 2008; West et al., 2006)
- What types of conservation initiatives and development interventions are required in different socio-economic and environmental contexts? What is the appropriate scale to address conservation and development problems? (Fisher et al., 2008)
- What lessons can be learned about the effective design of conservation and development initiatives? (Blom, Sunderland, & Murdiyarso, 2010; Wunder, 2007)
- How can win-win conservation and development outcomes be achieved? When are trade-offs required and how can difficult decisions be made? (Gjertsen, 2005; McShane et al., 2011)
- How can we adequately conserve biodiversity to maintain human well-being and not undermine the development agenda? (Sachs et al., 2009)

Macro-scale issues, particularly climate change and global environmental change, have also led conservation and development researchers to engage more with questions related to vulnerability and adaptive capacity. For example, recent research is exploring how communities adapt to climate change in such a way that it reduces social vulnerability and maintains the provisioning of environmental services (Bennett, Dearden, Murray, & Kadfak, 2014; Marshall et al., 2010).

The aforementioned topics and questions are explored using qualitative (interviews, narratives, perceptions), quantitative (surveys, economic analyses, cost-benefit and trade-off

approaches), and participatory methods (PAR, focus group discussions) as well as spatial analyses that draw on social, economic and environmental data sets (Andam, Ferraro, Sims, Healy, & Holland, 2010; Fisher & Christopher, 2007). Research and analysis can range in scale from single sites or communities, to broad meta-analyses or quantitative studies that bring together multiple case studies or communities (Leisher, van Beukering, & Scherl, 2007; Mascia, Claus, & Naidoo, 2010), to studies at national and international scales. At each of these scales, local people and nature are treated and analyzed in distinctly different ways. At the local scale, qualitative methods and perception-based studies are dominant. This means that "support for conservation" or "perceptions" are often used as proxies for ecological outcomes. Some authors argue that these perceptual studies provide little more than anecdotal evidence and that more rigorous methods (e.g., longitudinal and controlled studies) and improved indicators are needed for ecological and socio-economic outcomes to demonstrate relationships, causality and generalizable conclusions (Agrawal & Redford, 2006; Ferraro, 2008). Macro-scale studies use available data sets for social (humans) and ecological (nature) information.

Research on conservation and development is often used to identify solutions that are local in scale - i.e., interventions that can be applied by conservation or development organizations or practitioners. It can also provide insights into necessary improvements in national governance and international conservation and/or development policies and programs. In the past, this field has made several important contributions to conservation policy and practice. First, it has required a re-orientation of international conservation policy to take local needs and aspirations into account both for ethical reasons and for the success of conservation initiatives. Second, it has challenged many commonly held ideological positions about the relationship between conservation and development – e.g., either poverty or wealth lead to environmental degradation, resource dependency leads either to destruction of natural resources or to the creation of local systems of environmental management, or conservation either leads to poverty or improves the quality of life of local inhabitants. The important lesson here is that each context leads to different conservation and development outcomes and thus that interventions need to be place-based. Third, it has offered many important insights into previous failures and lessons or "best practices" for how to create more successful conservation and development programs (Bennett, 2010). Finally, it can contribute to previous and emerging attempts to incorporate social and economic considerations into the planning of environmental conservation at broader scales (Fisher & Christopher, 2007).

Future research in this area could be significantly improved if it builds on previous research and conceptual frameworks rather than continually re-inventing the wheel. Meta-analyses and systematic reviews would allow for the development of diagnostic frameworks. Researchers need to be clear in articulating methodological limitations and the level of generalizability of their results. Research on conservation and development needs to better address macro-scale factors and complexity and could draw useful lessons from the fields of political ecology, social-ecological resilience, adaptive capacity, adaptive management and governance. Further methodological insights are needed in the following areas: more efficient and effective participation and stakeholder engagement strategies; socially acceptable processes for making trade-offs between conservation and development; tools to make decisions about the appropriate scale and fit of interventions; and; means to effectively link local conservation and development projects with broader scale initiatives.

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11. Conservation of What for Whom?: A Political Ecological Approach to Conservation
- Robin Roth

As the speed of human transformation of the earth has accelerated, and with it our efforts at conserving non-human nature, it has become increasingly apparent that more and better knowledge derived from ecological and biological sciences, while important, is not enough. Conservation is a social and political practice that cannot be accomplished with the physical sciences alone. Political Ecology is one of many social sciences that engage issues relevant to conservation science. It is distinct in that it sees power (economic, social and political) as central to shaping human-environment relations. While wide ranging in its topical foci, conservation and particularly territorial forms of conservation such as protected areas, has featured prominently. As an interdisciplinary field its practitioners are trained in a variety of disciplines including Anthropology, Geography, Political Science and increasingly in fields such as Social Forestry and Environmental Studies. As such, political ecology employs a wide range of conceptual and methodological tools and draws on traditions ranging from the humanities, social sciences and to a lesser extent, ecological sciences. Consequently political ecology has been accused of being overly eclectic and even incoherent (Blaike 2008). I believe this is partly an outcome of the over-use of the term to encompass any scholarship that has to do with the politics of nature. In this paper I take a narrower definition of the field rooted firmly to the roots of the approach. After a brief explanation of its origins, this short paper will identify 4 main features that help to identify and define a political ecological approach to studying conservation and then discuss its main contributions to the field.

The field emerged from a concern over development initiatives in the 'third world' that blamed local poor and marginalized populations for environmental degradation while conveniently ignoring the roles played by corporate exploitation, colonial relationships and government policy (Neumann, 2005). In particular, Blaike and Brookfield's (1987) formative book titled Land Degradation and Society was a careful examination of land degradation as both a result and a cause of the economic, political and ecological marginalization of peasant herders and farmers. Put differently, resource dependent communities might act in ways that degrade their immediate environments but do so, not because they are bad land managers or because they have high birth rates (popular explanations at the time) but because they are situated within a regional political economy that constrains their choices, thus leading to a cycle of degradation and poverty. Political Ecology has since insisted that any explanation for environmental change take political and economic context seriously and holds a healthy skepticism towards dominant narratives that blame relatively powerless local populations for our environmental problems. In relation to conservation policy and practice, this means ensuring that the threat to a conservation target is correctly identified and that a policy simply does not assume that the primary threat is the most proximate one; the person or group of people appearing to be over-exploiting. For example, classic political ecology analysis of deforestation in the Amazon has drawn attention to factors well beyond the typical target of

small holder agriculture and shifting cultivators to include the history of the rubber boom, government policies that encouraged land colonization and road construction for geopolitical goals, and financial credit arrangements as well as the political economy of cattle ranching and soybean production (eg Hecht and Cockburn, 1990; Schmink and Wood, 1992; Zambrano et al 2010). Similarly, overfishing in Miskito territory in Nicaragua was due, not to a simple equation of too many people after too few fish, but to an articulation with a changing global economy at the very time that subsistence strategies and social norms were being undermined via state policy, migration, and increased corporate intervention in fishing (Robbins, 2012). In this way political ecologists interrogate the political contexts surrounding a particular pattern of human-environment interaction. From its origins then, political ecology has sought to provide robust and comprehensive explanations for environmental degradation and critical examination of the policies meant to address it.

