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A Mi'kmaw Perspective on Advancing Salmon Governance in Nova Scotia, Canada: Setting the Stage for Collaborative Co-Existence

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Abstract
Issues related to fisheries governance are a source of debate and tension between the Indigenous Mi'kmaq people of Nova Scotia and the Canadian Department of Fisheries and Oceans (DFO) in matters concerning Atlantic salmon, *Salmo salar*. Within the context of the existing governance regime, this analysis compares the concept of salmon conservation and management from a Mi'kmaq perspective and proposes a collaborative co-existence approach for effective salmon governance in Nova Scotia. This approach begins by using co-management as a process, Two-Eyed Seeing as the design, and treaties as the model to achieve shared objectives of maintaining and improving abundances of salmon populations, in spite of differing mechanisms for addressing the interwoven complexities of multiple realities, conservation, and cultural identity.

Keywords
conservation, salmon, Mi'kmaq, governance, Two-Eyed Seeing, treaties, co-management

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A Mi'kmaw Perspective on Advancing Salmon Governance in Nova Scotia, Canada: Setting the Stage for Collaborative Co-Existence

Conservation is a critical issue for both Aboriginal fisheries and state management of fisheries; it has been established as "valid legislative objective" that can be used to justify infringement on existing Aboriginal and treaty rights in Canada (King, 2011; *R. v. Sparrow*, 1990). For the Mi'kmaq, the Indigenous people of Atlantic Canada and Eastern Quebec whose territory is known as Mi'kma'ki, the use of management and conservation objectives as a justification for infringing on Aboriginal and treaty rights is respected because conservation is a shared philosophical approach. However, issues of fisheries governance, such as the power of the state to evaluate stock status, allocate shares of the resource, and implement conservation and management measures for fisheries, as specified in section 91(12) of Canada's Constitution Act (1982), are a source of debate and tension between the Mi'kmaq of Nova Scotia and the Canadian Department of Fisheries and Oceans (DFO). This tension and debate is evident in Atlantic salmon management, particularly when it comes to issues of access and allocation of salmon for food, social, and ceremonial (FSC) needs in Nova Scotia (Barsh, 2002; Wildsmith, 1995, 2001).

Within the context of the existing governance regime that determines the underlying principles governing decision-making, the aim of this article is to compare the concept of conservation within Atlantic salmon management from a non-Aboriginal state perspective with a Mi'kmaq perspective, and offer recommendations on how to further develop governance initiatives related to Atlantic salmon based on these perspectives.

Background

Before comparing different perspectives on management and conservation, it is important to discuss the underlying worldviews that influence the governance or the steering mechanisms (Rosenau, 1995), which the two societies—Aboriginal and non-Aboriginal—use to guide decision-making in Nova Scotia's salmon industry. This is discussed first by examining the Mi'kmaq relationship to salmon and the legal relationship of the Crown to the Mi'kmaq people, followed by a discussion of a non-Aboriginal or "Western" worldview in relation to decision-making and this perspective's influence on management. To aid in readability, the following list of key acronyms used in the article are listed in the Appendix.

Relationship Between the Mi'kmaq and Mother Earth

Mi'kmaq epistemology, also referred to as its worldview, is understood in the context of their relationship to the land and is best expressed by the Mi'kmaq phrase, *Msit no'kmaq*, which means "all my relations." In an interview, Elder Albert Marshall (personal communication, November 16, 2014) shares:

> Mi'kmaq carry a great sense of responsibility. As all life is our relations, any loss of life is a loss of kin and spirit. The unintentional eradication of species is deeply connected to loss in cultural identity. Time on earth is merely borrowed from future generations. As such, the Mi'kmaq have the inherent responsibility to ensure all of nature's gifts are there for the next seven generations.

This belief and connection is not only physical but also metaphysical. All relations are either present, past, or yet to be. Humans are thought of as merely another but equal part of Mother Earth and their existence is interconnected to their interactions and relationship to plants, animals, water and earth that sustain them. In the eyes of the Mi'kmaq, "spirit life is everywhere" (A. Marshall, personal communication, November16, 2014).

These ways of knowing were derived from the relationships Mi'kmaq hold with the world in which they exist, considering all life and objects as kin (Berneshawi, 1997; Prosper, McMillan, Davis & Moffitt, 2011; Robinson, 2014). Mi'kmaq people:

> Lived and died within the constraints of the world as they found it. They made no attempt to change the natural order to suit the convenience of human beings, for man was only one part of a totally interdependent system that saw all things, animate or inanimate, in their proper places. (Upton cited in Berneshawi, 1997, p. 120)

Elder Albert Marshall elaborates this idea, stating that the Mi'kmaq believe that all life has spirit and all lives are of one origin, all of which are gifts from the Creator. *Msit no'kmaq* connects Mi'kmaq people not only to each other but to the land from which they were created and exist today.

In addition, another related concept that underpins the Mi'kmaq worldview is *Netukulimk,* which is used to convey the notion of sustainability. Prosper and colleagues (2011) described it as "a complex cultural concept that encompasses Mi'kmaq sovereign law ways and guides individual and collective beliefs and behaviours in resource protection, procurement, and management to ensure and honour sustainability and prosperity for the ancestor, present and future generations" (p. 1). Linguistic analysis of the term translates it as "avoiding not having enough" (Barsh, 2002, p. 17). Mi'kmaq Elders understand the concept of *Netukulimk* as "take only what you need" (Barsh, 2002, p. 17; L. Marshall, personal communication, November 11, 2014; Robinson, 2014), but within self-imposed limits to avoid waste (Prosper et al., 2011). The concept implies interconnectedness of sustainability between Mi'kmaq and their environment (Berneshawi, 1997; Prosper et al., 2011; Wiber & Milley, 2007).

Salmon, or *plamu* as it is known to the Mi'kmaq, are one of many animals that contributed to Mi'kmaq sustainability. Historically, salmon were a staple food that was dependable, predictable, and could be found in most rivers in Nova Scotia (Parenteau, 1998). As one of the last fish harvests of the season before travelling inland to escape winter, the women would preserve the salmon through smoking over an open fire using heated rocks (A. Marshall, personal communication, November 15, 2014). Today, because of a lack of abundance and concern for local populations, it is often reserved (though not exclusively) for special occasions such as pow-wows[1] or other large gatherings where the serving of a large fish such as salmon is preferred.

