

**Aboriginal “Traditional Knowledge”, Science and Public Policy:
Ten Years of Listening to the Silence**

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ABSTRACT

In 1996, a nation-wide debate began on the incorporation of aboriginal peoples' "traditional knowledge" into public policy. Despite the serious issues that were raised, traditional knowledge continues to be promoted by governments, social scientists and aboriginal organizations. This is not due to the demonstrated value of traditional knowledge in policy development, but because aboriginal organizations are able to extract funding from governments as a condition of allowing development to proceed. Recognizing this circumstance will not only increase awareness of the problems of political advocacy's intrusion into environmental and aboriginal policies; it will also offer a widespread indictment of the imposition of postmodern relativism in the social sciences.

KEYWORDS

Traditional knowledge, aboriginal peoples, science, public policy, resource management, environmental management, postmodernism

In 1996, a nation-wide debate began about the role of aboriginal peoples' "traditional knowledge" – often referred to as TK - in the environmental assessment process, as well as in public policy more generally ("Aboriginal Perspectives on Reality", 1997; Abele, 1997; Berkes and Henley, 1997a; 1997b; Dawson, 1997; Fenge, 1997; Howard and Widdowson, 1996; 1997; Laghi, 1997; Stevenson, 1997). At the time, traditional knowledge was defined as "knowledge and values which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another" (GNWT, 1993). In the Northwest Territories, traditional knowledge was being recognized as a "valid and essential source of information" by governments (GNWT, 1993), and it was being used in a number of policy areas, including the environmental assessment of a proposed diamond mine (Stevenson, 1996; Usher, 2000).

Public and private opposition to traditional knowledge largely concerned its reference to "knowledge...acquired...from spiritual teachings". It was argued that traditional knowledge, because of its spiritual component and unscientific reasoning, was a threat to environmental assessment wherever it was applied. Incorporating traditional knowledge was also perceived to threaten policy development more generally since spiritual beliefs could be neither challenged nor verified. The acceptance of spiritual beliefs as "knowledge" by governments was dangerous because it could be used to justify any activity, including actions that were environmentally destructive.

In addition to opposing its unscientific character, critics argued that native spiritualism was being used to disguise traditional knowledge's vague and unsystematic character (Howard and Widdowson, 1997; Widdowson and Howard, 2002). Traditional

knowledge, when it was separated from its spiritual component, largely consisted of the information one would receive from a guide familiar with the local area – basic knowledge whose incorporation certainly would not require a radical transformation of scientific research, policy development or educational processes. Tying traditional knowledge to aboriginal spirituality, however, made it difficult to question its relevance to public policy development since politeness dictated that a person’s religious beliefs should not be publicly scrutinized.

Although there has been an enormous literature produced on traditional knowledge over the last ten years (Bocking, 2005), it has not really responded to the criticisms aired in the debate. The challenge to traditional knowledge has been either ignored, casually dismissed as misinformed (Bocking, 2005: 235; Dudgeon and Berkes, 2003: 80-81), or inexplicably attacked as “racist” or “right wing” (Augustine, 1998: 61; Howitt, 2001; Nadasdy, 2005: 279; Stevenson, 1997). Subsequently, the promotion of traditional knowledge has continued as if the debate never existed.

This paper explains the continued proliferation of traditional knowledge studies despite the absence of evidence of their contribution to accurate knowledge. The main reason is the abundance of political or economic interests in promoting traditional knowledge. More specifically, aboriginal organizations demand that they receive funding for traditional knowledge as a condition of allowing development to proceed. In addition, traditional knowledge finds support among disinterested parties who are sympathetic to what they perceive as aboriginal aspirations. Such unconditional support of traditional knowledge, however, only acts to disguise the alarming educational deficiencies in native

communities under the supposition of “another way of knowing”. This serves to justify the continued isolation, dependency and marginalization of the aboriginal population.

Is there a there, there?

In the extensive literature promoting the funding and incorporation of traditional knowledge into public policy it is maintained that traditional knowledge constitutes a “tremendous insight”, providing “more and sometimes better information” that is of “greater breadth and depth” than existing scientific data (Ellis, 2005: 67; Huntington, 2000: 1270; Parlee et al., 2005: 26; *Report of the Royal Commission on Aboriginal Peoples [RCAP]*, 1996, Vol. 1: 640). It is argued that the information obtained from the documentation of traditional knowledge will improve resource management processes, thereby contributing to environmental sustainability (Berkes et al, 2003; O'B. Lyver and Lutsel K'e Dene First Nation, 2005: 44-45; Sillitoe, 1998: 226).

It should be recognized from the outset, however, that the very term “traditional knowledge” is tendentious, for it purports to decide by terminological fiat precisely the fundamental issue under debate: namely, whether the beliefs in question actually constitute “knowledge”. For brevity we shall refrain from putting the phrase “traditional knowledge” constantly in ironic quotes, but such quotes should be assumed, and the presumption of advocates in using such a loaded phrase borne constantly in mind.

In everyday language, as in philosophical discourse, a distinction is made between *knowledge* and mere *belief*; that is why the word “knowledge” has a positive connotation while “belief” is neutral. Though philosophers continue to debate the precise meaning of

“knowledge”, the general consensus is that “knowledge” is, roughly speaking, a synonym for “justified true belief”. Thus, if we believe that Ontario lies due south of Mississippi, or that American troops have found weapons of mass destruction in Iraq (other than their own), these beliefs cannot constitute knowledge, for the simple reason that they are false. Similarly, if on the night of September 10, 2001 a person dreamt that the World Trade Center towers would collapse the next day, and then awoke believing it, that belief would still not constitute knowledge, for though it turned out to be true, that was so by accident; there was no *good reason* to believe it was true - i.e. it was not a *justified* true belief relative to the evidence available at the time.

The central question, then, is whether so-called traditional knowledge, in fact, constitutes knowledge, understood as justified true belief. For each element of purported traditional knowledge, we must ask, first of all, whether the belief is true (i.e. a factually accurate representation of the world), and secondly whether we (or its advocates) have good reason to believe it in the light of the currently available evidence. Let us stress that we are *not* claiming that traditional knowledge *never* constitutes actual knowledge; that would be both excessive and false. Rather, each item of purported traditional knowledge – like each item of purported knowledge of *any* kind – must be evaluated on a case-by-case basis, according to the quantity and quality of the evidence for and against it. What we *are* insisting, however, is that the mere fact that a belief has been “acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another” does not, in and of itself, constitute the slightest reason to believe that it is true. And if it is not true, it is not knowledge.

This discussion of the justifiable character of traditional knowledge raises the question of how it differs from the scientific “tradition”. It is a difficult question to answer since there is no consensus on what traditional knowledge actually is or how it relates to science (McGregor, 2005: 2-3). Some commentators say that it is a “kind of science” (RCAP, 4: 454-58; Cajete, 2000), while others maintain that it is fundamentally different from science (Simpson, 1999; 2003) or even “superior” to it (LaDuke, 1993). A common argument is that it cannot be separated from its "cultural context" (Berkes, 1999; Weinstein, 1996: 2-3), but government researchers insist that they can incorporate traditional knowledge data into scientific studies (Huntington, 2000; Usher, 2000). Furthermore, definitions are often evaded through assertions that traditional knowledge means different things to different aboriginal groups (Brooke, 1993) or that it is like “listening to the river” (White, 2005: 14-15) – a process that supposedly takes a lifetime to understand and can only be realized by a person of aboriginal ancestry who does not drink, gamble or “mess around on his wife” (François Paulette, cited in Federal Environmental Assessment Panel Review, 1996: 52-3). It is claimed that some aboriginal groups are even reluctant to state what traditional knowledge consists of “for fear that it will be used in ways contrary to their interests and wishes”, or because “deeply held ethical codes may proscribe any discussion of certain matters with anyone not in the community” (White, 2005: 9). Marie Battiste and James Youngblood Henderson, in fact, oppose developing any definition since this is a "eurocentric" impulse that must be "decolonized" (2000:36-38).

