Indigenous Principles of Wild Harvest and Management:
An Ojibway Community as a Case Study

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Introduction

In colonial nations such as Canada, there have been increasing requirements for governments to engage directly with Indigenous communities regarding their rights and interests in natural resource management generally, with specific focus on the role of Indigenous knowledge systems in harvest management decision-making (Tikina et al. 2010). Canadian courts have repeatedly focused on two factors with extremely important consequences for the Nation-to-Nation relationships that exist between the Crown and the Indigenous communities: (1) Indigenous rights must be reconciled with other government responsibilities including justified infringements for the often ill-defined concept of ‘conservation’ (Crawford and Morito 1997; Ayers 2005; Nadasdy 2005), and (2) the ‘honour of the Crown’ must be maintained when consulting Indigenous communities, especially with regard to management decision-making about their natural resources (Morito 1999; Slattery 2005). Given the legal necessities for a Eurocentric government to engage in honorable and meaningful consultation with Indigenous communities about conservation ethics and natural resource management, it remains to be seen how these Indigenous-Western science cross-cultural consultations should be undertaken (Crawford et al. 2010). The trend to date has largely been the domination of Western Science over Indigenous knowledge systems (in the sense described by Pentland 1995); circumstances in which Indigenous knowledge holders might be requested to provide information to scientists/managers who would evaluate it for reliability and utility before deciding whether to incorporate in a science-based management program (McGregor 2004; Clark and Slocombe 2009; Lyver et al. 2009). Some scholars have suggested that conflict caused by this kind of cultural domination could be reduced if governments and Indigenous communities re-initiated their discussions with an examination of similarities and differences in principles regarding ‘conservation’ and ‘natural resource management’ (Ratner and Holen 2007; Ebbin 2011; Watson et al. 2011). In this way, the communities could develop a structured and respectful dialogue about wild harvest management in the spirit of reconciliation and productive collaboration.

There have been numerous attempts by Western scientists to reach internal consensus on general principles for natural resource management (Holt and Talbot 1978; Christensen et al. 1996; Mangel et al. 1996; Dale et al. 2000), habitat management (Lindenmayer and Nix 1993; Botsford et al. 2003; Naiman and Latterell 2005), harvest management (FSC 1996; Heissenbuttal 1996; Lauck et al. 1998; Fowler 2003; FAO 2001; González-Laxe 2005; Ume 2006; Shelton and Sinclair 2008; Francis et al. 2007; MSC 2010) and biodiversity/endangered species management (Walters 1991; Tilman 1999; Ebbin 2011).

Although the practice of ‘defining principles for resource management’ is not something that Indigenous societies typically engage in, there have been many attempts to survey and understand Indigenous values and social norms in this regard (Ratner and Holen 2007; Turner and Berkes 2006; Watson et al. 2011). For example, Alcorn (1993) offered a general treatise on the relationship between Indigenous worldviews and the Western idea of ‘conservation.’ Berkes et al. (1998) explored fundamental properties of ecosystem-like concepts in Indigenous cultures. In the 2011 ‘Principles of Tsawalk,’ Umeek (E. Richard Atleo), a hereditary Nuu-Chah-Nulth chief, discussed his culture’s principles of Recognition, Consent, and Continuity and their important role in maintaining balance—in contrast to the global consequences of Western ‘sustainable’ development. Prober et al. (2011)
characterized the principles of Australian Aboriginal ecological calendars and indicators and evaluated their possible interaction with Western social-ecological systems for natural resource management.

Over the past decades, a growing body of community-based collaborative studies has provided more depth and insight into the structure and function of traditional Indigenous knowledge systems and their associated decision-making processes for harvest management (e.g., Feit 1986; Brightman 1993; Horstman and Wightman 2001; Ayers 2005; Castleden et al. 2009; Lyver et al. 2009; Moller et al. 2009; Bilbao et al. 2010). However, as Jones et al. (2010) caution, researchers must always be careful to consider Indigenous community-based value systems as spatially and temporally local expressions of their culture. Efforts to identify general Indigenous ‘principles’ of natural resource management must be tempered by conscious recognition that (1) ‘principles’ are social constructs which are deeply embedded in cultural and social norms that are typically complex and subtle to the outsider (Houde 2007; Peloquin and Berkes 2009), and (2) Indigenous cultures and worldviews are inherently more diverse than the relatively homogenous standards of Western science (although see a provoking challenge of this assumption about scientific homogeneity by Watson-Verran and Turnbull 1995).