[1] Pow-wows, or *Mi'kmaq Mawio'mi* as it is often known in the Mi'kmaq territories, is an important annual celebration that allows the Mi'kmaq to express and share their culture, pride, and identity. It is a unifying ritual of the young and the old, a recollection of the past, and a celebration of the future (see http://www.benoitfirstnation.ca/mikmaw_article31_powwow.html).

Legal Framework

The Mi'kmaq of Eastern Canada have both Aboriginal rights and treaty rights. Aboriginal rights (including Aboriginal title) are the inherent rights of the Aboriginal people of Canada that emerge from prior use and historical occupation of the lands and waters of what is now known as Canada. Treaty rights are negotiated rights and arise from formal agreements between European heads of state (and Canada) and Aboriginal leaders (Harris & Millerd, 2010). The right to fish for food, social, and ceremonial needs is an Aboriginal right, while the right to fish for a moderate livelihood is a treaty right. Treaties signed with Mi'kmaq are unique; they emphasized peace and friendship, as well as recognizing them as a sovereign people (King, 2011, 2014). Both Aboriginal and treaty rights are recognized and affirmed by Section 35(1) of the Constitution Act and, as such, cast Canada's Aboriginal people "in a different legal relationship to the fisheries than non-Aboriginal Canadians" (Harris & Millerd, 2010, p. 82).

Three court cases are of particular significance to describe the legal relationship between the Crown and the Mi'kmaq, and the Aboriginal right to fish (and hunt): *R. v. Denny, Paul and Sylliboy* (1990), *R. vs. Simon* (1985), and *R. v. Sparrow* (1990). *R. v. Simon* (1985) confirmed that established treaties with the Mi'kmaq did not extinguish Aboriginal rights; thereby confirming the co-existence of Aboriginal rights with treaty rights, including the right to hunt and fish. In the Nova Scotia Supreme Court, Denny, Paul, and Sylliboy were acquitted of illegal fishing and possession of salmon, since the regulatory regime for fisheries management was inconsistent with their Aboriginal right to fish (*R. v. Denny, Paul, & Sylliboy*, 1990). The outcome of the case prioritized Aboriginal fishing—after needs related to conservation had been met—over other interest groups. Sparrow too argued that restrictions imposed by the federal government through the Fisheries Act were inconsistent with his right to fish for food and ceremonial purposes (*R. v. Sparrow*, 1990). In recognition of the existing Aboriginal right to fish under the protection of the Constitution, the Crown must consider whether existing limitations or regulations infringe on Aboriginal rights. If so, justification of the infringement must be demonstrated by the Crown, such as the need to comply with a valid legislative objective regarding the conservation of the species. The government also has a responsibility to act in a fiduciary capacity with matters concerning governmental decisions and policy (Harris & Millerd, 2010; Wildsmith, 1995). Furthermore, the Supreme Court stated that Aboriginal people's food requirements must be met and must take priority over other users (Wildsmith, 1995). The Supreme Court further argued that "the burden of conservation measures should not fall primarily upon the Indian fishery" (*R. v. Sparrow*, 1990, p. 115).

Other court cases providing further recognition of Aboriginal peoples right to have involvement in natural resource management are those in which the "duty to consult," the process for consultation, and potential for accommodation are emphasized: *R. v. Haida* (2004), *R. v. Mikisew Cree First Nation* (2005), and *R. v. Taku River Tlingit First Nation* (2004). In *R. v. Haida* (2004), the Court ruled that Canadian federal and provincial governments must consult with Aboriginal peoples prior to making decisions that may have an impact on Aboriginal rights and title (*R. v. Haida*, 2004).

Consultation is a commitment to engage in a meaningful process and does not necessarily imply agreement but may include accommodation that "require good faith efforts to understand each other's concerns and move to address them" (*R. v. Haida*, 2004, s.49). *R. v. Taku River Tlingit First Nation* (2004) furthered the conditions for the consultation and accommodation process by expanding the duty

to consult as proportional to "the strength of the case supporting the existence of the right or title and to the seriousness of potentially adverse effect upon the right or title claimed" (p. 552). The Crown, including its provinces and territories, must provide notice and consultation through direct engagement. Furthermore, project information must be provided to stakeholder First Nations and attempts must be made to address expressed or anticipated concerns about potential adverse impacts through mitigation (*R. v. Mikisew Cree*, 2005).

Western Perspectives Underlying Natural Resource Management

Current fisheries management is based on Western epistemology that relies heavily on single sector and single species assessments to inform decision-making (Hollings, 2001). Under this worldview, decision-making is generally hierarchical, "command and control," and paternalistic (Fanning, Mahon, & McConney, 2011). Knowledge about the resource is science-based using a process that follows a systematic method to test questions from observations and is designed to reduce bias (Hurlbert, 1984). This approach follows what has become commonly referred to as the scientific method in which an underlying principle is falsification or the ability to test the fallibility of acquired knowledge (Pierce, 1877; Popper, 2002).

The approach is heavily dependent on the acquisition of data and information to advance knowledge. Thus, the hierarchical concept of sequentially moving from data to information to knowledge to wisdom can be found both explicitly and implicitly in Western knowledge systems (Rowley, 2007). This approach is most commonly presented in stock assessment and research documents upon which governmental policies, frameworks, and management decisions are expected to be based. However, despite the criticisms that have been directed at the scientific method since it gained prominence over a century ago, it remains the dominant paradigm for enhancing understanding of the natural system across temporal and spatial scales, as well as the resulting consequences of these changes to society at local, national, regional, and global levels (Bauer, 1992). Western society often accepts scientific ideas and their proponents above other sources, considering science-based knowledge to be fully objective and indisputable (Emerson & Gerlak, 2014). Yet, like all systems of knowledge, scientific practices are similarly governed by values and beliefs.

Current Atlantic Salmon Management in Nova Scotia

Atlantic salmon in Nova Scotia are managed by the federal (DFO) and provincial governments (Nova Scotia Fisheries and Aquaculture). The authority and responsibility for management resides with the Minister of Fisheries and Oceans. The provincial government—responsible for input into conservation measures, issuing fishing licenses, and public dissemination of regulations for salmon—have limited authority when fish are in the water. Management of salmon in Nova Scotia falls under two federal management regions: Gulf (eastern Nova Scotia) and Maritimes region (western Nova Scotia). The regions are divided at the most northern point of Cape Breton Island, Nova Scotia (see Figure 1).

