

**‘His knowledge and my knowledge’: Cree and
Ojibwe Traditional Environmental Knowledge and
Sturgeon Co-Management in Manitoba.**

BY

CHRISTOPHER JAMES HANNIBAL-PACI

**A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of**

DOCTOR OF PHILOSOPHY

**Department of Graduate Studies
University of Manitoba
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**'His knowledge and my knowledge': Cree and Ojibwe Traditional Environmental
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BY

Christopher James Hannibal-Paci

**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University
of Manitoba in partial fulfillment of the requirements of the degree**

of

DOCTOR OF PHILOSOPHY

CHRISTOPHER JAMES HANNIBAL-PACI @ 2000

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ABSTRACT

Cree and Ojibwe Traditional Environmental Knowledge and Sturgeon Co-Management in Manitoba takes an interdisciplinary approach to synthesis of Indigenous sturgeon knowledge, history, and social and scientific knowledge. To some degree this research has been driven by information needs for a specific purpose: the viability of sturgeon is threatened, domestic harvest information is lacking, and the knowledge of the sturgeon and Aboriginal relationships is incomplete. The methodology bridging these gaps generates new knowledge for sturgeon conservation efforts, a significant contribution; however, the object of the thesis was more concerned with creating a space from which to consider Indigenous knowledge in sturgeon research. The thesis concludes that to better manage the fishery now and in the future requires a greater appreciation of the marginalized knowledge of fishers and an appreciation for the environmental history of the sturgeon problem. What distinguishes this approach from others is a concern for solving a natural resource problem by including history and culture into what has mostly been a scientific discussion. While integrating TEK into co-management may resolve the sturgeon problem in Manitoba, in practice such integration and its outcome remain tentative. Successful sturgeon co-management has yet to be undertaken. There is a struggle over management options for remnant sturgeon populations in Manitoba. Sturgeon populations are so severely impacted they require interim special protection. Meanwhile, federal and provincial governments are recognizing the inherent rights of First Nations to natural resources. Governments are obliged to manage fisheries with First Nations' interests in mind. The argument is made in the thesis for the necessity of sturgeon co-management both as a means of overcoming previous failures and as a way to decolonize the fisheries. The theory and methodologies used in the thesis are applicable to other environmental studies.

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My interdisciplinary reading of history and science is beyond the separate disciplines. I have admired fishermen's stories, but I have written the little I have learned through my own biases. Hopefully I have listened and heeded the advice of teachers, colleagues, friends, and family. I have heard it said that thesis writing is never over, there are always new and old insights that can add or change the direction of research. This telling of the story of sturgeon in Manitoba is a beginning, not an end.

Chapter 1

Lake Sturgeon in Manitoba

1.1 Introduction

This thesis discusses the nature of traditional environmental knowledge (TEK), its accessibility through the research of a specific species-human relationship, and its application in natural resource management in co-management. In order to do this I set out to gather Cree and Ojibwe knowledge of sturgeon (*namew, name*), scientific knowledge (*Acipenser fulvescens*), and the role of sturgeon knowledge in co-management in Manitoba.¹ Sturgeon, the term generally applied in the thesis except to distinguish different *Acipensers*, is an unusual fish and as the thesis evolved, I became aware of significant gaps in knowledge about it. For instance, there are specialized studies in science and increasing numbers of papers on sturgeon by geographers and historians. To date there has not been a concerted effort to bridge the literature with material culture, and the knowledge held in Aboriginal fishing communities. This thesis seeks to bridge the gaps in current knowledge and advance a significant and important new approach to the study of the environment with a species-specific study.

By the mid 1990s, the limits of scientific natural resource management in the Arctic

¹ Figure 1 shows a sturgeon fry, perhaps a couple of weeks old, measuring approximately three centimetres, while Figure 2 shows an adult sturgeon, weighing somewhere between 20 to 100 kilograms. Compared with other species it is a fast growing, yet slow maturing fish, females first spawning around age 24 and males near age 18. Sturgeons do not spawn annually; females spawn once every four years and males every other year. These unique biology and life history characteristics make sturgeon vulnerable when managed like other fish and in Manitoba it is currently threatened. The present state of sturgeon reflects significant environmental changes over approximately the last 3000 years.

and sub-arctic were apparent, as was the understanding that Indigenous people held a great deal of knowledge about their landscapes. In natural resource management, Indigenous knowledge is subordinate to scientific knowledge. Recently, this unequal position is being rejected and challenged through study of traditional knowledge. For instance, Nakashima's (1991) doctoral thesis on ecological knowledge of Belcher Island Inuit illustrated the importance of applying traditional environmental knowledge to improve resource management. Internationally, Indigenous knowledge is vital to discussions of global environmental policy, expressed for instance in the *Brunland Report* and the *Rio Declaration*. Many academics have argued that Indigenous knowledge offers a powerful critique to a materialist science and Cartesian rationality (Apffel-Marglin and Marglin 1996, Berkes 1999). Increasingly, scientists are researching the linkages of biodiversity and sustainability to cultural factors, a line of argument that also supports linkages of history to environment. The thesis seeks to understand these issues as they are understood through the state of sturgeon knowledge in Manitoba.

Indigenous knowledge is not apparent in previous scientific research on sturgeon, it was hypothesised; however, that such knowledge still existed and could be gathered in sturgeon-using communities. By 1996, the Nelson River Sturgeon Co-Management Board sought the inclusion of TEK in co-management of sturgeon on the Nelson River. In 1997, Sagkeeng First Nation was favourable to research of community knowledge of sturgeon as part of a move to re-establish viable sturgeon populations on the Winnipeg River.

There have been many different ways people in Manitoba have related to sturgeon.

Before contact, sturgeon was consumed, processed and traded. During the early colonial period (1730 - 1850) sturgeon was an important country food for the people inhabiting and exploring the rivers draining into and out of Lake Winnipeg. Sturgeon remained important to both Indigenous people and newcomers to the area after 1850. From 1890 until 1910 when the fishery collapsed on Lake Winnipeg, sturgeon was increasingly sought after as a commercial commodity in an export commercial fishery. Until 1910 fisheries overseers, officers, naturalists, and industrial fishing companies had developed contradictory relations with sturgeon. These relationships displaced traditional Cree and Ojibwe sturgeon relationships expressed as fisheries. Frank Tough (1996, 1999) has argued that the dislocation of labour from decision-making and management ultimately led to the loss of sturgeon in Manitoba. Aboriginal labour was important to the sturgeon fishery, but more importantly, Indigenous knowledge was excluded from management and Aboriginal communities paid rent for industrial fisheries.

In the thesis I promote the view that early colonial fisheries in Manitoba continue to shape sturgeon management in the province. The exploitation of natural resources “show the common legacy of dispossession, dual tenure systems, [and the] relegation of indigenous people to labour” (Mayekiso 1999:4). Colonization is manifest in the processes and practices of foreign cultures occupation of politically “weaker” cultures, not only a physical and historical process, but also an ongoing physical and metaphysical displacement (Apffel-Marglin and Marglin 1990, Smith 1999). James Frideres (1988) advanced a theory of colonization that conceptualized reserves as internal colonies, underdeveloped as a result of

active colonization. According to Frideres the colonization process is ongoing.

With sturgeon disappearing from stretches of the Nelson River in the later 1980s, a number of different theories have been advanced in explanation of the loss. Some of the theories advanced a measure of local knowledge; others reflected global environmental and social changes. The predominant theories came from scientific understandings; losses explained exclusively as environmental impacts caused by economic developments. Noticeably absent from policy discussions were alternative explanations about sturgeon's disappearance. None of the theories could provide an explanation for the disappearance of sturgeon. As knowledge about localized habitat, sturgeon stocks, community knowledge, and biology of the fish increased independently, each part of a larger puzzle; a solution to the problem of sturgeon eluded natural resource managers. As the fragments of knowledge increased, stocks continued to fail. What has become apparent is that the sturgeon problem requires more than a privileged scientific explanation, more than a single cultural perspective. What is required is a vision to establish new human/sturgeon relationships, based on a broader understanding of the problem.

1.2 Context

The Cree along the Nelson River call sturgeon *numao*.² The Ojibwe on the Winnipeg

² The Cree spelling is from Faries (1938). Waugh *et al.* (1998:99, 439) use *namew*, which is much closer to the Ojibwe *name*. See the Ojibwe spelling for dried smoked fish: *namestek*, *namestekwak* [pl.].

River call the fish *name*.³ For many First Nations, sturgeon is an important and reliable renewable resource that is in trouble. Did Cree and Ojibwe fisheries knowledge, practices and institutions inform sturgeon management in Manitoba? Do those sturgeon fishers have knowledge that can be gathered and generalized as traditional environmental knowledge? What role can this knowledge play in the rehabilitation of sturgeon?

The Province of Manitoba concluded in 1995 that sturgeon populations were in jeopardy and designated the fish a Heritage species, a designation that has lower status than “endangered.” The Heritage designation is a conservative response by the Manitoba Department of Natural Resources (MDNR) to invoke conservation measures where justified while still allowing small-scale fishing, such as Cree and Ojibwe food fisheries and alternative uses of river systems, for instance, hydroelectric development. The designation responds to the economic, political and ecological state of sturgeon in Manitoba. The designation is different from historic distinctions of the fish as commercial commodity, country food, nuisance, subsistence fish, and *numao/name*. Can these various relationships be reconciled? What has happened to sturgeon so that it is now no longer mainly “food” or “commodity,” but a “heritage” species? As a remnant species, gravely threatened by human impacts, a complete history may be difficult to reconstruct, certainly not from a single disciplinary perspective. Interdisciplinary research can be employed to effectively reconstruction a more complete knowledge of sturgeon and human relations.

It is argued in the thesis that incomplete knowledge was, and continues to be, applied

³ The Ojibwe spelling used throughout the thesis is from Nichols and Nyholm (1995:91, 260).

to sturgeon management. Usher and Tough (1999) and Tough (1996) demonstrate linkages between industrial economic interests and the development of a “for export fishery.” The values of industrial economic development have taken sturgeon to the brink of extinction. Sturgeon stocks are now in serious jeopardy. Ojibwe values relating to fishing, well documented by Holzkamm (1987), Holzkamm and McCarthy (1988), Holzkamm and Wilson (1988), Holzkamm *et al.* (1988, 1991), were displaced by industrial economic development. The most significant point revealed by industrial fishing in Manitoba was that sturgeon stocks had limits. In addition, scientific values and biological knowledge have informed fisheries management for sturgeon (since the 1920s). As these stocks collapsed, the science of *A. fulvescens* increased. Scientific studies varied considerably in scope and quality and the science of sturgeon was not applied evenly to management of stocks. For example, closure of one area often stimulated greater production in another area. The most recent biological studies of sturgeon in Manitoba view stocks as discrete populations, based on management zones and genetic differentiation (Beyette 1994, MacDonald 1994a, b, c, d). Fisheries management is fragmented and incomplete.

Frédérique Apffel-Marglin (1996:145) argues that colonizing knowledge results when categories are taken as “givens rather than [seen to be] constructed on the basis of a certain Western epistemology and ontology.” In turn she argues that decolonization “requires questioning of a world constructed by the categories of the dominant system of knowledge” (ibid.). The thesis is concerned with how dominant systems of knowledge have categorized and constructed sturgeon, deconstructing these constructs to solve a current natural resource

problem. The problems identified in the course of researching the sturgeon problem in Manitoba are difficult to comprehend, but reveal competing knowledge systems. The values of industrial economic development and science have displaced the values of First Nations via fisheries management. The fragmented and competing nature of the various ways of knowing sturgeon must be addressed, resolved by interdisciplinary bridging: history can be combined with fisheries science, anthropology, and cultural studies. Western knowledge can be de-centered to include Indigenous knowledge. Methodologically, the research extends into several disciplines: science (biology and life history characteristics); natural resource theory: fishing, management, ecology and common property theory; traditional environmental knowledge; and history (Aboriginal sturgeon fishing and resource management).

1.2.1 Traditional Environmental Knowledge

Sagkeeng elder Henry Letander (pers. com, 1996) has said, “his knowledge and my knowledge are needed for the recovery and future survival of *name* [sturgeon]” in Manitoba. This statement is the focus for my thesis. What Letander meant by “his knowledge” is scientific knowledge of biology, zoology and aquaculture of *A. fulvescens* held by Dr. Terry Dick, University of Manitoba zoologist and acknowledged expert on sturgeon in Manitoba. By “my knowledge,” Mr. Letander, Sagkeeng elder, was referring to his experiential and traditional knowledge as a sturgeon fisherman from the Winnipeg River. Letander’s statement suspends the political issues of sturgeon management and speaks of the opportunities to cooperate in order to improve the situation and knowledge of sturgeon in Manitoba.

Zoologists Dick and Choudhury (1992) noted with understatement, “if the next 100 years sees as little progress in our understanding of the biology of lake sturgeon, as the past century has, its future does not look too bright.” As well as the need to preserve and advance the biology of sturgeon there is, equally, a need to advance, the social science and management of the fish. The hybridization of Indigenous and scientific knowledge in traditional environmental knowledge and its application in co-management could address past management failures in Manitoba. Co-management, advances in sturgeon biology, and increased understanding of Indigenous knowledge are key to protecting the fish.

1.2.2 *Acipenser fulvescens*

The natural range for sturgeon in North America is limited to three major drainage basins: the Great Lakes, James Bay, and Hudson Bay (Figure 3). The Hudson Bay drainage, which zoologists and other scientists have termed the “Hudson Bay Province,” is a large area draining 4,009,000 square kilometers (Burr and Mayden 1992:26). The northwest section of the Hudson Bay Province consists of a network of river systems and drainage surrounding Lake Winnipeg. The Saskatchewan River from the west, the Red River from the south, and the Winnipeg River from the east, drain into Lake Winnipeg. Their waters then flow north to Hudson Bay through the Nelson, Churchill and Hayes rivers.

Biologists R. Thresher and C. Brousseau (1986) found that by the time of their research, sturgeon had been over-fished and were no longer inhabiting parts of the Great Lakes system in which they had been historically abundant. Was over-fishing the cause of the

loss of sturgeon and was the same true for Manitoba? Threader and Brousseau do not draw on the analysis of historians or on Traditional knowledge from Aboriginal fishers; their conclusions are based exclusively on scientific study of sturgeon population in parts of the Moose River, Ontario. Habitat changes to river systems such as the Moose River, attributable to hydro development, limit fish movements and therefore range. These same changes to the river also narrow sturgeon research. Detailed stock-specific knowledge of sturgeon for a large area is incomplete and few scientific researchers are attempting to address such complexity with either an ecosystem approach or biogeography (Nikolsky 1963, Hennig 1966, Mayden 1992, and Findeis 1993). In fact, most recent biological sturgeon studies exhibit a trend toward study of area-specific and therefore fragmented, remnant populations (Wallace 1991, Beyette 1992, MacDonell 1993, Rusak and Mosindy 1997). There is no single cause for the decline of sturgeon. Over-fishing, impacts from climate change, and other developments such as hydro, deforestation, and increased siltation, all contributed to the decline of sturgeon.

1.2.3 Areas of Literature

There are relatively few previous studies on sturgeon in Manitoba. Don MacDonell (1997) has provided the most accurate discussion of sturgeon relations for the Nelson River. Frank Tough has produced much of what is now known on the economic history of sturgeon fisheries in northern Manitoba. However, the scientific literature, other historical literature, and related material are not readily available. In order to research sturgeon and Aboriginal fisheries, a broad literature search was conducted. Included in this search was research in

archives, art galleries, libraries and museum collections. Many of the early scientific studies on sturgeon are unpublished and difficult to locate. As previously mentioned, much of the secondary literature on sturgeon is fragmented, sometimes reflecting disciplinary specialization, but this also results from the uncoordinated study of sturgeon by a relatively limited number of researchers over an extended period of time. The failure to integrate many key elements, for instance Aboriginal people, in sturgeon fisheries management has compounded the problem. Furthermore, while there have been studies about sturgeon, Aboriginal sturgeon knowledge has only been recently considered a legitimate topic of research. The literature for sturgeon can be discussed under two broad categories: natural sciences and social sciences.

The natural science literature comprises works in genetics, systematics, biological field research, natural resource reports and popular science. The literature from genetics and systematics was peripheral to the final analysis (Rathburn 1895; Brice 1898; Stone 1900; Hennig 1966; Thuemler 1988; Burr and Mayden 1992; Findeis 1993). Field research and natural resources reports, the bulk of the literature researched, were gathered to establish the evolving role of sturgeon science and management in Manitoba. These documents reflect changing scientific understandings of sturgeon. They include several phases of development. The earliest studies by Taché (1870), Urquhart (1873) and Prince (1898) reflect the embryonic observations about sturgeon. Tache (1870) for example, made first hand amateur naturalist observations of sturgeon, which also included its role in the lives of Aboriginal and non-aboriginal sturgeon fisheries for Lake Winnipeg and Red River. Interestingly, Prince who

was responsible for fisheries research in Canada borrowed heavily from observations and statements recorded in annual fisheries reports by men such as Tache and Urquhart. Later scientific studies by Tower (1908), Feilding (1916), Skaptason (1926), and Harkness (1923, reprinted in 1980) added specific knowledge about sturgeon life history and biology. Provincial fisheries studies by Bajkov (1933a, b), Hinks (1943), McTavish (1954), Kooyman (1955), Roussow (1957), Hubbs and Lagler (1958), Sunde (1959a, b, 1961), Harkness and Dymond (1961), Nickolsky (1963), Royer *et al.* (1968), Priegel and Wirth (1971), Driver and Doan (1972), Alyes *et al.* (1974), Gaboury and Patalas (1984), Huston (1987), Oliver (1987), Sopuck (1987), Patalas (1988), Swanson *et al.* (1990), Macdonald (1991, 1994a, b, c, d); Wallace (1991), McCart (1992), MacDonell (1992, 1993), Beyette (1994), Auer (1996), Rusak and Mosindy (1997), built on preexisting knowledge. A significant issue raised by many of these biological studies was the lack of control by managers to arrest over production. Scott and Crossman (1973) and Dick and Choudhury (1992) are two excellent reference books, the first is a comprehensive source book for freshwater fishes and the later an annotated bibliography for sturgeon literature. MacDonell (1997), Dick *et al.* (1998), and Hannibal-Paci (1999) talk more directly about traditional knowledge of sturgeon in Manitoba. There is a need to further study the popular science literature to understanding the larger social context of sturgeon science.

The social science literature was more difficult to categorize. This diverse body of literature ranges from anthropology (including archaeology) to history, geography, human ecology, and fisheries management. While there is a growing body of material on fisheries

management (Burton 1977, Gislason *et al.* 1982, Collette 1989, Pinkerton 1989, Gough 1991, Manitoba 1991, 1994; Droshov *et al.* 1996), little has been written on Aboriginal fisheries (Nelson River Sturgeon Co-Management Board 1992, Wilson *et al.* 1994, MacDonell 1997). Explorers' manuscripts, post journals, social and environmental histories and ethnographies can be read for sturgeon information and Aboriginal fisheries. Published primary accounts that provide insight into post-contact fisheries included: Henry R. Schoolcraft (1856, Williams 1953), Alexander Henry and David Thompson, edited by Coues (1897); James Isham, edited by Rich (1949); Daniel Harmon, edited by Lamb (1957); Samuel Hearne, edited by Glover (1958); Andrew Graham, edited by Williams (1969); Father Nicollet, edited by Bray (1970); Henry Youle Hind (1971), Waddell (1970), Warren (1984 reprint), and Tanner (1994 reprint). Similarly, HBC Post histories by Stewart (1930), Rich (1955), and Williams and Johnson (1967), shed some light on fisheries prior to the establishment of "for export" commercial fishing.

Social and environmental history that pertains to Aboriginal fisheries is available in publications by: Blakey (1856); Benson (1970); Ray and Stevens (1971); Van Kirk (1980); Krech III (1981); Spry (1983, 1991); Holzkamm (1987); Holzkamm *et al.* (1988, 1991); Weiskel (1988); Worster (1988); Van West (1990); Peers (1994); Gulig (1995); MacDonell (1997); and Hannibal-Paci (1998e). Historical geography, of relevance to lake sturgeon fisheries, were produced by Ray (1974, 1996), Tough (1984, 1987, 1989, 1992, 1996, 1999) and Lytwyn (1990, 1993). Aboriginal resource use has been studied by Tamplin (1977), Carter (1980, 1990), Cronon (1983), Smith (1988, 1991), Abel and Friesen (1991), Peers

(1991), Rupert's Land Research Center (1992), and Meyer and Thistle (1995).⁴

The archaeological literature in Manitoba establishes the importance of zooarchaeology, establishing rethinking on the question of Aboriginal use of fish resources. Manitoba's archaeological literature provides necessary elements for the reconstruction of Aboriginal sturgeon fisheries (Hannibal-Paci 1997).

Following Rostlund (1952), ethnohistorical and anthropological studies of Aboriginal fishing and fisheries have improved the picture of Aboriginal resource use in North America (see also Rotstein 1972, Cordell 1978, McCay 1987, McEvoy 1988, Newell 1993). Oral history research by Michelson (1919) and Bloomfield (1930) gathered "sacred stories" of Cree and Ojibwe. In these stories there are limited references to sturgeon. Classical ethnography by Speck (1935), Feit (1969, 1987), Bishop (1970, 1974), Tanner (1979), and Hallowell (1992), provide insight into Cree and Ojibwe relations with fish.

Regarding the social science literature, Pierson (1991:80) cautioned (for history),

[if] the past is in some way knowable from 'sources' that have survived... ranging from the physical artefacts... official documents of government archives to individual memories as conveyed in diaries and oral testimonies... these 'sources' cannot be taken at face value, but rather require deciphering and decoding, for which critical skills and social contextual knowledge are necessary.

Few of the studies analyzing the documentary record for sturgeon fisheries have deciphered and decoded for a First Nations' perspective. In fact, very little information exists from different Cree and Ojibwe about their fisheries and relations with sturgeon. Tough has

⁴ Research on several record groups from the Provincial Archives of Manitoba (PAM), Hudson's Bay Company Archives (HBCA), Manitoba Legislative Library (MLL), and National Archives of Canada (NAC), further established the sturgeon – human relationship in Manitoba.

reconstructed the archival record for sturgeon in Manitoba and argued that the concern for developing an industrial fishery displaced Aboriginal sturgeon fisheries. Locating First Nation perspective(s) in these archives and Tough's research is problematic. Oral histories have not been included. The absence of Aboriginal voice(s), inherited from archival collections has produced a form of erasure when read uncritically. Tough (1999) is successful in telling the story of the commercialization of sturgeon by reconstructing economic behaviours accounted for in the records, primarily, of the HBCA. However, the picture of sturgeon-First Nation economics may change if these records could be reconstructed along with First Nations' accounts. The canon of traditional knowledge studies have grown since Nakashima (1991), focussing on the use of traditional environmental knowledge in natural resource management.

1.3 Statement of the Problem

The scope of the study is roughly defined geographically by the Lake Winnipeg basin; a portion of the Winnipeg River, between Nutimik Lake and Lake Winnipeg; and the Nelson River, Playgreen Lake to York Factory. This area is a localized portion of the overall range of the fish. While generalizations may mask the unique variations in this region and the differences between communities, with limits, there is economy in the approach. A literature review was unable to establish a full understanding of sturgeon and Aboriginal fishing in Manitoba. These sturgeon fisheries can be partially reconstructed from published sources, but it was felt that community interviews could provide a fuller picture. The scope of these interviews matched the available literature, and as such this serves as a theoretical constraint

to the study.

The fieldwork responded to the needs of several First Nation communities to gather their knowledge to improve management. A case study approach facilitated fieldwork (Table 1). Further studies of First Nation-sturgeon fisheries, or other resource relations, are required to test the methodological validity employed in the thesis. For other environmental relations research may not be possible in the historical or secondary and primary science literatures. Interviews with resource users may not always be possible. First Nations do not always want to share their knowledge with outside researchers. Unfortunately, many have experienced colonization through research (of their cultures, knowledge, territories and resources).

Participatory action research (PAR) methodology is the most common approach taken with traditional environmental knowledge research. Such a research methodology ideally involves First Nations' participation in developing and fully administering research. The approach taken in the thesis approximated PAR; the research questions followed a preexisting study by MacDonell (1997). Community members participated by selecting interviewees. Band officials, MDNR and Manitoba Hydro personnel were also interviewed for context.

1.4 Significance of the Study

The interdisciplinary research on sturgeon knowledge and management in Manitoba is significant for several reasons. First, studying sturgeon enables the development of an understanding of changing human-environmental relationships. Charting these changes can be helpful in resolving recurring or entrenched environmental problems. Furthermore,

research on sturgeon provides a window of opportunity to Cree and Ojibwe traditional knowledge. Did this knowledge inform such things as the development of the commercial fishery, extirpation, management, and attempts to conserve and enhance remaining populations? A significant question is, are there similarities and/or differences in traditional knowledge among Cree and Ojibwe communities in Manitoba (and between and within these communities). This focus on sturgeon, different cultural and local knowledge, is the first academic discussion of its kind. In this regard, the thesis brings together three case studies of Cree and Ojibwe sturgeon knowledge in Manitoba.

The critical skills used to study history and science are usually mutually exclusive: most scientific method is subject to laboratory experimentation, whereas most historical method tends to view documentary evidence with its own proofs and authentication process. The overall effect of disciplinary separations makes an interdisciplinary approach difficult. The bridging of disciplinary knowledge involved identifying cultural interpretations (including science as culture) and issues of importance to sturgeon fisheries in Manitoba. Science literature was read as narratives, in conjunction with social contextual knowledge, thus providing a set of critical skills missing from scientific sturgeon research to date. Aboriginal views were sometimes extracted from the literature in a controlled manner (Gleach 1996:22).

D. Mackinac (1996:3) argued that “significant new knowledge [since the 1970s] has been gained concerning sturgeon population biology, ecology, physiology, pathology, nutrition, and genetics.” However, Dick and Choudhury (1992:1) argued that “most of the (scientific) studies... have added little to our knowledge of sturgeon biology and the

relationship of sturgeon to the culture and livelihood of aboriginal peoples.” Any science of sturgeon fails if the history, knowledge and insights from other cultures are excluded. At the same time histories of sturgeon fail if the science and voices of First Nations are excluded. A growing concern, identified during the course of research, is the inclusion of culture specific knowledge (Dick and Choudhury 1992; Berkes *et al.*1995; Institute for Research on Environment and Economy 1994; Findlay *et al.*1996; MacDonell 1997; Dick *et al.* 1998). An awareness of situated sturgeon knowledge may facilitate combining Indigenous with Western knowledge in traditional environmental knowledge to improve fisheries management.

Interdisciplinary scientific approaches can provide researchers with deeper understandings. For example, biogeography is the bridge between biology and geography. The aim of biogeography is to relate living organisms to their habitats, bridging the analysis of the range and distribution features for a given species over a physical space, but not over a chronological period. Mayden’s (1992) view of historical biogeography provides answers to questions about historical knowledge of sturgeon, concerning issues of range and distribution. Historical biogeography does not include considerations about changing social relations. The limitation of this approach is the treatment of humans apart from ecosystems, as opposed to the view taken in this thesis, which more closely follows a human ecology view of humans as part of ecosystems (Kormondy and Brown 1998).

Interdisciplinary methodology relies on the strength of generating new knowledge by bridging and borrowing disciplinary knowledge (Klein 1990). Such an approach is useful to reaffirm disciplinary knowledge or to create new knowledge. This is hybrid knowledge

independent of any single discipline. It is a result of a synthesis and therefore fresh look at existing and evolving phenomena. “*Borrowing*” and “*bridging*” are key activities, which are in turn made rigorous by a test of “*responsibly and respectfully*” (Paci *et al.* 1995). This test is a basic rule inspired by Vickers (1991), which demands the researcher ensures the responsible borrowing and bridging of existing and evolving disciplinary theory and practice into an interdisciplinary context in a respectful manner. Research that is “responsible” and “respectful” requires disciplinary theory; language and practices are to be kept intact. In other words, they can not be corrupted in the borrowing. Therefore, researchers maintain the original disciplinary intent in much the same way in the interdiscipline. To achieve this goal, research must meet the theory of *enoughness*: some degree of the disciplinary context, in which theory and practice is embedded, must accompany borrowing (Vickers 1991). In this study divergent knowledge has been brought together by me to extend current disciplinary perspectives on sturgeon.

Several conditions set the stage for this study. The Nelson River Sturgeon Co-Management Board for conservation and enhancement purposes was seeking Cree and Métis knowledge of Nelson River sturgeon. Co-management has the potential to bridge and institutionalize Indigenous and Western knowledge in an administrative forum. Traditional environmental knowledge is ultimately complicit in a political act of creating a space for dialogue between unequal and diverse communities. First Nations believe that the failure to include their views in management has brought sturgeon to the brink of extinction. Scientists see the failure to include their views in management as having lead to the loss of sturgeon.

Indigenous and scientific perspectives can be complementary in management, but it would be naïve to ignore that management was to foster development and therefore is premised on values established by industrial commercial concerns. Cree, Ojibwe and scientists want to maintain the population of sturgeon; each in their own way they want to bring sturgeon back so future generations can enjoy the fish.

A significant contribution to academic knowledge is to provide an interdisciplinary approach to trace human-environment relations, from the archaeological past to the co-management present. The story of sturgeon serves as a metaphor for changes in cultural-environmental relations. This is the first Cree and Ojibwe traditional environmental study in Manitoba and the first study of community-based management of sturgeon on the Nelson River. The traditional knowledge methodology, discussed in the next chapter as a third generation approach, is research advancing past traditional knowledge studies. A practical aspect of the contribution to knowledge is gathering community knowledge for sturgeon management in order to examine its use in resource management.

The thesis gathers Cree and Ojibwe knowledge of sturgeon in Manitoba. In doing so, I am aware that what is reflected in the thesis is an approximation. The interpretation of both Indigenous and scientific knowledge in the thesis creates certain limits, but neither are frozen and archaic systems. What, if any, are the implications of including both kinds of knowledge in management systems? Sturgeon serves as the vehicle to understanding what knowledge is included/excluded from management. The research is about power relationships, Cree and Ojibwe, scientists, industrial companies, general populations; each group in Manitoba has

knowledge that was or was not used in sturgeon management (co-management needs to be a negotiated process). Communities are more or less empowered. The history of any management issue is an essential component in charting future directions. The educational function in co-management, government-industry-First Nations, needs to reflect a cross-cultural learning, which in turn may drive cultural revitalization (in this case as it is symbolically linked to sturgeon).

As previously mentioned, MacDonell (1997) provided a baseline study for sturgeon from three Bayline communities on the Nelson River. His is the first study of sturgeon knowledge for the Nelson River. On the Winnipeg River, before the 1980s there was little interest in the study of sturgeon. The fieldwork in York Landing, Norway House and Fort Alexander, represents the first effort to gather Cree and Ojibwe community knowledge about sturgeon for the Nelson and Winnipeg rivers.

Alison Haugh (1994) has previously compared the state of co-management in Manitoba, analyzing co-management agreements between various First Nations and provincial and federal agencies. Haugh summarized sturgeon co-management for both the Winnipeg and Nelson rivers. There is limited published research on the linkage of sturgeon co-management between provinces. A limited comparison of the effectiveness of co-management at the territorial level examines some of the elements that make or break co-management (Hannibal-Paci 1999). There have been few studies of co-management and the thesis contributes to this area of study.

First Nations on the Nelson and Winnipeg rivers see how fisheries management has

failed. Many fishers consider the only possible future for sturgeon lies in their communities return to traditional values, which structures their relationships with sturgeon. This is not some romantic return to simpler times; it is not throwing away of multi-filament nets and aluminum boats for birch-bark canoes and spears. Members of communities who were interviewed argue that the loss of governance over traditional territories, through competition from outsiders, as causes for what are becoming scarce resources. A greater degree of control over traditional territories, resources, and endorsement for sturgeon enhancement through aquaculture are essential features to the future for sturgeon. An apparent or real threat to sturgeon is now the alternative uses of the river, as a pollution sink or under harness for hydro production. The loss of traditional knowledge is a serious threat to the viability of sturgeon management in the future.

A contribution of the research is the development of a new generation of traditional environmental knowledge research, which enables decolonization. The earliest TEK research, conducted mostly by classical ethnographers, photographers and artists, and others, was not articulated as such, instead it was research on Indigenous people, usually under pressures of change and influenced by assumptions of the “dying savage.” The second generation of TEK research, since about the 1930s, by ethnoscientists and cultural ecologists saw the development of a more sophisticated interest in how Indigenous peoples related to lands they inhabited. The present generations of TEK researchers, those of us who are trained interdisciplinarians, are taking a keen interest in advancing the paradigm(s). James Frideres (1988) advanced a powerful theory for colonization, which enabled the examination of First

Nation reserves in Canada as internal colonies. Such analysis energizes TEK research, with the inclusion of political and environmental concerns, multiple viewpoints, marginalized perspectives, and perhaps a post-modernist approach to understanding the situated nature of knowledge. Decolonizing methodologies (Smith 1999) apply to cultures and disciplines.

1.5 Conclusions

While rare, there are archival documents, reports, and secondary sources that can be used in reconstructing Aboriginal fisheries and human-sturgeon relations. Such research can indicate, organize, and represent changing environmental relationships. To date, sturgeon research has not pieced together the complex relationship humans and sturgeons have. By bridging diverse disciplinary knowledge and sturgeon knowledge held by Cree and Ojibwe fishers, the thesis follows a *decolonizing methodology* (Smith 1999) to a sphere of inquiry that is negotiated and not closed by the thesis. It is not possible to form a comprehensive understanding of the *sturgeon problem* from a single discipline. It is only with an interdisciplinary approach that invaluable fragments of knowledge can be gathered.

The thesis acknowledges the significant barriers to understanding Indigenous knowledge and management systems and strives to find spaces within Western knowledge and management systems. Chapter 2 outlines a theoretical approach for TEK and co-management; it aims to engage with research that gathers traditional knowledge and applies it to alternative management. Chapter 3 expands on the context of scientific management by exploring the history of sturgeon management in Manitoba. Chapter 4 focuses on fieldwork, providing the

missing management dimension of Indigenous knowledge. Chapter 5 describes and traces the development of the Nelson River Sturgeon Co-Management Board by analyzing Board minutes and evaluating the effectiveness of joint management. Chapter 6 concludes the thesis with analysis of TEK in co-management as an institutional response to the current crisis and as a possible forum for decolonizing sturgeon research and management.