These uncertainties mean that any traditional knowledge study begins with a survey of the field, where researchers weigh the merits of various definitions (for example, Reid et al., 2002: 2-8; Usher, 2000: 185-6). The result is never satisfactory since the definition

decided upon is either tautological - traditional knowledge is a “way of knowing”, “different knowledge system”, “system of understanding”, and even “*knowledge*” (Battiste and Henderson, 2000: 12; Ellis, 2005: 73; Nadasdy, 2003: 62; Sadler and Boothroyd, 1994: 1; Spak, 2005: 234; Hunn, cited in Wenzel, 1999:113) - or it acts to include a vast array of elements that are distinct from knowledge, such as values, beliefs and practices (Berkes et al., 2000: 1252; Ellis, 2005: 72).

Beliefs, in fact, are one of the essential differences between traditional knowledge and science (Johnson, 1992: 13). There are numerous references in the traditional knowledge literature to the "spiritual aspects of the knowledge system" (Emery, cited in Battiste and Henderson, 2000: 44), “spiritual knowledge” (Simpson, 1999: 23) and “the relationship between the physical and spiritual in Indigenous ways of knowing" (Spak, 2005: 234). But what are these spiritual beliefs, and how do they constitute "knowledge" (that is, "justified true belief" as opposed to unsubstantiated opinion)? A common belief pertaining to aboriginal peoples, for example, is that they were placed in the Americas by "the Creator" as stewards of the environment, unlike other human beings who evolved out of an apelike ancestor in Africa (Brizinski, 1989: 33-34; McGhee, 2004: 17). Some aboriginal peoples also believe that animals originally existed in human form and they continue to talk to people and read their minds (Nadasdy, 2003: 84; Kofinas, 2005: 184). Another commonly referred to belief is Animism – the idea that the universe is governed by supernatural, as opposed to material, forces (Nadasdy, 2003: 83; Ellis, 2005: 72). As the Royal Commission on Aboriginal Peoples points out,

the fundamental feature of Aboriginal world view was, and continues to be, that all of life is a manifestation of spiritual reality. We come from spirit; we live and move

surrounded by spirit; and when we leave this life we return to a spirit world. All perceptions are conditioned by spiritual forces, and all actions have repercussions in a spiritual reality. Actions initiated in a spiritual realm affect physical reality; conversely, human actions set off consequences in a spiritual realm...All these interactions must be taken into account as surely as considerations of what to eat or how to keep warm in winter (RCAP, 1996, vol. 1: 628).

Paul Nadasdy maintains that these beliefs are "knowledge" because "many Aboriginal peoples insist that they are not 'just stories' but that they are true". He goes on to argue that "many northern Aboriginal peoples continue to this day to interact with animals in human form both in their dreams and in waking experiences during which they meet and secure the spiritual aid - usually for life - of an 'animal helper'" (Nadasdy, 2003: 84). Following from the anthropologist Edward E. Evans-Pritchard, Nadasdy even puts forward the viewpoint that the existence of witchcraft is "provable, rational and true" because certain aboriginal peoples believe in sorcery and the spiritual power of Shamans (Nadasdy, 2003: 62).

But the *belief* that something is true does not mean that it *is* true – in particular, that it can be considered *knowledge*. In order to evaluate whether a belief constitutes knowledge, we must determine, first of all, the *evidence* bearing on its truth or falsity. For instance, there is no evidence that aboriginal peoples were “created” in the Americas, that non-human animals were originally people and can be reincarnated, or in support of the belief in sorcery. Therefore, it is erroneous (not to mention condescending) to refer to these beliefs as a form of “knowledge”. And if only “some” or “many” aboriginal people hold

these beliefs (presumably meaning others do not), how do traditional knowledge advocates decide which native beliefs are actually “knowledge”?

Furthermore, it is incorrect to argue that values and practices are components of knowledge. Values are normative judgments about the way things should be, not what they are, and these principles do not necessarily indicate an understanding of the world. The value of "respect" attributed to aboriginal peoples (Berkes et al., 2000: 1259), for example, is based on the assumption that animals can talk to, and read the minds of, human beings (Nadasdy, 2003: 88-94; Spak, 2005: 238).

Similarly, a practice is not necessarily evidence of knowledge. Practices are how people interact with their environment, which can result from ignorance as well as understanding. While the success of aboriginal peoples' hunting practices suggests that they have *some* accurate knowledge of their local ecosystem, other practices are rooted in unsubstantiated beliefs. It has been noted, for example, that certain aboriginal peoples throw animal fetuses or bones into the water so that animals will be "reborn" - a practice that is associated with the belief in reincarnation (Johnson and Ruttan, 1993; Krech, 2005; Simpson, 1999: 64). Sillitoe also points out that New Guinean highlanders “burn pieces of old net bag to stop rain and squash sappy plants to end droughts”, despite the fact that “in meteorological terms neither practice has any effect on the weather” (Sillitoe, 1998: 226). And although practices attributed to traditional knowledge can have a beneficial environmental effect, they can just as easily have a detrimental one. Besides, even those practices that do have beneficial effects do not require an understanding of natural processes; they can be developed through trial and error, whereby environmental

interactions are adopted if they enhance survival, and discarded if they do not (Berkes et al, 2000; Sadler and Boothroyd, 1994: 2; Usher, 2000: 187).

It is a popular assumption that aboriginal values and practices reflect an innate environmental consciousness, due to the low environmental impact before contact (RCAP, Vol. 1: 86-7, 658). This fails to consider, or even denies (Sherry and Myers, 2002: 354), the reality that the available Neolithic technology and subsistence economy did not provide the *capacity* to have the same impact as the technology of peoples with much larger and productive economies. Aboriginal peoples now have acquired modern technology and participate in a market economy, and it does not make sense to claim that traditions associated with their subsistence past can somehow address the environmental problems associated with late capitalism.

On the contrary, these traditions often result in unsustainable practices in the modern context. A number of scientists, bureaucrats and explorers have noted in the past, for example, that aboriginal hunting tended to be “opportunistic”, killing animals “wherever they were encountered” since a highly variable food source prevented an “awareness of the need for conservation” (Bocking, 2005: 221; Sandlos, 2001). Today, in fact, many aboriginal people are resistant to any government attempts to restrict wildlife harvesting. They do not think environmental management is possible (Johnson, 1992: 7; Spak 2005: 235; White, 2005: 17) and believe that animal extinctions are planned by “the Creator” who has the “last say” (Leon Modeste, quoted in Johnson and Ruttan, 1992: 183). They also oppose the studying and monitoring of wildlife because this is “disrespectful” towards “other-than-human persons” (Kofinas, 2005; Nadasdy, 2003: 83). Even more

detrimental to environmental sustainability is the idea that animals “choose” to be hunted (Nasdasy, 2003: 120). Spak, for example, explains that

according to traditional Dene understandings, animals consciously participate in hunting and a hunter can only kill animals that have allowed themselves to be hunted. The placing of a satellite collar around an animal, instead of accepting its offer, is denying the animal’s right of choice and hence exhibits not only extreme disrespect towards the animal, but also endangers the continuation of everybody’s survival as the animals may refrain from offering themselves in the future (Spak, 2005: 238).

With this logic, it would be impossible to impose any limits on resource harvesting. Even the mass slaughter of endangered species could be justified with the unsubstantiated opinion that the sighting of an animal indicates that it “has offered itself to the hunter”.

Therefore, while knowledge, or “justified true belief”, about the nature of the universe *may* inform values and practices, values and practices do not, in *themselves*, constitute knowledge. Conflating all these elements into the definition of traditional knowledge, however, inhibits a clearer understanding of its actual character.

Postmodern relativism as the back-up ideology

Advocates of traditional knowledge often attempt, as we have seen, to urge its value as a contribution to knowledge of the natural world, complementary to modern science. But when these assertions are brought into question promoters of traditional knowledge tend

to adopt two alternative tactics. One is silence: simply ignore the criticisms (or misrepresent them so as to remove their force) and then carry on as before. The other is to fall back on postmodern relativism (Gross and Levitt, 1994). In this section we would like to analyze the latter response in some detail (see also Sokal and Bricmont, 1998: 194-196 for a similar analysis of this tactic).