The goal of our investigation was to develop and demonstrate a process for engaging with Indigenous communities to inquire about the structure and function of social norms in their culture that could relate to Western ‘principles’ for natural, renewable resource management. In order to achieve this goal, we worked in partnership with a sponsoring Ojibway community on a case study to employ community-based, participatory research methods with traditional people who were most familiar with social norms for harvest management.

Methods

This research employed a case study approach with the Chippewas of Nawash Unceded First Nation, hereafter referred to as Nawash, the home community of the first author. A research proposal for this investigation was reviewed and approved by Nawash Band Council, who appointed a male Elder to serve as Liaison, to ensure that the implementation of methodologies was culturally appropriate for the community. The methods for this research project were reviewed and approved by the University of Guelph Research Ethics Board.

Nawash and the Chippewas of Saugeen First Nation, collectively referred to as the Saugeen Ojibway Nation, share a series of distinctive treaties signed with the Crown in the mid-1800s that are recognized among the most clearly proven rights of Canadian First Nations (Blair 1997, 2000; Walters 1998). Their traditional territories (Fig. 1) comprise a land area of 6,500 km² extending from the Saugeen (Bruce) Peninsula into southern Ontario, as well as numerous tributaries, and more than 500 km of shoreline and 10,000 km² of Lake Huron extending offshore into both the Main Basin and Georgian Bay (Lytwyn 1992; Morito 1999). The Saugeen Ojibway Nation also have exclusive harvesting rights in a 930 ha hunting reserve on the northern Saugeen Peninsula, as well as an exclusive commercial fishing reserve negotiated with the Crown in Lake Huron extending north from central Main Basin, around the Saugeen Peninsula and associated Fishing Island, and east to the middle of southern Georgian Bay. The Nawash reserve itself is approximately 64 km² in land area, located at Neyaashiinigmiing; an Ojibway name translating roughly to “point of land covered on three sides by water” commonly referred to in English as Cape Croker (Borrows 1997; Keeshig-Tobias 1996). The on-reserve population of Nawash is approximately 700 people, while the off-reserve population is approximately 1,500 people (Chippewas of Nawash Band Council Membership Office, Iris Ashkewe, pers. comm. 2009).

A case study approach was used in this investigation because it provided the best opportunity for in-depth exploration of the socially constructed nature of an Ojibway knowledge system—especially the structure and function of fundamental principles used in resource management (Nakashima 1993; Turner et al. 2000; Kendrick and Manseau 2008). Nawash was a natural choice for this case study because (a) the community has a long history of interactions (both collaborative and conflicted) with Western scientists/managers over numerous natural resource issues (Borrows 1997; Akiwenzie and Roote 2004; Koenig 2005), and (b) Nawash sponsors the second author’s biology faculty position at the University of Guelph, including responsibilities to undertake research aimed at improving relations between Indigenous and Western science knowledge systems.

Since time immemorial, the Nawash people have lived in their traditional territories and participated in wild harvest management activities for sustenance, ceremony and commerce (Lytwyn 1990; Johnston 1995; Borrows 1997; Blair 2000). Nawash harvests have included a high diversity of wild food/medicinal plants, as well as fishes (including lake whitefish, lake trout, lake sturgeon, herring), birds (including ducks, ruffed grouse, geese), and mammals (including white-tailed deer, northern raccoon, black squirrel, North American porcupine, snowshoe hare, eastern cottontail rabbit). Nawash also has a long history of trapping American beaver, river otter, common muskrat, pine marten and fisher for food and/or commerce. A complete list of English, Ojibway and scientific names for these species can be found in Appendix 1.
To ensure that our research engaged knowledgeable community members, we used methods proposed by Davis and Wagner (2003) and Sillitoe et al. (2005). First, a survey form (Appendix 2) was distributed to each member of Nawash Council and the Liaison in Spring 2007, requesting them to help identify on-reserve Nawash community members who were considered to be most knowledgeable about traditional Ojibway practices pertaining to the harvesting of wild plants and animals. Knowledge holders were also identified during interviews with other knowledge holders; this snowballing process is considered to be especially important in highly embedded knowledge systems (Davis and Wagner 2003).

