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Positivism to post-positivism in conservation: A call for a philosophical paradigm shift

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Emergent environmental issues such as global climate change, human dependence on fossil fuels, agricultural pollution, and land conversion, are linked to contemporary social issues, which has given way to an integrative approach to biophysical scientific understanding. In particular, interdisciplinary ecology has emerged as a 'new' science connecting human dimensions to biophysical science. This integrated scientific approach appears promising for conservation; however at least one contentious issue remains. There has been little progress in terms of addressing the role of social science in biophysical realms.

While many public land management agencies in America implement in-house research programs to examine conservation initiatives, those agencies often struggle to have meaningful, constructive dialogue with community stakeholders regarding land management and science-based decisions. Engaging communities in communications and decision-making can lead to more effective conservation as well as foster trust and learning between scientists, managers, and the general public (Buchy and Hoverman, 2000; Keough and Blahna, 2006; Ostrom, 1999; Schusler, Decker, and Pfeffer, 2003; Varley and Schullery, 1996; Wagenet and Pfeffer, 2007; Wollenberg, Anderson, and Lopez, 2005). However, a positivistic perspective for myopic specialization pervades public land management and science disciplines manifesting as limited consideration for social dimensions and an apparent disconnect between public land managers/scientists and community stakeholders. Such manifestations reveal consequence for communication implications, such as a lack of multidirectional dialogue between stakeholders as well as a lack of translation of science and management to the general public. This paper proposes to identify the positivist perspective of management and science, deconstruct the constructs of this perspective and subsequent implications, followed by a reconstruction of an integrated perspective centered on community-based management.

The positivist perspective

In the context of protected area managers and scientists, the positivist perspective is premised on contemporary understanding of historical positivistic roots for scientific inquiry; whereby positivism is centered on truth and verification of the truth (Wittgenstein, 1968). Following this understanding, people in general are viewed as subjective in ascribing meaning to their observations, while land managers and scientists are trained to observe through objectivity without ascribing meaning. This distanced and one-dimensional perspective has implications for integrating social and biophysical sciences. Specifically, the positivistic science requirements of objectivity, neutrality, and lack of social dimensions fostered the "hard" versus "soft" science entanglements that historically burdened the integration of science (Bradshaw and Beckoff, 2001). As integration of the sciences has not fully taken root, these same entanglements are evidently alive and well today and the impetus of the positivist perspective in public land management/science.

Constructs of the positivist perspective. The positivist perspective is best understood as containing two distinct constructs. For instance, this perspective is based on the premise that social dimensions do not retain relevance in biophysical science realms and an apparent disconnect exists between managers/scientists and community stakeholders.

Specifically, social dimensions not retaining relevance in biophysical science realms is an area of contention long identified in the literature (Forge, 2000; Haila, 2000; Lubchenco, 1998; Rollin, 1989). For instance, ecologists have been at odds (Bradshaw and Beckoff, 2001), some supporting social involvement in research and management and the idea of a social contract for such involvement by troubling the

nature-culture dualism (Forge, 2000; Haila, 2000; Lubchenco, 1998), while others argue such involvement undermines the required objectivity of science (Rollin, 1989). As Bradshaw and Beckoff (2001, 460) reflect, "Ecology is wrestling between two models of science: a science apart from society and a science directly engaged with society. The twin missions of science, to pursue truth and to serve society, appear to be at odds."

Furthermore, public land management agencies are cognizant of an apparent disconnect that hinders conservation. Specifically, these agencies have identified a disconnect between people and land, and thereby employ educational efforts to mend the gap. However, the issue is less about a separation between people and land, and more about the gap between science/management and community stakeholders. Such disconnect is evidenced in stakeholder-management conflict. Stakeholder-management conflict centers on opposition for particular conservation and management initiatives (Manning, Valliere, Minteer, 1999; Dutcher, Finley, Luloff, and Johnson, 2004; Shindler, Steel, and List, 1996; Shindler, List, and Steel, 1993) impacting recreation and livelihood dependences. For instance, past inquiry on the topic has revealed community stakeholders disagreed with management of forests for single uses (Manning, Valliere, Minteer, 1999), the lack of tested ecosystems knowledge, management decisions dictated by politics, lack of public input, lack of access to wilderness areas for livelihood practices, lack of priority for community economic well-being, management's narrow focus on individual parts of forests (e.g., species) (Shindler, List, and Steel, 1993; Shindler, Steel, and List, 1996), and unfair management practices related to land restrictions (Larson and Santelmann, 2007). Such disagreements between management/science and community stakeholders have led to debilitating results for conservation through litigation to shut down management efforts.

