Socially-Just and Scientifically-Sound: Re-Examining Co-Management of Protected Areas

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Abstract: Co-management of protected areas is a growing trend within the conservation management field, but current practices often fail to replicate the ideals. The core tenets of co-management governance must be re-examined. An improved co-management governance structure would incorporate many of the tenets important to self-management of protected areas. A key tenet would be indigenous peoples' rights to self-control their knowledge, resources, and cultures, as is done within self-management governance structures. Best practices of co-management of a protected area should include the equal power relationships between partners, dynamic understanding of indigenous peoples (as opposed to a static understanding), and the acceptance of traditional ecological knowledge (TEK) as a legitimate knowledge system. This paper examines the current ideal best practices of conservation of protected areas, delves into the problems currently facing most co-management implementations, demonstrates the depth of TEK as a legitimate knowledge system, explores how self-control is the key tenet of self-management, uses self-management as an approach to re-think co-management, and discusses the ways in which co-management should be re-structured as a governance approach to conserving protected areas. Without an examination of the core tenets that comprise it, co-management as a governance structure will continue producing unequal partnerships that view indigenous peoples as unable to properly join in the protection and management of the world's important ecosystems, landscapes, and species.

Keywords: Conservation, co-management, self-management, IUCN, protected areas, indigenous, tribal, local communities

Introduction

As climate change and other forms of environmental degradation increasingly threaten the world's most biologically and culturally important areas, it is important to create systems to effectively halt this alarming degradation. Conservation management works to ensure the protection of some of the world's most ecologically-diverse and culturally-valuable areas.

Such conservation is often achieved through the management of protected areas through organizations like the IUCN. The IUCN (International Union for Conserving Nature), which has observer and consultative status at the United Nations, is an international organization comprised of over twelve hundred governmental and non-governmental organizations that work together to create and define conservation best practices. The IUCN defines a protected area as a "clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley 2008, 2). Each protected area is different: diversity in political actors and environments means that each protected area has a unique system of governance and management that aligns with the six IUCN management categories recognized by the Convention on Biological Diversity -- Ia: Strict Nature Reserve, Ib: Wilderness Area, II: National Park, III: Natural Monument or Feature, IV: Habitat/Species Management Area, V: Protected Landscape/Seascape, and VI: Protected Area with Sustainable Use of Natural Resources. In this approach, protected areas are the "fundamental building blocks" of almost all efforts toward ecological and cultural conservation theory, practice, and strategy (Dudley 2008, vi). They provide internationally recognized systems to protect endangered species and threatened landscapes, while also playing key roles in climate change resiliency strategies for ecological and social systems.

Co-management as a governance strategy is becoming recognized as a potential way forward in conservation management that solves multiple problems in current practices of conservation. Borrini-Feyerabend et al. (2004) define a co-managed protected area as a discrete area, defined by the government, in which government and partner stakeholders share power and responsibility (32). The partner

stakeholders referred to by Borrini-Feyerabend et al. (2004) are often indigenous peoples and mobile communities that require the area for the survival of their culture and livelihoods. Co-management can create governance in which the decisions and responsibilities of protecting an area are based on multiple knowledge types and are enforced through a strengthened management approach that is agreed upon by a multiplicity of political actors. Western science knowledge and traditional ecological knowledge (TEK) should equally and fairly inform management decisions. Berkes (2012) defines traditional ecological knowledge as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (7). In ideal co-management governance, TEK is not synthesized into scientific knowledge but instead understood as a discrete, holistic, and legitimate knowledge system.

To determine the extent to which TEK is effectively incorporated, respected, valued, and used in co-management governance, this paper examined literature on relevant conservation efforts. It was found that the current practice of co-management falls short of the ontological ideals and often disempowers indigenous peoples. This paper argues that the current practices of conservation in protected areas do not allow for proper co-management governance in which power is equally shared between indigenous peoples, conservation practitioners, and government officials. This paper shows that this unequal relationship stems from an invalidation of the complex nuances of TEK and that this unequal relationship ultimately hurts conservation efforts.

Many of the problems currently facing co-management can be drawn back to an inability of the international community to view TEK as a legitimate knowledge system. Delegitimizing this knowledge system disempowers the peoples whose lives, cultures, worldviews, and practices are founded upon TEK. Unless TEK is seen as equal to scientific knowledge as a basis for conservation management, there will not be fair partnerships in co-management governance. Adams and Hutton (2007) argue that such partnerships are inherently political and must address "issues of rights and access to land and resources, the role of the state (and increasingly non-state actors in NGOs and the private sector), and the power of scientific and other understandings of nature" (151). All too often, the current

approach to co-management ignores the underlying power relationships that drive and are driven by larger understandings of the validity of knowledge systems. Until TEK, and its role within protected area management and governance, is explicitly addressed and properly included, conservation cannot take place in a socially-just and scientifically-sound manner.

This paper calls for a re-examination of the core tenets that comprise co-management governance. As suggested by this paper, an improved co-management governance structure would incorporate many of the tenets important to self-management of protected areas. A key tenet would be indigenous peoples' rights to self-control their knowledge, resources, and cultures, as is done within self-management governance structures. Best practices of co-management of a protected area should include the equal power relationships between partners, dynamic understanding of indigenous peoples (as opposed to a static understanding), and the acceptance of TEK as a legitimate knowledge system. This paper examines the current ideal best practices of conservation of protected areas, delves into the problems currently facing most co-management implementations, demonstrates the depth of TEK as a legitimate knowledge system, explores how self-control is the key tenet of self-management, uses self-management as an approach to re-think co-management, and discusses the ways in which co-management should be re-structured as a governance approach to conserving protected areas. Without an examination of the core tenets that comprise it, co-management will continue producing unequal partnerships that view indigenous peoples as unable to properly join in the protection and management of the world's important ecosystems, landscapes, and species.