The interviewer made frequent preliminary visits (approximately bi-weekly) to the community throughout the winter and spring of 2007 in order to encourage a general sense of familiarity with the project and the investigators (Smith 1999). Formal introductions to knowledge holders were made by the Liaison prior to any request for an interview. During these introductions the Liaison identified the interviewer as a Nawash band member who had grown up off-reserve, and discussed the context and purpose of the research project with knowledge holders. Every effort was made to ensure that community members felt like research partners engaged in a relationship of trust (Santiago-Rivera et al. 1998; Smith 1999; Schnarch 2004); this trust was particularly important since participants were asked to share knowledge and beliefs that were potentially intimate (Brant Castellano 2004).
During the course of research, the primary author frequently participated in a variety of harvest-based activities including medicinal and food plant collecting, fishing, hunting, and trapping. These activities were initiated by the Liaison, and were designed to create an array of situation-based learning experiences for the primary author. These experiences provided the primary author with an opportunity to directly experience Ojibway harvesting, and created a shared sense of experience which was frequently drawn upon during knowledge holder interviews.

We employed a semi-structured interview technique during Initial and Follow-up phases of the study, to create an informal and conversational atmosphere that facilitated flexible and open-ended discussion (Grenier 1998). Initial interview questions were general in nature, and designed to elicit discussion about traditional wild harvest/management. Follow-up interviews were designed to extend discussion specifically on harvest/management principles that had been collectively identified by knowledge holders during the Initial interviews. Interview guides with predetermined but open-ended questions (Appendix 3) were provided to knowledge holders at the beginning of each interview, and were used to keep discussions focused, yet open to unanticipated knowledge (Huntington 1998; Sillitoe et al. 2005). Knowledge holders were asked if they had a preference regarding interview recording method (digital voice recorder-default, hand-written notes), and all subsequent discussions were recorded in a consistent manner, and then transcribed in full.

The digital knowledge base software program NVivo Version 7.0.247.0 SP2 (Copyright QSR International Pty. Ltd. 1999–2006) was used to organize, code, and interpret transcribed data derived from both Initial and Follow-up interviews. Depending on the specific context of a knowledge holder discussion, nodes were created for phrases-sentences-passages that made some reference to knowledge systems, natural history, practices or principles related to wild harvest and/or management. For the purpose of this study, ‘principles’ were defined as general concepts that are held to be true by the community members; concepts that could be either causal principles in the sense of explanations of cause-effect mechanisms (i.e. Western science ‘hypotheses’) regarding the states of nature, or moral principles in the sense of guiding factors formulated as general rules of conduct that promote the satisfaction of particular values (Crawford and Morito 1997).

### Results

Eight knowledge holders were first identified by Nawash Council/Liaison; the snowballing technique with knowledge holders also identified most of these persons, as well as an additional two knowledge holders, for a total of ten knowledge holders interviewed in this study. This group of knowledge holders included seven men and three women, ranging in age from 37 to 95 years.

A total of 17.5 h of interviews were conducted with the Nawash knowledge holders during the period from September 2007 to May 2008 (Table 1). Initial interviews were conducted over 11.5 h with the complete set of ten knowledge holders, ranging in duration from 0.75 to 1.50 h \((1.15±0.29, \text{mean±s.d.})\). Six of the knowledge holders preferred hand-written interview notes, while the remaining four expressed no preference and were recorded using a digital voice recorder. Follow-up interviews were conducted over 6.0 h with six of the ten knowledge holders, ranging in duration from 0.50 to 1.75 h \((1.00±0.52)\). Sadly, three knowledge holders passed away during the 10 month interview period of this study. There did not seem to be an appropriate time to re-engage with the other outstanding knowledge holder.

A total of 154 references to moral or causal principles of harvest/management were made by the knowledge holders during the Initial interviews. After closely examining the context within which individual knowledge holders had made these references, it seemed clear to us that there were repeated instances of five distinct principles. Table 2 presents the name and a selection of quotation/paraphrase text from different knowledge holders that we considered to be representative of the five identified principles.

The principle of SEASONally based harvesting implies that harvesters adhere to SEASONal cues that alert Ojibway people of the temporal availability of particular resources.