Implications of the positivist perspective. The proposition that the positivist perspective is based on an irrelevance of social dimensions in biophysical science and management as well as a seeming disconnect between managers/scientists and community stakeholders gives way to particular implications for public land management. For instance, a lack of multi-directional dialogue and deficient translation of science and management to the general public may be attributable to these components of the positivist perspective.

Gathering public input is a well-established practice amongst public land management agencies; yet the scope of generating this public input thereby fostering multi-directional dialog is limited. In particular, traditional management practices have relied on public scoping during planning sessions as a way to generate public input, while traditional research practices have relied almost entirely on educators to communicate the results of their work with community stakeholders during interpretive talks; leaving interpretation of science and management at the laboratory and administrative doors with the expectation that communication to the general populace is the responsibility of communicators and interpreters. Both streams of communication portray approaches that foster one-dimensional communication, meaning dialogue delivered from the manager/scientist to the community stakeholder with a limited opportunity for the community stakeholder to respond, and little to no discussion between managers/scientists and community stakeholders. Thus, management/science communication has followed a path of specialization that is exclusionary of diverse stakeholder groups' knowledge and insight.

For instance, communication strategies employed by public agencies foster exclusion, through the lack of introduction of conservation concepts to new publics. Typically, public agencies involved in conservation efforts have an educational

branch dedicated to informing the public regarding the importance of conservation and the latest advances made by the agencies' researchers. These educational activities also serve as vehicles to garner support for the conservation initiatives. Unfortunately, these efforts do not extend to new publics; those not typically associated with conservation such as urban demographics. The disconnection that exists between certain demographics and management/science burgeon from an assumed or existing indifference regarding conservation and is further perpetuated by the lack of opening multi-directional dialog with these demographics. However, this disconnect is widely recognized by public land management agencies as a pressing problem worth addressing.

Translating science and management practices into useable forms for the general populace is a process that is currently conducted. Yet an apparent lack of effectiveness is evident as stakeholder conflict continues. Particularly, when science and management is communicated in such a way that does not encourage dialogue between stakeholders, but rather kept in-house for management purposes, there is little reason for scientists or land managers to think from an alternative perspective such as a community stakeholder. Thus, the relevance for translating human-based conservation benefits is absent and conservation is only relevant to scientists and managers. From a community stakeholder perspective, the 'so-what' behind science or management action is unclear, translating into a disconnect.

As a first step in translation, managers and scientists must consider the general populace as one of the target audiences of their work. With this in mind, translation would begin within the lab and the administrative office and extend, as an ethical responsibility, directly to the public. Establishing a mindset that translation begins with scientists and managers has been identified as a practice worthy of improvement by federal agencies (Harmon, 1994; Varley and Schullerly, 1996).

We know community involvement in decision-making is effective for successful conservation (Chambers and McBeth, 1992; Chitere, 1994; Etzioni, 1996; Murphree, 1993). Thus, it is apparent that the need for conservation is a paradigm shift in the collective philosophy of conservation. A shift from the isolation of science to one that embodies a sense of responsibility to develop a connection between managers and stakeholders and a shared conservation philosophy. The role of science must move beyond the discourse of conservation within isolated scientific realms to larger domains that dictate identifying value for community stakeholders.

Reconstructing an integrated perspective through the community-based approach

Over the past few decades, a variety of community-based approaches to natural resource management and conservation have started to proliferate, a movement that aims to include post-positivistic approaches to conservation such as citizen involvement in decision-making processes and management activities (Agrawal and Gibson 1999; Berkes 2004; Charnley and Poe 2007; Plummer and Fennell 2007). The practice of community-based approaches provides a context for reconstructing conservation philosophy. Many researchers believe that this growing tendency towards community-based natural resource management and conservation is, at least in part, a reaction to a previous focus on intrusive, exclusionary approaches to environmental management that considered communities as road-blocks to conservation (Agrawal and Gibson 1999). Additionally, conceptual shifts in ecology over the past few decades that emphasize systems thinking, the inclusion of humans as part of nature, and working partnerships between resource managers and users have contributed to the growing popularity of community-based approaches (Berkes 2004).

Community-based approaches to natural resource management and conservation vary widely, ranging from civic science to community forestry to co-management and more, but common threads run through the various types of projects. In particular, community–based approaches tend to include management of natural resources and ecosystems, multi-party partnerships (e.g., governments, citizens, stakeholders, non-government organizations, community groups, etc.), projects/programs/decision-making processes that are dynamic and evolve over time, and participation by community rather than an exclusive approach (Carlsson and Berkes 2004; Conley and Moote 2003).

While it is not feasible to construct exact recipes for community-based projects that successfully make social dimensions relevant in biophysical realms and reconnect people with conservation management/science (Bradshaw, 2007), a review of literature suggests that key factors for successful projects include understanding the role of community participation for the project, the incentives and interests that drive the community, and the best tools for undertaking community participation. These factors will be briefly examined in an effort to better understand how community-based approaches ultimately hold promise for reconstructing an integrative perspective among protected area management and science.