Appendix A is a paper published in the **Manitoba Archaeology Journal**, “*Namew* as an under-rated economic resource: a review for lake sturgeon (*Acipenser fulvescens*) in Manitoba’s the Archaeological Literature” (Hannibal-Paci 1997). The paper is a critique of archaeology, arguing that a lack of faunal analysis in general has led to the undervaluation of sturgeon. Appendix B is a paper published in the **Canadian Journal of Native Studies**, “Historical Representations of Lake Sturgeon by Native and Non-Native Artists” (Hannibal-Paci 1998c). From a cultural studies approach sturgeon as representations reveals contrasting worldviews that say something about how the environment was “cultured.” Appendix C is a paper published in the **Papers of the 29th Algonquian Conference**, David Pentland (editor), ““Officers of the HBC, Missionaries and Other Intelligent Persons in the District of Keewatin’: Lake Winnipeg Sturgeon as an Aboriginal Resource” (Hannibal-Paci 1998e). This paper discusses Aboriginal resource use history of sturgeon and makes use of archival material for the period 1872 to 1898. The appendices provide background context to the collapse of sturgeon and post-collapse management.

Table 1: Summary of fieldwork undertaken in First Nation and other northern communities

DATE	LOCATION	DESCRIPTION
June 1995	Cross Lake First Nation, MB	Meet, establish rapport with community members, and learn about Cree fisheries.
June 1996	Cross Lake FN	Research sturgeon use on the Nelson River, including Cree management. Form interview techniques and methods.
August 1996	Sagkeeng First Nation, MB	Meet, establish rapport and learn about Ojibwe fisheries. Present Ojibwe fishing history poster.
September 1996	Nipiwini, SK	Saskatchewan River Sturgeon Board meeting. Learn about Cree management, DNR and DFO efforts. Establish rapport with Board.
October 1996	Cross Lake FN	Nelson River Sturgeon Co-Management Board meeting. Establish rapport and consult about TEK sturgeon research. Learn about Cree conservation and management efforts.
November 1996	Cumberland House First Nation, SK	Meet and learn about Métis and Cree fisheries. Workshop presentation on history of Cree use. Zoology and DFO views.
September 1997	York landing First Nation, MB	Conduct interviews with elder sturgeon fishers. Meet and discuss sturgeon issues with Band officials.
Oct 1997	Thompson, MB	Interview senior Manitoba Hydro and Natural Resources officials.
October 1997	Norway House First Nation, MB	Conduct interviews with elder sturgeon fishers. Meet and discuss sturgeon issues-problems with Band officials.
Nov. 1997	Berens River First Nation, MB	Meet and discuss (sturgeon) fisheries with Band officials. Hear about DNR and zoological views of the fish.
Dec. 1997	Sagkeeng FN	Meet and discuss sturgeon research with Band officials.
January 1998	Sagkeeng FN	Conduct interviews. Produce <i>Ojibwe Knowledge of Lake Sturgeon at Sagkeeng (1998c)</i> for Sagkeeng FN and Dr Dick.
Oct. 1998	York Landing FN	Produce and follow-up consultation re: <i>Cree Knowledge of Lake Sturgeon: York Landing (Hannibal-Paci 1998b)</i> .
October 1998	Norway House FN	Produce and follow-up consultation re: <i>Cree Knowledge of Lake Sturgeon at Norway House (Hannibal-Paci 1998a)</i> .
Oct. 1998	Thompson, MB	Follow-up consultation with Manitoba Hydro and DNR, re: (Hannibal-Paci 1998a, b).
Oct. 1998	Cross Lake FN	Consultation with Cross Lake, re: (Hannibal-Paci 1998a, b, c).

Figure 1. Sturgeon fingerling (Department of Fisheries and Oceans, pamphlet photo)



Figure 2. Adult sturgeon, showing significant physical characteristics (Department of Fisheries and Oceans, pamphlet photo)

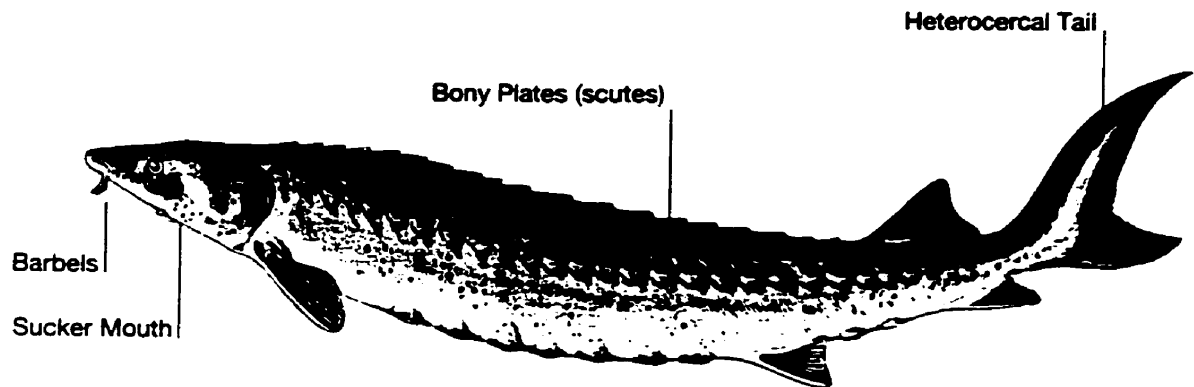
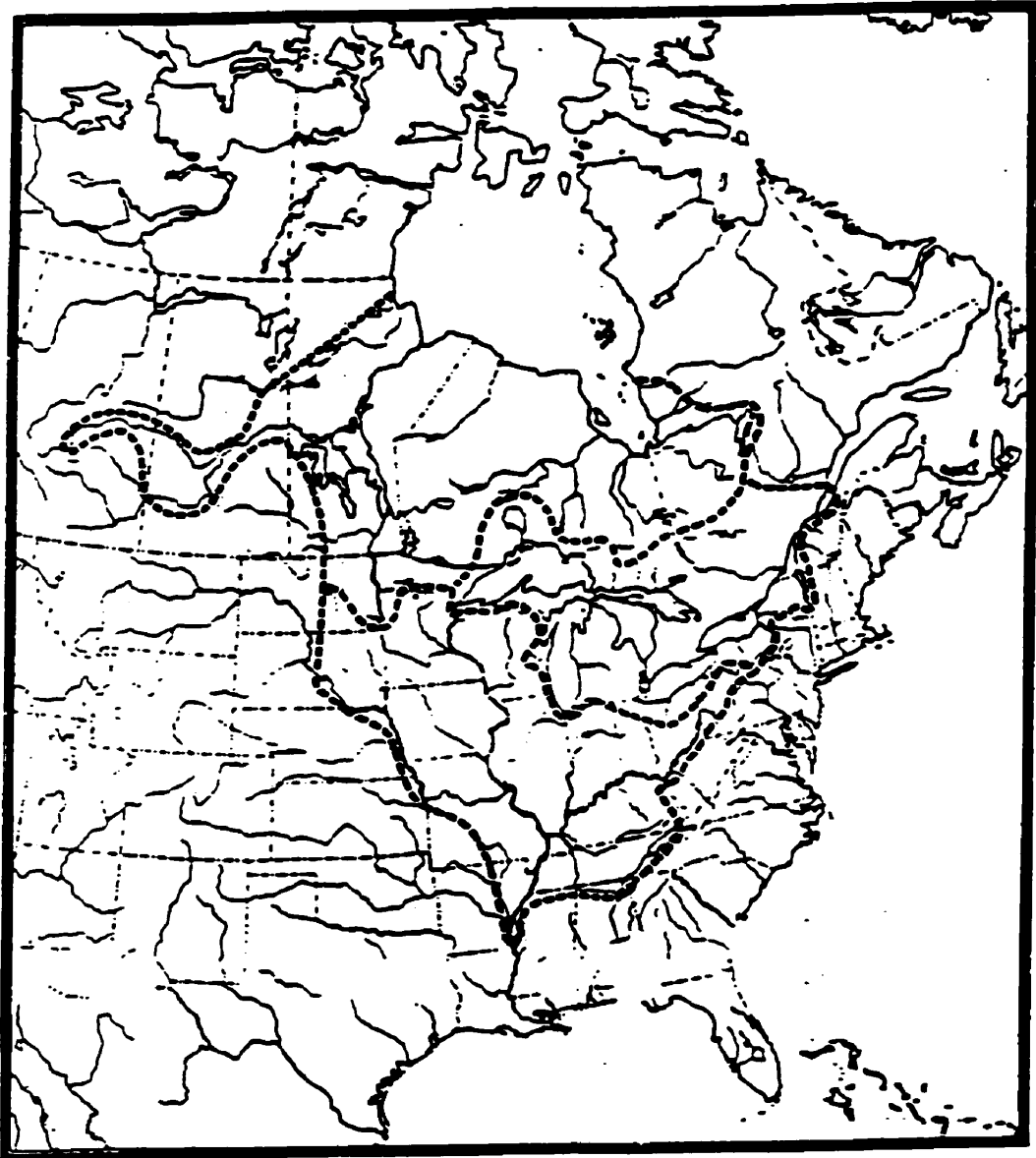


Figure 3. Map of North America, showing range of sturgeon (Harkness and Dymond 1961).



Chapter 2

A Theory for Traditional Environmental Knowledge and Co-Management

2.1 Introduction

Berkes (1999) and other scholars have developed a literature base from which my definition and theory of traditional environmental knowledge are derived. The object of this chapter is to attain a theoretical understanding of traditional environmental knowledge, which does not separate their experience, and knowledge, from management. The theory advanced in this chapter is not a predominant natural resource management concept and it does not have widespread applicability. As such, one challenge will be to produce theory for Aboriginal resource management that can manifest bridging terms and definitions that do not control and mask cultural disagreement. Following the introduction, traditional environmental knowledge (TEK) is defined. An important part of this definition focuses on how TEK is gathered and evaluated. Finally, a theory of co-management is advanced to support the practical application of traditional environmental knowledge.

Traditional environmental knowledge has not at this time been accorded a specific and exacting definition. There is a set of accepted characteristics and concepts that describe this form of knowledge previously outlined by Paci (1995). While these will be outlined below, one benefit of the relatively fluid definition is an absence of barriers to the inclusion of diverse local knowledge with changing scientific theories and management approaches. A surprising benefit from this fluidity is the displacement of the expert status of researcher. As such, a discussion about meaning and intent of terminology is required every time TEK is studied. Research becomes a way of learning

and traditional environmental knowledge can be a space where Indigenous voices are heard, as the paradigmatic and spoken languages change; listened for as ears learn to hear. What is argued in the thesis is that there are two components to what is being named traditional environmental knowledge. First, scientists and other academics construct what is called TEK, reflected in a growing body of literature. Second, TEK is gathered from Indigenous knowledge held by First Nation Elders, adults, youth, women, and men. The small and dedicated group of academics and First Nations people researching and discussing TEK, loosely share a common set of assumptions about cosmologies and the integrated nature of local or traditional knowledge. This thesis examines these assumptions and is concerned with more than these facts speaking for themselves. In addition to people speaking what they know the thesis looks at ways to hear and represent what is being said.

In the process of answering a research question both the nature and purpose of scientific⁵ and Indigenous knowledge⁶ are changed; there is, as such, a duality. TEK forms a unique context for its constituent parts: Indigenous knowledge and scientific knowledge, each of which also remains embedded in specific communities. Each knowledge system should be respected and accorded equal value, but this does not

5 What is science? There are many classical branches to the natural sciences and social sciences that have developed complex understandings of the natural physical world, social relations to it and each other. There are systems approaches and the ethnosciences, which are more sensitive and willing to accept cultural local knowledge, not only for verification and utility, but also to radically alter disciplinary perspectives. To date, however, there is little general scientific acceptance, reflected in the literature to demonstrate a paradigm shift. The social sciences, surprisingly, share this common indecisiveness.

6 While there are many sources for Indigenous knowledge, my primary sources were knowledge holders themselves. Their knowledge is mostly unwritten, primarily oral. There are a variety of methodologies used to translate and document oral knowledge (Cruikshank 1984, Brown and Vibert 1996). The translation to English enables access to a wide audience, including other Indigenous peoples. There are benefits to documenting the original language, especially for cultural revitalization, however the particular issue object was unfortunately beyond the scope of this research.

require that each needs to be treated the same way or conform to the others system. What is therefore required is the construction of a common language or space in which the two can co-exist, integrate, and/or complement each other. Although disciplinary rigor and ethics in general demand respectful treatment of all knowledge, Indigenous knowledge must be accorded greater respect for it has been suppressed and disregarded, a condition that science can relate to if we consider its roots and treatment of religions in Europe.

The specific facts of traditional environmental knowledge are local and therefore situated. As a framework structural theory, which is universal in application, would enable us to consider TEK as a paradigm. The thesis does not support the collection of lessons from some “primitive” society to enlighten an out-of-touch modern society or the teachings of modern society to acculturate others. Furthermore, Indigenous perspectives are gathered and interpreted as more than a history of the environment that provides a fuller understanding of colonizing history. Traditional environmental knowledge serves as much a window to the past as the present, with knowledge from the margins and center of decision-making. In the context of a community of resource users Indigenous knowledge is not marginal and plays a very important role in their daily lives, future and past, for a particular geographical and cultural area.

In this chapter I discuss theory for respectful treatment of Cree and Ojibwe sturgeon knowledge in co-management, a specific body of traditional environmental knowledge described as “my knowledge” in the title.⁷ “My knowledge” is characterized as Indigenous knowledge, that is knowledge held by people whose ancestry and way of

⁷ “His knowledge” is also included in the title. I have interpreted this to mean scientific knowledge that rejects modernist suppression of the local, possibly a post-modern sampling and deconstruction, which offers satisfactory outcomes measured by Indigenous cosmologies.

life follow Indigenous patterns. Indigenous knowledge (of sturgeon) has been ignored in management as anecdotal, superficial, descriptive, and of little value. It is important to recognize the marginalization of Cree and Ojibwe knowledge of sturgeon by fisheries regulations and management. The difficulties raised by the uneven past relationship needs to be acknowledged and addressed.

2.2 Third Generation TEK

Dennis Martinez (1996:50) argues that Indigenous peoples' worldviews, cultural institutions and other manifestations, are "nearly universal in their understanding of sustainable land/culture relationship", even though there are a plurality of worldviews. The environmental culture/land relationships, or aspects of them, are what the different terms advanced by scholars for the last fifty years seek to describe. Different environmental approaches influence researchers' appreciation of TEK, which will focus scholarly debate and understanding. Furthermore, the language and audience of studies may differ considerably. Broadly, TEK research follows one of two streams, either scientific advancement or as Martinez (1996:71) identified "putting history and culture back into nature... forging a synthesis between the old and new". What can be learned from integrating Indigenous and Western knowledge depends on the degree of integration, research approach taken questions asked, the sample groups interviewed, and the ways in which answers are articulated (and interpreted).

The intellectual origins of traditional environmental knowledge, as an area of studies⁸, are located in the scholarly treatment of Indigenous knowledge by

⁸ TEK has been championed by, to use Smith's (1999:131) archetypes, "institutionalized indigenous experts" and Indigenous academics, unequally through fields such as Anthropology, Ethnoscience and

ethnoscience and cultural ecologists. Indigenous knowledge that some scholars are now calling TEK belongs to communities far removed from universities and research questions. TEK is a formalized sub-discipline of an area of studies on Indigenous people, generated by the interactions of researchers interested in the study of Indigenous cultures and languages, that at its roots is colonial and can be traced to European imperialism.

A third generation approach, a theoretical position established by past researchers, is now influencing a new wave of methodologies and practices. In the first wave of research, from contact (a date which will vary depending on location) to the mid-1930s, was not articulated as TEK research (see Berkes 1999, Nazarea 1999). Environmental knowledge was more broadly researched under the rubric of Indigenous peoples and their ways (Hoffman 1891). To some extent this early research responded to a motive to study or capture the 'dying savage' and other ethnocentric tropes of the period (Francis 1992, Buege 1996). The second wave of research initiated the parameters, terms and definitions of TEK arising from the pioneering work of ethnoscience and cultural ecologists who began to speak of Indigenous environmental land relationships, specific resource use, and lessons for mainstream society. Some of the interest in Indigenous knowledge was as a critique of waste and environmental degradation caused by exploitative natural resource development from ethnocentric conservationists and preservationists. Third generation researchers are exposed to cultural and human ecology, ethnoscience, environmental history, and the products generated from TEK research. They are engaged in interdisciplinary and transdisciplinary research. Traditional environmental knowledge is discussed in this chapter from a third generation perspective.

Human Ecology. The development of research is being influenced by national and international Aboriginal rights discourse. The establishment of First Nations Studies programs has also been important.

Cree and Ojibwe sturgeon knowledge are discussed in the thesis as traditional environmental knowledge. The knowledge is rooted in cultural processes (continuity and adaptation) gathered from a number of representative community members as it intersects with scientific knowledge. Is each knowledge so exclusive to its own culture that people outside of the tradition can not understand it? Sensitivities can be tuned, but in fact the degree of understanding will always be negotiated. E. E. Ruyle (1972:214) casts doubts on the exclusive nature of cultures; “when the members of one population adopt elements of the cultural system of another population, they do so because they find the prospects of change more satisfying than the prospect of domination and exploitation.” TEK research may enable a mutually beneficial adoption of elements from different knowledge systems; however this may also be in the context of cultural adaptation in the face of “domination and exploitation.” Although the ideal goal may be mutual benefit, in reality this has not always been achieved. It is important to acknowledge neo-colonist assimilation influences inherent in all research. Returning to the point raised by Ruyle, there is the possibility in TEK research for cultural adoption and continuity.

2.3 Predominant Concepts

This section introduces the different terms developed from the literature. Terms most often used interchangeably are local knowledge, Indigenous knowledge and traditional ecological/environmental knowledge. Are these terms reflecting significant differences or different types of knowledge? I will argue that these labels are about the relationship between culture and environment and they represent differences in disciplinary perspectives. This is especially true with regard to the way “tradition” is

viewed and discussed. Stephen Marglin (1990:16) has noted, “traditional does not mean fixed and unchanging. Tradition is actually constructed and dynamic -except when it is artificially frozen in an archaic pattern.” The term traditional is used as a descriptive adjective for cultural patterns that are repeated and also adapting. Through the eyes of outsiders these may sometimes seem to be mindless repetition or adherence, explained as the way things are done. There is of course much more to tradition than rote behaviour. Tradition is more than history and while it may imply static, in reality it describes a dynamic state. The measure of what is tradition should not be an imposed concept by an outsider to a culture, a practice established by anthropologists. In TEK research, what is being described as traditional is negotiated during an interview (or through some other research method), set by the interplay between the knowledge holder and the researcher. The question that arises is does an emphasis on tradition negate local or Indigenous knowledge? Before this can be answered further discussion of these terms is required.

A distinction is made in the thesis between environmental and ecological knowledge, and it is explained as a function of epistemology. Ecology is derived from biology and other physical scientific understandings of the natural world. In comparison, environment is all that which surrounds a people and is, therefore, the accumulated experience rooted in place. Environmental knowledge is not necessarily bounded by ecosystems, but rather is bounded by a set of cultural-environmental relationships. Environment as a construct is not derived from a biological or physical scientific understanding of the world, although such understandings may be included. Ecological and environmental research may reach similar conclusions from very different processes, or reach different conclusions looking at the same phenomena. The concept of

environment is informed by humanistic assumptions, constituted from social history, often with limits that do not conform necessarily to ecosystem boundaries. The difference between traditional ecological or environmental knowledge is a function of disciplinary perspective and does not reflect differences in cultural environmental relationships.

Reflecting an Indigenous rights discourse heavily influenced by science, the International Indigenous Committee (1991) argued that Indigenous knowledge “is sought through experimentation, as well as observation. Means or analogies from human kinship often express it, although it can be as systematic as the algebraic terms employed by an academic scientist... organized by reference to particular places and people.” Indigenous knowledge is suggested here to be a body of knowledge, held by different cultural and linguistic groups. It is both recent and traditional, gathered mostly by using classical ethnographic methods over long-term observation. This knowledge is systematized, ordered and classified, common practices to anthropology. Paul Sillitoe (1998:223) defines this knowledge as “rural people’s knowledge, indigenous technical knowledge, traditional environmental knowledge, local knowledge.” If we accept Sillitoe’s definition, Indigenous knowledge becomes an umbrella term that encompasses much more than traditional environmental knowledge. Such a distinction would partially support an earlier definition made by D. M. Warren (quoted in Brouwer 1998:3) who equated Indigenous knowledge as synonymous,

with ‘traditional’ and ‘local’ knowledge to differentiate the knowledge developed by a given community from the international knowledge system sometimes also called ‘Western’ system, generated through universities, government research centers and private industry. IK refers to the knowledge of indigenous peoples as well as other defined communities.

The separation of 'Western system' from 'knowledge developed by a given community' is instructive and Warren's definition of traditional and local is now generally accepted. However, the definition is problematic, especially with regard to the separation of Western from local and traditional community knowledge. To begin with, there are no baseline understandings about the similarities and differences between 'Western system' and 'community-based knowledge.' If the distinction is a matter of more than environmental determinism, then there is something fundamentally different in the ways cultures, and groups within those cultures think. Such an assertion would be difficult to prove, although clearly there are manifest differences, over time and space that would suggest in fact that such is the case. It is equally important to recognize the similarities between divergent cultures as well. Mostly the distinction between Western and local, made by Warren and others, tend to be expressive of a certain recognition of cultural, historical and political linkages to environmental thinking, offered sometimes as a critique or counter-hegemonic discourse to development and Western global relations.

Marc Stevenson (1996) offers a potent critique on the fragmentation of Indigenous knowledge as traditional or local. In turn, George Wenzel (1999) has critiqued Stevenson's broad defense of Indigenous knowledge as an over-generalized politicization of "northern research." The main question arising from the debates is does Indigenous knowledge mask local and traditional knowledge in the politicization of national Indigenous issues? The question as to whether the terms of Indigenous knowledge will jeopardize or empower further research is important. If describing Indigenous knowledge as synonymous with traditional and local, limits or enables future TEK research methodologies and studies, it will be as a result of researchers building

strong relationships between and among Indigenous and research communities. Researchers need to negotiate and differentiate between Indigenous, local and traditional knowledge, through a dialogue with Indigenous, local and traditional knowledge holders.

Local knowledge, according to Berkes (1999:8), “is the term of choice of some scholars... but the term local knowledge conveys neither the ecological aspect of the concept, nor a sense of the temporal dimension and cumulative cultural transmission.” Berkes goes on to distinguish local knowledge as “recent knowledge” (*ibid.*), supporting recent parallel advances in the research of TEK in ethnoscience. According to Virginia Nazarea (1999:19), “ethnoecology needs to come to terms with the situated nature of knowledge, the constraining as well as liberating effect of this locatedness, and the importance of history, power and stake in shaping environmental perception, management and negotiation.” Indigenous knowledge is a generalized term, which applies to a wider linguistic or cultural group whereas local knowledge is contingent on locatedness. For example, local Cree knowledge in Moosonee (Ontario) may or may not be shared by local Cree in Fort Chipewyan (Alberta). Indigenous knowledge of fishing may share commonalities or be considerably different in Restigouche (Quebec) as compared to Saskatoon (Saskatchewan).

For Milton Freeman (1992:1) traditional ecological knowledge is “a legitimate field of environmental expertise”, which goes beyond,

descriptive biology, beyond knowing how to identify different species of animals, or describe their feeding, reproduction, or migratory behaviour. The knowledge possessed by such tradition-based, non industrial societies is essentially of an ‘ecological’ nature, that is to say, it seeks to understand and explain the workings of ecosystems, or at the very least biological communities.

Along these lines, Berkes (1999:7) defines traditional ecological knowledge “as a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission”. These definitions have some similarities. In particular, each sees TEK as involving detailed analysis of an environment, a landscape inventory, from distinctive Indigenous perspectives.

Traditional environmental knowledge is derived mostly from oral knowledge held by people with connections to a living environment, but it is also self aware of the intersection with Western knowledge. According to Eugene Hunn (1999:23-24) TEK,

is local rather than global in scope, a consequence of the context of its acquisition, transmission, and use. It is acquired via direct personal experience, is transmitted orally within a community, and is validated by its relevance to the daily struggle to wrest a livelihood from one’s land. It is fragile because it is local. Knowledge common to one community is specific to its immediate environment and will not be shared widely in other communities. Thus that particular body of knowledge lives and dies with the community that sustains it, and that it in turn sustains. A corollary is that the value of TEK is additive across the world’s cultures. Nevertheless, many formal characteristics of such cultural knowledge systems may be widespread or universal, reflecting the psychic and experiential unities of humankind.

Specific facts may be local and have no relevance outside their original context, for example sturgeon spawn at such and such falls, whereas higher level analysis, philosophy and theory may transcend the local and represent what Hunn calls the “psychic and experiential unities of humankind.” Hunn (*ibid.*) argues that “bodies of traditional knowledge are gravely threatened, in imminent danger of going to the grave with the present generation of elders.” There are examples of

traditional Indian government dismissed and replaced by Indian-agent-controlled models of white government. The ultimate control of finance and land use passed into federal hands. Governmental powers left with the tribes placed them, in multilayered Confederation, well below a respectable municipality. That kind of mid-century change in the constitutional status of native people was dramatic is apparent: the cause of that change is less obvious (Milloy 1991:146).

2.3.1 Colonization Theory

At the heart of this clarification of different terminology is uncovering the current political, social, environmental, economic, and spiritual context for traditional environmental knowledge in Canada as colonial. Thomas (1994:2) considered colonialism to be “a cultural process; its discourses and trespasses are imagined energized through signs, metaphors and narratives; even what would seem its purest moments of profit or violence have been mediated and enframed by structures of meanings.” According to Weiskel (1998:146) neither ecological nor political relations and change can be understood in isolation: “it is a conceptual mistake to give explanatory priority to either one or the other of these dialectical elements in retracing the evolution of colonial circumstance. Particular policies altered ecological conditions, and the ensuing transformation provoked further necessary policy choices.” James Frideres (1988) has produced a theory of colonization, useful to understand the development of reserves as internal colonies in Canada. In order to decolonize these reserves, the thinking that produced them and in turn are impacted by them, several structural changes need to take place. These changes include supporting Indigenous languages and cultures, delivery of high quality care and social programs, adequate land and resources to fully support self-governance by traditional or modern First Nations governments (as they see fit). In order to fully understand the colonial context for TEK research I will rely on Linda Smith’s (1999) perspective on decolonizing methodologies, and the first four parts of Frideres’ colonization theory.

Colonialism is an active ingredient in the loss of TEK, as much as neo-colonialism continues to influence the lives of First Nations in Canada. The possible

knowledge loss in some “cultural areas”, as well as cultural adaptation, has led to alternative modes of transmission and preservation of Indigenous knowledge. Hunn (1999:27) effectively argues, “we should not only preserve a record of lost TEK in libraries and archives but also to strive to preserve systems of TEK *in vivo, in situ* as radical alternatives to the present world system.”

2.4 The Question of Research Methods

Traditional environmental knowledge in this thesis is called upon to convey an understanding of a particular resource question. “My knowledge”⁹ is a representation of sturgeon information gathered from retired and active sturgeon fishers, community members (key informants) from three First Nations. Cree and Ojibwe informants did not generalize their knowledge about what others know. Instead this resulted from the research, bringing together knowledge in each community from a number of individuals. This information is a thin slice of the actual TEK held by each person, and the knowledge held within each community. The fieldwork involved conducting key informant semi-directive interviews. A more accurate title might have been Norway House, York Landing and Fort Alexander traditional sturgeon knowledge held by key informants, but then this would not accurately reflect the thesis concerning TEK as a paradigm and point of integration in co-management.

Cree and Ojibwe fishermen are part of a larger community of knowledge-holders who have rich and detailed knowledge of sturgeon. This knowledge is a portion of the

⁹ Henry Letander, Anishnabe Elder and retired sturgeon fisherman from Sagkeeng First Nation.

overall community knowledge about the environment.¹⁰ Not all Cree or Ojibwe share equally this knowledge. Rather, certain individuals in each community are repositories of Indigenous knowledge of sturgeon. Knowledge is therefore contingent on local, cultural and historic realities. Knowledge holders, self and community identified, are those who remember or are actively engaged in traditional practices. Some individuals and communities have ample knowledge whereas others may not. In addition, the knowledge may be more or less functioning or it may be archived in or outside a community. What this means is that even when knowledge has been relegated to history or rendered inactive, cultural revitalization may one day reactive it. The source of this knowledge, say a book or an archive may in fact be from outside a community or the source may be from within a community as dormant cultural expression.

The specificity of TEK does not rule out the possibility for development of general theory, rules and application. There are no set limits on general application and it is the responsibility of researchers and Indigenous knowledge holders to negotiate these parameters. Many different First Nation organizations that are advocating awareness of and possible limits to the access to and use of TEK. The definition used in the thesis was refined from the literature by talking with knowledge-holders in First Nations communities of Berens River (Manitoba), Cross Lake (Manitoba), Cumberland House (Saskatchewan), Fort Alexander (Manitoba), Nipiwini (Saskatchewan), Norway House (Manitoba), Thompson (Manitoba), Winnipeg (Manitoba) and York Landing (Manitoba).

¹⁰ In most ecozones in Manitoba, a variety of terrestrial and aquatic resources were used in combination with flora and avian resources. TEK provides a more accurate view of Aboriginal economies as an interdisciplinary methodology sensitive to people, their spatial and temporal perspectives.

This section discusses listening to and articulating Indigenous and Western knowledge within the sub-discipline of traditional environmental knowledge. It addresses an understanding that knowledge comes from different cultural contexts, translated into a bounded system for resource management. The apparent and real separations of human (cultural) experiences from environments are significant issues. Who defines the boundaries or limits of this separation/holism is not limited to the so-called Western or Indigenous expert.

There is no definitive methodology that will replace all other approaches. In fact such claims should be guarded against. Assigning fixed meanings to abstract categories should not be attempted without some critical intellectual discrimination that also is concerned with ideology, culture and power. Depending on the research question, there have been a plethora of research methods developed in other areas, primarily in the social sciences of anthropology and ethnic studies.¹¹ Classical ethnography was rejected as a research approach developed in this thesis. Instead an interdisciplinary environmental approach was taken to gather sturgeon knowledge from traditional fishermen, an approach which is discussed in detail in this and the next chapter. The benefits of this adaptive approach are in what was learned and for the sake of economy. The focus was to gather a significant body of scientific understanding of the life history characteristics and biology of sturgeon along with environmental history and recorded sturgeon knowledge.

¹¹ TEK studies reflect a variety of methodological approaches, on a continuum. Most of these studies are characterized by short duration of study (shorter than classical ethnography). Traditional knowledge is often gathered through living, for example going out on the land, asking or listening for knowledge of a specific resource issue. Various ethnographic methodologies, such as participatory action research, collaborative research, semi-directive interview format, participant observation, and a host of textual analysis methodology, have been used in research, each reflecting its own ideological and epistemological orientation. TEK research has been used to support or refute scientific assumptions.

The interview approach was developed to expand the work on sturgeon in northern Manitoba by MacDonell (1997).

The interview material does not claim to represent “authoritative interpretations of culture,” a goal of Julie Cruikshank (1997:1), as much as they contribute to the understanding of co-management. TEK is an interpretation of Indigenous knowledge and also a powerful affirmation of Aboriginal rights in general. Indigenous knowledge is redefined through interviews and also through the inclusion of western (scientific and historic) knowledge. First, literature is surveyed broadly to gather as much of the disciplinary information on the topic as can be researched in a reasonable expenditure of resources. Second, the literature is refined through informal discussions with experts and archives are studied. Third, semi-directive interviews elicit traditional knowledge. Fourth, TEK (interpretation) is returned to the community for confirmation and verification. The interpretation process is made possible by constructing Aboriginal fisheries from a broad reading of literature on sturgeon, fishing, Aboriginal people, geography, history, and scientific data. A significant problem, however, is how to evaluate this interpretation.

2.5 Evaluating Traditional Environmental Knowledge

Traditional environmental knowledge (TEK), as used in this thesis, aims to hear Aboriginal and Western voices on a subject. This approach has currency in academic circles; however, many First Nations are resisting what appears to be further colonization and co-option of their knowledge. Is it any surprise that First Nations see the irony of their knowledge sought as TEK and also trivialized, while scientific knowledge is privileged by universities? It is especially true that there is a legacy of research by outside

researchers who are unable to understand community knowledge, or worse yet by those who are seen to have misused it. An important question that will be discussed in this section regards the scientific application of Indigenous knowledge for the legitimization of scientific research. In some cases, Indigenous knowledge is used to reform science. Complementary integration (fit) of Indigenous and Western knowledge is seen to legitimize new approaches. Some unfortunately argue that Indigenous knowledge is vindicated by science, rather than assessing its value in its own right. The application of Indigenous knowledge to legitimize science is apparent, for example, in the recent published work of Leonard Tsuji, a biologist from York University.

Tsuji (1996) “attempts to evaluate the validity of Indigenous knowledge,” and quantify traditional ecological knowledge. In the end he uses “elders knowledge” to validate his biological study of Sharp-tailed grouse. Tsuji concludes that Cree knowledge “can be used as a starting point, (or can be added to existing databases), to help facilitate the direction and approach western science takes to a resource management problem” (1996:75). From what was discerned during researching the thesis, my understanding is that Indigenous knowledge is more than a data set or a starting point for academic research. Tsuji’s statements and treatment of elders knowledge is unfortunate and is indicative of the dissonance, characteristic in the value many resource managers and scientists are willing to afford TEK. It would be unfair to not acknowledge that more recently Tsuji and Nieboer (1999) have approached traditional ecological knowledge in a much more respectful and responsible way.

One of the strengths of science is that under constant conditions experiments can be replicated by anyone anywhere, following the same experimental procedures.

Replicability verifies scientific knowledge and the power of scientific method is in its predictive powers. Every time a sturgeon is cultured, scientific knowledge is affirmed. Are the same factors at work in Indigenous knowledge? When fishers go out for sturgeon they seek “constant conditions”, and fishing procedures are supported if fishing is successful. Each knowledge system, exclusive of the other, holds currency within its own system by having some degree of predictive accuracy. If each can be used to verify the other it will not result from a blanket approach, typical of hypotheses that become accepted principles or laws. Knowledge from one system, if put to the test of verification using the parameters set by another system, is bound to fail. What is lost or gained in such an exchange? It has been far too easy to dismiss Indigenous knowledge as anecdotal, while upholding the value of science in knowing. It will be many years before TEK is valued in the university beyond how it can improve environmental science and scientific understandings. An important question to ask is how much currency does environmental science have in Indigenous communities? Does science improve community life? TEK will only make sense to each constituency when it is measured by some combination of each and only so long as both also remains viable and, to some extent, independent of the other.

