SITUATING THE WORK

A typology of traditional knowledge literature

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Abstract

There is a growing array of actors engaged in the field of traditional knowledge (TK). The result is a broad, messy, and contested body of literature. To navigate this conceptual space, this paper provides signposts in the form of a typology. It classifies TK scholarship into four orientations: ecological, critical, relational, and collaborative. Categories are not fixed, mutually exclusive positions, but operate under differing sets of assumptions and towards particular ends. They perform particular work, with important discursive and material implications. This underscores the need to situate one's approach to TK, which this typology seeks to facilitate.

Keywords

traditional knowledge, Indigenous knowledge systems, environmental governance, Canada, settler-colonialism

Introduction

What is traditional knowledge? The question generates discordant responses, including fixed language to bound an unruly concept within operational terms (Committee on the Status of Endangered Wildlife in Canada, 2010), provisional research and policy guidelines (Assembly of First Nations, n.d.; Canadian Environmental Assessment Agency, n.d.), and metaphors to reflect the dynamism of knowledge, embodied in ever-changing ways of life (Kimmerer, 2013). Some feel that "incommensurable" Eurocentric language, thought, and institutions are wholly unfit to represent the knowledges held by Indigenous peoples (Battiste & Henderson,

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2000, p. 38). At any rate, it is widely acknowledged that traditional knowledge (TK) defies easy definition.

Different conceptualizations of TK reflect the varied contexts within which they are situated and have meaning. Internationally, governing bodies recognize and seek to protect TK (World Commission on Environment and Development, 1987; United Nations, 1992, 2007). In ecological science, TK is considered a "tool" that can help "revamp" environmental management (Shackeroff & Campbell, 2007, p. 344). In Canada, where my work is situated, a legal and policy framework compels government, industry, and academics to engage Indigenous peoples and their knowledges (Doyle-Bedwell & Cohen, 2001; Government of Ontario, 2012, 2014; Linden, 2007; McGregor, 2014b). Legislators and policy makers are working to codify TK (McGregor, 2014a), funding is being channelled to universities and Indigenous communities for research on TK and related areas (McNaughton & Rock, 2003; Social Sciences and Humanities Research Council, 2014), and First Nations and tribal groups are working to revitalize and protect their knowledge systems (Chiefs of Ontario, 2008; Climate and Traditional Knowledge Workgroup, 2014; National Aboriginal Health Organization, 2005). The many versions of TK reflect the growing array of actors engaged in the field, and the myriad claims, interests, and assumptions they represent. The result is a broad, messy, and contested body of work on the knowledge of Indigenous peoples.

Competing perspectives raise important questions of interest to researchers navigating contested conceptual space, and to Indigenous knowledge holders, practitioners, and communities. In an academic context, is it possible to distance research from a deleterious legacy of external interests driving extractive research on the knowledge of Indigenous peoples (Smith, 1999)? How might First Peoples leverage TK to advance their land claims and land-based initiatives? And in a settler-colonial state like Canada, to what extent can the state *hear* Indigenous perspectives on TK (Kuokkanen, 2007)? Intended for those engaged in this burgeoning field, drafting policy, managing natural resources, conducting research, and advancing Indigenous community claims, interests, and perspectives, I provide signposts in the form of a typology for thinking through and making sense of a fraught body of literature. In what follows, I classify TK scholarship into four orientations: ecological, critical, relational, and collaborative.

The categories respond to a glaring omission running through much of the scholarship and grey literature; namely, the dearth of reflexivity. Multiple disciplines and interests are represented, but authors often fail to identify their standpoint and related assumptions, motivations, and sources of knowledge—invisible inputs that shape research and the production of knowledge (Kovach, 2009). Similar to Sue Ruddick's (2009) conceptualization of the relationship between society and space, in the field of TK, how one understands the relationship between knowledge and environmental governance underlies the tensions recognized, questions asked, and prescriptions developed. Ecological, critical, relational, and collaborative orientations are not fixed, mutually exclusive positions. They have different emphases and advance certain arguments, interests, and interventions.

In this paper, I do not provide an exhaustive definition of TK. Rather, in what follows, I characterize the existing literature in terms of the work it performs. This typology emerges out of a literature review that I completed in advance of research conducted as a PhD candidate with Fish-WIKS, a national research project on fisheries management and Indigenous knowledge. It seeks to understand how Western and Indigenous knowledge systems can improve the sustainability of fisheries in Canada (Fish-WIKS, 2015). The relationship between knowledge and governance systems subtends the project's objectives and has shaped

my review and analysis of the literature. It acts as an organizing feature of the subsequent typology. After outlining the four orientations, I revisit Fish-WIKS. It provides a rich explanatory tool, demonstrating distinct conclusions can be drawn from each category in the typology. This highlights the contingent nature of research outcomes and policy prescriptions, and underscores the need to consider the discursive and material implications of one's conceptual approach to TK. Illuminating the strengths, weaknesses, and significance of different bodies of scholarship, the typology is intended to compel readers to situate their work. In what follows, I present the characteristic features, emphases, omissions, and corollaries of each orientation.

Ecological

From an ecological perspective, TK supplements Western science, offering unique insights into ecological processes. In the early 1980s TK was recognized for its ability to contribute to more effective and sustainable natural resource management and to the conservation of biological diversity, rare species, and protected areas (Berkes, Colding, & Folke, 2000; Menzies & Butler, 2006; Turner, Boelscher Ignace, & Ignace, 2000; United Nations, 1992; World Commission on Environment and Development, 1987). Through a comparative lens, early writing sought to prove the validity and empiricism of TK (Feit, 1973), and demonstrate commonalities in relation to Western science (Kimmerer, 2002; Turner et al., 2000). Its academic origins lie in the fields of international development, adaptive management, resource commons, ethno biology, and environmental history (Berkes, 2012; Whyte, 2013), linking it to vast literatures on Indigenous knowledge in Africa, Asia, and other less developed regions in the world.