Community participation as an end or a means to an end? A key factor for successful community-based projects is community participation; but before formulating community participation strategies, it is essential to address the question posed by Buchy and Hoverman (2000). "Is community participation in the context of the project an end or a means to an end?" Buchy and Hoverman (2000) elaborate on this question by defining participation *as an end* as "an approach, an ideology, an ethos for community development," where participation allows for the traditional dynamics of power in decision-making to shift and for relationships within the community to evolve (Buchy and Hoverman 2000, 16). Participation *as a means to an end*, then, is "a method, a set of guidelines and practices of involving communities or the general public in specific planning activities" (Buchy and Hoverman, 2000, 16). In this case, it is assumed that when communities are invited to participate on some scale, the outcome will be more effective toward conservation or socioeconomic goals, both because it is more realistic in terms of peoples' needs and because the local community will feel more project ownership and therefore responsibility to comply with project rules (Buchy and Hoverman, 2000).

While the difference may be perceived as subtle, it is important for project managers (e.g., scientists or land managers) to be clear as to which standpoint they are taking in regards to participation, because the standpoint has major implications for the type and extent of public involvement appropriate for the project. Additionally, project managers need to be able to clearly communicate to the community what the goals for participation are in order to foster appropriate public expectations (Buchy and Hoverman, 2000). Box 1 summarizes the differences between participation as an end and participation as a means to an end.

Little (1994, 357) suggests community-based project managers should begin deliberation on the role of community participation in their project by creating a simple model of:

- Identification of the major interest groups in the project,
- Their current resource-use motives and whether these conflict with those of other groups,
- Their behavior and its effects on resource use and conservation,
- The potential winners and losers as a result of a conservation program.

Community incentives and interests. Understanding the incentives and interests that may drive a community's participation and commitment to a community-based natural resource management or conservation project is an essential task for practitioners. Researchers looking into trends in incentives for these types of projects have debated whether incentives need to be strictly economic, or if they can include other benefits as well, such as social, recreational, or environmental benefits. Keough and Blahna (2006) conclude that collaborative management may be greatly benefited by economic incentives for community members, but that other values—such as recreational access or wildlife protection—may also play key roles in community support and participation. They emphasize that effective dialogue must occur on a case-by-case basis in order to identify those values, and projects must identify and manage social conflict rather than avoid it (Keough and Blahna 2006). Berkes (2004) notes that equity and empowerment among community members may be powerful non-economic incentives in many situations, which again supports the need for dialogue and inclusive decision-making processes (Berkes 2004). Additionally, Salafsky, Cauley, Balachander, Cordes, Parks, and Margoluis (2001) found, contrary to their hypothesis, that community-based conservation success was correlated with non-monetary benefits (i.e. social benefits) but not with monetary benefits, suggesting that non-monetary benefits are more useful in promoting trust and cooperation than monetary ones.

Box 1. The role of participation in community-based natural resource management and conservation

Participation as an end	Participation as a means to an end
1. Participation is an approach, ideology, or ethos for the project (Buchy and Hoverman, 2000).	2. Participation is a management tool useful for achieving the project's desired outcomes (ecological, economic, and/or social) (Buchy and Hoverman, 2000).
1. Participation serves to democratize science, i.e. make the production, use, and communication of science more reflexive, more inclusive of non-expert input, and more collaborative (Backstrand, 2003).	2. Participation serves to legitimize projects in the eyes of the public and therefore aids in the effectiveness of the project (Backstrand, 2003).
3. Success of project measured against inclusiveness of broad values and empowerment of traditionally marginalized sectors of society (Reed and McIlveen, 2006).	4. Success of project measured against ecological or economic objectives (Bradshaw, 2007).
5. Process criteria used in evaluation (i.e. diverse and inclusive participation, consensus-based decision-making, transparent process) (Conley and Moote, 2003).	6. Outcome criteria used in evaluation (i.e. improved habitat, improved water quality, skill and knowledge transfer to participants, increased employment) (Conley and Moote, 2003).

Effective community participation tools. Based on the above research, there is strong support for the notion that non-economic incentives are the key motivators for people to participate in community-based approaches to natural resource management and conservation. Utilizing effective community participation tools is essential for both identifying those non-economic incentives and facilitating an understanding of shared interests among stakeholders/participants, cultivating trust and commitment to a project. Key principles for effective public participation are presented in Box 2.

