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Insight, part of a Special Feature on Traditional Ecological Knowledge and Global Environmental Change: North and South Perspectives

"We Might Go Back to This"; Drawing on the Past to Meet the Future in Northwestern North American Indigenous Communities

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ABSTRACT. Traditional ecological knowledge (TEK) systems are as important today for the survival and well-being of many indigenous peoples as they ever were. These ways of knowing have much to contribute at a time of marked climate change. As indigenous peoples have sustained exposure to natural resources and phenomena in particular places over time, they are privy to the cumulative knowledge on the location and timing of a host of significant environmental events and processes. Not only do their intimate experiences of seasonal weather conditions, tides and currents, species, and environmental indicators contribute to a better understanding of the nature, rate, and intensity of climate change, but TEK systems can potentially contribute to more effective planning and decision making regarding resilience and adaptation to climate change. Furthermore, the values of respect and recognition of kinship with other species that are often embodied in these systems can serve to remind all of us about the imperative to conserve and protect these other species if we are to survive as humans. We identify some of the more obvious areas where TEK systems can provide important insights for climate change planners in British Columbia, Canada as well as some of the potential challenges to attempting to integrate TEK into mainstream planning for climate change.

Key Words: *applying indigenous knowledge; climate change planning; indigenous values; resilience; traditional ecological knowledge*

INTRODUCTION: LINKING TRADITIONAL KNOWLEDGE SYSTEMS TO CURRENT CLIMATE CHANGE

"We might go back to this, the way the world is going" (Gitga'at elder Tina Robinson, making spruce pitch salve, Gitga'ata Spring Harvest film, Gitga'at Nation and CUS 2003).

Traditional systems of environmental knowledge of indigenous peoples have been widely studied, beginning especially in the mid-1980s with the publication of *Our Common Future* (WCED 1988, see Berkes 1993, 2012, Clayoquot Scientific Panel 1995, Ford and Martinez 2000, Menzies 2006, Turner and Berkes 2006 for overviews). Traditional ecological knowledge (TEK) systems are defined by Berkes (2012:7) as "a cumulative body of knowledge, practice and beliefs, evolving by adaptive processes and handed down through generations by cultural transmission." TEK systems can also reflect the harmonization of an indigenous group's resistance and flexibility in the face of various levels and periods of environmental change over time (Sayles and Mulrennan 2010). Although most TEK systems have changed significantly over the past few centuries, many indigenous individuals still retain not only key memories and experiences of transformation and variability in their homeland environments, but also important modes of knowledge transmission, approaches to decision making, and particular values and worldviews. In British Columbia (B.C.), Canada during recent decades, TEK has provided valuable insights and depth of understanding to legal issues, such as Aboriginal rights and title cases, academic research in First Nations issues and environmental studies, interpretation of the archaeological and historical record, health care, and, to some degree, land and resource use planning. In this paper, we attempt to identify the potential advantages and challenges of applying TEK to planning for climate change adaptation in B. C., particularly along the coastal region.

The Earth's climate is changing relatively rapidly, because in large measure of human-caused increases in so-called "greenhouse" gases, especially carbon dioxide and methane, from intensive burning of fossil fuels, from the onset of the Industrial Revolution in the late 1700s to the present day (IPCC 2007). The change is reflected in increased overall global warming, of atmosphere, oceans and lands, widespread melting of snow and ice, and rising global average sea levels. It is also resulting in increased incidence and intensity of extreme weather events, such as major storms, floods and droughts, and unseasonable and unpredictable weather, with changes more intense in some regions and localities than others (IPCC 1997, 2007; see documents at UN DESA, http://sustainabledevelopment.un.org/index.php?menu=865). The ramifications are immense, ranging from dramatic shifts in species distributions, to greater vulnerability for those living in the Arctic, in montane regions, and near coastlines (Boesch et al. 2000, Pauly 2000, IPCC 2007, Pojar 2010, MPA Monitoring Enterprise 2012). Coping with these changes will require complex planning, undertaken at every level of society by an evolving group of specialists and decision makers who will consider: the scale of the physical and ecological change

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in any given region; the adaptive capacity of the communities and species within the region; possible adaptive strategies including avoidance; mitigation; and increasing the resilience of social and ecological systems (Adger et al. 2005). As politicians, administrators, planners, and policy makers grapple with planning for adaptation to a different environment, we strongly urge that they include indigenous practitioners of TEK in this process.