When advocates of traditional knowledge are obliged to address criticisms such as ours, which question whether traditional knowledge actually constitutes justified true belief, they generally respond by asserting that the very concept of justified true belief is intrinsically incoherent because there are no objective (i.e. trans-cultural) standards of truth or justification. The Big Bang theory of cosmology and the Darwinian theory of biological evolution may be true *for us*, these postmodern relativists claim, but aboriginal peoples' creation myths are just as valid *for them*. As archaeologist Roger Anyon put it, "science is just one of the many ways of knowing the world...[the Zunis' world view is] just as valid as the archaeological viewpoint of what prehistory is about" (Anyon, cited in Sokal and Bricmont, 1998: 195).

But can the relativist claims withstand scrutiny? The relativity of *truth* is particularly untenable. After all, the statements "native peoples first entered the Americas 10,000-30,000 years ago, crossing the Bering Strait" and "native peoples have always lived in the Americas" – are *mutually contradictory*; they cannot both be true. (They could, of course, both be false; but that is presumably not what postmodern relativists mean by "just as valid".) Furthermore, these are statements concerning the past of humanity as a whole: their truth or falsity therefore depends on the facts of human history, i.e. on what actually happened 10,000-30,000 years ago or earlier, and not on the beliefs or other

characteristics of any individual or society today. The same goes for any assertion of (alleged) fact.

Of course, postmodern relativists might not intend to be staking out such treacherous philosophical territory: they might simply be using the phrases “true for us” and “true for them” as euphemisms for “play some sociological or psychological role for us or for them” – in which case their assertions would change status from absurdities to truisms. But if this latter notion is really what postmodern relativists mean, why do they not say so openly, rather than perverting the meaning of the word “true”? Indeed, authors who use the word “true” in this way are playing a double game with the reader: making claims that the reader will inevitably interpret in the *ordinary* sense of the word “true” (i.e. as factually accurate assertions about reality), while allowing themselves to fall back on this redefinition of “true” when the evidence for their assertions is challenged.

The cultural relativity of *justification* is, on the face of it, more plausible. After all, evaluations of evidence and its relevance depend on background knowledge and beliefs. The philosopher Susan Haack, for example, provides the following example of such a disagreement: “Suppose you and I are both on an appointments committee. You argue that this candidate should be ruled out on the grounds that his handwriting indicates he is not to be trusted, I think graphology is bunk and scoff at your supposed evidence...what we have is disagreement in background beliefs, not real incommensurability of epistemic standards” (Haack, 1995: 331). If we want to resolve this disagreement rationally, therefore, we must back up and evaluate the evidence for and against graphology. And if that again founders on different background beliefs, then we must back up farther, until we reach common ground. And in the end, we will, because we are all members of the

same species, with the same sensory and intellectual tools are our disposal, trying to make sense of our world in a reliable way (Boghossian, 2006).

But attempts to reach common ground are resisted by those who advocate the importance of traditional knowledge. In fact, there is a reluctance to even state what traditional knowledge is because of the risk that it can be “taken out of the context in which it was generated” and consequently “misinterpreted or misused” (Usher, 2000: 191-192). But it is never explained precisely how this “knowledge” can be “taken out of the context” or how it is “misinterpreted or misused”; nor is there any attempt to describe the difference between “decontextualized knowledge” and knowledge that remains contextually embedded. All such assertions do is obfuscate the fact that traditional knowledge, when compared to scientific methods, is very limited in the contribution that it can make to our understanding of the natural world.

Traditional knowledge: junk science and spiritualism?

Although beliefs, values and practices are distinct from knowledge, many claims about the importance of traditional knowledge focus on its empirical findings. Empiricism is obviously an essential component of knowledge regardless of culture; it is only through our senses that we can verify an assumption about how the world works. But if the observations and experience of aboriginal peoples are the only aspect of traditional knowledge that can be considered knowledge, how do they differ from scientific findings? For if traditional perceptions were the same as scientific ones, why would it be necessary to have separate traditional knowledge studies? If traditional knowledge really

is “replicable, generalizable, incorporating, and to some extent experimental and predictable” (Bielawski, 1995: 221), how is it empirically distinguishable from science?

One unique feature attributed to the empirical findings of traditional knowledge concerns the fact that they have been accumulated in a local area for the purposes of survival (Berkes and Henley, 1997b; Spak, 2005: 240). Aboriginal observations and experience have occurred over generations, it is claimed, instead of in the short period of time used in scientific studies. It is pointed out that scientists collect data during a few field trips (Sallenave, 1994), unlike aboriginal peoples, who have been "intimately connected" with their environment for “thousands of years”. Peter Usher, for example, maintains that traditional knowledge

has a substantial time-depth, ranging from 'living memory' (personal experience), to the memory of several generations, preserved as oral history. It thus provides a diachronic or 'natural history' perspective, rather than synchronic perspective. Hence a 'baseline' is not conceived as a static, snapshot phenomenon but as a more fluid and evolving one that offers a clearer perspective on deviations from 'normal' conditions. TEK [traditional ecological knowledge] can thus contribute to environmental assessment by providing a broader and deeper understanding of baseline conditions and a fuller understanding of local environmental processes, at a finer and more detailed geographical scale, than conventional scientific knowledge can offer (2000: 187).

But these assertions distort the nature of science and obscure the fact that its methodology has evolved *out of* “traditional knowledge”. Rather than being another “way of

knowing”, traditional knowledge is a precursor to science. All peoples, regardless of their culture and location on the planet, "survived" for "thousands of years". They did so by observing patterns in the environment they interacted with, and then using this knowledge to make their lives more secure. By developing an understanding of where animals could be found, what plants were edible or had curative qualities, and how natural materials could be fashioned into effective weapons and other tools, human beings were able to increase their productive and reproductive capacities. This aspect of traditional knowledge is often referred to as “local knowledge” – the knowledge one obtains from residing in a particular area, and observing and interacting with it for an extended period of time. This is information that everyone has about where things are located (where to catch a bus, for example), as well as their understanding of general environmental characteristics (the strength of a particular river’s current). It should be distinguished from references to “indigenous knowledge”, which maintain that a particular race or culture of people has special knowledge not available to others (generally for “spiritual” reasons).

It is important to understand, therefore, that *some* traditional knowledge (i.e. local knowledge, not spiritual beliefs) *may*, in fact, constitute knowledge - i.e. justified true belief. After all, indigenous peoples’ knowledge of local ecosystems is likely to contain many facts (even if it also contains some mistaken interpretations). Their knowledge is not likely to be *better* than scientific knowledge *where the latter exists*; but where the latter does not exist or is incomplete, indigenous people’s ideas might be useful at least as a starting point for more rigorous investigation. Each claim about aboriginal peoples’ “knowledge”, however, has to be judged on a case-by-case basis in the light of all available evidence – giving low but not zero weight to anecdotal evidence.

The most common contribution of local knowledge that is referred to in the literature is aboriginal hunters' understanding of where to find certain animals at certain times. Environment Canada biologists, for example, have used past aboriginal knowledge about the location of polar bear dens as the basis for some of their studies when scientific information was lacking (Van de Velde, 2003). This knowledge, however, was only useful because it had been written down by a priest who talked to the hunters soon after they returned from an expedition, indicating the importance of writing in scientific research. The information that is actually provided by hunters is impressionistic, and so it must be subjected to the systematic analysis provided by scientific methods before it can be considered "knowledge". It is not correct, therefore, for traditional knowledge holders to claim that they "know" that beluga whales are not threatened when they "see whales as far as the eye can see" (cited in Peters, 2003: 54), since the only way this can be determined with any degree of certainty is by developing a methodology to estimate the numbers of whales (usually by counting a segment of the population and then determining what proportion of the entire population the counted segment represents), recording the data, and comparing the numbers with previous studies. This difference between the observations of traditional knowledge and modern research, in fact, is recognized by a scientist interviewed by Evelyn Peters. The scientist points out that

we have a [traditional knowledge holder] comment on the condition of ice from traveling by skidoo – very good information, we know that. But it is impossible to know how [aboriginal traditional knowledge holders] can know other things. For example if we say that there are one million caribou up north and the Inuit

traditional knowledge says that there are not so many. Who knows how many caribou are up north? It is impossible if you do not count them (Peters, 2003: 54).