I would suggest that most political ecology of conservation work does not accept *a priori* that a particular conservation policy is inherently the best way to meet environmental goals and their task is simply convincing people of this fact, rather they see conservation and its practice as a subject of inquiry. Political ecology has shown how conservation practice, and particularly the establishment of protected areas, is frequently used as a political tool to serve nation building and territorial goals, with environmental goals being only secondary, the result being that conservation goals are not met due to resulting conflict (Eg; Chhatre and Saberwal, 2005; Vandergeest and Peluso, 1995). A common observation from a political ecology standpoint is, for instance, that conservation policy is a source of displacement for resource dependent communities who effectively end up paying the costs of conservation by losing access to subsistence resources while wealthy middle class and urban populations obtain the benefits of recreational opportunities and potentially alleviated guilt over their own unsustainable lifestyles. Further, particular variations on a theme including buffer zones, Integrated Conservation Development Programs and the like can suffer from similar dynamics (eg Neumann 1997; Daniels and Bassett, 2002; West, 2006). Put simply, political ecologists ask "conservation of what for whom?"

Unsurprisingly, then, the most significant criticism of political ecology is that it is entirely about critique and that it is inherently suspicious of state, INGO or market-led conservation initiatives. The response to this critique is that accurate explanations for the causes of the environmental degradation that conservation is meant to address are necessary for effective design of conservation interventions and that further, a better understanding of the impacts of conservation interventions can be used to improve them. Under ideal conditions, political ecology is a 'hatchet' of critique containing a 'seed' of improvement (Robbins, 2012). It should be noted however, that not all political ecology makes the leap from hatchet to seed or from descriptive critique to constructive engagement. Another critique of Political Ecology is that it is ill-named and that it doesn't take 'ecology' seriously enough in that it doesn't study biophysical realities but rather treats them as the background upon which social relations occur. This is certainly true for some work that ascribes to the label, but not of all of it. At minimum I think political ecology does take the type of ecology people are relating to seriously and many practitioners are comfortable enough to read and understand scientific literature. However, the use of accepted ecological sampling techniques to actually measure ecological outcomes of

particular social relations is not as common as the use of remote sensing and local knowledge surveys (eg Robbins, 2001; Rocheleau et al 2001).

Despite its breadth and eclecticism, I argue that there are four features of political ecology that are near universal. The first is an understanding of nature as necessarily socially produced. This means that we cannot understand nature as a purely physical entity but we have to understand it as significantly shaped due to human action and as a result of human ideas about what "nature" is and how "nature" should be. A good example of this approach is Paul Robbins (2003) work in India, where he shows how different, competing, ideas of 'forest' helps explain why foresters are claiming increased forest land while local villagers are complaining of increased degraded land. Generally speaking political ecologists aim to understand humans as part of nature (and nature as a necessarily social entity). Political Ecology thus has sustained a critique of forms of conservation that aim to separate humans from nature (eg Roth, 2008) and instead support those conservation initiatives that treat landscapes in their social, ecological, economic and cultural dimensions (eg Zimmerer, 2006).

The second, and arguably most important, is an explicit focus on how processes of power shape conservation practice and thus its social and ecological outcomes. Power is understood in both material political economic terms (degrees of autonomy, decision making influence) as well as more cultural terms (the ability to shape behavior, create favourable conditions). Political ecology investigations would include an exploration of who benefits and who doesn't benefit from a proposed or already existing conservation initiative (protected area, use restriction etc) and an examination of the relationship between different actors including how and whether consent was obtained from whom and under what conditions. Political ecologists are trained to think of society in differentiated terms so their analysis attends to differences in gender, race, citizenship, ethnicity, livelihood strategy and so on; how these axis of power shape the conservation practice itself as well as how people experience the outcomes.

The third feature of political ecology is cross-scale analysis. A political ecological study is never limited to the community scale or to, for instance, the national scale but rather seeks to attend to processes of power as they cross scale. Most frequently a technique called the 'chain of explanation' (Blaike and Brookfield, 1987) is used where the study begins with a particular case, a particular conservation initiative and a particular group of people effected, the analysis then moves 'upwards' and 'outwards' to attempt to explain or understand what is happening on the ground. Comparative and multi-sited work is increasingly common. So while starting with an understanding of a particular place, political ecology seeks to understand it within the context of regional, national and global policy, trends and action. Of particular interest now, for instance, is the ways that conservation practice has become increasingly reliant upon as well as threatened by market processes captured by mechanisms such as ecosystem services markets, ecotourism, carbon and biodiversity offsets and how that impacts social and ecological landscapes all over the world (Roth and Dressler, 2012; Buscher and Davidov, 2013).

The final feature is that political ecologists have a political project and that is to contribute to a more socially just and environmentally sustainable future. That is their goal. What makes them a controversial community for collaboration is that they don't necessarily believe that mainstream conservation practice, such as protected area establishment, indigenous hunting bans and biodiversity offsets will get us there; and they are cynical about corporate and celebrity involvement in conservation and the class-based power imbalances from which they

originate (Brockington et al 2008). Their political stance, however, does translate into applied research, often conducted in solidarity with communities, community organizations or non-government organizations sharing similar goals. Political ecologists have been instrumental in helping to negotiate conservation arrangements more palatable to local communities and frequently find themselves in a position to 'translate' between conservation advocates and the residents affected by the proposed policy. Further, they actively document and try to destabilize accepted narratives that frequently drive conservation policy (eg that the only way to preserve 'nature' is to integrate it into a market based logic). The goal is to make space for narratives that might allow for a more socially just conservation (eg conservation will really only be effective when peoples connection to nature is valued in more than dollars and cents). As a whole, political ecologists practice an engaged scholarship that tries to understand and transform the root causes of environmental degradation and the practice of conservation.

True to form, political ecology is methodologically eclectic. Most often the studies are qualitative in nature, including ethnography (both of communities and of organizations), key informant interviews, focus groups, life history interviews, archival research, discourse analysis and document analysis. Many political ecologists, especially those with training in Geography, use spatial methods including community-based mapping, transect walks, GIS and remote sensing. And many also incorporate quantitative techniques such as the multi-variate analysis of survey data and even (in some cases) ecological data. The exact set of methodological expertise will vary significantly with the researcher.

The single biggest contribution political ecology has made to conservation policy and practice is to illuminate conservation as a political process, one which contains tremendous friction over both the material (who gets access to what and under what conditions and for what reasons) and the discursive (what is meant by conservation and whose definition has leverage) (Holmes, 2014). It has drawn attention, for example, to:

- the ways in which the construction of conservation territories excludes local and aboriginal communities and the need for better collaboration with those communities (Brosius, 2004; Bennett, et al 2010 : Lunstrum 2011; Roth 2009);
- the effects of and means through which conservation is increasingly reliant upon and threatened by political and market processes (Brockington et al 2008); and
- the internationalization of conservation through the influence of international NGOs and the promotion of global norms (Brosius and Campbell 2010).

Political Ecology, as an approach, can be very useful as a way of engaging and improving conservation policy and practice. Its practitioners are broadly trained, many in both the physical and social sciences, and can frequently draw on a robust set up methodological tools. And many of the pressing conservation problems of our day are political, thus requiring questions that are attentive to political ecology – what are the ecological and social effects of wide spread government budget cuts? How can conservation mechanisms be designed collaboratively with local communities? What are the implications of a changing demographic for conservation policy and practice? Why is a particular conservation policy causing conflict amongst stakeholders? Most importantly, perhaps, political ecologists offer an opportunity to engage their critiques sharpened by their concern over equity and inclusiveness to strengthen our conservation practice.