Current Ideal Practices of Co-Management

All protected areas should uphold best practices for ecological, cultural, and governance considerations within conservation efforts. Dudley (2008) argues that ecological and cultural best practices can only be achieved when implemented through a governance structure that values fairness among partners. This governance structure works best for the particular protected area, however, it must be managed through a system flexible enough to ensure long-term ecological and cultural resiliency of the area.

Co-management is a governance form in which multiple stakeholders and partners negotiate to create an agreed-upon management plan for the conservation and the enforcement of rights. In such governance systems, indigenous peoples are not mere stakeholders but rather are understood to be full partners in the process of management. A strong co-managed governance structure must incorporate historical events and relationships, previous governance structures, multiplicity of actors with explicit interest in the protected area, and ecological realities, as well as the more intangible aspects of governance, such as fairness of process, capacity and means to manage, and true power-sharing (Borrini-Feyerabend et al. 2004) Co-management governance allows for knowledge integration of scientific knowledge and TEK. Knowledge integration promotes resiliency in both governance and management. More resilient governance structures and management approaches provide stronger conservation practices (Bohensky and Maru 2011). A properly created and implemented co-management structure can result not only in the protection of cultural systems, but also of ecological systems (Redman and Kinzig 2003). In many protected areas, ecological and social systems are interconnected. The resiliency of one system can promote the resiliency of the other—as long as neither is allowed to over dominate the other (Plummer and Armitage 2007).

As was declared in the 1997 IUCN Inter-Commission Task Force on Indigenous Peoples, "The best guarantee of the conservation of biodiversity is that those who promote it should uphold our rights to the use, administration, management and control of our territories. We assert that guardianship of the different ecosystems should be entrusted to us, indigenous peoples, given that, we have inhabited them for thousands of years and our very survival depends on them" (25). Co-management presents the possibility that a protected area could incorporate the ecological and cultural needs of an area in a manner that upholds the best practices required by governments, communities, scientists, and conservationists. When done well, a co-managed protected area shares both power and responsibility among the partners in the management of an area. In doing so, proper co-management acknowledges the rights of the partners and increases the participation of peoples involved in the conservation of protected areas.

One example of a co-management process heralded by many as successful is Nahanni National Park Reverse. Established in 1972, the Nahanni National Park

Reserve is co-managed by the Dehcho First Nations, the Canadian Government, and the Northwest Territories Government (UNESCO World Heritage Committee 1978; Parks Canada 2009a). The ongoing process of co-management draws upon the rights to land of the Dehcho First Nations, the knowledges of the Dehcho First Nations, the ecological best practices of conservation, and the realities of the existing power and capacity for the multiple political actors to manage the Park Reserve (UNESCO World Heritage Committee 2001). The protection of this ecologically and culturally rich region depends upon an ever-evolving and constantly negotiated management plan that respects past historical events, relationships, and traditional knowledge (The Deh Cho First Nations, the Government of Canada, and the Government of the Northwest Territories 2001b; Parks Canada 2003; Parks Canada 2009b). The Nahanni National Park Reserve is managed by a multiplicity of political actors who have social and ecological interests in the protection of the area. The 2010 Nahanni National Park Reserve Management Plan states that a major objective of future management is: "The cultural heritage and values of Naha Dehé are protected and management respects traditional users and interests" (Parks Canada 2010, 23). As such, a cultural resource values statement will be written and implemented throughout the overall management strategy to ensure proper protection and inclusion of Dehcho First Nations' worldviews, interests, and knowledges (Parks Canada 2004). The existing management plan was developed in coordination with the Naha Dehé Consensus Team (The Deh Cho First Nations, the Government of Canada, and the Government of the Northwest Territories 2001a). The process of co-management of Nahanni National Park continues to be premised on a negotiation between the Dehcho First Nations, the Government of Canada, and the Government of the Northwest Territories, and be advised by community members, academics, and conservation practitioners (Dehcho First Nations 2011; Ford 2011; UNESCO World Heritage Committee 2011).

The management planning process of the Nahanni National Park Reserve is continually under review to ensure conservation best practices and fairness in the distribution of burdens and benefits of the protected area (Parks Canada 2010; Dehcho First Nations 2011). Such a paradigm of fair negotiation has been essential to the management plan of the Park Reserve from the beginning. As explained in the most recently published Management Plan: "Dehcho First Nations and the Government of Canada are negotiating self-governance, land use planning and

resource management issues through the Dehcho Process. As part of the Dehcho Process Interim Measures Agreement, Dehcho First Nations and Parks Canada created the Naha Dehé Consensus Team in June 2000" (Parks Canada 2010, 2). The process of maintaining ecological integrity in a socially just manner is essential to the management of the Nahanni National Park Reserve. The Naha Dehé Consensus Team plays a key role in ensuring fair negotiation and adherence to best practices of conservation. Comprised of four appointees from Dehcho First Nations and three appointees of Parks Canada, the Consensus Team works together to co-manage the protected area (Parks Canada 2009a).