Today, along coastal B.C. and elsewhere, indigenous communities are among those potentially most affected by, and most vulnerable to, global climate change. Most coastal First Nations live in small, relatively remote communities usually near sea level (IPCC 2007). They rely on anticipated seasonal abundance of particular resources, and predictable levels of rainfall, winter snowpack, and montane glaciers to feed the waterways that are essential habitat for salmon and other species critical to their diets and livelihoods. Their transportation systems, communication, community infrastructure, resource harvesting areas, foods, and resource-based economies are all at risk (e.g., Hennon et al. 2012, for an example of loss of yellow cedar, *Chamaecyparis nootkatensis*, a key species for Northwest Coast peoples). Each coastal B. C. First Nation is politically, linguistically, and culturally distinct, but here we refer to them collectively because they face a common threat and share many traditional cultural linkages and alliances. Our intention is to provide insight into the possibilities and challenges of incorporating TEK into climate change planning at a regional level.

Despite the excessive rate of climate change occurring and predicted over the next century (Meinhausen et al. 2009), variations in the Earth's climate, geography, and ecosystems are not new. Environmental variability has been a constant feature of the Northwest Coast of North America since humans arrived in the area around the close of the Pleistocene or earlier (Burroughs 2005, Kirk and Daugherty 2007, Turner 2014). Sea level fluctuations, earthquakes, volcanic eruptions, ice ages, floods and drastic torrents, and species extinctions are enshrined in the geomorphological and paleoecological records, and adapting to these changes has been an ongoing challenge for humans and other species (cf. Lertzman et al. 2002, Geladof et al. 2006). Recognizing and accommodating change has always been a part of TEK systems for peoples of the Northwest Coast. Oral histories of these groups present instructive examples of how the ancestors endured and responded to environmental variability through time (Boas 1895/2002, Cove and MacDonald 1987). It seems logical then, that this body of TEK knowledge can contribute to climate change planning and adaptation initiatives. We outline some of the obvious areas where TEK may assist these initiatives and, also, where there may be obstacles to including TEK into climate change adaptation planning.

ONGOING AND POTENTIAL CONTRIBUTIONS OF INDIGENOUS KNOWLEDGE

Each indigenous culture has its own associated knowledge system, but the commonalities seen in the TEK systems of peoples closely linked to particular territories over many generations are notable in addressing current global climate change (Krupnik and Jolly 2002, Salick and Ross 2009, Turner and Clifton 2009, Tebtebba Foundation 2010, Turner and Singh 2011, Berkes 2012). Recognizing, responding to, and alleviating the effects of global climate change presents a complex challenge for humankind. Although most scientists, academics, and decision makers can appreciate the value of TEK in principle, they often relegate it to secondary consideration, privileging "scientific" knowledge, measurements, and projections over TEK (King 2004, Ellis 2005, Nadasdy 2006). Ideally, as suggested by Atleo (2011), Berkes (2012), and others, a society needs to find a way to draw on multiple perspectives, and as much detailed knowledge as possible integrated from local to regional to global scales, to develop solutions to climate change adaptation and amelioration that are effective and participatory. Society's resilience depends on diversity. Many indigenous peoples accept the strength derived from weaving TEK together with western scientific and academic knowledge (Trosper 2009, Atleo 2011). Increasingly, too, as noted previously, practitioners of western science and other academic disciplines are acknowledging the potential of such cross-fertilization (Clayoquot Scientific Panel 1995, Lertzman 2010, Salick and Ross 2009, Berkes 2012). In terms of humanity's capacity to manage climate change, the ability to draw from and bridge these knowledge systems is desirable, especially given the complexity of the problem and the need to address it at a multitude of scales.