If there are pre-existing tests for knowledge, part of the cultural (including spiritual) and environmental context, then such tests need to be understood. There is always a tendency to give greater priority to testing knowledge against a set standard of evidence. However, before standards can be acceptable, a significant discussion needs to take place. There are barriers to scientific tests of local knowledge, resulting from the linkages to local/cultural variables. There are barriers to Indigenous tests of scientific

knowledge resulting from the linkages to global/anti-cultural variables. Indigenous knowledge is difficult to quantify. Traditional environmental knowledge can serve as the platform where standards of verification are negotiated.

Once oral knowledge is transformed into the written, translated from its original language to English, some authority is transferred to the words in books and articles. The legitimacy of the documentation project is contingent on the continuance of oral knowledge. Local continuance does not rest exclusively on the authority of written documents and such other manifestations, for example as maps. Conflict can arise when complex holistic knowledge is compartmentalized and abstracted from a cultural context. This is especially true when researchers sever them from the whole or mask important differences. The acceptance of openings and barriers enables various degrees of resolution, which will facilitate a process of understanding with its own built-in verification process. The questions of standards, whose knowledge is it, how many people share the knowledge, who benefits, and so on, should be negotiated issues. Documented TEK may provide a wider literate audience with access to specific Indigenous and Western knowledge. An important question is who uses this knowledge and to what ends?

During the literature research stage, historic and scientific documents were actively gathered and returned to community members. It was discouraging to run into older fishermen who had guided fisheries biologists in the 1950s and 1960s, but had never seen any of the reports. I re-read many of these reports and found no sign, views or voices, of First Nation's knowledge that should have informed policy. First Nation intellectual property rights after the 1980s have only recently been given high priority in

research. The dominant research mode was to study First Nations for the benefit of all humankind, to catalogue and then appropriate and assimilate, or to simply ignore cultural knowledge. Communities were mined in a variety of ways by outsiders interested in finding resources, locating species specific habitat, locating heritage sites, and studying Indigenous ways. The acknowledgement of local populations, their knowledge ignored or exploited, reinforced for me the need to build into any research protocol a confirmation stage. Confirmation of research ensured that it is accurate and correctly articulated. Furthermore, this stage reaffirmed a commitment to return knowledge to the community.

Indigenous knowledge is a dynamic process which can be best understood, according to Gadgil *et al.* (1993:151), as complex, dependent “greatly on spatial and temporal scales, rendering the generalizations that positivistic science has come up with of little value in furnishing practical prescriptions for sustainable resource use.” Generalizations that might be derived from a study of Indigenous communities are a point of concern. Intellectual property rights do not protect against the application of a body of generalized Indigenous knowledge outside its originating context (community), and therefore the debate needs to extend to generalized knowledge.

There are significant limits to strict scientific verification of TEK. The bias of science is to disregard anything that does not meet its rules, and as such much of the “unexplainable” will be disregarded by scientific scepticism. The holistic nature of this knowledge may elude compartmentalized or specialized research questions. The possibilities of scientific verification of Indigenous knowledge are alluring for many scientists who are limited by scientific approaches. The hazard of adding Indigenous knowledge to the body of scientific understanding is to improve science at the cost of

Indigenous communities. Scientific verification may legitimize local knowledge, adding currency to increase its use, but will there be returns to Indigenous communities? The disadvantage to scientific verification is that there are no guarantees Indigenous knowledge is honoured and respected. Elements based on faith and spirituality may not meet tests of science and as such the ways the world is related to may be rejected.

2.6 Traditional Environmental Knowledge and Co-Management

Indigenous resource management, use and rights, are topics of considerable interest across Canada and internationally. The diversity of First Nations' traditional and evolving economies reflect a diversity of resource/land use and management practices. The establishment of Supreme Court of Canada decisions relating to Aboriginal rights and title has created an appearance of general application for all First Nations, which tends to mask the plurality of these nations. While it is important to balance legal decisions regarding Aboriginal title with local knowledge and plurality, the thesis focuses on how this rights discourse is influencing natural resource management in Canada.

The application of traditional environmental knowledge in co-management is a recent research area. However, integration of TEK in co-management is not the only way that Indigenous knowledge is being used. Abele (1997:iii) noted, "the GNWT [Greater NorthWest Territories] has adopted what is probably the first formal traditional knowledge policy in Canada, in an attempt to improve democratic representation in the North by moving the policies and practices of territorial government closer to reflecting the values and needs of all northern residents." Abele and others suggest that government "institutions through which Northerners are now trying to make decisions that offer their

lives and the lives of generations to come are artifacts of a quite different historical trajectory –of class divided nations-states that evolved in Europe during the last 300 years” (1997:iv).

Indigenous approaches to resource management have hinged on control of access, to the actions of local communities in relations to the natural environment. Western management has focused on managing natural resources by predicting and controlling the environment. Each requires supportive conditions that at times are in direct conflict. The inclusion of TEK in co-management should be in joint decision-making between local resource users, federal and provincial resource agencies that have historically drawn on scientific and economic evidence in decision-making. The long-term viability of co-management and the success of Aboriginal fisheries, to reduce management conflicts, depend on full participation and a shift from the predominance of economics and science.

State-conceived fisheries management and regulations have negated traditional Indigenous sturgeon fisheries (institutions and mechanisms). Such a strategy has failed to maintain sturgeon populations. This goes beyond the net effect of failing sturgeon populations, more than Hardin’s (1968) “too many people too few (resources)” argument (McEvoy 1988). Sturgeon resources were squandered, over used and wasted. Scientific and Indigenous knowledge represents pre-existing systems, fragments of expertise and information. Both knowledge systems continue to change over time. But how can both be combined to co-manage fisheries? Is co-management an alternative to the current state-organized and run fisheries management?

Berkes (1994:19), adapting Arnstein’s (1969) ladder of citizen participation describes co-management as a continuum. In relation to the application of TEK, the

lowest degree of participation in co-management would be “informing.” At this level, the dominant knowledge systems suppress other knowledge. TEK is used in a supportive or descriptive role, not as a viable paradigm. The greatest degree of participation in co-management would be full community input in management (planning and decisions). TEK would therefore jointly shape the character and direction of resource management. Application of TEK on this co-management continuum produces very different results.

The integration of traditional environmental knowledge into co-management is of practical consideration and significant importance, with the understanding that the inclusion is to improve management and empower First Nations. This section is especially concerned with advancing application and contribution of this knowledge in the growing development of co-management, thus supporting Indigenous knowledge at the community level. Where available, traditional sturgeon knowledge and knowledge holders need to be integrated into planning and decision-making at all policy levels and in the practice of management.

Traditional environmental knowledge provides insight to pre-existing Aboriginal management processes and institutions. According to Notzke (1994:154) the, “indigenous system of management is a core feature of all northern Native cultures, and therefore is intimately linked with their value, ethics, and cosmology, which are generally based on an integrated, non-compartmentalized view of the environment.” For the integration of TEK into co-management the values, ethics and cosmology of First Nations must be respected, while meeting management objectives mandated to government agencies. However, such integration may in fact mean moving away from counting fish to better organizing social relations with fish and larger ecosystems.

Integrating TEK in co-management is about power and knowledge in management, expressed clearly in international environmental discussion. The *Bruntland Commission* (World Commission on Environment and Development 1987:1) suggests,

indigenous peoples will need special attention as the forces of economic development disrupt their traditional life-styles –life-styles that can offer modern societies many lessons in the management of resources in the complex forest, mountain, and dry land ecosystems. Some are threatened by virtual extinction, by insensitive development over which they have no control. Their traditional rights should be recognized and they should be given a decisive voice in formulating policies about resource development in their areas.

The World Commission on Environment and Development did not explicitly state that co-management was the means by which “traditional rights should be recognized”; however, Indigenous populations could be given “a decisive voice” with co-management at the top end of the continuum. Such inclusion would satisfy the goals set by Bruntland.

In Canada, several legal decisions since 1982 have established an incentive for co-management between First Nations, federal and provincial governments. One very important case involved the Musqueam. In the *Sparrow* decision (1990), the Supreme Court of Canada, “has given the government a directive to include Aboriginal people in co-operative management of natural resources. The Supreme Court’s ruling has a direct impact on management” (Berg *et al.* 1993:247). Murray Wagner (1991:26) noted, “as a result of the Sparrow decision, the Manitoba Court of Appeal refused to hear the Crown appeal in *Flett*. In October 1990, Manitoba stopped all charges against... violations of the MBCA and the *Fisheries Act*.” Besides these legal and political forces, there are currents in science that support inclusion of TEK in co-management of natural resources. Robert Keith (1994:6) argued for “ways of observing and of recording and exchanging information on critical indicators of ecosystem integrity.” Sturgeon can be considered a

key indicator of ecosystem integrity; perhaps its failure as a commercial commodity makes it especially relevant as an indicator.

Many observers and researchers of resource crisis argue that without the knowledge of local users in the decision making process, the management of resources is doomed to fail (Newell and Ommer 1999). TEK represents understandings of local use, it can be implemented in co-management of sturgeon and its inclusion would remedy poor performance and chronically failing human-resource relationships. Fisheries co-management, according to Evelyn Pinkerton (1989:23) is “a way to address the conventional management problem of overinvestment-leading-to-overfishing,” and “decentralized management decisions permits more appropriate, efficient, and equitable management.” Pinkerton’s optimism for decentralized decision making is based on the assumption that local decisions would not be superceded by environmental changes and development elsewhere, a problematic assumption when it comes to fisheries.

Tracy Campbell (1996:6) warns that “co-management agreements now appearing on the provincial natural resource scene should be looked at for what they *don't* include, such as substantial transfer of decision-making power, or even a share of royalties for resources harvested from traditional territories.” Campbell warned that many First Nations resist co-management, because they see the process as subverting their claims (and resources) to settle outstanding issues of Aboriginal title and rights. It should be noted that the British Columbia Treaty process has, from the perspective of many participating First Nations, circumvented natural resource co-management in the province; however, recent provincial support for interim agreements may remedy this.

Co-management is, therefore, a mechanism or institution that enables multilevel integration of Indigenous and scientific knowledge systems for the improvement of natural resource management. Billie DeWalt provides a framework for integration in three comprehensive areas: the means used to study phenomena; resource utilization characteristics; and outputs. The means used to study phenomena is TEK research, with its appreciation for holism, observation, implementation of scientific method, and “Mutable Mobiles.” Mutable mobiles are what Kloppenburg (cited in DeWalt 1994:125) calls “relatively malleable knowledge that is finely tuned to the continually changing circumstances that define a particular locality.” Resource use, characteristically well suited for co-management, include dependence on local resources with moderate mixtures of externalities, minimal critical inputs, land-intensive strategies, knowledge and technology that is labour demanding, risk aversion matched with climate as well as market, and flexible adaptive strategies. Outputs from TEK in co-management include high productivity for labour and energy inputs, source utilization strategies that are cultural compatible, food security, comfortable standard of living, sustainability and regeneration of resources.

2.7 Conclusions

Berkes, George and Preston (1991:21) characterize First Nations as,

not merely one of the ‘user-groups’ in the managers’ parlance, they are the owners of the resources of ‘their’ land. The issue of co-management is, therefore, one of the more tangible aspects of sovereignty and the applicability of the laws of the land. Indeed, some native leaders believe that genuine co-management is possible only with native self-government.

For co-management to be genuine, collaborative joint decision-making, First Nations first require guarantees or state recognition of established ownership and title to land. Co-management is also a result of different knowledge systems collaborating to manage resources exclusive of state conceived processes. Berkes (1994:18) argues that “real co-management involves shared decision making power by the partners and requires governments to devolve some of their power to the partners; but in practice there is an individual variety of partnership arrangements that involve various degrees of power-sharing.” He elaborates that; “local-level management systems are decentralized and may involve customary authority. They are based on traditional ecological knowledge (Indigenous knowledge) and rule making and enforcement at the local level. They rely on consensus, self-regulation, and social sanctions”(ibid.). TEK can contribute to “co-operative development and management strategies” (Huntington 1998:237).

Traditional environmental knowledge research is interdisciplinary, combining Western and Indigenous knowledge. It supports scientists’ and First Nations’ inputs for conservation and capacity building. Research of this nature offers an opportunity to rethink research about generalized cultures and environments (Tanner 1979, Brody 1981, Cruikshank 1984, Johnson 1992, Berkes *et al.* 1994, McDonald 1997, Sherry and Vuntut Gwichin 1999). It became apparent during public hearings for mega-projects like the Mackenzie Valley pipeline and hydroelectric development of James Bay, that TEK could be used in decision-making to avoid environmental problems. Such instances heightened public awareness of the limits and dangers to both environment and social options from development driven by economic and political choices (treating the local as a possible pool of resources or as a sink for urban and industrial development). The remedy is to

respect Indigenous resource users in the development and planning, environmental assessment and resource management that impact their local geography. However, Stevenson (1996) noted the actual inclusion of TEK, into even the most remote northern and Native contexts have proven hard to achieve. Perhaps the best possibilities for traditional environmental knowledge are still to be developed. As First Nations gain greater powers of governance and land base, the possibilities for the intersection of their different cultural values in co-management increase.

Co-management, according to Berkes and Feeny (1990:52), was a term used to describe “ways in which local users and government managers may collaborate in decision making and share the duty and responsibility of resource management.” TEK is the created voice to empower Indigenous and Western knowledge. Berkes argued (1994:20) “co-management arrangements that combine traditional knowledge and appropriate science and that spell out rights and responsibilities for resource management are potentially very powerful... an attractive alternative in the contemporary world in which local-level traditional controls alone are in many cases insufficient, and state level controls simply inadequate.” What integrates the two systems is a set of conditions, often in crisis and conflict, such as title, rights, resource scarcity, or some other highly politicized element that brings difference to the fore.

Berkes (1993:6) noted that “TEK is complementary to western science, not a replacement for it.” There are complementary features and differences of the two systems, in particular regarding politics and power. In the case of First Nations’ resources and traditional territories, the knowledge required for management of species or spaces would be improved by combining scientific and Indigenous knowledge in the design and

implementation of management and land use planning. It will be important to gather TEK for co-management in the future. To guard against misappropriation First Nations need to develop community-based research protocols. First Nations also need to develop a prominent role adjudicating publication of articles on TEK. The inclusion of knowledge holders and researchers in the external examination of scholarly papers would add some measure against misrepresentations. It is equally important for researchers and institutions to reform their methodologies to include respectful and responsible treatment of TEK. Researchers should include a community verification stage (as was the case in this research) as a matter of responsible research.

Carmen Ferradas (1998:240) noted, “indigenous knowledge is a contested concept... the knowledge of an other who becomes defined in opposition to an authoritative ‘we,’ vaguely presented as scientists from the West (experts in hard, natural ‘systems,’ gender neutral privileged enlightened revealers of truth).” Ferradas’ critique exposes a tradition of ‘othering’ by academic disciplines and popular culture. Colonization of Indigenous peoples land, cultures, bodies and souls, cause the most vocal re-examination of traditional environmental knowledge research. Thom, Stolo First Nation and Washbrook (1997:3) argue “information about First Nations’ historic and contemporary use of land [cannot] be used out of context by Provincial resource managers to make decisions without input from First Nations concerned.” Documentation of Indigenous knowledge is not an end to consultation, “only a beginning, though [Indigenous land use] can provide a common ground to resource management... application remains a difficult process of negotiation over competing interests”(ibid.).

Chapter 3

Lake Sturgeon Management in Manitoba

3.1 Introduction

Cultural ecologist Tim Ingold (1987:2) argued that “an environment can only be defined relative to a being or beings whose environment it is.” Precontact Aboriginal fisheries reflect Cree and Ojibwe relationships (environmental processes and institutions) with sturgeon. Natural resource management is a cultural process, serving as the context for definitions, values, rules and regulations. Resource management accounts for human and nature interactions. Natural resource management processes are used to create order, from what environmental anthropologist Douglas Buege (1996:72) described as “the complexities of the relationships between specific peoples and the particular lands they inhabit”. In this chapter I reconstruct the history and analyse sturgeon management for the region that is now the province of Manitoba. Management is broadly applied to include environmental processes and institutions from before European contact up to the 1990s.

Sturgeon management in Manitoba is discussed in four periods¹²: Aboriginal management from 1600 to 1750, transitional mixed fisheries from 1750 to 1890, commercial

12 For comparative purposes, we may note that McEvoy (1988) has defined three periods of change in American fisheries, providing us an insight to the policies and motivations of fisheries management in the United States. From 1850 to 1900, the U.S. federal government followed a *laissez-faire* approach towards fisheries that was characterized by an overwhelming concern for economic growth. Between 1910 and 1960 a management perspective based on the maximum sustainable yield (MSY) model replaced the *laissez-faire* approach. An overriding emphasis of MSY was to emphasize efficiency in fishing effort and economies of scale. McEvoy characterized his last period, 1970 to 1990, as a time when systems thinking replaced MSY, indicating a shift away from an emphasis on economics to a biological systems approach. This shift may be more apparent than real, however, in the translation to management and public policy. Canada’s fisheries policy followed a trajectory similar to that described by McEvoy (1988).

“for export” fisheries from 1890 to 1990, and 1990 onward. The last period is shorter than the first three and may prove to be a period where sturgeon are completely destroyed or allowed to live. During each period many changes occurred to the environment. I take a holistic view of the environment so that it encompasses ecological, socio-cultural (spiritual), political, and economic variables.

Aboriginal fisheries managed sturgeon and this is reconstructed using controlled speculation (Gleach 1997) from limited archaeological evidence, the earliest ethnographic materials, and from interviewing knowledgeable community members. Cree, and later Ojibwe, sturgeon fisheries were characteristically for local use and benefit. There is evidence that these fisheries were in place for well over two thousand years (Hannibal-Paci 1997). The second phase of transitional mixed fisheries, 1750 to about 1890, saw Aboriginal sturgeon fisheries serving a dual purpose: as well as sustaining Aboriginal peoples (including Métis), sturgeon also increasingly became an object of trade. In addition, after 1800, and particularly after 1821, a significant sedentary population was established at Red River, now present day Winnipeg. As the mixed population (Métis and other ethnic groups) at Red River increased, the ecology of the region was radically altered. Commercial “for export” fisheries management lasted from 1890 to about 1990. During this period Aboriginal and transitional mixed sturgeon fisheries were displaced. Aboriginal fishing institutions and sturgeon knowledge were disregarded by the authorities in favour of a growing body of scientific and economic knowledge of fisheries. Sturgeon failed during this period and in response to the collapse of the Lake Winnipeg fishery extensive regulations ensued. After 1930, fisheries

regulations became a provincial responsibility and Manitoba's sturgeon management mirrored earlier federal regulatory approaches. It is obvious from the continued failure of these fisheries that these regulations did not work. The final period discussed in this chapter began in the decade of the 1990s. During this period sturgeon population numbers for remnant stocks have been at record lows, it is the vantage point from which all the other periods are viewed, and it is characterized by continued restrictions on Aboriginal fisheries and limited participation of First Nations in co-management in Manitoba.

Five successive cumulative collapses, beginning in 1910, resulted during government controlled sturgeon management.¹³ Tough (1999:98) argues that "the pattern of the collapse of these fisheries is well known, [but] the precise population dynamics is obscure because historical production records do not include subsistence yields." In order to shed some light on the population dynamics, research beyond the historic production records is required; however, it may be impossible to ever fully establish records for subsistence yields. Research was conducted during 1995 to 1998 and from what fishermen said, the greatest challenge is not to reconstruct population dynamics, but rather to save remaining sturgeon.

This chapter links the theory of traditional environmental knowledge and co-management presented in the previous chapter to the case study of Cree and Ojibwe sturgeon knowledge in the next chapter. The growth of government fisheries regulations and their impacts on First Nation communities is summarized in this chapter. It is concluded that

¹³ Commercial data for Lake Winnipeg reveal declines since 1886 (Dick *et al.* 1998). By 1907 fishing removed the reproductive class of sturgeon. Once this stock was converted into capital the fishery could not be sustained.

government sponsored sturgeon regulations were ineffectual and that lack of regulations for the early commercial fishery (1870-1900) sealed the fate for sturgeon. A case study of Nelson River sturgeon regulations fleshes out this argument by tracing the development of fisheries policy for the life of a specific river. Finally, the chapter discusses the development of sturgeon science in Manitoba, concluding that studies in this field remain fragmented and specialized, contributing little to fisheries policy and ignoring Indigenous knowledge.

3.2 Aboriginal Sturgeon Management

In his pioneering thesis on Aboriginal fishing in North America, E. Rostlund (1952:ix) found fish to exhibit, “strong regional differences in quality, quantity, and availability... the amount of fish that could have been captured in a year, varied so greatly from region to region that some tribes had a chance of catching more than a hundred times as much fish as others.” In Manitoba, the spring spawning run of sturgeon supported the establishment of seasonal congregations of individual families. These fishing sites served as collective gathering places that also supported political and cultural processes and institutions. Sturgeon inhabited many of the largest river and lake systems in Manitoba, for example, Lake St. Martin and on the Saskatchewan River at Grand Rapids. Sturgeon is not known to inhabit Lake Manitoba or Lake Winnipegosis and it did not occur in large numbers along the west shore of Lake Winnipeg.

There is no evidence to suggest that sturgeon populations were anything but abundant, reliable and stable before contact. Aboriginal fisheries were well established and the

archaeological record suggests sturgeon use for the last 4000 to 6000 years (see Appendix A). Leigh Syms (pers.com, 1996), discussing recent excavations at The Forks in Winnipeg, stressed the difficulties of faunal analysis. Due to its largely cartilaginous skeleton, sturgeon readily decomposes leaving insignificant traces. Furthermore, the use of screens small enough to detect minute traces in large amounts of soil requires an enormous outlay of resources. Several archaeological sites, however, do have some evidence of sturgeon, for example, The Forks, Lockport, Nelson House, Grand Rapids, and Fort Alexander (Hannibal-Paci 1997). Historic records support the significance of these sites for sturgeon (see Appendix A).

Archaeologist Anthony Buchner (1981, 1982, 1984) suggested, for the Winnipeg River and surrounding area, a bison economy dominated during the Woodland and early post contact periods. Buchner does not mention use of sturgeon. This absence of sturgeon does not fit with what can be reconstructed from historic records. Historical observations place sturgeon within a complex economy of resources that included bison, wild rice, maple sugar and other seasonally abundant resources (Lytwyn 1993; Peers 1994; Tough 1996; Hannibal-Paci 1997). There is no indication of a shift in economies from bison to sturgeon and there is no evidence of climate changes. According to Syms (pers. com, 1996) the “big game hunter” bias is dominant throughout much of the study and writing on early Manitoba archaeology. Archaeological arguments are reasonable conclusions about social organization, movement and behaviour in relation to antecedent environments, based on what can be reconstructed. These arguments frequently reveal more about the epistemology of our methods of inquiry than what was actually there. Brian Smith (1991:35) proposed that lesser

resources, including fish, were largely under-represented in archaeological studies. Sturgeon was not a lesser resource, but it has been under-represented in archaeology.

From 1750 to about 1890, sturgeon both sustained Aboriginal peoples and increasingly became an object of trade with Europeans and Canadians. With increased residency of inland fur traders over the entire year a stable market for country food was established. The scale of this market is difficult to establish with accuracy. By the 1800s, Cree and Ojibwe were acquiring European trade items, including fishing technology, in exchange for sturgeon (Tough 1999). The 1821 amalgamation of the North West Company and Hudson's Bay Company, and resulting employment cutbacks, led to a significant population established at Red River settlement, present day Winnipeg.

By the time the Selkirk settlers reached Red River in 1812 sturgeon was a valued country food (see Appendix B). A commercial fishery and market for sturgeon is not known to have developed at the settlement at this early stage; however, within 70 years sturgeon had largely been fished out of the Red and Assiniboine rivers, bringing to an end a 4000 year old fishing site. Peers (1994:184) noted "the continuing importance of country products (including canoes) sold by the Ojibwa to residents of the settlement. On a visit to Red River in late winter of 1869, Walter Traill also confirmed the settlement's reliance on country food." After 1870 the cumulative effects of fishing along with large-scale development, such as the mill at Sturgeon Creek and Lockport dam, and agricultural improvements, such as irrigation and deforestation along the river corridors, diminished sturgeon populations (see Hannibal-Paci 1998, 1999). The Ojibwe on the Roseau River maintained sturgeon weirs to 1890. The

decline in sturgeon on this river was due to changes in management of the weirs, access to sturgeon up-stream, and competing resource use; for example, log runs (Waddell 1970).

Aboriginal lifeways in and around Lake Winnipeg were altered by settlement at Red River and changed by the developing resource frontiers.¹⁴ Traditional land use in the form of the seasonal rotation of family territories was contrasted starkly with the pattern of Treaty and reserve settlements.¹⁵ Peers (1991:107) described the Ojibwe as being strategic, extracting “the most food with the least effort and to maintain a balanced and productive annual food-harvesting round.” Land restrictions such as reserve allocations, rendered the productive annual food harvesting round difficult, if not impossible to achieve. Balanced and productive annual harvests were lost with increased commercial activities, for example fishing for foreign markets (Tough 1999).

There is no scientific database regarding the nature of traditional fisheries,¹⁶ so the people are therefore, along with archaeological data and other material, important sources of information. Can fishers and their children be asked if traditional fishing areas were individually or collectively owned? Can oral histories be relied on to characterize sturgeon

14 According to historian Irene Spry (1983), federal policies to protect, civilize and assimilate Indians were successful with the transformation of common property to open access conditions and private property. Berkes (1985) found colonization to be successful at creating open access conditions, transforming fisheries from steady-state to growing harvest levels. The reality for Lake Winnipeg sturgeon fisheries was that policy/jurisdiction ushered in instability. In the frontier economy, Crown property rights created *de facto* open access (Innis 1954).

15 Families, communities and trade developed around prosperous fisheries. Prior to the advent of industrial commercial fishing, Cree and Ojibwe maintained large-scale, apparently sustainable commercial trade in sturgeon. For some of those who traveled the waterways, sturgeons were gifts (Tanner 1994). Reserve selection and land allocations were sometimes based on reliable fishing grounds (see Aronson 1988).

16 The displacement of Native fishing institutions and the general state of these fisheries after 1900 can be

fishing as being collectively used? There is some documentary evidence to suggest that Aboriginal sturgeon fishing locations were collectively used, but were they controlled by clans, families, or powerful individuals? By comparing the oral interview information along with historical and other information we can get a good idea of what the traditional fisheries were like. Aboriginal use, and therefore ownership, was based on claim and active fishing. Fishing camps were established on the shores of rivers and lakes, spawning areas where sturgeon would congregate and were accessible to spear, trap and net. With few exceptions sturgeon spawning runs were relatively stable before the 1890s (see Chapter 4).

Aboriginal fisheries and local fishing institutions were displaced by state sponsored open access after 1890. Communal control over fisheries access had no force of law nor could such control be made through social sanctions (see Appendix C). In the face of industrial fisheries, Cree and Ojibwe resisted, but it is unlikely that bands or families controlled major sturgeon fisheries for long. Commercial companies limited domestic efforts by usurping or hiring experienced Native fishers. Sturgeon was commodified and made into private property, servicing the national economy by creating employment and revenue in exchange for natural resources. In the conversion to open access and private property, sustainable productivity was lost to rising monetary value. Riches were privately drawn from natural stocks. If private property was regarded as the means of developing resources, it was equally a process whereby great wealth could be accumulated. Fortunes were based on growth, not only of resources, but also of capital.

characterized as *uncommon property resources* in a spiraling *tragedy of the commons* (Marchak *et al.* 1987).

The loss of food fisheries was devastating for “Indians” who were unable to amass sufficient capital required for industrialization and intensive development. Cree and Ojibwe were not able to purchase new technologies such as steam tugs and pound nets. Environmental historian A. F. McEvoy (1988:217-8) found that in the United States, Indian fishing policy was predicated on the assumption that “resource depletion was a necessary complement to economic progress [of commercial fishing companies], and no less inevitable than the passing of the buffalo or the Indians.” Commercial fishing companies did not exploit fish in Lake Winnipeg until market demands and a means of transportation were established. Aboriginal sturgeon resources were reduced as the fish took on a significant commercial value after the 1880s, when the fish acquired commercial export value.¹⁷ By 1910, when the first collapse of the fishery in Manitoba occurred, sturgeon became a valuable commodity. The inevitable destruction of different sturgeon populations in Manitoba was a product of an excessively growing industry. The causes for the physical disappearance of the fish include the complex relationship between biology, over-fishing, and habitat loss due to hydroelectric and other large-scale human developments. Although not within the scope of research, climate change could also have negatively impacted the species. Anthropogenic impediments, including small-scale subsistence fishing, continue to hinder the recovery of the species.

The main elements of Aboriginal management can be reconstructed from documentary records and from the accounts of sturgeon fishermen (see chapter 4). The key components

¹⁷ Fisheries biologists W. J. K. Harkness and J. R. Dymond (1961:4) wrote, “long after the colonial period in the United States, sturgeon roe was regarded as worthless except as feed for hogs or as bait for other fish. Prejudice

of Cree and Ojibwe management were: customary laws, collective access to fishing sites, appropriate respect toward fish during and after capture, mixed fishing methods including live capture, sharing of resources, limited catch based on community needs, gifting of processed sturgeon, and use of other resources (Hannibal-Paci 1998a, b, c). Access to sturgeon was mostly regulated by kin groups, more or less dependent on local consumption and distribution within the use of multiple resources based on seasonal abundance. Commercial trade of sturgeon had been part of some Aboriginal economies for over 200 years. In comparison, “for export” commercial industrial fishing did not last long and the fish was quickly depleted.

3.3 Commercial/State Sturgeon Management

The third annual report of the Federal Department of Marine and Fisheries, 1871, includes excerpts from the *Digest of the Laws of Assiniboia*, 1870. This report marks the beginning of annual fisheries reports from Manitoba and Keewatin (Canadian Sessional Papers, Fisheries Report [CSP] 1871:118). Fisheries reports for 1872 to 1876 continually restate the need to enact regulations to protect stocks. By 1877 estimates were made as to the nature and quantity of fish landed in 1876. Catfish and gold eye were listed as the top two commercial species, followed by whitefish and sturgeon. Federal fishery Overseer Donald Gunn reported an extensive fishery for local consumption and a small-scale commercial fishery valued at \$30,590.75 (CSP 1877:348-51). These early fisheries were not subject to

against eating sturgeon seems to have had two bases; one was not knowing how to prepare it, and the other was that it was the food of inferior people, such as servants, slaves and Indians.”

regulations until the 1890s, and there is no evidence that regulations were enforced till after 1910. Commercial “for export” sturgeon management lasted from 1890 to about 1990. During this period state sturgeon management was instituted in response to a crisis and collapse of the Lake Winnipeg fishery (the most significant of the sturgeon fisheries).

Formalized government sturgeon management evolved in response to the growth of a market, in addition to the growth of an industrial fishery, and fisheries science. Tough (1999:98) has discussed the industrialization of the fishery in detail, and he has argued,

the particular failure of resource management to sustain sturgeon populations was the result of two main factors: the inability of sturgeon to respond reproductively to overfishing, and the relatively higher prices for sturgeon and caviar... we must look at these management problems within the context of the political economy of a capitalist industry and an ineffective regulatory system.

There is little written on the regulatory system, unfortunate because it is an important expression of public policy and a good indication of changing environmental relationships. An attempt is made in this section to reconstruct the evolution of regulations.

Commercial and state fisheries management and regulation largely ignored and displaced Cree and Ojibwe sturgeon management. These changes indicate that a different set of values was being applied to sturgeon and other fisheries. Tough (1999:100) noted, “in contrast to the traditional fishery, in which Natives fished for their own consumption and for exchange in response to the provision needs of the fur trade, the commercial operation that developed after 1880 had the characteristics of frontier capitalism: dependence on export market (in this case, the large American market), increasing intensity of capital, paternalistic labour relations, and reckless rates of resource extraction.”

Maximum sustainable yield estimates the quantity of fish and potential economic growth in the conversion of the maximum portion of stocks into revenue, while still maintaining a sustaining stock. These estimates and objectives were not in place when commercial fishing companies spread over the fishing grounds. Only a partial accounting, recorded as historic production records, indicate what was first removed. This early fishery grew during a period of resource anarchy (1870s to 1910). Tough (1999:111) considers this period a time when “officials lacked knowledge to manage the resource scientifically”. In effect, Tough argues that, “effective state management” was absent, and “the commercial companies controlled the fishery.” The federal government sought to encourage a commercial fishery and may have used this development to wrest control of natural resources and land away from First Nations. This control was established by proscribing what was legal in regulations: for example the legal use of gill and pound nets and illegal use of setlines, weirs and spears.

Cree and Ojibwe fishermen reported traditional fisheries were predominantly based on spawning runs and late summer concentrations (see chapter 4). These fisheries were based on the use of weirs, spears and setlines. These methods were all non-selective,¹⁸ that is fish were randomly captured and were not targeted or selected by size or gender. Even with weirs,

18 When examining the early state of the fishery, it is apparent that local knowledge from Aboriginal communities, or for that matter local knowledge collected by local overseers, were not influencing regulations. For example, at the Red River settlement regulations were created as early as 1865, the year after Chief Peguis died. The Council of Assiniboia, in effect the governing body headed by the HBC, had passed an order in council banning weirs (CSP 1871:118). I suspect the ban was to control navigable waters, with increased steamboat traffic on the Red River, and perhaps to establish some form of commercial fishery, although this is speculative. Weirs could be constructed to effectively block entire fish runs; however, most were not built with this in mind.

fish, under high water conditions, could get over a fixed fence. In contrast, the open period of commercial fishing (to 1910), when there were no regulations, was a period of all-selective, the intensity and quantity of harvest were unsustainable. After the Lake Winnipeg collapse, regulations were aimed at establishing selective harvests of certain age class of fish, thus altering the remnant population dynamics. Pound nets, eventually made illegal by fisheries regulations in the 1920s, were similar to weirs, except that they were suspended from the water surface and therefore fish could rarely pass. The problem with pound nets and other commercial fishing methods were that they were too efficient. Furthermore, there was no incentive for companies to ensure immature fish were released. One should not assume that companies, whose incentives were largely economic, considered biological concerns of yield. Frontier economics meant a rush on the harvest of resources, ownership was an afterthought, and regulations were impediments to development. Environmental historian A. McEvoy (1988:219) argued, “to harvesters and the public officials whose job it was to oversee their industry, commercial fish were like gold nuggets: valuable commodities to be recovered from a state of nature and transformed into cash.”