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12. Human Dimensions and the Evolution of Interdisciplinary Approaches in Conservation Social Science
- *Douglas A. Clark*

Definition and History

Conservation implies a biological goal but is nonetheless a very social process involving individuals and institutions directed towards specific ecological outcomes valued by society (McTaggart-Cowan 1995). It is unsurprising then that understanding of the "human dimensions" of conservation has become a goal of management agencies and social science researchers. This term emerged first in global change literature (e.g. Druckman et al. 1991) though it is usually defined simply in terms of the human dimensions *of* global change; itself a deliberately ambiguously-defined concept. Explicit "human dimensions" research is exemplified by the human dimensions of wildlife work undertaken by several established research clusters in the USA (e.g. Decker et al. 2012). A typical definition is as follows:

> "*Human dimensions" is an area that deals with the people aspects of natural resources management. Typically, human dimensions relates to beliefs, values, attitudes, behaviors, and socioeconomic and demographic characteristics of user-groups or publics and how these people aspects are incorporated into the overall management scheme.*"
> Gigliotti & Decker, 1992.

From that starting point, thinking about human dimensions quickly broadened beyond simply addressing wildlife managers' immediate information needs:

> "*As a field, human dimensions blends specialties such as sociology, psychology, education, communications, economics, and anthropology into the study of the interaction of humans with the conservation of biological diversity. Human dimensions seeks to integrate the social and ecological sciences for an interdisciplinary understanding of conservation issues.*" Jacoben and Duff, 1997.

That shift means that in current usage, the term is often applied broadly, uncritically, and generally without specifying the dimensions "of what" that are under consideration. Nevertheless, it has become a popular shorthand for interdisciplinary, problem-oriented approaches that blend social and ecological understanding of specific issues (Robinson 2008, Clark 2011). Because most conservation and environmental management issues are usually defined in biophysical terms, "human dimensions", for all its vagueness, has remained a useful bridging term across disciplines and with non-specialist audiences.

Focus

Over the last two to three decades, literature on the human dimensions of conservation (broadly defined) has proliferated. Multiple interdisciplinary approaches seek insight into human dimensions of conservation problems and attempt to articulate strategies to apply such insights with normative goals in mind. Those goals are typically framed as having both biophysical and human dignity outcomes (Mattson & Clark 2011), though with varying emphases.

Taken together, this literature exhibits a number of strong and consistent cross-cutting themes:

- **existing institutions are inadequate-** illustrated through examples, case studies, and suggested ways to bring about change,

- **power imbalances are problematic-** demonstrating through cases and theory how these have arisen, their negative effects, and how they could be addressed- usually through decentralized, community-scale institutions,

- **sustainability is a goal-** stated often despite differing on whether sustainability is a substantive goal or an ideal to strive for,

- **the science-society relationship is changing-** science is no longer seen as the only legitimate source of knowledge and its privileged position in policymaking is no longer assured (authors differ about whether this a positive development),

- **equitable participation is required-** stakeholders and the public often have much to contribute and inclusion in conservation decisions is necessary, they must be meaningfully and honestly engaged, not disadvantaged by inequitable distributions of power,

- **a cross-scale approach is required-** there are no absolute boundaries , nor any one correct temporal or spatial scale for management (embodying a paradox: ecologically speaking, longer and larger is usually desirable but institutionally, small-scale focused effort is often more effective), so a multiple-scale, systems-aware approach is necessary,

- **deliberate learning and an adaptive approach are required-** strongly recommended as a means to deal with complexity and unpredictability, best done broadly inclusively instead of exclusively scientifically in order to not only resolve institutional and power issues, but also to improve the quality and relevance of knowledge used and generated,

- **ideas must be integrated from multiple sources-** there are many legitimate sources of knowledge - their observations, and the perspectives they represent, are valuable to achieving goals and such inclusion builds adaptive capacity and resilience,

- **self-organization can bring about change**- changes in institutional relationships, practices, and outcomes are apparent in numerous case studies, and novelty in institutional form also appears to result.

"Classical" human dimensions research began by applying and adapting quantitiative sociological approaches (Decker et al. 2012), and developed specific concepts and ways to measure them, e.g. "wildlife stakeholder acceptance capacity" (Decker and Purdy 1998) and the "potential for conflict index" (Manfredo et al 2003). Quantitative approaches are much more common than qualitative inquiry. Unsurprisingly though, outside that subdiscipline, methodologies are extraordinarily diverse. Multiple methods are common, as is usual in policy-oriented research (Clark 2011). In much of the human dimensions literature written by biologists, descriptions of methods are often absent (e.g. Holling and Meffe 1996).

Table 12.1 - Approaches to environmental management that demonstrate convergent normative principles.

Approach	Example Citations
Adaptive governance	Brunner et al. 2005, Folke et al. 2005
Adaptive management	Holling 1978; Walters 1986
Co-management	Berkes et al. 1991, Armitage et al. 2009
Community-based management	Western 2000, Berkes 2004
Conservation Biology	Soulé 1985
Ecosystem approach	Slocombe 1993*a*; Kay and Schneider 1994
Ecosystem (-based) management	Agee and Johnson 1988; Slocombe 1993*b*, Grumbine 1994
ecosystem integrity and health	Rapport 1989
Policy sciences	Clark 2011
Social-ecological systems	Kittinger et al. 2012. Hunt et al. 2013
Traditional ecological knowledge	Berkes 2008, Pierotti & Wildcat 2000, Houde 2007

Contributions

This broad movement for change in conservation (and environmental management more broadly) is manifested across a wide range of theoretical approaches (Table 1). Examination of the emergent themes and interconnections show that despite different origins and theoretical emphases, publications across a wide range of environment-related fields have increasingly come to espouse a common set of normative principles. This isn't to say that these fields have evolved towards a common goal or emphasize the same things; far from it. Rather, this evolution appears more as a convergence across disciplines, rooted in iterative empirical observations about the challenges of "doing" conservation, and consequent modifications of disciplinary standpoints and approaches. Again though, different modifications may come from similar observations, so it should not be assumed that there is a common progression in the

same direction or at the same pace. Finally, it is still an evolution in progress. There is no distinct "human dimensions" tradition yet, except in wildlife (discussed above), and given the rapid proliferation of approaches across a wide range of disciplinary standpoints, it may be some time, if ever, before others take form.

This normative core expresses the essence of what society is demanding in conservation efforts, as well as the features that many conservation researchers and practitioners see as necessary. These normative core principles hold that conservation efforts ought to be:

- **participatory-** broadly and substantively inclusive, recognizing science as one of many legitimate contributors of knowledge within an extended peer community,

- **pluralistic-** participation must be fair and equitable, integration of knowledge from different sources takes place respectfully and appropriately, with none given unwarranted priority,

- **reflexive-** allowing for individual and collective reflection, questioning, and fundamental "double-loop" learning (Argyris and Schön 1978),

- **adaptive-** deliberate learning efforts take place and are highly valued, institutions and practices self-organize, adapt, and change based on that learning,

- **systems-oriented-** more specific than a holistic view, this implies using accessible systems thinking and ideas- e.g. a cross-scale perspective, awareness of social-ecological system connections and dynamics,

- **action-oriented-** intended to achieve real and substantive contributions to the sustainability of social-ecological systems.

This core set of principles resembles many other broader calls for rethinking the role of science in society, such as Funtowicz and Ravetz's (1994) "post-normal science" and Lee's (1993) civic science, which he summarizes as "experimental science but reformist policy". Western (2000) described a similar set of factors for success in current conservation practice: participation and collaborative partnerships, scale-relevance, local self-organizing and self-regulating institutions, and multiple goals, integration, and adaptive management.