| Knowledge Holder | Initial Interviews | Follow-Up Interviews |
|------------------|--------------------|----------------------|
|                  | Recording method   | Duration (hr)        | Recording method | Duration (hr) |
| A                | DVR                | 1.50                 | DVR              | 1.50          |
| B                | HWN                | 0.75                 |                  |               |
| C                | HWN                | 1.25                 |                  |               |
| D                | HWN                | 1.00                 | HWN              | 0.75          |
| E                | HWN                | 1.25                 |                  |               |
| F                | HWN                | 1.50                 | HWN              | 1.00          |
| G                | HWN                | 1.00                 |                  |               |
| H                | DVR                | 0.75                 | DVR              | 0.50          |
| I                | DVR                | 1.50                 | DVR              | 1.75          |
| J                | DVR                | 1.00                 | DVR              | 0.50          |
| Total            |                    | 11.50                |                   | 6.00          |
For example, the first warm rains in the spring might bring to the Ojibway mind images of the first wild leeks or wild mushrooms emerging from forest soils, just as the appearance of fireflies in late May or early June may serve to remind the Ojibway that the wild strawberries are ripe and the birch bark is ready to be harvested (Liaison, pers. comm. 2007). The SEASONS also serve to remind Ojibway people as to the appropriateness of harvesting particular resources at particular times within each season (Knowledge Holder J). For example, Ojibway people do not hunt for deer and other mammals when females may be carrying or nurturing young, however, they know that when the leaves begin to turn in the fall that they can safely hunt for deer without endangering the newly born (Driben et al. 1997). The SEASONS principle was classified as moral due to the consideration of appropriateness of harvesting in-season, however this principle was also classified as causal since some of the knowledge holders linked season-based harvesting to underlying biological or ecological cycles of harvested species.

The NEEDS principle described harvesters’ effort in relation to the abundance or availability of the target plant or animal species. It was important that a harvester not succumb to temptation in cases where they had the
opportunity and the means to harvest more than what was
required to satisfy current needs of their family/community.
In this study, the NEEDS principle was also classified as
both moral and causal, in this case because some of the
knowledge holders linked harvester restraint to the ability of
the supporting populations of harvested plants/animals to
regenerate for continued existence, and the prospect of
sustained future harvests. Several Nawash knowledge hold-
ers expressed the need for caution in determining how much
to harvest in contemporary situations, because recently cre-
ated or improved technologies such as refrigeration and
dehydration enable harvesters to accumulate far beyond
their immediate needs.

The THANKS principle was described by knowledge
holders who stressed the moral imperative for harvesters to
consiously and actively express gratitude for their good
fortune in receiving desired plants/animals. This gratitude
could be directed to the Creator and/or the organism that
gave its life to the harvester. Gratitude could be expressed in
various ways, however many of the knowledge holders
stressed the importance of expressing gratitude in traditional
Anishinaabe manners, especially those involving the respect-
ful offering of tobacco (Hallowell 1960).

The WASTING principle focused on the abhorrence of
disrespecting the plants/animals that had offered their lives
to the harvester. Specifically, it was the harvester’s moral
obligation to make maximum use of the gift that had been
received, rather than taking only premium organisms that
had been killed, or using only premium parts of the organ-
ism’s body. This principle was also classified as causal,
because some of the knowledge holders linked the effects
of not WASTING with the idea that such a strategy would
reduce harm to the supporting population, and thus increase
the opportunity of future harvests.

The SHARING principle reflected the expectation that
harvesters would provide some or all of their harvests to
members of their extended family, other members of the
community, or anyone who was in need of such provisions.
The SHARING principle was strongly related to the idea
that the harvested plants/animals do not ‘belong’ to the
harvester, but rather give themselves to the people so they
may also survive and flourish.

Table 3 presents frequencies at which the ten knowledge
holders referenced the five identified principles during Initial
interviews. The principles are organized horizontally in de-
creasing frequency across knowledge holders, while the al-
aphabetic codes of specific knowledge holders are organized
vertically in decreasing frequency across total number of
principle references. The cumulative number of references
made by all knowledge holders to each of the five identified
principle ranged from 7 to 26, with a mean of 15.4 (±7.0 s.d.).
For each knowledge holder, the number of references per principle
ranged from 0 to 8 with a mean of 3.1 (±2.0 s.d.). It is
interesting to note that 6 of 10 knowledge holders made
reference to all five of the identified principles; the remaining
knowledge holders (B, I, G and D) still made reference to most
of the principles, despite making the fewest references of all
knowledge holders in the group.

Discussion

In this study, we identified five major principles about
traditional Ojibway harvest/management expressed by ten
Nawash knowledge holders over 17.5 h of semi-structured
interviews. While we believe this small sample can provide
insight into the structure and function of Indigenous knowl-
edge systems, we are under no illusions that the sample is
representative of the traditional principles that exist within
Nawash or Ojibway culture. The principles that we identi-
fied in this study reflect only what the knowledge holders
chose to share with us at the time and in the specific context
of the interviews. We explicitly recognize that it can be very
difficult for these concepts to remain intact through the
processes of cultural and language translation; as Ingold
and Kurtilla (2000) caution, the lack of Indigenous articula-
tion of ‘principles’ under these kinds of interview conditions
does not necessarily mean the concepts did not exist. In the
future, community-based research focusing on principles of
resource management should employ some means of detect-
ing an asymptote in the number of new principles identified
during interviews, similar to the sampling designs used by
ecologists to estimate the number of undiscovered species in
an ecosystem (e.g., Chao et al. 2009).