The transition to establish state regulated sturgeon management was driven by tensions between economics, politics and fisheries science. For example, an 1885 report from New Brunswick’s Fisheries Inspector, W. H. Venning noted,

great decrease in the catch of this fish [Atlantic sturgeon (*Acipenser oxyrhincus*)] which I have had to report for several years past has, this year, been still more marked... I never believed the stock in the river would stand the excessive fishing... in my present knowledge of the habits of the fish... few small fish were taken; most of the seasons’ catch consisted of large fish, and it would seem as if the smaller fish

are not in the river (CSP 1885:vii).

Venning's reports did nothing to turn the New Brunswick situation around. As fisheries biologists J. Wilson *et al.* (1994) have argued, the science of fisheries management was placed at the service of industrial commercial fisheries. J. B. Feilding (1916:89) noted for federal fisheries policy at the turn of the last century that "fisheries department should carry on its administration in full co-operation and sympathy with the fishing industry."

The Canadian *Fisheries Act* came into effect for Manitoba and Keewatin in 1880, although sturgeon regulations were not set out until 1891. Following considerable political pressure from the Atlantic Provinces, the Judicial Committee of the Imperial Privy Council decided in 1898 that authority for Canada's fisheries should be shared between provincial and federal governments. After this decision the provinces held proprietary rights to fish and the federal government held "exclusive competence to enact fishery regulations and restrictions," including direct taxation and licensing (Gough 1991:41). Fisheries Department was inactive in Manitoba and regulations did not take hold until after 1910.

David Chastellaine, clerk of the Hudson's Bay Company (HBC) post at Dogs Head, Lake Winnipeg, in a letter to Lieutenant Governor of Manitoba and Keewatin, John Christian Schultz, in 1890, described the whitefish fisheries:

I left Warrens Landing, viz. On the 5th October, and my slow progress gave me the opportunity of seeing the Indians engaged in the fishing, and everyone of these Indians assured me that up to that time they had not got half as many as they had got to the same date last year, and they very much feared starvation this winter. I was surprised also to find that many fish-boats were still engaged up to as late as the 20th of October; the ordinary white people's fish-boats were putting down their nets and catching considerable quantities and taking them to Selkirk to market. Although I

suppose this to be against the law (Provincial Archives of Manitoba, MB 12 E1, December 1890/4847).

Chastellaine's comments on fishing regulations referred to white fish, Sunday fishing and fishing past the start of October.¹⁹ There were no separate regulations for sturgeon; however, such fishing would also have been destructive to it. Unfortunately, we must speculate that industrial fishing companies did not follow established regulations and excessive fishing devastated stocks. There are no records and very limited documentary evidence from these companies. The issues raised here could use further discussion; however, the point that lack of regulations and enforcement were problematically characteristic of these early fisheries is supported by the collapse (see also Tough 1999).

By 1890, there was great division of opinion about the state of fish populations, in particular of whitefish and sturgeon in Manitoba. The debates are readily apparent in the reports and correspondences of the Department of Indian Affairs and the Department of Fisheries (1870-1890s). This difference led the federal government to "discreetly examine into the condition of the fisheries in Lake Winnipeg generally", sending Samuel Wilmot, Superintendent of Fish Culture, to investigate the situation during July 1890 (CSP 1891:xxi). Wilmot suggested,

the closed season for sturgeon, should be from what is at present known of its habits, from 15th April to 15th July. The license to fish sturgeon should describe the location where to fish, the description. Length and size of mesh of the net, and the description of boat to be used (CSP 1891, Appendix 3:62).

¹⁹ Criticism of commercial fishing from a HBC employee, not that individuals necessarily reflected the company, must be kept in perspective. The HBC would have been fairly negative towards competing commercial endeavors (competing for Native labour and with the fishing company stores) and the new Dominion government.

It is of importance to note that Wilmot's recommendations were based on, "what is at present known of its habits." While designed to protect the spawning run, these measures, insofar as they applied to Cree and Ojibwe fisheries, displaced traditional fisheries management. The regulations were aimed at commercial fisheries and did not provide for Aboriginal management.

Fisheries Inspector Alexander McQueen (CSP 1891, Appendix E:160) noted, "Indians had been deluded into the idea that they had a legal right, under treaty stipulations, to fish during the closed season." Tim Holzkamm and Chief Willie Wilson (1988:5) noted "as part of the treaty [three], the Ojibway insisted upon reserving their traditional rights to the fisheries.... Tough has noted similar concerns on the part of the Indians living around Lake Winnipeg." James Waldram (1988 32) noted,

no mention was made of Indian retention of hunting, fishing or trapping rights on ceded lands in the treaty itself [one, two and three]. However, the Lieutenant Governor of Manitoba and the North-West Territories, Adams Archibald... did promise orally that the Indians would "still be free to hunt over much of the land included in the treaty".

First Nations were free to use the land until it was settled or needed by non-Natives. It is clear by McQueen's statement that Aboriginal fishing rights were negated.

The knowledge of sturgeon held by Cree and Ojibwe did not inform the direction of fisheries regulations in Manitoba, possibly due to it being trivialized. Dominion Commissioner of Fisheries, E. E. Prince (CSP 1898:lvii) noted, "sturgeon are of such vital importance for the sustenance of the Indians - 'It is to us Indians,' a Blackfoot hunter is recorded to have

said, ‘in the water, what the buffalo was on land.’” Prince was Commissioner from 1895 to World War I, a Scottish trained zoologist; he developed considerable expertise on sturgeon. There are no records that he spoke with the Blackfoot, Cree or Ojibwe (the Blackfoot are not known to eat fish, with the exception of ‘Fisheaters Band’). Prince may have borrowed this phrase from an 1872 report by Manitoba Fisheries official Urquhart’s (CSP 1873:194). The original statement was, “as an Indian hunter said to me [sturgeon] ‘is to us in the waters what buffalo is on the land.’” By 1898 Prince officially lamented “no special code of protective regulations has been formulated in Canada” for sturgeon and he concluded that the failure of the fishery resulted from a lack of enforcement of fishing regulations, not over-fishing by Aboriginal people (CSP 1898:lvii).

The Royal Commission to investigate the state of fish in Manitoba and Ontario, 1909-10, responded in some measure to the loss of sturgeon and depletion of whitefish. Gough (1991:45) noted that the recommendations from E. E. Prince and the other Commissioners set a cornerstone for fisheries regulations. Gough (1991) listed significant recommendations as including the reduction of gear, introduction of quotas, limiting of areas and attempts to share allocations between commercial interests and others, such as First Nations. Because the Commission was dealing with failed fisheries it is not surprising there was a shifting concern about sustainable yields.²⁰

20 Fish quotas promoted harvest targets not conservation. In theory, quotas are based on the resource’s ability to sustain what is harvested. Replacement stock is a function of the biological assumptions about the reproductive capabilities of a species. Prior to the quotas, Aboriginal fisheries were based on need, mostly for local consumption, with some trade in sturgeon products during the mercantile period, approximately 1770-1870.

That sturgeon fisheries in Manitoba were closed and reopened five times is of less importance than the fact that each time regulations have preceded and at times anticipated, rather than eliminated, further closures. Moreover, each cycle saw an overall decrease in sturgeon stocks, indicating a failure to manage fishing. Why was the depletion pattern allowed? Did managers permit, and in some cases encourage depletions? After the initial collapse did a bias against sturgeon as a viable commercial commodity develop? The next section examines sturgeon management to 1990, particularly the Nelson River regulations.

3.4 Sturgeon Fisheries Regulations on the Nelson River²¹

With the historical decline of Lake Winnipeg sturgeon fisheries there was an example for managers of the need to establish sturgeon fisheries regulations on the Nelson River. However, archival documents, fisheries reports, and the secondary literature illustrate the displacement of traditional fisheries and a failure to manage sturgeon. Norway House Cree Chief Balfour, during a visit by Lieutenant Governor John Christian Schultz in 1890 to investigating the state of country food, was recorded as saying,

we dread the approach of these white fishermen, we have heard from relatives at Poplar River, and the Great Saskatchewan how quickly their fishing affects the supply of small nets of the Indians, and we dread every day hearing a report that... they will come and build an ice-house at the station at the beginning of the river where it is so narrow, and if they stretch their nets across there as they have done at the Saskatchewan and Poplar River, what are we to do? (PAM, MB 12 E1 July 1890 4579-80)

²¹ Unless otherwise noted regulations are from MacDonnell (1997). This material is photocopied records of MDNR, Fisheries Branch, held in files at North/South Consultants.

“What are we to do” was a fair question to ask. Furthermore, the reference to net size, “small nets of the Indians”, construction of an icehouse, and the destructive practice of taking entire fish runs, were significant management issues. Commercial nets arrived on the Nelson River after 1900, with the exhausted of southern stocks and the establishment of the ‘Bayline’ railway system (Tough 1996, MacDonell 1997).

Fisheries biologist Leif Sunde (1961:3) identified 1907 as the year when commercial fishery began on the Nelson River; however, this date actually marked the beginning of the distinction in accounting practices between commercial production records for the Nelson River from the Lake Winnipeg commercial fishery.²² Between 1910 and 1940 the fishery went through four periodic closures. The first closure of sturgeon fishing in Lake Winnipeg was from 1910 to 1916. Six years later, in 1922, the fishery was again closed, reopened in 1924, and closed in 1927. After closure of the Lake Winnipeg sturgeon fishery in 1927, the Nelson River commercial sturgeon fishery closed in 1933, and reopened in 1937. The main regulatory methods used after 1937 mirrored earlier regulations setting limits to gear type, area, season, licensing, and production quota. MacDonnell (1997:50) found “scant [sic] little information exists for this period [1930s] and the rationale for reopening the fishery is uncertain. However, the great depression was in full swing at the time, suggesting that economics rather than biology had the greatest influence in the decision.”

22 In North America, the turn of the century was the dawn of scientific management. In 1907, as commercial fishing was established on the Nelson River, the first United States Forest supervisor, Gifford Pinchot published “Breaking new ground.” Pinchot, with the support of President Wilson, brought forest and irrigation practices, that had been established by Imperial England in India, to America. Pinchot is credited with ‘fathering’ the wise-use conservation movement in the United States.

Sturgeon fishing regulations in 1937 restricted gear for each license to 500 yards of 12-inch mesh gillnet. A license fee of five dollars was introduced and while it may have limited the entry of some fishermen, it probably was enacted to cover administrative costs. The license fee was less prohibitive to new entrants than the outlay of capital for nets and boat. A fishery based on the use of a single mesh size is assumed to allow smaller fish to mature and reproduce before they are harvested. The gillnet restriction did not ensure the reproductive success of sturgeon. The problem with a set mesh size is the selective nature of the technology. Sturgeon population dynamics are still very difficult to establish with certainty, however, one mesh size would not ensure what amount of the reproductive stock would be harvested and what would be left to sustain future stocks. The regulatory tool established to ensure sustainable harvests was the quota. The quota for the Nelson River was set at 50,000 pounds in total without any concern for where on the Nelson River the sturgeon were harvested. A shortfall in meeting the production quota for 1937 to 1939. This may have suggested that there were not enough sturgeon to meet the limit; however, it may also have been read as a fishery not producing at full capacity. DNR increased the quota, fishing areas and extended the season in 1940.

For 1940 the fishing season was extended for sturgeon to the end of September. Fishing areas were expanded to include Angling River in the Sipiwesk Lake area. The production quota for the Nelson River was raised to 60,000 pounds. During the 1945 fishing season sturgeon seemed to have failed and the next year, 1946, the quota was reduced to 15,000 pounds with the season reduced from July 2 to September 28. In an attempt to adjust

the failure mature sturgeon were targeted through a minimum 15 pounds dressed weight. The dressed weight is approximately two thirds the round weight (approximately 22 pounds round weight). These changes to the fisheries regulations did not halt the decline of sturgeon and the fishery was closed in 1947.

After only five years the Fisheries Branch had received a number of requests to re-open the sturgeon fishery. In 1953, the MDNR opened the Nelson River commercial sturgeon fishery from Whitemud Falls to Split Lake. The season ran from June 22 to August 8. The quota was lowered to 25,000 pounds, but was exceeded. The industry entry was limited to twenty-five licenses at \$10.00 each. The gear restrictions set in 1937 were maintained for 1953. While there is no supporting documentation for why many of the changes to regulations were made, many did not follow the most basic biological assumptions of the day for sturgeon. For example, the minimum catch weight for 1953 was lowered to 18 pounds in the round (10 pounds dressed). A mature male sturgeon would weigh at the minimum 18 pounds round, with females weighing at minimum 22 pounds round. Clearly the 1953 minimum catch weight indicate that some immature sturgeon were landed. While re-opening the sturgeon fishery may have reflected the political pressure, changes to minimal weights demonstrate negligence in managing the fishery. Prices paid to fishers varied from fifty cents to \$1.10 a pound (Robert Pronteau Sr. in MacDonell 1997:65). In 1954, the season opened 12 days earlier (during spawning concentrations) and the fishing area was expanded to Gull Rapids. Not surprisingly the quota was again exceeded.

Manitoba fisheries biologist B. Kooyman (1955:1), analyzing data collected in 1953

and 1954, noted, “since there is very little in [the] way of previous biological work on this species in Manitoba, or for that matter in North America, the season, size limits and production quotas set in 1953 were based tentatively on the assumption that previous regulations were fairly valid.” He predicted in 1955 that the fishery would collapse in a few years under these regulations. Despite this warning, the fishing area was extended to Kettle Rapids and the quota was exceeded. A year later the quota was again exceeded. By 1956, the quotas had become production targets; exceeding them was not seen as a violation of fisheries regulations as the department responded by expanding fishing season and region. In 1958, regulations were extended to allow fishing to the Weir River past Sipiwesk Lake, with increases to the quota (to the 1937 target of 50,000 pounds). In addition to these pro-development changes in regulations was an increase in the number of licenses to 50. Sunde (1959), analyzing data for 1953-1956, agreed with Kooyman that sturgeon were in jeopardy. Sunde suggested Kooyman’s collapse hypothesis be tested with continued fishing for 1960. That year a significant physical change to the river resulted from the completion of the Kelsey generating station. Forty-nine licenses were issued and sturgeon fetched \$1.35 a pound. The commercial fishery was closed in 1961. During each closure a significant Cree and Métis subsistence sturgeon fishery continued (see Chapter 4).

Kooyman’s assertion in 1955 that there was “very little in way of previous biological work on this species in Manitoba,” the dominant view held by the Fisheries Branch, triggered some significant biological studies during the decade of the 1960s. While Sunde (1961) studied the growth and reproduction of the sturgeon of the Nelson River, Driver and Doan

(1972) completed fish sampling in 1965 from Cross Lake. Other research underway in the 1970s would improve the biological knowledge of sturgeon on the Nelson River. Ayles *et al.* (1974) examined fisheries to determine the impact of hydroelectric development on the lower Churchill, Rat-Burntwood and upper Nelson rivers.

In 1967 Keystone Fisheries Limited, The Pas, showed an interest in re-establishing the sturgeon fishery in Manitoba. However, K. H. Doan, Director of Fisheries, wrote to them “the season has only been closed for 7 years, and will probably not be re-opened before 1970” (May 15, 1967 photocopy of a letter from Doan to Mr. John Bodnar). At both Cross Lake and Split Lake, Cree were seeking a reopening of the commercial fishery by 1968. Minister Donald W. Craik replied in a letter to Band and Council, “we are not permitting sturgeon fishing in Northern Manitoba until 1970. This is to allow the sturgeon to increase to the point where we can have a continuous fishery with a Specified limited contributing to your economy” (August 30, 1968). In a letter from A. Kirkness, Métis Field Worker (photocopy of a letter, April 25, 1969) to the supervisor of commercial fisheries in Winnipeg, he asked on behalf of Thicket Portage, “this community would like to know if there will be a season on sturgeon this summer”. Doan replied in a letter on May 1, 1969 that “you will be advised in the near future regarding the sturgeon fishery you are interested in.” In an inter-departmental memo from R. O. Schlick, Fisheries Biologist to the Northern Regional Director the decision was made that “we are not opening the sturgeon fishery on the Nelson River until 1970.” Northern Regional Director, W.C. McLean, in a letter to Baptiste Crait, Thicket Portage (photocopy, May 12, 1969) completed the loop by stating “there is no sturgeon

fishery during the 1969 season but we are considering opening one in 1970.” Similar to this letter is one sent by E. B. Johanson, Chief Conservation Officer, The Pas, March 13, 1969 to O. Freedman, Thicket Portage. What was proposed to be an opening of three years in 1970, followed by a five to seven year closure, ended up as a 22 year run with cumulative decreases in sturgeon overall.

Provincial fisheries biologist Dickson had outlined two paths available to manage sturgeon, as either “a rapid harvest of the stockpile population over the short term; or annual low sustainable harvests” (MacDonnell 1997:79), but it is not obvious that Fisheries Branch followed either path. Regulatory changes in 1970 were to gear (1000 yards of 13-inch-mesh/fisherman, although fishermen were allowed to use 12-inch-mesh for the season) and minimum catch size (42-inches round or 25-inches dressed). The change from minimum weight to minimum length corresponded with improved aging measures established by Kooyman (1955) and Sunde (1961). After 1970 fish size was measured by fork length (that is the length from tail to gill), rather than by the older criterion of overall weight. Another significant change in regulations was basing quotas on specific fishing areas. Playgreen Lake to Cross Lake was assigned a quota of 5000 pounds; Kelsey Dam to Kettle Rapids was assigned a quota of 3000 pounds; and Kettle Rapids to 53° north was assigned a quota of 2000 pounds. The union of quota to area corresponded with an assumption of separate populations of sturgeon. The fishing season was set to start in the middle of June (15th) and ran to the end of September.

An important commercial regulation in 1970 was licensing exclusively to active

commercial fishermen, that is fishermen who already held commercial licenses for other species on the Nelson River. In a letter from E. B. Johanson, Chief Conservation Officer to D. C. M. Allen, Conservation Officer at Norway House (January 28, 1970), Johanson noted, "sturgeon fishing licences should be based on qualification as a commercial fisherman of the area insofar as record of licenses, ability to produce and quality of production." This move excluded the majority of traditional sturgeon fishermen and it reflects the intent of Fisheries Branch to engage only "bona fide gill net fishermen already fishing these waters" (See New Service, May 12, 1970, press release 'To Permit Limited Sturgeon Fishing'). It may be difficult to understand, but commercial sales of sturgeon enabled traditional sturgeon fishermen, a group that probably never exceeded 100 individuals, to combine an Aboriginal tradition with a means to make money. With a barrier to accessing the fishery, part of the Aboriginal community were disadvantaged from making money while another sector, commercial fishermen, were given unfair advantage. Such divisions may have reflected good economic sense in southern Manitoba, but such divisions in the north and in Aboriginal communities caused serious problems. Subsistence sturgeon fishing, even during the commercial closures, continued and in 1970 was allowed under a subsistence license. The commercial fishery was going through readjustments with a loss of opportunity for newcomers and preferential treatment to active commercial fishers.

The 1970 regulations continued without any changes to 1976. The Freshwater Fish Marketing Corporation, established in 1970, purchased sturgeon for the first time in 1973. In 1974, the enforcement of net size regulations was proving impossible for such a large area.

One Native man was charged with using an illegal 10-inch mesh net prior to the start of season (he was fined \$50.00). Violations continued to occur throughout 1975, with undersized fish and illegal mesh nets seized. Poaching was reported and sturgeon management was becoming increasingly difficult. In 1976, the MDNR asked fishers to keep catch data for the first time. A year later, MDNR failed to convict a Native man charged with possessing undersized sturgeon due to lack of proof over origin of the fish.

The 1980s saw several significant changes that were not directly regulatory. In 1982 the Canadian Constitution enshrined Aboriginal and treaty rights. After 1982 the Aboriginal right to fish was protected constitutionally and such legitimacy would seriously delimit provincial natural resource authority. In addition to this change, Don MacDonald (pers. com) of the DNR, Fisheries Branch, has alleged after 1985 there was increased fishing by Cree who had regained their Indian status under Bill C-31²³ (the claim has not been substantiated with a census of reinstated fishers). A constitutional challenge by Nelson River Métis would have probably supported that they too held constitutionally protected rights to fish. Under the pressures of increased fishing Fisheries Branch renewed the need for domestic licensing. In some measure this was an attempt to control the domestic or subsistence fishery. Domestic fisheries had been “managed” along with commercial fisheries since 1937. Subsistence fishers were assigned a license and corresponding disk, which was attached to their nets. Domestic fishers were not required to provide MDNR with catch data. In 1980, domestic licenses

23 Bill C-31 reversed a discriminatory policy that had stripped Indian women and their children of status if the women had married non-status men.

restricted fishers to setting 500 yards of 13-inch mesh net. These licenses also required fishers to keep production records on a monthly basis. Commercial fishing regulations in 1982 shortened the season from June 15 to October 1. That year domestic fishing permits prohibited lower Nelson River fishermen from fishing downstream of Sipiwesk Lake. This regulation negated traditional management and access rules on Sipiwesk Lake (Chapter 4). While it may have infringed on Aboriginal rights; the fishery was in such a poor state that it never became an issue for the Cree.

The 1980s were a significant decade for both social and biological studies of sturgeon fisheries. Considerable data had been collected after 1970, since there was an increasing public concern that the health of northern communities was decreasing. M. Wagner (1985) studied Cree sturgeon fisheries for the Treaty and Aboriginal Rights Research Centre of Manitoba. Wagner surveyed (see *Five year Report*, Manitoba 1983) ten reserves in Manitoba for domestic harvests. Biologists M. Gaboury and J. Patalas (1984) studied the effects of hydroelectric development on the fisheries at Cross, Pipestone and Walker lakes, describing some of the impacts of the Jenpeg Generating station. Fisheries biologist R. Sopuck (1987) examined data from the Sipiwesk Lake area of the Nelson River, accumulated from 1976 to 1978. J. Patalas (1988) studied fishing data for 1987 to 1988, assessing impact of commercial fishing on the same sturgeon population with little concern for Cree and Métis fisheries.

By 1990 there was a sharp drop in commercial production, and increases in domestic fishing. The domestic fishery was becoming increasingly problematic for sturgeon conservation. Despite domestic licensing and requests for the collection of data, relatively few

records were maintained. Cree fishermen often chose not to inform MDNR about their catches; their lack of cooperation stemmed from antagonism dating back to the 1970s. In 1990, Fisheries Officers confiscated 36 sturgeon (weighing 430 kg) from two domestic fishers. No charges were laid, probably as a result of the Supreme Court of Canada *Sparrow* decision (1990). In 1991, a fishing party was documented with 88 sturgeon, weighing 1,113 kg., a harvest that exceeded the commercial quota for 1987. The commercial sturgeon fishery was closed in 1992. This closure did not arrest domestic harvests.

Sturgeon regulations in Manitoba were aimed almost entirely at commercial fishing. The growth of a commercial fishery during the 1800s, led to the regulations in the early 1900s, regulations which sought to restrict fishing effort and narrow the opportunity for commercial harvests. These measures failed to conserve sturgeon and increased Cree and Métis sturgeon fishers' antagonism to regulations. Fundamental, resource management regulations and policy decisions were made far from the fishing grounds and Aboriginal fishers were not involved in decision-making. Aboriginal fisheries were usurped by commercial and domestic fishing. Traditional knowledge was shown a considerable disrespect. The next section examines the growth of sturgeon science in Manitoba.

3.5 Analysis of Sturgeon Science in Manitoba

The training and recruitment of fisheries scientists developed in Manitoba after 1900 (Benson 1970). Alexander Morris, Lieutenant Governor of Manitoba initiated higher education in the province by drafting the *University Act 1877*. The University's mission,

according to the Rev. James Robertson, was to teach men to “forget in public affairs what church or nationality they formerly belonged to, and act as intelligent citizens in this new country, for the general good” (Glenn 1927:25). The general good is problematic in that it reflected in reality a standardized culture and religion. There was a certain degree of racism inherent in such an ideal. It was the responsibility of the member colleges to teach students in the arts (theology), and after 1890, in the “Natural Sciences.” Glenn (1927:46) noted, “the need of a more up-to-date type of science teaching was so acute that the Council of the University decided in 1890 to bridge the interval by allocating the three colleges, St John’s, Manitoba, and Wesley to combine for the teaching of science.” The historian W. L. Morton (1957:47) noted that there were 124 students enrolled in science in 1890. Three professors were hired on a half term basis, for teaching at the University of Manitoba. Morton (1957:46) lists Rev. Dr. George Bryce, Manitoba College, as teaching botany, zoology, some geology, and astronomy. By 1904, the Faculty of Science was formed and hired six professors. According to historian W. J. Spence (1918:23-24), a professor was hired to teach physiology (including zoology) with a grant by Lord Strathcona. The first science degrees (five-year program) were conferred in 1912 with 16 professors on staff and 812 students enrolled (Morton 1957:91).

If the University of Manitoba produced no graduates with science degrees until 1912, the training, if any, of earlier fisheries overseers would have been received elsewhere. Who then developed sturgeon management in the province? Sturgeon were extirpated from the Red and Assiniboine rivers and their numbers collapsed in Lake Winnipeg by the time the first

science graduates left the University. Fisheries managers before 1912 were men whose abilities ranged on a continuum from naturalist to patronage appointee. A survey of the first few fisheries overseers shows an interesting mix of personalities and abilities.

Mgr. Alexandre Taché, Bishop of St. Boniface, published one of the earliest known “scientific” writings on sturgeon for the region. Taché (1868, reprinted CSP 1873, Appendix S:192) noted:

there are very fine Sturgeon in Lake Winnipeg: I have seen them seven feet long and one hundred and fifty pounds in weight. The fish is excellent to eat: it furnishes a great deal of oil, and its air-bladder, simply dried, supplied the very useful isinglass of commerce. The Ruddy Sturgeon [*Acipenser Rubicundus*] is much smaller than the common sturgeon [Rupert’s land Sturgeon-*Acipenser Rupertcainus*]; its head is more elongated, and the cartilages are more prominent. Salt provisions are as yet not much used here, and salt is so dear that salting sturgeon has not hitherto been thought of; but such a method of preserving them would be more profitable than the plan of merely drying some pieces by the Indians.

The reports of the earliest fisheries managers indicate that economics and politics were more important determining factors than scientific management of the fish. The first Fishery Overseer in Manitoba was W. T. Urquhart (1873-4), self-admitted to have no first-hand knowledge of the fishery (Hannibal-Paci 1998e). Donald Gunn (1875-7) followed Urquhart. Gunn was from a prominent and well-established Red River family and he had been a member of the Manitoba Legislative Council in 1873. Even if Gunn knew little about sturgeon he was knowledgeable about the fisheries (Hannibal-Paci 1998e). Between 1878 and 1884 there appears to have been no federal Fisheries Officer (or statistics). Alexander McQueen was appointed as Fisheries Inspector in 1885, and in 1888 J.V. Begin replaced him. McQueen is best remembered for being opposed to claims by First Nations and others that the Lake

Winnipeg fishery was failing. Begin was commanding officer of the North West Mounted Police at Grand Rapids. In 1889, R. La Touche Tupper replaced Begin as Fisheries Inspector. Tupper seemed to have spent a considerable time on the fishing grounds becoming familiar with his new position (Hannibal-Paci 1998e).

The basic life history and biological characteristics of sturgeon were known at the turn of the century, but how widely such knowledge was circulated is speculative. Others have argued that before 1910 science did not inform management. Gough (1991:57) observed, “fishery science [in Canada] was in no fit state to be applied to management.” This was not necessarily the case in the United States, in particular in New York and New Jersey, where the U.S. Commission of Fish and Fisheries had gathered and documented knowledge of spawning, “embryology” and culturing for Atlantic sturgeon (*A. sturio*) in the 1890s. By 1900, the U.S. Commission had documented a basic understanding of spawning behaviour with studies from Lake Winnebago and the Detroit area.

In Canada, sturgeon evidently had little importance in fisheries policy overall. While Commissioner of Fisheries Prince was a considerable expert on sturgeon, men with his knowledge were more the exception than the rule. The Dominion Fisheries Research Board initiated fisheries research in 1899, but it was not until 1907 that a study of freshwater species began at Departure Bay, British Columbia (this did not include study of sturgeon). Fisheries Biologist J. Skaptason (1926) published the earliest scientific work on sturgeon in Manitoba, and he had little to say about population dynamics except that the species was depleted.

Since 1930 the scientific knowledge of sturgeon has steadily increased. A report by

Manitoba Fisheries biologist A. Bajkov (1933) advanced a scientific understanding of the fish, but also inadvertently raised many questions concerning social issues surrounding these fisheries. First, Bajkov was able to identify spawning locations on the Pigeon River, which may have been reported by his unmentioned guides or the Native fishing party who appear in his photo (Figures 4 to 7). Bajkov (1933:2) comments, "plenty of indications were found that a great deal of illegal sturgeon fishing takes place on this river and undoubtedly in other rivers on the *east shore of Lake Winnipeg*... there are still, no doubt, enough sturgeon to warrant the hope that a very valuable industry can be built up again in the future" (*emphasis added*). The existence of "illegal sturgeon fishing" along the east shore would be Aboriginal fisheries, constantly seen by biologists as a hindrance to building up a valuable industry. After 1930, concerns for conservation would displace domestic fishing, just as market economics displaced traditional fisheries in the late 1800s.

Although running female sturgeon were hard to find, Bajkov hypothesized that sturgeon spawned once every two years.²⁴ Provincial Fisheries biologist W. Harkness (1936 reprint in 1980) examined the sturgeon fisheries from 1876 to 1935. Harkness believed there was a need for comprehensive regulations that crossed provincial boundaries,

24 Sturgeon is unique; for the most part it spawns in fast waters with rocky bottoms, often at rapids (the same hydrology attracts hydroelectric facilities). Spawning takes place most years from May to June, depending on break-up and weather conditions (optimal water temperatures range from 13 to 18° C), and scientists have suggested under rare conditions (abnormally high waters, late break-up or environmental changes) sturgeon may not spawn. Phylogeneticists Burr and Mayden (1992:33) noted, "slow growth and late maturity make sturgeon especially vulnerable to overharvest." Scientists David Starr Jordan and B. Evermann (1914:10) found sturgeon "most abundant in the Lake of the Woods, where the annual catch in 1894 on the U.S. side amounted to 1,059,267 lb. Since then the decrease was rapid, until 1899 the catch was only 197,033 lb." The life history characteristics were poorly understood until the 20th century, becoming clear after the failure of sturgeon fisheries in general.

Ontario and Saskatchewan are much more likely to furnish spawning grounds for Manitoba sturgeon. Sturgeon usually ascend streams for purposes of spawning returning to the lakes for the summer... fishermen and poachers in Ontario and Saskatchewan may take sturgeon on the spring runs.

While sturgeon do migrate to spawn, and on the Saskatchewan River and Winnipeg River they transcend provincial boundaries, a grand approach to sturgeon management never materialized. After Harkness, subsequent studies by provincial fisheries biologists stayed within political jurisdictions. For instance, Hinks (1943:15) found sturgeon to be abundant "in all the large rivers, which enter Lake Winnipeg from the east and is very common in the Nelson and Churchill rivers. In Lake Winnipeg it is found amongst the granite rocks of the eastern shore, but is practically absent for the western portions of this lake."

Manitoba Fisheries biologist W. T. McTavish (1954) began the first scientific studies on the Nelson River with B. Kooyman (1955) examining both the Nelson River and Churchill River. In their studies, sturgeon were sexed and aged for the first time. McTavish recommended raising the quota to 25,000 pounds. Kooyman (1955:1-2) noted that sturgeon fishery management had not been based on sound principles and knowledge of the fish's biology and life history characteristics. It may seem reasonable to suggest that managers with knowledge of the sex ratios and age distributions of stocks could have managed the fishery; however, Aboriginal management was successful without this scientific data. Aboriginal fisheries were managed by principles of respect, sharing and taking only what was needed.

Manitoba fisheries biologist R. Sopuck (1987:37) noted, "the age of first reproduction and the frequency of breeding are important life history parameters that can greatly effect [sic] population size and the rate of population growth." Low sturgeon stocks on the Nelson River

since the 1950s are indicative of a remnant population (Kooyman 1955). Such a population is considered difficult to recover in great numbers. The most effective methods for aging sturgeon, refined by Harkness (1923), evolved through the work of Hinks (1943), Sunde (1959) and others. According to calculations by Hinks (1943:17), a female sturgeon that reaches sexual maturity at 25 years of age would be approximately three and a half feet in length, weighing around 25 pounds. Fisheries regulations that allowed harvests of sturgeon from 18 to 22 pounds were harmful to stocks by allowing capture of immature fish.

In a scientific fishery, an assessment of sustainable yields takes into account the history of a species, habitat changes and predation. Kooyman (1955:1-2) wrote, “sound management of a fishery resource requires knowledge of the growth rate for the species involved, the age at which sexual maturity is first attained, the subsequent spawning pattern, the age composition of the population being exploited and the rate of exploitation.” For example, whitefish mature at 5 to 7 years of age and spawn every fall. During the adult phase, larger (older) fish achieve reproductive capabilities, adding new stock within a couple of years after maturity. If the habitat, feeding, spawning and predation levels remain constant and balanced, then a fishery should be relatively healthy. Kooyman (1955:4) noted, “in an ordinary fishery prosecuted on a sustained yield basis in our southern commercial lakes the life expectancy of any fish is approximately 10 years”, true for whitefish and not sturgeon.

Exploitation of sturgeon might result in sustainable yields if harvests were limited to mature fish (>24 to 28 years old) that had already spawned once or twice. Harkness (1923:23) contended, “it is not until after the age of about 30 years that [the female] begins

to produce a large number of eggs. Therefore, the taking of fish of 30 years or less diminishes greatly the production of fry and is likely to result ultimately in the complete depletion of the sturgeon." Managing a fairly healthy brood stock, with mature fish, requires a management planning timeframe of one or two generations (30-60 years). In Manitoba commercial regulations have never focused on such long-term plans. Instead, season by season adjustments of some general assumptions about population size, age distribution and short-term adjustments of allowable gear, season, area, and nets, have been more common.