The management planning process focuses on the ever-evolving negotiation between the conservation partners (The Deh Cho First Nations, the Government of Canada, and the Government of the Northwest Territories 2003; Parks Canada 2009b). Each new management plan agreement builds on the previous plans, emphasizing the previous plans' strengths and addressing its weaknesses to ensure the production of relevant and effective management (Parks Canada 2009b). Key features of successful co-management strategies include partnerships that are multi-party, multi-level, multi-disciplinary, and flexible, with an emphasis on constantly evolving process, and created in a paradigm in which powers are shared and benefits distributed. An explicit focus on multi-party collaboration requires incorporating different types of political actors, including their respective capacities and interests. A co-management structure that can balance these diverse political actors' differing capacities and interests will provide much stronger long-term governance than one that ignores these complexities to focus only on the politically powerful. The complexities of power relationships between politically and culturally diverse groups can present major difficulties to a successful co-management governance structure, but, when successful, this diversity can likewise ensure the long-term stability and success of a protected area.

A diversity of political actors with a wide spread of informal and formal political power must come together in a co-management agreement. All political actors involved should recognize that governance is a process, not than an end result. The process of co-management is strengthened by a structured, regular review process of the management structure in a manner that emphasizes flexibility to create continual improvement. These key features of co-management are founded on a basic principle of power-sharing among the political actors involved in the

management of protected areas. All political actors involved have a responsibility to ensure that decisions are fairly decided and that those management decisions result in the sharing and distribution of the benefits of a protected area.

Shortcomings of Current Practices of Co-Management

While, in theory, co-management systems have the potential to create the ever-idealized "win-win" solution, in practice, many co-management protected areas do not achieve these ideals. Many fall short of the idealized theories that inform co-management. The losers in such situations are often those who are most politically disempowered and those who are not properly included in the conservation process and creation of a protected area. The problems that undermine a co-managed protected area can often be drawn back to an unequal relationship of power, inclusion, and knowledge legitimization.

Lockwood, Worboys, and Kothari (2009) describe the seven major flaws of many co-management protected areas: "1) Denial of cultural identity and rights of communities; 2) Inadequate or absent policies/laws; 3) Applications of rigid, universally applied prescriptions; 4) Local and national inequities in power; 5) Inadequate, short-term or see-saw government commitment; 6) Inadequate capacity; and 7) Continuing threats from external sources" (541-544). Denial of cultural identity denies any validity of TEK and its use in a co-management structure. Denial of communities' rights denies the ability of TEK to be seen as a legitimate knowledge. Inadequate policies and laws reduce the possibility that the theory of co-management could be adequately continued in the practice of co-management. Little to no enforcement of the agreements created through the co-management process undermines the entire governance structure. Applications of universally applied prescriptions often overvalue scientific knowledge and undervalue TEK in a manner that eliminates most knowledge produced at the local level. Prescribed standard management is not well-suited to culturally and ecologically diverse landscapes. Rigid prescriptions prevent the necessary flexibility in the process of co-management. Local and national inequities in power prevent true partnership relationships and result in benefits to only certain political actors. Inadequate commitment by governments undermines the co-management process and dramatically shortens the long-term viability of such an endeavor. Co-management best practices cannot be implemented if the political actors involved

lack the capacity to manage the protected area as agreed upon by the partners of the co-management structure. External threats, like extractive projects, international market demand, and improperly planned tourism projects, can overwhelm the structure of co-management governance.

Tokenism of TEK underpins the seven major flaws outlined by Lockwood, Worboys, and Kothari (2009). Subpar co-management strategies create unequal partnerships in which TEK is co-opted through overly prioritized Western-style governance (Stevenson 2006; White 2006; Ross et al. 2010). As Nadasdy (2003) writes of his work with the Kluane people of Yukon Canada, "within the context of contemporary bureaucratic wildlife management and land claims negotiations, decisions/concessions simply cannot be based on anything other than Euro-North American assumptions about land and animals" (8). Within such a paradigm, TEK is reduced from a highly nuanced and complex knowledge system to a shallow dataset to be incorporated into datasets that align better with scientific knowledge.

When the knowledge underpinning a culture is not valued equally within a partnership, the negotiations concerning management decisions can never be equal between indigenous peoples and Western science conservation practitioners. As Berkes (2012) argues, knowledge produced by conservation professionals in the normative, positivist paradigm of science is often prioritized over knowledges produced by indigenous peoples (252). Such an approach neglects the needs of indigenous peoples and degrades TEK. It allows for nothing other than a tokenism of TEK to be used in the management of a protected area. If those who possess power in the governance of a protected area do not see value in TEK, they will not and cannot fully employ it as a legitimate knowledge system. Nadasdy (2003) says, "when First Nations peoples make claims about animals as intelligent social beings, they get nowhere because government biologists and resource managers, regardless of their own personal beliefs or understandings, simply cannot implement management decisions based on such alternate concepts of animals" (8). All too often, if TEK is used at all, only a tokenism of inclusion of multiple knowledge systems will exist. Tokenism of TEK can only create unequal partnerships within a co-management approach.

It is a misuse of TEK to employ it only as something to supplement scientific knowledge. Babidge et al. (2007) argue that this misunderstanding, and resulting

disempowerment of indigenous peoples, stems from the fundamental difference between TEK and scientific knowledge. They argue that TEK should be understood as a holistic system, while scientific knowledge should be understood as "categorized and compartmentalized" (151). Scientific knowledge lends itself to being dissected and creating data points. TEK does not. It is a holistic system that cannot and should not be reduced to data points or used in context-free generalization (Kuhn 2007).

The conflict between conservation practitioners and indigenous peoples over knowledge sources and the validity of a multiplicity of knowledge paradigms presents a major hurtle to true partnership relationships in co-management systems. As Berkes (2012) asks, "How can the researcher avoid the trap of treating indigenous knowledge as just another information set form which data can be extracted to plug into scientific frameworks? How can both indigenous and scientific kinds of knowledge be used together respectfully?" (174). Indigenous peoples cannot be seen as full partners until their knowledge(s) are seen as equal to scientific knowledge.

