NAVIGATING TRADEOFFS: SOCIAL SCIENCES AT IUCN'S WORLD CONSERVATION CONGRESS

by

MEREDITH WELCH-DEVINE

(Under the Direction of J. Peter Brosius)

ABSTRACT

Conservation is a complex undertaking that requires expertise in both ecological and social systems. It is, therefore, necessary to take a holistic approach to conservation that integrates many different disciplines; however, in the past social scientists have sometimes felt marginalized in conservation work. In this thesis, I explore some of the challenges to the integration of the social sciences in conservation and opportunities for more fruitful engagement. I discuss these challenges and opportunities in the context of changing approaches to conservation, paying particular attention to market-based approaches and approaches integrating climate change mitigation. This research was completed at IUCN's Fourth World Conservation Congress in Barcelona, Spain, as part of a collaborative "event ethnography", and this thesis also comments on the strengths and weaknesses of such a methodological approach.

INDEX WORDS: social science, conservation, World Conservation Congress, NGO

NAVIGATING TRADEOFFS: SOCIAL SCIENCES AT IUCN'S WORLD CONSERVATION CONGRESS

by

MEREDITH WELCH-DEVINE

BA, Washington and Lee University, 2000

PhD, University of Georgia, 2008

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment

of the Requirements for the Degree

MASTER OF SCIENCE

ATHENS, GEORGIA

2009

NAVIGATING TRADEOFFS: SOCIAL SCIENCES AT IUCN'S WORLD CONSERVATION CONGRESS

by

MEREDITH WELCH-DEVINE

Major Professor: J. Peter Brosius

Committee: Lisa M. Campbell
C. Ronald Carroll

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
August 2009

ACKNOWLEDGEMENTS

This thesis could not have been completed without the support of many people within both the Ecology and Anthropology departments, and I am deeply grateful for the help I received from them along the way. In 2003, several doctoral students in Anthropology began to explore the idea of simultaneously completing the Anthropology PhD and CESD master's degree. The head of the Department of Anthropology at the time, Ervan Garrison, and the director of the Institute of Ecology at the time, Ron Carroll, both strongly supported the idea and went above and beyond to make sure we had the opportunities we needed to succeed. Coordinating the effort also required extensive help from Margie Floyd and Patsy Pittman to make sure all degree requirements were met and classes were appropriately parceled out to the two different programs of study.

I'd like to thank my advisor, Pete Brosius, both for his help in improving this research and for helping me navigate through several changes of focus and other hurdles. Ron Carroll and Lisa Campbell also provided many interesting insights and great help along the way, and I am grateful to them for agreeing to serve on my committee. The Event Ethnography was Pete's creation, so I'm also thankful to him for dreaming up such an interesting venue and methodology. I'd also like to thank the Steering Committee for the Event Ethnography for accepting and agreeing to fund my proposal. Funding was provided by the *Advancing Conservation in a Social Context* initiative, which in turn is funded by the John D. and Catherine T. MacArthur Foundation, and by the University of Georgia.

Finally, I'd like to thank John for his love and support and for tolerating the amount of travel that my work entails.

TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

I. Introduction

There are strong arguments for interdisciplinarity when conducting research on real-world problems, and conservation is particularly complex and demanding of a holistic approach. Fox et al. argue that "conservation actions are ultimately human behaviors, and it is vital to understand how social factors (eg. markets, cultural beliefs and values, laws and policies, demographic change) shape human interactions with the environment and choices to exploit or conserve biodiversity" (2006:217). Similarly, Wilkie et al. point out that most conservation work takes place in

> . . .spaces dominated by human land uses focused on generating valued commodities. Managing these complex landscapes that combine areas that preference biodiversity conservation with areas that preference generating goods for human consumption is a new challenge to the conservation community and one that will require new skills, new partnerships, and new incentives to ensure that the spaces between protected areas remain permeable enough to provide wildlife with needed resources and safe passage, whilst simultaneously generating goods sufficient to meet human needs. (2008:4)

Because conservation requires attention to both ecological and social complexity, many papers have called both for increased involvement of the social sciences in conservation and for better integration of social and natural sciences in that work (Campbell 2005; Mascia et al. 2003; Meine et al. 2005).

Fox et al. (2006) point out that this push toward integration is being driven with increasing urgency, and indeed, the interest in the role of the social sciences in conservation has grown so great that a special issue of *Conservation and Society* (2007) was devoted to the engagement

between the social and natural sciences and the role of social science researchers in biodiversity conservation and protected area management. There is great variability, though, in what it means to use social sciences in conservation. For some, it simply means using social sciences as an input to improve models (Nyhus et al. 2002; Turner 2007). In this context, the social aspects of conservation tend to be reduced to how humans impact 'natural' systems. In contrast, Endter-Wada et al. (1998) argue that the social sciences can be used to elucidate such things as broad social, cultural, political, and economic values, behaviors, and trends, individual and group attitudes, values and behaviors, social organizational structures, power differentials, social and economic equity issues, linkages across groups and communities, human conceptual systems in resource uses, conditions, and management approaches. Even more importantly, social science can help test some of the underlying assumptions of conservation (Brosius 2006; Eghenter 2004; McSweeney 2005).

Though the social sciences share many common interests and research themes, their orientations and approaches can differ substantially, leading them to sometimes yield very different insights. To help practitioners and academics understand the theories and tools of other disciplines, the Social Science Working Group of the Society for Conservation Biology has compiled descriptions of how the various social science disciplines are relevant to and engage with conservation. *Anthropology* is "the scientific and humanistic study of the human species: humankind's present and past biological, linguistic, social, and cultural variations" (Russell 2009). Anthropology recognizes that even isolated groups are often connected to larger economies and that few societies are homogeneous. Within the domain of conservation, anthropology can support projects through data collection, can engage critically by examining indigenous and human rights concerns and providing historical and socio-political analysis, and

can help in the planning, funding and evaluation of initiatives (Russell 2009). *Economics* "is the scientific study of the allocation of resources under scarcity: how we behave when trying to use any resource (e.g., time, money, duikers) that exists in insufficient quantity to satisfy all users" (Raheem 2009). Economics can support projects by providing knowledge of human interactions and markets, modeling decision-making, and evaluating initiatives using such tools as cost-benefit analyses (Raheem 2009). *Environmental education* "is about helping us learn to live in a way that protects and restores the integrity of the environment upon which we depend. . . EE teaches us to weigh various sides of environmental issues so that we can make our own informed decisions (Zint & Higgs 2009). *Human geography* is "dedicated to the study of human activity, culture, politics and economics within its spatial and environmental context" (Robbins 2009). Geographers argue, among other things, that human behaviors can change and that some behaviors improve or maintain biodiversity, that human resource use is mediated by culture, economics, institutions, and power structures, that collective action can lead to better environmental outcomes, and that behaviors are deeply influenced by constraining political and economic contexts (Robbins 2009). *Political science* "is the study of governments, public policies, and political processes, systems, and behavior" (Miller 2009). Political science engagement with conservation has, thus far, been limited, but some political scientists argue that "without acute political analyses that take incentives and actions of multiple actors at different scales into account, there is no effective policymaking or governance related to biodiversity and, consequently, no protecting biodiversity" (Agrawal & Ostrom 2006). *Psychology* is "the scientific study of human thought, feeling and behavior. Ultimately it is devoted to both understanding human behavior and promoting human welfare" (Clayton & Saunders 2009). Conservation psychology studies such topics as how humans care about and behave towards

nature with the goal of changing behavior (Clayton & Saunders 2009). *Sociology* "is the study of social life, social change, and the social causes and consequences of human behavior" (ASA 2006). Sociology can contribute to better understanding and management of habitat change, monitoring and evaluation, studies of organizations and examination of the production of knowledge (Machlis 1992).[1]

Even though each of these disciplines brings its own approach to conservation, the social sciences are often lumped together and discussed as "social science" rather than as "the social sciences." Anthropology, though, brings something quite different to the study and practice of conservation than does economics, which in turn contributes quite differently than does education. Though there is overlap, one social science is not exchangeable for another, and within a particular discipline, individual scholars have very different orientations, with some focusing on providing data to craft better projects while others use their work to question the very merit of a project-based approach. At the same time, the different approaches and tools of the various disciplines paint different pictures of the social context of conservation at different resolutions. Ethnography, which is shared across anthropology, sociology, and geography, will arguably give a much more complex and nuanced understanding of a situation than will rapid appraisal methods or quantitative approaches like cost-benefit analyses.

In an effort to enhance our understanding of the role of the various social sciences in conservation, I participated in an event ethnography of the Fourth IUCN World Conservation Congress (WCC) in Barcelona, Spain (Oct 5-14, 2008). The WCC provides an unparalleled opportunity not only to meet conservation practitioners from around the world, but also to

1 Though the SSWG includes sociology in its list of social sciences, it does not provide the description that it does for other disciplines, so these comments were taken from other sources.

directly observe their work and interactions across organizational and disciplinary lines. The WCC is unique among conservation-related conferences in that its scope and focus are international and in the diversity of actors present. The objectives of the research were to:

1. Understand how the social sciences are viewed and used by practitioners
2. Understand which applications of social science have been most useful in conservation planning and why
3. Identify opportunities for more fruitful engagement between social scientists and conservation practitioners

This thesis will begin with a review of the literature discussing the engagement of the social sciences in conservation in order to situate the data collected at the WCC. Because climate change mitigation and market-based approaches to conservation occupied such prominent positions at the WCC, I will next examine the literature on these emergent conservation strategies. I will then explain how attention to social context was manifested at the WCC and discuss the role of the social sciences in revealing and constituting that context. I will finish with a reflection on how changing approaches to conservation are affecting and likely will continue to affect the role the social sciences are asked to play in conservation planning and implementation.

II. Literature

Much of the anthropological interest in conservation centers on the effects of conservation on local populations and interactions between these populations and the conservation project. Much of that writing focuses on protected areas, a catchall phrase covering parks, reserves, sanctuaries, and other such designations. Protected areas have proliferated since the early 1970s, and anthropological writings on them have flourished since the 1990s (Orlove & Brush 1996). More recently, attention has turned to the politics of protected area creation, conservation outside of park boundaries, conservation at ever-broader spatial scales, and how the social and natural sciences can work together in conservation.

Studies of the effects of conservation projects on local communities have looked at such diverse topics as displacement (Brockington 2001; Chatty 1998), the interplay of conservation and livelihoods (Coomes et al. 2004; Hulme & Murphree 2001), and changes in gender dynamics (Dey 2000; Schroeder 1993). In this body of literature, the negative effects of conservation are emphasized in an effort to call attention to things that had largely gone undocumented: loss of land-use rights, evictions from homes and ancestral domains, disruption of livelihoods, exacerbation of gender inequality, state seizure of resources and exclusion of local populations (Neumann 1992), and state violence either to achieve conservation goals or to pursue its own ends under the guise of conservation (Peluso 1993). Several authors, though, have offered positive stories of conservation that not only achieves biodiversity goals but also empowers local

communities. The showcased approaches are largely community-based (Berkes 2004; McShane & Wells 2004; Western & Wright 1994a), and arguments that local populations should be included in protected area management are based either on the grounds of social justice (Brechin et al. 2003), on concerns for practicality (Agrawal 1999), or on both (Western & Wright 1994b).

The recognition that biological zones of interest do not usually map well onto political boundaries, along with a backlash against community-based approaches, has increased interest in large-scale conservation planning, including transboundary or transfrontier initiatives (Brosius & Russell 2003; Goodale 2003; Wolmer 2003). Büscher and Dressler (2007) argue that the divergence between those who favor community-based approaches and those who favor protectionist approaches is rooted more in different scale preferences rather than in 'pro-nature' versus 'pro-people' arguments. Nonetheless, these large-scale projects raise many questions about equality and participation of local communities and often rely on rapid appraisal methods to gather any social data that are deemed necessary, and many anthropologists fear that these approaches ignore heterogeneity among communities and do not adequately include local actors in the conservation planning process.

Much of the recent writing on social sciences in conservation is dedicated to identifying why it has been so difficult for natural and social scientists to work together. This section will begin with an exploration of those obstacles but will continue to an examination of the ways in which natural and social sciences could work together more effectively. At the WCC, many of the people with whom I spoke echoed concerns that have come out in the literature, but they also presented several new ways of thinking about different fields of study and their interactions that

had not been previously captured. Examining the literature alongside the collected data will help us update our thinking on the challenges and opportunities of cross-disciplinary collaboration in conservation and to think about that work in the light of emergent conservation approaches. At the WCC, there was a strong interest in both climate change mitigation and market-based approaches to conservation, the two of which often overlap. As a result, many people were also talking about the insights that could be offered by economists. This has the potential to increase the prominence of the social sciences in conservation but also to change the balance of power among the social disciplines. In order to better situate the insights of the practitioners and academics I spoke with at the WCC, I will finish this section with a look at emergent approaches to conservation, particularly economic approaches and strategies incorporating climate change mitigation and adaptation.