Sturgeon exhibit several unique life history characteristics. Evidence from Ontario suggests that individual sturgeon stocks vary widely in their biological development and spatial movements (Harkness and Dymond 1961, Ontario 1987). While debate exists, sturgeon are known to range both very short and long distances. MacDonell (1992:5), tracking sturgeon in the lower Nelson River from 1986 to 1991, found a range of migratory behaviour: "some have shown extensive movements over relatively short periods of time, while others have displayed highly sedentary behaviour for long periods of time." Overwintering in one locale is a common seasonal behaviour, so sturgeons are mostly sedentary during the winter (Swanson *et al.* 1990, Nickolsky 1963). Migration occurs in the spring as sturgeon move upstream from overwintering and feeding to spawning grounds.

Sturgeon are broadcast spawners that prefer fast flowing water and rapids. According to Hinks (1943), sturgeon were abundant in many parts of the lower Hudson Bay drainage system, an area with abundant habitat. Sturgeon are believed to "express strong homing tendencies" (Priegel and Wirth 1971, Thuemler 1988, Swanson *et al.* 1990). Variables such

as the availability of spawning sites and suitable food, the proportions of sexually mature sturgeon and fluctuations in waterways (levels, obstructions, diversions, temperatures and flows) are all factors that determine their range and survival on a given river system.

Sunde (1959:21) called sturgeon “a slow maturing as well as slow growing fish.” In actuality it is a fast growing fish, gaining on average a pound a year for the first twenty years, and close to that for the next forty years. Sturgeon is a long-lived fish. Lord (1984:22) wrote, “a 94 kilogram 154 year old was caught in Lake of the Woods in 1953.” Harkness (1923:23) stated that in 1922, near Sault Ste. Marie, a large sturgeon measuring 225 cm was taken (which he estimated through a photograph to be approximately 100 years old). Carlander (1969:33) calculated that a female caught on the Roseau River at the turn of the last century was 125 kilograms or approximately 150 years old (Figure 8). The largest sturgeon recorded from the Saskatchewan delta was in 1968 and measured just under 6 feet (fork length) and weighed 110 pounds (round weight). The largest sturgeon caught by an angler in Saskatoon (1962) was a female that measured just over 6 feet and weighed 270 pounds. Harkness and Dymond (1961:8) recorded the largest sturgeon from Lake Superior to be 7 and a half feet in length with a weight of 310 pounds.

Collete (1989:27) wrote that sturgeon have been “sucking primeval slime off the bottom of the sea [since the time] when there was only one great earth ocean.” Like other benthic fishes sturgeon employs various foraging behaviours. Prince (CSP 1899:vii) noted,

after the embryo has exhausted all the yolk, hanging like a sack from the under part of its body, it takes very small food, and probably up to the third month, when it first exhibits small conical teeth, it subsists upon minute plant forms, infusoria and

animalcule, as well as worms, microscopic shrimps, and the larvae of water insects, rhizopods, diatoms, &c., which abound on the slimy bottoms of sloughs, creeks and esturaries, and are swallowed by the little sturgeon in quantities.

Harkness (1923:25 citing Ryder 1888) agreed with Prince,

during the first three months, the food consists of minute plant forms such as *diatoms*, *Infusoria*, *Rhizopoda*, worms, microscopic shrimps, larvae of aquatic insects, etc. When one to two inches in length the little fish feeds upon *Cladocera*, worms, insect and fish larvae. The mature sturgeon has a diet consisting of larger crustaceans, shrimp like isopods and amphipods, and Mollusca, as well as microscopic organisms.

Hinks (1943) found the primary food for juveniles and adults to be mayfly (fish fly) larvae (*Hexagenia*), crayfish (*Orconectes virilis*), and on occasion, suckers. According to a classification based on feeding habits, sturgeon would be categorized as an omnivore that is stenophagous, consuming a limited assortment of food types (Moyle and Cech 1988:84). There are links between availability of food and over-exploitation. Scientists have found sturgeons especially threatened by anthropogenic influences. McDonnell (1992) noted sturgeon “react negatively to hydroelectric development... [a fact of] primary concern when addressing previous and potential impacts of hydroelectric development”.

Scientific knowledge tends to be fragmented by specialization and is not necessarily cumulative. In addition, the results of scientific studies reflect the segmentation of river and lake systems by hydro and other developments (Mosindy and Rusak 1991, Auer 1996, Rusak and Mosindy 1997). The post hydro-development movement and distribution of fish is now the prime focus of research. Most studies are not concerned with the entire ecosystem nor are they concerned with historic populations; instead they focus on the variables set by resource

agencies, provincial, federal and increasingly Aboriginal organizations. A focus on anatomy, life history characteristics, biogeography and systematics, reveals diverse facts about the fish.

This section has focused on the development of scientific capability and knowledge of sturgeon in Manitoba. What has been learned in Manitoba since 1950 has greatly increased scientific understanding of sturgeon. Before the 1950s, findings about the distribution, diet, aging and spatial movements were indeed sparse, but had even the little that was known been distributed widely, sturgeon management could have been improved greatly. Scientific knowledge of sturgeon was refined a great deal by 1990, but these advances have not reversed the sharp decline of the species in Manitoba.

3.6 Summary and Conclusions

Human-sturgeon relations viewed as a component of management increases the theoretical scope of research. This provides us an intellectual context whereby environment, culture and history can be discussed interdependently. This conceptual model enables research, to examine ethnic differences, and probe race-relations as a function of fisheries (sturgeon) management. From Urquhart's report on fisheries for Manitoba (1872) to the 1920s, statistics reveal increasing development of industrial fishing, with sturgeon fished out of one area and fishing boats moving to exploit new stocks.²⁵ One can get a sense of sturgeon

²⁵ Economic priorities and interests led to the collapse of sturgeon. Canadian fisheries officials were aware of the market demands of the United States and it is possible that they were unaware of the root causes of these demands. However, the Canadian experience mirrors earlier American experiences, for example, "in 1832 Americans began to reorganize the fishery in the Mackinac Straits, curbing Indian fisheries and beginning to sell fish outside the region. Those were ominous changes, since the Chippewa and Ottawas needed the fish for food" (Doherty 1990:9).

population dynamics only after the stocks were exhausted. Why has the Manitoba Department of Natural Resources, Fisheries Branch had difficulties successfully managing sturgeon since the 1930?

It is apparent from this chapter that provincial fisheries officials inherited a fishery in ruins. Biologist D. Hinks (1943:18) concluded that by 1927 the fish was nearing extinction as a commercial resource. I would argue further, based on the advantage of interdisciplinary research into the failure of sturgeon and fisheries management, which Manitoba has not been able to think outside the box of classical fisheries management of sturgeon. Provincial sturgeon management after 1937 followed the same path set by the federal Department.²⁶

Burton (1977:42) identified two major forces in modern natural resource policy in Canada: one is an, "impetus towards exploitation and development... based largely upon the concept of a relatively inexhaustible supply of resources... aimed at correcting regional disparities." The other is the wise use conservationist bias, which is pro-growth, but cautions against wasteful processes. These two forces developed in the wake of frontier resource development, which saw unprecedented changes to the environment. The early sturgeon fisheries policy in Manitoba enabled the growth of commercial companies. Fisheries were managed mainly for foreign markets. The fishery failed because regulations aimed at managing

Many Canadian and provincial fisheries officials were unsympathetic to Native concerns over loss of fish. A mix of arrogance and naivety toward sturgeon and Aboriginal fisheries enabled officials to develop a commercial fishery driven by increasing market demand.

²⁶ The scientific picture of sturgeon has grown, but the application of this knowledge has been uneven. A boom and bust fishery was permitted, perhaps because this was the way resources were predominantly managed. Industry economics outweighed implementing policies based on Aboriginal rights and biological concerns.

access to fish, population size and the like, were not effective. These efforts were largely ineffectual because management served one master: commercialization.

Commercial sturgeon fishing and fisheries management failed to conserve the fish. In Manitoba, successive and cumulative collapses are a significant feature, as is the lack of historical reflection by biologists, and the lack of attention to Aboriginal fisheries. E. E. Prince's statements in 1898 about the value of sturgeon to Blackfoot, to be generous, trivialized Aboriginal management and is indicative of a racial standard followed by Bajkov and others.²⁷ Tough (1999:117) has argued "the state favoured involving Natives in the commercial exploitation of the...sturgeon fisheries, yet the fishery collapsed." This statement is offered by Tough to argue against analysis of sturgeon fisheries that focus on race-relations, citing Holzkamm, Lytwyn and Waisberg (1988) as an example of such analysis. Tough argues that analysis of race-relations misses the economic political history of the sturgeon fishery.²⁸ That Natives participated in the commercial fishery masks the fact that these fisheries developed outside their influence. Analysis of the poor performance of these fisheries through an analysis of race is 'insufficient' for Tough, but one that is none-the-less employed in this thesis.

When historical reflection inform biological fisheries studies it is used to characterize

27 Pinkerton and Weinstein (1995:2) argued that a fundamental difficulty in fisheries management is that these agencies are trained to manage fish species and not people; fishers are seen as predators, not part of management solutions. In this regard, regulations can be made to benefit specific groups (local, community, provincial or national interests), to the exclusion of others. There is evidence of the view of Aboriginal fishers as predator from McQueen (CSP 1885) to Bajkov (1933), and more recently in reports from McDonald (1991, 1994d).

28 Tough (1985:77) has argued, "Indians had limited access and ownership of technology and as such could not

the destructive impacts of the commercial fisheries. Manitoba fisheries biologist Lief Sunde (1959:20) noted,

in Lake Simcoe Ontario the sturgeon has been fished to the point of extinction; from 1881 to 1898 a total of 126,500 pounds were produced, but since then only 1 sturgeon was reported. Lake of the Woods was considered the best sturgeon pool in the world. During the height of the fishery, from 1890 to 1900, over 7,500,000 pounds were taken, since 1900 less than 1,000,000 pounds were produced and since 1920 only 25,000 pounds have been reported.

A characteristic of the science of sturgeon before 1960 is the lack of historical accuracy. After Harkness (1937, reprint 1980) the history and early developments of sturgeon fisheries were taken as a standard and viewed by subsequent fisheries biologists as inconsequential. This is not unique to biologists in Manitoba. For example, Ontario fisheries biologists Harkness and Dymond (1961:76) argued that in Manitoba, "in the Nelson River, where original conditions have been little affected by industrial development, the average catch for the last five years (1955-1960) for which statistics are available is still 13.9 per cent of the maximum catch." It is hard to imagine that these influential biologists felt that by the 1950s the Nelson River was anywhere near "original conditions... little affected by industrial development." Industrial development, such as the commercial fishery had heavily depleted sturgeon populations. This statement is absent of any real historical consideration and it is unfortunate that these scientists influenced policy in Ontario.

Fisheries managers' concerns with historical declines were not concerned with social-environmental relationships. There was never any apparent tension between sturgeon

move to new fishing grounds."

preservation and conservation. It could very well be that the Manitoba Department of Natural Resources, Fisheries Branch, did not consider sustainable use as an issue for sturgeon, although this perspective is certainly apparent in the decade since 1990. D. Ludwig *et al.* (1993:17) argued, “there are currently many plans for sustainable use or sustainable development that are founded upon scientific information and consensus. Such ideas reflect ignorance of the history of resource exploitation.” In order to achieve sustainable development an understanding of resource or environmental history, the nature and tone of exploitation, is essential. To address the sturgeon problem in Manitoba, both the history and science of sturgeon needs to be combined, but this combination alone will not necessarily improve knowledge; traditional environmental knowledge is essential as well.

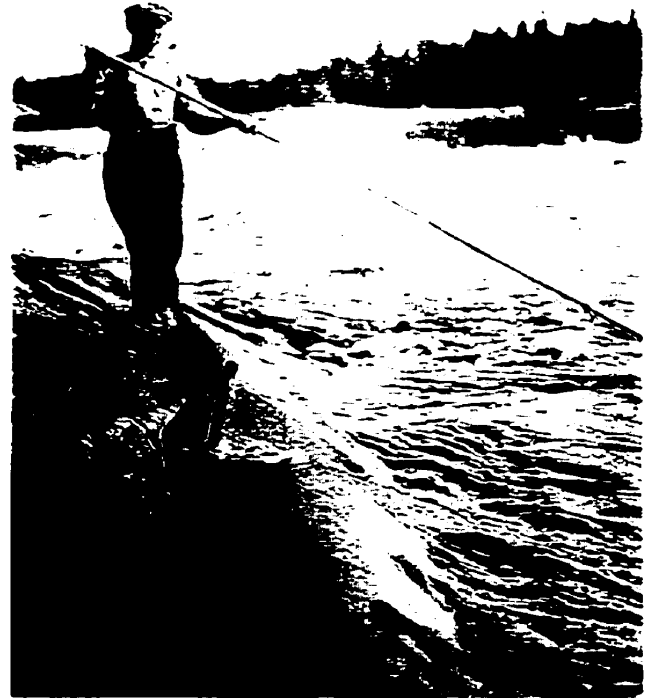
Claudia Notzke (1994:77, citing Berkes 1985) sheds some light on the transformation of sturgeon fisheries with analysis of the “life cycle” of development of a fishery. Generally, Aboriginal fisheries were typically steady-state, “low-level exploitation... utilized communally under some kind of common-property management institution” (1994:78). There is a stage in the cycle when “pressure builds to exploit the resource, not for the benefit of the local community, but for individual profit. The situation may be complicated by population pressure and/or the availability of more effective exploitation technologies” (*ibid.*). It is at this point in the cycle that Aboriginal fisheries are displaced “or marginalized by the movement of more effective exploiters into the [fishing] area” (*ibid.*). Growth is not sustainable and since resources are not under the stewardship of an individual or a collective the original stock of resources is depleted. The only way to sustain this type of development is by finding a

successive supply of stock along a resource frontier or by diversifying resources.²⁹

In 1990, the *Sparrow* decision of the Supreme Court of Canada upheld First Nations exclusive rights to subsistence fish. Although there is some debate about the actual effectiveness of this decision, the Supreme Court's decision meant that provincial and federal regulations do not supersede Aboriginal rights, and government resource managers must show how their regulations accounted for Aboriginal use (Parnesh 1998). Since 1991, sturgeon has been classified a Heritage Species (Manitoba 1991:11). For purposes of management, heritage designation means sturgeon is considered native and "not rare at the present time, are threatened by ongoing and future development... preservation of the future options with respect to these species is considered a legitimate use of the resource" (*ibid.*). Sturgeon management continues to respond to failures, and efforts at regulatory fine-tuning have not benefited from the available local knowledge of sturgeon nor respected Aboriginal rights. In the next chapter, Aboriginal perspectives on sturgeon are gathered to show that alternative, local perspectives still exist to aid in sturgeon management, and that these perspectives would improve and secure the future for sturgeon.

29 Lake Winnipeg was in the District of Keewatin (to 1911) after the Crown purchased the territory from the Hudson's Bay Company, and even then under the political and economic influence of Manitoba (more so with the transfer of natural resources in 1930). This transition was not seamless (Tough 1999). The commodification of resources and displacement of Aboriginal economies caused incredible ecological changes.

Figure 4 and 5. Sturgeon fishing on the Pigeon River (Bajkov 1933:20).



Figures 6 and 7. Sturgeon spawning places on the Pigeon River (Bajkov 1933:21).

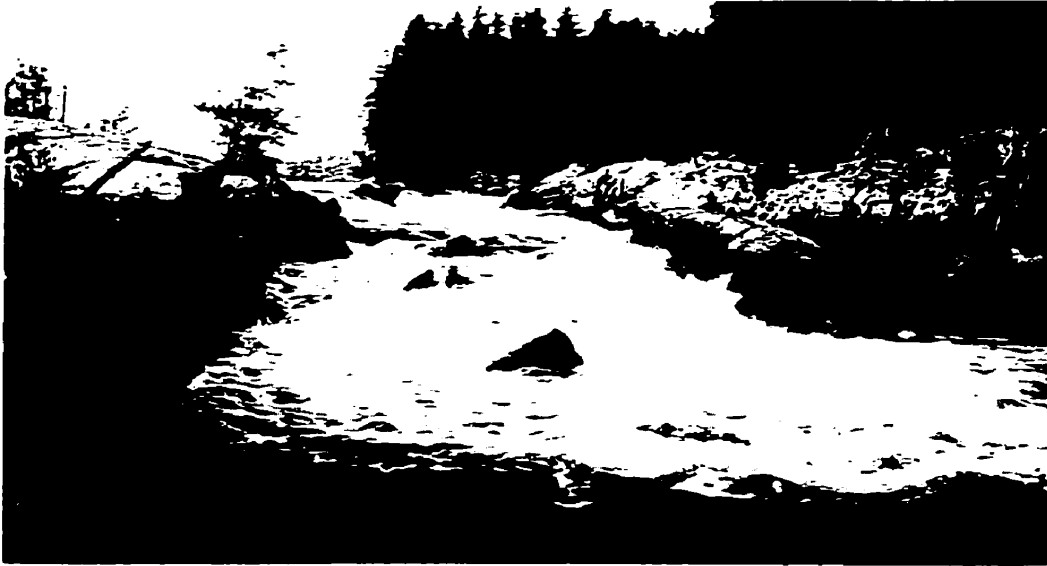


Figure 8. Photographer unknown. *Children standing around fish hanging from tree.*
Dominion City, Manitoba (PAM, Natural Resources Series II 120, n.d.).



Chapter 4

Case Study of Cree and Ojibwe Sturgeon Knowledge

4.1 Introduction and Context

In the last chapter the impacts of jurisdiction and regulation can be read to have displaced Aboriginal fisheries. According to Robert Brightman (1987:120), “management was and is practised by boreal forest Algonquians in the 19th and 20th centuries. These systems (a) could have existed prehistorically, been displaced by historic economic and/or ecological circumstances and subsequently resurfaced; or (b) could have emerged in response to fur trade, undergone subsequent disruptions, and then reappeared.” Arthur J. Ray (1996:xxi) has argued “many of Canada’s Indigenous people define themselves in terms of the homelands that sustained their ancestors.” If the forces of landscape and environment define Aboriginal identity then a good deal can be read from the practices and knowledge generated from subsistence pursuits. Historical environments can be viewed through what is known of human-animal relations and the meaning of land and subsistence as expressed in Aboriginal resource use. Coming from Aboriginal rights arguments are illustrations of practices and resource use, including the use of sturgeon, which compel the state to recognize prolonged and preexisting land tenures and systems of governance. Aboriginal identity is deeply embedded in the notion of homeland and is being articulated by Canadian courts as various rights and title to the land (*Delgamuukw* 1997). Can Aboriginal knowledge be gathered and discussed as traditional environmental knowledge, and to what degree can this knowledge be

taken from its original context? To some degree this chapter, and the next, are shaped by a concern for empowerment of local knowledge in fisheries management, decolonization of Aboriginal sturgeon fisheries.

In a comparison of community fisheries from 32 different societies, J. Wilson *et al.* (1994) did not find a relationship between earth-based spirituality and exploitation taboos. Most “Indigenous societies demonstrated a variety of institutional arrangements, rules and regulations about ‘how’ fishing is done rather than limiting the ‘amount’ of various pieces to be caught. Such societies promulgated rules and regulations at the community of local level over limited areas” (Wilson *et al.* 1994:302). This finding does not diminish the importance of spirituality because many of the institutional arrangements, rules and regulations are supported through customary law that may in fact be imbedded in religious institutions and practices. That earth-based spirituality and exploitation taboos are not relational would indicate a more complex set of relationships is at work in these different fisheries. Traditional environmental knowledge research of sturgeon fishing in this chapter and the next builds on the basic finding of Wilson *et al.* I am interested in understanding the process, institutions, rules and regulations for self and community fishing organization. The research is open to finding deeper meanings, i.e. exploitation taboos; however, it was not the focus of research.

The chapter begins with a discussion of the case study format employed in the fieldwork and methodological considerations, which depend on adaptation of participatory action research methods. Following these two sections are findings from each of the three fieldwork communities. Each of the three sections starts with a brief summary contextualizing

significant influences that have shaped Indigenous fisheries management. The conclusion acknowledges regional differences and differences among individuals within communities. It is argued that the case study approach allows a degree of understanding, which does not negate these differences while still allowing for generalizations from local specific traditional environmental knowledge of sturgeon in Manitoba. It is apparent that a study of Cree and Ojibwe fisheries requires the insights of fishers and other knowledgeable community members, knowledge that can be gathered from interviews with fishers.

4.2 Case Study Format

The research has benefited from a case study approach. Cree and Ojibwe sturgeon knowledge was gathered from representative communities. This section contextualizes community interviews and fieldwork methodology used in each of the three cases. The knowledge represented in the thesis is a synthesis of the knowledge of individuals as representative of community knowledge. These communities represent a storehouse of knowledge about sturgeon and other environmental relationships, knowledge that might very well be lost. The three case study communities were selected from a larger set of nine (Figure 9). Three selection criteria were established: the availability of historic documentation of sturgeon fisheries, community involvement with sturgeon co-management, and the presence of active sturgeon fishers in the community. The original scope of the research was to examine Nelson River communities exclusively. These communities included Norway House, Cross Lake, Split Lake and York Landing, all of them participants in the Nelson River

Sturgeon Co-Management Board. From the four communities on the Nelson River, only two participated in the study. For several reasons, the communities of Cross Lake and Split Lake were not studied. Both funding and time constraints influenced the decision, but of greater importance at Cross Lake was the desire of community members to gather sturgeon knowledge. Similarly, at Split Lake community members instituted their own sturgeon study; it is essential that research be not imposed on communities (Hudson 1982).

In contrast to Cross Lake and Split Lake, Norway House and York Landing were favorable to this study. These two communities represent the most southerly and northerly Nelson River Sturgeon Co-management Board communities. Historically Keenosayo Seepie, Norway House, is one of the longest settled communities on the Nelson River, whereas Kichchiwaskahikanink, York Landing, was formed through relocation of the York Factory band to an upriver location in the late 1950s. Furthermore, York Factory fishermen have knowledge of sturgeon at the northern extent of sturgeon's range. These communities are at the periphery of management, efforts in the 1990s were directed toward dwindling resource.

The third case study community is Sagkeeng, Fort Alexander.³⁰ This Ojibwe

30 Case study at Sagkeeng began as an invitation from Dr. Terry Dick in 1996 to attend the annual summer powwow. The Manitoba Sturgeon Committee funded a five-year study of sturgeon on the Pigeon River and at Round Lake, by Dick, which included interest in gathering Ojibwe TEK at Sagkeeng (Hannibal-Paci 1998c). In discussion with Donovan Fontaine, Sagkeeng Band Administration, December 1997, the fieldwork methodology and semi-directive questionnaire utilized for study of Cree TEK at Norway House and York Landing were adopted. Interviews were conducted during the winter of 1998. Formal co-management did not take hold at Fort Alexander and so this line of question was modified. With this modification it was decided it was important to gauge the opinion of fishers regarding aquaculture. A significant research interest for Dick (pers.com, 1997) was whether or not Sagkeeng fishermen would support sturgeon-culturing efforts for conservation/management, economic development, and personal opinion about eating these fish. Funding was through Dick and the Manitoba Sturgeon Committee. Sagkeeng First Nation supported the research.

community was involved in the first formal co-management agreement in Manitoba (1992). They have pursued informal arrangements since 1993. These three communities enable comparisons and some assessment of formal and informal management arrangements can also be made. In addition, comparing Cree sturgeon knowledge with that of the Ojibwe grants an opportunity to locate traditional sturgeon knowledge trends for Manitoba.³¹ Furthermore, the Winnipeg River fishery was impacted by development much earlier than the Nelson River and questions regarding adaptation, continuity of knowledge, persistence, and colonization, can be asked when discussing sturgeon fisheries in this comparative manner.

4.3 Fieldwork Methodology

Don MacDonell (1997) studied the traditional environmental knowledge of sturgeon held by three Bayline communities (Pikwitonei, Thicket Portage and Wabowden) for the Nelson River Sturgeon Co-Management Board. MacDonell's questionnaire format was roughly followed to ensure continuity and comparability, minor improvements included re-tooling the questions to be semi-directive (Appendix E).³² The number of questions was reduced, to guard against informant fatigue. A general blueprint of prior traditional

31 Tradition is not a static replication of past actions, beliefs and attitudes. It means that esthetics; processes and institutions originate from older sturgeon fishers, and are adapted to experience and environmental variables. Knowledge is used through a cultural paradigm; more than facts, but also relationships, esthetics, ideology, cosmology, and spirituality.

32 In addition to the questionnaire sturgeon related images were used. These representations ranged from pictures of artefacts to historic images and events. The objective was to share the material with informants and possibly gain further responses. At the end of each interview the images were shown and stimulated discussion.

environmental knowledge studies (Nakashima 1991, Johnson 1992, Berkes et al. 1997) guided the methodological adaptations of MacDonell (1997). Questions specifically about co-management and aquaculture were added.³³

Field research procedure followed three stages. After receiving ethics approval from the University of Manitoba, the respective Chiefs and councils were contacted by letter, which included the interview questions. The letters asked permission to conduct research, stating the nature of the study and the researcher's affiliations (Appendix D). Letters were followed up with faxes and phone calls. With guidance from Band officials, a community research assistant was selected. This person was indispensable, playing several roles, as well as lending community credibility to the study.

The main individuals selected for interviews were loosely described as senior or experienced sturgeon fishers. The advice of the community research assistant, along with the recommendations from those previously interviewed, guided the selection of interviewees. An oft-heard remark at the end of an interview was that this other person had "lots of sturgeon knowledge" and should be contacted. The goal of gathering knowledge from representative community members meant that pre-set or a random sample is inappropriate. Those who were interviewed represented a sample that was established through discussions with community members. Elder community members were selected for being known as knowledge holders and experienced sturgeon fishermen. The basic sample guide was that interviews were

³³ In the case of Sagkeeng, questions regarding sturgeon culturing were added because accessing fishers' attitudes towards cultured sturgeon were important to the on-going conservation and rehabilitation of Winnipeg River

conducted as long as there were people in the community to talk to.

As a show of respect, the community research assistant introduced the research to key informants. Respect was also conveyed by immediately taking boots off and putting on moccasins when entering either band office or home. After describing the study, the nature of the questions, the researcher affiliation, and funding agent, respondents were asked for their verbal consent to be interviewed. Informants were then given tobacco and the interview was initiated. Tobacco was both symbolic and an appropriate cultural gift to initiate the sharing of knowledge, a further sign of respect. I should caution that tobacco does not have the same significance with all First Nations or even with individual community members. Respect is fundamental to research involving First Nations. As outsiders to a community, regardless of our affiliations, we learn as guests from a person with knowledge. This is not to mask ethnicity and indeed cultural context is lost to outsiders, especially when context is lost due to differences in languages. However, the starting point to acknowledge research as learning also requires understanding that researchers often ask questions outside the normal Aboriginal ways of learning.

The appropriate steps to the community fieldwork begin with the researcher, most often in conjunction with community members, designing and implementing a research protocol. This methodology approximates Participatory Action Research (PAR), but is not fully community-driven (Maguire 1987, Ryan and Robinson 1990). PAR's basic participatory nature is subsumed under a pre-established historical approach, driven by need for information

about a specific environmental relationship. In this case, the viability of sturgeon is threatened, domestic harvest information is lacking, and the knowledge of the sturgeon-Cree/Ojibwe relationship is incomplete. TEK fieldwork methodology addresses information gaps, generating knowledge for sturgeon conservation efforts in Manitoba.

The semi-directive questionnaire format is a suitable method of gathering traditional sturgeon knowledge. The semi-directive format allows for conversations about sturgeon and the flexibility for elaboration of information where appropriate. When discussing the semi-directive interview format Huntington (1998:238) noted, “the participant or participants are guided in the discussion by the interviewer, but the direction and scope of the interview are allowed to follow the associations identified by the participant.” This approach suspended the formality of research and was readily accepted by those interviewed, thus supporting the claims by Huntington and others. What is required for this approach to work is a conversational approach based on rapport and respectful learning.

Interviews were conducted with the assistance of a community research assistant. This person was both a respected senior community member with knowledge of sturgeon, and fluent in Cree or Ojibwe, and English. The interviews were conducted in the language appropriate for the informant and some chose to speak English, in which case the community assistant often played a lesser role in conducting the interview. At Norway House and York Landing, interviews were undertaken in consultation with the community representative on the co-management board. At Fort Alexander, consultation was through the Environment Directorate. Subjects were primarily community members who were active sturgeon fishers,

who were historically involved with commercial sturgeon fishing, or who were known to have significant knowledge of sturgeon. Whenever possible interviews with resource managers and scientists were also conducted informally.

Questions covered several key areas of knowledge: habitat, fishing techniques, significance of the sturgeon as community resource, and the social and cultural significance of sturgeon. Interview questions regarding practices and traditional harvest limitation methods, asked:

- When and where one fished
- How often one fished
- What fishing techniques were used
- What fishing was like
- What the fish were used for
- What the average catch and sturgeon size were

In addition to these questions regarding fishers' knowledge of sturgeon behaviour, semi-directive interviews sought to gather stories and myths related to sturgeon. Here the greatest deficiency is evident. No myths and only a few anecdotal personal stories were gathered. Several important issues became apparent following the verification or post-interview research stage in the three study communities, including:

- Have the relationships to sturgeon changed over time and how
- Are there fundamental values that inform or guide the ways in which fishers interact with sturgeon and are there institutional structures to ensure continuity of these values

- Do Indigenous knowledge and scientific knowledge complement or are they separate and competing systems

Following the field study, a written report of the interviews was sent to each community acknowledging their contribution and depositing in the community a written account of the study. In the case of the Nelson River Sturgeon Co-Management Board, reports were deposited with them to ensure the Board had access to this information. About a year later the communities were revisited for verification of information (Hannibal-Paci 1998a,b, c).

The interviews were recorded by hand. Video and audiotapes were not used because of the potential problems of incrimination and anonymity. There are obvious advantages and disadvantages to this approach; the most significant is that the record is interpreted. For cultural revitalization, the original interview is unfortunately lost. Such loss is justified in that consent was contingent on the assurance of confidentiality. Those interviewed would not be directly linked to any documented comments. This approach protects individuals and it masks the fact that knowledge is coming from several sources. Confidentiality is imposed to protect individuals because of the unique conditions surrounding these fisheries. Many of those interviewed considered this a novel opportunity to have their knowledge brought together in a research study. After the interview a book of sturgeon representations, maps, pictures and paintings was shown to the respondent and these often garnered further responses. In order to show appreciation and respect for the interview, an honorarium was given. Many respondents were surprised with this and it always ended the interview on a positive note.

The interviews were in effect, reconstructed and translated into English, as they were conducted. Responses to questions asked in Cree, Ojibwe or English were given in Cree, Ojibwe or English. The community research assistant translated into English. A more respectful and responsible approach would have been to preserve the interviews on video or audiotape for future study and education purposes. However, the confidential nature of the interview and possible repercussions from discussing the sometime illegal subject matter made this unrealistic, unfortunately this constrained the thesis research. Gathering sturgeon knowledge was not intended to be the documentation of ethnohistory or ethnography of informants. Such research if performed respectfully, would be an excellent exercise, and would mesh well with community desires to document elders' knowledge for purposes of cultural continuity and revitalization. Each approach has its place and the ultimate utility of the research was for the better management of the sturgeon fishery (as well as understanding what management has done, or failed to do for First Nation communities).

While comprehensiveness was desired, not every person with sturgeon knowledge, not every fishing community, were contacted. There were three selection criteria for fieldwork communities. First, the communities chosen had expressed support for the fieldwork. There was a conscious decision not to impose research on a community, even if it may be debated that academic research is always imposed to some degree. Second, each community had already participated in co-management and had to have active sturgeon fishing. It was felt that there needed to be some similarity between communities in order to gather traditional environmental knowledge for the object of its application in management

broadly. Finally, each community needed to have a body of accessible historic documentation. Archival and published historic material served as essential background to the scientific material. The fishers and communities who participated in research were in many ways both unique and representative of a larger community.

The separation of fisher “men” from women, children, elders, and others from a community misrepresents traditional fishing practices. Interviews revealed that traditional fisheries were a holistic community activity, and even up until the 1950s the whole family participated. As it will be shown in this and the next chapter, the separation has resulted from influences of the commercial fishery, fisheries regulations, and other social constraints such as the *Indian Act*.

The interviewees did not present themselves as Indigenous knowledge holders. Each person’s knowledge is patched together. Like a cognitive quilt community knowledge comes from members who hold a portion of the overall knowledge of the local environment. Together the knowledge represents a community resource held by individual elders and traditional institutions. The normal transmission of this knowledge is through oral tradition and doing. One facet of TEK research is documentation into maps, tables, videos and the like. This transition in medium is a result of the tenuous transmission to subsequent generations, especially in light of rapid social change occurring in many First Nations communities (Ohmagari and Berkes 1997). While environmental and resource pressures experienced by Native communities require adaptation, change is manifest in many ways and the research and application of TEK in resource management and land use planning is only one form. “So that

Elders' knowledge will not be lost forever" was often repeated during interviews.

Several groups were underrepresented in the interview process, namely young people and women. The exclusion was in part a result of bias in the questionnaire, and the preference of the study assistants to favor interviewing older established male community members, "those who know sturgeon." Questions tended to be aimed more to active commercial and sturgeon fishers. Most young people, those people under 25 years of age, had never participated in sturgeon fishing, certainly not in the commercial fishing of sturgeon, nonetheless they may hold important knowledge which was one not gathered during this research. Similarly, women were not interviewed; however, they may also hold vital knowledge that could improve management. It was made clear from the interviews that women did not participate in sturgeon fishing as much as they did in its processing. It is essential to note that historical documentation and interviews stress that traditional and the early phases of the commercial sturgeon fisheries involved whole families. The collective role of women was important to sturgeon fishing and further interviews with women are important. In addition, the three villages have significant Métis communities in close proximity. Métis were not specifically targeted for interviews. Although they hold extensive knowledge of sturgeon (MacDonell 1997), their participation in the sturgeon fisheries is difficult to study. While Aboriginal fisheries have gained legitimacy after 1982 (*Canadian Constitution*) and since 1990 (*Sparrow*), a specific test of Métis fishing rights has not been made.