Need for empirical knowledge

TEK systems of indigenous peoples reflect a wide spectrum of practical information based on generations of observations and experiences within particular places (Turner et al. 2000). Over the past 30 years, a large body of TEK has been documented in the coastal B.C. region. It could be beneficial to use TEK to assist in defining a baseline picture of the Pacific Northwest coastal ecosystems, such as:

- predicting and adapting to weather patterns, tides, currents, celestial cycles, snowmelt, and water flows;
- local species, varieties, and names of the diverse life-forms;
- interactions among species, including food webs and stages of ecological succession following disturbance;
- phenology, harvesting times, seasonal variation, productivity and habitats of plants, algae, and fungi;
- behaviors, life cycles, migration routes, population fluctuations, and habitats of local fish, birds, and mammals;

- qualities and means of harvesting and processing different woods, fibres, and other materials used in technology, for fuel, construction, tool-making and other purposes;
- knowledge of edibility and health-giving attributes of plants and their different parts, and effective ways of processing and storing food and medicine resources.

Because this knowledge is accumulated multigenerationally, it incorporates perceptions both of change over time and of the expected range of variability in these factors seasonally, annually, and over more extended time periods and cycles. This kind of knowledge, essential for the survival of those relying on resources in their own territories, may vary among individuals and subgroups depending on particular training, experiences, and gender. For example, men who hunt will have deeper knowledge of animal populations and migrations, whereas women may be more knowledgeable about plant foods, herbal medicines, and use of plant fibres. Taken collectively, however, a community's knowledge spans all of these areas.

Historically, the highly structured seasonal round whereby many groups divided their time between semipermanent winter villages and smaller summer villages and camps so that extended family groups could harvest plants and hunt for food and medicines to help them through the winter was an important strategy for survival, based on a deep knowledge of species and their lifecycles. Adopting this approach, Pacific Northwest Coast peoples increased their ability to survive even when a single resource, e.g., salmon, was reduced, as well as becoming very familiar with the ecosystem of large and diverse territories, and spreading out the effects of resource harvesting over a wider area. The resulting effect of this approach was resilience in the face of change, the ability to respond to surprise events, and maintenance of food security (Turner and Davis 1993, Turner et al. 2003, 2012).

In the Canadian Arctic, indigenous peoples' observations of ecological impacts due to unusual climate events has proven valuable and is becoming accepted as a valid source of information for local environments over relatively short time frames (Krupnik and Jolly 2002, Salick and Ross 2009, Kunuk and Mauro 2010, Berkes 2012). In general, this type of traditional knowledge, i.e., observations and experiences of environments at the local level, is the most congruent with western scientific knowledge of species, ecosystems, geography, and weather patterns (Turner et al. 2000, Lantz and Turner 2003). In B.C., a large body of TEK has been documented for land-use and occupancy studies undertaken by B.C. First Nations as a way to protect their aboriginal rights and title in the absence of formal treaties. As well, the TEK of B.C. indigenous groups has been compiled and organized by a growing number of academic researchers in recent decades (Turner 2014). If used with close attention to the intellectual rights and legal interests of the knowledge holders, the TEK already compiled could contribute a richly layered picture of local changes and impacts, multiplied out across the landscape (Neis and Morris 2002, Failing et al. 2007, Tobias 2010). As in the Arctic region, the compendium of Pacific Northwest local experience and observations could inform broader understandings both of the intensity and the extent of climate change.