More recently, TK has been rediscovered as a form of adaptive management (Berkes et al., 2000) aligned with post-positivist science (Berkes, 2012), ecosystem-based management (Menzies & Butler, 2006), complexity, and common pool resources (Cox, Arnold, & Tomas, 2010). Indeed, Fish-WIKS is premised on the potential of Indigenous knowledge systems (IKSs) to improve adaptive fisheries management in Canada. It shares the claim made by others that understanding TK and related social mechanisms underlying Indigenous management practices can help broader society design improved resource management systems (Berkes, 2012). As a recent construct of non-Indigenous origin, TK emerged with the "discovery" that the environmental knowledge and practices of Indigenous peoples could contribute to sustainable development (McGregor, 2004, p. 400). Much-needed space has been created for the consideration of TK within dominant science and policy circles, and this paradigm continues to present opportunities for Indigenous peoples (McGregor, 2014a). But it often contains omissions.

Viewed as a "body of knowledge" (Berkes, 2012, p. 7), this orientation can neglect the lived or active dimension of TK and its interrelated ecological, socio-political, and spiritual dimensions (Houde, 2007; Whyte, 2013). Typifying this treatment of TK, Fikret Berkes, prolific scholar in this field, dismisses the need to produce research findings that are intelligible and relevant to the community from which information has been drawn (Berkes et al., 2000). Rooted in a Western worldview, the authors criticize traditional practices that fail to conform to Western standards of "wise" resource management, dismiss the cosmology—"the belief or spiritual component of traditional knowledge"—that gives rise to how people relate to the world, and reduce TK to a purely "ecological perspective" mostly of use to Western resource managers (Berkes et al., 2000, p. 1252).

This body of work is often focused on resource management as opposed to environmental governance, and can be extractive,

linear, and outward-oriented in its universalist vision for TK. Driving the call for partnership between TK and science is the imminent environmental crisis (Berkes, 2009; Hutchings, 2014), particularly in the face of climate change (Nakashima, Galloway McLean, Thulstrup, Ramos Castillo, & Rubis, 2012). TK is fashioned as a service to broader society, a source of information able to "fill" knowledge gaps in scientific ecology (Shackeroff & Campbell, 2007, p. 344). But framing TK in comparative and complementary terms works much the same as unmarked whiteness in the maintenance of racial hierarchy. Constructed as the "common heritage of humankind" (Berkes, 2012, p. 38), this version of TK puts Indigenous peoples at an earlier stage of an inevitable development trajectory, and can marginalize contemporaneous, yet alternative, ways of knowing and being. Valued as a form of adaptive management, it can reinforce the concealed dominance of the Western worldview. And considered apart from the distinct cosmology, social context, and system of values and ethics within which Indigenous knowledge has meaning, TK can be reduced to a series of facts, observations, and practices, ripe for extraction. Subsumed within dominant natural resource agendas, within limited land claim, self-government, and co-management frameworks (Nadasdy, 1999), and focused on integration, fundamental contestations with respect to lands and resources can be overlooked, including treaty grievances, the exclusion of Indigenous peoples from environmental decision-making (Linden, 2007; Royal Commission on Aboriginal Peoples [RCAP], 1996), and the restoration of jurisdiction (Borrows, 2002).

Ultimately, the recognition of TK from an ecological perspective has increased the value afforded to Indigenous knowledges in dominant science, research, and policy circles. But at the same time, it runs the risk of privileging the priorities, interests, and paradigms of non-Indigenous peoples and institutions, and preserving the socio-political status quo. The subsequent perspective addresses these concerns.

Critical

From a critical perspective, TK is embedded in uneven, colonial relations of power. Indigenous knowledge of and relationships to the environment have "always" been of interest to non-Indigenous people (Menzies & Butler, 2006, p. 4). The earliest travelogues produced by Europeans in the Americas represented "Indians" through discourses of savagery and the untamed terrain of the frontier (Beier, 2002), which helped to justify dispossession in the name of progress and improvement (Byrd, 2011). Today, "traditional" can denote static culture and facilitate the denunciation of perspectives currently held by Indigenous peoples regarding land use practices (Nadasdy, 1999, p. 4; White, 2006). "Environmental" is biased towards a Euro-Canadian understanding of humans as separate from the natural world, itself the underlying assumption of scientific management (Nadasdy, 1999, p. 4). And the "knowledge" of Indigenous peoples is subject to the violence of Western epistemic conventions that are inscribed by imperialism, racial hierarchy, and liberal multiculturalism (da Silva, 2007; Kuokkanen, 2007).

In this light, the full meaning of Indigenous knowledges is dampened and its *sui generis* nature distorted by a Western interpretive lens (Battiste & Henderson, 2000, p. 39). As Nick Houde (2007) shows, TK is often reduced to three of what he calls the six faces of traditional knowledge. Indigenous peoples' factual observations about the environment, resource management systems, and past and current land uses are well understood and appreciated by resource management bureaucrats, academics, courts, and the Western scientific community. But often overlooked are the more "problematic" belief systems and values, cultural meanings, social relations, and identities

tied to place, and the cosmology or worldview that motivates how people relate to the world (Houde, 2007, p. 41). From this perspective, the search for universal and absolute knowledge in the field of TK works to skew research methodologies, the interpretation of data, dissemination of findings, and distribution of benefits (Battiste & Henderson, 2000; Shackeroff & Campbell, 2007). TK is subject to distortion, theft, misappropriation, and commodification (McGregor, 2004; Shackeroff & Campbell, 2007).