Barriers and obstacles to social science engagement in conservation work

Though it is often acknowledged that interdisciplinary work can help tackle problems that do not yield to disciplinary approaches, it can also be fraught with difficulty (Brewer & Lövgren 1999), and many projects that are styled as interdisciplinary efforts fail to achieve integration across disciplines (Fry 2003). Among the most frequently-cited difficulties in interdisciplinary work are language and communication issues. Several authors point out that there is a lack of common vocabulary to speak to each other: "as conservationists we mostly lack the knowledge and language to be able to properly to understand and talk about the most significant problems we face, and we lack the language to have an effective conversation with those who claim (on the basis of their social science training) to have the understanding we need" (Adams 2007: 275;

Endter-Wada et al. 1998; Fox et al. 2006). Adams goes so far as to argue that the language used by social science is "unintelligible" and that the terms and assumptions of conservationists are "profoundly simplistic" (Adams 2007:275). Concepts and terms that are often taken for granted by conservationists, such as community, custom, tradition, rights, or indigenous, are, in contrast, seen as problematic by social scientists because they are fragile, mutable, and variable (Brosius et al. 1998), and social scientists often do not adequately understand the biology of the place in question (Gartlan 1998).

Another important obstacle to effective communication lies in differing world views. Endter-Wada et al. (1998) argue that natural scientists view humans as intruders in ecosystems and social scientists view ecosystems as providers of goods and services for humans. While this is certainly an over-generalization, particularly given the time that has elapsed since their analysis, it is worth consideration. Such differences affect the assumptions and principles underlying the research, which questions are asked, and which methods and approaches are used. Both Adams (2007) and King et al. (2007) point out differences between statistical methods used in the natural and social sciences, as well as differences in modeling and complex qualitative analysis. Endter-Wada et al. (1998) also note that social and natural data can be incompatible over spatial and temporal scales and have different units of measurement. Some natural scientists even profess a concern over the rigor of social science data (Gartlan 1998). Even among groups of natural or social scientists, language difficulties are likely to arise among those that hail from different disciplines as a result of their differing traditions of theoretical and historical understanding (Adams 2007). These problems are compounded by the lack of conferences that promote professional interaction across the disciplines (Endter-Wada et al. 1998).

Furthermore, there are serious misunderstandings on the part of many natural scientists as to what social scientists actually do, as well as disagreements over whether or not it is useful. The first priority of conservation biologists is saving biodiversity, and as a result they tend to see social science's value as helping them do that. For example, Machlis asserts:

> It is becoming increasingly clear that the management of protected areas in the 21st century is necessarily the management of people. And managing people is a difficult task that will be facilitated through the use of the social sciences at the protected area, regional, national, and global levels. (1995:45)

Social scientists are often seen as those who manage conflicts, avoid litigation, improve participation, and do environmental education (Endter-Wada et al. 1998) or as those who will "fix" socioeconomic problems (Campbell 2005). Endter-Wada et al. argue that even ecologists who recognize the "political realities of ecosystem management" still "fail to note the *scientific* contributions that can be made by political scientists, sociologists, anthropologists, economists, and other social scientists," instead viewing them more as facilitators (Endter-Wada et al. 1998: 892, my emphasis). Brosius notes, though, that "whatever else anthropology is today, it is not about figuring out how to manage people better" (Brosius 2006: 684).

Many social scientists believe, though, that their most important contributions do not lie in providing data but in interrogating the underlying assumptions of conservation. McSweeney argues that conservationists "have a weak grasp of the 'how' behind social and political processes" and that they "allow practice and policy to be guided by 'myths'" that social scientists can help dispel (2005:1376). Brosius (2006) further argues that when the social sciences provide data or deliverables, they are welcome to contribute to conservation, but when they are asking other questions, the social sciences are often seen as unproductive or even destructive: [anthropologists often] "frame conservation issues in ways that challenge fundamental

assumptions held by the conservation community, and they are usually not well-received" (Brosius 2006:683). Urgency, he argues, makes critique feel like an "unaffordable luxury" (Brosius 2006:684). Büscher and Whande (2007a:6) believe that the emancipatory agenda of much conservation research, focusing on such things as displacement and denial of access to resources, was needed at one time, but that such "shock therapy" has given a negative connotation to "politics" in conservation and has therefore made conservationists less open to social science contributions.

Finally, academic expectations and the structure of the university system can make cross-disciplinary collaboration difficult as well (Brewer 1999). Faculty members are expected to publish regularly in order to achieve tenure and to be promoted, and in this system, single-authored papers are favored, which discourages collaborative work (Fox et al. 2006). When researchers do publish together, where and how to do so can be tricky. Different disciplines have different publishing protocols governing the acceptable number and order of authors (Campbell 2005), and it can be difficult to decide what sort of journal to publish in. Discipline-based journals are longer-established and thus are more favorably-viewed by tenure committees, while newer journals are treated with suspicion (Campbell 2005). When publishing in a newer, interdisciplinary journal is not deemed in the best interests of the authors and the work could easily be published in journals of several disciplines, the group must make tough choices. For example, I am currently co-authoring an article with a geographer, an anthropologist, a sociologist, and a lawyer, and our discussions of where to publish have not been oriented solely to what would be the best fit and where we would have the most impact, but also on whose career demands are most urgent. Campbell (2005) has also found that when trying to reach an

audience of conservationists as a social scientist by publishing in a journal outside of her discipline, inappropriate revisions are suggested to the articles because the reviewers are unfamiliar with social science methods and theories.

Endter-Wada et al. (1998) argue that university incentive structures reward specialization within disciplines, and Campbell (2005) adds that in some cases where it would be helpful to have a researcher from another discipline on a tenure committee, it is not considered appropriate. The applied nature of most interdisciplinary projects can also hurt those that undertake them in programs where theoretical work is privileged (Fox et al. 2006). Finally, Blockstein (2001) notes that inter- and cross-disciplinary work has not been adequately embraced in universities due to lack of funding for such work.

Improving interdisciplinarity and exchange

The first step in moving toward increased interdisciplinary collaboration and increased exchange between conservationists and academics is for everyone concerned to find points of agreement. Redford and Brosius argue that, in fact, conservationists and anthropologists share a common vision, namely a commitment to fighting "forces of homogenization" (2006:317). While visions of a particular place and what needs to happen there may vary, most people can agree that both cultural and biological diversity are generally good things that should be encouraged and protected from many different kinds of threats. One might argue that while conservation organizations have at times done harm in the places they work, they are well-intentioned and

certainly less destructive than the oil or mining companies that both they and social scientists often work against.

However, not all social scientists believe that they should be working in concert with conservationists, and there is a strong counter argument that holds that we can be most effective by critiquing from the outside (Li 2007, 2008). In *The Will to Improve*, Li (2007) argues that research and critique that is not geared toward creating or improving a program offers different insights than can be produced by scholars acting as consultants, explaining that her brand of open-ended critique can be taken up by a variety of different people working on projects of their own: "I hope that readers involved in enterprises such as rural development and environmental management find, in my account, grist for their own critical thinking about programs of improvement, their prospects, and their limits" (Li 2007:30). Others have suggested that perhaps conservation is doing enough harm to people that we should not attempt to aid it or engage with it in any way, instead focusing on bringing to light injustices that have been perpetrated in the name of conservation.

Brosius, though, argues that it is precisely by engaging with conservationists that anthropologists and other social scientists can be most effective:

> Anthropologists must challenge themselves to take their analyses to the next step: linking critique with engagement by showing in concrete form how their analyses can inform the practices of conservation practitioners by providing alternatives . . . We must premise this effort to bridge critique and engagement on recognition of the value of anthropological assessments of conservation and on recognition that critique alone is not enough. (2006:684)

If we accept, as Brosius suggests, that social science has important contributions to make to conservation and that it can ethically and effectively do so by working in collaboration with

conservationists, we can again consider the idea of finding points of agreement. Brosius cautions that rather than expecting to align our worldviews, we must start small: "most points of consensus should be sought in small ways, in particular places, in 'situated collaborations'" (2006:685).

At the project level, Campbell (2005) argues that one of the best foundations for collaboration is for all parties involved to engage in an open discussion of the project's assumptions and objectives at its very earliest stages. Such a discussion can create space for social scientists to challenge those assumptions before too much is invested in a particular approach. Brosius (2006) reminds us that social science analyses need, themselves, to be subject to examination and discussion. Beginning this discussion at a project's outset can increase the likelihood that flaws will be caught early on and that the various parties involved will establish a pattern of open communication and willingness to exchange. Van Mansfeld also treats collaboration at the project level and argues that teams must have a "knowledge broker" who serves to "facilitate the flow of different forms of knowledge and know-how contained in interacting parties to optimise the process of problem solving" (2003:33). Among other things, such a person needs to have a wide breadth of knowledge, good facilitation skills, and the ability to reformulate issues in plain language. They must also be able to manage conflicts, create a safe environment, and be willing to learn (van Mansfeld 2003). Perhaps most importantly, all parties must maintain a high level of professional courtesy (Winder 2003).

McSweeney argues that in addition to seeking points of agreement in project-level collaborations, social scientists must reach out to natural scientists in much broader contexts:

> Achieving effective cross-disicplinarity in conservation science demands more than social scientists' input on specific conservation projects or in curricular development. Instead, social scientists must be willing to regularly and explicitly update conservation biologists about emerging ways of thinking about social processes, and they must demonstrate how these conceptual insights can be used to enhance conservation outcomes. (McSweeney 2005: 1376)

Reaching out to conservationists also requires moving past dissemination to the academic community and making a concerted effort to get research and theory into the hands of practitioners. Finally, we must also be aware that there are those "on the other side" that feel they are reaching out to the social sciences and are not being met with as much reciprocation as they would like (Blockstein 2001).

Fox et al. (2006) suggest that one of the most important steps for promoting interdisciplinary collaborations would be to secure increased funding for interdisciplinary work and to encourage graduate training in interdisciplinary work. For those that do not have the luxury of being trained in an interdisciplinary department, Fox et al. (2006) suggest that both academics and practitioners need to read literature from fields other than their own. Given that this literature can sometime be inaccessible in terms of both access and jargon, an internal WWF study suggested that social science literature be made accessible to practitioners through translation and summaries (WWF-US 2008). Endter-Wada et al. also suggested that social scientists create a "translation device" to give natural scientists "a better understanding of distinct domains of social science contributions" (1998:891).

Emergent approaches to conservation

This section will focus on economic approaches to conservation and the entrance of climate change into the conservation agenda. Many conservation organizations are moving forward with some forays into market-based conservation, and almost all are examining how climate will impact their work and how climate mechanisms can be used for conservation. Though it remains to be determined to what extent conservation organizations will adopt market-based approaches and exactly how they will use climate initiatives for conservation, it was clear that these approaches are being championed by an increasingly vocal set of supporters. Both climate-oriented and economic approaches to conservation will continue to require a subtle and nuanced understanding of the social and ecological contexts where these projects are implemented. However, climate approaches will also require a thorough understanding of international policy and national political and social contexts, and economic approaches will require expertise in such areas as marketing and accounting. Both increase the range of skills needed on a project team and make cross-disciplinary engagement and integration more urgent.

Economic and market-based approaches

Economic and market-based approaches to conservation emphasize that while the benefits of conservation accrue at regional, national, and even global scales, the costs of conservation are often borne in specific places and usually by the poor. These approaches are based on the philosophy that we can only expect things to be preserved if benefits are redistributed to those who "pay" for conservation (Heal 1998) and use various direct and indirect methods of payment to try to "make biodiversity conservation a competitive form of land use" (Kiss 2004:98). Bowling argues that "economic approaches, by firmly addressing the root causes of biodiversity

loss, can offer promising solutions to intractable problems" (Jill Bowling in Le Quesne & McNally 2006:4). Furthermore, economic approaches to conservation can also be a way to try to make conservation self-financing through the use of market mechanisms (McNeely 1988).

Economic incentives range from fairly indirect incentives, such as community-based projects and ICDPs, that provide additional income, to direct incentives, such as land purchases, leases, conservation easements, and performance payments (Svadlenak-Gomez et al. 2007).

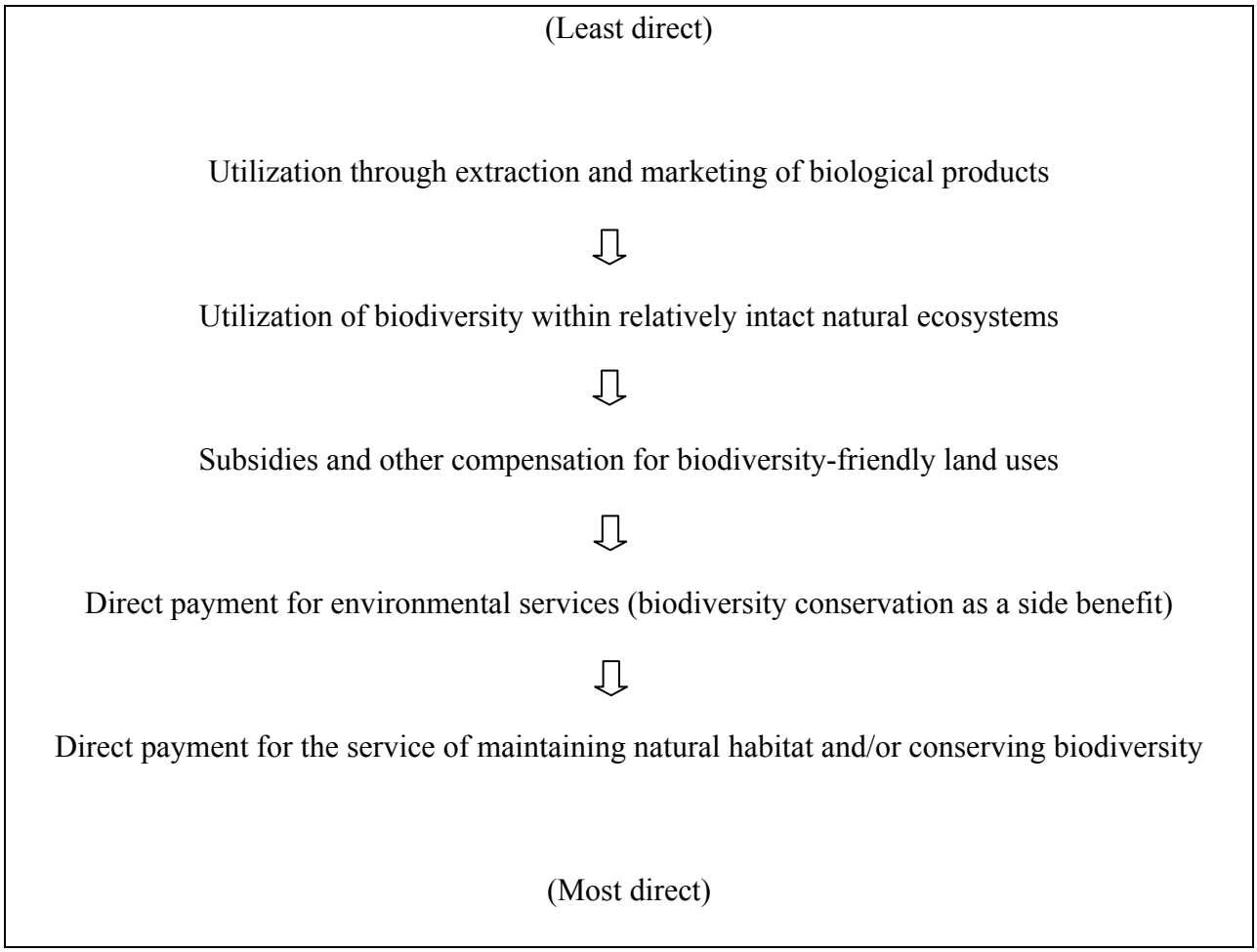

Figure 1. Varieties of economic incentives for conservation (Kiss 2004:108)