Berkes (2012) suggests that this conflict can be traced back to knowledge authority claims within the Western positivist tradition (173). Knowledge produced outside normative, positivist science does not fit well inside the current, Western science paradigm and is thus easily dismissed (Berkes 2012, 173). Those who hold the authority over the knowledge informing the management strategies hold the power of the governance system. The common use of TEK within conservation uses a shallow version of the depths of TEK.

An understanding of TEK that views it as inferior to scientific knowledge is a poor representation of the depth and breadth of TEK as a knowledge system (Li 2001; Peloquin and Berkes 2009; Kothari et al. 2014). Such a reductionist approach is all too often replicated in projects that follow policy and legislation that require an inclusion of TEK into protected area management, but with little instruction on how to incorporate it effectively. This approach proves incredibly problematic for the equal treatment of indigenous peoples, the protected areas being conserved, and the integration projects in co-management governance structures that aim to bring together TEK and scientific knowledge in the name of conservation.

In theory, the mandated integration of TEK and scientific knowledge in the name of conservation seems logical. In practice, it often proves disastrous and unhelpful to indigenous peoples. Sweeping generalizations are made about TEK and misconceptions are abundant. Unrealistic expectations are put onto these integration projects with little to no support to ensure their success. Simpson (2005) explains: "Governments often create requirements of inclusion of TEK but do not emphasize a process of inclusion that requires proper consultation with indigenous peoples in long-term timeframes and appropriate financial support" (1650). Many integration project frameworks require TEK to be pre-planned and written so that it can be processed and fit into the existing Western science paradigms (Simpson 2005). Such documentation changes the resonance of TEK from an adaptive knowledge system to a stagnant dataset.

A true integration of TEK and scientific knowledge can never succeed if both are not viewed as distinct and valuable knowledge systems. Integration of the two cannot happen until larger paradigms are understood. An integration project in a co-management governance cannot expect TEK to be subsumed by scientific knowledge. Nadasdy (1999) argues that integration projects are almost always problematic because they are founded on the conformation of TEK to western approaches to knowledge and knowledge production. Integration of knowledge forms cannot be viewed as a technical problem to be solved. Instead, it must be approached with a holistic understanding that views power relationships between indigenous peoples and the government as the foundation for any integration project. The problem of integration projects is not a technical one of integrating data sets but rather a political one of understanding drastically differing worldviews (Nadasdy 1999). An integration project that ignores power relationships between the political actors at play and the knowledge hierarchies assumed to be true by the powerful political actors could never be equal and fair. An approach to integration of TEK and scientific knowledge that comes from a government mandate, weakly supported financially and politically, that seeks quick fixes rather than long-term solutions will never succeed.

A Nuanced Understanding of TEK

A better approach to incorporating TEK as a knowledge system would approach TEK as a nested system of an ever-evolving process that is inseparable from one's

way of life. TEK is not a body of knowledge in which pieces can be selectively chosen to emphasize in an integrated management plan for conservation. Co-management plans cannot adapt TEK into data points of scientific knowledge. Instead, true co-managed areas must incorporate scientific knowledge and TEK approaches to the land and peoples. Doing so requires a re-framing of how scientific knowledge understands TEK. A major difference between TEK and the scientific approach is the way in which knowledge is conceptualized. Science views knowledge as a "thing known," and TEK views knowledge as an on-going process; it is a way of knowing rather than a defined known concept (Berkes 2012, 8). This is a radical difference in understanding what knowledge represents. Berkes (2012) argues that TEK is a way of knowing and a process through which one's worldview is essential in framing and understanding concepts and objects.

Defining TEK as a way of life and a worldview allows one to understand the multiple levels and nuanced relationships inherent to TEK. McGregor (2004) argues that TEK should be defined as much more than a body of knowledge. TEK includes, but should not be limited to, such a definition: "TEK also encompasses such aspects as spiritual experience and relationships with the land. It is not being just the knowledge of how to live, it is the actual living of that life" (McGregor 2004, 78). TEK, McGregor (2004) emphasizes, is "expressed as a 'way of life'; it is conceived as being something that you do" (78). TEK is not an abstract thing known but rather a worldview expressed through everyday life.

Berkes (2012) presents a similar way of defining the nuanced understanding of TEK that shows such a knowledge system to be a way of life rather than just a body of knowledge. He argues for TEK to be understood through four inter-related levels: (1) local knowledge of land and animals, (2) land and resource management systems, (3) social institutions, and (4) worldview (17). Most management systems that give preference to scientific knowledge and superficially incorporate TEK only value the first level of Berkes's (2012) description: local knowledge of land and animals. This level of information is important but, as many have argued, is not the entire system of TEK (Babidge et al. 2007; Sheridan and Nyamweru 2008; Bohensky 2011). Berkes's (2012) other three levels of TEK are equally important to the first level, but most management systems that claim to incorporate TEK only address Berkes's first level. A management system that only incorporates one

aspect of TEK but disregards the others trivializes the wealth of information provided by respective cultures that possess TEK. To oversimplify TEK is to trivialize entire cultures.

Trivializing TEK is a social injustice continually perpetrated against indigenous peoples. Bohensky and Maru (2011) argue that recognizing TEK within the context of conservation management is "beyond scientific or broader societal merit: it is tantamount to social justice, sovereignty, autonomy, and identity of indigenous peoples (e.g., Agrawal 1995, Nelson 2005, Aikenhead and Ogawa 2007)" (1). For far too long, indigenous peoples have been mistreated and disempowered in the name of colonization, governance, and progress. The current trends in governance structures of protected areas must be understood in the particular historical and social legacies in which they reside.