The impressionistic character of traditional knowledge's observations, in fact, makes them very different from scientific findings. Scientific research represents a significant advancement because the traditional reliance on subjective interpretation allows for the potential misunderstanding of natural processes. The sun appearing to revolve around the earth, flies "spontaneously generating" out of fruit, and heated water transmuting into mysterious substances, were all conclusions drawn from human observations and experiences (Rensberger, 1986: 154-57, 222-225, 325). Only when specific measurements and controlled experiments were undertaken by scientists like Galileo, Redi and Lavoisier were they shown to be false. Science, in fact, is an approach designed "to exclude or at least minimize the chance of being misled by an observation" (Rensberger, 1986: 14). By enabling us to discard those observations that do not stand up to repeated testing, the scientific method increases our understanding over time. The accumulation of more and more accurate observations also enables a body of theory to be developed, which can be continuously tested and refined by further observations.

Therefore, Usher's statement that scientific data is "static" is incorrect, implying that this information is less accurate than traditional knowledge's observations. It is by taking a "snapshot" of animals, vegetation, water and soil at regular intervals, in fact, that scientists are able to systematize the collection of data. In this way, they are able to provide a definite benchmark that can be directly compared with data that is collected under similar conditions at a later date. Science requires a detached examination of data to prevent premature generalization, whereas traditional knowledge is acquired as a by-

product of subsistence activities and is recalled from memory. Although it is beyond the scope of this paper to review the scientific literature on the accuracy of memory, Usher makes the implausible claim that the “memory of several generations” can be “preserved” to offer “a broader and deeper understanding of baseline conditions” than scientific records. Are we to believe that aboriginal peoples collected information on “baseline conditions” so that it could be used in future studies? And given that the “memory of several generations” is admittedly passed down in the form of myths and stories, how accurate could the data possibly be?

The inconsistent and imprecise character of traditional knowledge observations can be seen in the types of information that are supposed to contribute to baseline studies. In one study of the Liard River Basin, for example, there are tables referring to traditional knowledge data concerning the types and numbers of fish, waterfowl and game species in different areas of the basin (Macdonald Environmental Sciences Ltd., 1995), but all that is noted is whether a particular species’ abundance is "high", "medium" or "low" in different areas. Similar kinds of data are collected in another study concerning caribou health. Although the study maintains that collecting traditional knowledge is an “inexpensive, repeatable approach to monitoring”, caribou are categorized by aboriginal hunters as “skinny”, “not so bad”, “fat”, or “really fat”. Butchered caribou are also analyzed and the character of their fat deposits is classified as follows: “none”, “some”, “quite a bit”, or “lots” (O’B. Lyver and Lutsel K’e Dene First Nation, 2005: 46-52).

The data of both of these traditional knowledge studies would be much less useful for monitoring ecosystems than the more precise measurements being used in current scientific research because it is impossible to know exactly what was meant by the

subjective terms "high" versus "low", "skinny" versus "fat", or "some" versus "lots". Science today requires specific measurements so that the data collected can be compared with other studies. There also must be an explanation of the methods used for the collection of data so that it can be publicly evaluated. Traditional knowledge, on the other hand, is impossible to judge even on its own terms because the categorizations used are not definite and objective. As a result, contradictory impressions from traditional knowledge holders cannot be reconciled since there is no way of determining which elders' memories are accurate.

The above studies, however, are at least trying to present data in a systematic fashion. This is different from most traditional knowledge studies that simply provide random recollections from elders. A recent study attempting to use traditional knowledge to understand the environmental impact of climate change, for example, conducts interviews with "16 community members and elders considered to be local experts on sea ice" (Nichols et al., 2004). Although it is maintained that these "observations were remarkably consistent in providing evidence of local change in such variables as multiyear ice distribution, first-year ice thickness, and ice breakup dates", the observations – provided in the form of numerous quotations throughout the article - are so vague that they would not be useful in a scientific study on this subject. Quotations from elders such as "[Ice] goes out quicker now...It is different" (Edith Haogak and Sarah Kuptana), "Freeze-up is way later. Less [multiyear ice] doesn't make the water as cold (Roger Kuptana)", and "[The weather nowadays is] sometimes cold, but sometimes hot too...[but at the] wrong time. Way different now (Edith Haogak)" are provided to support the assertion that traditional knowledge can be used to "provide a baseline against which to measure change". This is in contrast to much more detailed and systematic information that

already exists - ironically mentioned in the above study - such as the dates barges can access northern communities each year, thirty years of documented ice draft measurements from submarine expeditions, and data from satellites.

Even more problematic than studies that provide vague recollections in the form of unsystematic quotations are those that offer "interpretations" from intermediaries in traditional knowledge research. As a result, it is common to hear grandiose claims like "the research team watched and listened to an elder explain in as much detail as any scientist, the effects of permafrost and drainage on the composition and condition of two neighbouring plant communities" (Johnson and Ruttan, 1993: 169), an Inuit assistant "knows more about the breeding habitat of the ringed seal than [wildlife biologists] do" (Smith and Stirling, quoted in Bocking, 2005: 224), or that "indigenous people...can make better predictions about the consequences of any physical changes or stresses they have previously experienced than scientists..." (Battiste and Henderson, 2000: 44).

These interpretations then are then adopted in actual scientific studies, which treat these highly speculative assertions as fact. In an otherwise highly informative study of human development, for example, Jared Diamond uses such interpretations to make the following dubious claim: "[hunter-gatherers and subsistence farmers] are walking encyclopedias of natural history, with individual names (in their local language) for as many as a thousand or more plant and animal species, and with detailed knowledge of those species' biological characteristics, distribution and potential uses" (Diamond, 1999: 143). But substantiation of the "detailed explanation" of the effects of permafrost, the actual knowledge of seal breeding habitat, the nature of the "better predictions" or the specific nature of these "walking encyclopedias", however, have not been elucidated. Claims about traditional knowledge's "precision", in fact, are often contradicted in the

same article. Peter Usher, for example, explains on one page that "in TEK, factual observations may be very precise and recalled in extraordinary detail" (2000: 187). No examples are given in support of this qualified generalization, but Usher goes on to claim two sentences later that traditional knowledge "tends to be localized and restricted to personal, uninstrumented observations, with little concern for precision in measurement, and it is normally unrecorded" (2000: 187).

When information is supplied, a researcher's interpretations often turn out to be unsubstantiated inferences. Fikret Berkes, a Professor of Natural Resources at the University of Manitoba, for example, claims in his book, *Sacred Ecology*, that traditional knowledge has been used to obtain both quantitative and synchronic (simultaneously observed) data, and that "traditional knowledge systems...use controlled experiments". The "quantitative measures" to which Berkes refers, however, were actually provided by a scientific survey of geese in the region, which just happened to coincide with "an elders' rule of thumb that 'for every goose killed, 20 must leave the Bay'" (1999:10). Similarly, the "synchronic data collected over large areas" by the "Dene Indian system of monitoring caribou movements" (1999: 10) was obtained from two scientific studies that used aerial surveys and tagging studies with radio collars as part of their research (1999: 97-8) and one traditional knowledge study making the dubious and qualified interpretation that the Dene' occupation of the area "may be viewed as strategically situated reconnaissance patrols for collecting information on caribou movements and intentions" (Smith, cited in Berkes, 1999: 100). Finally, the "controlled experiments" undertaken by traditional knowledge holders turns out to be an experiment carried out by Berkes himself (although he alleges to have received the "perfect design" for the experiment from the Cree fisher accompanying him {1999: 113}).

Often discussions about traditional knowledge conclude that its observations have “confirmed” scientific findings or “proved that some scientific results were incorrect” (Gilchrist and Mallory, 2007). But how can traditional knowledge “confirm” or “prove” anything when it does not have a methodology that can be evaluated? What actually occurred in these cases was that a more rigorous *scientific* evaluation of the data determined that previous findings (which may or may not have been consistent with traditional knowledge claims) were inaccurate. Scientific methods, in fact, always must be used to determine if traditional knowledge claims are accurate, making the observations of traditional knowledge holders redundant.