Payments for environmental services, or payments for ecosystem services (PES) are hybrid measures that lie between direct and indirect incentives (Ferraro & Simpson 2002). They have roots in ideas that have been around for at least 20 years in ecology and economics, particularly that nature provides valuable services to humans (Gutman & Davidson 2007). Defining what exactly is or is not a PES program, though, can be quite difficult and in some cases simply comes down to semantics:

> Many in the conservation movement favor a broader definition of PES where the buyers may be either (a) the direct beneficiaries of the ecosystem services in question (e.g. consumers, businesses); or (b) a private or public intermediary that passes the costs on to final consumers (e.g. a private or public water company pays for watershed conservation and includes the cost in the water bills); or (c) the government procuring ES on behalf of society, as is the case with many other public goods (education, security, culture, social security etc.). In this approach, what makes a PES a PES is that in any payment arrangement those who pay are aware that they are paying for an ecosystem service that is valuable to them or to their constituencies—and those who receive the payments engage in meaningful and measurable activities to secure the sustainable supply of the ecosystem services in question.[2] Some critics consider this definition too broad, and find little gain in now calling PES what previously was known as certification schemes, park entrance fees or conservation grants. Supporters answer that even for traditional finance schemes, adopting a PES approach may improve the procurement and delivery of conservation, as it makes both parts more aware of what they are paying and being paid for. (Gutman & Davidson 2007:65)

As Gutman and Davidson point out, some traditional financing mechanisms that are not usually considered PES could fit under this broad definition, such as ecotourism, markets for sustainably-produced products, bioprospecting contracts, and even carbon markets that deal in bio-carbon.[3] Forest Trends et al. (2008) include public payment schemes for private landowners, formal regulatory and voluntary markets, and self-organized private deals under the label of PES

[2] See Gutman (2007)

[3] "Bio-Carbon refers to the carbon sequestered and stored in the world's plants, soils and oceans. It is being rapidly released into the atmosphere, triggered by an unprecedented rate of deforestation and land degradation, resulting in 20 percent (8 Gt/year) of greenhouse-gas emissions" (Business for Social Responsibility 2007: 44).

and add that to be considered PES, the service provided must be additional. In other words, the service would not have been provided if it were not for the payment.

PES proponents argue that they may be the best way to ensure efficiency of public payments for conservation. PES opponents, however, often object to the concepts of payments and services, fearing that they herald a coming privatization of the environment, while

> . . . others are concerned with its political implications. For example, India's lowland states oppose PES, fearing that it will make them debtors of upstream Himalayan states. Still others suggest that PES may run against the "polluter pays principle" (PPP), a cornerstone of European environmental policy, and wonder if PES may not open the door to rent seeking, bribes or even blackmail by the would-be providers: the "pay me or else" scenario. (Gutman & Davidson 2007:64)

Mayrand and Paquin (2004) inventoried 300 PES schemes from around the world, and though most were quite recent, and several were still in the pilot phase when they were evaluated, the authors concluded that there are some initial lessons that can be taken away. They argue that PES schemes may not be cost-effective in all circumstances and that their success depends on pre-existing conditions. Similarly, Gutman and Davidson argue that PES schemes are enormously complex and difficult to establish effectively:

> Down to its bare bones, the PES concept looks straightforward: those who benefit from nature's services should pay those who shoulder the cost of ensuring the provision of the ecosystem services in question. In practice, the issue is much more complex and discussion lingers regarding many of the nuts and bolts: What qualifies as an ecosystem service? When does it deserve (or need) to be paid for? Can governments be the buyers? What are PES best practices? What has been thus far the on-the-ground environmental and livelihood benefit of PES schemes? (2007:28)

Major developments in the use of economics and markets to conserve biodiversity

1970s – United States' Clean Water Act leads to first markets for ecosystem services

1970s/80s – Tradable permits for fish harvests (McEvoy 1986)

1980s – US Acid Rain trading scheme begins, first "large scale environmental market" (Bayon et al. 2007)

1980s and 90s – Concern with seeking conservation solutions at larger scales furthers the push toward using economics (McShane & Wells 2004)

1987 – WWF executes one of the first debt-for-nature swaps in Ecuador

1989 – First corporate carbon offset project: CARE Agroforestry Project in Guatemala, funded by AES Corporation (Trexler et al. 2006)

1993 – Convention on Biological Diversity enters into force

1998 – An ICRAF Regional Program for Southeast Asia workshop concludes that payments could be an effective way to maintain beneficial land uses

1998 – The International Fund for Agricultural Development (IFAD) commissions a study of the potential for payment for environmental services to be beneficial to poor communities

Late 90s – First uptick in the literature of discussions about financing environmental services (around 1998)

1999 – Hulme and Murphree (1999) call market–based approaches the "new conservation"

2000 – IUCN and WWF launch www.biodiversityeconomics.org. Katoomba Group is formed http://www.katoombagroup.org/

2004 – Mayrand and Paquin (2004) note that there are more than 300 PES schemes

2005 – Completion of Millennium Ecosystem Assessment

2008 – Markets and business journey at the World Conservation Congress encompasses 50 events over four days (IUCN 2008b)

2008 – Launch of interim report on The Economics of Ecosystems and Biodiversity (Sukhdev 2008)

Figure 2. Developments in the use of economic instruments for conservation.

Market-based mechanisms constitute a particular class of economic approaches to conservation and are driven by "frustrations with traditional government regulatory approaches, growing recognition of the limits of protected area approaches to conservation, [and] societal demands for ecologically sound products" (Scherr et al. 2004:7). Bayon et al. argue that markets are useful because change needs to be systemic, altering the way we "eat," "drink," "sleep," and "do business" (Bayon et al. 2007:xvii). Markets allow for the allocation of "rewards" and "punishment" and allow trading of various types of credits across both geographic and temporal scales.

Market-based approaches to conservation can include a variety of mechanisms, such as eco-labeling schemes, green markets, and green investment funds (Gutman & Davidson 2007). Eco-labeling can include certified wood and fish, sustainable soy, and the like. This approach has grown substantially in the last 15 years (Scherr et al. 2004). Green markets, which Gutman and Davidson call "the other side of the eco-labeling coin" include such things as organic, fair trade, and sustainably produced goods (Gutman & Davidson 2007:52).

> With global sales of organic food at about $USD 30 billion in 2005 and 100 million hectares of sustainably certified forest, markets for green, organic, and sustainably produced food and fibers may become the largest source of financing for mainstreaming biodiversity conservation into production landscapes. Each time consumers pay a premium, such as for fair-trade coffee or certified fish, they are paying for two things: a consumption good (coffee, fish) and a service, namely the assurance that back in the countryside the good has been produced in a way that is environmentally and socially responsible. (Gutman & Davidson 2007:42)

Gutman and Davidson (2007) point out that such products are a fast-growing share of the world's food and fibers market and argue that global demographic trends toward an older and richer population bode well for continued growth. However, they caution strongly that we must

be wary of alluring market figures like $USD 30 billion for organic food and $USD 22 billion for carbon trading because these figures do not reflect the amount of money that actually reaches the farm. Scherr et al. (2004) similarly point out that the trade in medicinal products derived from forests is alone worth tens of billions of US dollars per year, but that forest peoples are not the ones realizing these profits. Furthermore, small coffee producers whose product often comes closest to the ideal conception of "fair trade shade-grown organic practices" may find the certification process expensive and inaccessible (Ron Carroll, personal communication, May 17, 2009). On a different note, Kiss (2004) cautions that when using market mechanisms to conserve biodiversity there is a very important distinction to be made between *markets for biodiversity* and the *marking of biological products*, which she argues is often not compatible with conservation because commercial success can lead to over-harvesting.

Green investment funds are also increasingly popular for financing conservation, particularly in high-income countries. These funds focus primarily on investment in the pollution control industry, clean energy, and environmental-friendly manufacturing (Gutman & Davidson 2007). Many proponents of green investment funds believe that they offer the opportunity to finance biodiversity conservation in developing countries by supporting bio-carbon sequestration (Bayon 2007).

The utility of markets for biodiversity conservation will depend on their incentives and the opportunity and capacity of host countries to produce and export green products and ecosystem services (Gutman & Davidson 2007). Secure property rights and favorable national legal frameworks are essential for the development of markets for ecosystem services, and if these markets are to alleviate poverty, they must be actively shaped to do so (Scherr et al. 2004).

There remain important questions about the effect of market-based conservation on local populations, however:

> Attempting to squeeze something as holistic as global biodiversity into the structured and relatively rigid framework of the market was always going to be difficult (not to say morally dubious). For anything to become marketable, the 'product' has to be:
>
> - Commodified and transformed into a clearly defined legal object or entity that can be traded;[4]
> - Privatized, in terms of becoming the clear property of a specific owner who has the legal right to sell it; and
> - Sold, which also means there needs to be a buyer willing to pay to become the new owner (Global Forest Coalition 2008)

The Global Forest Coalition completed case studies of a carbon sink project in Colombia, certification in South Africa, ecotourism in India, bioprospecting in Costa Rica, and biodiversity offsets in Paraguay and found that local communities, particularly indigenous peoples and women, are not benefiting from these market-based projects and that these systems can affect community-level systems of governance, negatively affect livelihoods, and reduce food security (Global Forest Coalition 2008). Even when local communities are able to successfully enter the market, Igoe and Brockington argue that "it is possible, even probable, that people will lose their capital due to limited opportunities on the bottom rungs of the investment ladder" (2007:442).

Other critiques of these sorts of approaches center on neoliberalization of conservation more generally, and what McAfee (1999) has called 'green developmentalism.' McAfee argues that green developmentalism reinforces existing environmental injustices:

> If it is true, as advocates of green developmentalism contend, that the conservation and use of biodiversity can be managed primarily by market means, then the existence of gross economic and power inequalities—North-South, urban-rural, landed-landless —and

[4] Castree (2008) has called this phenomenon of using states to turn previously untradeable things into tradeable commodities 'reregulation.'

> disputes over the limits of state sovereignty become irrelevant to the task of international environmental management. (McAfee 1999:135)

McAfee further argues that the emphasis on technology in green developmentalism focuses attention away from social-structural changes that may be needed. Similarly, Igoe and Brockington argue that neoliberal approaches give an "illusion of certainty presented by rigorously formulated technocratic solutions" (Igoe & Brockington 2007:436).

Integration of climate change into conservation

Given some of the potential effects of climate change – changing species ranges, disaggregation of biotic communities, and phenological changes, to name only a few – its relevance to conservation is clear (Heller & Zavaleta 2009). Only recently, though, has climate change been mainstreamed into the work of the major conservation organizations. One of the earliest of these efforts to address climate change was WWF's creation of the Climate Action Network with partners in 1987 (Fund 2009). This network is comprised of more than 430 NGOs and focuses on mitigation in an effort to limit climate change. Climate, though, also needs to be factored into conservation planning to inform selection of conservation targets, locations, and activities. In July of 2005, Conservation International launched an internal review of its climate change response, and recently, the organization established a Climate Team incorporating staff from each field program or region. Although many programs previously included climate change mitigation or adaptation in their portfolios, the creation of the Climate Team marked a shift toward viewing conservation from a climate perspective at CI (CI staff member, personal communication, 3.23.2009). Heller and Zaveleta (2009) point out that climate change is not currently factored into most conservation interventions, but this is rapidly changing as climate change garners increased attention at multiple scales.