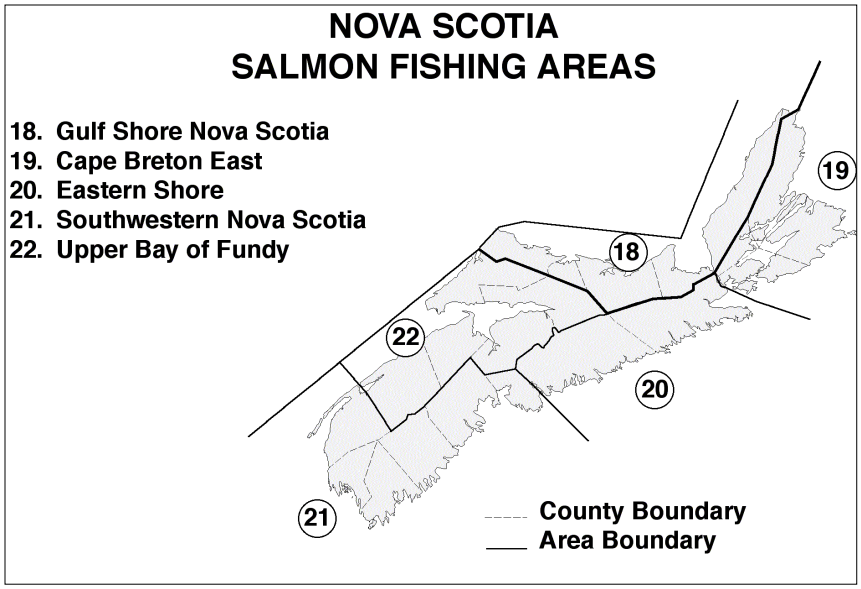

Figure 1. **Salmon management fishing zones in Nova Scotia** (*Source*: DFO, 2015).

Atlantic Salmon Assessment Methods in Nova Scotia

Each of the two regions utilizes different quantitative methods for estimating salmon populations in salmon fishing areas (SFA). In the Maritimes region (SFA 19-22), data are collected from dive counts of adult salmon, electrofishing surveys, smolt (young salmon migrating to the ocean to feed in the ocean) assessments, and fishway counts on index rivers in each of the SFAs. These data are coupled with catch information from the "catch and release" fishery and removals from permitted Mi'kmaq food, social, and ceremonial salmon fisheries. Estimation models are then used to determine the probability of a river meeting or exceeding the desired harvesting criteria (DFO, 2014a). In contrast, the Gulf region had a retention fishery until 2015, and relied on electrofishing surveys and catch records from the recreational fishery to develop its index of abundance for the assessment. However, regardless of the region, assessments rely primarily on quantitative data collected and scientific knowledge to help understand current population abundance (DFO, 2012).

There is commitment in Canada's Policy for Conservation of Wild Atlantic Salmon to incorporate Aboriginal knowledge in the assessment process (DFO, 2009). This implies that Aboriginal knowledge is and can be used in a similar manner to determine whether salmon populations are above or below DFO defined assessment criteria. While the intent is to use Aboriginal traditional knowledge and local knowledge to inform management decisions, it has been a challenge to make such knowledge fit into current quantitative assessment frameworks and advisory reports.

Conservation Efforts

Salmon in Atlantic Canada have been in decline since the early part of the 19th century (King, 2014). Salmon in Nova Scotia have been independently assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and designated as either endangered, as in SFA 19, 20, 21,

and 22, or special concern in SFA 18. Only SFA 22, Inner Bay of Fundy population, is protected under the legislative authority of the Canadian Species at Risk Act (SARA) since 2003. The purposes of the Act are to prevent species and distinct populations from becoming extirpated or from going extinct, and also to provide for the recovery of endangered or threatened species. SARA also encourages the management of other species to prevent them from becoming at risk (DFO, 2014b). While ongoing public consultations to list salmon populations in other SFAs under SARA are underway, conservation measures have been implemented for other populations.

Conservation, as described in Kalland (2009), "is designed to regulate people's relations with their physical environment to optimize resource use while at the same time safeguarding species, habitats and biodiversity" (pp. 5-6). In Canada's Policy for Conservation of Wild Atlantic Salmon, the DFO defined conservation in relation to salmon as "the protection, maintenance, and rehabilitation of genetic diversity, species, and ecosystems to sustain biodiversity and the continuance of evolutionary and natural production processes" (DFO, 2009, "Goals and Guiding Principles," textbox, para. 2). While the DFO maintains that conservation is the highest priority in resource management decisions, it also specifies that "resource management decisions will consider biological, social, and economic consequences; they will reflect best science including Aboriginal Traditional Knowledge (ATK) and local knowledge, and they will maintain the potential for future generations to meet their needs and aspirations" (DFO, 2009, "Goals and Guiding Principles," textbox, para. 4).

The DFO further clarified their terminology in a side box and offered the following definition of sustainable use and benefits: "the use of biological resources in a way and at a rate that does not lead to their long-term decline, thereby maintaining the potential for future generations to meet their needs and aspirations" (DFO, 2009, "Goals and Guiding Principles," textbox, para. 4).