The colonial legacy continues to impact indigenous peoples today and to influence their capacity and mandate to manage protected areas. Repairing the damages perpetrated by colonialism, particular historical, and social legacies will require large timescales and great effort (Martin and Sloan 2012). Such injustices will not be corrected in a short time span, nor will they be adequately remediated if TEK continues to be understood within the conservation arena in an oversimplified manner. A full understanding of TEK, like the one presented by Berkes (2012), is required. Governance structures must view TEK as a nuanced, legitimate knowledge system that incorporates inter-related levels of local knowledge, land and resource management systems, social institutions, and worldviews. Such a definition is critical to indigenous peoples' ability to claim and acquire self-control—a key step in addressing past social injustices.

Self-control over knowledge, resources, and culture is inherent to creating socially-just co-management systems within protected areas. Self-control often forms the basis of indigenous peoples' claims to power in the international political arena. Self-control of the understanding and use of knowledge, resources, and culture forms the principles of self-determination of indigenous peoples. As was written in the 1997 Indigenous Peoples and Sustainability IUCN Inter-Commission Task Force on Indigenous Peoples, "…Indigenous Peoples' basic demand is that their right to self-determination be recognized" (4). Self-control, when applied to protected area management, is the ability to determine how a landscape is

managed, what knowledge(s) are used to manage that landscape, and what governance structures are employed and by whom.

The current, cumulative, and future impacts of a protected area must be considered when creating partnerships of co-management. Such an approach requires considering human rights within the context of conservation management. Self-control must be an essential tenet of future management decisions. The management, and the knowledge(s) that underpin the management decisions, are both impacted by and impact a community's ability to self-control knowledge, resources, and culture.

As was written by the 1997 IUCN Inter-Commission Task Force on Indigenous Peoples: "Successful in situ conservation and wider use of indigenous knowledge in sustainability strategies depend on strengthening Indigenous Peoples' rights to self-determination. The ideal situation is for communities to be in control of all activities both at the planning and implementation stages, with limited outside involvement if necessary" (4-5). Self-control of knowledge and an equal involvement in governance at every stage and level of management is required. Partnerships can and should be encouraged, but they must allow for indigenous peoples' ability to control the ways in which their knowledge, resources, and culture are employed in the name of conservation.

The United Nations Declaration on Indigenous Rights (UNDRIP) was adopted by the United Nations in 2007. It explicitly recognizes that "respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment" (UN General Assembly 2007, 2). UNDRIP affirms indigenous peoples' individual and collective rights to "fundamental freedoms that include territorial, tenure, political, economic, development, cultural, environmental, civil, and legal rights. The rights acknowledged in UNDRIP are considered to be the 'minimum standards for the survival, dignity and well-being of the indigenous peoples of the world'" (Stevens 2007, 20). These minimum standards then make the foundation for any relationship between indigenous and non-indigenous peoples working in partnership for conservation. UNDRIP offers an international recognition of the cultural, historic and natural rights to the lands indigenous peoples once possessed. Any conservation partnership that includes indigenous peoples as political actors must

recognize these rights and understand UNDRIP's influence on indigenous peoples' argument for self-control of knowledge, resources, and culture.

Control of their knowledge and ability to manage their lands through traditional systems is an essential part of many indigenous peoples' movements to re-claim their cultural heritage and revitalize their communities (Alcorn et al. 2003; Kimmerer 2002; Ross and Pickering 2002; Berkes 2012). UNDRIP Article 3 states, "Indigenous peoples have the right to self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development" (2007, 4). Indigenous peoples' ability to claim self-control and management rights to their lands is situated in the acknowledgement of TEK as a valid knowledge source. Respect for TEK, the knowledge system that informs and is informed by a community's relationship to land, allows communities the opportunity to possess self-control over their resources and culture.

Self-Management and Self-Control

Self-management of lands is the ultimate expression of self-control. Self-management refers to the ability of a community to solely govern and manage their land. Self-management does not preclude the assistance of NGOs (non-governmental organizations), governments, or conservation practitioners, but it does require that the community leads the management systems and determines the final decisions; the community has both the authority and responsibility of conservation (Lockwood, Worboys and Kothari 2009, 120).

Community conserved areas are the most common form of self-managed protected areas. Defined in the Seventh Conference of the Parties to the Convention on Biological Diversity congress, community conserved areas are ecosystems with a high degree of value—both ecological and cultural—that are conserved by indigenous peoples through customary law informed by (and informing) TEK (Lockwood, Worboys, and Kothari 2009). Lockwood, Worboys, and Kothari (2009) argue that within community conserved areas "much of the historical interaction with the environment happened not for the intentional conservation of biodiversity but in pursuit of a variety of interlocked objectives and values (spiritual, religious, security related, survival related), which did, however result in

the conservation of ecosystems, species and ecosystem-related values" (120). This type of conservation is not always explicitly referred to as "management" of a landscape by indigenous peoples. Instead, terms like "caring for the country," "taking care of the land," or "keeping the land" (Weir 2009; O'Flaherty et al. 2008; Miller and Davidson-Hunt 2010) are used. The end result, the protection of a landscape, has often led to the same goals of conservation practitioners, despite the differences in underpinning worldviews (Adams and Hutton 2007). Lockwood, Worboys, and Kothari (2009) write that community conservation areas all share three main characteristics: "1) Close relationship between community and environment; 2) Worldview and lifestyle choices result in conservation regardless of the explicit stated purpose of a conservation goal; 3) Communities, through select elite or entire group, make decisions on the management of ecosystems" (549).