Heller and Zavaleta (2009) reviewed the literature on biodiversity management and climate change adaptation published between 1975 and March 2007 in a variety of journals addressing both social and natural sciences. In the 113 papers (from 57 journals and three books) they found that made explicit recommendations regarding climate change and conservation, the emphasis was strongly on "science and nature conservation rather than on social or political adaptation measures," and when data needs were laid out, they "were overwhelmingly calls for more ecological rather than social scientific data" (Heller & Zavaleta 2009:17). Heller and Zavelata argue, though, that climate change is likely to exacerbate existing tensions with human communities in and around conservation areas by calling into sharper focus tradeoffs between conservation and human needs as efforts are enacted to expand and gazette new reserves and as land outside of protected areas is increasingly brought under conservation management. Despite the fact that a call to "promote conservation policies that engage local users and promote healthy human communities" was among the most cited recommendations in the surveyed literature, there was little attention to identifying what kinds of research and data would be needed to do so (Heller & Zavaleta 2009:19).

Among the more recent approaches to carbon mitigation is carbon trading, which usually entails the exchange of allowance or credits to emit the included greenhouse gases: carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydroflourocarbons, and perfluorocarbons (Bayon et al. 2007). Emissions reductions are traded in the currency of carbon credits, with each credit equaling one metric ton of CO_2. For example, a one-ton reduction of methane is considered equivalent to 23 tons of CO_2. Carbon credits are traded both within compliance markets and

within voluntary markets, and can entail the trading of allotted but unused permissions to emit or the purchasing of credits generated by offset projects.[5] Compliance markets are those that are regulated by such regimes as the Kyoto Protocol and the European Union Emissions Trading Scheme and exclusively trade in allowances. Voluntary markets, on the other hand, function outside of these structures and serve businesses, organizations, and even individuals who wish to offset their carbon emissions for public relations, stewardship, or personal reasons rather than for reasons of compliance with regulations. Voluntary markets almost exclusively trade in project-based credits, rather than in allowances created by government fiat.[6]

Carbon trading schemes have been criticized for many reasons. In addition to concerns that these schemes perpetuate unfair cycles, allowing developed countries to continue to pollute while putting the onus for reduction on poorer countries, that communities with carbon projects do not always receive benefits from the project, and that such projects are the equivalent of "carbon colonialism," technical concerns over the effectiveness of the projects have frequently been raised (Kollmuss et al. 2008). These concerns are largely captured in the concepts of permanence, leakage, and additionality (Bayon et al. 2007), as well as poor quality of offset (Chan 2009), overestimation of reductions, and double-counting, or selling the same credits more than once (Warringa et al. 2009). Permanence refers to whether or not carbon will be stored over the long term. There are worries that forest carbon, in particular, is highly susceptible to threats such as fire and harvesting, which would release accumulated carbon into the atmosphere. Leakage refers to the displacement of carbon generating activities to other areas not covered by

[5] Offset projects are designed to reduce, avoid, or sequester greenhouse gases (Chan 2009) and are often undertaken in developing countries.
[6] The only exception is the Chicago Climate Exchange, the members of which agree to cap emissions, which are then traded amongst them.

the project. For example, if one carbon project ends logging in one patch of forest, that activity might simply shift to another patch, be it nearby or even in another country. Finally, additionality refers to the fact that, to have an effect, these projects must only have been undertaken because of the financing provided by the carbon trade. These problems are exacerbated by a lack of transparency and quality assurance, particularly in the voluntary carbon market (Kollmuss et al. 2008).

More than 12 sets of standards for assessing carbon projects in voluntary markets have emerged to address these problems, and each has a slightly different focus and different evaluation criteria (Warringa et al. 2009; WWF International 2008). In an effort to understand the major proponents, market share, price of offsets, approval processes, and types of projects accepted for each, and to understand how each treats additionality, Kollmuss et al. (2008) evaluated the following standards:

- Clean Development Mechanism (CDM)[7]
- Gold Standard (GS)
- Voluntary Carbon Standard (VCS)
- VER+
- The Voluntary Offset Standard (VOS)
- Chicago Climate Exchange (CCX)
- The Climate, Community and Biodiversity Standards (CCBS)
- Plan Vivo System
- ISO 14064-2
- WRI/WBCSD GHG Protocol for Project Accounting

It is interesting to note that various NGOs promote different standards. WWF, for example, has been active in shaping and advocating use of the Gold Standard, while CI, TNC, and WCS are major supporters of the Climate, Community and Biodiversity Standards.[8]

[7] The CDM is part of the Kyoto Protocol. Kolmuss et al. measure the voluntary standards against the CDM.

Of the standards surveyed, only the Gold Standard, CCBS, and Plan Vivo were judged to focus on "strengthening the co-benefits of carbon projects" (Kollmuss et al. 2008:30).[9] Kollmuss et al. (2008) note that carbon offsets were originally conceived as a way to combine carbon reduction with sustainable development, however, there is now a distinction made by those in the offset community between "gourmet offsets" (Kollmuss et al. 2008) or "gourmet carbon" (Bayon et al. 2007) and "minimum standards offsets" (Kollmuss et al. 2008). Kollmuss et al. explain the distinction this way:

> A minimum standard makes sure that offsets are real, not double counted and additional. Gourmet offsets are those that are sourced from projects that adhere to strict additionality standards and have strong social and environmental benefits (so called co-benefits or secondary benefits). Such offsets often fetch a considerably higher price in the voluntary carbon market. (2008:29)

They argue that while distinguishing between these two types of offsets can be useful, "it also reveals that sustainability and development benefits are no longer seen as an integral requirement for a carbon offset" (Kollmuss et al. 2008:29).

Bayon et al. have a slightly different take on the utility of the "gourmet carbon" concept, arguing that because voluntary carbon markets allow buyers to fund specific types of projects, they give more "political and ethical bang for the buck" (2007:102). When trading gourmet carbon, price is not the only factor in a buyer's decision, as it usually is for commodity carbon. This can encourage the creation of more projects that provide important co-benefits. Furthermore, voluntary markets allow projects for reforestation or avoided deforestation, which Bayon et al.

---

[8] These organizations are part of the Climate, Community and Biodiversity Alliance (along with BP, Intel, SC Johnson, Sustainable Forestry Management, Weyerhaeuser, GFA Envest, CARE, and Rainforest Alliance)
[9] Co-benefits are social, economic, and non-carbon-related environmental benefits that accrue in carbon projects.

(2007) argue makes them able to support the goals of the Convention on Biological Diversity, the Ramsar Convention, and the Millennium Development Goals.

Chan argues, though, that all offset projects should be eliminated and that trading in future carbon reductions is extremely risky:

> Subprime carbon contracts — called 'junk carbon' by traders — are contracts to deliver carbon that carry a relatively high risk of not being fulfilled and may collapse in value. They are comparable to subprime loans or junk bonds, which are debts that carry a relatively high risk of not being paid. **Subprime carbon would most likely come from shoddy carbon offset credits, which could trade alongside emission allowances in carbon markets** . . . Currently, most carbon credits are sold as simple forward contracts. But they can carry high risks because sellers often make promises to deliver carbon credits before the CDM Executive Board (or other crediting body) officially issues the credits, or sometimes even before verifiers confirm how much or if GHGs have been reduced. (2009:3, emphasis in original)

Chan cites difficulties in accurately assessing emissions reductions or carbon sequestration and concerns over additionality as prime reasons that offset projects should be treated with great suspicion, but she adds that there have also been instances of carbon fraud:

> Some of the most visible carbon offset scandals to date have centered on international offset projects that may be simply disingenuous. Perhaps the most well-known controversies relate to offset projects designed to destroy HFC-23, a chemical byproduct of refrigerant production that is more than 11,000 times more potent than carbon dioxide. Widespread reports of companies purposely creating these very powerful greenhouse gas chemicals — just to destroy them and make money off of the credits — prompted the Kyoto Conference of the Parties to take up this issue at their December 2008 meeting in Poland. (2009:3)

What Chan argues is overly aggressive risk-taking and speculation also contributed to the decision by Friends of the Earth to call for the elimination of offset projects and allowance banking.

Conclusion

Interdisciplinary work is challenging regardless of the subject matter. In conservation, where emotion and personal and moral convictions are often quite strong, making way for multiple viewpoints can be particularly difficult. The literature documents that differing theories, concepts, methodologies, and vocabularies can make communication across disciplines difficult and that unfamiliarity with other fields may contribute to misunderstanding of different peoples' roles and to suspicion of their methods and data. Furthermore, job insecurity and the need to show results, as well as preference for one's own methods and theories, may make it difficult to accept critique, and academic expectations make interdisciplinary projects more difficult to navigate. We will see in chapters IV and V that these concerns and others were raised by a variety of academics and practitioners at the WCC.

Also at the WCC, it became apparent that economic and market-based approaches to conservation and the use of climate mechanisms for conservation goals are receiving increasing attention. The literature notes many unresolved technical issues and social justice issues with these approaches, but as of yet, there has been little explicit examination of interdisciplinarity within them. In chapter V, I will comment on some of their possible implications.

III. Methods

In October of 2008, I engaged with 16 other researchers in a collaborative ethnography of the IUCN World Conservation Congress. The WCC is comprised of two events: the Forum (October 5-9), which includes workshops, panel discussions, learning opportunities, and exhibit booths; and the Member's Assembly (October 10-14), which allows members to come together to vote on motions, leadership, and IUCN's program for the following four years.

The first phase of this research consisted of preparing for the WCC. Tasks included: 1) determining which organizations (or government agencies) to focus on, determining which workshops they sponsored and which motions they proposed, and contacting them to set up meeting times at the WCC; 2) analyzing the proposed motions and workshops and adding additional workshops to be observed; and 3) refining interview questions and discussion topics.

While at the WCC, I observed and participated in workshops, knowledge cafés, learning opportunities, and motion discussions (both in plenary sessions and in contact groups), paying particular attention to how the social sciences were discussed and used in these varied settings. The Congress is dizzying in scope, with more than 8,000 people convening for 10 days of activities and discussion. As such, it is impossible for one person to attend more than a fraction of the events and activities of interest. Being part of a large group of researchers, however,

allowed us to share notes and recordings of sessions, effectively expanding the data set of each individual far beyond what each of us could have collected on our own.

At the same time, I conducted interviews with 11 people identified as key players at the WCC or within organizations that were highly active at the WCC. A major strength of the collaborative format of the research was that it allowed the group to exchange names and contact information and to provide introductions to people we had met that were relevant to another team member's work. The interviews I conducted lasted from one to two and a half hours and were recorded whenever feasible. In the months following the WCC, I returned to many of these people to discuss how their perceptions of what had happened at the Congress had changed. All interview transcripts and observation notes were coded and analyzed thematically.

Taking an ethnographic approach to this research, observing and participating in WCC workshops and attending formal and information meetings, helped to counter the shortcomings of an interview-only approach by allowing me to reconcile the ideal vision of the role of the social sciences that I heard in interviews with observations of their actual contributions in workshops and resolution discussions. Similarly, the interviews allowed me to better understand how and why the social sciences came to play that observed role.

Research Questions

Research questions included:

1. How do conservation practitioners learn about the social sciences and their applications to tradeoffs? What networks, events, or actors influence the spread of these ideas? Who are the major proponents of the social sciences in conservation work?

2. What fields within the social sciences are attractive or accessible or have so far seemed most useful to conservation planners in clarifying or solving tradeoff problems, and why? Which have not been useful, and why?

3. In what ways does a 'toolkit' approach make the social sciences more useful to conservation practitioners in or solving tradeoff problems? Do such approaches provide a sufficient knowledge base for action? In what ways are these tools scale-dependant?

As is evident in the research questions, before the WCC I did not anticipate the importance of economic and market-based approaches to the conservation discussion. Though many of these strategies have been around for quite some time, it was clear at the WCC that they were being promoted by ever more vocal and powerful supporters. This realization was one of the important understandings to emerge out of combining the insights of multiple researchers. As a result, I began also to explore a fourth research question:

4. How are emergent approaches to conservation shaping the way that the social sciences are viewed and used?

Interview protocol

Interview questions were tailored to the interviewee, but all interviews included the following questions:

1. For you, what does the term "social context" denote when talking about conservation decisions?

2. Do you have a social science background? In what discipline? Who (else) in your organization does? What role do you/that person play in informing conservation tradeoff decisions? Who in your organization has been instrumental in driving use of the social sciences?

3. In what ways have the social sciences been useful to you in your work? Which uses of social science have not been useful, and why? Which social science disciplines have been most and least useful to you, and why?

4. Does having a 'toolkit' available make it easier for you to use social science tools? Are there challenges to this approach? How else do you learn about and access social science data or tools?

5. What are the challenges and barriers to using the social sciences? How do you think they could be better used in the future?

Doing this research in a setting like the World Conservation Congress did present some unique challenges. The Congress is so immense that it was often difficult to see all the sessions of interest and meet all the relevant people. Working collaboratively did help to alleviate some of that problem; however, more diligently taping every session and streamlining data sharing could make collaborative work even more effective. The size of the Congress combined with the ways in which sessions are presented and described in IUCN materials also makes it hard to figure out the scope of the sessions, sometimes leading me to choose to attend one session over another when, in hindsight, the session I did not attend would have been more productive.

The role of the Congress as one of the premier networking opportunities for conservationists also meant that people of interest were extremely busy and that setting up interviews was quite difficult. During the WCC, I conducted 11 interviews, which was one of the highest numbers of interviews conducted by someone in our group. Extensive efforts to arrange interviews before arriving in Barcelona were key to securing as many interviews as I did, but I was hoping to complete several more than were possible.

Finally, the WCC workshops tended to discuss little in the way of the science behind decision-making and project implementation. Rather, the workshops presented projects, showcasing success stories and discussing difficulties. As a result, the data that I did glean from workshops were somewhat limited with the most valuable insights coming from interviews rather than observation.