The abundance and distribution of principles expressed
by Nawash knowledge holders were remarkably consistent.
Most interviewees made relatively equal references to most
(if not all) of the five identified principles, suggesting that
these principles derive from a general set of values that
permeate through the traditional community. Despite inci-
dental comments from community members about tradition-
ally people with specialized knowledge, we did not find causal
or moral principles that were specific to certain individuals
or particular kinds of harvesting. It could be that more
specialized principles require additional detail in the semi-
structured interview format, including greater focus on par-
ticular kinds of harvesting or management situations (e.g.,
seining whitefish, trapping beaver, shooting grouse).

We were also interested to note that all five of the identified
principles could be considered moral precepts; two of which
were classified as solely moral (THANKS, SHARING), while
three were classified as having both moral and causal charac-
teristics (SEASONS, NEEDS, WASTING). The causal
The natural resource management principles identified in this study are highly consistent with the descriptions of principles previously reported for Ojibway communities (e.g., Warren 1885; Hallowell 1955, 1960; Overholt and Callicott 1982; Borrows 1997; Driben et al. 1997) and for other Indigenous knowledge systems in Canada and throughout the world (e.g., Turner et al. 2000; Colding and Folke 2001; Turner and Berkes 2006; Metallic 2008).

The SEASONS principle has been reported in other Ojibway communities where harvesters avoid hunting for deer or other wildlife species when females could be carrying or nurturing young; hunting can resume without endangering young-of-the-year when the leaves begin to turn in the fall (Driben et al. 1997). Scheduling harvesting activities relative to critical life history periods of harvested organisms is practiced in many Indigenous societies (Colding and Folke 2001). Sami people in northern Finland intensively organize their migratory and harvesting efforts with annual seasonal fluctuations in temperature, precipitation and daylight hours—and the associated seasonal patterns in the distribution and abundance of the plants and animals upon which they rely (Bjørklund 1990; Ingold and Kurtilla 2000). Lyver et al. (2009) discussed alternate possible explanations for Māori principles regarding post-breeding harvests of kereru and tītī, including coincidence of favorable circumstances and deliberate conservation planning. Prober et al. (2011) described ecological calendars and seasonal knowledge of Australian Aboriginal communities to predict environmental conditions, distribution and abundance patterns, migration pathways, and effectiveness of harvesting tactics. Recently there has been increased focus on Indigenous season-based principles, especially with regard to the enormous potential of global climate change to disrupt traditional capabilities to live off the land (Turner and Clifton 2009; Green and Raygorodetsky 2010).

Table 3 Frequency of references to five identified principles of wild harvest/management made during initial interviews with traditional knowledge holders from the Chippewas of Nawash Unceded First Nation

| Knowledge Holder | SEASONS | NEEDS | THANKS | WASTING | SHARING | Subtotal | Percent |
|------------------|---------|-------|--------|---------|---------|----------|---------|
| J                | 8       | 6     | 4      | 5       | 3       | 26       | 16.9    |
| A                | 6       | 4     | 7      | 4       | 3       | 24       | 15.6    |
| H                | 5       | 5     | 3      | 5       | 5       | 23       | 14.9    |
| F                | 3       | 5     | 5      | 2       | 3       | 18       | 11.7    |
| C                | 5       | 4     | 2      | 4       | 1       | 16       | 10.4    |
| E                | 1       | 1     | 5      | 1       | 4       | 12       | 7.8     |
| B                | 2       | 2     | 1      | 5       | 0       | 10       | 6.5     |
| I                | 2       | 2     | 0      | 1       | 5       | 10       | 6.5     |
| G                | 2       | 0     | 2      | 2       | 2       | 8        | 5.2     |
| D                | 0       | 3     | 1      | 0       | 3       | 7        | 4.5     |
| Subtotal         | 34      | 32    | 30     | 29      | 29      | 154      | 100.0   |

Bold numbers are summary statistics, rather than test statistics.
The NEEDS principle is also prevalent in other Ojibway and Indigenous communities (Borrows 1997; Driben et al. 1997; Knudtson and Suzuki 1992). Over-killing, which can be understood as killing beyond immediate needs, is harshly criticized in other Ojibway and Cree Nations (Driben et al. 1997). Brightman (2007) discussed the importance of this principle in the Cree stories of Wisahkiicaah who taught the people about the ‘wages of gluttony.’ In Mi’kmaq culture, the principle of netukulimk serves the same kind of constraining function when harvesters find themselves in a rich environment that could provide more than their needs (Barsh and Youngblood Henderson 2003). Similarly, Zavaleta (1999) reported complex and species-specific restraint practices among Yup’ik waterfowl hunters in Alaska.