The Department also stated its commitment in relation to sustainable use and benefit of wild salmon resources and protection of biodiversity to humans:

> As a resource management agency, DFO is committed to the sustainable use and benefit of wild salmon resources. The intent of this Policy is to protect the biological foundation of wild Atlantic salmon to provide the fullest benefits now and for future generations. In the long term, protection of biodiversity will provide the greatest opportunity for maintaining sustainable benefits to Canadians. (DFO, 2009, "Goals and Guiding Principles," textbox, para. 5)

Conservation measures in place for salmon, as determined by DFO and implemented by the provincial Department of Fisheries and Aquaculture, are a reflection of differences in population status in each region and guiding principles of conservation, sustainable use, and benefits. Catch and location restrictions are communicated in the provincial Nova Scotia Fisheries and Aquaculture 2014 Salmon Fishing Regulations (DFO, 2014a). SFA 18 is the only salmon management area in which the population is not assessed as "endangered" by COSEWIC, and a recreational retention for salmon less than 63 cm (also referred to as grilse) was permitted prior to 2015. In this SFA, the retention of salmon was reduced from eight grilse per license to four per license per season in 2008, and from four to two grilse per license per season in 2014, and further reduced to zero retention (catch and release only) in 2015. No salmon fishing for retention or catch and release is permitted in SFAs 20, 21, and 22 as all are assessed as endangered by COSEWIC, with the SFA 22 population in the Inner Bay of Fundy being

protected under SARA. Salmon Fishing Area 19 shares the same endangered designation as these three SFAs but three rivers within the area are subjected to a 31-day catch and release fishery with barbless hooks. Catch and release recreational salmon fisheries take place on rivers that meet or exceed 25% of the conservation requirements (G. Stevens, personal communication, 2014) and are limited to the three rivers on eastern Cape Breton Island (SFA 19)—Middle, North and Baddeck.

The Maritimes region of DFO enforces a zero removal of salmon from any of the rivers by non-Mi'kmaq in the Maritimes region. The North River is the only river in SFA 19 to be assessed as slightly above the criteria used to determine whether there is a surplus of fish but non-Mi'kmaq retention fishery is not permitted.

Mi'kmaq Perspectives Underlying Natural Resource Management

In essence, the use of traditional knowledge encompasses assessment, management, and conservation within the worldview of the Mi'kmaq. However, for the purpose of this article, Mi'kmaq traditional knowledge was compartmentalized into sections for comparison with the Western perspective.

Current Mi'kmaq Salmon Fishing and Management Practices

To ensure a mutually beneficial relationship with natural resources, considered "gifts," the Mi'kmaq had their own governance. Ladner (2005) summarized Mi'kmaq governance as a "complex system of territorially defined relations and responsibility, multilevel governance, ethics and law [that] was and remains an effective means of managing a people, a territory and the relationship with other beings" (p. 941). The existence of distinct political districts within Mi'kma'ki (Figure 2) sustained a certain number of families and allowed for intimate knowledge about movements of animals to be observed. This suggests that districts were not only political districts, but ecological districts as well. The Mi'kmaq interacted with the availability of resources in the area. Often they would move between districts, living a nomadic existence that ensured renewal of the land and gifts. This philosophy was not only for salmon, but also for all animal and plant beings that contributed to the survival of the Mi'kmaq people (Berneshawi, 1997; A. Marshall, personal communication, November 15, 2014).

Salmon fishing rivers were shared among families, and sometimes other tribes, and fished on a rotational basis (Ladner, 2005; L. Marshall, personal communication, November 11, 2014). The delicate nature of too many fishers on one river and the population of salmon were recognized long before European arrival.

Figure 2. **Traditional political districts of the Mi'kmaq in the northeastern region of North America, including the Maritime Provinces of Nova Scotia, Prince Edward Island, and New Brunswick (*Source*: http://www.danielnpaul.com/Map-Mi'kmaqTerritory.html)**

Salmon populations declined rapidly in the early half of the 19th century and Mi'kmaq were "legislated out of the fishery" through harvesting bans and creation of a licensing system (King, 2014, p. 946). Many Mi'kmaq continued to fish for food, confident in the existence of their right to fish and hunt from stories passed down from their forefathers. Following court decisions such as *R. v. Denny, Paul, and Sylliboy* (1990) and *R. v. Sparrow* (1990), the federal government created a new strategy, known as the Aboriginal Fisheries Strategy (AFS), to deal with the outcomes of these court decisions. While these agreements are negotiated with Mi'kmaw communities and are "without prejudice", there are restrictions on where salmon can be fished, how many can be taken, and how they can be removed. Some First Nations did not enter into arrangements with the federal government but have DFO-imposed licenses for salmon. Those communities that did enter into arrangements have unique, community specific agreements with specific quotas or allocations for harvest. The harvest of Atlantic salmon by the Mi'kmaq is regulated, for the most part, through the use of these agreements.

Fishing of Atlantic salmon is both contemporary and traditional for the Mi'kmaq. Salmon were, and are today, fished using *Netukulimk* as the guiding principle and fishers govern themselves in accordance with their interactions and relationships with their environment (Giles, Fanning, Denny & Paul, 2016). Salmon are caught using hooks, snares, or spears that allowed fishers to select fish to be captured without first harming the fish. Traditionally, all parts of the salmon were used and great care was taken to bury the unusable portions of salmon so that the spirit and body of the salmon would be recycled (Prosper et al., 2011).

Today, many still take part in the traditional ceremony and return eggs to the water as food for other aquatic life and to thank the Creator for the gift of salmon. Common methods for salmon fishing included spear, snare, seine, angle, and fly. In addition to retaining salmon under 63 cm (grilse), the Mi'kmaq are the only group permitted to access multi-sea winter salmon (salmon > 63 cm, mostly female) and post-spawning salmon (kelts). These are harvested in several, but not all, rivers in which there is an allocation.

From a management perspective, the Mi'kmaq strive to fish for balance. This balance is not only relevant to achieving a balance in nature; it reflects a fishery that is balanced in spirit. The Mi'kmaq believe that salmon fishing is reciprocal and that selection of grilse over multi-sea winter salmon is not always possible. The harvest of salmon has as much to do with Mi'kmaq spirituality as the skill of the fisher. The availability of salmon is considered an offering from Mother Earth and the Mi'kmaq acknowledge the offering by taking part in ceremony, preventing waste, and returning what is not consumed to the earth. As such, not all fishers target or retain the same life stage of salmon as regulated in the non-Mi'kmaq recreational retention fishery. Furthermore, many of the fishing strategies are individualistic rather than a single approach adopted by the entire tribe. This makes it difficult to impose a universal, Western-based approach to managing fish declines and achieving conservation objectives, especially when the imposed strategy is at odds with Mi'kmaq epistemology and practice (Giles et al., 2016).