IV. Results

Conservationists aren't working on biological issues; they aren't counting birds. The future developments we need to deal with are more social than biological. The big challenges are social rather than biological (Consultant, natural scientist).

Conservation practitioners largely agree that paying attention to the social context of conservation is an important foundation for a successful project. While the sentiment that "development is not our mission" was voiced by several practitioners at the WCC, and perhaps rightly so, many of those same people have started to see working with local populations as not just a necessity to address human rights concerns but also to advance biological objectives (but see Brockington 2004 and Terborgh 2004 for alternate perspectives).

There has been a thorough chronicling in the conservation literature of changing attitudes toward conservation approaches (Büscher & Whande 2007b; Hutton et al. 2005; Wilshusen et al. 2002). Broad trends, from "fences and fines" to community-based initiatives, to "resurgent protectionism," have brought along with them different ways of viewing the social context of conservation, with human populations variously characterized as threats or partners. Parallel discussions in the international community on such topics as human rights and poverty have, at the same time, resulted in international declarations, accords, and goals to recognize indigenous rights and to alleviate poverty, thereby influencing not only the general climate, but perhaps more importantly, donor imperatives handed down to conservation organizations.

There is a strong push within IUCN to foreground human aspects of conservation, and for this Forum, the Secretariat organized two "journeys" – collections of suggested workshops – to highlight social context issues: the Journey on Biocultural Diversity and Indigenous Peoples and the Journey on Rights and Conservation. These served as roadmaps to guide participants to a selection of workshops that fell within these topical areas and set the stage for a focus on the concepts of "rights" and "biocultural diversity."

At the WCC, workshops discussing the social context of conservation ranged from explorations of indigenous and local knowledge:

> 636 - Traditional practices of adaptation to climate change and variability (organized by IUCN)
>
> 892 - From concepts to operational tools: Traditional knowledge in environmental protection (organized by the Università degli Studi di Bergamo)

to sessions on human well-being, livelihoods, and human rights:

> 648 - Safeguarding human well-being and the financial sustainability of national systems of protected areas (organized by The Nature Conservancy)
>
> 165 - Conservation and livelihoods in production landscapes: Coffee and cocoa consumers push sustainability in tropical agriculture (organized by Rainforest Alliance, Inc.)
>
> 1532 - Conservation with justice: A rights-based approach (organized by IUCN Environmental Law Center)

to discussions of how to achieve local buy-in for a conservation project:

> 223 - Building public support for protected areas (organized by the World Commission on Protected Areas Australia, NZ)
>
> 325 - Conservation education and communication: Exploring approaches to engage communities in conservation through African in-situ primate conservation projects (organized by the International Fund for Animal Welfare)

Integration of the social sciences

While it was clear at the WCC that many individuals and organizations are considering social context in their conservation projects, how information on that context is gathered and what is then done with it in terms of project creation and implementation remains an open discussion. The picture presented at the WCC is that, at the project level, elucidating social context is primarily the domain of biological scientists. Similarly, within the major conservation organizations, many of the programs aimed at human well-being, livelihoods, and participatory processes are headed by people with no social science education or background. Among many natural scientists working for conservation organizations the sentiment is that "you don't always need trained social scientists to do social science work" (Consultant, natural scientist). Jacobson & McDuff (1998) point out that biologists have been dealing with social issues for quite some time and draw on Culter (1982) to show that even in the early 1980s, conservation professionals within the U.S. Forest Service and Soil Conservation Service felt they would benefit from expanding their training in the social sciences. However, there is an increasing realization that social scientists bring a particular skill set to the conservation table and that creating partnerships between biological and social scientists, rather than simply equipping biologists to "do it all," can help better achieve conservation goals while addressing issues of human well-being.

One session of the Forum in particular, 1537 - Human Wildlife Conflict: Beyond Biology[10], featured biologists addressing the role of the social sciences in conservation. One of the only workshops that explicitly addressed the link between social and natural sciences, this session, organized by the IUCN Species Programme, noted that "social and biological scientists have been slow to learn from each other and appreciate each others' roles" (Thouless 2008:1). The recommendations of the session argued that

> It is essential to have a framework to bring in other non-biological expertise within the SSC [Species Survival Commission] system. At present this is not possible because of the taxon-specific nature of the specialist groups, which may not be particularly interesting to non-biologists. Suggestions for this included the following:
> • A human-wildlife conflict cross-cutting Specialist Group within SSC
> • A joint group or task force between SSC and other commissions, especially CEESP
> • Some more informal means of maintaining a register of people from non-biological disciplines interested in engaging with SSC on human-wildlife conflict (Thouless 2008:2)

The feeling that social scientists and natural scientists could work more effectively across Commission lines than they already do was echoed by those within the Commission traditionally seen as the domain of social scientists, CEESP – the Commission on Environmental, Economic, and Social Policy. At the CEESP Steering Committee meeting, it was noted that CEESP members need to reach out to other Commissions, particularly the SSC. Some in the Secretariat echoed the sentiment that there could be more exchange between commissions, and one argued that the most effective social science work is not being done by CEESP at all, but by social scientists in other Commissions:

> CEESP has not been as useful for integration as it could have been. What has been more important is the work of social scientists in other commissions. In the SSC there is a growing interest in integration of livelihoods into species assessment systems. It's done by biologists who are interested in this sort of thing with the help of IUCN personnel. There are people working on forests and drylands within the Ecosystem Commission who

[10] This session was also called in some documents "Human Wildlife Conflict: Biology and Beyond."

> are not getting help from CEESP. CEESP contributes in some cases to integration but mainly works on its own issues. (IUCN employee, social scientist)

While certainly the motivation for creating linkages between biological and social scientists often stems from a desire to create projects that are more effective or do less harm, it also can reflect attempts to advance certain agendas (such as "wise use") or to enhance legitimacy of the project and reflect themes that speak to donors.

Despite a push toward interdisciplinary projects at different scales, regardless of motivation, many biologists remain wary of incorporating social scientists into their projects. One academic natural scientist, himself a proponent of interdisciplinary work, noted that to many of his colleagues, social science was seen as "loose" and not providing the same kind of rigorous data that the natural sciences do (see also King et al. 2007). This perception prevents many interdisciplinary collaborations from occurring and can damage relationships between collaborators when it does, as social scientists can feel marginalized and suffer from inadequate resource allocation.

Some practitioners, both natural and social scientists, see social scientists too often as merely serving as activists for people at the site of the conservation project: "Many social scientists go on and on – it's awful. They shout, put tape over their mouths and just talk about people being moved out of their homes" (Practitioner, social scientist; see also Gartlan 1998). Many practitioners made a distinction between two kinds of social scientists: those who are pro-conservation and those who examine a project from a critical perspective, and who are, therefore, less useful to the project: "Social scientists can sometimes muddy the water. You need the right kind of social scientist, someone who's sympathetic, excited, and committed to the conservation

project" (Consultant, natural scientist). Critique, to many, is not a constructive means of engagement, and frustrations run particularly high when critique is not accompanied by suggestions to improve practice: "What is a copout is critique without a constructive path forward" (Practitioner, social scientist).

Social scientists are also frequently perceived as not having an appropriate skill set for conservation work or the ability to "work with duct tape" (Practitioner, natural scientist). There is a strong sense among practitioners that social scientists need to have more field experience and more training in environmental issues if they want to work in conservation (Consultant, natural scientist; see also Fox et al. 2006).

> The actual working of conservation requires some skills. If you're a social scientist working in conservation you'd better learn some biology so you don't get fooled. For example, people say that swidden agricultural adds biodiversity, but it adds garbage species – it depends on your targets and priorities. (Practitioner, natural scientist)

While, as noted above, it is often perceived that you do not need a social scientist to do social science work, many people argued that if biologists are to be doing this sort of analysis, they would benefit from more training in the human dimensions of conservation (Practitioner, natural scientist; see also Jacobson & McDuff 1998; Saberwal & Kothari 1996). While there are training courses and capacity-building programs in some of the major NGOs, in the conservation community as a whole, it appears that shortages of time and funding for such work have led to a reliance on the creation of social science tools or toolkits and an effort to get those "into the hands of biologists, in language they can use" (Practitioner, social scientist). The Social Science Working Group of the Society for Conservation Biology has collected and organized a set of social science tools (http://www.conbio.org/workinggroups/sswg/catalog/), and other such compendiums have been compiled by the Poverty and Conservation Learning Group

(http://www.povertyandconservation.info/en/tools.php) and USAID (http://rmportal.net/tools/social-context-of-biodiversity-conservation-tools), among others.[11] Adams, though, argues that while sharing methods and tools is a good start, "Our challenge is not to take biologists and equip them with the skills to get by in social surveys. Our real task is to create conservationists for whom these skills are innate, for whom the disciplinary boundaries so beloved of academic researchers are no constraint" (Adams 2007: 276).

Another major obstacle to a move toward further interdisciplinary engagement is a misunderstanding on the part of natural scientists as to what social scientists actually do. "People don't know what it means, social science. Part of it is their problem-solving orientation – get shit done" (Practitioner, social scientist). Social scientists are hampered by the idea that their sole, or most useful, purpose is to facilitate stakeholder meetings and interactions. Even among natural scientists who are quite favorable to including social science in their projects, there is often the conception that the natural scientists will design and execute the project, while the social scientists will "talk to the people" and get their "buy-in" – in essence, the social scientist is there not to provide a more thorough understanding of complex political and social contexts, but to make the people "behave" (Practitioner, natural scientist). When social scientists are asked to provide information, the data asked for are often limited to such things as "how

[11] This paragraph is taken from the SSWG website and describes the intended audience and use of the catalog: "The Catalog is designed to facilitate more effective conservation initiatives based on a better understanding of the relationship between humans and nature. The tools in the Catalog are intended to be used by practitioners with social and environmental backgrounds: social scientists familiar with biodiversity conservation, and conservation practitioners with knowledge of theoretical and methodological insights provided by the social sciences." In addition to providing tools to practitioners, the SSWG, in collaboration with Colorado State University, is sponsoring a short course on the social sciences in conservation at the 2009 meeting of the Society for Conservation Biology. This course is designed to increase awareness of how the social sciences can help address conservation challenges and to build social science capacity. The intended audience includes "conservation researchers and practitioners as well as graduate students in conservation-related fields of study and early-career conservation social scientists" (SCB website).

people are a threat and what incentives will make them change their behavior" (Practitioner, social scientist).

Rejecting the natural/social division

Many social and natural scientists from the practitioner community, though, reject the idea of a division between the social and biological sciences and frame the communication problem more in terms of experience and ability to understand the complexity of conservation: "I don't care what your PhD is in – have you spent several years understanding tough contexts?" (Practitioner, natural scientist). This extends not just to people working in the field, but also to the upper management of conservation organizations: "The big problem is who is leading these organizations – it's not biologists anymore, it's financial and marketing guys. There's a hugely complex set of situations at multiple scales that we have to deal with. At least the biologists got the complexity. Biologists know you have to work with people" (Practitioner, social scientist).

In keeping with the dichotomy seen between field and non-field people, there has also been tension and frustration between academic and practicing social scientists. "I'm curious about the academics. There is often a divide between those working within conservation organizations and those on the outside" (Practitioner, social scientist). Some social scientist practitioners feel that the critiques of their academic counterparts are naïve and overly harsh, ignorant of the difficulties inherent in conservation interventions (Practitioner, social scientist), and while many academic critiques of conservation argue that a project has overly-simplified what is indeed very complex, one critique conservation practitioners offer of academia is that it is the academics who

are underestimating complexity, that of the practitioners' situations as well as the heterogeneity within and among BINGOs: "If people described indigenous communities the way they describe NGOs, with such a broad brush, they'd be laughed out of the profession" (Practitioner, social scientist).

There is also a sense that academics enjoy the luxury of time that practitioners do not:

> Academics are used to talking in conceptual terms, analyzing life from frameworks, and when you're actually in an organization that just doesn't seem to happen very much. There's conceptualizing around issues, but not about organizational processes. That level of analysis is not brought to bear on decision-making. I haven't reflected on things conceptually in a while; there's just not time. (Practitioner, social scientist)

The feeling that practitioners are always pressed for time and funding heightens their sense that they and academics have different priorities and goals and that these priorities and goals can often be in conflict.

V. Discussion

Schaller (1992) notes that "conservation problems are social and economic, not scientific, yet biologists have traditionally been expected to solve them." While in many instances conservation practitioners still feel this is the case, there are many opportunities for increased engagement between social and natural scientists and for creating more interdisciplinary projects, both within IUCN and in the broader conservation community.

Within IUCN, perhaps one of the most logical and pressing changes would be increased engagement of social scientists across the Commissions. Elements of the membership of both CEESP and of the SSC are ready for increased collaboration. This could take the form of establishing formal cross-cutting groups, or as suggested in the Beyond Biology session, it could mean the creation of a database of social scientists interested in working with SSC members. More importantly, the Species Survival Commission could actively recruit more social scientists, and social scientists could request membership in that commission and others. Moving social scientists directly into these commissions, rather than just promoting collaboration between CEESP and the other commissions, can help shape the way social context is thought about from the earliest stages of conservation interventions, change the questions that are asked, and combat the idea that social scientists are simply "participation consultants."