Critical perspectives are often grounded in the empirical analysis of collaborative resource management arrangements. Given a salient "cultural divide" (Usher, 2000, p. 371), research has shown that it is nearly impossible to integrate TK into conventional environmental and resource management regimes (Nadasdy, 1999). Where co-management bodies are in place, the Western scientific model and Euro-Canadian cultural bias are privileged, colonial relations of power maintained, and alternative values, narratives, and practices of Indigenous peoples silenced (Howitt & Suchet-Pearson, 2006; Nadasdy, 1999; White, 2006). The rarity of empowered co-management (Goetze, 2005), and the "'deep colonization' (Rose 1999) of both material and discursive spaces by Eurocentric ideas … limits the transformative possibilities" of co-management (Howitt & Suchet-Pearson, 2006, p. 323). As an empty shell (Nadasdy, 1999), co-management is shown to render unintelligible the knowledges of Indigenous people. This is compounded by a systemic imbalance of power and the weight of resource inequity facing Indigenous communities (Linden, 2007; RCAP, 1996).

Interlocutors of this persuasion question whether the knowledge of Indigenous peoples *should* be integrated with conventional models for resource management (Shackeroff & Campbell, 2007). Literature cautions that in the absence of structural change, so that Indigenous peoples are equipped with binding decision-making authority, provisions for the consideration of TK within co-management arrangements and other policy frameworks only preserve the dearth of Indigenous involvement in decision-making processes, perpetuate institutions of settler colonialism, and perpetuate uneven relations of power. The subsequent body of scholarship is similarly critical, but unlike this orientation, is rooted in Indigenous worldviews, priorities, and resiliency.

Relational

Anishinaabe scholar Deb McGregor (2004) writes that there are two versions of TK: the dominant Eurocentric view that reflects colonial attitudes, and an Indigenous, relational view that focuses on the ways in which Indigenous peoples relate to their ecosystems and to all of Creation. Rooted in Indigenous ways of understanding the world, this body of scholarship is often grounded in Creation, re-Creation, and other stories and teachings as the basis from which knowledge systems derive meaning (Borrows, 2010; Geniusz, 2009; Kimmerer, 2013; McGregor, 2004). The use of the term Indigenous knowledge (IK) over TK reflects an emphasis on distinct ways of knowing (Battiste & Henderson, 2000). The empirical, experimental, and systematic nature of Indigenous science is acknowledged (Cajete, 1999), but as an alternative knowledge system to Western science, scholars highlight differences in intellectual orientation, language, methodology, findings, structure, and purpose (Huntington, 2000; Menzies & Butler, 2006; White, 2006). Unlike Western science, IK values emotional and spiritual knowledge in the interpretation of the natural world, and encompasses the cultural experiences of the observer (Kimmerer, 2002).

This orientation tends to emphasize the relationship between knowledge, place, and practice. IK is described broadly as cyclical and dynamic (McGregor, 2004), a system of knowledge, practice, and belief (Reo, 2011), and an infinite web of relationships (Wilson,

2008) thoroughly rooted in place (Battiste & Henderson, 2000; Johnson, Louis, & Pramano, 2006; RCAP, 1999). Rather than knowledge *about* relationships (Berkes, 2012), IK "*is* the relationship" with the natural world (McGregor, 2004, p. 394). It is lived, and something one "does" (p. 394). Social and highly localized (Battiste & Henderson, 2000), IK is embedded in cultural frameworks that are rooted in the land (RCAP, 1996; Shaw, Herman, & Dobbs, 2006). It is expressed in songs, stories, dance, inscription, drawing, place names, and ceremony that contain knowledge about the landscape and connect communities to the environment from generation to generation (Johnson et al., 2006; Pearce & Louis, 2008; Short, 2009).

From this perspective, IK includes appropriate conduct and systems of governance. As a distinct way of knowing *and* being, IK entails roles and responsibilities for all beings of Creation—human, natural, and spiritual (Johnson, 1992; McGregor, 2004). It contains operating instructions (Battiste & Henderson, 2000), a moral code (Johnson, 1992), responsibilities (McGregor, 2014b), and law (Borrows, 2010) to guide appropriate conduct. General principles and values such as respect, reciprocity, and responsibility (Kimmerer, 2002), specific rules, and strategies distinct to Indigenous communities and nations inform the practices and ethics of IK, and inform resource use, redistribution, and governance (Johnson, 1992).

Research and writing from this framework explicate the inextricable link between IK and governance. Kyle Whyte (2013) writes that IK is a living system of environmental governance rooted in Indigenous cosmologies as they relate to environmental change and challenges over many generations. As with all knowledge systems, it expands and contracts in relation to wider social and ecological processes (Cardinal, 2001; Menzies & Butler, 2006). Gifted by the Creator, it is impossible for First Nations to relinquish their stewardship roles and responsibilities (Danard, n.d., pp. 5–6). Though disrupted, systems of traditional knowledge and governance continue to survive ongoing settler colonialism (Borrows, 2010).