Communities develop and are developing their own self-regulating systems, usually interrelated to TEK, that are employed through cultural practices and customary law (Luzar et al. 2011). These self-management systems usually align with conservation best practices of maintaining rich biodiversity and ecologically healthy systems (Painter, Duran, and Miro 2011). As outlined by Dudley (2008), best practice conservation objectives require nuanced management systems that exist in the long-term and focus on knowledge systems that understand the local environment. The use of TEK employed by indigenous peoples can and has achieved such results (Peloquin and Berkes 2009; Kothari et al. 2014). Indigenous peoples cannot be expected to self-manage protected areas based on outsiders' conceptions of how TEK can be employed to manage a landscape. Rather, indigenous peoples must be allowed to manage their social institutions in a manner consistent with their knowledge system. This difference is of great importance.

Terry Tanner of the Wildland Recreation Program of the Confederated Salish and Kootenai Tribes explains that the ability of the Salish and the Kootenani tribes to manage their lands and resources depends on their ability to retain their knowledge of the environment, which has been developed and honed by their community over generations (Cajune, Martin, and Tanner 2008). This intense understanding of place comes from an ever-evolving, nested system of knowledge that is inseparable from community members' ways of life in which local understanding of flora and

fauna are interwoven with land and resource management systems, social institutions, and worldviews (Berkes 2012).

TEK proves an essential part of self-management because of its flexibility and connection to place. Igoe (2004) explains that TEK is founded on inter-generational knowledge sharing (46). Knowledge of how to interact with an environment and the flexibility to deal with abnormalities in the environment comes from information gathered over multiple generations, not just one. Such an approach comes from a nuanced understanding of TEK in which one does not reduce TEK or indigenous peoples to a hyperbolic, romanticized understanding in which diverse, heterogeneous communities are slotted as static, apolitical actors (Li 2000).

True self-management of an area by indigenous peoples can prove a difficult concept to translate into larger, bureaucratic institutions. The drastic difference between the worldviews of indigenous peoples and the worldviews of the scientific community presents many stigmas and misconceptions that create barriers to the acceptance of true self-management (Ens et al. 2012). These differences make it hard to translate key conservation concepts between worldviews in a manner that allows for self-control by indigenous peoples and acceptance of management techniques by the scientific knowledge community.

Many indigenous peoples' environmental monitoring systems examine the same environmental aspects as conservation practitioners, but the way in which the variables are assessed and understood may differ radically (Berkes 2012, 201). For example, Berkes (2012) explains that killing game is understood in radically different ways by the Cree and by Western conservation managers. Western conservation managers consider hunting to be a violent act to be regulated by a preservation ethic. Cree do not view hunting as a violent act but as a relationship between the hunter and the animal killed in which the animal itself regulates the hunt. Both Cree hunters and Western conservation managers believe that their worldview of killing creates the humane approach to the issue and would bring that worldview into their conservation regulations of hunting.

Indigenous peoples' sovereignty and treaty rights are often tenuous and not always respected (Igoe 2004). Development projects and other short-term economic gains

can cause splintering within communities, which are always heterogeneous (Lockwood, Worboys, and Kothari 2009). Historical legacies, like colonization, have disempowered many indigenous peoples. While many strive to regain their lost cultures, knowledges, and political sovereignty, indigenous communities may not yet possess the cultural and political institutions that would allow them to follow through on a self-management governance structure in a protected area.

Using Self-Management to Rethink Co-management

In situations where self-management proves unrealistic, co-management governance structures must still incorporate key tenets of self-management: TEK must be viewed as a legitimate knowledge system and indigenous peoples must be true partners in all decisions at all levels and stages of the conservation effort.

Examples of good co-management partnerships between conservation practitioners and communities can often be seen in the conservation of sacred natural sites. Sacred natural sites provide good case studies for the proliferation of true partnerships in co-management governance. These sites are well protected and conserved through means that respect and require TEK and scientific knowledge (Sheridan and Nyamweru 2008).

Sacred natural sites often represent the continued conservation of culture and biodiversity through bureaucratic, governmental protection and cultural taboos, regulations, and laws. Such cultural taboos, regulations, and laws have protected these sites for long periods of time. Within the IUCN framework, sites that are recognized as sacred are afforded larger protection structures to help the site remain free of most disturbances. Within the sacred natural site protection framework, scientific knowledge is not prioritized over TEK; international governance supplement local customs instead of overpowering them. Management plans that value TEK can count on cultural practices that have ensured the continued protection of a sacred natural site. Verschuuren et al. (2010) state, "Sacred natural sites often represent the highest human aspirations and spiritual values of any given culture" (63). Dudley et al. (2009) argue that not only do these sites have high cultural value but, often, they also represent areas of concentrated biodiversity. Effective protection of a biologically-rich ecosystem is ensured through a convergence of TEK and international governance regulations.

The successful co-management of sacred natural sites that value TEK and scientific knowledge equally shows that other areas can be properly co-managed to ensure socially-just and scientifically-sound practices. Berkes (2012) argues that "it is often assumed that indigenous peoples have only two options: to return to an ancient and 'primitive' way of life, or to abandon traditional beliefs and practices and become assimilated into the dominant society. Increasingly, indigenous groups have been expressing preference for a third option: to retain culturally significant elements of a traditional way of life, combining the old and the new in ways that maintain and enhance their identity while allowing their society and economy to evolve" (271). Sacred natural sites can help move the conversation beyond this false dichotomy into Berkes's (2012) example of a third option. Well-managed sacred natural sites show that culturally significant sites can be protected, valued, and represented in scientific best practices of conservation.