It is just such a capacity of scientific research to improve inadequate methodologies that is ironically used to justify a “diminished confidence in science and more credibility for indigenous knowledge” (Bocking, 2005: 232). This assertion concerns two examples relating to population estimates – one concerns the Beverly/Kaminuriak (or Qamanirjuaq) caribou herd and the other bowhead whales in the Arctic. In both cases, scientific estimates of wildlife populations resulted in hunting restrictions in the late 1970s, causing aboriginal opposition to these findings and the claim that populations were larger than wildlife biologists had documented (“Breaking the ice”, 1995; Freeman, 1992; Huntington, 2000; “National Park Service”, 2006; Spak, 2005: 236). As a result of this opposition, new studies were undertaken and methodological concerns, which advocates claimed were raised by the native hunters, addressed. Population estimates of both animal species were then increased and aboriginal peoples were permitted to resume hunting.

In the literature, this sequence of events is interpreted as traditional knowledge being “right” and science being “wrong”. But what these two examples really show is not the inadequacy of the scientific method, but how scientific studies can be revised and improved through the discovery of additional information. The ability to show that the claims of traditional knowledge holders were “right”, in fact, depended on revised *scientific* methods to more accurately estimate wildlife populations. And while traditional knowledge holders *believed* that the animal populations were larger than the original estimates, this belief was not based on a justifiable methodology; it was rooted in their political opposition to hunting restrictions – restrictions that would be relaxed if wildlife populations were shown to be larger than was first estimated.

A review of the traditional knowledge literature, in fact, shows that any knowledge that exists is essentially the information provided by a guide who is familiar with the local area. But this kind of knowledge is very basic and its incorporation hardly requires separate studies or a revamping of modern educational systems. This information also becomes less pertinent as more data about local ecosystems is accumulated. The northern environment has been studied scientifically for over fifty years, and data can be acquired from satellites, aircraft and other technological advancements. It is therefore questionable as to how much new information can be gained from the vague and unsystematic recollections of traditional knowledge holders.

If this is your science, where are your theories?

In addition to the vague and unsystematic character of the observations described above, traditional knowledge also differs from scientific research because it is not guided by

empirically tested theories. Science, after all, has made great advancements in explaining the nature of material forces, from the laws of thermodynamics to the composition of chemical bonding to the theory of evolution, and these insights provide direction to further studies. Traditional knowledge, on the other hand, has made no such progress. It relies upon ancient stories, passed down from one generation to another, where supernatural forces are believed to cause natural occurrences. And because “the spiritual acquisition and explanation of TEK is a fundamental component and must be promoted if the knowledge system is to survive” (Johnson, 1992: 13), traditional knowledge comes into direct conflict with scientific theories such as evolutionism. It is for this reason that concerns have been raised about the incommensurability of the two “knowledge systems” (Nadasdy, 2003: 62).

The theoretical impoverishment of traditional knowledge’s observations is obscured by the characterizations of science as “reductionist” and traditional knowledge as “holistic” (King, 1997; Watt Cloutier, 1997). Milton M.R. Freeman, for example, maintains that while scientists “seek to understand organisms or nature by studying the smallest or simplest manageable part or sub-system in essential isolation”, traditional knowledge “eschews reductionism, placing little emphasis on studying small parts of the ecological system in isolation....” (Freeman, 1992). But studying “small parts... in isolation” is a necessary prerequisite for understanding the “whole”, otherwise opinions about “organisms or nature” are just guesswork. In fact, traditional knowledge’s “holism” really amounts to a *lack* of understanding of the parts, where all “interconnections” are perceived in terms of a nebulous spiritual totality (see, for example, Augustine, 1998: 63)

Similar problems can be found when one investigates claims about traditional knowledge's insights with respect to the theory of relativity and quantum mechanics (Cajete, 2000; Jefferson, 2001; Little Bear, 1994). A number of aboriginal and non-aboriginal theorists have asserted that aboriginal cultures have an intuitive understanding of the nature of the universe, one even arguing that "quantum theory *validates* indigenous concepts" (Duran, 2007: 2). But nowhere is it explained how aboriginal cultures, without the aid of measurement or mathematics, were able to develop such a sophisticated theoretical framework about the nature of matter. Unlike the gradual evolution of modern physics, which emerged out of detailed mathematical understanding of the deficiencies of Newtonian predictions, aboriginal conceptions are recounted only as general platitudes, unsubstantiated spiritual beliefs, or dubious assertions about the "verb-oriented" character of aboriginal languages (Little Bear, 1994: 70). Phillip H. Duran, a former Dean of Science and Mathematics at Northwest Indian College, for example, maintains that "modern physics provides strong evidence that theory and fact regarding what is known about the universe compare favorably with key Native concepts". These "Native concepts", however, merely consist of the following:

- All things are imbued with spirit.
- All things are related and connected and belong to a coherent whole.
- The world is in constant flux; i.e., change is constantly occurring.
- Matter is equivalent to vibrating energy.
- The earth is a system of cycles.
- A mysterious energy or ultimate spiritual Power pervades the universe, also referred to as the Great Mystery.

- Renewal and self-organizing processes spontaneously occur in nature.
- Natural law is preeminent, the body of laws forming their own authority system (Duran, 2007: 5).

Once again, it is up to the “interpretation” of the traditional knowledge advocate to vouchsafe that aboriginal beliefs have an “amazing resemblance” to “some of the insights into the structure of the universe that are emerging from modern science” (Peat, 1996).

The absence of a theory to guide traditional knowledge’s observations becomes especially apparent in studies of animal behaviour. In contrast to scientific studies, which would be guided by an understanding of empirically tested evolutionary principles, traditional knowledge research merely provides a number of unsubstantiated opinions from elders. One traditional knowledge study prepared for the West Kitikmeot Slave Study, for example, claims that “caribou migrate to people who live well and behave properly”, where “behaving properly” includes using all parts of the animal, not hitting them with sticks, and knowing Dogrib caribou terminology (Dogrib Treaty 11 Tribal Council, 1998: 18; 1999: 20). It is also maintained that the caribou always follow a leader that is the mother of a large bull, but it is not shown how the elders could determine this. Stephen C. Ellis even complains about the “scientization” of traditional knowledge in animal behaviour studies – the fact that “when traditional knowledge is not substantiated by scientific methods, results, and conclusions, it is commonly ignored or discarded” (2005: 72). To illustrate this point, he notes the elders’ explanation of a westward shift in muskoxen distribution in terms of their belief that the animals were “following the people because they missed them and wanted their company”. Ellis

criticizes wildlife biologists for ignoring the elders' interpretation (2005: 73), but how could a "further dialogue" take place if this was just an unsubstantiated opinion? Does this mean that scientists should consider all the opinions of elders as a potential source of knowledge, even when there is no justification for these beliefs?

The absence of theory is also a deterrent to the use of traditional knowledge's "classification systems" to interpret data. It is now claimed that a number of "ecological insights" can be gained through the study of "folk taxonomies", but this is not apparent from a review of these systems. Douglas J. Nakashima, for example, maintains that the taxonomy developed by the Inuit "reveals a strong ecological logic" that has the ability "...to advance our understanding of arctic ecosystems..." (Nakashima, quoted in RCAP, 1996, Vol. 4: 139-40). This "ecological logic", however, merely consists of dividing organisms into the following six divisions: "those that rise to the surface", "those that walk", large birds, small birds, large motile fish and "a diverse group of bottom-dwelling marine organisms, that includes fish, clams, sea urchins and seaweeds". The use of this kind of "classification" appears to be limited to Inuit subsistence, since it seems to reflect the fact that the methods used for hunting and/or gathering the six types of animals (not to mention seaweeds) would differ considerably.

A simple description of how a particular culture interacts with its environment does not provide the basis for a system of classification that advances human knowledge. To do so, the information provided must have some universal ecological applicability. This is the case for the current classification system that is used in biology (originally developed by Carolus Linnaeus), because it greatly assists our understanding of evolution (Rensberger, 1986: 234-5). The Linnaean system is a valuable tool for helping us to

understand the world because it reflects the very nature of organisms, by classifying them according to “key” or foundational characteristics, instead of more arbitrary features such as size, shape or colour and the methods of hunting them. Biological classification has become a complex process whereby scientists use developments in a variety of disciplines, including biochemistry, molecular biology, embryology, paleontology and ethology to learn how various organisms have changed and evolved throughout history

It is important to recognize, however, that the Linnaean system of classification has itself evolved, showing the progressive character of scientific research. At its inception, classification embodied schemes for grouping organisms that in some cases turned out to be as biologically irrelevant as those found in “traditional knowledge”. The system we have today, in fact, is supplemented by cladistic principles, which stem from a long series of modifications designed to accommodate more precise biological concepts, particularly evolutionary ones (personal communication with Norman Levitt, January 18, 2007).