This orientation aligns with elements of a critical perspective, recognizing, for example, that TK can be essentializing and serve outside interests (Battiste & Henderson, 2000), but it also extends scholarship into the distinct beliefs, values, practices, and socio-cultural relations that underlie IKSs. This view calls on Western science practitioners and resource managers to transcend their worldview and recognize the *sui generis* nature of IK. Much like the highly specialized nature of Western scientific training, IK requires proficiency in traditional protocols and Indigenous methods of observation and interpretation. Non-Indigenous partners are called to appreciate IK as a stand-alone system, not in relation to or through the interpretive lens of Western science.

With important implications, this view challenges state policy provisions and TK frameworks. Context-specific IK cannot be extracted from people and places and plugged into existing resource management regimes. An alternative vision calls for the involvement of Indigenous peoples in project design, programme planning, and policy and legislative development from the outset. As it is tied to governance, IK requires empowered participation in technical, managerial, and high level decision-making. In this way, procedural justice can be considered a key concern of this perspective. But enhancing Indigenous participation in decision-making does not hinge on benevolent state intervention or institutional reform, nor does the survival of IK rest in its documentation or capture. As a way of life, the survival of IK requires the protection of Indigenous peoples and ways of life (McGregor, 2004). Policy prescriptions from this perspective would include improved access to lands and resources; the exercise of Indigenous rights and self-determination; sustained knowledge revitalization initiatives; free, prior, and informed consent; and equitable partnerships (Bowie,

2013; McGregor, 2004; Williams & Hardison, 2013). Canada, like other settler-colonial states, would be urged to re-commit to "an old relationship" of coexistence (McGregor, 2004, p. 63; RCAP, 1999).

Models and protocols for knowledge exchange have already been established within Indigenous forms of governance and diplomacy. The historic nation-to-nation or treaty relationship encourages mutual recognition, knowledge sharing, and collaboration for mutual benefit; it provides a viable model for co-existence that is contemporaneously applied to environmental and resource co-management (McGregor, 2004; Ransom & Ettenger, 2001). From an Aboriginal and treaty rights framework, the present challenge would be to establish appropriate conditions for the "re-expression" of IK in environmental governance and resource management (McGregor, 2014a, p. 347). The final orientation goes even further to elucidate the conversations, spaces, institutions, and mechanisms needed to work across knowledge systems in a way that protects Indigenous peoples and their knowledge systems (Ermine, 2007; Stevenson & Natcher, 2010).

Collaborative

From this orientation, TK is held as a means of empowerment for Indigenous peoples (Berkes, 2012; Johnson, 1992; Kimmerer, 2002; Menzies & Butler, 2006; Turner et al., 2000). Given the current dearth of mechanisms to facilitate involvement (Borrows, 2002), TK offers a "powerful tool in the establishment of Aboriginal influence in environmental and resource management regimes" (McGregor, 2004, p. 396), particularly when Indigenous values and traditional governance and protocols lead the way (Bowie, 2013). This derives from a degree of "operational optimism" accompanying the relatively recent consideration of TK within mainstream environmental and natural resource management regimes (Menzies & Butler, 2006, p. 240). Kyle Whyte (2013) writes that institutions of environmental governance

> have evolved ways of doing things out of histories in which the very idea of indigenous environmental governance was overtly and subtly marginalized. Times are changing, and greater respect is accorded to indigenous peoples through international, federal, and local law and policy. These changes create opportunities for indigenous peoples to work collaboratively with non-indigenous peoples, instead of against them or in secrecy from them (covertly). (p. 8)

Adopting an expectant, long-term view, "Indigenous peoples can begin to build institutions of environmental governance that are integrated with non-indigenous institutions in ways that benefit indigenous communities and respect the stewardship goals of their worldviews" (Whyte, 2013, p. 8).

Following this line of thought, TK is a collaborative concept: a means of creating long-term processes to facilitate cross-cultural and cross-situational collaboration (Whyte, 2013). It contains an invitation to share and learn about how each party approaches the very question of what constitutes knowledge and how it relates to environmental governance—to interrogate the founding assumptions driving competing definitions of TK. The task shifts from defining TK to exploring difference as part of long-term processes that seek to blend divergent approaches and enhance environmental governance through mutual respect, learning and the maturing of working relationships.

Characterizing this position is an exploration of the conditions that allow for the full expression of IK within collaborative contexts. Key concepts include ontological pluralism—the co-construction of thoughts and actions based on situated, or contextualized, engagement with the multiple knowledges of researchers and community-based collaborators (Berkes, 2012; Howwitt & Suchet-Pearson, 2006); and

knowledge co-production—shared learning through change, which compels institutions to value divergent styles of communication, deliberation, and social interaction, and enables them to build adaptive capacity and sustain difficult social processes (Armitage, Berkes, Dale, Kocho-Schellenberg, & Patton, 2010).

With a focus on procedural innovation and institutional transformation, the goal is the creation of epistemic communities capable of bridging distinct epistemologies and addressing multiple axes of identity, sovereignty, and rights (Howitt & Suchet-Pearson, 2006). Notable empirical examples include the Eastern Ontario Model Forest (Kofinas, 2005; O'Flaherty, Davidson-Hunt, & Manseau, 2008), tribal participation in Northwest fisheries management (Ebbin, 2002), empowered co-management in British Columbia (Goetze, 2005), and the Climate and Traditional Knowledges Workgroup (2014). As for models for cross-cultural negotiation and knowledge sharing, Potawatomi scholar Robin Kimmerer (2013) applies the symbiotic relationship between the three sisters—corn, beans, and squash—to suggest that the principles, values, and ethics embedded in IKSs ought to serve as the scaffolding for mutually beneficial knowledge sharing between Western and Indigenous science traditions.