The need to move beyond seeing social scientists as just meeting facilitators, public educators, and implementers is one that has been recognized for some time (see, for example, Endter-Wada 1998), and indeed, some progress toward that end has been made. Nyhus et al. (2002), for example, argue that the social sciences provide important inputs for better models. Eghenter goes farther by showing how the WWF Indonesia and Ford Foundation collaboration, the Culture and Conservation research program, "brought to light the complexities of the social, environmental, political, and historical context of the Kayan Mentarang conservation area" thereby aiding conservation managers to design "flexible and locally appropriate measures" (2004:229). Similarly, Aswani and Hamilton (2004) argue that social science is important for understanding traditional uses that can then provide ideas for management interventions. Social scientists, though, need to make explicit how they can contribute upstream in the planning phases of conservation interventions. The social context, just as much as the ecological context, needs to be understood if practitioners are to craft conservation projects that meet their goals and do so in a just and equitable fashion.

Even more than helping to outline which interventions are likely to work, social science research can inform conservation by examining the assumptions that underpin conservation interventions. For example, McSweeney (2005) uses her work to show that it is necessary to rethink the population-degradation link that is often assumed to exist. Eghenter similarly argues that "research can and should be effectively used as a means to critically question and test key assumptions implicit in the project's objectives" (2008: 231). The challenge, of course, is to create an atmosphere in which assumptions can be tested, and at times refuted, without causing relationships to sour and collaborations to collapse.

Interdisciplinary collaborations allow for the exchange of highly-developed expertise, but they are not always feasible or fundable. Another option for improving conservation practice is to create practitioners who are interdisciplinary people, who are well-rounded, have the ability to adapt, and who know the social and ecological context of their project and know when they need to bring in outside expertise. Saberwal and Kothari (1996) propose adding training on social and policy issues to the curricula of conservation programs in developing countries to reflect that fact that parks in these countries often serve subsistence needs of the rural poor. Jacobson and McDuff furthermore argue that the same training should be extended to conservation biologists in developed countries as well because "conservation biologists in the trenches need skills to communicate with the public and assess the interests of stakeholders" (1998: 264). Though the Jacobson and McDuff article does fall prey to the critique made above that social scientists and their skill sets are largely seen as being most useful for communication with stakeholders, their call for such training remains valid. Similarly, social scientists would benefit from training in biology and ecology if they are to serve as project managers or key project staff. Adams even argues that this approach is *preferable* to creating interdisciplinary collaborations: "We have to recognize that what we need in conservation are not inter-disciplinary teams, but inter-disciplinary people" (Adams 2007: 276). Creating interdisciplinary practitioners has the advantage of not only investing one person with a larger skill set but also training that person to think in a more holistic way, hopefully more thoroughly capturing the breadth of the conservation problem he or she is facing. One might similarly argue for the creation of interdisciplinary conservation researchers within academia so that structures of research and practice would mirror each other – though this, of course, poses its own problems, many of which were chronicled by Campbell (2005).

Finally, conservation practice needs to inform research, and research needs to inform practice. Eghenter argues that

> . . . while anthropologists and other researchers working in conservation and development projects must ask themselves whether and how social science research can contribute to conservation, conservation and park management specialists also need to think about why and how they need to make use of social science research in order to better meet the needs of a national park and the people in it. (2004: 232)

To date, the link between social science research and practice has been somewhat tenuous. The Social Science Working Group of the Society for Conservation Biology has been one of the most visible groups working to bridge the divide between social science research and conservation practice. Similarly, research initiatives, such as the Advancing Conservation in a Social Context project, of which this work is a part, have also moved toward more closely linking research and practice. Though researchers have begun earnest efforts to get their work into the hands of practitioners, much work remains to be done, and perhaps more importantly, practitioners need a more open avenue for communicating their knowledge needs to academics. The large conservation NGOs all have their own science programs and branches, but those working within them can sometimes feel constrained by the need to work on data for particular projects rather than looking at "big picture" questions (Practitioner, social scientist). A closer link with academia has the potential to supply some of that big picture work and could support smaller NGOs that do not have the same social science capacity. The WCC and World Parks Congress provide high profile opportunities to showcase and promote exchange between science and practice through sessions, themes, and journeys. At the same time, these conferences could highlight different approaches to interdisciplinary conservation work and the engagement of the social and natural sciences.

One integral part of social science research in conservation has been critique of assumptions, practices, approaches, and indeed the entire conservation enterprise. This critique, as noted above, is not always constructively given nor favorably received, and in my own work, I have found that it has to some extent tempered the enthusiasm of conservation organizations toward working with academics. In exploring collaborations with several NGOs on a research project I am currently undertaking, staff of each organization expressed concern about "critique in ignorance," "attacking a BINGO," "bagging a BINGO," and "burning the organization." One practitioner asked me to "just do it gracefully. If you have to stab me, do it here [indicating the chest], not here [indicating the back]." All of this would seem to indicate that academics and conservationists have yet to work out where the appropriate nexus of engaged critique and willing self-inspection lies. Brosius (2006) argues that among the first steps to finding this common ground are for academics to point out where things *have* worked and when they offer critique to also offer suggestions for improvement.

New directions in conservation

There has been a lot of thought put into discerning the challenges to increased social science participation in conservation and to finding opportunities to move forward with closer collaboration and integration (Adams 2007; Brosius 2006; Büscher & Whande 2007a; Campbell 2005; Endter-Wada et al. 1998; Fox et al. 2006; King et al. 2007; McSweeney 2005). As new strategies for conservation emerge, however, these challenges and opportunities need to be revisited. New approaches have the potential to change how the 'stakeholder' community is defined, which tools and disciplines are deemed relevant and necessary, and what kinds of data

are needed. What follows is a discussion of emergent conservation strategies and their likely repercussions for interdisiplinarity.

At this WCC, there was a great deal of emphasis placed on the idea of "rights-based conservation." Many sessions displayed a shift in thinking from the idea of livelihoods and well-being to human rights. This followed from a key message that came out of the World Parks Congress in Durban that conservation needs to acknowledge the relationship between humans and protected areas, to incorporate "the rights, interests and aspirations of both women and men," and to respect "human and social rights," or at least not make conditions worse for the poor (2005). The theme was more fully developed at the WCC, and IUCN organized a Journey on Rights and Conservation as well as several sessions on the concept of human rights, including 1532 - Conservation with Justice: A Rights-based Approach. Five resolutions (051, 052, 056, 077, 0127) also encouraged IUCN to acknowledge and work with a human rights paradigm.

Along with rights-based approaches to conservation, the concept of conservation of "biocultural" diversity was also picked up and expanded from Durban. Several sessions and motions made an effort to link biological diversity to cultural diversity and to make the argument that to conserve one it is necessary to respect the other. The argument for biocultural conservation counters protectionist paradigms by asserting that the cultural features of the area in question are vital to the continued existence of the species, habitats, and ecosystem services that are the target of conservationists.

The World Parks Congress in Durban also led to the recognition and acknowledgement that indigenous and local people were, in fact, practicing conservation in certain areas. At the WCC, the debate was what to do with those areas. While some advocates were calling for incorporation of these areas into national protected area systems, others were more cautious, fearing that such incorporation could lead to control being taken from the community. A proposed alternative was to encourage formal recognition of Indigenous Community Conserved Areas (ICCAs) without incorporating them into existing legal frameworks. Still others were concerned that even this would undermine customary law and proposed that these areas be "respected" but left essentially autonomous.

A focus on human rights, linkages between biological and cultural diversity, and indigenous communities is likely to lead to a deeper integration of anthropology, sociology, and related disciplines into conservation. These foci are also likely to lead to conservationists relying more heavily on legal expertise in their work. At one level, discussions of rights, biocultural diversity, and protected areas very much remain rooted in place and small-scale conservation. Simultaneously, though, these concepts require work in the international policy arena, and there are new efforts to bring indigenous and traditional peoples to meetings like the Conference of the Parties to the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change, as well as to the World Parks Congress and the World Conservation Congress. Each year it seems indigenous and traditional peoples become savvier at advancing their agendas, donning traditional dress, hiring consultants and spokespeople, and holding press conferences and media events.

Alongside this push toward rights and recognition of humans in the ecosystem, the WCC showcased an uptick in economic language surrounding conservation. At this Congress, we witnessed a shift in the discussion from "community-based" and "participatory" approaches to using the language of the Millennium Development Goals, such as "poverty reduction" and "livelihoods." As of yet, it is unclear how much of this shift is simply a reflection of changing global narratives and how much of it results from donor imperatives or other driving forces. Nonetheless, the focus on livelihoods and poverty reduction was evidenced in Forum sessions and in the Assembly through motions such as the "Motion on Conservation and Poverty Reduction."

Another major manifestation of the attention to economics was the rise in justifying conservation by detailing the monetary contribution of ecosystem services or how many jobs the shift to a green economy would create. This line of reasoning is in tension with approaches based on the rights of nature to exist regardless of its value to humans and has generated substantial discussion in the conservation community, with many bristling at the idea of conceptualizing nature as being in service of humanity.[12] Its increase in prominence stems largely from the desire to be effective at a higher level and to engage decision-makers at national and global scales. It also reflects lessons the conservation community has learned from those addressing climate change. The impact of the Stern report on the economic effects of climate change grabbed the attention of many conservationists, and a similar style report, The Economics of Ecosystems and Biodiversity (TEEB) was subsequently commissioned, the hope being that

[12] Session 320 - Valuing Ecosystem Services: From science to practice or "what did nature do for you today"? sponsored by Wageningen University was mentioned to me by more than one interviewee as exemplifying this approach.

money does, indeed, talk. The WCC featured a session – an IUCN Director General's special event - on TEEB that was designed to "explore the issues around 'mainstreaming' biodiversity and ecosystem values in economics, markets and business" (IUCN 2008a).

Similarly, this WCC also paid more attention to market-based approaches to conservation. The Bangkok WCC featured a stream on markets, but many of 2008's attendees felt that it was "better communicated" and more "front and center" in Barcelona. The organizing document for the Markets and Business journey posed such questions as: "How can biodiversity help to mitigate and adapt to climate change?" and "How do we value and market biodiversity and ecosystem services in today's world?" (IUCN 2008b). Such an approach raises concerns about differential ability to pay for services, inequalities between those that are dependent upon a resource for their livelihoods and those who are not, and different ways of thinking about and valuing resources.

At the same time, climate has become a driving concern among conservationists. One of the three content areas of the Forum was devoted to climate change (New Climate for Change) and encompassed more than 60 sessions that focused largely on how practice needs to change in the face of climate change. Adaptation-centered workshops that discussed such issues as expanding and linking protected areas were complemented by mitigation discussions that addressed various mechanisms for reducing emissions and financing conservation through the use of carbon offsetting projects. Integrating climate change into conservation policy can be especially delicate and complex because it requires conservation organizations to present a coherent message at multiple scales, in some cases reducing their ability to respond in appropriate ways to

local contexts (Practitioner, social scientist). While an organization might support particular actions in particular places, assisted migration for example, it might also consider this a dangerous policy to advocate at a larger scale.

There is much work for social scientists to do on climate adaptation. Interests range from studying potential effects of climate-related biodiversity loss and habitat change on indigenous and traditional peoples (Gitay et al. 2002), determining which species are culturally important for indigenous and traditional peoples (in contrast to determining which species to target based on other criteria such as their own vulnerability) (McCarthy & Intergovernmental Panel on Climate Change. Working Group II. 2001), and examination of indigenous and traditional technologies that may increase resilience (McCarthy & Intergovernmental Panel on Climate Change. Working Group II. 2001). It is unclear, though, how systematically this work is being undertaken. As noted above, conservation organizations are only now starting to create Climate Teams and similar mechanisms for assessing and coordinating their climate activities, and much of the adaptation work has to this point been handled in different ways by different local offices and project teams.

Mitigation work, however, tends already to be coordinated primarily from an organization's headquarters. The scale at which one must work to try to effect governmental policy changes or to establish carbon trading projects requires this centralization. While biological and policy aspects of adapting conservation to climate change were well-represented at the WCC (cf. Hagerman et al. nd), my interviewees and the sessions I attended focused on mitigation strategies

and using carbon offsetting to finance conservation.[13] Following from that, I will generally limit my consideration of climate change in conservation to those aspects. These strategies, including such approaches as Reducing Emissions from Deforestation and Degradation (REDD) and generation of carbon offsets, use market mechanisms and as such will be considered below in conjunction with other market approaches.

It is important to realize that economic and market-based approaches, including carbon offsetting, have not been universally and uncritically adopted by conservation organizations. The debate over their usefulness and implications is currently playing out within many NGOs, and there is tension and push back from those favoring place-based approaches and from some indigenous and traditional communities and their advocates, as well as from natural scientists who fear biodiversity will take a backseat to capital accumulation or carbon. Nonetheless, these approaches do seem to be gaining traction, and they raise new practical and theoretical questions, some of which received heightened attention as a result of the WCC coinciding with the beginning of the financial downturn that was called, on October 11th, the "worst financial crisis since the Great Depression" (Luhby 2008).

On October 6th, the first full day of the Forum, the Dow Jones Industrial Average closed below 10,000 for first time since 2004. The figure below outlines some of the major events in the timeline of the economic downturn and how they related to the World Conservation Congress. As illustrated there, on October 8th, European regulators stepped in to inject liquidity into

[13] This is another example of the benefits of a collaborative approach to studying conferences. Without having discussed the WCC with Shannon Hagerman, I would have come away with the impression that mitigation largely dominated adaptation, which was not the case.

European markets, and the central banks of several nations discussed a coordinated rate cut (2008). During this time, the news media showed nearly endless clips of world leaders meeting to discuss possible actions and trying to reassure nervous populations. At the WCC, many practitioners began to worry about the health of conservation trust funds and ecotourism projects, and expressed concern about making local people reliant on finicky international markets for their products. In stark contrast, IUCN's official message was one of hope, as Chief Scientist Jeffrey McNeeley's closing address recalled the spending for conservation that had been prompted by previous economic crises (McNeeley 2008).