Today, organisms are classified with the help of a “cladogram” – a diagram that “shows the relationship of a group of species based on the fewest number of shared changes that have occurred from generation to generation” (“Classification”, 2006).

Rather than providing additional insights to modern research, therefore, serious difficulties occur when incorporating the empirical component of traditional knowledge. Traditional knowledge’s interpretations of natural occurrences tend to be incommensurable with scientific theories such as evolutionism because they are either spiritually based or not applicable outside the confines of aboriginal subsistence.

Traditional knowledge’s observations are actually what John E. Dodes, the president of the New York Chapter of the National Council Against Health Fraud, has referred to as

"junk science". According to Dodes (2001), "junk science results when conclusions are drawn using low-quality data such as testimonials, anecdotes, and case reports rather than from randomized, controlled clinical experiments". Dodes notes that junk science is generally used "in support of a political or legislative agenda", which is driven by interested parties who have an interest in suppressing reliable scientific evidence. It is just such an agenda, in fact, that is causing exaggerated claims about the importance of traditional knowledge.

The confusion of popularity with validity

Until twenty or so years ago, no one had heard about "traditional knowledge"; now it is ubiquitous in the social sciences. It is sought after by governments, studied in universities around the world, recognized in environmental assessment processes, and promoted by international protocols for environmental protection and third world development (Simpson, 2003). How did traditional knowledge become such a hot commodity?

The current interest in traditional knowledge can be traced back to changes in the discipline of anthropology. Initially, anthropologists studied traditional knowledge in order to document tribal cultures, so that their understanding of the world could be compared with modern societies (Dene Cultural Institute, 1994: 5; Kuhn and Duerden, 1996: 72). In the 1950s, however, the focus shifted from objective documentation to advocacy as anthropologists took on the role of "validating" aspects of aboriginal cultures that they perceived had been "deprecated by the dominant culture" (Bocking, 2005: 225). As Stephen Bocking explains, "these trends have led many anthropologists

to view indigenous knowledge...as part of the defining subject matter of their discipline” (2005: 226) and to become “intermediaries between Native communities and the rest of society” (2005: 231). Anthropological consultant Marc Stevenson, for example, points out that an anthropologist can be useful in traditional knowledge research because they are “cognizant of asymmetrical knowledge-power relations in co-management processes” and have the “professional literacy” to “[create] the space for [aboriginal peoples] to bring their own ways of knowing, thinking, and speaking...to the co-management table” (2004: 104; see also Usher 2000: 184, 190-1).

This transformation of anthropology coincided with two other developments in the 1960s – a heightened environmental consciousness and increasing activism for the rights of colonized peoples around the world, including aboriginal peoples (Dene Cultural Institute, 1994: 5; Johnson, 1992: 5). The emerging environmental movement at this time was becoming increasingly concerned about environmental degradation, and many “deep ecologists” and “dark green” environmentalists began to reject science and technology and embrace the romantic idea that traditional “world views” were the key to living harmoniously with nature (Devall and Sessions, 1985: 127; Lewis, 1992: 42-5; McKenzie, 2002: 38-42). These developments congealed in the 1980s “when interest in Indigenous ways of knowing...and understanding the environment became more widespread and, in particular, was adopted by international development organizations” (Spak, 2005: 234). It has been noted, in fact, that the growth of traditional knowledge research over the past two decades has been due to “the presence of a dedicated group of core scholars producing not only academic material but also feeding information into international policy circles” (Berkes, 1999: 17).

These international developments have legitimized traditional knowledge research in Canada. This was especially the case in the Northwest Territories, where aboriginal peoples comprised the majority of the population. Increasing international recognition of traditional knowledge led the NWT's Government Leader, Dennis Patterson, to claim that there was a "wide spectrum of areas where traditional knowledge may have an influence on government policy and programs" during the 30th annual meeting of the Canadian Commission for the United Nations Educational Scientific and Cultural Organization (UNESCO) in 1988 (quoted in Legat, 1991: 1). This was part of the justification for the development of the Government of the Northwest Territories' "Traditional Knowledge Policy". It then prompted a number of federal government departments and agencies, especially the Canadian Environmental Assessment Agency (CEAA) and the Canadian International Development Agency (CIDA), to pursue their own traditional knowledge initiatives (Usher, 2000: 184).

These kinds of government initiatives, however, are more reflective of an attempt to symbolically recognize traditional knowledge than evidence of its incorporation into modern research. It is often argued in the traditional knowledge literature that government researchers and industry are merely paying lip service to aboriginal peoples' "world views", rather than giving them a significant role in the policy process (Ellis, 2005; Simpson, 1999; Spak, 2005; White, 2005). As Paul Nadasdy points out,

in spite of nearly fifteen years of effort by countless scientists, resource managers, Aboriginal people, and social scientists to develop a method for integrating scientific and traditional knowledge...there has been little actual progress towards achieving such an integration. Despite the establishment of numerous co-

management regimes across the North, scientists and resource managers remain essentially at a loss regarding TEK; many are still not quite sure what it is, much less how to use or integrate it with scientific research (Nadasdy, 2003: 114-15; see also, Kuhn and Duerden, 1996: 72-73, 79).

The Royal Commission maintains that this problem is largely due to "scientific scepticism" concerning "the credibility or reliability of aboriginal information gathered through interviews" leading some scientists to "dismiss Aboriginal knowledge as subjective, anecdotal and unscientific" or "inconsequential and unfounded" (RCAP, 1996, Vol 3: 526; Vol 4: 457; see also Bocking, 2005: 237 and Spak, 2005: 242). It is noted by Paul Nadasdy, however, that these doubts are rarely expressed publicly or in the presence of aboriginal peoples. Instead, he maintains that there is a "hidden discourse" with respect to traditional knowledge, whereby scientists and resource managers publicly support traditional knowledge, but privately question its value for research (Nadasdy, 2003:118).

This suspicion of scientists towards traditional knowledge is generally explained in terms of "unequal power relations" (Bocking, 2005: 234-235; Nadasdy, 2003: 132-143; RCAP, 1996, Vol. 3: 526; Spak, 2005: 243). Such an assertion adopts the postmodern relativist position discussed above, which assumes that all "world views" are equally valid (see, for example, Agrawal, 2002: 293). Science is believed to have achieved widespread acceptance, not because of its explanatory capacity, but due to its privileged position in powerful state institutions. But as was pointed out earlier, science has a methodology that separates out unrepresentative observations, and it has developed a body of theory that is able to offer explanations of natural processes that can be tested. This means that

science has demonstrable value for improving human understanding – a value that is independent of culture or political considerations. Therefore, it is not surprising that scientists are reluctant to embrace traditional knowledge, which does not have any of these capacities.

What is hard to fathom, in fact, is not that traditional knowledge has failed to gain acceptance by the scientific community, but that criticism of it remains a “hidden discourse”. Incredibly, despite the numerous problems with incorporating traditional knowledge into scientific research, there has been no scholarship (except our own articles) that publicly questions its use in public policy. If there is so much scientific opposition to traditional knowledge, what is stopping these concerns from being aired publicly?

This circumstance can be explained by the political climate in which traditional knowledge is currently studied (Howard and Widdowson, 1997; Widdowson and Howard, 2002). In addition to the fact that scientists are required to accommodate traditional knowledge (or at least pretend to do so) as a condition to pursue their research (Nadasdy, 2003: 118), there is tremendous pressure within the bureaucracy for public servants to promote traditional knowledge publicly, including the possibility of disciplinary action if traditional knowledge is criticized. Such pressure is largely due to the fact that governments are negotiating land claims and self-government agreements to facilitate resource development in aboriginal traditional territories, and one of the conditions of settlement is that aboriginal peoples’ traditional knowledge be considered in scientific studies (Bocking, 2005: 232). As Daniel Clément, a traditional knowledge consultant, maintains,

in Canada, northern industrial development has become prominent in the last decade and there is some resistance to that development from northern indigenous communities. The new way to try to pursue that development is to present to Native people a new candy called TEK, trying to have them believe that now their opinions are considered as important as any other knowledge in that development, and parallely [sic], trying to integrate them in the process (www.courses.washington.edu/tek/tek3.htm).