Along the B.C. coast, archaeological records show the ancestors' ability to shift from one resource to another with changing circumstances, based on knowledge of alternative resources, and ability to travel and access different locales for resource harvesting. They also show how people have been able to intensify the use of resources based on innovations in harvesting and management techniques, processing, or storage (Peacock 1998, Ames 2005). This flexibility and adaptability proved essential in the historic period as people responded to immense changes in virtually all aspects of their lives, from incorporating potatoes and a whole range of other new foods in their diets, to finding new ways to undertake their sacred ceremonies in the face of legal prohibitions. The overall character of this capacity for resilience in the face of constant change may prove instructive for the challenges ahead.

Even though coastal indigenous peoples maintain relatively small populations, they used, and, to a great extent, still use, resources over large and diverse territories (B.C. Treaty Commission 2012). Their unique historical and contemporary perspective of the rural and vulnerable areas of coastal B.C. can provide key information to government planners who are developing regional, provincial, and national plans for climate change. Not only are people living in key remote areas where they are alert to the changes already evident, e.g., heavy winds, unusually high tides, higher precipitation, etc., but because of their intimate local environmental knowledge, they can detect a far greater subtlety in how these weather events are impacting ecosystems. Hence, at the initial stage of climate change planning, i.e., intelligence gathering, mapping, and monitoring change, there are tremendous opportunities for applications of TEK.

Effective, inclusive communication and knowledge transmission

As Berkes (2012:175) reveals, in the Canadian Arctic different techniques have been employed to involve Inuit knowledge holders in climate change research. Researchers there have made explicit efforts to "share scientific understandings with the Inuit, rather than 'mining' Inuit knowledge, and ... to establish a dialogue that provides space for the Inuit to respond to the science of climate change." The exchange of technology, ideas and information has served to complement the knowledge systems of both groups, to the point where Berkes (2012:189) notes, "...the people of Sachs Harbour do not see themselves as victims of a climate change drama. Rather, they

see themselves as part of the solution... as resourceful and adaptable."

The ways in which TEK and associated worldviews are acquired and transmitted are diverse. Much learning is experiential: learning by doing. Traditionally, from a young age, children were, and in many families still are, encouraged to participate in activities of food gathering and processing, often through accompanying parents, grandparents, and other elders as they undertake daily chores or travel to harvest sites (Ingold 2000, Davidson-Hunt and Berkes 2003, Gitga'at Nation and CUS 2003, Turner 2003, 2006). Even with the hugely disruptive effects of residential schooling, many indigenous peoples in B.C. have managed to continue this tradition of experiential learning. In recent years, innovative programs have been developed in First Nations schools to reconnect children with their language and knowledge systems of the natural world and their place within it (Turner and Thompson 2006). Such practices provide opportunities for guidance and instruction from experts in their communities, sometimes one-on-one in apprenticeship arrangements, or sometimes within small groups through storytelling, and other culturally mediated means, about local flora, fauna and habitats, weather, tides, and other environmental features (George 2003, Turner et al. 2003, Thompson 2012). Providing indigenous narratives of ancestors adapting to storms, changing sea-levels, and resource shortages, and elders' teachings on self-reliance and innovation, serves to link past victories over uncertain and catastrophic changes with community resilience (George 2003, Ommer and CUS 2007, Salick and Ross 2009).

Increasingly, the TEK of the First Nations of coastal B.C. is communicated through books, maps, and academic journals. Adaptations of traditional knowledge dissemination through publications, geographic information systems, films, and other media, as well as through public speaking, university classes, and conferences provide opportunities for wider knowledge transmission, applications, and acceptance of TEK. Although nontraditional media can serve as an efficient and powerful format for exchanging knowledge with those outside of these cultures, it can lead to information and key concepts being taken out of context and possibly misinterpreted (Berkes 2012). It is essential to keep the indigenous TEK experts involved throughout the planning process to help interpret how their knowledge is applied to new circumstances and communicated through new media. See examples of indigenous TEK experts in broadcast media in: APTN programming Down2Earth (http://www.aptn.ca/groups/oid,1287056), Gitga'ata spring harvest film (Gitga'at Nation and CUS 2003), and Inuit knowledge of climate change (Krupnik and Jolly 2002, Kunuk and Mauro 2010).