Information gathered from the interview process is summarized in Tables 2 to 15. The

21 respondents were males of, on average, 64 years of age (Table 2). Sixteen respondents had been involved with the domestic fishery since being young adults (in the years 1930 to 1950) (Tables 3 and 4). Sixteen had learned to fish from older relatives including older women relatives (Table 5). The variety, names and descriptions of sturgeon fished are situated knowledge and no generalized comparison was made among communities (Tables 6 and 7). At Norway House there is one predominant kind of sturgeon, at York Landing there are two and at Sagkeeng there are three types of sturgeon distinguished by fishers. These variations aside, at both Norway House and Sagkeeng sturgeon ate the same range of insects and benthic invertebrates, while sturgeon's diet was not known in York Landing (Table 10). There was general agreement among respondents on the types of sturgeon preparation (Tables 8 and 9). The depth of knowledge held by fishers at Norway House and Sagkeeng was greater than for fishers at York Landing; however all communities noted expressions of respect towards the fish (Table 11). In all three communities an extensive sturgeon harvest area is still used albeit to harvest less fish (Table 12). It was determined during interviews that the family fishing area was a significant mode of organizing the traditional fishery before 1960 (Table 13). The impacts of hydro development are seen as the single greatest determining factor in the decline of sturgeon in all three communities (Table 14). Fishers from the Nelson River were split on the question of whether co-management was working and on the Winnipeg River individuals held no strong opinion about such an approach (Table 15).

TEK research responds to a perceived and real crisis. Management has failed to conserve sturgeon. First Nations now have more rights to fish, protected by the constitution

and affirmed by Canadian courts. The knowledge of Aboriginal fishers has been largely ignored, but in light of these two conditions mentioned above, there is greater interest to include Indigenous knowledge in management, whatever that might mean (discussed in chapter 6). Aboriginal sturgeon fishermen were interviewed and so part of their experience is abstracted and reapplied to management questions. The relationship between fishers and fish was discussed and interpreted as data on fisheries management. Traditionally, knowledge is attained through experience; that is a younger person would learn about sturgeon from older community members and by going out and fishing and doing other activities relative to sturgeon fishing. Rather than going out on the water to participate in sturgeon fishing, interviews were conducted in the homes of fishermen. A significant reason why this research was not conducted on the water is that sturgeon fishing is “illegal.” Taking an academic researcher out to fish serves no real benefit to Aboriginal fishermen. Research was also conducted in the fall/winter, respecting the availability of fishermen and the respect for the seasonal restrictions on the telling of sacred stories. River trips were infrequent, mostly to note historic habitat, fishing sites, and to experience environmental changes. In the remainder of this chapter Cree and Ojibwe sturgeon knowledge from Kichchiwaskahikanink (York Factory First Nation), Keenosayo Seepie (Norway House First Nation) and Sagkeeng (Fort Alexander First Nation) is presented.

4.4 Kichchiwaskahikanink (York Landing-York Factory)

York Factory is located at the confluence of the Hayes and Nelson Rivers, on the

west shore of Hudson Bay. Tough (1996) argued that structural changes to the north-west trade during the 1870s relegated York Factory from the HBC's main entrepot to that of a trading post, a considerable downsizing and loss of opportunity for York Factory Cree. The structural changes at York Factory meant the Cree no longer were required to fill the many roles necessary for inland trade. York Factory had formally asked for Treaty "privileges" as early as 1879, and was eventually included under Treaty 5 adhesions, August 10, 1910. Among other things, Treaty 5 guaranteed each family of five, 160 acres of land and Aboriginal fishing rights. The residents of York Landing were relocated at the urgings of the Federal government and the HBC post was closed in 1957 (Figure 10). The Cree were mainly relocated to the southeast shore of Split Lake, 250 kilometers inland from the Bay.

York Landing people continue to utilize traditional resources along the Hudson Bay coast, as well as utilizing the reserve area on the shores of Split Lake, and other "lent" trap lines supplied by the Split Lake band. Currently there is an on reserve population of 400. At the end of September 1997, the band was in the process of constructing six new homes and a new arena. A year later the community was in the process of building another ten houses and a six-unit motel. The school and Ripple River store-restaurant (including CD jukebox) are additions to the community. Saturday afternoon Bingo played over the local radio transmitter is enjoyed by most of the community.

The main resources used at York Factory, gathered during interviews and listed here with spellings that reflect common usage in the community, included *attik* (caribou), *wawao* (snow goose), *niska*, *apish'chishkish* (Canada goose), *ininis sipi* (mallard duck; Faries 1938

lists *eyinesip*), *wabush* (snowshoe hare), *osowusk* (ruffed grouse; Faries 1938 lists *puspuskew*), *amisk* (beaver), *mooswa* (moose), and *wabbusk* (polar bear; Faries 1938 lists *wa'pusk*). Aquatic resources played a lesser role in subsistence and trade activities than is common for inland Cree. The fall spawning run of *attikamek* (whitefish), *ukaau* (pickerel), and spring spawn of *nameybin* (sucker) and *namaew* (sturgeon) were significant. Whaling *wa'pumak* (beluga) played a lesser role than did taking *ahkik* (seals).

The seasonal pattern followed by many York Factory Cree (pre 1956) involved winter dispersal to distant hunting and trapping grounds, late winter-early spring caribou hunting and sealing. Spring goose hunt and both sealing and whaling on the seacoast complemented activities at the Fort after breakup and into the summer. Summer was a time of gathering wild plants and both fishing and opportunistic hunting of small and big game. Fall was a time of goose, waterfowl and caribou hunting, as well as sealing and whaling. Some would live most of the year away from York Factory, return to trade furs, provisions and participate in whatever labour opportunities were presented. The Cree applied an opportunistic approach to game, taking resources that made themselves available regardless of the season, and for instance *attik* was hunted all year long. These subsistence patterns changed a great deal with inland relocation to Split Lake. In order to understand this change it is important to understand something of the economics of York Factory.

Helen Fast (1996), borrowing heavily from historical geographer Victor Lytwyn (1993), provides the most detailed examination of York Factory resource use to date. They distinguished between *Upland and Lowland Indians*, the latter group being composed of

coasters (homeguard) and the former of *inlanders* at York Factory. The two groups pursued separate cultural activities influenced greatly by geography. According to Fast, a lack of documents led her to carry out extensive oral histories for the 1900 to 1957 period, from which five groups of people were identified as comprising the York Factory band. York Factory informants discredited the conventional view of resource scarcity, with most recalling a steady and ample supply of game in all seasons (Fast 1996).

Beardy and Coutts (1996) were able to gather elders' stories about fishing with nets and weirs that support Fast (1996) and Lytwyn (1993). A variety of harvesting technology was used. Fast (1996:100) wrote, "the lowland Cree used nets, spears, hooks and weirs (traps or baskets) to catch them [fishes] by the hundreds. Gill nets were used throughout the year in many locations, with drag nets being used only when there was no ice." On the subject of sturgeon, Fast is noticeably silent and this is consistent with community claims that sturgeon was not a major resource. This is not to say that community members did not use sturgeon; for instance sturgeon were eaten fresh, dried and smoked (1996:129). At York Factory the waters are brackish, with the content of salt water dependent on the tide. At low tide there is a flush of freshwater entering the Bay and on high tide there is a greater influx of salt water into the mouths of both the Nelson and Hayes rivers. Sturgeon is a freshwater fish that can stand brackish waters for short periods.

The move to York Landing was significant. The usefulness of the knowledge gathered and passed from generation to generation about the arctic climate, saltwater coastal resources, aquatic, avian and terrestrial migrations, was not as relevant to the inland

environment. From interviews it became clear that at York Landing the people had to re-learn how to support their families. Those who had been trappers had to borrow traplines from Split Lake trappers because relocation did not include adequate allocation of Registered Trap Line (RTL). That they prospered is testament to the adaptation of their traditional knowledge. Another significant impact on the Cree at York Landing was the completion of the Kelsey (1960) and Kettle Rapids (1966) generating stations, and the Lake Winnipeg outflow and Churchill River diversion (1976).

This study was the first effort to gather York Factory/York Landing knowledge of sturgeon. A written report, "Cree Knowledge of Sturgeon: York Landing", was sent to the community in January 1998 (Hannibal-Paci 1998a). In October 1998, a community visit was made to verify contents of the report and no other knowledge was gathered from community informants. Consultation was important in returning the research to the community, verifying results and encouraging future studies.

4.4.1 Cree Sturgeon Knowledge at York Landing

This section summarizes the interviews conducted at York Landing. Most of those interviewed claimed not to know much about sturgeon. Rich and detailed recounting of sturgeon fishing often followed this statement. In follow-up consultation, community members indicated that those interviewed were the most active sturgeon fishers and that others would not add significantly to the knowledge of sturgeon gathered by the study.

York Landers, the term commonly used in the community, began catching sturgeon

in 1958. While most fishers talked about catching at least one sturgeon on Split Lake, they cautioned that sturgeon was never caught in the same spot again. Community members did not go fishing specifically for sturgeon. Not one respondent reported using sturgeon nets with any regularity. Mostly sturgeon was fished with 5 ¼-inch whitefish nets. This is not surprising since at York Factory few people fished for sturgeon. Elders found live sturgeon along the Bay coast as far as the Matchi River during a visit to the Bay in 1996. Elders noted that freshwater sturgeon “could not survive the salt water too long” (field notes, York Landing, 1997). In the past sturgeon were readily caught in the Port Nelson area. Mostly, York Factory fishers would travel up the Hayes River for sturgeon and the largest caught by York Factory fishers was eight feet long.

During the interviews, sturgeon behaviours and life history characteristics were not noted in great detail. Most respondents had not observed spawning, and had only seen small sturgeon as recently as the fall of 1997 when one was caught near York Factory. Although lacking detailed knowledge of life history characteristics, York Landers add to the overall knowledge of sturgeon by noting such things as the quantity, size and locations of sturgeon at the margin of its northern range. Big fish averaged from four to eight feet in length. Mostly York Factory fishers caught whitefish, pickerel and pike. Community members spoke about resource harvesting activities at York Factory which were vastly different at York Landing. For instance, all the knowledge and skills for whaling and other coastal activities on Hudson Bay were no longer needed inland at Split Lake. York Landing is the only study community where some still knew how to make sturgeon nets. Most fishers elsewhere and in the

community have lost net-making skills because nets are commercially available. Net making was inter-generational knowledge that fit and supported other cultural activities. Such skills were relevant prior to the influx of imported nets.

Besides the use of nets, fishers were historically familiar with the use of setlines, a technique used to a great extent in the Jackfish Island area (Figure 11). One respondent noted, “below the island there was a creek where it was said that sturgeon spawned,” this is where “hangers” were set (field notes, York Landing, 1997). In addition to nets and setlines, spears and fish traps were used. Spear construction varied from the detachable harpoon head to fixed spears (see Appendix A). Simple fishing spears were constructed from carved spruce; “the tip would be fire sharpened-hardened and it would take teamwork to bring in larger sturgeon in this manner” (field notes, York Landing, 1997). Traps would be built in rapids, an efficient fish capture method. Fishers recalled trap locations near Churchill for suckers and the use of weirs near Kaska. Weirs were more complex constructions than traps. A weir would bridge the middle of the river, using wooden poles and rocks. Fish traps were located nearer to riverbanks, while some were maintained seasonally by a single family, others were kept up with the cooperation of different community members.

Many of the set locations along the Nelson and Hayes Rivers are historic. For example, respondents noted that at a creek below Jackfish Island, sturgeons were found in greater abundance, especially when the water was low. The conditions of rivers and streams have changed noticeably since the construction of Limestone dam in the 1970s. Three well known sturgeon sets are: on the Hayes River, at the confluence of the Fox River; and at the

first falls below Seal Island; and at Black Water, 15 miles inland.

After resettlement, fishers often traveled upriver to fish sturgeon below Limestone. Family fish camps were no longer common after resettlement, and fishing trips were organized informally. According to informants, partnerships were formed “between hunting partners, family members, older community members with boats and younger men wanting to go fishing and York Landing people with other people from other communities” (field notes, York Landing, 1997). The latter arrangement sometimes provided access for fishermen from one area to harvest in an unfamiliar area. In other words, community control over an area was to some extent a function of each community/fisher’s ability to maintain local knowledge of where sturgeon had been available in the past, what conditions had changed and therefore what degree of success was likely.

Sturgeon fishing was never formally structured by rules. Commercial fishing and fisheries regulations did little to change the knowledge required to find sturgeon and the ways in which sturgeon were fished on the upper Nelson River. Fishers even mentioned that “the permit system was good because it ensured a well-kept net” (field notes, York Landing, 1997). On the other hand, Manitoba Hydro developments did produce noticeable changes in how fishing was structured. With decreasing abundance and changes in habitat and water flows, sturgeon were harder to find.

Before 1992, the average fall harvest of sturgeon was reported to be approximately 32 fish per party of two. Respondents stated that there were not more than five sturgeon fishing parties per year. Two or three fishing parties would, in an average year, make the trip

for sturgeon. These fish would be brought to the community and distributed. Larger sturgeon would be portioned while smaller ones were halved. Portions were given to elders as gifts and sturgeon was also bartered for. While no one said that it was sold by community members to others in York Landing, some fishers received cash to cover basic costs. Sturgeon was brought into the community from time to time by nonresident fishers. For instance, “in 1989 a Split Lake fisher had shared sturgeon with elders at the Seniors Complex and with other community members” (field notes, York Landing, 1997). When asked about sharing, fishers stated they “shared even with people they didn’t like” (field notes, York Landing, 1997). It would be naive to suggest that the fish were always shared. For instance, “the fish could fetch ten dollars a pound, two dollars a head, at Gillam. Split Lake fishers would also sell sturgeon at York Landing, and for twenty dollars, three or four pounds could be purchased” (field notes, York Landing, 1997). York Landers have not been significant participants in the Nelson River commercial fishery.

Changes in the structure of Cree fishing at York Landing demonstrates adaptation rather than the loss of Indigenous knowledge. Children learned to fish by fishing with older experienced relatives who showed them good set locations and how to fish in creeks and “good place like back eddies” (field notes, York Landing, 1997). Fishing skills, such as net making, traps and weir construction were transferred to younger people.

Fishers talked about really enjoying the taste of sturgeon. An oft-repeated comment was that “younger people do not want to eat it” (field notes, York Landing, 1997). Older community members wasted very little of the fish. For instance, the head, mouth, notochord

and innards (liver and stomach) were considered delicacies. Sturgeon would be “boiled, cut into pieces with fins and scutes removed, while the skin was left on” (field notes, York Landing, 1997). Sturgeon oil was not saved and most did not eat the roe (caviar). The flesh was also “smoked at fishing camps ensuring it kept during transportation” (field notes, York Landing, 1997). The fish would be “halved and hung using pine or spruce over a smoking fire for four hours” (field notes, York Landing, 1997). Sturgeon dripped a lot of fat and caution was advised when smoking it. Stories about smokehouses burning down, while rare, reflect opinion about a person’s ability or lack thereof. When consumed, “smoked sturgeon would be boiled fifteen minutes” (field notes, York Landing, 1997).

Most fishers noted that “it is important to show respect to sturgeon” (field notes, York Landing, 1997). Respectful fishing behaviour was shown by being “careful not to spill blood,” which would drive other sturgeon away (field notes, York Landing, 1997). Equally, when fish were cleaned on shore the wastewater was thrown in the bush and not in the water. Only one fisher dismissed respectful behaviour; “there was no way to show respect or disrespect” (field notes, York Landing, 1997).

When asked how communities could ensure sturgeon for the future, most respondents believed that hatcheries would be the best way of making sure there were sturgeon in the Nelson River. In contrast, only one fisherman believed that sturgeon needed to be “left alone and that it would eventually come back without human interference” (field notes, York Landing, 1997). None of those interviewed talked about sanctions against playing with fish (for example, catch and release), a common point raised by anthropologists (Tanner 1979).

Fishers' desire to leave sturgeon alone reflects a common non-interventionist view held by Cree fishers (Berkes 1999). Co-management is not well understood. A minority view held by respondents was that communities on the lower Nelson River are "still fighting with Hydro and Natural Resources" (field notes, York Landing, 1997). For Cree at York Landing personal experience is what matters. Those who had never attended a co-management meeting claimed no basis for assessing the value of the process.

York Landers have carved out their own place on the shore of Aiken River. As a community they are growing, building new homes and infrastructure along the dirt roads that wind through a diverse and thriving community. Although it has not been quantified, it appears that the mixed-subsistence economy ebbs and flows with the redistribution of country food, a significant supplement to the cash economy. The community values individuals and families that are able to add to the overall good of the community with sturgeon harvests. Those who hoard and do not share are not highly esteemed. Young people who show no respect are ignored.

The adaptation of local knowledge over the next few years will be an issue faced by community members. Most respondents claimed not to be passing on their sturgeon knowledge to their children. However, aside from capture methods, the distributive side of sturgeon use is still based on traditions of sharing. With the resettlement to York Landing, York Factory Cree have dispersed with some now living at Shamattawa and Fox Lake. Future research should be geared towards gathering sturgeon knowledge from Cree in these two communities. York Landing Cree have adapted after re-settlement, learning about sturgeon

fishing from Cree at Split Lake, Ilford, Fox Lake, and Gillam.

York Landers still have strong ties to the York Factory resource area and York Factory is not only a historic site; it is a living community. York Landing has purchased a lodge at York Factory for community use, teaching children about life on the Bay and linking elders to their ancestral region and lifeways. The lodge will serve several purposes: as a wilderness camp, as a key institution toward self-governance, a focus for traditional justice system initiatives, and as a venue in which Indigenous knowledge and elders' teaching can be sustained. Such initiatives respond to suppression of traditional teachings, suppression attempted through resettlement.

4.5 Keenosayo Seepie (Norway House)

Keenosayo Seepie was a seasonal fishing region for Swampy Cree in archaeological time 5-6000 years ago, or as the Cree say, "since time immemorial" (Figure 12). Beginning in the late 1780s, and for the next hundred years, the location called Norway House by the Hudson's Bay Company (HBC) was an important fur trade location. By 1821 it was an important meeting place for the HBC, Council of the Northern Department. After the HBC amalgamation with the North West Company, Norway House remained an important trade depot and administrative center. Little has been written and published about the Norway House Cree when compared to the amount that has been written about Norway House.

According to Tough (1996:23), in the 1840s the HBC, influenced by the Methodist mission, separated the Cree into "Wood" and "Village," the former being Cree at Cross Lake

and the latter those settled at Rossville. One result of Tough's analysis, is the demonstrated link between Cree subsistence activities and HBC profits. Domestic activities were retooled to meet the needs of the fur trade and resources were commercialized in the process. The pressures for Treaty in 1875 resulted after the HBC monopoly collapsed. Many factors lead to changes in the regions' ecology and a significant variable is Cree participation in the staples economy of fur and fish.

Writing a history of Grand Rapids, Manitoba, McCarthy (1988:19-20) found "Norway House Cree, who had lost their employment in the HBC boat brigades on the Hayes River, asked for a reserve at the Grassy Narrows on the west side of Lake Winnipeg." Fishing was important to the Cree at Norway House and according to McCarthy (1998:22), Lieutenant-Governor Alexander Morris "denied the band Grassy Narrows as their reserve, since it had been assigned to Icelanders. He substituted Fisher River." Fisher River provided suitable access to fisheries. The traditional economy at Norway House continued to be mixed (wage and subsistence) and based mainly on subsistence rounds; Cree participated at the periphery of the national (commercial) economy.

In a study of economic development, Bird (1984:6) argued that traditional pursuits at Norway House declined during the inter-war years. Before the First World War trapping was a way of life for 75% of the year, family groups traveled and trapped together. He noted that "distribution was community-oriented . . . a natural part of sharing and caring for friends and relatives" (1984:7). According to Bird (1984:15) the traditional economy collapsed because of "Treaty 5, white man's diseases, family allowance [1945], residential schools, and

settlement at Norway House,” legal restrictions on trapping (1943) and fishing (1957) for conservation, the introduction of social assistance and welfare (1954). The examination of sturgeon TEK at Norway House supports some of Bird’s claims and not others. Berkes (*et al.* 1994:351, 359) contends “even aboriginal people themselves differ on the suggestion of whether the traditional economy is ‘healthy.’”

At Norway House the list of main resources traditionally used, as noted by community members, while not exhaustive, included *niska* (Canada goose, Faries 1938:88 spelling is *Nis'ku*), *wawao* (snow goose), *sisip* (ducks, Faries 1938 spelling is *sese'p*), *wabush* (snowshoe hare), *papaskuw* (ruffed grouse, Faries 1938:90 spelling is *puspuskew*), *amisk* (beaver, Faries 1938:19 spelling is *U'misk*), *w'chashk* (muskrat, Faries 1938:125 spelling is *wu'chusk*), *mooswa* (moose, Faries 1938:122 spelling is *mooswu*), *apishchi'mosus* (white-tailed deer. The closest to this spelling in Faries 1938:55 is *upistomoosos*, which means jumping deer), *athik* (caribou. Faries 1938:36 spelling is *utik*, for barren land cariboo), and *muskwa* (black bear). Aquatic resources played a significant role in subsistence and trade. The fall spawning run of *attikamek* (whitefish), and spring spawn of *namao* (sturgeon, Faries 1939:188 spelling is *numa'o*, *numa's* for small sturgeon), *ukaau* (pickerel, Faries 1938:139 spelling is *inuchwa'pes*, *oka'w*), and *nameybin* (sucker, Faries 1939:190 spelling is *numa'pin*) were important resource times. *N'toknsew* (northern pike, Faries 1938:138 spelling is *kino'sao*, *nuchwa'pao*), *otunipi* (tullibee), *melato* (maria), and *maney'nameybin* (carp, Faries 1938:36 spelling is *numapin* or *numabil*) were landed all year.

A generally accepted seasonal pattern followed by some Norway House Cree can be

reconstructed from the historical literature (Tough 1996). This pattern involved winter dispersal to hunting and trapping grounds, late winter-early spring caribou hunting, spring goose hunting. Activities after breakup and the summer at the HBC Fort included gathering wild plants. In the fall goose and moose were hunted. Some Cree lived most of the year away from Norway House, only returning to trade furs, provisions, and participate in labour opportunities that became available. The construction of York Boats is one example of the specialized skills that people developed. Boat building became redundant in the transition to imported freighter canoes, steam, rail, air and road transportation. The importance of location within the fur trade provided a niche for Norway House Cree. As well as participating in the fur trade economy, the people took an opportunistic approach to game.

The knowledge gathered and passed from generation to generation about climate, aquatic, avian and terrestrial migrations, was not abruptly changed by the fur trade. At Norway House, people supported their families by trapping, hunting, fishing and with small-scale farming. Community members also participated as workers, first in the fur trade as boatmen, guides, manufacturers of country food and other goods, and later in commercial fishing, logging, and in other development projects, such as the construction of roads and hydroelectric dams. Norway House prospered because of the adaptation of traditional knowledge. It was apparent during fieldwork that similar to changes at York Landing, hydro developments since the 1950s have impacted local knowledge at Norway House.

There are no documentary records available about the importance of sturgeon to the Cree, although there are HBC records for trade in isinglass from 1832 to 1891, and

commercial records for the Nelson River fishery beginning in 1907. Sturgeon has been, until recently, an important resource in the Norway House area. A written report, "Cree Knowledge of Sturgeon: Norway House," was sent to the community in February 1998 (Hannibal-Paci 1998b). In October 1998, a community visit was made to verify the contents of the written report and no other knowledge was gathered from community informants. Unfortunately at least three knowledgeable fishermen were busy with the fall whitefish harvest and were not interviewed.

4.5.1 Cree Sturgeon Knowledge at Norway House

At Norway House, the five respondents consulted held rich and detailed knowledge of sturgeon fishing activities. In follow up consultation, community members indicated that there were other active sturgeon fishers who would add to the knowledge of sturgeon gathered by the study. As such, future study should be geared to contacting five to ten more Norway House sturgeon fishers, both Cree and Métis.

Namao (sturgeon under 30 pounds) and *mistanamao* (big sturgeon 100 pounds plus) are known as the "old man of the river" (field notes, Norway House, 1997). Three of the respondents learned the skills needed to capture sturgeon from older relatives; "old people would teach younger people where to fish," (tables 4-5) supported by periods of trial and error, "learning by doing was supported by learning from the land, water, and animal, all of which were also considered teachers" (field notes, Norway House, 1997). Historic knowledge of past seasons would be factored into lived experience of gradual environmental

changes. By watching water currents and learning which areas consistently had sturgeon, younger people became proficient sturgeon fishers. If one did not do as one was taught sturgeon could easily be lost, especially in fast water.

Sturgeon fishing traditionally began when certain environmental signals were present. Respondents mentioned two environmental indicators: “when the dragonfly nymph would come out, sturgeon could be seen feeding at the surface,” and “when the leaves of the poplar were as big as a coin - sturgeon would float at the surface, sunning” (field notes, Norway House, 1997). Sturgeon fishing was a time between the end of muskrat trapping and other late spring-early summer harvesting activities. “Sturgeon would be harvested on the way in from the trap line towards the end of May and sometimes into June” (field notes, Norway House, 1997). Intensive fishing would end and then occasional catches continued throughout the summer and fall.

Winter sturgeon fishing occurred at fast flowing water. “Sea Falls where there is now a ferry crossing on the east channel was very important. *Aminowin* was another area, Whiskey Jack rapids, now known as Jenpeg” (field notes, Norway House, 1997). Sturgeons were fished in the winter at “*Opanaha* near John Bulls, at the northern part of big Playgreen Lake” (field notes, Norway House, 1997). In Norway House, sturgeon fishing historically met with success at Mission Point, now called Prince of Wales Point, “there was a shore anchor there, which was used to anchor sturgeon nets” (field notes, Norway House, 1997). Both Playgreen Lake and Lake Winnipeg were important for the commercial sturgeon fishery as well.

Respondents noted sturgeon behaviour and life history characteristics in great detail.

One respondent reported that sturgeon “sing, make a particular noise, like humming low when spawning” (field notes, Norway House, 1997). As well at rapids and near rocky shores, such as at Rock Island, “sturgeons were found spawning in bulrushes. In the bay at Long Point is a place where historically sturgeon spawned. In the area near Black Creek there is a boggy dark earth shallow point where sturgeon spawned and at *Manamow* (Catfish Point)” (field notes, Norway House, 1997). Fishers knew the fish ranged as far north as the mouth of the Hayes River on Hudson Bay. Life history characteristics were based on observation and what was heard from other experienced fishers. For instance, most learned what sturgeon ate by observing stomach contents. Sometimes crayfish were found alive in the stomachs, other times a “grayish substance”, which some fishers ate, was apparent. Sturgeon also ate ‘aces’ (small clams)” (field notes, Norway House, 1997).

Norway House fishers believe there are two types of sturgeon. Those caught in the Nelson River were of a grayish color, “these sturgeon favour a rocky-sandy place where they could feed on crayfish, like at Sipiwesk Lake” (field notes, Norway House, 1997). River sturgeons are black in colour and are found east of Norway House, for instance at Jack River. “River sturgeons, snared near Sioux Lookout, Ontario, had a strong plant taste and were darker than Nelson River sturgeon” (field notes, Norway House, 1997).

Fishing camps historically involved the entire family. Camps were traditionally established in places such as Warrens Landing. “The fish camp would start after school let out in June and fishing lasted into July. Children played in drying racks and found work cleaning boats” (field notes, Norway House, 1997). Between 1930 and 1959 commercial buyers, such

as Purves Fisheries Inc., Coasties and Canadian Fisheries, employed each family group,

Coasties were located across the narrows with Canadian Fisheries and Purves located at Warrens Landing. Each company had a store, credit and ice. Some men found temporary work at packing stations (field notes, Norway House, 1997).

Fishermen would come in each evening and children would go and watch the gutting. Women generally prepared the fish for packing, some cleaned nets on drying racks, repairing nets, as well as taking care of the family. Even while commercial fishing, traditions such as not closing off the river with nets continued to be enforced and respected at Norway House. Some fish or parts, not used in the commercial fishery, were set aside for family use.

While commercial fishing lasted “only as long as the ice,” domestic fishing was continuous. Domestic fishing changed at some point in the late 1950s, from family outings to organized parties of men, structured mostly by family relationships. “Those with boats and nets would go with those who had none” (field notes, Norway House, 1997). Respondents rarely mentioned women fishing, “in the past, clans had areas, which were maintained by elders. Grandfathers were the principal keepers of family territories” (field notes, Norway House, 1997). However, productivity could change boundaries, so one person could fish in another’s area based on kin relations or on losses of productivity. “The old people camped at Sandy Bar, east of Eight Mile Channel and at Black Creek” (field notes, Norway House, 1997). Historically, fishing parties would go to Duck Bay, Two Rivers and Playgreen Lake areas. Sets were placed in areas of fast water. In the more recent past, fishing parties mostly fished the Nelson River, from Sea Falls to Sipiwesk Lake.

Historically, Sipiwesk sturgeon fishing was well organized,

the Thicket Portage and Pikwitonei fishers tended to select areas at different times, some after June 15, right after Cross Lake and Norway House fishers left. This later group of fishers would have been fishing at Sipiwesk for three to four days. Pikwitonei fishers would set nets for two or three nights and then leave (field notes, Norway House, 1997).

The fishery was preserved in two ways: rotation of fishers and limitation of fishing. MacDonell's (1997) study of Bayline communities recalls the commercial sturgeon fishery. It provides no detail on sturgeon fishing at Sipiwesk Lake as described at Norway House. In order to confirm the details of organization, fishers from all four communities need to be consulted. Conflicts did occur on the fishing grounds, though mostly indirect in nature. The commercial fishery displaced traditional fishing institutions, structures, and the manner and degree to which knowledge was shared. This displacement occurred as a byproduct of licensing and fisheries regulations that created an exclusive group of commercial fishermen.

Most respondents fished with commercially available nets. They did not spear, nor did they use setlines, also known as "metal hangers" (figure 11). Hooks were thought to be "no good because there was a tendency to cause bleeding, which scared other sturgeon away" (field notes, Norway House, 1997). Fishers recalled using home made nets, made from seaming or gilling twine, "spruce floats or corks, rock weights, some twenty fathoms long with meshes that varied between 11 to 13- inches" (field notes, Norway House, 1997). When twine was not available, "older people had told some fishers that the inner bark of certain trees could be braided and fashioned into nets" (field notes, Norway House, 1997). Harkness and Dymond (1961:65) note, "roots, as those of spruce and willow were probably used in making nets." Nets made of natural materials were smaller than most commercial nets and

“had to stay constantly wet or they became brittle and fell apart” (field notes, Norway House, 1997). Care was shown when lifting a net to not alarm and cause sturgeon to struggle.

Some fishers remembered grandparents using *chimahowan* (fish traps, Faries 1938, list *chemuwawin* as a seining place). Fish traps would be constructed of stones and wood, “in shallows at certain times of the year” (field notes, Norway House, 1997). Captured fish would be kept alive in pens. “At Whiskey Jack Falls, in the spring, fishers built *chimahowan*, herding the fish with canoes and nets, making noise to run the sturgeon into the trap” (field notes, Norway House, 1997). Traps are no longer used because they are “labour intensive and there are less fish.” Sturgeons were often tethered rather than being lifted out of the water and after a couple of days they would be docile. To keep them from spoiling, fishers reported placing fish in a shaded spot in the water. Tethering was accomplished by looping a line through the gill and mouth. Pairs of sturgeon were also tethered in fast water. Sturgeons were mostly tethered in deep water; “if they were tethered in shallow water, they would die when it thundered” (field notes, Norway House, 1997).

Being respectful of sturgeon fell into three categories; respect while fishing, respect for treatment of the fish once captured, and respect when butchering. “Fishing respect was conveyed in practices of washing paddles and canoes before fishing” (field notes, Norway House, 1997). Nets were also kept clean. Set or hook lines, as previously mentioned, were seen as both disrespectful and dangerous. A functional component in the discrimination against “hangers” was that “they contaminated the water and dispatched sturgeon” (field notes, Norway House, 1997). Older fishers taught younger people to “lower their anchor

slowly,” thus minimizing the echo on a rocky bottom. Being quiet while paddling to lift nets and not disturb the fish was not only respectful, but also it would prevent sturgeon from becoming alarmed. Fishers believe that “loud noises frighten sturgeon.” Respectful treatment of the fish was shown when lifting nets. “Nets were lifted slowly till the fish was surfaced. Sturgeon gave themselves to fishers and were treated gently, turned over, untangled from nets and tethered to the canoe” (field notes, Norway House, 1997). Leaving what was not eaten in the bush for animals showed respect. Without showing respect it was believed that fishermen lost the ability to catch sturgeon. No specific community sanctions were noted.

As country food, sturgeon was highly valued. Boiling was the primary preparation for bigger fish. Smaller fish would be roasted. Sturgeon was also dried and smoked. The fish was smoked with willows, “dry diamond, split down the center, with sturgeon opened up, butterfly style” (field notes, Norway House, 1997). It would be washed and left to dry in the wind and sun, after which it was ready for smoking, “most of the grease and oil would drop in the sun and would drip off in the smoking process” (field notes, Norway House, 1997). Smoked sturgeon lasted a long time. Respondents reported using all parts of the fish, heads, flesh and roe. “*Atafe* (notochord) would be boiled or roasted and was considered a treat.”

Older community members had told respondents about sturgeon being used to fuel the boilers in steam ships on Lake Winnipeg, “sturgeon would be stacked like cordwood (4 ft. x 8 ft.) at Warrens Landing, and one cord of sturgeon was enough to get the steamboats to Grand Rapids, where they would pick up more. These boats had a distinctive smell” (field notes, Norway House, 1997). As well as being used to fire boilers, sturgeon oil was

nutritionally important. Oil was rendered through boiling the flesh. "Oil was stored in sealers." Sturgeon oil would be mixed with sap and other medicines, good for diaper rash and other skin problems. The oil was also used as a "cough remedy and was a preventative for colds" (field notes, Norway House, 1997). Oil was also mixed with meats such as dried moose and beaver. *Opachachi* (isinglass) was used for glue. Into the 1890s there was significant isinglass trade with the HBC at Norway House.

At Norway House a series of displacements have degraded traditional territories and lifeways. Informants noted that provincial fisheries management threatens the viability of remaining sturgeon populations (field notes, Norway House, 1997). While the commercial value of sturgeon has been almost completely eliminated with closure, sturgeon is a valued food for older people. Respondents blamed Nelson River hydro generating stations for restricting populations. For instance, Jenpeg Dam is seen as having caused dramatic fluctuations in water depths and reversed flow trends (field notes, Norway House, 1997).