Furthermore, the idea of traditional knowledge is used to justify self-government initiatives since it is argued that aboriginal peoples' distinctive "world view" can only be protected by a parallel political system for the native population (Battiste and Henderson, 2000: 5, 277-8; Stevenson, 2006).

What is important to recognize, however, is that the demand that this knowledge be considered involves a continuous dispersal of funds to aboriginal organizations (Stevenson, 2006). Traditional knowledge is a lever that is used to extract government transfers, not just for studies to document traditional knowledge, but for various "co-management" boards that have been formed to integrate traditional knowledge into environmental management. These funds are distributed to "traditional knowledge holders", aboriginal leaders, and most importantly, the non-aboriginal consultants (many of them anthropologists) who act as "mediators" or "facilitators" in traditional knowledge research. Many of the studies referred to in this paper, for example, obtain contracts to undertake traditional knowledge studies, thus compromising their objectivity.

The case of the Northwest Territories provides a good example of the role of consultants in promoting traditional knowledge research. The pressure to incorporate traditional knowledge in government policy began in the 1980s, when an "ad hoc working group" on traditional knowledge was formed by bureaucrats and consultants to investigate how aboriginal "ways of knowing" could be incorporated into government policy. After a number of meetings, correspondence was initiated by the Assistant Deputy Minister of Culture and Communications to make this group more official. A Traditional Knowledge Working Group was formed and this senior bureaucrat took on the role of chairing and coordinating it after leaving the government to become a consultant. The Working Group subsequently recommended a number of bureaucratic and legal processes, including the "financial resources to support these initiatives". It also argued that "career paths, opportunities for promotion, job evaluations and professional development must place tangible value on attitudes, skills, experience and work records which demonstrate traditional knowledge awareness and appropriate use" (Legat, 1991: 24, 33). As a result of this report, the Government of the Northwest Territories developed the aforementioned "Traditional Knowledge Policy" (Renewable Resources, 1993) and also funded the West Kitikmeot Slave Study ("WKSS approves first research projects", 1996).

The financial benefits that can be obtained from these contracts explain why assertions about traditional knowledge's importance are usually accompanied by appeals for more funding (see, for example, AFN and Inuit Circumpolar Conference, 1994: 63-4; Duerden, 2005: 310; Peters, 2003:49). As one report by a traditional knowledge consultant points out, "many elders are open to the documentation of their knowledge, but it is a time-consuming and therefore expensive process. Financial resources are rarely made available for the kind of traditional knowledge research which is both appropriate for

First Nations and Inuit communities and rigorous enough to earn credibility among western scientists and policy makers” (Brockman et al., 1997: 7). This explains the increasing preoccupation with “intellectual property rights” with respect to traditional knowledge (Forbes, 1997), even though its value has not been demonstrated. The bizarre scenario is that “knowledge” that is not needed must be considered and paid for, and then its coerced “use” is heralded as evidence of its necessity.

It is important to point out that the identification of these economic interests is not meant to impugn the integrity of traditional knowledge researchers or to imply that they are intentionally trying to distort their research findings. It is entirely possible that traditional knowledge advocates are completely convinced about traditional knowledge’s validity and the contribution that it can make to modern research. At the same time, however, it is important to be cognizant of the fact that, similar to the way in which a drug researcher can have ties to pharmaceutical companies, economic interests shape the promotion of traditional knowledge research. Economic incentives mean that researchers who receive funds for documenting traditional knowledge will be subconsciously predisposed to exaggerate its importance, while avoiding arguments questioning its validity. Aboriginal organizations, in fact, only hire researchers who are traditional knowledge advocates, and therefore a criticism of traditional knowledge would directly impact the careers of those engaged in this research.

It is commonly recognized in the policy literature that the evaluation of programs should not be undertaken by those who receive the funding to implement them, as the latter have a financial stake in the program’s existence and growth. Entrusting those in charge of a program with its evaluation, in fact, could easily result in a wasteful use of government

funds. In the case of traditional knowledge research, however, it is always advocates who undertake the evaluations. The best example of this circumstance was the West Kitimeot Slave Study, where traditional knowledge researchers, not scientists, conducted the peer review of the studies. The result was millions of dollars being spent on studies that contributed little, if anything, to our understanding of northern ecology.

But the uncritical promotion of traditional knowledge is not only a waste of government resources; it also has a number of negative consequences for environmental sustainability, as well as for policies pertaining to aboriginal peoples more generally. The first is the fact that many aboriginal people are actually in a conflict of interest with respect to environmental management, and this is disguised by the current demands to include traditional knowledge. Aboriginal peoples often occupy the position of “productive interests” in policy development – i.e. they obtain material benefits from the extraction of resources - and there are numerous examples of aboriginal groups supporting unsustainable environmental practices when it is in their economic interest to do so (Poelzer, 2002). These interests, in fact, could result in the unconscious distortion of information by traditional knowledge holders, as is perhaps the case with recent research pertaining to polar bears (“Polar Bear Quotas”, 2005; “The polar bears are on literally thin ice”, 2006) and bowhead whales (McCluskey and Hrynyshyn, 1998; Wilson and Hrynyshyn, 2001).

In addition to the possibility of traditional knowledge holders’ impressions being shaped by their material interests, it is also important to recognize the environmental consequences of the tendency of governments and industry to fund traditional knowledge as an incentive to allow development to proceed. This was the case with the attempts of

BHP to develop a diamond mine in the Northwest Territories. Although BHP declared that it did not know what traditional knowledge was or how it could contribute to the environmental assessment of the mining development, it agreed to pay for the research that was being undertaken, presumably to provide a financial “incentive” for aboriginal groups to go along with the project. Similar types of incentives are associated with the promotion of traditional knowledge at the international level, where entities such as CIDA and the World Bank fund traditional knowledge studies in developing countries to overcome resistance to development. The assumption that aboriginal peoples are “natural stewards” of the environment, therefore, could give projects that have been vetted by traditional knowledge findings an artificial legitimacy.

This tactic, in fact, is already being exploited by Shell Oil in its efforts to portray oil sands as environmentally sustainable. In a half page advertisement in *The Globe and Mail* on January 26, 2002, for example, it is noted that “Bertha Ganter, an elder from the local community, is helping us to see the environment from a new perspective. She’s teaching us about Traditional Environmental Knowledge...we’re applying what we’re learning not just to improve our Athabasca Oil Sands Project, but to ensure we respect the needs of generations to come”. But nowhere in Shell’s literature is it shown how this “new perspective” will help to “respect the needs of generations to come”. All this advertisement does is to encourage readers to accept environmentally destructive activities such as oil and gas development on the basis that an aboriginal elder supports it (presumably after receiving funds as a “consultant”).

Traditional knowledge enjoys a layer of unqualified support on the political Left, partially because it is believed that “advocacy of traditional knowledge threatens the

stability of conventional power structures rooted in the industrial complex” (Ellis, 2005: 75; see also Simmons, 2006). What is not understood, however, is that the values and beliefs of traditional knowledge are not opposed to capitalist imperatives (Newhouse, 1993). Instead, demands for the inclusion of traditional knowledge are used to obstruct development so that aboriginal organizations can extract rent in the form of royalties and honoraria. Once these payments are acquired, development proceeds and traditional knowledge just becomes another cost of doing business. In fact, assertions about the importance of traditional knowledge can even be used to support the right-wing agenda of deregulation, whereby aboriginal peoples’ different “way of knowing” is used to justify a lower standard of environmental protection so as to facilitate development and increase rent.