Inclusion of indigenous experts in predictive modeling

A logical application of TEK climate change adaptation is for traditional knowledge holders to assist with the development of predictive models for coping with climate change. Adapting successfully to climate change is a new area for all Canadians. Having an intimate knowledge of the local environment plus a history of responding to unexpected environmental events makes TEK experts excellent partners in generating options and solutions for this task. Concurrently, just as climate change scientists will benefit from TEK, indigenous peoples, particularly those in remote, sea-level communities, need the knowledge and technology gathered by climate change scientists and others to begin planning the future infrastructure and location of their communities. The synthesis of strong local knowledge with the powerful tools of climate science, e.g., computer modeling and mapping, wildlife and plant inventories, etc., can provide interesting analyses and scenarios for planning for the unknown. This form of collaboration has not yet been attempted in B.C., but is being introduced in the Canadian Arctic (see Berkes 2012).

Changing societal attitudes toward greater sustainability with the natural world

All knowledge systems arise from culturally prescribed values and beliefs, variously known as worldview or philosophy (Davis 2009, Berkes 2012). Along with our practical needs for food, water, and shelter, our perceptions of the world and our place within it determine humans' day-to-day decisions and actions, our priorities, and how we live our lives. Traditional ecological knowledge systems tend to be holistic, recognizing the connections and interdependence of everything. In Northwest Coast cultures, a widely held perception of the human place in the world is characterized as kincentricity, the understanding that all of the other life-forms on Earth, from bears to salmon, from cedar trees to berry bushes, as well as even rivers, mountains, and other geographic features, are sentient beings who are relatives, or kin, of humans, related to us both practically and spiritually (Salmón 2000, Turner 2005, Martinez 2008). Many indigenous stories and ceremonies reflect these kincentric beliefs. Along with this perspective is recognition that all of these elements are worthy of respect, and that they have powers to contribute to human life or thwart humans, depending on our treatment toward them. Reciprocity is an important concept in traditional knowledge systems, not only between humans and within and across human communities, but also between humans and all other entities. This concept is expressed in various ways, but often, as Atleo (2011) states, as a way of achieving balance and harmony with diverse life-forms by integrating human behavior with the Earth's behavior. An example of a practical application of kincentric thinking can be found in the "contingent proprietorship" model, in which rights of individuals and leaders to lands and resources is balanced by responsibility for sustaining resources and communities within their influence for future generations (Turner 2005, Brown et al. 2009, Trosper 2009). By recognizing the importance of other species and parts of the earth, humans can take responsibility for using them with care and attention, to

ensure that they continue into the future and that balance is maintained (Atleo 2004, 2011, Turner 2005).

DISCUSSION

The indigenous societies of coastal B.C. have endured over millennia, in relatively dense populations, without seriously depleting the abundance or productivity of their resources (Turner 2014). Precisely because of the remoteness of many of these communities, their strong history of coping with environmental variability, their deep knowledge of local species and habitats, their supportive social relationships, and their instructive oral traditions, these peoples seem well situated to participate in building a strategy for survival on the Pacific Northwest Coast in the face of ongoing climate change (Trosper 1998, 2009, Turner and Berkes 2006, Atleo 2011).

However, although it seems that there are great opportunities for incorporating TEK into climate change planning in B.C., there are still many barriers to synthesizing multiple knowledge systems into the single planning goal of developing resilience and adaptation strategies. A central question requiring more research beyond the scope of this paper is whether knowledge systems that develop and adapt to environmental variability over thousands of years can adjust in today's socio-ecological context to relatively sudden and sometimes violent changes in the earth's climate and ecosystems (Egeru 2012). Also, in terms of more institutional settings, there are methodological challenges in sharing traditional knowledge for the purpose of climate change planning. Much of the existing research about TEK is to be found in ethnoecological and archaeological research and resource-based land-use and occupancy studies. Although this information is applicable, it should be understood that there are limits and issues in applying it within the context of climate change planning.