Mi'kmaq Assessment of Plamu

Traditional knowledge served the purpose of locating and quantifying populations to determine how many, and which ones, could be removed. Not all members were hunters or fishers. Providing was left to those who were especially gifted to hunt and fish, not only for their family but also for others who could not provide for themselves. Care was taken to conserve the ecological integrity of the districts and to preserve habitats as Mi'kmaq survival depended upon their relationship to and treatment of the land and water. Traditional knowledge is not only information about species or habitats. It is the collective knowledge derived from a lifetime of observing and interacting within the natural environment. It is more than knowing about nature: It is about knowing how to interact with nature to ensure co-existence and survival for humans and animals (A. Marshall, personal communication, November 15, 2014).

Mi'kmaq Perspectives on Conservation of Plamu

The Mi'kmaq concept of conservation is engrained within *Netukulimk* and has been described as the "traditional Mi'kmaq idea of conservation" (King, 2011, p. 3). Conservation connects "the wellbeing of the fish stocks. . . to the economic, political, and spiritual wellbeing of the larger community" (King, 2011, p. 3). The complete absence of fishing for salmon as a conservation practice is, and was, thought of as something that is needed when very few of those species are in existence. The word conservation evokes images of extinction—the last tree or fish—and is taken very seriously. Managing for conservation is believed to be for the benefit of the salmon and not for humans; there are no exceptions (A. Marshall, personal communication, November 15, 2014).

Mi'kmaq are in general agreement that salmon populations have been in decline and there are certain rivers in which there is concern for its populations. The application of the English word "conservation" to salmon is confusing as salmon are still observed in many places. They may not be present in historical

numbers, but they are there, and there are far more than one salmon per pool. Scientific assessments are met with scepticism because many Mi'kmaq have their methods for assessing and managing salmon based on traditional knowledge. For the Mi'kmaq, it is the initial quantity of salmon in the pool that determines whether or not salmon will be removed and, if present, how many. Only a certain number of salmon will be harvested from a pool and, once fished, the pool will not be fished again that season. Fishers move from pool to pool, carefully selecting their catch and moving on to a new pool if more salmon are required. There is no set removal rate. There is an understanding that not all salmon are to be removed from the pool, and only to remove what is needed. The Mi'kmaq were, by nature, sustainable users rather than conservationists unless it was necessary to do so. The needs of the species must be met in order for it to recover and this includes more than restricting further declines in their population. Conservation includes a holistic perspective that includes maintenance of habitats and ensuring food availability for salmon (A. Marshall, personal communication, November 15, 2014). For the Mi'kmaq, if conservation were the guiding principle for management, all SFAs designated as "endangered" should be subjected to the same conservation management regime.

It is evident that the concept of management and conservation of salmon by the federal government is very different from the Mi'kmaq perspective. These differences, which were discussed above, are summarized in Table 1.

Discussion

An attempt to align a Mi'kmaq perspective of salmon management and assessment with that of the federal and provincial governments in Nova Scotia can be described by the idiom "square peg in a round hole." While not strictly dichotomous, Mi'kmaq spiritual elements of fishing for balance and traditional practices of sharing catch communally are at odds with the DFO's regulation of removals of multi-sea winter salmon and limiting catch per licence. Similarly, Mi'kmaq traditional teachings related to taking only what is needed while preventing waste is contrary to the DFO's control in limiting removals of salmon. The catch and release salmon fishery promoted as a conservation measure is also at odds with the Mi'kmaq belief and practice of respectful treatment of animals, with conservation focused on the benefit of the species, without exceptions. These differences are not unique to the Mi'kmaq and federal management but are common conflicts and tensions among other Indigenous management initiatives as well (Berkes, 1989; Notzke, 1994). Mi'kmaq and federal perspectives both acknowledge the decline in Atlantic salmon, but differ in the approach needed to address the problem. How do groups move forward to reconcile perspectives and still retain values of conservation, the need for consumption, and recognition of the spirituality and cultural identity through salmon harvesting?

Despite the dissimilarities, the common element connecting perspectives is, at least partially, concern for salmon populations. Both perspectives include conservation and sustainable use as demonstrated in DFO policy statements and the Mi'kmaq guiding principle of *Netukulimk*. However, given the complexities surrounding the two groups' differing worldviews and partially shared philosophy, we explored whether or not a mutually beneficial solution can reasonably be expected.

Table 1. Summary of Differences Between the Perspectives of the Federal and Provincial Governments and the Mi'kmaq in the Management and Conservation of Atlantic Salmon

Theme	Domain	Western (DFO/Provincial) Perspective	Mi'kmaq Perspective
Worldview	Epistemology	• Western, "command and control," scientific, reductionist based approach • Judeo-Christian belief of human superiority above everything else • Application of single rule to multiple watersheds	• Multiple ways of knowing • Equality of life where humans are part of the ecosystem • Mi'kmaq knowledge is holistic and varies depending on place
Management philosophy	Philosophy	• Conservation and sustainable use and benefits	• *Netukulimk* (sustainability, take what you need)
Beneficiary of salmon resource	Beneficiaries	• Salmon exist to benefit Canadians • Biodiversity and ecosystem • Common property	• Salmon and Mi'kmaq benefit from relationship; • Role of salmon extends beyond human needs; • Communal property
Management	Structure	• Written regulations rooted in written policy • Hierarchical and segregated structure of science and management • Focused on limiting removal of salmon • Prescriptive	• Oral knowledge reflected in fishing practices and rooted in interactions with natural world (Mi'kmaq knowledge) • Responsibility driven • Inclusiveness of fisher, naturalist, and manager in one individual • Holistic view of conservation • Preventative
	Salmon access	• Privilege • Provincial license regime for individuals	• Constitutionally protected Aboriginal right • Negotiated federal communal allocations through AFS agreements, assertion of