Lynam, de Jong, Kusumanto, and Evans (2007) present a useful review of tools used for incorporating community input (i.e., values, knowledge, and preferences) into natural resource management decision-making processes, including Bayesian belief networks and system dynamic modeling (simplifying complex systems using key variables and their relationships), discourse-based valuation (tool for developing a common representation of importance), the 4 Rs frameworks (used to assess stakeholder roles and resilience), participatory mapping (tool for obtaining and representing spatial relationships), the pebble distribution method (used to rate alternatives and examine the reasons for these ratings), future scenarios (describes possible future outcomes as a basis for planning and decision making), spidergrams (tool for representing causal or categorical relationships among variables), Venn diagrams (represents social relationships and power differences), and who-counts

matrices (used to give priority to stakeholders whose well-being is closely linked to forest management). Explaining how to use these tools is not the focus of their work (such explanations are available in the individual papers that present these tools, and are worth looking into), but they do evaluate the usefulness of each tool toward certain goals. The researchers suggest that more open, idea-generating tools should be used in the beginning of collaborative efforts, with a movement toward more focused, situation-specific tools as the effort progresses. They also suggest alternating between creative and analytical tools in order to tap into the full range of participant perspectives (Lynam et al. 2007). Two additional guides present practical instruction in community-based participation methods: Pretty, Guijt, Scoones, and Thomson (1995) and Wollenberg et al. (2005).

Project managers wishing to work toward the larger goal of successfully reconnecting people with conservation science and stewardship may find community-based approaches to be more successful than some of the traditional, more exclusive approaches to natural resource research and management. As discussed, key steps towards designing and implementing successful community-based approaches include understanding the role of community participation, identifying the community's incentives and interests, and learning to work with the most effective tools for facilitating community participation. In particular, incorporating the use of community-based approaches fosters multi-directional dialog between stakeholders and the translation of incentives in the form of human-based benefits for a shared conservation philosophy.

Box 2. Principles of effective public participation in community-based approaches to natural resource management and conservation[1]

1. Clarity regarding the goals and expectations of the participation (i.e. input, actual decision-making, etc)
2. Flexibility regarding the definition of the problem (willingness to include additional perspectives regarding how the issue affects participants)
3. Open communication and unrestrained thinking encouraged
4. Diverse participation
5. Fair participation (equity in voices heard)
6. Ample time and money allotted for the process, including relationship-building
7. Appropriate facilitation skills utilized (bringing in trained facilitators if needed)
8. Multiple sources of knowledge utilized (i.e. science, values, traditional knowledge)
9. Consensus and/or democratic decision-making processes employed
10. Constructive means of dealing with conflict

[1] Based on (Buchy and Hoverman, 2000; Keough and Blahna, 2006; Ostrom, 1999; Schusler et al., 2003; Wagenet and Pfeffer, 2007; Wollenberg et al., 2005).

A call for a shared conservation philosophy

When considering the call for integrated science, Bradshaw and Beckoff (2001) pose the question "can ecologists be good scientists and still fulfill their social responsibilities?" The answer they provide is applicable to the same question framed in the context of a call for a conservation philosophy paradigm shift: "Yes, but in so doing ecologists must tread in non-traditional waters." Particularly, these non-traditional waters must include considering the relevance of social dimensions in biophysical resource management and science as well as identifying and mitigating the disconnect between stakeholders as a way of fostering opportunities for mulit-way communication and greater translation of science and management to the general public.

Community-based management approaches have made advances in contemporary conservation strategies; the same needs to occur with conservation philosophy. Just as "sacred ecology" (Berkes 1999) and "ecologies of the heart" (Anderson 1996) challenged the scientific process to include social and cultural dimensions, we also need to challenge the way science and management is communicated so that a shared conservation philosophy is fostered; thus moving beyond a positivistic perspective toward post-positivistic strategies.

As evidenced in previous discussion, the current positivist perspective is not effectively meeting socially constructed issues of protected area management. In particular, the current perspective shows disregard for a shared philosophy. The responsibility of traditional scientists and land managers to extend the communication and translation of their work beyond the lab or administrative doors remains remiss; instead these disciplines rely almost entirely on interpreters and communicators to translate science and management efforts and foster dialogue with stakeholders. This guiding philosophy does not promote an ethic of responsibility on behalf of all involved in conservation to translate conservation by way of multi-directional dialog for a shared philosophy.

Thus, this is a call for a paradigmatic shift in conservation philosophy to one that fosters shared responsibility. In particular, scientists and land managers must recognize their role in conservation as an ethical responsibility. They must play a role in making science relevant to the general populace by translating and communicating the human-based benefits of conservation for multi-directional dialog. And the science of ecology must also play a role in this paradigm shift by moving beyond the nature-culture dualism to integrating social science in biophysical dimensions where all scientists - social and biophysical alike - have a responsibility to foster a shared conservation philosophy with community stakeholders. Once this post-positivistic responsibility ethic occurs, a conservation philosophy paradigm shift towards a shared philosophy can begin.

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