First, the information is largely site and species specific, identifying physical areas or remains of occupation and use. Any information about coping with and adapting to cataclysmic or adverse cumulative events is rarely captured in detail in such research; therefore, we have few documented alternative models of social resilience and adaptation. Second, traditional resource use research sorts and interprets indigenous uses according to standard categories, developed largely in the field of ethnography, and designed to make indigenous land uses and approaches comprehensible to professional land managers in the public land and resource management system (Spalding 1998, Usher 2000, Ellis 2005). In the past two decades, because of the expansion of TEK research both in indigenous communities and in the academic world, there is a much greater indigenous ecological knowledge base to draw upon (see Turner 2014). There are still disputes, however, about how to use this knowledge for decision making because of concerns about the standards of research employed to collect the information; the ownership and intellectual property rights of the information; and the challenge of transposing decontextualized indigenous information into a foreign epistemological framework (Tobias 2010).

In attempting to incorporate indigenous knowledge into climate change planning, we may find some useful lessons from attempts to use TEK in land-use planning and environmental assessment over the past two decades. Although TEK research has been useful in identifying explicit indigenous land practices and their locations, and indigenous groups in B.C. have developed expertise in maintaining and presenting this information when appropriate, the interpretation and use of TEK in the context of decision-making, such as proposed development activities or environmental assessment, has been less successful (Deloitte and Touche 1997, Spalding 1998, Usher 2000, B.C. Ministry of Sustainable Resource Management 2003, Stevenson 2006, Houde 2007). In fact, the legal context for requesting TEK in B.C. may be the major stumbling block for trust and free exchange of information in the context of climate change planning. For almost 200 years, indigenous peoples' knowledge, rights, and worldviews were largely ignored by the colonizing governments in B.C., causing extreme hardship and loss amongst First Nations, where cultural information was kept secret as a way to safeguard it from the colonizing society (Recalma-Clutesi et al. 2007, Turner and Hebda 2012). The relatively recent requirements for the public governments to include indigenous perspectives in planning and decision making came only after decades of legal battles initiated by First Nations (see Tennant 1990). In this toxic environment of fundamental legal disputes over the ownership of their lands and resources, sharing information and perspectives with government officials is challenging, particularly when worldviews or analyses of a problem are approached differently according to cultural norms.

Certainly, in this legal and political context, indigenous TEK experts are understandably more reluctant to freely supply information to government planning processes. This brings us to an important distinction: an indigenous knowledge expert may be able to participate in the information gathering and modeling stages of a planning process, but it is unlikely they would feel comfortable representing the political or legal interests of their community at the same planning table. Hence, incorporating TEK into decision making around unexpected events and climate change is part of a different process involving a formal government-to-government relationship between First Nations and the Province of B.C. or the Government of Canada. Ideally, such engagement will incorporate indigenous institutions, such as clan-based structures, as vehicles to monitor and advise on local and regional issues related to climate change. For example, the work of the Clayoquot Scientific Panel (1995) was effectively facilitated through Nuu-chah-nulth protocols for planning and

decision making around forest practices (cf. also Atleo 2004, 2011, Lertzman 2010, Berkes 2012). More recently, the Wit'suwit'en Territorial Stewardship Plan, along with policy and protocol agreements with private and government entities, facilitated greater Wit'suwit'en involvement in decisions regarding the management of their cultural resources (Budhwa 2005). An additional outcome of the outstanding Aboriginal rights and title questions in B.C. is that First Nations' governments are overwhelmed with requests by public governments for input on whether proposed land and resource development requests within their traditional territories will impact their Aboriginal rights and title (Weinstein 1999). Resultantly, coastal First Nations' governments will not have the staff or financial capacity to participate in climate change planning initiatives with the federal and provincial governments, unless they are specifically funded to do so.