In some ways parallel to an ecological orientation, this scholarship is hopeful about the weaving together of TK and science in resource management (Kimmerer, 2002; Turner et al., 2000). Research seeks to leverage the increasing interplay of Indigenous and non-Indigenous peoples in the environmental sector; however, the integrity of distinctly Indigenous ways of knowing and being is not up for negotiation, as in mainstream versions of integration (Armitage et al., 2010). Inherently critical, this body of work focuses on the political, legislative, institutional, and policy transformations needed to facilitate empowered forms of collaboration, shifting attention away from the management of resources as a mere technical exercise, as per an ecological perspective. It focuses on the management of relationships, which, Ryan Bowie (2013) writes, allows for the inherently political and complex nature of resource management to emerge. This challenges established social relations and accepted cultural assumptions, beliefs, and practices, and brings attention to how resource users, technicians, decision-makers, scholars, and policy makers might establish planning, management, and decision-making structures that reflect the values upon which IKSs are based (Ebbin, 2002; Kofinas, 2005). While it shares the "intellectual skepticism" of critical literature (Menzies & Butler, 2006, p. 239), it also reflects calls for bridging work in order to link Western and traditional ways of knowing and allow for the development of bi-cultural resource governance models (Colorado, 1988), particularly where there is mutual need and benefit (Berkes, 2012). This orientation encourages research and practice that builds self-governance capacity (Bowie, 2013) and encourages innovative and transformative collaborative processes led by Indigenous peoples.

Discussion

To synthesize what I have just presented and exercise its explanatory power, I apply the categories to two related questions adapted from the Fish-WIKS research objectives: what are the commonalities and differences, or, the nature of the relationship, between Western and Indigenous knowledges; and how can TK enhance the current regime for natural resource management and decision-making? Addressing the first question, critical and relational approaches tend to emphasize fundamental differences between knowledge systems, while ecological and optimistic approaches celebrate their similarities, or at least their potential for symmetry. As per the second question, an ecological approach would suggest that TK can correct the failure of Western science-based knowledge systems to manage

common resources, and through adaptive management, can facilitate a holistic, place-based ecosystem approach to resource governance. Critical theory would suggest that discursive and material power imbalances marginalize and render TK wholly unintelligible and that co-management models are empty in the absence of structural change and decolonization. A relational perspective tends to recognize and appreciate IK as a dynamic way of life embedded in particular cosmological, socio-cultural, and place-based contexts that finds expression in systems of Indigenous governance and the nation-to-nation or treaty relationship. Finally, as a collaborative concept, increased interplay between Indigenous and state resource managers can encourage innovative processes at multiple levels that facilitate the exercise of inherent Indigenous rights. As a powerful tool, TK invites the co-production of knowledge at multiple levels, which, under the right conditions, can result in more effective resource governance (see Table 1).

Marking its distinction from other insightful categorizations of the concept (Bowie, 2013; Houde, 2007; Whyte, 2013), these results demonstrate the unique outcomes and policy implications that can flow from different sets of assumptions and values that comprise the four conceptualizations of TK. This speaks to the contingent nature of knowledge production in the field of TK and raises important questions for research design and conduct, which I will discuss. But first, it is worth reiterating that the literature is neither static nor fixed in discrete categories. Likewise, research projects rarely subscribe to pure ideological frames, as they are presented here. Projects often exhibit multiple perspectives and rationales; for instance, Fish-WIKS seeks to enhance ecosystem-based management, ease barriers to the full inclusion of Indigenous peoples in resource governance, and obtain mutually beneficial outcomes through the interplay of diverse knowledge systems (Government of Canada, 2002; Ontario Ministry of Natural Resources, 2014; Wiber & Milley, 2007). A product of successive waves of interest in TK since the 1980s, overlap in the field of TK reflects the continued purchase of ecological and post-positivist perspectives in the performance of fundable research. Overlap also mirrors the varied interests and assumptions at play in partnership-based projects; the growing significance of critical, Indigenous relational, and collaborative scholarship; and a gap in the literature.

The broad, contested, and sometimes overlapping literature is often overlooked or simply taken for granted. Instead, researchers and writers ought to situate their work; that is, to consider their positionality and the implications of their approaches for Indigenous empowerment and self-governance. In my own self-directed research supported by Fish-WIKS, I have been explicit in this regard. I employ a critical decolonizing epistemology and privilege a collaborative treaty perspective in my research methodology (Latulippe, in press). My

TABLE 1 Applying the typology to two research questions adapted from Fish-WIKS (2015)

Orientation	What is the relationship between Western and Indigenous knowledge?	How can Indigenous knowledge or TK improve resource management?
Ecological	Indigenous knowledge complements post-positivist science	Through adaptive or ecosystem-based management frameworks
Critical	Epistemic colonization renders Indigenous knowledge unintelligible	Through structural change and decolonization
Relational	Distinct knowledge systems can be shared for mutual benefit	Through Indigenous governance models, including treaties
Collaborative	There is potential for knowledge co-production	Through empowered, collaborative processes at multiple scales

approach is based on my relationships to the lands, peoples, history, and knowledges where I live, work, and learn. Though my research is not yet complete, this has been a most productive preliminary finding. Researchers need to be clear about their nuanced positions and the potential pitfalls of their research. If not, they run the risk of further exploiting Indigenous peoples and their knowledges.