Theme	Domain	Western (DFO/Provincial) Perspective	Mi'kmaq Perspective
			Aboriginal right or imposed licenses • Collective
		• SFA 18 open to retention for recreational catch and release fishers • Reduced number of grilse allowed per license from 8 to 0 over 7 years • Issued approximately 2,500 licenses annually • One area in the Margaree River closed to catch and release fishing	• Imposed and negotiated and community specific • Restriction to certain rivers • Not all rivers available to non-Indigenous recreational fishery are available to Mi'kmaq because of Mi'kmaw preference to harvest large salmon over the grilse, belief in taking what is offered by Mother Earth, and limited availability of large salmon in rivers that met or exceeded conservation egg requirement • Shared within community
	Retention rules	• Fishery takes place on estimated surplus population prior to 2015 • Catch and release in rivers with populations ≥ 25% conservation egg requirement (CER) • Management based on previous year's assessment	• Retention/fishing strategy determined at the time of fishing • Based on knowledge gathered in real time (adaptive management)
Conservation Measures	Catch and size limits	• Retention limit based on regulations • Retention fishery permits only grilse (mostly, but not entirely, male < 63 cm) • Preservation of large salmon for spawning	• Retention limit rooted in Netukulimk • Retention of MSW[a], grilse and kelt • Fish for "balance"
	Catch and release fishery strategy	• Practiced in areas allowing zero retention as of 2015; river must meet ≥ 25% CER	• Opposed to perceived harmful and disrespectful treatment of salmon

Theme	Domain	Western (DFO/Provincial) Perspective	Mi'kmaq Perspective
		• Restricted to 3 rivers in SFA 19 and open in all rivers in SFA 18	
	Method of capture	• Angle, fly with barbless hooks	• Spear, snare, angle, fly, seine, hooks (barbed and barbless)
Knowledge base to inform decision making	Source of "data"	• Collection and use of quantitative data for scientific assessments • Use of recreational fishery advisory boards and consultation with Mi'kmaq • ATK, biological, social and economic consequences	• ATK and scientific assessments • Use of both qualitative and quantitative data sources
Application of Alternative Knowledge	ATK	• Information to feed into science, which feeds into management	• Mi'kmaq knowledge is specific to the Mi'kmaq and to the place from which it was derived • Inclusive of observations and fishing practices rooted in guiding principle of *Netukulimk*

Note. [a] MSW refers to "multi-sea winter" or large salmon. MSW salmon spend more two or more years after migrating from the rivers as smolt to feed at sea before returning to their natal rivers to spawn and describe those salmon that have a fork length of 63 cm or greater. The terms "large salmon" and "MSW salmon" are used interchangeably (DFO, 2008).

We argue that while it is in the interest of the governments and the Mi'kmaq to find acceptable solutions, this is extremely challenging for a number of reasons. Some scholars have noted that a solution-based approach is not possible, or even preferred, when dealing with such complex and radically different ways of being, knowing, and interacting (Jentoft, Bavinck, Johnson, & Thomson, 2009). Salmon management in this case is embedded within cultural and legal pluralism and can be described as a "wicked" problem, according to Jentoft and Chuenpagdee (2009).

Wicked problems are complex problems. They have no technical solutions, no indication of when they are solved, and no right or wrong solution (Jentoft & Chuenpagdee, 2009). The authors described the process for tackling wicked problems as not focused on defining solutions but rather engaging in "interactive communication and learning among stakeholders, where norms and values are played out and where different ethics and ideologies, and epistemologies are active" (p. 555). In the case of salmon management in Nova Scotia, it is a call for a conversation about conservation (King, 2014; Jentoft & Chuenpagdee, 2009). The conversation will provide the opportunity to engage in discussion on topics that recognize multiple realities (King, 2014; Jentoft et al., 2009) to develop an interdisciplinary approach and cross-cultural conservation ethic or goals (Berkes, 2004) as a means to move forward. However, the process to move forward is not through conversation exclusively. Many scholars have suggested that co-management is the process in which conversations about conservation can take place, by providing a forum to address issues surrounding legal pluralism and develop cross-cultural conservation ethics or goals (Berkes, 2004; Jentoft et al., 2009). As noted by Jentoft and colleagues (2009), in the context of wicked problems and situations embedded within pluralism and conflict, co-management may be "an essential path to legitimacy" (p. 36).

Conservation, although utilized by the federal government as a valid objective to justify infringement of Aboriginal rights to salmon, has been used by First Nations as a political framework to contest the government's position on the fishery (King, 2014). Conservation becomes the platform from which to be heard and for which conversations transpire. In Nova Scotia, the platform for conversation between the Mi'kmaq of Nova Scotia and the federal and the provincial departments currently exists through a tri-partite agreement known as the Terms of Reference (TOR) for a Mi'kmaq-Nova Scotia–Canada Consultation Process:

> The consultation process under this Terms of Reference is available whenever Canada or Nova Scotia wishes to conduct consultation on the record and with prejudice with one or more Mi'kmaq Bands respecting established or asserted Mi'kmaq Aboriginal or treaty rights, including consultation in respect of a decision or activity concerning Crown land, water, or a natural resource. (Kwilmu'kw Maw-klusuaqn Negotiation Office [KMKNO], 2014, para. 1).

Conversations about conservations are consultations—structured, formal dialogue, agenda dependent, on the record and often without solution, although improvements to recreational salmon fisheries management have resulted. Consultation topics to date have been about Aboriginal rights, conservation, allocation, and governance that largely remain unresolved. However, we suggest that consultation must be combined with other modes of participation; otherwise, there is no assurance that concerns and ideas will be influential in decision-making (Arnstein, 1969). As such, for meaningful progress to be made, the consultation focus of the TOR (KMKNO, 2014) needs to be revisited to negotiate power to something more than what Arnstein (1969) described as a degree of tokenism. What ought to be considered by

both the governmental and Mi'kmaq negotiators is a step towards moving up Arnstein's "ladder of participation" to a more meaningful process that incorporates approaches leading to the sharing of power, responsibility, and clearly defined conflict resolution mechanisms (Arnstein, 1969; Jentoft et al., 2009). One such rung up the ladder to self-governance is co-management.