For generations, Norway House Cree have lived on or near the banks of the Nelson River. Growing, the community continues to build new homes, malls, recreation center, schools, and hospitals. The dirt and asphalt roads link a diverse and thriving community. Although at times dwarfed by the cash economy, the mixed-subsistence economy follows the ebb and flow of redistribution of country food. It would be difficult, but not impossible to quantify this economy which, from what could be seen, is still important as a supplement to the cash economy. All informants said that fishing is more difficult these days. The community no longer esteems and values, although individual families still do, those who are able to add

to the overall good of the community with sturgeon. Norway House has become, in many ways, a big city on the Nelson River.

At Norway House there are significant amounts of traditional sturgeon knowledge. Half of the respondents claimed to be passing their knowledge on to their children. However, aside from capture methods, the distributive side is no longer based on traditions of sharing. Sturgeon is not shared in the community to a great extent although a small underground or family based economy may exist. The influences of commercial fishing and increased adaptation of the cash economy appear to have had significant influences on distribution. Future research should be conducted in Norway House to get a fuller picture and knowledge of sturgeon, including research of both Treaty and non-treaty residents.

4.6 Sagkeeng (Fort Alexander)

Ojibwe use and occupation of Sagkeeng on the Winnipeg River have been documented since 1737 when La Verendrye and his party made first contact (figure 13). Before the 1730s, archaeologists have dated constant occupation of the area by the Cree (for 2-3000 years). Fishing is a significant reason why this location along the Winnipeg River was important. By the 1830s, access to the fishery was in dispute. By 1830, Chief Factor John Stuart reported to London that Red River settlement fishermen were coming up to the Winnipeg River to fish. Stuart (HBCA E 24 1826-1831, fos.1-39) wrote,

to fish at or in the vicinity of this place [Fort Alexander]... this I most solemnly protest against any such thing, and if Mr. McDermot comes, he may depend on having his nets sunk, unless he brings a stronger physical force than any I can

oppose-...It is on our fishery that our subsistence at this place depends.

Peers (1994:22-23) argued that sturgeon was an “extremely important food for the Ojibwa... excess sturgeon was processed by the women into a type of pemmican made of dried, pounded sturgeon and sturgeon oil.” There is very little written on Ojibwe sturgeon fisheries at Sagkeeng, although there are several good studies of Ojibwe sturgeon fisheries to the east at Rainy River and Lake of the Woods, Ontario (Holzkamm 1987, Holzkamm *et al.* 1988, Van West 1990). Tough (1989) argued that the Lake Winnipeg sturgeon fishery produced large annual yields between 1825 and 1891, and no doubt, the Ojibwe participated in these early fisheries. What these studies of Ojibwe fisheries tell us is that under their stewardship harvests were sustained, in striking contrast to the first 10 years of the industrial fishery that led to collapse.

During the interviews respondents noted that resources traditional harvested and consumed at Sagkeeng³⁴ included, *wapethew* (willow ptarmigan), *aukuskow* (sharp-tailed grouse), *omimi* (pigeon), *wewe* (blue phase of the lesser snow goose), *wabwewe* (white phase of the lesser snow goose), *jishib*, *ininishib*, *ansig*, *jingibiss*, *ginogweiaweshib*, *kinishtinokweshib*, *siamo*, *wakeiawishib*, *pikwakoshib*, *pakojishib* (ducks), *wapuss* (rabbit), *amik* (beaver), *wajashk* (muskrat), *shicauk* (skunk), *caqua* (porcupine), *waskashe* (deer), *moose* (moose), *waskashe* (white-tailed deer), *mashkode-pijiki* (buffalo), and *makwa*, *musqua* (black bear). Game not favored included *mohigan* (wolves) and *wejack* (fisher). Aquatic

³⁴ Respondents were themselves the sources of Ojibwe orthography. Nichols and Nyholm (1995) are listed in

resources were important in both domestic and commercial activities. The fall spawning run of *atikameg*, *tikomeg* (whitefish) and spring spawn of *name* (sturgeon) and *namepith*, *mithnamepith* (sucker) and *oga* (pickerel) were important resources. *Keneshue*, *kinoje*, *mashkinoje* (northern pike), *namegoss* (trout), and *mathy*, *awassi* (burbot) would be fished throughout the summer and winter. Other fish commonly prepared for consumption included catfish, while *namebin* (translated as carp, a recent immigrant to the area, the name refers elsewhere to suckers) were discarded. Plants and berries also factored into Ojibwe diets, for instance, *nicoshemin*, *manomin* (wild rice), *skesheckamenuk* (strawberries), and *wusiskumenuk* (cranberries).

A typical subsistence pattern for some fishers before Treaties 1 (1871) and 3 (1873) were signed were to begin sturgeon fishing after other harvesting activities such as trapping let up in early spring. As timber harvesting became an alternative wage opportunity the same spatial sequence occurred as soon as logging let up in early spring. Sturgeon fishing in conjunction with sugaring was common in the early period. Sagkeeng Ojibwe and Métis followed, roughly, a traditional seasonal pattern which involved winter dispersal to distant hunting and trapping grounds, late winter-early spring goose and buffalo hunt, spring and fall fishing of sturgeon and other fish. Fur trade activities and farming at Fort Alexander occurred into the summer, gathering of wild plants ended with fall fishing, 'riceing,' goose and moose hunting. Few Ojibwe lived most of the year away from Sagkeeng. After Treaty and more

the bibliography; however, common usage at Sagkeeng differed, in some case significantly.

recently, the people applied an opportunistic approach to game. More recent patterns of hunting and fishing are characterized by participation in either commercial or domestic activities, i.e., commercial fishing. Hunting trips for moose, deer, ducks and geese have been reduced in duration. Day or weekend trips to harvest sturgeon, pickerel, and whitefish, east to the Ontario border, is made possible with big boats, motors, trucks and trailers. Gathering wood, berries and plants, particularly wild rice, continue to be important resource activities.

Although some would dispute the fact, community members noted that Fort Alexander (Fort Alex), officially named in 1804 after Sir Alexander Mackenzie, was a seasonal gathering place where bison, fish, wild rice, birch bark and other items were traded and exchanged amongst dispersed bands of Ojibwe. After contact with French fur traders in 1737, Sagkeeng eventually became part of the global trade network. This was especially true after Toussaint Lesieur built a NWC post on the south side of the Winnipeg River in 1792. As a location supporting diverse activities, seasonal fishing, lumbering and gardening, it remained important to Ojibwe lifeways along the Winnipeg River. With increased inland trade by the HBC (Fort Alexander 1793), the territory was disputed in the struggle between French Canadian and English traders until 1821. After 1821, Fort Alex served as a station along the water route from Lake of the Woods, a hub and supply depot for the growing trade in furs and other goods. Treaty between the Crown and Ojibwe sought to centralize Aboriginal rights, affirmed in the Royal Proclamation of 1763, to reserve lands in exchange for surrender of traditional Ojibwe resource areas along the Winnipeg River. In 1997, the on reserve population was approximately 3044 (off reserve 2397).

In previous studies there has been no effort to gather Sagkeeng traditional sturgeon knowledge. There are no records about the importance of sturgeon, although there are HBC records for trade in isinglass, Lac la Pluie district, 1823 to 1885, and some general records that encompass “Lake Winnipeg” for 1825 to 1891, Norway House district records (Holzkamm, Lytwyn and Waisberg 1988; Tough 1984, 1987, 1989, 1996). In addition, there are annual commercial records for the Lake Winnipeg sturgeon fishery from the 1870s to the 1920s (Canada, Annual Fisheries Reports 1890-1930). Sturgeon has been an important resource for the Winnipeg River economy (field notes, Sagkeeng, 1998). At Sagkeeng, the Ojibwe hold vital information regarding sturgeon use and their oral histories should clarify the actual resource relationship.

4.6.1 Ojibwe Sturgeon Knowledge at Fort Alexander

In follow-up consultation, the community research assistant noted that the most active sturgeon fishers were interviewed and others would not add directly to the knowledge gathered by the study. The Ojibwe historically referred to sturgeon as *name*. Baraga (1992) lists Sturgeon Lake as *namewib* and Sturgeon River as *namewibisigi*. Sagkeeng fishers reported catching *name* (sturgeon) and *namegoshe* (river and rock sturgeon) in the Winnipeg River. *Namegoshe* may be a variation of *namegoss* (listed in Baraga as trout). Slight variations in spelling and meaning for some of the words used by Ojibwe fishers at Sagkeeng were also noted for *wakok* (caviar). Baraga lists caviar as *wanan*. Another example of the variation is with the *namotam* (notochord) and the shortened version *otam*. Baraga uses

Tatakwan, *tatagawan*, meaning literally backbone or spine, and the word is usually prefixed by a possessive pronoun. Thus *namotam* may be the adapted truncated version of *name tatagawan*. Slight variations probably occur because the language is orally based and dialects exhibit some variation. It should be noted that the Ojibwe spoken at Sagkeeng in 1998 is similar and different from the Ojibway used in 1873 Minnesota.

Three time periods emerged as significant for the history of sturgeon fishing. Family fishing camps characterize the nature of the resource harvesting in the early period known to respondents, 1930 to 1960. At the beginning of this period, responsibility for natural resources was transferred to provincial jurisdiction (*Natural Resources Transfer Act 1930*) without consultation with First Nations. The middle period, 1960 to 1980, marks a decline in the family fish camp and increases in day and weekend harvesting trips, which did not require the entire family unit. The later period, since the mid 1980s, has been marked by increased resource crisis, conflicts with Manitoba Department of Natural Resources (MDNR), and attempts to negotiate some form of management with Sagkeeng First Nation.

The main fishing locations reported by respondents, historically for the Winnipeg River, were those at the “north shore of the reserve, McArthur Falls, Great Falls, Point Du Bois, Slave Falls and Seven Sisters” (field notes, Sagkeeng, 1998). Historically documented fishing areas, such as around Netley Creek (Dead River), once a favoured sturgeon fishing ground for the Ojibwe, have not been important for the generations of fishers interviewed (Hind 1971). Only one Ojibwe fishers knew of sturgeon fishing on the Red River. Likewise, sturgeon fishing was not reported for Lake Winnipeg. A reason for this may be that

commercial fishing excluded most Ojibwe from Lake Winnipeg (field notes, Sagkeeng, 1998). Respondents indicated fishing activities mostly east as far as the Ontario-Manitoba border. Active domestic harvests have reportedly declined significantly. However, fishing continued to be reported for the Whiteshell, at Sturgeon falls, Dorothy, Nutimik and Eaglenest lakes.

Five of the nine respondents learned to fish “by watching older relatives” (Table 5). During the spring fishers watched for “the pink [wild] rose buds to come out or the [wild] plum trees bloom” (field notes, Sagkeeng, 1998). These environmental signals indicated the onset of spawning; “fishers would put a baited snag line or net in fast water for two to three days” (field notes, Sagkeeng, 1998). Rather than set across the middle of fast water, lines were placed off a point, parallel to the shore where the water was calmer and pooled back around into the fast water at the center of the river. “Sets were lifted each morning” (field notes, Sagkeeng, 1998). Nets would have to be removed for cleaning after a couple of days. In the fall, sturgeon would again congregate in large numbers “to feast on fish flies” (field notes, Sagkeeng, 1998). Traditional territories were based on a family’s seasonal use, a practice that continued unaltered from 1930 to 1960.

Sturgeon would be tethered till fish buyers visited the camps to purchase, paying in both money and goods. Traditional uses for sturgeon, since the 1950s, have greatly fallen off with the introduction of manufactured goods (field notes, Sagkeeng, 1998). For instance, one or two respondents recalled the practice and use of *namekwan* (isinglass) and production of sturgeon jars (Figure 14). In addition, sturgeon oil no longer served the same purposes as it once had. In 1888, sturgeon oil was listed fetching prices of 70 cents a gallon, “highly prized

by the indian [sic] for many purposes,” including cooking meat, bread, wild rice, in fish pemmican, medicines, lamps, for dressing leather, and sold to non-Natives in Red River (PAM MG 12 E1 nos.7944-5).

The contemporary declines in traditional use and family fishing camps indicate a major shift in sturgeon fishing. After 1960 more men went out in partnerships to fish on shorter trips. This shift in fishing served both a domestic and commercial harvest. Fishing parties consisted of mostly relatives or close friends. There were no concrete rules. Instead, the knowledge, skills, equipment, needs of fishers and the availability of fish structured the activity. The fishing grounds were, in appearance, somewhat unstructured but organized by tradition amongst Ojibwe fishers. Net sets were allocated informally, mainly on “a first come first serve” access rule, maintained only by active use (field notes, Sagkeeng, 1998). Tough (pers. com, 1999) suggests that this access rule may have its origins in post-1900 open access; however, respondents did not indicate such origins. During and after the 1950s, set nets would be marked. Both the influences of fisheries regulations and incursion into traditional fishing grounds by non-Ojibwe fishers led to the concealment of sets (field notes, Sagkeeng, 1998). Fishers would conceal their sets “by submerging the nets under the water” (field notes, Sagkeeng, 1998). Conflicts on the fishing grounds between Ojibwe were resolved through “avoidance and shunning” (field notes, Sagkeeng, 1998). Conflicts on the fishing grounds between Ojibwe and outsiders, including fisheries officials, were met with various strategies, all of which reflected an aversion to state controls. As late as the 1980s, Sagkeeng fishers followed a type of traditional pattern based on family fishing territories, which were non-

confrontational and adversarial to state regulations (field notes, Sagkeeng, 1998).

The Ojibwe never successfully restricted access of others to the Winnipeg River. Since the 1700s the river has been a major transportation route (field notes, Sagkeeng, 1998). Access to fisheries did not require restriction, as there were lots of areas to set in; many people fished and respected each other's right to take what they needed. According to respondents sturgeons are not so much scarce as impeded by damming, pollution, multiple and competing uses, restrictions to traditional lifeways and over-regulation. The problem is complex. There are overlapping access and use issues for the Winnipeg River. The lack of formal sturgeon management creates conditions of resource anarchy. Fishermen at Sagkeeng are unable to assert control over regulations to their resources and do not feel any vested interest in managing them (field notes, Sagkeeng, 1998).

The perceptions of Sagkeeng fishers since the 1980s, is that many "areas along the Winnipeg River have been over fished" (field notes, Sagkeeng, 1998). Winnipeg Hydro developments have caused some relearning of where sturgeon might be found. Historical spawning locations (Table 12), such as those at McArthur Falls, Great Falls, Slave Falls, Dorothy Lake, Nutimik Lake, Sturgeon Falls and Mud Falls, are no longer reliable (field notes, Sagkeeng, 1998). Spawning seems to be faltering since the Pine Falls dam was built (1952). "Sturgeon are no longer going to McArthur Falls since the powerhouse was built (1955)" (field notes, Sagkeeng, 1998). Up to 1990 (*Sparrow*), sturgeon fishing out of season was routinely and inconsistently treated as poaching, inconsistent with Aboriginal rights.

Traditional harvest-domestic use and trade has been criminalized as poaching by the

MDNR. Charges have been annually laid against Sagkeeng sturgeon fishers and some identified themselves as recidivists (field notes, Sagkeeng, 1998). Two men were charged in 1998 and fines were paid for sturgeon fishing out of season (field notes, Sagkeeng, 1998). The increased costs, mostly associated with the risk of being held liable for violation of fisheries regulations, and difficulty with finding it, have made eating sturgeon a special occasion (field notes, Sagkeeng, 1998).

Through intense enforcement sturgeon fishing had become a domestic harvest with very little commercial trade. In 1992 the community, in conjunction with MDNR, attempted to formally co-manage sturgeon (Sagkeeng *et. al* 1992). After the agreement was not renewed in 1993, informal co-management has been pursued. During this period, fishing increased at Nutimik Lake (field notes, Sagkeeng, 1998). In addition, respondents reported shifts away from using nets to angling (field notes, Sagkeeng, 1998). As these changes illustrate, local knowledge is not static; rather it is derived from past generations, but not necessarily bound by the replication of past practices. Adaptation is part of the traditional sturgeon fishing-management system for the Ojibwe, built on observation including periods of innovation and experimentation. This is particularly true in response to radical changes, such as those associated with hydro development. As noted, fishing methods and technologies have changed over the years, from nets to snag lines and back to nets. Changes, such as the increase in angling, denote impacts of fisheries enforcement and fishing industry initiatives, as well as the dwindling of Ojibwe sturgeon fisheries and increase in sports fishing.

There is inter-generational sturgeon knowledge at Sagkeeng. The history of fishing

regulations spanning the last hundred years, which continue to be used by community members as examples of the dangers of centralized control, failure of management and destruction of sturgeon stocks are all entwined. Inconsistencies between Indian Affairs and Fisheries Department regulations, in two vastly different approaches to Native fishing have muddled how resources ought to be used and conserved. For example, use of snag lines, which was a carry over from Treaty supplies of hooks and fish lines, was banned by fisheries regulations (field notes, Sagkeeng, 1998).

Sturgeon characteristics and behaviour are topics of considerable weight to fishers. As at York Landing, fishers at Sagkeeng begin by disclaiming detailed knowledge, which is usually followed by detailed observations. Most fishers agree the fish moved in groups “of five or more, up and down the river a considerable distance each week” (field notes, Sagkeeng, 1998). Unlike other fish “sturgeon does not school and congregates only to spawn” (field notes, Sagkeeng, 1998). Most felt that sturgeon stay in “deep water,” with the exception of June and July when they can “be heard and seen surfacing to feast on fish flies” (field notes, Sagkeeng, 1998). Like some other fish and animals, sturgeons were believed to move seasonally. Respondents noted the fish “lose their snout as they get older and bigger and that the bony plates (scutes) wear with age” (field notes, Sagkeeng, 1998).

On average respondents reported catching fish that were “three to five feet,” although seven to eight foot sturgeon were also common (field notes, Sagkeeng, 1998). Any in excess of 100 pounds was referred to as *Kitchiname* (big sturgeon). Small sturgeon, less than 12 inches, were also caught by fishers. Mostly, these fish were caught in small mesh nets and

released. Fishers consistently reported two types of sturgeon *namegoshe* (rock, river) and *name* (sturgeon). Each of these grew from juvenile to adult. In general, rock or gray sturgeon was described as having “a big square head and small lightly coloured body” (Tables 6, 7). Similarly, river sturgeons were generally described as “lighter in colour from rock sturgeon, with a shorter head and snout and a bigger body.” *Namegoshe* were found mostly in rapids. Comparatively, “*name* (sturgeon) has a dark colour with a long head and body and were found mostly in flat or calm waters.” Distinctions between *name* and *namegoshe* are muddled by assertions that “all sturgeon lose their snout as they get older.” However, fishers noted that “the two lived apart and did not mix.” Not all fishers agreed on the reasons why these types of sturgeon lived in distinctive habitats. Some cite the cause as pre-dam phenomenon and others a result of post-dam conditions (field notes, Sagkeeng, 1998).

Fishing regulations have dramatically changed throughout the lives of those interviewed. Fisheries management efforts are viewed as recent activities at Sagkeeng. For instance, culturing and releasing fingerlings (approximately 2000 a year) have occurred since 1996 (Dick pers. com, 1997). Culturing is accomplished at both the Zoology Department, University of Manitoba and Whiteshell hatchery, with future plans for establishing a hatchery at Sagkeeng (D. Fontaine pers. com, 1998). Most respondents were favourable to the culturing of sturgeon for economic development and enhancement.

Most respondents did not know about past co-management activities or those carried out elsewhere, and yet many still felt that Sagkeeng needed to be involved with the management of Winnipeg River sturgeon (field notes, Sagkeeng, 1998). It was felt that co-

management needed to focus on “habitat enhancement, culturing, control over access and building co-operative relations with MDNR, Winnipeg Hydro and other users, such as Pine Falls Paper” (field notes, Sagkeeng, 1998).

The interviews at Sagkeeng can only approximate the traditional inter-generational knowledge of sturgeon use and sturgeon fishing. Ojibwe have adapted some of this knowledge and they have learned a great deal about sturgeon fishing in the face of unprecedented changes to the river. At Sagkeeng there is a good mix of traditional sturgeon knowledge. However, half the respondents claimed not to have passed on their knowledge to their children (field notes, Sagkeeng, 1998). Most of those interviewed used sturgeon nets with regularity; incidental catches were made with 5 ¼ to 3 ¼-inch fishnets. Sturgeon behaviour and life history characteristics were noted in great detail. Traditional knowledge is fairly abundant for life history characteristics and capture-preparation methods. As for distribution, sturgeon is no longer freely shared. Sturgeon was historically shared in the community, stored for the winter and traded, including trade with non-residents. In these changes to distribution, respondents appear to have been significantly impacted by the commercial fisheries in general.

The Sagkeeng Ojibwe have a long history on the banks of the Winnipeg River, building a thriving and growing village along dirt and asphalt roads that follow the Winnipeg River. It is a diverse and thriving community; however, this does not erase the fact that Sagkeeng is struggling with the impacts of colonization. While once abundant, *name* (sturgeon) is described as elusive (field notes, Sagkeeng, 1998). There is continued domestic

sturgeon fishing, especially by older community members, “those who have a taste for sturgeon” (field notes, Sagkeeng, 1998). Community members have both rich and detailed knowledge of sturgeon fishing activities and sturgeon life history characteristics. The interviews brought to the surface a significant contemporary trade in sturgeon with fish buyers from Winnipeg. This trade may or may not have been recorded as commercial sturgeon fishing by DFO statistics or by the MDNR. One fish buyer who wanted to remain anonymous stated that the purchases were substantial. Sturgeon is fished for a combined domestic/commercial harvest; some portion of the catch or fish was sold. While the number of commercial fishermen at Sagkeeng, those actually holding commercial license seldom exceeded four, it was reported that many families participated in fishing camps, which commercially harvested sturgeon between 1930 and 1960.

Historically, sturgeon formed a stable, predictable resource within a harvesting cycle. The mixed-subsistence economy at Fort Alexander no longer ebbs and flows with the redistribution of country food. No longer a significant supplement to the cash economy, country food forms a very small portion of individual and community income and well being. Although difficult to measure, the costs involved with sturgeon fishing outweigh the benefits (if fishers are caught). It is more difficult to judge whether the community still esteems and values those community members who are able to add to the overall good of the community with sharing of country food. While those who hoard and do not share are not given high esteem, sharing has become displaced through commercialization of local resources and sturgeon is no exception. Young people who show no respect are indeed ignored, but the

younger generations have less of a taste for sturgeon. The historic pattern of passing on knowledge and values to the next generation has become somewhat disjointed. Some of the impacts from residential schools have been to limit and interfere with the transmission of traditional teachings. It should be noted that Sagkeeng has shown incredible adaptation and flexibility in response to overwhelming forces of acculturation.

4.7 Summary and Conclusions

Indigenous sturgeon fishing mirrored the biological characteristics of the fish. Irene Spry (1991:83) describes this type of knowledge as “profound knowledge of the environment,” knowledge which developed through living in close relations with the land. Historian Sarah Carter (1990:49) argued “their [Indians’] highly specialized empirical knowledge of nature approached a science.” Taking science, from the Latin *scientia*, to mean the knowledge of principles and causes, one could argue that Plains Indians had almost developed a system of arrangement and order of facts in relation to each other, allowing the knower to predict outcomes. In fact, both observers’ descriptions and archaeological evidence of buffalo pounds and jumps support assertions that First Nations had developed a keen awareness of sophisticated hunting techniques, cause and effect physics. Similar to pounds, some sturgeons were taken in weirs. These parallel techniques represent a sensitive and sophisticated appreciation and understanding of efficient capture methods. The exception with fish was that there was a greater variety of techniques and technologies over a greater geography, cultural and physical (Rostlund 1952, Harkness and Dymond 1961, Mayer-Oakes

1970, Cleland 1982, Hannibal-Paci 1997).

As has been shown with this study, Cree and Ojibwe sturgeon fishers showed respect for sturgeon as it was reflected, for instance, in a common practice of only taking what was needed. While traditional lifeways declined somewhat it is important to keep in-mind the limits of these changes and the continuity in some communities of core cultural practices or worldviews.

These case studies determined such geographic and historic information as where and when sturgeons were fished, management and biological information on periodicity, spawning, range, and other significant locations and movements. Respondents discussed fishing techniques and related management and historic information. The semi-directive interviews were able to gather what the fishing was like, experiential knowledge that often generally matched biological knowledge. Answers to questioning about what the fish were used for and what the average catch and size were, fills in some gaps around fisheries management, including management objectives other than the commodification of sturgeon (i.e., commercial fishery).

Traditional sturgeon knowledge was generally maintained as oral knowledge passed from one generation to the next. The knowledge of sturgeon fishing was not told as legend. However with this said, it should be noted that often knowledge was passed down within richly layered oral tradition. Sturgeon knowledge may include community and family history, or governance and management systems, depending on the teller and the circumstances under which the knowledge was conveyed. Elder fishermen would instruct (apprentice) younger

fishers on proper fishing methods, spawning indicators and sites, proper harvesting behaviour and uses for all parts of the fish.

The Indigenous knowledge gathered during semi-directive interviews was not intended for quantification and the knowledge was not gathered to legitimize scientific sturgeon data. Cree and Ojibwe sturgeon knowledge was gathered to improve current management efforts. In part the thesis serves as a critique of provincial and federal management. Knowledge was gathered from key informants to represent community knowledge, demonstrating the breadth and depth of this understanding. Because there are no “numbers” or measures to prove or disprove what was recorded, how reliable is it?

In the second chapter the praxis of traditional environmental knowledge was articulated as a paradigm, no longer exclusively Indigenous or scientific knowledge. The different sources and forms of knowledge that are the constituent parts include Indigenous knowledge taken out of context to answer a research question. Furthermore, social-scientific, historic and scientific understandings of sturgeon are brought into the paradigm. Knowledge is therefore reconstructed to answer the sturgeon problem through lenses partially constructed from reading the social scientific, historic, and scientific literatures regarding sturgeon, sturgeon fisheries and Aboriginal relations with the fish and other traditional knowledge studies. The reliability of such an approach is not exacting quantification; however, its validity is nonetheless quite strong. For instance, the utility of this approach is to identify biological trends, diachronic and synchronic, offer solutions to management problems, empower local-traditional management knowledge and institutions, and illustrate the sources and sinks that

are currently interfering with and threatening sturgeon.

Relationships with sturgeon have changed over time. There are fewer sturgeon and fewer people are fishing. Sturgeon is not used the same way it was in the past. Fundamental values based on survival and growth; community needs and respect for the fish have changed. Indigenous knowledge has been in the past contingent on practice. To ensure continuity, TEK research is part of a larger process of decolonization. A larger question resulting from these case studies is: can Indigenous knowledge of sturgeon continue to adapt to the scarcity, and if so can this knowledge be operationalized in management? The possibilities for Indigenous knowledge may be that TEK adequately supports its inclusion in the practices and processes of fisheries management, in particular in co-management. However, as the next chapter demonstrates, successful inclusion is a hoped for goal more than a reality. Because of these deficiencies, TEK researchers should continue cautiously; First Nations should continue to share and protect their knowledge, as they deem appropriate. Unfettered collection of Indigenous knowledge and proposals to include it in management will remain problematic.

This study aimed to gather knowledge from active fishermen, those who had been active and are now retired, and commercial fishermen. York Landing was unique for a number of reasons, not the least of which is the issue of relocation. Commercial fishing was really not an option at York Landing. At both Fort Alexander and Norway House, historic commercial fisheries existed which were, by the time of the research, in serious decline. At Fort Alexander the most active fishers were interviewed, but Sturgeon clan members were not. Had the research been focussed specifically on Sturgeon clan members a far different picture of the

relationship would probably have resulted (D. Fontain pers. com).

If the Cree had totemic relations with sturgeon, like the Ojibwe, there is no evidence of it. At Norway House fishing was organized by family fishing territories. Clan was a term used by Cree respondents; however, I do not believe it holds the same description as Ojibwe clans (Schenck 1997). Cree clans, for instance, were not matrilineal and totemic (bear, crane, etc.), but were described as based on the eldest male family member (patrilineal). For many Ojibwe fishers, with the exception of Sturgeon clan who do not eat sturgeon, sturgeon was considered a gift; it gave its flesh to fishers in exchange for proper use. Sturgeon gifting itself to fishers is similar to the relationship described by many Cree fishers. Common to traditional sturgeon fishers was the idea that if proper respect while fishing were not adhered to, success in the future would be jeopardised (Berkes 1999). It is easy to see that those who did not show proper respect for cultural sanctions against sturgeon consumption or ill treatment of the fish would suffer community scorn or worse.

The practice of pulse fishing can be characterized as “fishing a productive area intensively for a short length of time, and then relocating somewhere else” (Berkes 1999). At each of the three communities, fishers gave examples of set locations where they would consistently fish for sturgeon using larger meshed nets. As well, fishers noted that they would fish for sturgeon in smaller mesh nets closer to home. When fishing farthest from the community, a larger mesh net was used, ensuring that larger fish were caught and maximizing the catch per unit of effort. In all three communities these practices were historically the rule. Pulse fishing applies easily to sturgeon, which do not school but congregate during spawning.

The use of larger nets farther from the home community would capture consistently larger fish than the use of smaller mesh nets in the community. It would be interesting to know the impacts of pulse fishing on the composition of local sturgeon stocks and at other locations.

Fishing all sturgeon out of an area, by Cree or Ojibwe, is an undocumented practice. However, since the 1870s, and more recently, sturgeon have been fished out of rivers impacted by other impediments, water control structures, hydro-electric generating stations and so on. Pulse fishing ended in many areas when the fish left and so it made itself available only at certain times, such as spawning, at certain locations, i.e. water falls, etc. When the hydrology of rivers and streams changed and after a great demand was placed on sturgeon, the fisheries failed.

Both Cree and Ojibwe fishers identified a transition in the 1950s and 1960s from extended duration, family-fishing camps to day or weekend trips by fishing partners, not always kin relations. In addition, fishers characterized changes in fish populations, technologies and regulations. Family fish camps were typically based on sharing and caring, whereas the fishing partnerships disassociated fishers from family often based on material incentives. Advances in transportation and fishing technology made further trips of shorter duration possible. Changes in access also challenged communities to respond to an influx of harvesters, native and non-native, locals and outsiders, in traditional harvesting areas. Declines in sturgeon populations and stricter fisheries enforcement occurred as the viability of commercial fishing were in decline. For a time, there was a rise in an underground economy in sturgeon that continues to exist. It is difficult to get a full picture of this trade,

though some indications are that for a time it was quite lucrative, but certainly never at the scale of the previous commercial fishery.

Domestic and commercial fishing economies have not been static. For domestic wants, the amount of sturgeon fished depended on what could be used, traded and stored. However, there is inadequate documentation for Cree and Ojbiwe fisheries. Without such records, predictions by resource managers are flawed. If not for the living memory of fishers and community members who captured and sometimes consumed the fish there would be no record at all. Domestic fishing efforts were aimed at traditionally abundant fishing locations; communal property rights were based on historic use. After World War II, the trend of domestic fishers was increasingly toward the commercial fishing model of two or so men going out after sturgeon. Fish would be taken to fishing stations in ice. Undersized sturgeon and other by-products of commercial fishing, for example heads, were used by the fishermen and their families. Another transportation method was to keep live sturgeon tethered till commercial buyers visited fishing camps. The commercial fishery mostly displaced traditional fish processing. For instance, sturgeon was not commercially prepared, dried, smoked or rendered into pemmican. Icing fish in the round, for processing elsewhere, meant that whole families were no longer necessary in fishing and fish processing. Furthermore, with increased demands placed on the family, and in particular, on children being schooled, traditional family fish camps conformed to summer holidays.

The loss of traditional controls over the fishery proved costly to local communities. The experience of the Nelson River commercial sturgeon fishery, discussed in the remaining

chapters, demonstrate loss of traditional fisheries. After years of increased domestic fishing, based on rights and not responsibilities, conservation of sturgeon is tenuous. The Winnipeg River commercial fishery does not have adequate commercial data to make comparisons with the Nelson River; however, similar patterns would be expected to have occurred as well. Before the Nelson River Sturgeon Co-Management Board can secure access rules on the Nelson River there has been a run on the remnant resource by Cree and Métis fishers, many of whom were from Cross Lake. Similarly, in 1992 there was a run on sturgeon following the signing of the Winnipeg River Co-Management Agreement. It would be interesting to see if a run on the resource resulted from poor communication or was a common feature of co-management in general. Often environmental changes are difficult to correlate; there are often multitudes of causes for declines. For example, equally devastating to sturgeon on the Nelson River has been the opening of road access to Sipiwesk Lake and impact from hydro developments.

Not all communities hold the same Indigenous knowledge. At Norway House and Sagkeeng, sturgeon behaviour and life history characteristics were noted in great detail; at York Landing the knowledge of sturgeon is different. Part of the reason for this is the influence of geography, followed by relocation to York Landing. It is interesting that although there are few sturgeon fishers in York Factory, at York Landing several men are interested in preserving stocks above Kelsey and Limestone. All three communities have passed on inter-generational knowledge of sturgeon use and sturgeon fishing. Indigenous knowledge reflects how people read nature, but now nature is speaking a different language; it is no

longer stable and this knowledge is being challenged by Western cultural paradigms. As a body of knowledge passed by Elders from one generation to the next, Indigenous knowledge is constantly being updated by experience, but now that experience of sturgeon fishing is no longer central to Aboriginal lifeways. Fishing depended on knowledge about location, based on a calendar of past experience, adjusted to present and future conditions and needs. At all communities there are grocery shelves with cans of tuna and salmon, and frozen fish.

Freezers have made smoking and salting redundant. This change may have also eliminated some of the health benefits of traditional processing. Traditional smoking utilized pine, birch and willow. Decker (1996:170) found that willow bark “contains salicin, the active ingredient in aspirin... conifer branches [contain] oils [which function as] a decongestant.” Health benefits from consuming smoked sturgeon are unknown and would require more in-depth research to determine the health benefits or risks of smoking or freezing fish. Freezing sturgeon, a common practice today, means some nutritional loss. Sturgeon oil is no longer used to the extent it once was and is now mostly discarded. Sturgeon pemmican was made of dried, pounded sturgeon, a practice that has not continued.