Looking Forward

Major challenges of incorporating human dimensions knowledge into conservation policy and practice remain. Foremost is the difficult paradigm shift required by individual practitioners socialized or indoctrinated into scientific management to acknowledge the significance human dimensions of conservation issues. Second, and related, is the political nature of these core principles, which often threaten the *status quo* for both individuals and institutions. The obstacles faced by interdisciplinary scholarship more generally (e.g. Campbell 2005, Pfirman

and Martin 2010) are subsets of both inter-related challenges. For example, Clark et al. (2008) demonstrated how a narrow focus on specific types of science and knowledge caused significant – and still unresolved – controversy over how polar bears ought to be managed in Nunavut. The literature on indigenous approaches to conservation and co-management open the door to alternative ways of knowing as well, though these have often been overlooked (Berkes et al. 2000, Turner 2005, Barrett 2013).

Surprisingly, although the clear convergence towards adaptive and participatory approaches in conservation has been noted, this commonality among approaches has received little detailed examination in the literature. Deeper investigation is clearly warranted, especially if conducted with an eye to the above-identified challenges. Though much progress has been made in understanding the nature of these challenges (e.g. Brunner et al. 2005, Ascher et al. 2010, Clark 2011, Pooley et al. 2014), they are unlikely to be solved anytime soon. Aldo Leopold recognized this integrative challenge almost eighty years ago, but his successors have fallen short meeting it during the century in which he hoped that we would:

> "*One of the anomalies of modern ecology is that it is the creation of two groups, each of which seems barely aware of the existence of the other. The one studies the human community, almost as if it were a separate entity, and calls its findings sociology, economics, and history. The other studies the plant and animal community (and) comfortably relegates the hodgepodge of politics to "the liberal arts." The inevitable fusion of these two lines of thought will perhaps constitute the outstanding advance of the present century.*" Aldo Leopold, 1935. Unpublished manuscript, Aldo Leopold Collection at the University of Wisconsin, Madison.

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13.   The Conservation Social Sciences: An Overview and A Process for Setting a Research Agenda
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Understanding the contribution of the conservation social sciences

The series of papers in this report clearly demonstrate the breadth of insights that have and can be offered by the conservation social sciences. The conservation social sciences reviewed in this document include Psychology, Economics, Sociology, Anthropology, Political Science and Governance, Human Dimensions, Political Ecology, Ethics, Education and Communication, Conservation and Development, and Science and Technology Studies. We have included an overview of each, their common questions, methods, scale of analysis, products and contributions in Table 13. 1 located at the end of this chapter. What follows is a brief discussion of the past and potential contributions of each of the conservation social sciences to conservation policy and practice followed by a discussion of the steps that an organization might take to better incorporate insights from the conservation social sciences into its mandate.

There are numerous ways that the conservation social sciences have led to new lessons and improvements in conservation policy and practice at different scales from the local to the international (see also Table 13.1). For example:

1. Anthropology – Anthropologists have helped us to understand that we are often protecting cultural landscapes that have been used, shaped and preserved by different cultural groups for generations and have worked with local communities to document those management practices. National governments (e.g., Canada) and international bodies (e.g., UNESCO) recognize that these "cultural landscapes" require distinct forms of management. Anthropologists have also shed light on conservation practice, for example, how ways of thinking emerging from different cultural traditions can affect the form and content of conservation interventions.

2. Sociology – Sociology helps conservation organizations and practitioners understand how behaviors—of individuals, groups, and other collectivities—are patterned and driven by social structural forces. Conservation approaches and management interventions cannot focus solely on behaviors as fully voluntary but need to take into account the role of structural influences such as social norms, institutions, etc.

3. Economics – Ecological economists have developed several approaches to identify, characterize and, where possible, quantify trade-offs inherent in natural resource management for conservation, restoration and other purposes. Researchers in this field have also provided insights on the pricing of goods or services as might account for negative environmental externalities, on the functioning of ecological-economic

systems, and on the implications of ecological constraints for desirable scale of the economy.

4. Psychology – Psychology, and more specifically social psychology that takes into account one's social surroundings, can help address the significant need for human behavior change solutions in conservation given its emphasis on understanding how and why individuals think and behave the way they do. Conservation-related studies in this area, for example, have focused on determining what behaviors lead to undesirable impacts on the natural environment, why they occur, and behavior-change strategies for minimizing those impacts. Through an examination of such concepts as values and attitudes, psychological research can also help conservation agencies and organizations understand how people are likely to respond to conservation issues and management actions.

5. Political Science – Political scientists have drawn attention to the ways in which governance and policies (e.g., adoption of community-based, participatory or decentralized environmental governance programs) can be used to alter the incentives that groups face as they interact with the environment and each other. At the local level the likelihood of successful conservation tends to increase when communities participate in the creation and enforcement of rules.

6. Philosophy – Environmental ethics provides a framework for understanding the values upon which people ground their beliefs. Understanding not only what people believe, but why they believe it, is critical for environmental problem solving.

7. Science and Technology Studies – Science and technology studies provides the critical and practical insight into the connections between science, policy and practice. This theoretical perspective has been used to support more effective interactions between scientists, land managers, local communities and policy makers to ensure that conservation science supports effective and ethical conservation practice from local scales to national policy dialogues to international platforms like the Intergovernmental Panel on Biodiversity and Ecosystem Services.

8. Environmental Education and Communication – Research building from environmental education and communication can aid in the development of outreach programs designed to change attitudes or specific behaviors among members of a target audience. Efforts geared specifically toward youth can establish an ecological foundation upon which future decisions will be based. Further, the field has contributed strategies for evaluation of communication efforts in order to ensure that program objectives are being met.

9. Conservation and Development – Social scientists from various disciplines have demonstrated that the costs of conservation initiatives can be borne by local communities who are often excluded from decision-making. This realization has led to changes in conservation policy and practice. For example, international conservation policy documents such as the Convention on Biological Diversity now require consideration of equity, benefit sharing and participation. Researchers in this field have also provided insights into the improvement of on-the-ground conservation and development programs and sustainable livelihood interventions.

10. Political Ecology – Political ecologists have drawn our attention to the political economic context of conservation practice and have critiqued the ways that western ideas about nature have informed a coercive conservation practice. They ask conservation practitioners to think about the ways power shapes their practice and the nature-society relationships at the site of their conservation intervention.
11. Human Dimensions - "Human dimensions" has become a popular shorthand for interdisciplinary, problem-oriented approaches that blend social and ecological understanding of specific conservation or natural resource management issues.

As noted in the introduction, this list of conservation social sciences is not comprehensive and other fields (including environmental law, planning, human geography, environmental history and environmental humanities) have also made important contributions.

Towards a process for setting a social science research agenda

Our experience suggests that many organizations employ an ad-hoc approach to engaging with the conservation social sciences resulting in lost opportunities to realize the full value of conservation social sciences. All too frequently social science is used only to communicate physical science findings, facilitate stakeholder meetings or help implement fully formed policy positions when its contributions to robust conservation practice can be much more profound. Knowledge of the definitions, focal areas, theories, methods and contribution of the different conservation social sciences is helpful to conservation biologists, organizations and funders hoping to engage with social scientists. Such knowledge, however, is not enough and it is also clear that actions need to be taken to overcome barriers to incorporating conservation social sciences and that processes are required to help conservation organizations and funders more clearly articulate their conservation social science research priorities. We propose the following steps to guide organizations wishing to better employ the conservation social sciences.

1. Recognize and overcome barriers to incorporating conservation social sciences; these steps will help build support for and understanding of the conservation social sciences in your organization.
   - Start an open conversation within your conservation organization about the current place and potential contributions of the conservation social sciences. This conversation needs to start from a position of respect vis-à-vis different ways of knowing and approaching conservation policy and practice.
   - Fill knowledge gaps that might exist on the potential types, approaches, contributions and roles of the different conservation social sciences relevant to the mandate of your organization.
   - For organizations with no appropriate in-house social science expertise, it is best to hire an outside facilitator, who is knowledgeable in the conservation social sciences, to facilitate a conversation regarding engagement with the conservation social sciences and to help identify particular approaches, tools and disciplinary expertise. Another possibility would be to have key decision makers read this report and

potentially a few articles written on conservation social science and its place in conservation practice to help guide this conversation.