Of course, not all sacred natural sites are well-managed. As with most other co-managed, protected areas, enhanced recognition of TEK as a legitimate knowledge system is necessary in many sacred natural sites. Further research is needed to ensure that indigenous peoples (and their knowledge systems) are true partners in conservation. Cultural value identification -- within the World Heritage system, for example -- should be closely examined to ensure that true partnerships exist in both designation and management of sacred natural sites.

Using the tenets of self-management, one can examine the current priorities in conservation management to better understand how indigenous peoples must be valued as true partners and how TEK should be employed a legitimate knowledge system within co-management structures. Current priorities in conservation management are to emphasize five elements within a protected area system: (1) representativeness, comprehensiveness, and balance; (2) adequacy; (3) coherence and complementarity; (4) consistency; and (5) cost effectiveness, efficiency, and equity (Dudley 2008, 10). These five elements of conservation provide a solid foundation for the achievement of the best practice objectives of protected areas. Ecological representativeness ensures the management of biodiverse and heterogeneous landscapes. Adequacy ensures that enough space is protected for the realistic conservation of an area and the species within it. Coherence ensures a beneficial relationship between an individual country's development goals and the

country's conservation management plans. Consistency ensures standardization of management to uphold best practices within conservation. Cost effectiveness, efficiency, and equity ensure that conservation is both financially feasible for the political actors involved and socially beneficial through economic and social mechanisms in which both benefits and costs are distributed equally. These five elements of protected area management create the foundation of all governance approaches, especially for co-management systems.

The success of these five elements depends on the recognition of TEK as a legitimate knowledge system and on the equal representation of indigenous peoples. Adams and Hutton (2007) state that all co-management partnerships must start with an equal relationship between indigenous peoples and the government conservation managers. To do so, "such partnerships must address the widely embedded intolerant and coercive approaches of park planners and managers to indigenous residents in parks (Colchester 1997, 2002)" (Adams and Hutton 2007, 162). The consistency between the five elements of conversation, the employment of TEK as knowledge system, and true partnership with indigenous peoples is clear:

1. Representativeness, comprehensiveness and balance: The use of TEK can inform decisions about the placement of protected areas. TEK can ensure that a protected area is established within an ecologically-important region of a country and that multiple environmental types are represented. A partnership with indigenous peoples can help to ensure the successful protection of a conservation area. Working with the surrounding communities, instead of against them, has the potential to drastically improve the effectiveness of a protected area.

2. Adequacy: Working with indigenous peoples can help to provide effective protection of an area, allowing for sufficient area for the preservation of ecosystems and species of conservation interest.

3. Coherence and complementarity: True partnerships between conservationists and indigenous peoples can create protected areas that reach conservation goals while also fulfilling the country's development goals.

4. Consistency: When valued equally, TEK and scientific knowledge create

management objectives that are applied consistently across a multitude of political actors involved in the conservation.

5. Cost effectiveness, efficiency, and equity: Indigenous peoples should be intimately involved in deciding the balance between the costs and benefits of a protected area and the location(s) of protected areas. TEK should be used to inform these decisions. Working with indigenous peoples, not against or around them, creates a much more efficient system of allocation of protected areas.

Each of Dudley's (2008) five categories of conservation management in a protected area is improved by the inclusion of TEK as a legitimate knowledge system and a true partnership with indigenous peoples. Better, more efficient protected areas can be achieved through an increased number of knowledge systems that inform conservation best practices and the inclusion of indigenous peoples through true partnerships. This type of protection can be achieved through governance that values indigenous peoples and other conservation partners equally. Such a co-management structure is achievable and improves protected areas.

Discussion

This analysis gives us a foundation of nine principles that are necessary to the creation of co-management governance structures. Above all, these nine principles are founded on a system that empowers indigenous peoples and values a nuanced understanding TEK and scientific knowledge equally. The nine principles are:

1. Establishing the kinds of partners involved in co-management governance structure: Who are they; what capacities, mandates and motivations do they possess; and how do they currently interact with one another and the site in question? Is there compatibility between the partners' interests, activities, and political powers? If there is not compatibility, how is that difference accounted for? If there is a difference in capacity, mandates, and motivations for conservation, how is that difference solved?

2. Distribution of burden and benefits of protected area: What political actors are responsible for the burdens of the area under protection? Who reaps the benefits? Are these burdens and benefits distributed fairly amongst involved political actors?

If they are currently not being distributed fairly, how is that inequality being addressed? What process is guiding that redistribution of burdens and benefits? What political actors determine the distribution of burdens and benefits of the protected area?

3. Historical legacy and Rights: Does the governance structure acknowledge the existing legal or customary rights to land and resources in the protected area? Does the governance structure acknowledge the historical legacy of disruptions (like colonization) of cultural institutions?

4. Incorporation of TEK and scientific knowledge systems as equally legitimate: What is the process to ensure fair contributions from both scientific knowledge and TEK? Is TEK being used superficially or employed in a true, nuanced manner? If it is currently being used superficially, how is that problem being corrected?

5. Flexibility and ability to continually evolve as a governance process: can the co-management structure adapt to the ever-evolving relationship between the political actors to maintain a fair governance structure?

6. Social Performance: Does the co-management governance structure promote a fair relationship between partners? In what ways is "fair" measured?

7. Ecological Performance: Does the protected area provide the necessary structure for the required ecological conservation needs? By what knowledge systems is the ecological performance judged? What political actors determine the management plan of the protected area?

8. Local Particularity: Does the co-management governance structure take into account the local, ecological, and social particularities?