In the current historio-political moment, certain interventions in the field of TK are surely detrimental to Indigenous peoples. The very real, structurally and discursively embedded logic of Indigenous assimilation and elimination in Canada suggests that, while Indigenous peoples, lands, and sovereignties remain under heavy and persistent attack, researchers and communities ought to be wary of government concessions that appear to recognize the distinctiveness of IK (Coulthard, 2014; Diabo, 2012). New legislative provisions for TK may function like other seemingly innocuous settler-state sanctioned forms of recognition and accommodation. As Coulthard (2014) convincingly argues, in exchange for the dispossession of Indigenous territories, political economies, and modes of traditional governance, these "delegated administrative powers … over relatively minuscule reserve lands" (p. 4), designed "in the interests of the hegemonic partner in the relationships" (p. 17), actually preserve and reproduce colonial relations of power. Ultimately, they facilitate continued state access to Indigenous lands and resources. Caught unaware, TK research may well contribute to this project.

For example, what befalls the inherent rights of Indigenous peoples when their practices fail to meet government standards or those set by the instrumental value afforded to TK in light of ecosystem-based management frameworks? The same can be said of the precarious nature of Indigenous involvement in environmental decision-making when it is premised on Western fantasies of the ecologically noble Indian (Nadasdy, 2005). What is overlooked when TK is reconciled to the state's duty to consult, or as a technical fix, to prevailing resource extraction agendas? Is there room for co-governance and treaty relations in dominant TK discourses? And how are uneven relations of power reproduced through unempowered co-management and apolitical collaborative work on TK? The negative consequences of these and other related considerations can be avoided through self-reflection, scepticism, and caution (Coulthard, 2014); free, prior, and informed consent; and respect for the particular goals, interests, and priorities of Indigenous research partners.

Who ultimately benefits from research is one of the most important questions one can ask. Ecological, critical, relational, and collaborative orientations, on their own or worked together, can be of value to Indigenous communities. Ecological and relational initiatives can operate in tandem as communities revitalize land-based practices, and in a collaborative spirit, communicate TK protocols to outside interests and implement transformative agendas. Critical research can be a useful tool for building awareness within communities, educating non-native resource users, and building alliances through the concept of intersectionality. Research partners may choose to draw from multiple elements, or exclusively from one orientation. Resistance, rejection, and other politics of refusal are also viable alternatives. Ultimately, Indigenous communities and researcher partners determine the most appropriate approach based on their histories, geographies, goals, and knowledge sources.

As a final comment, given the territorial motive of settler-colonialism and the contested nature of resource management and environmental governance, TK research cannot afford to be politically neutral. The point is to be explicit about the assumptions, interests, and claims driving research and writing on TK, even the elisions. Research design, conduct, and dissemination ought to be unambiguous about what it does and does not endeavour to

achieve. This helps to avoid the conflation of limited or apolitical TK work as *the* answer to Indigenous dispossession and exclusion, or ecosystem sustainability and resiliency, when, in fact, it could run counterproductive to those aims. Ultimately, for TK to advance the priorities and goals of Indigenous research partners and to be of benefit to Indigenous peoples, it is paramount that researchers consider their positionality and anticipate the outcomes of particular approaches within situated contexts.

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References

Armitage, D., Berkes, F., Dale, A., Kocho-Schellenberg, E., & Patton, E. (2010). Co-management and the co-production of knowledge: Learning to adapt in Canada's Arctic. *Global Environmental Change*, *21*, 995–1004.

Assembly of First Nations. (n.d.). *First Nations ethics guide on research and Aboriginal traditional knowledge*. Retrieved from http://www.afn.ca/uploads/files/fn_ethics_guide_on_research_and_atk.pdf

Battiste, M., & Henderson, J. (2000). *Protecting indigenous knowledge and heritage: A global challenge*. Saskatoon, Canada: Purich.

Beier, J. M. (2002). Beyond hegemonic state(ment)s of nature. In G. Chowdhry & S. Nair (Eds.), *Power, postcolonialism and international relations: Reading race, gender and class* (pp. 82–114). New York, NY: Routledge.

Berkes, F. (2009). Indigenous ways of knowing and the study of environmental change. *Journal of the Royal Society of New Zealand*, *39*(4), 151–156.

Berkes, F. (2012). *Sacred ecology* (3rd ed.). New York, NY: Routledge.

Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Adaptations*, *10*(5), 1251–1262.

Borrows, J. (2002). *Recovering Canada: The resurgence of indigenous law*. Toronto, Canada: University of Toronto Press.

Borrows, J. (2010). *Drawing out law: A spirit's guide*. Toronto, Canada: University of Toronto Press.

Bowie, R. (2013). Indigenous self-governance and the deployment of knowledge in collaborative environmental management in Canada. *Journal of Canadian Studies*, *47*(1), 91–121.

Byrd, J. (2011). *The transit of empire. Indigenous critiques of colonialism*. Minneapolis, MN: University of Minnesota Press.

Cajete, G. (1999). *Native science: Natural laws of interdependence*. Santa Fe, NM: Clear Light.

Canadian Environmental Assessment Agency. (n.d.). *Considering Aboriginal traditional knowledge in environmental assessments conducted under the Canadian Environmental Assessment Act—Interim principles*. Retrieved from https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=4A795E76-1

Cardinal, L. (2001). What is an indigenous perspective? *Canadian Journal of Native Education*, *25*(2), 180–182.

Chiefs of Ontario. (2008). *Aboriginal traditional knowledge elders workshop*. Retrieved from http://www.chiefs-of-ontario.org/sites/default/files/files/ATK%20workshop%202008.pdf

Climate and Traditional Knowledge Workgroup. (2014). *Guidelines for considering traditional knowledges in climate change initiatives*. Retrieved from https://climatetkw.wordpress.com

Colorado, P. (1988). Bridging Native and Western science. *Convergence*, *21*(2/3), 49–68.