2. Identify the conservation problem(s) that your organization aims to address.
   - With key decision-makers in the organization, pinpoint the problem(s) that your organization aims to address as laid out in its mission, vision, focus, programs and specific projects.
   - Identify key strategies used by the organization to address the problem (e.g., increase awareness of the importance of wetlands, increase the number of conservation easements on private property).
   - Identify key areas where there exists potential social science insight. This may involve re-framing a conservation objective as a social one. For example, a problem such as "our objective is to protect x wetland and y species" might be reframed as "our objective is to build a constituency that supports wetland conservation" or "our objective is to work with local landowners to conserve wetlands."
   - Identify the scale or scales at which the organization wishes to target its efforts (e.g., national, provincial or municipal policy; corporate regulations; sectorial actions; household behavior; individual behavior; etc.)
   - Identify key social groups or individuals that the organization wants to work with or access (e.g., user groups such as recreationists, community groups, landowners, youth, policy makers, politicians, etc.)(see Table 13.2 for guidance).

3. Partner with social scientist(s) to frame key topics, questions and approach.
   - If your organization does not have conservation social science expertise on staff, formulating conservation social science questions and identifying suitable approaches and methods (see Table 13.3) will require outside help. Conservation social scientists might be identified through local universities (look to specific disciplinary departments in the social sciences, interdisciplinary environmental programs and environmental themed research institutions), environmental consultancies or organizations. Professional societies such as the Human Ecology Society and working groups within those societies such as the SSWG within the Society for Conservation Biology can also be helpful. Try to seek out individuals with the expertise you are looking for, both in terms of approach and in terms of the ecology or species of focus. These individuals are often looking for opportunities to collaborate or can recommend someone who is. Note that this step might also occur before step 1 or 2.

4. Brainstorm key topics for investigation or research questions. Establish a conservation social science agenda through prioritizing key topics and questions.
   - With the assistance of someone familiar with the conservation social sciences, create a list of the topics and questions along with information relating to their importance to the organization's mandate, feasibility in terms of capacity, available financial resources and preferred timeline, potential benefits to conservation, and potential spin-off partnerships, collaborations or projects.
   - We then recommend having a group of key decision-makers in the organization rank the topics on the basis of importance, feasibility (capacity, resources, timeline),

conservation benefits and additional benefits, construct a ranking based on the aggregate rankings and then discuss the resulting draft ranking in a meeting.

5. Partner with, contract or hire conservation social scientist(s) to carry out the work
    - Depending on the nature of the work, this might be the same person you collaborated with in step 3. The organization might also choose, now that you are clear on its needs, to go back to the Universities or consultants to find the right fit in terms of the social science expertise you are seeking.
    - For some organizations or funders with a more open-ended mandate, it might be more appropriate to post an open call for proposals to conduct the research.
    - Be aware that if you are working on or near traditional Indigenous territory, it is expected that you coordinate with the indigenous group in the area and follow protocol for working with Aboriginal or indigenous communities. Here are some websites that might help with this process:
        www.conservationcollaboration.ca
        www.iucn.org/about/work/programmes/social_policy/sp_themes_ip/
    - An ideal collaborator is someone who: can work well with the organization; has a personality that fits well with the rest of the team; can clearly communicate verbally and in writing, the approach, purpose and outcomes of the project; and, understands how the social science component fits with the natural sciences and applied approaches to conservation used by the organization.
    - It is critical in social science research that appropriate permissions and approval for research with human subjects be obtained through an established institutional process at a partner university, tribal organization and/or conservation organization.
    - Upon completion of the research, in addition to a project report we recommend a dissemination workshop so that results can be meaningfully discussed within the organization and the utility of the research can be enhanced.

Conclusion

Conservation as a practice is necessarily multi- and inter-disciplinary – meaning that it requires an understanding of both natural and social systems and collaboration between natural and social scientists. Discussions and conversations across such disciplinary boundaries is no simple task but one well worth undertaking since these efforts, at the very least, will lay the groundwork for better mutual understanding and, at best, will contribute to better conservation outcomes. Despite some local successes, the prognosis for the Earth's environment is far from positive and there is a distinct need to strengthen our ability to address conservation challenges. The content of this report shows that the social sciences have a role to play in improving marine and terrestrial conservation policy, practice and outcomes. Each field of conservation social science has made a distinct contribution and yet remains underutilized, its potential largely unrealized. There is thus a need to build social science capacity and increase knowledge of the social sciences among conservation practitioners and within conservation organizations. Knowledge of the distinct focal areas, people or topics of study, types of questions and methods, and research products can assist in distinguishing among the different conservation social sciences and strengthening their application to conservation practice. In this

report, we offer an overview of the conservation social sciences and present a process for conservation organizations looking to establish a conservation social science research agenda. Engaging with the conservation social sciences in a productive and useful way will likely require long-term ongoing partnerships, knowledge and capacity building, open dialogue and clear communication as well as a reflection on past and present practice and a willingness to adapt programs of work.

Table 13.1 - Overview of the conservation social sciences

Disciplines/Fields	Focus	Sample Questions	Methods, Scale and Common Research Products	Contributions to conservation
Anthropology (Environmental Anthropology)	Relationships between humans and the environment as mediated through culture	How do societies use their environment and manage social relationships through resource use? How has a particular cultural group used a landscape historically? How do cultural models affect the way that people use the environment?	Methods: Ethnography, participant observation, interviews, discourse analysis Scale: Usually local, extra-local Products: TEK documentation, methods for incorporating cultural considerations, maps of culturally important areas	Illuminating environmental justice issues; Forwarding culturally appropriate conservation models (e.g., cultural landscapes); Understanding local contributions to conservation and documenting TEK; Elucidating non-economic views of nature; Facilitating better conservation relationships with diverse cultural groups
Sociology (Environmental Sociology)	Influence of social context and the material world on individual conservation behaviors	How might social and economic contextual factors at local and broad scales mediate an individual hunter's attitudes, perceptions ad behavior? How do power structures influence access to natural resources? How do social interactions influence relationships with the environment?	Methods: Survey methods, secondary data analysis, interviews, focus groups, participant observation Scale: can range from the analysis of individuals as affected by structure to nation states and beyond Products: range from in depth localized ethnographic analyses, to analyses of large scale secondary data sets to quantitative surveys dealing with environmental beliefs, attitudes, and behaviors	Clarifying the role of context in determining individual conservation behaviors; Understanding how to manage for different stakeholder and cultural groups; Articulating how new meanings of nature are being created by changing contexts; Conveying role of inequality in determining access to natural areas and in destruction of natural resources; Identifying broad scale interventions that facilitate conservation
Economics (Ecological Economics)	Interdependence of economies, ecosystems and human well-being	How much should goods or services cost to account for environmental externalities? What is the net worth of ecosystems to society? What are the contributions of ecosystem services to well-being? What is the optimum scale of economic activity? How should resources be allocated to produce socially just and ecologically sustainable outcomes?	Methods: Economic valuation, economic modeling, energy accounting, changes in prices, stated or revealed willingness-to-pay studies Scale: Local to global Products: Valuation estimates; recommended pricing to account for externalities; scenarios of growth or de-growth	Valuing of ecosystem services; Identifying trade-offs associated with changes in natural resource management; Providing economic justifications for conservation actions; Identification of policies, management and incentive systems that produce ecologically sustainable and socially just outcomes; Strengthening of arguments for ecological restoration; Critique of the growth paradigm and construction of alternative paradigms focused on human development separate from growth.