The THANKS principle is well known and deeply rooted in Ojibway natural resource harvesting and management as an important means of acknowledging relationships to the beings that sustain individuals in their daily life (Densmore 1928). Acknowledging these relationships in Ojibway culture can be as simple as leaving tobacco or offering a few words of thanks—something that directly reminds the harvester and consumer that all humans are connected to, and sustained by, the natural world (Johnston 1976; Metallic 2008). Mi’ori offer THANKS to acknowledge the unity between all aspects of creation, as well as the specific energy that radiates from life (Marsden and Henare 1992). Many other Indigenous societies also give THANKS to spirit beings before and/or after harvesting activities (Knudtson and Suzuki 1992; Turner and Berkes 2006). In many Indigenous cultures, knowledge systems are grounded in reciprocal and spiritual relationships with plants, animals and the environment; there are strong social forces regarding the right ways and wrong ways of interacting with these spirits that sustain the community in more than physical ways (Tanner 1979; Feit 1986; 1987; Menzies and Butler 2006). McClellan (1975) identified the belief among the Tutche and Kaska people of southern Yukon that appropriate respect for the animals is a precondition for continued success in the hunt. Brightman (1993) and Feit (1994) described the complex of Cree principles of respect and reciprocity for harvested animals, including the “same respect you give yourself” expressed variously as singing to the animals, verbal petition, quick killing to minimize suffering, ritual sacrifice and offerings. Berkes (1999) refers to a reciprocity ‘ethic’—a state of mutual respect and exchange, in which all life exists on the same level, including humans. Within the terms of this ethic, humans are able to take plant or animal life for food because the organism gives itself to the human—the human reciprocates by respecting and honoring the organism.

The idea of WASTING a harvest is particularly unfavorable in Ojibway and other Indigenous communities with beliefs that plants, animals and other elements of creation possess their own spirits and have a right to live that is equal to that of humans (Driben et al. 1997; Turner and Berkes 2006). Brightman (1987) described the strong avoidance of wasting among traditional Algonquins in the Hudson Bay region; Tanner (2007) discussed the broader, spiritual and religious worldview within which Innu have concerns about wasting nutshimiu-natukun (‘country medicine’). This anti-WASTING principle is expressed in many different ways, but often takes the form of maximizing utility from as many parts of the harvested organisms as possible, with moral sanctions for those who take only ‘premium’ organisms or parts of organisms (Menzies and Butler 2006). Zavaleta (1999) noted that Indigenous hunters who practice waste avoidance reduce the likelihood of hunger when food is scarce, and also minimize the number of harvested animals necessary to meet the needs of hunter and community.

In Ojibway culture, the SHARING principle is based on the fundamental fact that no person in the community is permitted to claim ownership over a particular resource, thereby denying the use of this resource by others (Johnston 1976). Indigenous Nations generally identify with common resources that are shared in a manner that maintains and strengthens relationships within families, communities and territories (Metallic 2008). Perhaps the most well-known examples of the SHARING principle is evidenced in the practice of potlatch festivals/ceremonies in which Indigenous communities of the Pacific Northwest of America promote inter-dependence through the redistribution of natural resources (Knudtson and Suzuki 1992; Ayers 2005).

As investigators, we must constantly be mindful that these Indigenous ‘principles’ do not exist in isolation, but are embedded within the geographic and cultural and social conditions of community life. Consider, for example, the set of ethics and values presented by the Council of the Haida Nation to explain their worldview: Yahguudang (Respect), Giid il’juus (Balance), Gina waadluxan gud ad kwaagiiida (Interdependence), Isda ad digii isda (Reciprocity), Gina k’aadang nga gii uu tl’ k’anguudang (Wise Counsel), ‘Laa guu ga kanhlhns (Responsibility) (Jones et al. 2010). Likewise, the work of Feit (1986, 1994) and Brightman (1993) with Cree communities reveals a profoundly inter-woven and inter-dependent complex of spirituality, causality, reciprocity, and morality in the ‘principles’ of traditional hunters. Consider Brightman’s (1993) description of the ‘grateful prey’:

“The event of killing an animal is not represented as an accident or a contest but as the result of a deliberate decision of the animal or another being to permit the killing to occur. The dream events that Cree say prefigure successful kills are sometimes talked about as signs that this permission has been given. In waking experience, the decision finds culmination when the animal enters a trap or exhibits its body to the hunter for a killing.
shot. Since the soul survives the killing to be reborn or regenerated, the animal does not fear or resent the death. The animals’ motivations for participating in these events of killing are figured both in the idioms of love and of interest. Animals may “pity” the hunters who have need of their flesh, and especially is their benevolence evoked when the hunter complies with the conventional objectifications of “respect,” treating the carcass, meat, and bones in the correct fashion. Conversely, ritual omission or blasphemy angers the animals, who then withhold themselves. But the role of the hunter-eater is not that of passive recipient only, and the animals themselves stand to gain from the exchange. Having received the gift of the animal’s body, the hunter reciprocates. Animal souls are conceived to participate as honored guests at feasts where food, speeches, music, tobacco, and manufactured goods are generously given over to them. Hunter and prey are thus successively subject and object in an endless cycle of reciprocities. Ultimately, the roles of human and animal are complementary, for each gives life to the other. The treatment of the remains not only objectifies respect but is said to restore the animal to a living condition.” (Brightman 1993, p.187)

Clearly, within traditional Indigenous knowledge systems much of the so-called objective knowledge—including what Western people call causal principles—are framed within a moral and spiritual context. This context may seem to be very different from the detached and abstract causal principles that drive the Western science knowledge system, until we peel back the layers to find the implicit and deep moral and spiritual context. This context may seem to be very different from the detached and abstract causal principles that drive the Western science knowledge system, until we peel back the layers to find the implicit and deep moral and spiritual context. This context may seem to be much more to discuss in principle than either community might have originally expected.

Given the modern legal requirement for meaningful consultation with Indigenous communities regarding natural resource harvest/management, it is difficult to imagine that such consultation could begin anywhere except by going back to the beginning—with Indigenous and Western science communities re-introducing themselves as people, their worldviews, and their knowledge systems. It is reasonable to expect that causal and/or moral principles would emerge naturally among the substantive points of discussion between Indigenous and Western science knowledge systems (Ratner and Holen 2007). If the local knowledge holders from both cultures recognize similarities in their principles, then these principles could be codified in more formal agreements and protocols between the parties. If the local knowledge holders recognize differences in their principles, then the parties would have to discuss how these differences can be respected and accommodated.

Is it possible to develop a framework for cross-cultural discussion that would enable Indigenous and Western science knowledge holders to engage meaningfully with each other’s set of beliefs, practices and values? Was Callicott (1991) correct when he claimed that all systems of resource management are practical expressions of underlying principles? If so, then we think that Indigenous and Western science knowledge holders are obliged to actively search for these principles, and to make sure that they communicate them effectively to each other. If not, then Indigenous and Western science knowledge holders will have to keep searching for other bridges that will enable meaningful and reciprocal consultation on natural resource management issues. Either way, it seems clear to us that there could be much more to discuss in principle than either community might have originally expected.

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Appendix 1

List of species names (English, Scientific, Ojibway) referenced in this investigation