Committee on the Status of Endangered Wildlife in Canada. (2010). *COSEWIC Aboriginal traditional knowledge (ATK) process and protocol guidelines*. Retrieved from http://www.cosewic.gc.ca/eng/sct0/ppg_e.cfm

Coulthard, G. (2014). *Red skin, white masks. Rejecting the colonial politics of recognition*. Minneapolis, MN: University of Minnesota Press.

Cox, M., Arnold, G., & Tomas, S. (2010). A review of design principles for community-based natural resource management. *Ecology and Society*, *15*(4), 38.

da Silva, D. (2007). *Toward a global idea of race*. Minneapolis, MN: University of Minnesota Press.

Danard, D. (n.d.). *Looking back, looking ahead. Traditional knowledge literature review*. Toronto, Canada: Chiefs of Ontario.

Diabo, R. (2012). Harper's First Nation termination plan 2012. *First Nations Strategic Bulletin*, *10*(7–10), 1–8. Retrieved from http://www.scribd.com/doc/113392661/Harper-s-First-Nation-Termination-Plan-2012

Doyle-Bedwell, P., & Cohen, F. (2001). Aboriginal people in Canada: Their role in shaping environmental trends in the twenty first century. In E. Parson (Ed.), *Governing the environment: Persistent challenges, uncertain innovations* (pp. 169–206). Toronto, Canada: University of Toronto Press.

Ebbin, S. (2002). Enhanced fit through institutional interplay in the Pacific Northwest Salmon co-management regime. *Marine Policy*, *26*, 253–259.

Ermine, W. (2007). The ethical space of engagement. *Indigenous Law Journal*, *6*(1), 193–203.

Feit, H. (1973). The ethno-ecology of the Waswanipi Cree: Or how hunters can manage their resources. In B. Cox (Ed.), *Cultural ecology* (pp. 115–125). Toronto, Canada: McClelland and Stewart.

Fish-WIKS. (2015). *Exploring distinct indigenous knowledge systems to inform fisheries governance and management on Canada's coasts*. Retrieved from http://fishwiks.ca/wp-content/uploads/2013/04/Summary-Sheet-Plus-Sep-13.pdf

Geniusz, W. (2009). *Our knowledge is not primitive: Decolonizing botanical Anishinaabe teachings*. Syracuse, NY: Syracuse University Press.

Goetze, T. (2005). Empowered co-management: Towards power-sharing and indigenous rights in Clayoquot Sound, BC. *Anthropologica*, *47*(2), 247–265.

Government of Canada. (2002). *Canada's ocean strategy: Our oceans, our future*. Retrieved from http://www.dfo-mpo.gc.ca/oceans/publications/cosframework-cadresoc/pdf/im-gi-eng.pdf

Government of Ontario. (2012). *Ontario's Great Lakes strategy*. Retrieved from https://www.ontario.ca/environment-and-energy/ontarios-great-lakes-strategy

Government of Ontario. (2014). *Ontario's provincial fish strategy: Fish for the future. Draft for public comment*. Retrieved from http://www.ontario.ca/environment-and-energy/ontarios-provincial-fish-strategy-fish-future-draft-public-comment-january-2014

Houde, N. (2007). The six faces of traditional ecological knowledge: Challenges and opportunities for Canadian co-management arrangements. *Ecology and Society*, *12*(2), 34.

Howitt, R., & Suchet-Pearson, S. (2006). Rethinking the building blocks: Ontological pluralism and the idea of "management". *Geografiska Annaler B*, *88*(3), 323–335.

Huntington, H. (2000). Using traditional ecological knowledge in science: Methods and applications. *Ecological Adaptations*, *10*(5), 1270–1274.

Hutchings, S. (2014). Indigenous knowledges impacting the environment. *AlterNative*, *19*(5), 445–449.

Johnson, J., Louis, R., & Pramano, A. (2006). Facing the future: Encouraging critical literacies in indigenous communities. *ACME: An International E-Journal for Critical Geographies*, *4*(1), 81–98.

Johnson, M. (Ed.). (1992). *Lore: Capturing traditional environmental knowledge*. Retrieved from http://www.mtnforum.org/sites/default/files/publication/files/1418.pdf

Kimmerer, R. (2002). Weaving traditional ecological knowledge into biological education: A call to action. *BioScience*, *52*(5), 432–438.

Kimmerer, R. (2013). *Braiding sweetgrass. Indigenous wisdom, scientific knowledge, and the teachings of plants*. Minneapolis, MN: Milkweed Editions.

Kofinas, G. (2005). Caribou hunters and researchers

at the co-management interface: Emergent dilemmas and the dynamics of legitimacy in power sharing. *Anthropologica*, *47*(2), 179.

Kovach, M. (2009). *Indigenous methodologies. Characteristics, conversations, and contexts*. Toronto, Canada: University of Toronto Press.

Kuokkanen, R. (2007). *Reshaping the university: Responsibility, indigenous epistemes, and the logic of the gift*. Vancouver, Canada: UBC Press.

Latulippe, N. (in press). Bridging parallel rows: Epistemic difference and relational accountability in cross-cultural research. *International Indigenous Policy Journal*.

Linden, S. (2007). *Volume 2: Policy analysis, Report of the Ipperwash Inquiry*. Toronto, Canada: Ipperwash Inquiry.

McGregor, D. (2004). Coming full circle: Indigenous knowledge, environment, and our future. *American Indian Quarterly*, *28*(3/4), 385–410.

McGregor, D. (2014a). Lessons for collaboration involving traditional knowledge and environmental governance in Ontario, Canada. *AlterNative*, *10*(5), 340–353.