Disciplines/Fields	Focus	Sample Questions	Methods, Scale and Common Research Products	Contributions to conservation
Psychology (Environmental Psychology)	Individual values, attitudes, beliefs, norms, and behaviors regarding the environment or conservation; social psychology, as a sub-discipline, emphasizes the individual in the context of social groups	What are people's thoughts and behaviours regarding the environment and conservation? Why do people think and behave the way that they do towards the environment? How do values shape human relationships and interactions with the environment? What attitudes or preferences do people have regarding conservation issues, species, eco-tourism experiences or management interventions?	Methods: Survey methods, interviews, focus groups, participant observation Scale: Data typically collected at individual level, with generalizations made to populations of interest (e.g., communities, local residents, visitors, etc.) Products: Descriptive reports of people's reactions to conservation issues; theoretical models depicting relationships among key concepts such as values, attitudes, behaviors; audience segmentation and information for use in development of communication or outreach efforts	Anticipating people's response to conservation issues or management actions; Determining more socially acceptable environmental management actions; Predicting and understanding the basis for undesirable behaviors; Helping to frame communication and outreach strategies designed to change attitudes or behaviors; Understanding the basis for social conflict among different population segments or user groups and informing strategies for conflict resolution
Political Science (Environmental Governance)	The formal and informal rules that structure the incentives that society and individuals face as they interact with the environment and each other.	How can environmental governance systems be designed to improve environmental and societal outcomes? What factors are associated with sustainable and successful systems of environmental governance? How can governance be designed to fit different contexts? How do formal and informal rules determine interactions with the environment?	Methods: Agent-based models, lab and field experiments, case studies, statistical meta-analyses Scale: Local to global, but more emphasis on local. Products: Diagnostic frameworks, analytical databases	A better understanding of the attributes of generally successful environmental policies; Designing more efficient, effective, equitable and legitimate conservation governance; Illuminating the importance of community involvement in rule-making and monitoring; Contributing to adoption of community-based or driven conservation programs; Illustrating the usefulness of adopting or incorporating local governance arrangements; Identifying factors that may motivate conservation such as nested governance, community-building, education, and participation
Philosophy (Environmental Ethics)	Reasoning how we ought to relate to nature	What values should we hold towards the environment? How should we manifest those values through conservation policies and actions? What aspects of nature deserve moral consideration? On what basis?	Methods: Argument analysis and synthetic analysis Scale: Theoretical, global to policy to individual Products: Diagnostic values frameworks, analysis of positions articulated in specific conservation issue, framework to integrate a wide variety of disciplines engaged in conservation problem solving	Providing a means of evaluating the robustness and rationality of claims about the values we ought to hold and manifest towards the environment; Understanding the merits of the ethical stances that conservationists hold and espouse and that conservation programs engender; Aiding in the avoidance of undesirable environmental outcomes – e.g., through precautionary approach; Enabling justified and transparent positions through an objective and collaborative methodology

Disciplines/Fields	Focus	Sample Questions	Methods, Scale and Common Research Products	Contributions to conservation
Science and Technology Studies	Role of scientific knowledge and expertise in social and policy change	What forms of knowledge are legitimate for conservation practice? How is science produced, shaped and used in conservation decision-making? What is the relationship between conservation science, policy and practice? How do people develop and use scientific knowledge? How do scientific framings or concepts change the way we govern and manage resources? How does science and knowledge shape people's relations to nature? How can we connect diverse knowledges with environmental governance at different scales?	Methods: Trans-disciplinary, empirical case studies, historical accounts, interviews, focus groups, ethnographic studies, surveys, secondary document reviews, comparative case studies, participatory methods, knowledge co-production Scale: theoretical insight can work at any scale, from local to regional, national to global, management initiatives, environmental policies, cross-scalar analyses Products: methods for trans-disciplinary collaboration, concepts and approaches to bridge different knowledge	Promoting multiple types of knowledge and more inclusive conservation science; Understanding and improving the connections between science, policy and practice; Engendering lasting and effective relationships between conservation scientists, policy makers, practitioners and funders to sustain conservation outcomes; Highlighting conditions under which scientific, cultural and policy change are likely to occur; Informing research design, conservation programs and policy to be more inclusive
Education and Communication (Environmental Education and Communications)	Effectiveness of environmental education and communication and outreach campaigns, understanding target audiences	Do environmental education programs lead to changes in knowledge, attitudes or behaviors? How can information about public values, beliefs, emotions and attitudes lead to more effective communication with key stakeholder groups? Are programs achieving their objectives, and what are the best metrics for evaluating program success or failure?	Methods: Program evaluation, quantitative (surveys), qualitative (focus groups, interviews, participatory mapping, photoelicitation), often involves collaboration between conservation organizations and educational institutions (e.g., schools) Scale: Local (individual programs) to global (addressing phenomena associated with communicating conservation with public audiences) Products: Evaluation results used to improve upon existing efforts, documentation of best practices	Improving conservation education programs and outreach campaigns; Increasing environmental literacy; Understanding that knowledge needs to be connected to values, beliefs and attitudes and that knowledge does not lead to behavior change; Tailoring of communications to target audiences; Illuminating the need to empower audience to take local actions; Affirming need to connect children to natural world; Applying social marketing and behavior change theories to identify barriers and bring about changes in behaviors and promote stewardship

Disciplines/Fields	Focus	Sample Questions	Methods, Scale and Common Research Products	Contributions to conservation
Conservation and Development	Relationship between conservation and/or development processes and environmental and social-economic outcomes	Do local livelihoods support or undermine conservation outcomes? How do levels of wealth impact environmental outcomes? How do conservation initiatives impact local livelihoods, wealth and well-being? What constitutes best practice in designing conservation and development initiatives? Under what conditions are win-win conservation and development outcomes possible? When are trade-offs required? How can we simultaneously achieve Convention on Biological Diversity and Millenium Development Goals? What actions will maintain social adaptive capacity and ecological resilience?	<u>Methods</u>: Qualitative (interviews, focus groups), quantitative (surveys, economic analyses, cost-benefit, trade-off approaches), participatory methods (PAR, focus groups), spatial analyses <u>Scale</u>: Local initiatives to global scale analyses <u>Products</u>: insights on how to enhance sustainability of livelihoods; evaluations and recommendations for improving ongoing initiatives, best practice guidelines for conservation and development projects, maps and quantitative analyses of ecological and societal outcomes, policy briefs.	Understanding the social and economic impacts of conservation initiatives; Re-orienting national and international conservation policies to consider local development needs; Identifying how to contextualize conservation programs; Designing and improving individual conservation and development projects or broader programs; Incorporating social-economic considerations into broad scale environmental planning
Political Ecology	Critique and improvement of conservation processes; focus on political economic context and power relations that shape practice	What is the political economic context of resource users' decisions? What are the economic, political, social and cultural sources of conservation conflict? How can a better understanding of the above inform more successful conservation practice? How is conservation governance functioning? What are the perceptions of the different players in the governance arrangement and what are the conservation outcomes?	<u>Methods</u>: Case study based analysis frequently using mixed methods featuring qualitative techniques (interviews, focus groups, discourse analysis, ethnography) and quantitative techniques (surveys, land use mapping, remote sensing analysis, participatory mapping). <u>Scale</u>: cross scalar: contextualizing local case studies by tracing processes that shape the dynamics of the case up through to the global scale. <u>Products</u>: descriptive reports; community based maps and analysis; recommended improvements to processes and practices	A better understanding of the political economic context of conservation policy and practice; better understanding of the conflicts arising due to conservation interventions; critique of how particular ideas of nature have informed a coercive conservation practice; critique of the involvement of corporate interests in conservation practice; better understanding of local nature-society relationships and under what conditions conservation compatible livelihoods persist.