There are many potential misunderstandings in trying to synchronize two or more knowledge systems with respect to environmental planning in B.C. (Nadasdy 2003, Parlee et al. 2004, Ellis 2005, Butler 2006, Stevenson 2006). Even explicit policies to include TEK in environmental monitoring and decision making have fallen short because of communication barriers, political barriers, and, perhaps most significant, lack of capacity and funding (Spalding 1998, Budhwa 2005, Ellis 2005, Turner and Bitonti 2011). It is one thing to establish a top-down policy to include First Nations' perspectives and TEK in planning and decision making, and quite another to provide bottom-up support in the form of funding and other services for individuals to meaningfully participate in the same. There is a tension between the need for indigenous groups to express their cultural views and resource practices within their own knowledge and communication contexts, on the one hand, and the need for those from public governments to reconcile indigenous views within a politically and legally defined resource management framework on the other (Usher 2000). In North America, public land and resource management legislation and policy are based upon knowledge grounded in scientific and western economic values and methods. Often, information gathered by scientists is suggested to be objective, value-free, and impartial. The more western scholars understand other systems of knowing, however, the more commonly accepted is the idea that all knowledge, whether within a scientific paradigm or held by an indigenous cultural group, is based on beliefs and values that are always adapting and evolving to new circumstances.

CONCLUSIONS

Decisions around climate change adaptation and mitigation made by local, regional, and national governments will require the involvement of many groups, whose values and priorities will not always synchronize harmoniously (Dabelko et al. 2013). Managing this disharmony will be one of the many challenges associated with establishing systems to respond and adapt to climate change. The complex problems associated with climate change will certainly require that we consider multiple ideas and diverse, even sometimes conflicting, perspectives to synthesize new strategies. As noted earlier, however, in B.C. recognition of TEK beyond using decontextualized empirical knowledge as background for academic research or legal title cases is rare. Involving TEK knowledge holders in planning and decision making, education and communication, choosing priorities, and incorporating values and attitudes in fostering greater stewardship and responsibility toward other peoples and life-forms could become common practice. The importance of indigenous peoples' knowledge and perspectives in climate change planning is not well recognized, however, and is often overlooked in mainstream society where rights of individuals, free enterprise, commodification of resources, and reliance on global markets are stressed. However, these last approaches, and the scientific technology supporting them, have led, in large part, to the current unsustainable practices of the majority of humans in developed and industrializing countries. On the other hand, First Nations are reluctant to agree to participation in planning processes, when they: (1) have limited infrastructural capacity to participate effectively; and (2) are unsure how their TEK will be used and whether their involvement will prejudice outstanding legal claims or other Aboriginal rights.

Although including indigenous TEK of B.C.'s coastal region in climate change planning and decision making is fraught with many potential barriers, it makes abundant sense to work to eradicate these so that the path of resilience and adaptation that lies ahead is informed by as many wise voices as possible. Some initial first steps might be to establish case studies in one or two communities where their TEK is assessed and assembled through the lens of climate change planning and how this information will be used on a local and regional planning scale.

We need to embed ourselves more firmly into the biosphere, to live as one life-form among many, to understand our relationships with, our responsibilities to, and our absolute dependence on each other and on all other species. There are models of conserving behavior, models of effective decision making, and models of achieving resilience to be found not just in our universities and in mainstream society but in the knowledge and wisdom of indigenous societies (Turner and Berkes 2006, Brown et al. 2009, Trosper 2009, Atleo 2011, Berkes 2012). We must find more effective ways of communicating and motivating each other toward this understanding, and of educating those who have become disconnected with the natural world (Brown 2011, Larson 2011). Traditional ecological knowledge of First Nations along coastal B.C. and of indigenous peoples throughout the world can contribute significantly toward this essential goal.

Responses to this article can be read online at:
http://www.ecologyandsociety.org/issues/responses.php/5981

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