9. Resiliency: Does the co-management governance structure promote resiliency in its ecological frameworks and social institutions? By what knowledge systems is "resiliency" defined?

These nine principles demonstrate the important tenets to consider when integrating TEK and scientific knowledge. They show the important questions the

political actors creating a co-management system of governance must ask at all stages of the process of establishing a protected area. Using these nine principles and asking their related questions allows practitioners and communities to create successful co-management processes that promote complementary social justice tenets and scientific best practices in the name of conservation.

Above all, the process of creating a co-management system of governance must be begin and end with an important question: "Is the governance type in place for a given protected area fair in the light of historical conditions, customary and legal rights and impact on the relevant communities?" (Borrini-Feyerabend et al. 2004, 21). These nine principles are useless as a theory foundation if, in practice, the concept of a fair relationship between partners is ignored. Fairness must drive the process of creating a sustainable, co-managed protected area.

Conclusion

Understanding the knowledge systems and the ways in which they are employed in the name of conservation of a protected area provides a key insight into co-management governance structures. It's important to acknowledge the respective differences between TEK and scientific knowledge and the ways in which they are currently perceived within most conservation projects.

This paper argues that a static understanding of TEK that reduces it to a trivial data set subordinate to scientific knowledge is not only socially unjust but is also inadequate for the protection of ecologically and culturally important areas. This paper argues that co-management governance in protected areas must consider nine foundational principles and their corresponding questions. These principles pull strongly from the theory and practice of self-management of protected areas by indigenous peoples. Such self-management requires the proper acknowledgement and employment of TEK as a legitimate knowledge system. Good examples of the proper integration of TEK and scientific knowledge can be seen in the protected sacred natural sites. Sacred natural sites, while often covering small areas, give examples of how multiple knowledge systems can work together in a conservation management system to bring together multiple political actors with an array of capacities, mandates, and interests in the protection of an area.

Self-management requires indigenous peoples to be able to self-control their knowledges, resources, and cultures. Rights to self-control over resources and cultures are often founded in the larger recognition of TEK as a legitimate knowledge source. Understanding TEK as a legitimate knowledge source allows TEK to be employed as a key principle of the management of a protected area and provides indigenous peoples with a larger recognition of their management capacities and mandates.

Self-management can prove unfeasible or unpractical in many protected areas because of historical legacies of colonization, strict government regulations, and existing unequal power dynamics between indigenous peoples and other political actors. In such cases, co-management can be a useful governance structure if it draws upon many of the key principles of self-management and recognizes TEK as a legitimate knowledge system.

TEK is a nested system of continually evolving processes that is inseparable from the ways of life of the indigenous peoples who create TEK. Rather than being understood as only a body of knowledge, TEK should be thought of as a lifestyle. It is an interconnected system of local knowledge, land and management systems, social institutions, and worldviews that impact one another and cannot be completely separated into discrete items. Viewing TEK as anything less nuanced or selectively employing only certain parts of a TEK knowledge system is nothing short of tokenism of TEK.

The recognition of TEK as a legitimate knowledge system can help to re-frame co-management governance structures. The current practices of most co-management systems fall short of the theoretical ideals of such governance structures. Most continue to create political environments in which indigenous peoples are disenfranchised and disempowered. A major step in correcting these governance structures is the recognition of TEK as a legitimate knowledge system on par with scientific knowledge.

Such a step is crucial but not easily done. As Stevens (2014) writes, "Although Indigenous peoples' rights are now established international law and policy, ensuring that these rights are honored and facilitated is a huge challenge" (22). The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) helps

to direct how co-management is understood and implemented. Most present-day approaches to co-management prioritize ecological criteria over social criteria, and, therefore, do not recognize TEK as a legitimate knowledge source to be fully used in the management of a protected area. The adoption of the UNDRIP through the United Nations requires that self-management of protected areas not only be emphasized in protected area management but also that any instances of co-management be founded on principles that value TEK and scientific knowledge equally.

Co-management as a governance structure has the potential to work well within all six categories of protected areas defined by the IUCN. From strict nature reserves to protected areas with sustainable use of natural resources, co-management provides a long-term advantage to the governance of a protected area. Further research is needed to better understand the best practices for implementing fair co-management structures within each category of IUCN protected areas. It should be noted that the previous relationships and interests of involved political partners as well as the ecological particulars would determine the individual implementation of a co-management partnership in a protected area. Regardless of the individual specifics of each protected area, the nine principles described above are applicable to all six categories of protected areas. This is because the nine principles are based on the premise that TEK should be valued as a legitimate knowledge source and that such a valuation allows for fair partnership between political actors. More work should be done to examine how these nine principles can be applied in each protected area category.

Valuing indigenous peoples as partners in conservation increases the knowledge systems used to protect an ecologically and culturally important area. This approach will be beneficial as climate change increases and other types of environmental degradation continue to threaten protected areas. Co-management premised on TEK and scientific knowledges can create strong mitigation and adaptation strategies for the predicted climatic changes. Ecosystem and social system resiliency is essential to all climate change strategies. Such strategies should rely heavily on a nuanced inclusion of TEK. TEK, as opposed to scientific knowledge, is often place-based; process-oriented; and consists of a nested system of local knowledge, management systems, values, and worldviews. Such a localized approach is essential to creating resilient systems. As we continue to find

ways to mitigate and adapt to climate change in protected areas, the principles of the UNDRIP must underline all co-management relationships. Co-management can only begin when TEK is viewed as a legitimate knowledge source. The understanding of TEK as a legitimate knowledge source is the understanding of the rights, cultures, and values of indigenous peoples.

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