Disciplines/Fields	Focus	Sample Questions	Methods, Scale and Common Research Products	Contributions to conservation
Human Dimensions of Conservation and Natural Resource Management	Type 1 (Classical). Addressing natural resource managers' information needs about public attitudes & values. Type 2 (Problem Oriented). Creating comprehensive and actionable ways to effectively integrate conservation and human dignity	1. What is a community's level of tolerance for a species involved in human-wildlife conflicts? 2. How do community members define and judge the significance of the impacts of a particular wildlife management initiative, such as reintroduction of a species? Is there common ground between stakeholders, managers, and other participants in a controversial conservation situation?	Methods: 1. quantitative sociology adapted- e.g. wildlife stakeholder acceptance capacity 2. multiple-methods selected for traction on a specific problem Scale: local to macro-scale Products: 1. Quantified understanding of public attitudes and values formatted to guide managers; 2. collaborative re-definition of previously-intractable problems	Conservation efforts ought to be participatory, pluralistic, allow for individual and collective reflection and learning, adaptive, systems-oriented, and action-oriented.

Table 13.2 - Conservation problems (as defined by locus, scale, groups and topics) and relevant fields of social science*

Locus and Scale of Problem*	People and groups or topics of study*	Examples of problems or questions at this scale	Possible fields of Social Science
Society at national and international scales	• General public, advocacy groups, NGOs and ENGOs, national agencies, international bodies such as the IUCN • Ideas, metaphors, philosophies, narratives, beliefs, ethical stances	How does society imagine nature? How does society understand the relationship between humans and nature? How do conservation organizations envision conservation? What logics inform particular conservation practices or resistance to them? In what ways might ethics guide conservation actions? What social and material factors shape the way society approaches conservation? Do environmental ed. programs facilitate connections between people and nature?	Political ecology; humanities; sociology; ethics; education and communication; science studies; anthropology
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 law or policy? Do existing educational policies facilitate learning science effectively?	Environmental law; governance; science studies; education and communication
Mid-level multi-jurisdiction management unit	• Tribes, NGOs, management boards • Planning, regional policy creation, brokering of management actions	How does decision-making occur in management boards? In what ways is power brokered? Who is involved in environmental governance? What is the role of science in management? How has the area been used historically? What are the main contestations over resource management and why? How has the influx of corporate funding transformed the conservation agenda?	Environmental governance; science studies; anthropology; history; human dimensions; political ecology
Local governments	• Elected leaders, planning departments, technical agencies • Political 'grounding', best practices, applied technologies	Is environmental conservation a local election issue? How do cities plan their green space and parks?	Environmental governance; planning
Management initiative – e.g., protected area	• Managers, co-management boards, adjacent communities • Best practices, participation, governance	What management actions are being taken? By whom? How? How are community livelihoods impacting or being impacted by a protected area? How is the management initiative being received or resisted? What cultural models are being employed to shape policy and practice?	Human dimensions; Cons. and dev.; political ecology; science studies; ethics; anthropology; governance; psych.
Private sector and businesses	• Resource-dependent corporations, local businesses and sectors • Best practices, goods & services, sustainability programs	What economic mechanisms might be used to guide corporate behavior? How can environmental messaging be used to guide consumer behavior?	Cons. and development; ecological economics; communication
Community neighborhood, community 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 affect conservation behaviors? What impact does social networking have on levels of civic engagement? What competing visions for conservation exist? 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; education and communication; psychology
Household/individual	• Residents, individual resource users, homeowners, visitors/tourists, private landowners, recreationists • Awareness, knowledge, attitudes, values, personal norms, emotions, behavior, stewardship, conflict	How can we reduce the consumption of goods or energy in the household? How can we change knowledge and behavior of traditional or recreational resource users? How are individuals likely to respond to a particular conservation or management action? How can we develop effective communication to build local support for conservation efforts?	Psychology; ecological economics; education and communication; human dimensions; environmental governance

Note: *This analysis inspired by a paper titled "Human Dimensions of Puget Sound Ecosystem Health and Recovery: Social Sciences Scale and Scope" by Mary-Anne Rozance (rozance@pdx.edu) and Kathleen Wolf presented May 2, 2014 at the Salish Sea Conference, Seattle, WA.

Table 13.3 - Explanation of social science methods applicable to conservation issues. This table is illustrative, not comprehensive.

Social Science Method	Brief Description
Interviews	Interviews seek to identify interviewees' perceptions, opinions, beliefs, and attitudes. The data obtained can be **qualitative** (descriptive data, e.g. explorations of meaning, asking why and how), **quantitative** (numerical data, e.g., measurements of frequency and magnitude, asking what, when, where, how much) or **mixed**. **Structured** interviews follow a script. **Unstructured** interviews involve questions that are not created in advance, which allows for spontaneity and the developments of new questions over the course of the interview. **Semi-structured** interviews follow a framework of specific topics, but they are flexible, allowing and often enabling new ideas to emerge from the interviewee. **Key informant** interviews focus on the impressions, opinions and experiences of people with a specified expertise. In a **life history interview**, the researcher tends to proceed chronologically and ask open-ended questions to prompt the interviewee to share the story of his or her life. The resulting life-history stories can help researchers understand how people think about and create meaning in their lives and provide insight into other cultures.
Focus group	A moderator facilitates a small group discussion among carefully selected people who discuss their perspectives on a specific topic. This method enables researchers to identify the extent to which participants share an understanding of a topic and the influence of individuals on others in the group. Moderators need strong group leadership and interpersonal skills. Focus group facilitators can employ a diversity of social science approaches, such as those listed in this table, and also **Delphi methods** (a systematic method of forecasting using a panel of experts), **nominal group processes** (involves developing ranked solutions to a problem) or **structured decision making.**
Participant Observation	The researcher immerses him or herself in a group of people that he/she studies for an extended period of time (months to years). The researcher establishes rapport with the group or community and collects data via **informal interviews**, **life history interviews**, **participating in everyday life** of the group**, observing community discussions**, and **analyzing documents** that individuals and the group create.
Free lists	A method to elicit from research participants about all the entities that are related to a particular issue. Particularly useful during initial exploratory research. The benefit of this approach is that it is less leading than direct questions about an issue and is more effective at eliciting participants' views.
Policy analysis	**Analysis *of* policy** tends to be conducted by academics to explain why a policy was developed in a particular context and its intended as well as unintended consequences. Policy makers often commission **analysis *for* policy,** usually conducted on shorter time frames than most academic research. Both entail **case studies, surveys** and **statistical analysis**.
Policy sciences	A high-level approach for integrating multiple methods to comprehensively define a problem in-context, and invent and select alternative courses of action.
Structured Decision Making	Structured decision-making (SDM) provides a practical approach to collecting and organizing the knowledge and values of a group working together to identify and evaluate alternatives in the context of a complex decision. With the goals of transparency, rigor and efficiency, SDM clarifies trade-offs and uncertainties while integrating technical information with value-based deliberation.
Program evaluation	Researchers collect, analyze and use data to determine if and to what extent policies, projects and programs are efficient and/or resulting in the intended effect. Such evaluations may include the program's cost per participant, possible ways to improve it, unintended consequences linked to the program, alternatives and insight into whether or not the program's goals are useful and appropriate. Evaluators often work closely with stakeholders in such assessments.
Discourse analysis	Discourse analysis is the study of the meaning of language beyond the level of a sentence. Given that language is a system of thought and linked to social practices, discourse analysis focuses not just on what is said or written, but how this discourse is embedded in historical, political and social contexts.
Narrative analysis	Researchers use narrative analysis to understand how people create meaning through stories, often based on personal experience. The units of analysis include stories, conversations, journals, autobiographies, letters, interviews, field notes and photos.
Participatory methods	Social scientists work closely with non-academic research partners to co-create research questions and co-produce knowledge relevant to the communities of the research partners and academia. **Participatory action research** involves close collaborations with partners beyond academia aimed at generating social change. There are an array of participatory methods and facilitation techniques.
Ethnography	Ethnography is systematic research on people and cultures. Methods can entail **participant observation** as well as generating extensive field notes, **surveys** and **interviews**. Ethnographers strive to be reflexive, that is researchers seek to account for the influence of their presence and personalities within the groups they study.