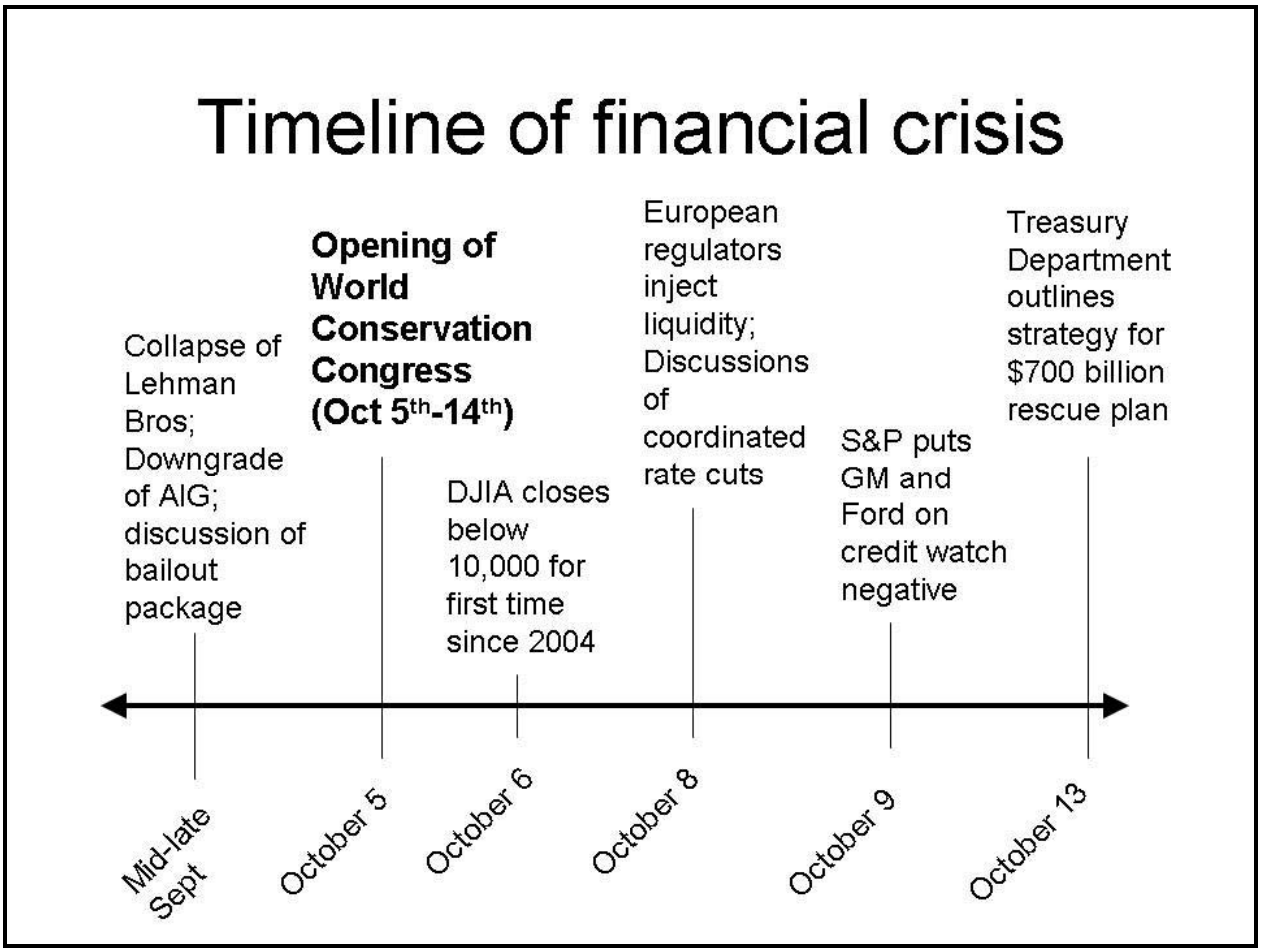

Figure 3. Timeline of financial crisis in relation to the World Conservation Congress.

Solvency questions aside, a shift toward market-based approaches would likely entail a different way of thinking about the social context of conservation, possibly increasing tolerance for abstraction and simplification as conservation moves toward action at broader scales and toward the common language of currency. A market-based approach – whether it is payments for ecosystem services, sale of conservation friendly products, or trading of carbon credits – requires that incommensurable objects be made commensurable through a process of translation to a monetary value. At the same time, even values, beliefs, and practices must also either make the leap or risk being excluded from the calculation altogether. It is a difficult question for conservationists - who should have the power to assign a monetary value to cultural practices and beliefs? Or in the words of Martinez-Alier, "who has the power to simplify?" (2002:271). Who gets to reduce complexity to a dollar sign?

Often, it is the role of the practitioner in the field or his or her academic colleague to facilitate processes of planning, negotiation, and, increasingly, valuation. A shift to market-based approaches is likely changing the disciplines that are called upon to investigate and explicate the social context of a given place to enable those tradeoffs (Igoe & Brockington 2007; McAfee 1999). For example, we might expect to see more economists join the ranks at conservation organizations, a trend that has been at least anecdotally mentioned to me by staff members of two different conservation organizations.

Economists clearly have a role to play in these approaches to conservation. Many argue that economic research is vital for creating markets that support conservation, that it can effectively influence government plans and programs, and that it has a vital role in the planning stages of

conservation by helping conservationists understand the pressures on biodiversity. An economic approach to conservation design starts

> . . . with an analysis of the land-use practices that impact on ecosystem services: What is driving current practices, and how might the introduction of payments provide incentives to change these practices? . . . At the same time, a valuation exercise is needed to establish the benefits from the preservation or improvement of the ecosystem service. (Le Quesne & McNally 2006:9)

As Scott argues, though, certain forms of knowledge "require a narrowing of vision," and a focus on certain measurable variables, such as market prices and production potential, limits the complexity that can be taken into account (1998:11).[14] It is clear that more than economic expertise is needed to study the political and social contexts that will influence if and how a market-based intervention will work. It remains too early to tell if these hires are adding economists to the ranks of other social scientists or if economists are replacing their colleagues from other disciplines, whether this is increasing diversity or homogenizing social science expertise. The question, then, is does this increase our ability to tell the story, or does it come at the expense of pluralism and of different ways of understanding values, institutions, practices, and power structures?

[14] In schemes that involve marketing local products as "eco-friendly" this blurring of vision regarding local complexity is compounded by moving local products through a commodity chain to national and international markets, where we also lose the complexity of the individuals, groups, and organizations that refine, market, and consume these conservation products.

VI. Conclusion

A social scientist working within a large conservation NGO perhaps summed it up best when he said to me that there was little real social science research discussed at the WCC. He echoed a member of our group who likened the Forum to a trade show and pointed out that whatever it is, the Forum is not an academic conference. The real value of the WCC, as far as discerning trends in conservation research, lies in the opportunity it offers to observe and participate in informal discussions between practitioners and to meet conservationists in a setting that encourages reflection on such issues.

Many of the same themes captured in the literature on the engagement of natural and social sciences were voiced at the WCC. Among them, the idea that differences in vocabularies and world views make communication difficult and the recognition that natural and social scientists have been slow to understand and appreciate each other's roles were key. In the interviews at the WCC, however, many themes came out much more strongly than they had been expressed in the literature. Though almost everyone would describe conservation as a social process, there was mixed opinion on the value of actually having trained social scientists on a project team. Quite commonly the feeling was that various social science methods and tools could be used without a strong understanding of theories underpinning them. I also heard more concern over the rigor and credibility of social science data than exists in the literature and much more about the distinction between 'useful' (or mission-driven) social scientists and their 'monkey wrench'

counterparts. What was virtually absent in the interviews was a concern over how academic structures and processes can hinder cross-disciplinary work. I believe that some of these differences reflect the fact that, though there are exceptions, most of the literature is written by academics, and I was speaking mostly with practitioners. There are distinct differences in the experiences of these two groups and what is, subsequently, important to them.

The different experiences and priorities of the academic and practitioner communities have also contributed to the tensions between them. Social scientists working within conservation organizations sometimes feel that the critiques of their academic colleagues are not well-informed or that they do not contribute to advancing conservation. At the same time, they feel pushed by the organization to produce 'deliverables' focused on particular projects rather than big picture questions, and they may feel marginalized or vulnerable within the organization and thus resentful of critiques aimed by those with more secure positions.

Differences in approach are not explained solely by whether one works for a university or a conservation organization. Within and among the various disciplines of the social sciences there are multiple lines of thought. Some choose to focus on creating explanatory or predictive models, while others strive for a thorough accounting of political, social, and economic forces in an area. Some aim to provide data, while others choose to challenge assumptions and critique implementations. These distinctions can lead to frustrations and clashes when there is inadequate understanding of and respect for multiple viewpoints.

At the WCC, there were many new approaches to conservation discussed, among them: conservation of biocultural diversity; human rights; climate change; and economic approaches. In this thesis, I noted that climate adaptation and mitigation strategies, as much as or even more so than other conservation approaches, require input from a variety of disciplines. Mitigation strategies in particular, though, risk to become the solely the domain of marketing, financial, and policy professionals, excluding those who work at smaller scales and who focus on the complexity of local contexts.

Though it was clear at the WCC that market and economic approaches to conservation are increasingly being discussed and studied, what is not clear is whether they will diminish or supplant more traditional approaches that are rooted in particular places, species, or habitats. After all, many types of economic approaches, such as debt-for-nature swaps, ecotourism, and even ICDPs have been around for quite some time. What may be newer than the economic orientation in itself is rather the scale and intensity with which such interventions are being promoted. What also remains to be seen is the exact effect that these changing approaches will have on interdisciplinarity in conservation practice and the attendant decisions about who matters, what data are relevant, which scales of analysis and practice are appropriate, and eventually, the character of the conservation projects that are implemented. For the moment, it appears that the rise of economic approaches is changing preferences for disciplinary expertise within conservation organizations and that this could lead to greater reductionism in the production of knowledge surrounding local contexts.

This thesis research has persuaded me that economic approaches to conservation need further inspection, and I am currently planning two projects that will examine them in more depth. The first is an in-depth project that will explore how social context is conceptualized differently by different types of programs within the same organizations. This project will, furthermore, situate the emergence of new approaches in a historical context and examine how conversations about the human context of conservation have changed over time and how the social sciences have been integrated into conservation. The second project is a follow up to this event ethnography that is to be conducted at the Conference of the Parties to the Convention on Biological Diversity. The CBD research will also take the form of a collaborative ethnography, and my portion will focus on how and why economic and market approaches seem to be gaining so much traction at the moment, who the major proponents are, and where the points of resistance are.

References

2005. The Durban Accord. Vth IUCN World Parks Congress.

2008. The crisis: A timeline. A shocking series of events that forever changed the financial markets. CNN.com. 26 December.

Adams, W. M. 2007. Thinking like a human: Social science and the two cultures problem. Oryx **41**:275-276.

Agrawal, A., & C.C. Gibson. 1999. Enchantment and disenchantment: The role of community in natural resource management. World Development **27**:629-649.

ASA. 2006. What is sociology. American Sociological Association. http://www.asanet.org/cs/root/topnav/sociologists/what_is_sociology.

Aswani, S., and R. J. Hamilton. 2004. Integrating indigenous ecological knowledge and customary sea tenure with marine and social science for conservation of Bumphead Parrotfish (*Bolbometopon muricatum*) in the Roviana Lagoon, Solomon Islands. Environmental Conservation **31**:69-83.

Bayon, R., A. Hawn, and K. Hamilton 2007. Voluntary carbon markets: An international business guide to what they are and how they work. Earthscan, London ; Sterling, VA.

Berkes, F. 2004. Rethinking community-based conservation. Conservation Biology **18**:621-630.

Blockstein, D. 2001. Integrated science for ecosystem management: An achievable imperative. Conservation Biology **13**:682-685.

Brechin, S. R., P. R. Wilshusen, C. L. Fortwangler, and P. C. West, editors. 2003. Contested nature: Promoting international biodiversity with social justice in the twenty-first century. State University of New York Press, Albany.

Brewer, G. D. 1999. The challenges of interdisciplinarity. Policy Sciences **32**:327-337.

Brewer, G. D., and K. Lövgren. 1999. The theory and practice of interdisciplinary work. Policy Sciences **32**:315-317.

Brockington, D. 2001. Women's income and livelihood strategies of dispossessed pastoralists near the Mkomazi Game Reserve, Tanzania. Human Ecology **29**:3070338.

Brockington, D. 2004. Community conservation, inequality and injustice: Myths of power in protected area management. Conservation and Society **2**:411-432.

Brosius, J. P. 2006. Common ground between anthropology and conservation biology. Conservation Biology **20**:683-685.

Brosius, J. P., and D. Russell. 2003. Conservation from above: An anthropological perspective on transboundary protected areas and ecoregional planning. Journal of Sustainable Forestry **17**:39-65.

Brosius, J. P., A. L. Tsing, and C. Zerner. 1998. Representing communities: Histories and politics of community-based natural resource management. Society & Natural Resources **11**:157-168.

Büscher, B., and W. Dressler. 2007. Linking neoprotectionism and environmental governance: On the rapidly increasing tensions between actors in the environment-development nexus. Conservation and Society **5**:586-611.

Büscher, B., and W. Whande. 2007a. Introduction: The politics of engagement between biodiversity conservation and the social sciences. Conservation and Society **5**:1-21.