McGregor, D. (2014b). Traditional knowledge and water governance. The ethic of responsibility. *AlterNative*, *10*(5), 493–507.

McNaughton, C., & Rock, D. (2003). *Opportunities in Aboriginal research. Results of SSHRC's dialogue on research and Aboriginal peoples*. Retrieved from http://www.sshrc-crsh.gc.ca/funding-financement/apply-demande/background-renseignements/aboriginal_backgrounder_e.pdf

Menzies, C., & Butler, C. (2006). Introduction: Understanding ecological knowledge. In C. Menzies (Ed.), *Traditional ecological knowledge and natural resource management* (pp. 1–17). Lincoln, NE: University of Nebraska Press.

Nadasdy, P. (1999). The politics of TEK: Power and the "integration" of knowledge. *Arctic Anthropology*, *36*(1/2), 1–18.

Nadasdy, P. (2005). Transcending the debate over the ecologically noble Indian: Indigenous peoples and environmentalism. *Ethnohistory*, *52*(2), 291–331.

Nakashima, D. J., Galloway McLean, K., Thulstrup, H. D., Ramos Castillo, A., & Rubis, J. T. (2012). *Weathering uncertainty—Traditional knowledge for climate change assessment and adaptation*. Joint UNESCO-UNU Report. Paris, France: UNESCO and United Nations University.

National Aboriginal Health Organization. (2005). *Sacred ways of life. Traditional knowledge*. Retrieved from http://www.naho.ca/documents/fnc/english/2005_traditional_knowledge_toolkit.pdf

O'Flaherty, M., Davidson-Hunt, I., & Manseau, M. (2008). Indigenous knowledge and values in planning for sustainable forestry: Pikangikum First Nation and Whitefeather Forest Initiative. *Ecology and Society*, *13*(1), 6.

Ontario Ministry of Natural Resources. (2014). *Lake Nipissing fisheries management plan: "Valuing a diverse fishery" (draft)*. Retrieved from https://www.ontario.ca/document/lake-nipissing-fisheries-management-plan-draft

Pearce, M., & Louis, R. (2008). Mapping indigenous depth of place. *American Indian Culture and Research Journal*, *23*(3), 107–126.

Ransom, R., & Ettenger, K. (2001). "Polishing the Kaswentha": A Haudenosaunee view of environmental cooperation. *Environmental Science and Policy*, *4*, 219–228.

Reo, N. (2011). The importance of belief systems in traditional ecological knowledge initiatives. *The International Indigenous Policy Journal*, *2*(4), 1–4.

Royal Commission on Aboriginal Peoples (RCAP). (1996a). *Report of the Royal Commission on Aboriginal Peoples*. Government of Canada. Retrieved from http://www.aadnc-aandc.gc.ca/eng/1307458586498/1307458751962

Ruddick, S. M. (2009). Society-space. In R. Kitchin & N. Thrift (Eds.), *International encyclopedia of human geography* (pp. 217–226). Amsterdam, Netherlands: Elsevier Science.

Shackeroff, J., & Campbell, L. (2007). Traditional ecological knowledge in conservation research: Problems and prospects for their constructive engagement. *Conservation and Society*, *5*(3), 343–360.

Shaw, W., Herman, R., & Dobbs, R. (2006). Encountering indigeneity: Re-imagining and decolonizing geography. *Geografiska Annaler B. Swedish Society for Anthropology and Geography*, *88*(3), 267–276.

Short, R. (2009). *Cartographic encounters: Indigenous peoples and exploration of the new world*. London, England: Reaktion Books.

Smith, L. T. (1999). *Decolonizing methodologies. Research and indigenous peoples*. London, England: Zed Books.

Social Sciences and Humanities Research Council. (2014). *Funding: Future challenge areas*. Retrieved from http://www.sshrc-crsh.gc.ca/

funding-financement/programs-programmes/challenge_areas-domaines_des_defis/index-eng.aspx#a6

Stevenson, M., & Natcher, S. (2010). *Planning co-existence: Aboriginal issues in forest and land-use planning*. Edmonton, Canada: University of Alberta Press.

Turner, N., Boelscher Ignace, M., & Ignace, R. (2000). Traditional ecological knowledge and wisdom of Aboriginal peoples in British Colombia. *Ecological Applications*, *10*(5), 1275–1287.

United Nations. (1992). *Convention on biological diversity*. Retrieved from https://www.cbd.int/doc/legal/cbd-en.pdf

United Nations. (2007). *United Nations declaration on the rights of indigenous peoples*. Retrieved from http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

Usher, P. (2000). Traditional ecological knowledge in environmental assessment and management. *Arctic*, *53*(2), 183–193.

White, G. (2006). Cultures in collision: Traditional knowledge and Euro-Canadian governance processes in northern land-claim boards. *Arctic*, *59*(4), 401–414.

Whyte, K. (2013). On the role of traditional ecological knowledge as a collaborative concept: A philosophical study. *Ecological Processes*, *2*(7). doi:10.1186/2192-1709-2-7

Wiber, M., & Milley, C. (2007). After Marshall: Implementation of aboriginal fishing rights in Atlantic Canada. *Journal of Legal Pluralism*, *55*, 163–186.

Williams, T., & Hardison, P. (2013). Culture, law, risk and governance: Contexts of traditional knowledge in climate change adaptation. *Climate Change*, *120*(3), 531–544.

Wilson, S. (2008). *Research is ceremony. Indigenous research methods*. Halifax, Canada: Fernwood.

World Commission on Environment and Development. (1987). *Our common future*. Oxford, England: Oxford University Press.