Social Science Method	Brief Description
Surveys/Questionnaires	Individuals sampled from a population provide information that can be analyzed statistically. Typically, surveys assess preferences, behavior, factual information and opinions.
Economic valuation	Economic valuation is the assessment of monetary value associated with environmental conditions or ecosystem services (e.g., carbon sequestration, coastal protection from mangroves) that tend to be overlooked in traditional financial valuation.
Cost-benefit analysis	Cost-benefit analysis is a systematic method for determining and comparing the costs and benefits associated with a policy, decision or project. It provides quantitative, monetized values to compare alternatives and inform decision-making.
Economic modeling	Economic modeling involves the identification of key elements of an economic system to determine cause, effect and influence among interacting components. Economists use models to generate different scenarios, often to assess the effects of various policy options or other choices. **Visual models** are graphical representations of an abstracted economy, generally used for teaching. They tend to be visual extensions of **mathematical models**, which are linked systems of simultaneous equations involving multiple variables. **Empirical models** involve the application of data to a mathematical model to estimate the model's values. Computers are critical for economists to build and run **simulation models**, which are mathematical models that the user parameterizes (setting the numerical value of certain variables), then the computer runs the simulation to find solutions to the equations in the model.
Agent-based modeling	Agent based models are a type of **simulation model** used to study the actions and interactions among autonomous agents to determine how they influence a system in its entirety. Such modeling can be used to study emergence (how larger patterns arise in systems via interactions among smaller system components that, by themselves,do not display the pattern), game theory (the study of strategic behavior) and complex systems, among other topics.
Lab and field experiments	Lab-based experiments are conducted in closed and controlled settings. Field experiments are conducted in more natural settings with treatment and control groups. Field experiments tend to be associated with greater variability in the data since unanticipated environmental conditions may influence the variables studied. Social scientists can use field experiments to identify causal relationships between policy interventions and outcomes.
Case study	Case studies involve the use of one or more quantitative, qualitative or mixed method to explore, explain or describe a group, person, decision, project, institution, policy or other system. Researchers use case studies to empirically investigate an issue in its real world context. In **prospective case studies**, researchers define the characteristics of the cases that correspond to the purpose(s) of their research, then select cases when they become available. In **retrospective case studies**, researchers identify inclusion characteristics then select cases from historical records. **Comparative case studies** can illustrate similarities or differences between cultures, countries and contexts. Special attention needs to be paid to the definition of categories and types of data that may vary across case studies when comparing two or more.
Meta-analysis	Meta-analysis involves employing statistical methods to combine and/or compare results from previous research to find patterns, disparities or other relationships across multiple studies. Such analysis can collate information to provide greater statistical power pertaining to a metric of interest. Researchers need to be attentive to how they select studies, manage incomplete datasets and deal with publication bias (studies that support the null hypothesis or have inconclusive results are less likely published).
Systematic review	In contrast to meta-analysis, which *always* uses statistical techniques, a systematic review is a literature review that strives to find, assess, select and compile robust evidence concerning research question(s). Reviewers use both quantitative and qualitative methods to synthesize the data.
Argument analysis	Argument analysis is the process of evaluating the soundness of premises and the validity of arguments that underlie any particular ethical claim.

Social Science Method	Brief Description
Synthetic analysis	Synthetic analysis involves the use of basic conceptual frameworks from ethics (including various ethical theories, environmental ethical theories, and then even some metaphysical ideas) to test people's beliefs with social science methodologies (surveys, focus groups, etc.) to understand not only what people think but why they think it and how this aligns with ethical theories. For example, this might show that people have a variety of opinions about whether or not it is okay to intervene in wilderness, or to hunt large carnivores, etc., but we can also then employ ethical frameworks to understand why – or rather to understand how these various opinions on wilderness and hunting line up with various ethical and environmental ethical predispositions.
Mixed methods	Mixed method research focuses on understanding the real-world context and cultural influences linked to the topic(s) under investigation. Researchers in mixed methods projects tend to employ quantitative and qualitative methods and integrate the results. Researchers are also explicit about the philosophy and theory underpinning their inquiries.
Pile Sort	During a pile sort, the researcher asks a respondent to organize a set of items (specimens, photos of objects, names of things, etc.) into piles according to criteria that the respondent deems relevant. After the sorting is complete, the researcher asks why the participant sorted in the chosen manner. This method can be less leading that direct questions and effective at eliciting how participants think about the items and how they relate to each other.
Archival research	Archival research focuses on the analysis of **primary sources**, which were written or created during the period of study (not to be confused with **primary data**, which is data that the researcher collects). Researchers use primary sources to find data and evidence from archival records.
Secondary document analysis	Secondary document analysis involves the study of documents, often found in libraries and online, containing information originally presented elsewhere, generally in **primary documents**. Secondary document analysts recognize that the authors of secondary documents interpret, evaluate, generalize, synthesize or otherwise alter the original information.
Secondary data analysis	Secondary data is information that someone other than the researcher created. Common secondary data sources are census records, records from organizations. Researchers can use this data to reveal aggregate patterns or broad trends and make comparisons over time and across contexts.
Documentation of Traditional Ecological Knowledge (TEK)	Berkes (2001) defines TEK as "a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and their environment" (p. 8).* TEK researchers record 1) factual observations, such as names and classification systems; 2) management systems that determine access to resources, types of harvest/use etc.; 3) historic and current uses of ecosystem components, often preserved in oral traditions; 4) ethics and values underpinning the management of exploitive capacities as well as appropriate relationships between humans and ecosystems; 5) culture and identity, often embodied in language and cultural landscapes; 6) cosmology and worldview related to beliefs and perceptions of how humans and animals ought to interact and the roles that humans ought to have in their communities.
Arts-based research	Researchers systematically use the process of creating an artistic expression, which can take diverse forms (e.g., paintings, dances, carvings) to understand the experience of researchers and the people who they study.
Spatial analysis	**Geographic Information Systems (GIS)** can be used to organize spatial information to better understand human behavior in a spatial context and inform planning, such as helping optimize locations for development or conservation. Data sources include **remote sensing** data from satellites and **aerial photos**. In **Community-based mapping,** researchers employ a wide range of tools to facilitate the participation of community members as they map local knowledge (e.g., contaminated sites, sacred sites, sources of water etc.). Such mapping can help communities improve resource management, plan for the future, record and use their local knowledge, make their concerns more visible and improve communication with external organizations (e.g., government agencies). **Transect walks** involve a systematic walk following an established path crossing a project area with locals who create a transect diagram identifying concerns about a particular topic which community members and researchers later discuss.

Note: *Berkes, F. (2001). Sacred Ecology. New York, NY: Routledge.