Büscher, B., and W. Whande. 2007b. Whims of the winds of time? Emerging trends in biodiversity conservation and protected area management. Conservation and Society **5**:22-43.

Business for Social Responsibility. 2007. Bio-carbon and corporate climate strategy: A business brief on emissions reductions via forestry and land use projects. Business for Social Responsibility, San Francisco.

Campbell, L. M. 2005. Overcoming obstacles to interdisciplinary research. Conservation Biology **19**:574-577.

Castree, N. 2008. Neoliberalising nature: Processes, effects, and evaluations. Environment and Planning A **40**:153-173.

Chan, M. 2009. Subprime carbon? Re-thinking the world's largest new derivatives market. Friends of the Earth, Washington, DC.

Chatty, D. 1998. Enclosures and exclusions: Conserving wildlife in pastoral areas of the Middle East. Anthropology Today **14**:2-7.

Clayton, S., and C. Saunders. 2009. Psychology. Social Science Working Group of the Society for Conservation Biology. http://www.conbio.org/workinggroups/SSWG/catalog/psycology.cfm.

Coomes, O., B. Barham, and Y. Takasaki. 2004. Targeting conservation-development initiatives in tropical forests: Insights from analysis of rainforest use and economic reliance among Amazonian peasants. Ecological Economics **51**:47-64.

Culter, M. R. 1982. What kind of wildlifers will be needed in the 1980s? Wildlife Society Bulletin **10**:75-79.

Dey, C. 2000. Women, Forest Products and Protected Areas: A case study of Jaldapara Wildlife Sanctuary, West Bengal, India. Pages 131-157 in K. B. Ghimire, and M. P. Pimbert, editors. Social Change and Conservation. Earthscan, London.

Eghenter, C. 2004. Social science research as a tool for conservation -- The case of Kayan Mentarang National Park (Indonesia). Policy Matters **13**:224-233.

Endter-Wada, J. 1998. A framework for understanding social science contributions to ecosystem management. Ecological Applications **8**:891-904.

Endter-Wada, J., D. Blahna, R. Krannich, and M. Brunson. 1998. A Framework for Understanding Social Science Contributions to Ecosystem Management. Ecological Applications **8**:891-904.

Ferraro, P. J., and R. D. Simpson. 2002. The cost-effectiveness of conservation payments. Land Economics **78**:339-353.

Forest Trends, The Katoomba Group, and UNEP. 2008. Payments for ecosystems services: Getting started. UNEP.

Fox, H., C. Christian, J. C. Nordby, O. W. Pergams, G. Peterson, and C. Pyke. 2006. Perceived barriers to integrating social science and conservation. Conservation Biology **20**:1817-1820.

Fry, G. 2003. The need for knowledge brokers. Pages 72-73 in B. Tress, G. Tress, A. van der Valk, and G. Fry, editors. On successes and problems. Alterra, Wageningen.

Gartlan, S. 1998. Every man for himself and God against all: History, social science, and the conservation of nature. Yale F&ES Bulletin **102**:216-226.

Gitay, H., A. Suárez, D. J. Dokken, and R. Watson. 2002. Climate change and biodiversity. IPCC Technical Paper V. Intergovernmental Panel on Climate Change, Geneva.

Global Forest Coalition. 2008. Life as commerce: The impact of market-based conservation on indigenous peoples, local communities, and women. Global Forest Coalition, CENSAT Agua Viva, COECOCEIBA, EQUATIONS, Alter Vida, the Timberwatch Coalition, Asunción, Paraguay.

Goodale, U. M. 2003. Transboundary protected areas: The viability of regional conservation strategies. Food Products Press, New York.

Gutman, P., and S. Davidson. 2007. A review of innovative international financial mechanisms for biodiversity conservation with a special focus on the international financing of developing countries' protected areas. WWF Macroeconomics for Sustainable Development Program Office, Washington, DC.

Hagerman, S., T. Satterfield, and H. Dowlatabadi. nd. Adapting conservation policy to the impacts of climate change: Promotion, ambivalence and resistance at the WCC.

Heal, G. 1998. Markets and sustainability. PaineWebber Working Paper Series in Money, Economics, and Finance. Columbia Business School, Columbia University, New York.

Heller, N. E., and E. S. Zavaleta. 2009. Biodiversity management in the face of climate change: A review of 22 years of recommendations. Biological Conservation **142**:14-32.

Hulme, D., and M. Murphree. 1999. Communities, wildlife, and the "new conservation" in Africa. Journal of International Development **11**:277-285.

Hulme, D., and M. Murphree 2001. African wildlife and livelihoods: The promise and performance of community conservation. Heinemann, San Francisco.

Hutton, J., W. M. Adams, and J. Murombedzi. 2005. Back to the barriers: Changing narratives in biodiversity conservation. Forum for Development Studies **2**.

Igoe, J., and D. Brockington. 2007. Neoliberal conservation: A brief introduction. Conservation and Society **5**:432-449.

IUCN. 2008a. IUCN Director General's Special Event, IVth World Conservation Congress, Barcelona, Spain.

IUCN. 2008b. Markets and business journey: Events Programme. IUCN, Gland.

Jacobson, S., and M. McDuff. 1998. Training idiot savants: The lack of human dimensions in conservation biology. Conservation Biology **12**:263-267.

King, N., H. Biggs, and R. Loon. 2007. Seeking common ground: How natural and social scientists might jointly create an overlapping worldview for sustainable development: A South African perspective. Conservation and Society **5**:88-114.

Kiss, A. 2004. Making biodiversity conservation a land-use priority. Pages 98-123 in T. O. McShane, and M. P. Wells, editors. Getting biodiversity projects to work: Towards more effective conservation and development. Columbia University Press, New York.

Kollmuss, A., H. Zink, and C. Polycarp. 2008. Making sense of the voluntary carbon market: A comparison of carbon offset standards. WWF Germany, Frankfurt.

Le Quesne, T., and R. McNally. 2006. The green buck: Using economic tools to deliver conservation goals: A WWF field guide. WWF-UK, Godalming.

Li, T. 2007. The will to improve: Governmentality, development, and the practice of politics. Duke University Press, Durham.

Li, T. 2008. Social reproduction, situated politics, and The Will to Improve. Focaal: The European Journal of Anthropology **52**:111-118.

Luhby, T. 2008. Crisis on the world stage. CNNmoney.com, October 11.

Machlis, G. 1992. The contribution of sociology to biodiversity research and management. Biological Conservation **62**:161-170.

Machlis, G. 1995. Social science and protected area management: The principles of partnership. Expanding Partnerships in Conservation:45-57.

Martinez-Alier, J. 2002. The environmentalism of the poor:A study of ecological conflicts and valuation. Edward Elgar Publishing, Northhampton, MA.

Mascia, M. B., J. P. Brosius, T. A. Dobson, B. C. Forbes, L. Horowitz, M. A. McKean, and N. J. Turner. 2003. Conservation and the social sciences. Conservation Biology **17**:649-650.

Mayrand, K., and M. Paquin 2004. Payments for environmental services: A survey and assessment of current schemes. Unisfera International Centre for the Commission of Environmental Cooperation of North America, Montreal.

McAfee, K. 1999. Selling nature to save it? Biodiversity and green developmentalism. Environment and Planning D: Society and Space **17**:133-154.

McCarthy, J. J., and Intergovernmental Panel on Climate Change. Working Group II. 2001. Climate change 2001: Impacts, adaptation, and vulnerability: Contribution of Working Group II to the third assessment report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK ; New York.

McEvoy, A. F. 1986. The fisherman's problem: Ecology and law in the California fisheries 1850-1980. Cambridge University Press, Cambridge.

McNeely, J. A. 1988. Economics and biological diversity: Developing and using economic incentives to conserve biological diversity. IUCN, Gland.

McShane, T. O., and M. P. Wells 2004. Getting biodiversity projects to work: Towards more effective conservation and development. Columbia University Press, New York.

McSweeney, K. 2005. Indigenous population growth in the lowland neotropics: Social science insights for biodiversity conservation. Conservation Biology **19**:1375-1384.

Meine, C., M. Soulé, and R. F. Noss. 2005. A mission-driven discipline: The growth of conservation biology. Conservation Biology **20**.

Miller, D. 2009. Political science. Social Science Working Group of the Society for Conservation Biology. http://www.conbio.org/workinggroups/SSWG/catalog/political_science.cfm.

Neumann, R. P. 1992. Political ecology of wildlife conservation in the Mt. Meru area of Northeast Tanzania. Land Degradation and Rehabilitation **3**:85-98.

Nyhus, P., F. Westley, R. Lacy, and P. Miller. 2002. A role for natural resource social science in biodiversity risk assessment. Society and Natural Resources **15**:923-932.

Orlove, B. S., and S. B. Brush. 1996. Anthropology and the conservation of biodiversity. Annual Review of Anthropology **25**:329-352.

Peluso, N. 1993. Coercing conservation: The politics of state resource control in R. L. K. Conca, editor. The state and social power in global environmental politics. Columbia University Press, New York.

Raheem, N. 2009. Economics. Social Science Working Group of the Society for Conservation Biology. http://www.conbio.org/workinggroups/SSWG/catalog/economics.cfm.

Redford, K. H., and J. P. Brosius. 2006. Diversity and homogenization in the endgame. Global Environmental Change **16**:317-319.

Robbins, P. 2009. Human geography. Social Science Working Group of the Society for Conservation Biology. http://www.conbio.org/workinggroups/SSWG/catalog/human_geography.cfm.

Russell, D. 2009. Anthropology. Social Science Working Group of the Society for Conservation Biology. http://www.conbio.org/workinggroups/SSWG/catalog/anthropology.cfm.

Saberwal, V. K., and A. Kothari. 1996. The human dimension in conservation biology curricula in developing countries. Conservation Biology **10**:1328-1331.

Schaller, G. B. 1992. Field of dreams. Wildlife Conservation **September/October**:44-47.

Scherr, S., A. White, and A. Khare. 2004. For services rendered: The current status and future potential of markets for the ecosystem services provided by tropical forests. Technical Series 21. International Tropical Timber Organization.

Schroeder, R. A. 1993. Shady practice: Gender and the political ecology of resource stabilization in Gambian garden/orchards. Economic Geography **69**:349-365.

Scott, J. C. 1998. Seeing like a state: How certain schemes to improve the human condition have failed. Yale University Press, New Haven.

Sukhdev, P. 2008. The economics of ecosystems and biodiversity: An interim report. European Communities, Wesseling, Germany.

Svadlenak-Gomez, K., T. Clements, C. Foley, N. Kazakov, D. Lewis, D. Miquelle, and R. Stenhouse. 2007. Paying for results: WCS experience with direct incentives for conservation. USAID, Wildlife Conservation Society.

Terborgh, J. 2004. Reflections of a scientist on the World Parks Congress. Conservation Biology **18**:619-620.

Thouless, C. R. 2008. Workshop report: Human-wildlife conflict: Biology and beyond. 4th IUCN World Conservation Congress, Barcelona.

Trexler, M. C., L. H. Kosloff, and D. J. Broekhoff. 2006. A statistically-driven approach to offset-based GHG additionality determinations: What can we learn? Environmental Law and Management **18**:118-130.

Turner, M. 2007. Ecological complexity and the management of common property resources. Tenure Brief, No. 5. Land Tensure Center, Madison.

van Mansfeld, M. 2003. The need for knowledge brokers in B. Tress, G. Tress, A. van der Valk, and G. Fry, editors. Interdisciplinary and transdisciplinary landscape studies: Potential and limitations. Alterra, Wageningen.

Warringa, G., M. Korteland, and M. Doorn. 2009. Evaluatie klimaatstandaarden. Ministerie van VROM, The Hague.

West, P., J. Igoe, and D. Brockington. 2006. Parks and peoples: The social impact of protected areas. Annual Review of Anthropology **35**:251-277.

Western, D., and R. M. Wright. 1994a. The background to community-based conservation. Pages 1-12 in D. Western, and R. Wright, editors. Natural connections: Perspectives in community-based conservation. Island Press, Washington, D.C.

Western, D., and R. M. Wright, editors. 1994b. Natural connections: Perspectives in community-based conservation. Island Press, Washington D.C.

Wilkie, D., W. M. Adams, and K. H. Redford. 2008. Protected areas, ecological scale, and governance: A framing paper. Pages 1-14 in K. H. Redford, and C. Grippo, editors. Protected areas, governance, and scale. Wildlife Conservation Society, New York.

Wilshusen, P. R., S. R. Brechin, C. L. Fortwangler, and P. C. West. 2002. Reinventing a square wheel: Critique of a resurgent "protection paradigm" in international biodiversity conservation. Society & Natural Resources **15**:17-40.

Winder, N. 2003. Successes and problems when conducting interdisciplinary or transdisciplinary (= integrative) research. Pages 74-90 in B. Tress, G. Tress, A. van der Valk, and G. Fry, editors. On successes and problems. Wageningen.

Wolmer, W. 2003. Transboundary conservation: The politics of ecological integrity in the Great Limpopo Transfrontier Park. Livelihoods in Southern Africa Research **4**.

WWF-US. 2008. Summary results of survey of WWF-US social science needs, priorities, and capacities. WWF-US, Washington, DC.

WWF-US. 2009. A 20-year view of the world's response to climate change. WWF-US, Washington, DC.

WWF International. 2008. Green carbon guidbook. WWF International, Gland.

Zint, M., and A. Higgs. 2009. Education. Social Science Working Group of the Society for Conservation Biology. http://www.conbio.org/workinggroups/SSWG/catalog/education.cfm.