Co-management is a prominent governance arrangement especially in the context of Indigenous peoples and natural resource management (Berkes, 1989; Castro & Nielsen, 2001; Doubleday, 1989; Emerson & Gerlak, 2014; Morrell, 1989; Richardson & Green, 1989). A concept with many definitions, co-management refers to a suite of governance arrangements to find solutions to many of the pressing problems in natural resources management (Armitage, Berkes, & Doubleday, 2007; Berkes, 2009; Carlsson & Berkes, 2005; Castro & Nielsen, 2001; Jentoft & Chuenpagdee, 2009; Pomeroy & Berkes, 1997). Co-management regimes attempt to alter the relationships between the public (state) and private (non-state) actors for the benefit of those involved (Carlsson & Berkes, 2005; Pinkerton, 1989). Natcher, Davis, and Hickey (2005) described co-management as a way of managing relationships rather than managing resources. More formalized than other forms of participatory or network governance, co-management links different levels of political and institutional arrangements in relation to the resource system (Armitage et al., 2007; Carlsson & Berkes, 2005). Co-management arrangements generally focus on the element of sharing decision-making power between the state and citizens (Bevir, 2009; Castro & Nielsen, 2001; Gray, 2005) and responsibility (Fanning, 2000; Rettig, Berkes, & Pinkerton, 1989). Co-management arrangements generally focus broadly on the spectrum of the three P's: participation, partnerships, and power (Castro & Nielsen, 2001). Co-management can be initiated by the state, community-level agencies, or both (Thomlinson & Crouch, 2012), but develops over many years (Berkes, 2009, 2010). A precursor to co-management regimes is "real or imagined stock depletion" (Pinkterton, 1989, p. 27), social movement (Kearney, 1989), court decisions (Castro & Nielsen, 2001), research (Chuenpagdee & Jentoft, 2007) and resource conflicts such as perceived inadequacies in resource management (Morrell, 1989) and structure (Chuenpagdee & Jentoft, 2007), unfairness in fisheries access (Richardson & Green, 1989), and title to land (Doubleday, 1989; Richardson & Green, 1989). Co-management arrangements between Indigenous peoples and the state often arise out of conflict (Castro & Nielsen, 2001), as legal obligation by the state to consultation in matters of natural resources (*R. v. Haida*, 2004, *R. v. Mikisew Cree First Nation*, 2005; *R. v. Sparrow*, 1990; *R. v. Taku River Tlingit First Nation*, 2004), resource management issues (Castro & Nielsen, 2001), need for an innovative management approach (Notzke, 1994) and/or are explicitly stated in land claims agreements (Castro & Nielsen, 2001; Pomeroy & Berkes, 1997).

As governance, co-management is an *approach*, and the contexts of issue (Berkes, 2009), place, willingness of the state to facilitate co-management (Pomeroy & Berkes, 1997), and commitments to long-term institution building are important drivers for success (Armitage, Berkes, Dale, Kocho-Schellenberg, & Patton, 2011). Power sharing is a result rather than the starting point, and a more realistic view of its application as a governance approach is that co-management is the arena for the process (Armitage et al., 2007). While co-management may be seen as a potential process to solve problems, share knowledge, learn and adapt, and as a legal battlefield (Armitage et al., 2007;Berkes, 2010; Emerson & Gerlak, 2014) for the multi-faceted challenges faced in society, distinct cultural backgrounds, colonial histories, conflicting values and lack of shared management perspectives may hinder the co-management process (Natcher, Davis, & Hickey, 2005).

However, given the parties involved, any co-management approach being discussed must acknowledge and recognize the value of multiple realities. Pluralism in this case refers to the multiple realities related to views on allocation and access, provincial and customary laws, traditional knowledge and science, values and economics, and natural and legal relationships to salmon, all of which can offer depth and insight in the design of co-management (Jentoft et al., 2009; King, 2014).

The concept of Two-Eyed Seeing may be useful in this situation. Two-Eyed Seeing, also referred to as *Etuaptmumk*, was developed by Mi'kmaq Elder Albert Marshall (see for example Bartlett, Marshall, & Marshall, 2012; Hatcher, 2012) who explained that it "refers to learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of Western knowledges and ways of knowing . . . and learning to use both these eyes together, for the benefit of all" (Marshall, 2004, para. 3). Two-Eyed Seeing is interdisciplinary, cross-cultural, and pluralistic. It is a potential approach for working on wicked problems. Two-Eyed Seeing can be the framework for approaching such problems, especially those in which there seems to be little common ground from which to advance. It provides the design for social learning through sharing management perspectives, cultures, and colonial histories. The co-existence of both perspectives for the benefit of all is a process with no pre-existing guidelines; rather it is dependent on the personalities at the table and their receptiveness. It is a fitting process for the unique approach required in addressing wicked problems.

Within the design of Two-Eyed Seeing, there are other opportunities to further improve management. The use of the strengths of both the Indigenous and Western worldviews for the benefit of all may offer creativity in both management and assessment to improve current conservation strategies, given the current environmental challenges in the 21st century (Bartlett et al., 2012). The application of Aboriginal knowledge to management rather than as simply information to complement the science that informs governmental decision-making is possible through Two-Eyed Seeing. Often in resource management traditional knowledge is taken out of context, made to fit into current scientific assessments based on DFO criteria, and little value is given to the practical, qualitative application of the knowledge. Fishing strategies employed by the Mi'kmaq people, derived from lessons learned over generations of interactions and interdependence, have withstood the test of time (Giles et al., 2016).

While Two-Eyed Seeing may be a useful approach for wicked problems within the co-management process, the question of who implements the plan and how they do it, requires a different approach. Governance may be addressed through a true co-management process where there is sharing of power and responsibility, both of which are appealing and relevant to the Mi'kmaq, but has yet to be applied in Nova Scotia. However, Peace and Friendship Treaties can serve as a model for improved fisheries governance (King, 2014).

Peace and Friendship Treaties were negotiated between the Mi'kmaq and the Crown in the latter half of the eighteenth century as an attempt to create new relationships and political order for the co-existence of the British and Mi'kmaq nations by creating a "plural place" (King, 2014, p. 160). King (2014) explored the plural place as a way to "preserve multiplicity" (p. 266), and to uphold and renew the relationships that were intended in treaties, rather than the typical practice of interpreting and reframing within existing laws or management frameworks. Pluralism provides an opportunity to incorporate

traditional law and practices into state law, or even to replace it, as has been demonstrated in the case of the Listuguj salmon fishery.