| English name         | Scientific name    | Ojibway name |
|----------------------|--------------------|--------------|
| American beaver      | Castor canadensis  | Ahmik        |
| American black bear  | Ursus americanus   | Mukwa        |
| American mink        | Mustela vison      | Zhongwyzh    |
| Atlantic salmon      | Salmo salar        |              |
| Bald eagle           | Haliaeetus leucocephalus | Migisi     |
| Black squirrel       | Sciurus carolinensis | Makade     |
| Bloater              | Coregonus hoyi     |              |
| Carp                 | Cyprinus carpio    |              |
| Chinook salmon       | Oncorhynchus tsawytscha |        |
| Cisco spp.           | Coregonus spp.     | Bemidewishkawed |
| Coho salmon          | Oncorhynchus kisutch | Maazhi-namegos |
| Common muskrat       | Ondatra zibethicus | Wazhushk    |
| Common strawberry    | Fragaria virginiana | Odemin      |
| Eastern cottontail   | Sylvilagus floridanus | Waabooz  |
| Eastern wolf         | Canis lupus        | Maengun      |
| Fisher               | Martes pennanti    |              |
| Lake herring         | Coregonus artedii  | Okeyawis     |
| Lake sturgeon        | Acipenser fulvescens | Maame       |
| Lake trout           | Salvelinus namaycush | Namegos    |
| Lake whitefish       | Coregonus clupeaformis | Mitaakkamaig |
| Large mouth bass     | Micrpterus salmoides | Maanashigan |
| Muskelunge           | Essox masquinongy | Maaskinoozhe |
| North American porcupine | Essox lucius | Gidagaaganoozhii |
| Northern pike         | Essox lucius       | Gidagaaganoozhii | Ehihan |
| Northern raccoon     | Procyon lotor      |              |
| Pickerel/walleye     | Sander vitreus     | Ogaa         |
| Pine marten          | Martes martes      | Wabizhashi   |
| Rainbow smelt        | Osmerus mordax     | Biijaamaagons |
| Rainbow trout        | Oncorhynchus mykiss | Namegoshens |
| Red fox              | Valpes valpes      | Miskwaawaagosh |
| River otter          | Lutra canadensis   | Nigig        |
| Ruffed grouse        | Bonasa umbellus    | Bine         |
| Small mouth bass     | Micrpterus dolomieu | Ashigan    |
| Snowshoe hare        | Lepus americanus   | Waabooz      |
| Splake               | Salvelinus namaycush X | Salvelinus fottiinals |
| Striped skunk        | Mephitis mephitis  | Zhiguag      |
| Sucker spp.          | Catostomus spp.    | Namebin      |
| Sweet-flag           | Acorus americanus  | Weekah       |
| White-tailed deer    | Odocoileus virginianus | Warwashkeshshi |
| Wild leek            | Allium tricoccum   |              |
| Yellow perch         | Perca flavescens   | Ashigan      |

Appendix 2 Preliminary survey used to identify Knowledge Holders about wild harvest/management from the Chippewas of Nawash Unceded First Nation community

Rationale
This survey is designed to systematically identify those persons who possess knowledge of traditional Aboriginal practices and/or stories pertaining to the harvesting of wild populations, including fish and wild.

Section A
In section A please identify the one person from your community who you feel is most knowledgeable for each of the numbered topics (1 through 4). Please note that you may identify persons who are originally from your community but who reside elsewhere because of intermarriage or other personal reasons. If you do choose to identify persons living outside of your community please indicate this in brackets beside their name and where possible include the name of the community in which they reside.

1. The use of spiritual practices such as prayer and offerings in relation to the harvesting of wild populations including fish and wild.
2. Traditional techniques or practices for harvesting whitefish, trout, suckers, etc.
3. Traditional techniques or practices for harvesting wild such as deer, moose, beaver, bear, muskrat, etc.
4. Stories about the harvesting of wild populations including fish and wild.

Section B
In section B, identify up to five persons from your community who you feel are knowledgeable for each of the numbered topics (1 through 4). Please note that you may identify persons who are originally from your community but who reside elsewhere because of intermarriage or other personal reasons. If you do choose to identify persons living outside of your community please indicate this in brackets beside their name and where possible include the name of the community in which they reside.

1. The use of spiritual practices such as prayer and offerings in relation to the harvesting of wild populations including fish and wild.
2. Traditional techniques for harvesting whitefish, trout, suckers, etc.
3. Traditional techniques or practices for harvesting wild such as deer, moose, beaver, bear, muskrat, etc.
4. Stories about the harvesting of wild populations including fish and wild.
Appendix 3 Guide for Initial and Follow-up semi-structured interviews with Chippewas of Nawash Unceded First Nation Knowledge Holders regarding traditional Ojibway principles of wild harvest/management

Initial Interview

1. How did you make a living in the old days?
2. How did you store food before you had electricity?
3. What types of animals were hunted?
4. Were there animals that people did not hunt? If so, why?
5. What kinds of fish were caught?
6. What principles guided you when you were hunting or fishing?
7. How did you know how much to take?
8. How did you know when to hunt and when not to?
9. How did you know when to fish and when not to?
10. How were you taught how to hunt and fish?
11. Did people share stories with one another about hunting and fishing?
12. What were the fish huts at the Cove of Cork used for?
13. Did people make offerings or pray before they went out to hunt or fish?
14. Did people give thanks after they returned from hunting and fishing?
15. What is the meaning and importance of the clans?
16. Can you tell me about the Ojibway belief about creation?
17. Has the loss of the Ojibway language changed what knowledge is passed on? If so, how?

Follow-up Interview

1. The following harvest and management principles arose during the Initial interviews conducted with Nawash Knowledge Holders:
   - Take only what you need
   - Share with the community
   - Give thanks
   - Acknowledge your relationship to that which has offered itself to you
   - Obey the seasons
2. Is there anything that you would like to add, change in any way, or elaborate about?

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