The sympathies of the political Left for traditional knowledge initiatives also stem from its natural support for the aspirations of impoverished and repressed peoples. Traditional knowledge is perceived as a harmless way to “recognize” and “respect” aboriginal culture, which is thought to be an important step in righting past wrongs and achieving social justice. But contrived support for traditional knowledge is not only condescending; it also will have the opposite effect of what its promoters are trying to achieve. The belief that aboriginal peoples have a spiritually different “knowledge system” does not facilitate their emancipation because it acts to mask the low level of education that actually exists in the native population. And since traditional knowledge looks to the past for answers and is opposed to skepticism and critical analysis, it alienates aboriginal people from science and inhibits their participation in the wider society, perpetuating their dependency and marginalization.

The perils of contrived respect for traditional knowledge

The promotion of traditional knowledge is based upon the idea that aboriginal peoples have a culturally significant “world view” that is beneficial, and different from science. But what does it mean for one ethnicity to understand the world differently from another?

Describing traditional knowledge as another “way of knowing” disguises the fact that most of the aspects of this “world view” have nothing to do with knowledge. There is, in fact, no such thing as a different “knowledge system”. Knowledge is what everyone acquires when they understand the nature of matter - which is universal. Science is the method that can be used by all peoples, regardless of their culture or traditions, to understand this material reality. The use of the adjective “western” to modify “knowledge” or “science” is an attempt to beguile anti-scientific sentiment.

The idea that there is a universal reality that *can* be understood, however, does not mean that everyone understands it. At one time in human history, people believed that the world was flat. This was the “world view” that existed at the time, one that was “different” from the understanding that exists today. But scientific evidence shows that the belief in a flat earth is erroneous, even though some people might still think this is true. In other words, we cannot “know” that the earth is flat, and it would be unthinkable to insist that the proposition be “respected” and “recognized”.

The fact that knowledge only can be said to exist when sufficient justification is provided means that scientific claims about the nature of the universe must change when new evidence becomes available. Consequently, it is incorrect to imply that science itself is

“flawed” if the methods used in a particular study result in inaccurate data or an incorrect interpretation of research findings; the significance of science is not that its research is always “right” but that the methods used are revised and conclusions discarded if they are shown to be inadequate. In this way, a more comprehensive understanding of the world can gradually emerge over time.

Traditional knowledge, on the other hand, does not have this capacity to progress because it involves repeating ancestral patterns, binding its “holders” to mythology from the past. This assertion about the static character of traditional knowledge, however, is contested in the literature, which maintains that it is “adaptable” (Abele, 1997: iii; Brockman et al., 1997: 1; Usher, 2000: 85-6). But if traditional knowledge changes when new information is made available, what is meant by comments about elders being “custodians of traditional knowledge” or that traditional knowledge “is passed down from one generation to another”? It would not make sense to say that there are “custodians of science” or that scientific theories are “passed down” through the generations, since these theories are abandoned once they are refuted. This is why one of the essential characteristics attributed to science is its deployment of “skeptical rigour” to understand the material causes of natural phenomena (Science, History of, 2006).

The static character of traditional knowledge is illustrated by the fact that it is immune from questioning, preventing its methods from being assessed. It is assumed to be “held” by people with revered qualities, usually elders, whose views must be uncritically supported. With respect to northern aboriginal peoples, for example, the political scientist Graham White states that “the wisdom of elders is accepted without question”. In contrast to what he characterizes as “the aggressive, adversarial approach to expressing

disagreement or challenging assertions” that exists in “EuroCanadian” systems, White cites an aboriginal participant at a workshop who maintains that “questioning TK is attacking the integrity of the elders...which is the most disrespectful thing you can do” (White, 2005: 18). A common demand, in fact, is that even the spiritual component of traditional knowledge should be “respected” (Augustine, 1998; Battiste and Henderson, 2000; Berkes and Henley, 1997b; Simpson, 1999), and accusations of “disrespect” meet any attempt to even ask questions about the methodology of traditional knowledge. In cases where skepticism begins to emerge, public “information sessions” about traditional knowledge are structured to prevent critical questions from being raised.

The huge infrastructure of scholarly studies, peer reviewed journals, government programs, and “institutes” giving legitimacy to the idea of traditional knowledge, in fact, often results in assertions that the importance of traditional knowledge has already been determined, so its value to scientific research does not need to be discussed (Usher, 2000: 185). Mary Simon, Canada's ambassador for Circumpolar Affairs and to the Kingdom of Denmark, even argues that “we would be taking a step backwards if we fell into the debate again of what indigenous knowledge is and does it or does it not have value” (Simon, 2006).

But it is exactly the idea that “traditional knowledge does...have value” that has not been substantiated. In spite of the voluminous literature, the case about the benefits of incorporating traditional knowledge is very weak, often relying on fabrications and obfuscation. This is why we see our ten years of analyzing traditional knowledge claims as one of “listening to the silence”. If we are supposed to embrace the claim that traditional knowledge provides a valuable contribution to modern research, “respect”

notwithstanding, it is up to traditional knowledge advocates to convince us that this is the case.

The objective distance that is needed to evaluate the current claims about traditional knowledge, however, is lacking. Most of the studies of traditional knowledge are undertaken by traditional knowledge advocates, many of whom have a vested interest in the assertion of traditional knowledge's validity. There is even a reluctance to critically evaluate traditional knowledge research amongst those who have no political stake in the issue. Instead, the tendency is for policy analysts and social scientists to *want to believe* that traditional knowledge has value. Supporting traditional knowledge, in fact, is seen as a harmless way of building aboriginal self-esteem so that the native population can overcome the harmful effects of colonization.

Behind this lies the fear that the conclusion that traditional knowledge cannot contribute to scientific research somehow is equivalent to a racist devaluing of aboriginal peoples as "inferior". This is not surprising when one considers that traditional knowledge advocates often make such misguided accusations when their research is challenged. Leanne R. Simpson, for example, notes that "if you want your knowledge to be legitimate in this society, you have to prove it is legitimate on western terms". According to Simpson, this "is not only epistemologically unsound, it is also racist" (Simpson, 1999: 62; see also Stevenson, 2001: 78).

But these kinds of arguments rely on a confusion of race with culture. While peoples with different ancestral or biological characteristics can all obtain the highest levels of educational excellence and offer valuable contributions to humanity, they can be deprived

of academic achievement when their learned behaviour (i.e. culture) inhibits their understanding of the universe. It is also important to understand that there is a difference between the *political aspiration* that all people should be entitled to equal rights and equal access to the necessities of life and the *epistemological assumption* that all ideas are equally valid. While the former is justifiable, the latter is not. Scientific methods have shown that not all ideas have equal explanatory value; in fact, it is the discarding of epistemologically “inferior” ideas that has enabled science to progress.

As a result of these confusions, it is not recognized that the very practices, values and ideas that are promoted as "traditional knowledge" are actually detrimental to education. The promotion of such a “world view”, with its intrinsic elements of spiritualism and a lack of rigorous methodology, will exacerbate the problem of native students’ performance in the Canadian school system, which already indicates that they are not being well served. Those studies that are available show that native students are in the lowest strata of the population, particularly in the sciences (RCAP, 1996, Vol. 2(1): 7; Vol. 2(2):794; Vol. 4: 436-38).

Promoting these cultural aspects, in fact, results in an entrenched resistance to education in aboriginal communities. There is a deep suspicion of science due to the fact that it is perceived as being contrary to the interests of aboriginal peoples (Wenzel, 1999). Science also is described as a form of “cognitive imperialism” since it causes aboriginal peoples to “lose” certain aspects of their traditional culture, such as Animistic beliefs (Battiste and Henderson, 2000: 134-5; 92-6). This explains the concern with the “problem” of the “scientization” of traditional knowledge (Ellis, 2005: 72) and the fear that it will be

destroyed if it is subjected to the “instrumental rationality of science” (Kofinas, 2005: 188).

Of all the obfuscation that is going on in the promotion of traditional knowledge, the last - i.e. the rejection of science itself - is the most destructive. By saying that there are other “ways of knowing”, there is an encouragement to forego the intellectual development that comes with the understanding of scientific methods and their application. This rejection of science indicates an inability to distinguish between the scientific method and the various political and economic interests that have oppressed aboriginal peoples historically. It is not understood that science is the only methodology that can enable all cultures, including aboriginal peoples, to understand the material world, and that isolation from it results in ignorance and confusion. Aboriginal peoples’ opposition to science, in fact, leaves them open to manipulation from the very interests that are benefiting from their current vulnerability.

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