In Listuguj, Quebec, community members who fished salmon according to their traditional values and harvesting practices for both food and sale on the Restigouche River came into conflict with commercial and recreational salmon fishing interests. After Mi'kmaq fishers were charged for failing to comply with provincial laws that did not have jurisdiction over them and their land, and that failed to recognize the sacredness of Mi'kmaq values and traditional teachings, the Listuguj and Quebec governments collaborated to establish governing rules for the salmon fishery. Quotas (subsistence and sale combined) were issued to Listuguj community members in exchange for training as Quebec-hired Listuguj conservation officers. Tagging requirements were agreed upon as necessary for off-reserve transport of salmon, and financial compensation ($3/lb) was paid to fishers who did not reach the quota, possibly as incentive to refrain from catching the entire quota. Discontent arose, after many years of attempting to compromise, upon learning that competing interests sport fishery rather than conservation was at the root of a large quota reduction. As a result, the community asserted its right to fish and govern its people, land, and waters in its own ways.

Listuguj Mi'gmaq Nation Government Law on Fisheries and Fish for the Restigouche River watershed is an assertion of self-determination over fishing activities and the use of the resource based on targets. Community leadership, in collaboration with community members, agreed to "assert and exercise Mi'gmaq[2] self-governance over fishing activities and fishing resources" (National Center for First Nations Governance Native Nations Institute for Leadership, Management and Policy, 2010, p. 12) by balancing rights and responsibilities through competent management and imposing their own rules in the form of laws that were enforceable by their own community (Cornell, 2015; National Center for First Nations Governance Native Nations Institute for Leadership, Management and Policy, 2010). By 1993, the Listuguj Mi'gmaq First Nation Law on Fisheries and Fishing that defined its governance had been presented to the Quebec government. It outlined the territory, beneficiaries, responsibilities of the management regime, issues related to compliance, resource allocation, use of the resource, and created fishing plans, identified special areas for protection, mapped fishing and non-fishing areas, and set rules governing monitoring by the rangers (National Center for First Nations Governance Native Nations Institute for Leadership, Management and Policy, 2010). Without federal jurisdiction over the Mi'gmaq, there was little the provincial body could do. However, there was willingness by both parties to collaborate to establish conservation targets. The law provides for co-management agreements with the federal and provincial departments (National Centre for First Nation Governance Native Nations Institute for Leadership, Management, and Policy, 2010). In 1995, the community received the award for the best managed river in the province by the Atlantic Salmon Federation (National Center for First Nations Governance Native Nations Institute for Leadership, Management and Policy, 2010). While this is on a smaller scale (i.e., one community, one watershed) than the scale of salmon management explored in this article, and represents a unique situation in Canada where marine fisheries are regulated provincially, it is an example of the willingness to collaborate while respecting Aboriginal rights and

[2] Different orthographies may be used. In the Gaspé region of Quebec, Gespe'gwa'gi (the seventh district of Mi'kma'ki), the Listuguj orthography is used. "Mi'kmaq" is spelled "Mi'gmaq." In Nova Scotia, the Francis-Smith orthography is used. The Santi Mawio'mi declared the Smith-Francis orthography is the official orthography of the Mi'kmaq nation (see http://www.muiniskw.org/pgCulture4b.htm).

responsibility, cultural and legal pluralism, and co-management. Based on the practice demonstrated by the province and the Mi'kmaq in the Listuguj example, it would appear that the state would benefit from learning to be pluralistic, which involves a recognition of multiple realities, the Mi'kmaq right to self-determination, and confidence in the capacity of the Mi'kmaq to "manage" salmon.

Conclusion

It is evident that perspectives on how to achieve conservation through salmon management in Nova Scotia are quite different between the Mi'kmaq and DFO. Both groups share and respect the idea of conservation. However, differences in underlying worldviews, management philosophies, beneficiaries of the salmon resource, management, conservation measures, knowledge to inform decision-making, and application of ATK to achieve conservation are "governability issues" (Jentoft & Chuenpagdee, 2009, p. 553). These all make for a wicked problem embedded in cultural and legal pluralism.

On-going consultation between the groups remains valuable. While consultation may be considered a degree of tokenism, it is an essential step towards implementing co-management and has been referred to as "step zero" in the process by Chuenpagdee and Jentoft (2007). Given the legal responsibility of the government of Canada to engage First Nations in resource management (*R. v. Haida*, 2004; *R. v. Mikisew Cree First Nation*, 2005; *R. v. Sparrow*, 1990; *R. v. Taku River Tlingit First Nation,* 2004) and the "wickedness" of the problem, the use of co-management to develop shared goals of conservation of species and conservation of Mi'kmaq identity may be the only way to further governance of salmon in Nova Scotia that does not involve loss of cultural identity or replacing one belief system in favour of another (Notzke, 1994).

Co-management for complex issues must be approached with multiple realities in mind, incorporate shared decision-making, and develop rules for conflict resolution. This includes the recognition of salmon access priorities (Jentoft et al., 2009), such as the priority of Aboriginal food fisheries over other user groups, and incorporation of diverse perspectives on conservation and management. The use of Two-Eyed Seeing is both interdisciplinary and pluralistic. Its use as the design to develop cross-cultural conservation ethics or goals, creative management, and appropriate assessment will be challenging but is necessary to maximize the effectiveness of a co-management approach to salmon conservation in Nova Scotia.

From an application perspective, the use of Peace and Friendship Treaties to further the governance of resources related to salmon management and conservation may be more appropriate than attempting to reframe the square peg of Mi'kmaq salmon fishing into the round hole of existing regulations, scientific assessments, or the current management framework in Nova Scotia. Given the experience on a smaller scale in Quebec, there may be much to learn about the process and potential application to Mi'kmaq governance of Atlantic salmon in Nova Scotia.

In conclusion, we suggest that an essential first step in the effective management of Atlantic salmon is to begin the process of adopting a co-management approach that incorporates Two-Eyed Seeing as the design and treaties as the model to achieve a collaborative co-existence approach for salmon governance in Nova Scotia. Such an approach would be based on the shared objectives of maintaining and increasing salmon populations; yet, allow for differing mechanisms to address the concept of conservation, include multiple realties, and help preserve cultural identity. It acknowledges the benefits to be gained from

understanding different knowledge systems and recognizes that opportunities for new and innovative regimes for governing the fishery may evolve from a joint appreciation that there may be more than one way to achieve the shared goal of salmon sustainability in Nova Scotia.

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Appendix

ATK	Aboriginal traditional knowledge
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Department of Fisheries and Oceans
FSC	Food, social, and ceremonial
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
SARA	Species at Risk Act
SFA	Salmon fishing area