The decline in sturgeon has created greater dependency for Aboriginal people on western cultural constructs. The decline in the value of sturgeon and the introduction of commercially available alternatives to it has contributed to alienation of the fish in Cree and Ojibwe lifeways. At one time it provided for many different uses and benefits, but these things have been lost, and in their wake, the importance of the fish has declined. The use of isinglass as an agent for refining wines and beers and as glue has declined significantly after the

introduction of seaweed derivatives and commercially available glues and resins. Changing technology and storage capacities have allowed larger harvests, but in order for larger harvests to occur the pressures of competition had to reach a level that negated taking only what was needed. This is not some reiteration of Calvin Martin (1978), in fact, it points to the major flaw in Martin's thesis; identifying the break down in human-animal relations as a result of open access and increased competition, not some imagined spiritual loss.

Surprisingly, there was disagreement among respondents on the question of whether there were now fewer sturgeons on the Nelson and Winnipeg rivers. What fishers generally accepted was that there are places where sturgeons have been thinned out. Causes for this are attributed to damming, development and over-fishing. Neither the Ojibwe nor the Cree could fully restrict access to sturgeon fishing areas. There were lots of areas to set nets. People respected each other's right to take what was needed. The problems are now complex, with competing and overlapping access and use issues. The lack of a formal management arrangements, power-sharing and local dissociation from fisheries policy, conspires to create conditions of resource anarchy.

Sturgeon ethics, that is, the respect and responsibility shown towards the fish and sturgeon fishing, is becoming dysfunctional. Most of the 21 respondents noted that the fish is no longer sensitive as it once was. A significant concern is that Aboriginal fishing rights are impeded by regulations. Fishermen talked about how sturgeon is shown respect, how important the fish is, and how it is their responsibility to not allow it to disappear. It is important to note that those with commercial fishing experience were less inclined towards

treating sturgeon respectfully. Nets would be hauled up and the catch was valued for its commercial worth, indicating a shift in cultural paradigms, traditional vs. commercial fishing. In the past, sturgeon would not be made to bleed in the water and wastewater from cleaning the fish was discarded on land. These practices are now only followed in a patchy and inconsistent manner. The Cree and Ojibwe have no way of supporting their traditional fishing practices because domestic and commercial regulations undermine them. With growing scarcity of sturgeon and increased mobility of fishers, unspoken access restrictions and harvest limits are ignored. Government regulation, river closures for conservation, and the criminalization of sturgeon fishing have combined to usurp traditional management practices. Regulations have eroded core values of respect and connectedness that once existed between fishers and sturgeon.

Table 2: Total number of interviewees by age group

Community	b.1910-1920	b. 1930-1950	b. 1960-1990s	Total	Avg. Age
York Landing	1	5	1	7	64
Norway House	1	4	0	5	63
Sagkeeng	4	5	0	9	64

Table 3: What is your status as a sturgeon fisher?

Community	Not a sturgeon Fisher	Domestic sturgeon fisher	Commercial Sturgeon fisher	Total
York Landing	1	5	1	7
Norway House	0	3	2	5
Sagkeeng	1	6	2	9

Table 4: When did you start fishing sturgeon?

Community	As a child 1910-1929	As a young adult 1930-1959	Later in life 1960-1990s
York Landing	0	6	1
Norway House	0	3	2
Sagkeeng	0	7	1

Table 5: Who taught you to fish sturgeon?

Community	Relative	Fishing partner	Self taught
York Landing	6	1	0
Norway House	5	0	0
Sagkeeng	5	2	1

Table 6: What kinds of sturgeon were caught?

Community	Dark	Light	Other
York Landing	6	1	0
Norway House	2	5	0
Sagkeeng	5	2	1

Table 7: By what names and descriptions do the people know these sturgeon?

Community	Description
York Landing	River sturgeon: dark colour found off Hayes River. White sturgeon: lake sturgeon.
Norway House	Lake sturgeon: grayish colour, spring spawners. Black sturgeon: fall spawners, found mostly in Ontario.
Sagkeeng	Rock/Grey sturgeon: big box head, small body. <i>Namegoshe</i> –river sturgeon: light colour, short head, small snout, and big body. <i>Name</i> –lake sturgeon: dark colours. long head and body.

Table 8: How were sturgeons prepared?

Community	Description
York Landing	Smoked (halved and hung with pine and spruce for 4 hours of smoking), boiled smoked sturgeon (15 minutes), sun and air dried, boiled (10 minutes skin on), frozen (cut up dinner portions), roasted notochord.
Norway House	Boiled, sun and air-dried, smoked with willows butterfly style, frozen whole, roasted, commercial preparation (round).
Sagkeeng	Boiled, smoked, fried, cut into strips and steaks, salted and dried (air and sun), frozen whole (gutted skin on) or portioned, caviar (salted and screened, shell would be used for frying), eggs frozen in small packages.

Table 9: Besides the flesh, what parts of sturgeon were used?

Community	Description
York Landing	Head, mouth, stomach, liver, oil, eggs, notochord.
Norway House	Oil, stomachs (gizzards), fish eyes, burnt in steam boats, <i>opahachi</i> -isinglass, pemican, tail, head, <i>otafe</i> –notochord (boiled or roasted), caviar, bannock with eggs, gray clay like stomach contents (crayfish?).
Sagkeeng	Head, oil-fat, <i>nameomoshk</i> (jar), <i>namao na ghagisheb</i> (greyish-black stomach contents), <i>wakok</i> , <i>wanan</i> (caviar), <i>namekwan</i> (isinglass), <i>namotam</i> , <i>otam</i> , <i>tatakwakan</i> , <i>ojishtut</i> (notochord), pemican.

Table 10: What do sturgeons eat?

Community	Description
York Landing	No knowledge.
Norway House	Dragon fly nymph, “aces” small clams, crayfish.
Sagkeeng	Fish flies - May flies (summer), <i>shagishe</i> (crayfish –all seasons), clams (little black oysters), and leeches.

Table 11: How is respect expressed towards sturgeon?

Community	Description
York Landing	Older relatives taught fishers to leave sturgeon alone during spawning. Sharing with community members. Careful not to spill blood in water, clean fish on shore and throw waste water into the bush. There is no way to show respect.
Norway House	Wash paddles and canoe. Quiet while paddling, dropping anchor and lifting nets. Treat sturgeon gentle while in net. Tether sturgeon for a day before butchering. Don't throw fish in water. Women would not fry fish if the smell carried towards the fishing grounds, same with wood smoke. Keep things unchanged. Keep flesh under tarp and cool. Tether in deep water. <i>Mistahnamao</i> -big sturgeon. Doesn't matter today if you're noisy because sturgeons are used to the noise.
Sagkeeng	Big sturgeons are referred to as <i>Kitchiname</i> . Being quiet shows reverence. Sturgeon is removed from water to be killed. Clan system. Release small sturgeon (under 5 kg [10 lb]). Sharing sturgeon among older family members.

Table 12: Where were sturgeon fished, historically and more recently?

Community	Description
York Landing	Hudson Bay coast 14 miles east of York Factory, Nelson River, <i>Wanatawakau</i> -Fishing Island area, <i>Matchi</i> River, York Factory, Hayes River, Seal Island, Atkinson Lake area, Black Water Creek area, Fox River, Shamattawa, Jackfish Island area, mouth of Angling River, Split Lake (pre Kelsey on rapids), Aiken River, Big Stone River, below Limestone, Fort Nelson area, Bird River.
Norway House	Warrens Landing, Playgreen Lake, Duck Bay, <i>Kinosao Sipi</i> – Norway House, Nelson River east channel, Prince of Wales (Mission) Point, <i>Opanaha</i> , John Bulls, Sea Falls, <i>Kiskisin</i> Falls, <i>Aminowin</i> , Whiskey Jack Rapids (Jenpeg), Sandy Bar east of Eight mile channel, Two mile, Black Creek, <i>Manamow</i> –Catfish Point, Long Point, Red Rock, Rock Island, Sipiwesik Lake, Hayes River, <i>Ichiman</i> River.
Sagkeeng	Black Island, Sagkeeng, Abraham’s Point, St. George (Silver Falls), Mud Falls, Powerview, Pine Falls, McArthur Falls, Great Falls, Seven Sisters, Slave Falls, Point Du Bois, Lac du Bonnet Lake, <i>Windigo</i> Island, Pine Island, Eagle Nest Lake, Whiteshell, Otter Falls, Nutimik, Sturgeon Falls, Dorothy Lake, Bird River, Lee River, Kenora (Ontario).

Table 13: How was sturgeon fishing organized, historically and more recently?

Community	Description
York Landing	Family camp. Fish with father (father decides). Fishing party (male dyads –joint decisions). No formal rules and customs.
Norway House	Family areas (grandfather principal of territory) clan based. Family camp (<2 families). Fishing party (<2 fishers). Fished with older male relatives. Overlapping boundaries. No formal rules and customs. Commercial areas.
Sagkeeng	Family camp (<5 families). Fishing party (<2 fishers). Go with relatives (share equipment). No formal rules and customs. Marked territories. Priority access. Outside incursions. Pulse fishing.

Table 14: What has led to the decline of sturgeon?

Community	Description
York Landing	Hydro development, turbines, spillway, Kelsey dam.
Norway House	Hydro has restricted sturgeon populations. Loss of abundance. Jenpeg has blocked migration patterns.
Sagkeeng	Water is dirty. Debris from pulp mill. Debris like plastic bags. Hydro dams have displaced traditional fishing areas.

Table 15: Is co-management working?

Community	Yes	No	No opinion
York Landing	3	4	0
Norway House	2	0	3
Sagkeeng ³⁵	1	0	8

35 Sagkeeng fishers were not asked if co-management was working, however they were asked what they thought of co-management. Furthermore this line of questions included community involvement and support for aquaculture with possible management of a community hatchery.

Figure 9. Map of Manitoba (drawn by V. Remesz 2000).

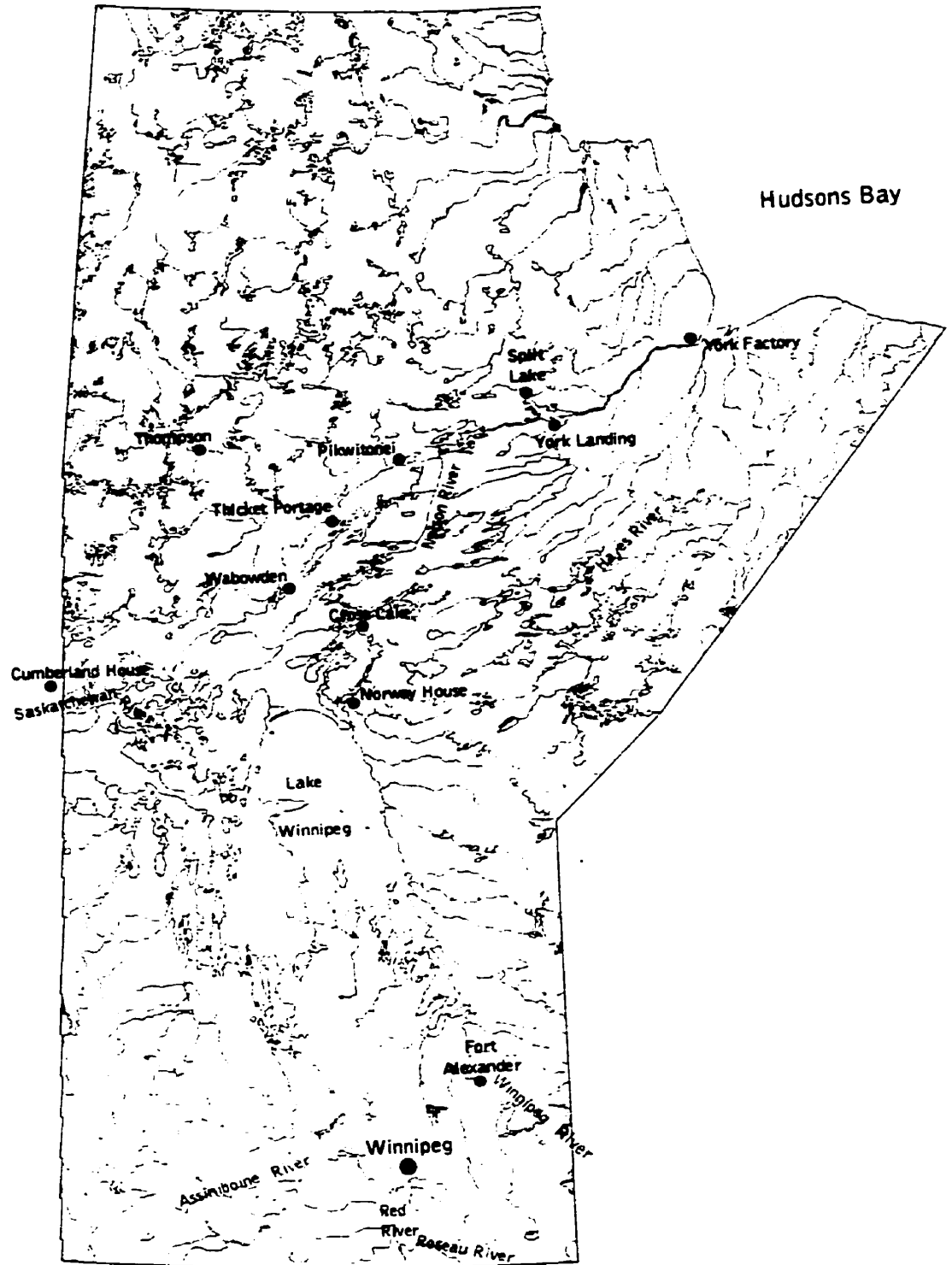


Figure 10. Map of the York Landing region (drawn by Remesz 2000).

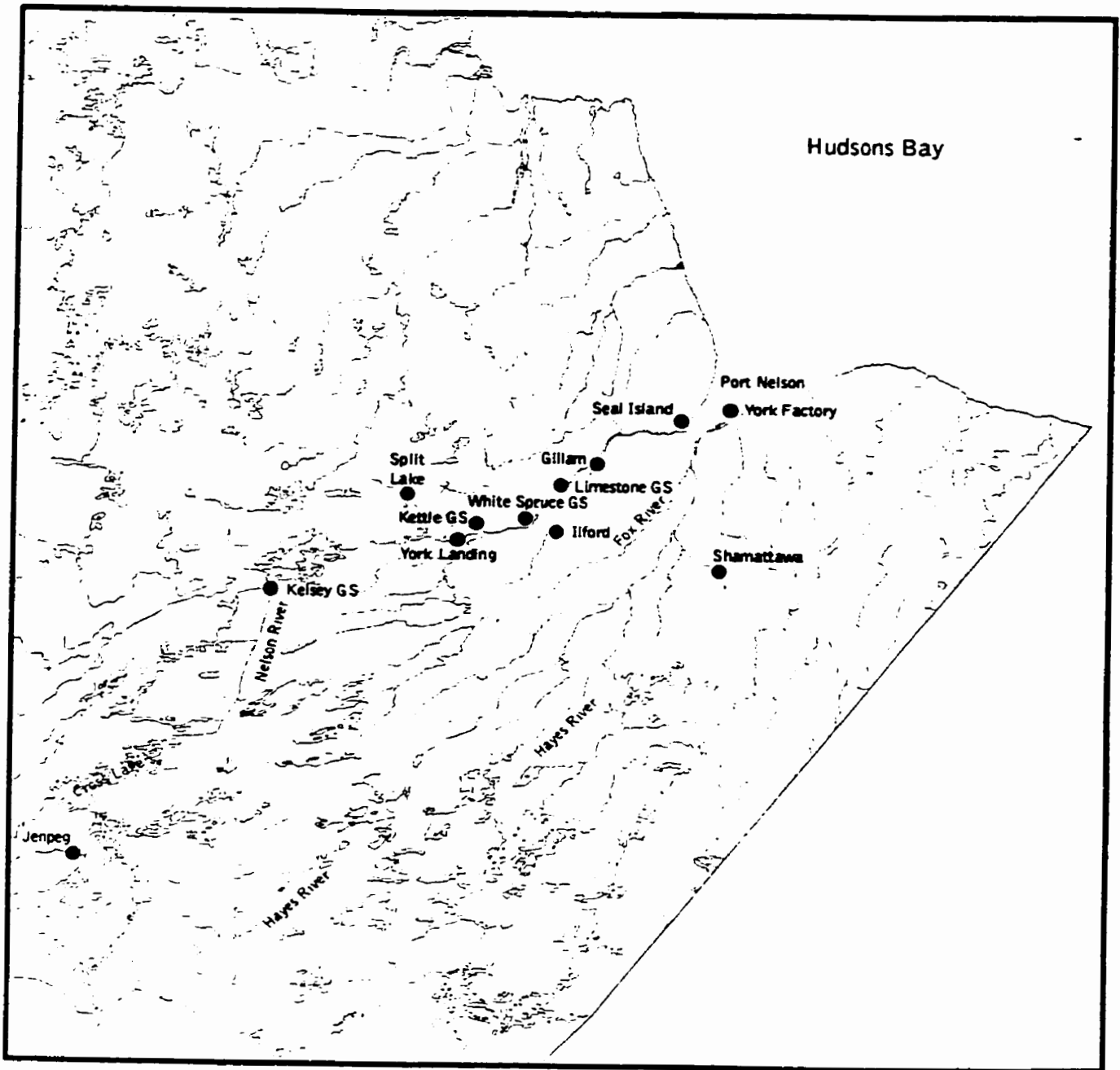


Figure 11. Setlines (drawn by C. Hannibal Paci 1998).

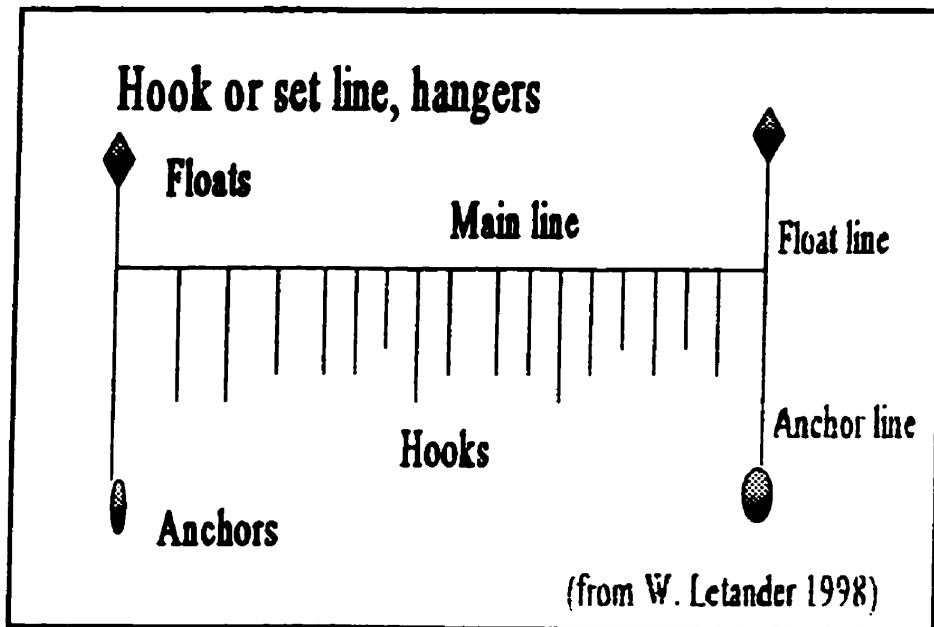


Figure 12. Map of Norway House region (drawn by Remesz 2000).

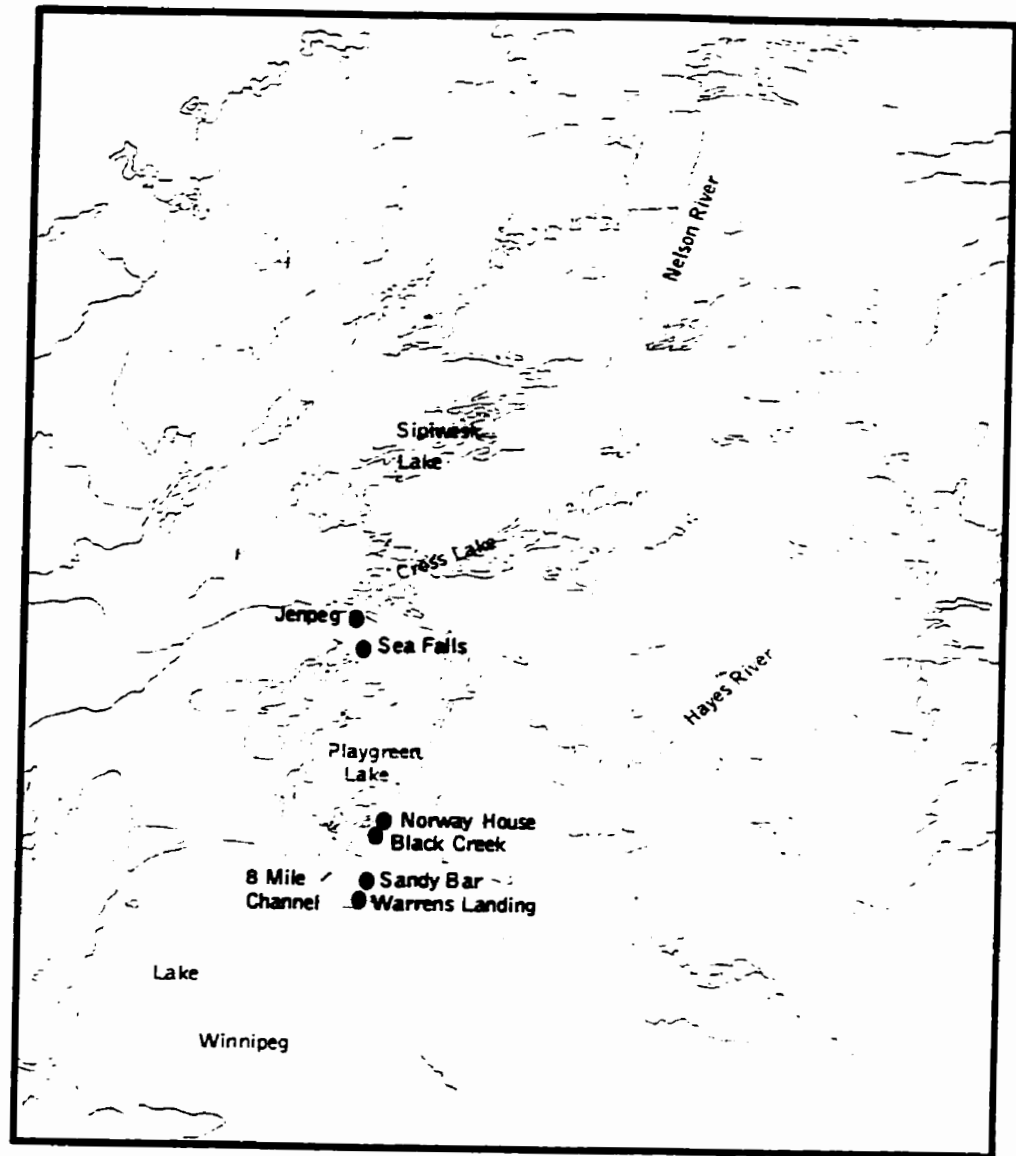


Figure 13. Map of Fort Alexander region (drawn by Remesz 2000).

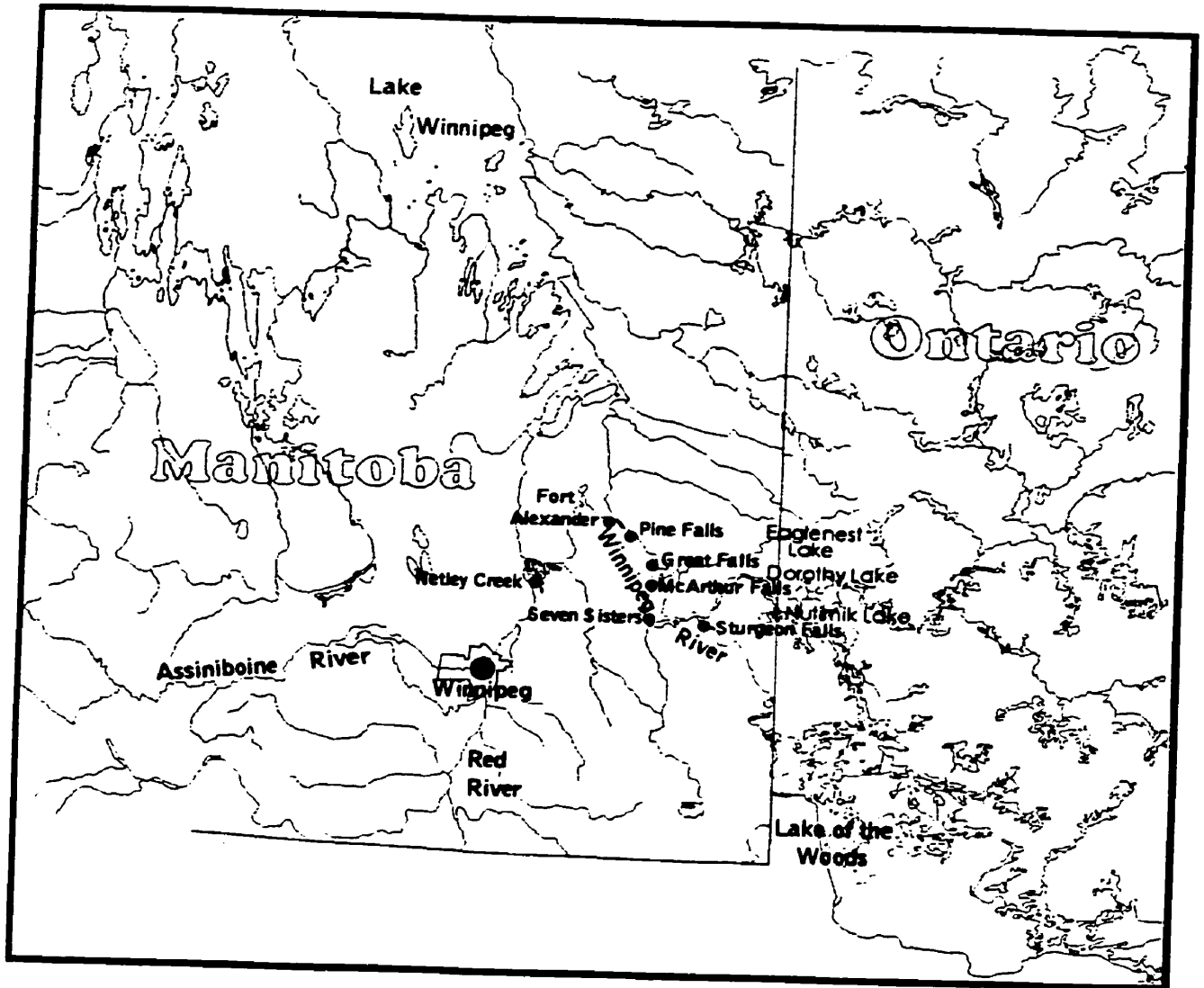
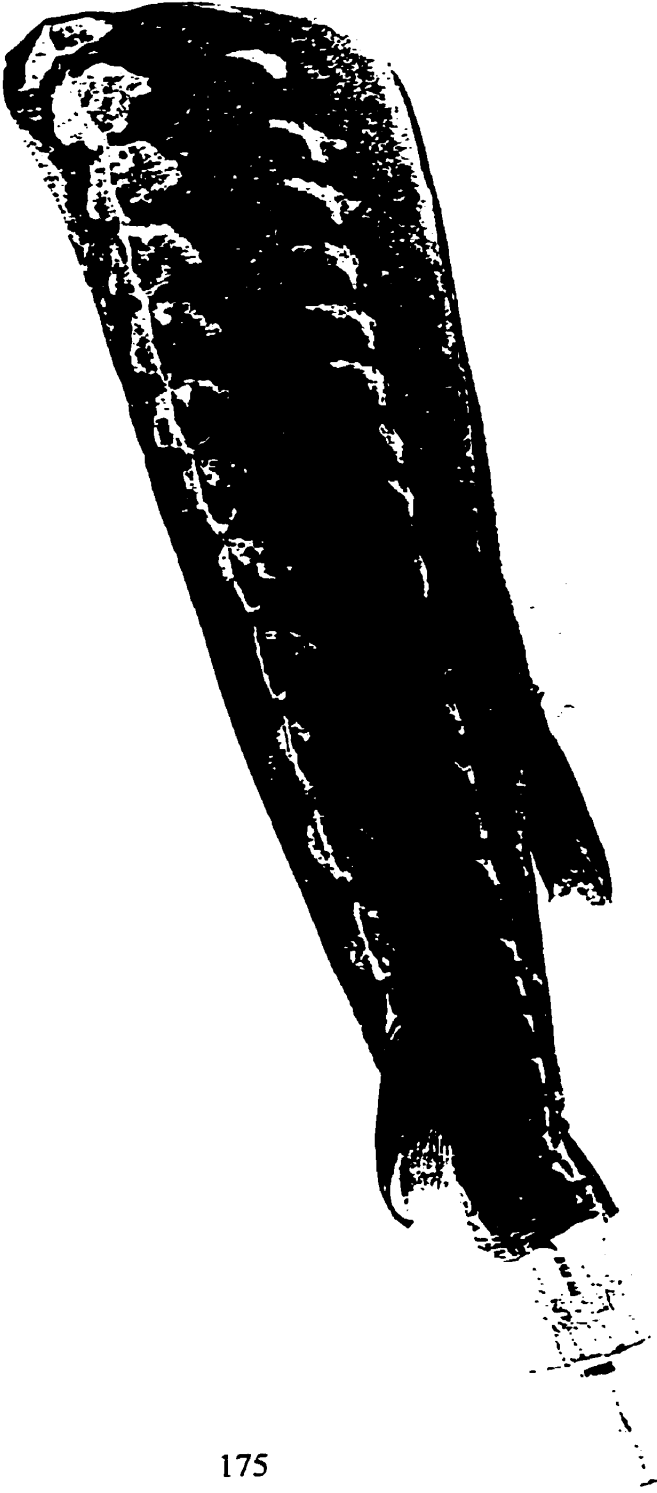


Figure 14. Sturgeon jar collected by Jack Steinbring. Photo courtesy of K. Pettipas, Manitoba Museum of Man and Nature (H4.11.3-MMMN 7244).



Chapter 5

The Nelson River Sturgeon Co-Management Board

5.1 Introduction and Context

Co-management is theoretically a public policy process intent on joining local level resource use and centralized decision-making. Researching international fisheries co-management, Robert Pomeroy and Fikret Berkes (1997:466) defined this institutional arrangement as “the sharing of responsibility and authority between the government and community of local fishers to manage the fishery.” Fisheries co-management implies a degree of sharing rights and duties. Gail Osherenko (1988) identifies the goal of co-management as reducing “problems associated with the clash of indigenous and state systems and melding the two into a single ecologically sound, efficient, equitable, and enduring system.” Pomeroy and Williams (1994:iv) consider informal arrangements,

various partnership arrangements and degrees of power-sharing and integration of local-level management systems. It may involve recognition and legitimization of traditional local-level management systems. It involves some degree of communal management of the resource. That is, a recognized group of fishers or an organization established and enforces community rules, norms and regulations for catching fish or using the resource, with support from the government

Evelyn Pinkerton (1989) argued that co-management is a possible response to fisheries crises. Crises in the fisheries have arisen as a result of the marginalization of fishing communities, many of which are traditional fisheries established by First Nations communities. Co-management attempts to accommodate various levels of participation and power sharing between fishing communities and governments. For instance, the *Alaska Eskimo Whaling Commission* has become an effective means for self-regulation

(harvesters meeting state standards) and the perpetuation of Eskimo traditions (Freeman 1989). Similarly, the *James Bay and Northern Quebec Agreement* has given the Cree a high degree of power sharing in some areas (Berkes 1989). In contrast to these two cases, the *Inuvialuit Agreement* is an example where there is less power sharing. Doubleday (1989:14) noted, “the Inuvialuit are overly influenced by government against their own long-term interests.” These examples demonstrate that public participation of resource management can function at various levels. The ideal situation is one where, as Berkes (1994:20) envisioned, ecological connectedness is managed, by both government and local users: “it makes good management sense to have as much local-level control and responsibility as possible and only so much government regulation as necessary.”

In recent years there have been increasing criticisms regarding the effectiveness of the co-management approach. The attraction for some First Nations and governments is that it is an institutional alternative to lengthy land claims and litigation. From a First Nations’ perspective, however, co-management remains a distinctively non-Aboriginal concept and process, which does not guarantee their full and equal participation in the management of resources (Hannibal-Paci 1999). From a governmental perspective, co-management is a viable response to crisis, expensive enforcement and court cases. Criticism mostly results from the highly politicized process and competing expectations that arise from natural resource conflicts. In the gap between provincial regulation and enforcement on the one hand and First Nation’s control over resource use on the other, depletions occur. Co-management risks becoming an alternative to costly management regimes, whereby enforcement and education costs are passed on to local peoples.

In order to evaluate some of the theory outlined above, this chapter examines the Nelson River Sturgeon Co-Management Board (NRSCB), assessing, the written agreement and actual implementation of the NRSCB. The minutes produced by the Board since 1992 are a unique record; the majority of Board members are First Nation's representatives, with what appears to be minimal non-Native representation. The minutes are an archive, which differs from other historical records because Aboriginal voice is central. In evaluating co-management a significant question is the degree of power sharing and use of traditional environmental knowledge in decision-making. Furthermore, to what extent is the NRSCB the operational agent responsible for fisheries management? Finally, how does the NRSCB compare to past management; is the NRSCB effectively managing human impact on sturgeon?

5.2 Nelson River Sturgeon Co-Management Board

In 1992 discussions for co-management were initiated under the umbrella of the *Northern Flood Agreement* (NFA). The Nelson River Sturgeon Co-Management Board (hereafter referred to as NRSCB or the Board) was established with a signed agreement between Manitoba Hydro, the Province of Manitoba and Cross Lake First Nation (1993). Norway House, Wabowden, Thicket Portage, Pikwitonie, Split Lake and York Landing were invited to the Board to represent sturgeon management issues for the Nelson River (Figure 12). The 10-year agreement covers a range of management functions.

The NFA (1977) provided the institutional framework for co-management, guaranteeing the monitoring of environmental effects of hydroelectric: *Article 15* established the Wildlife Advisory and Planning Board (WAPB) and *Article 19* provided a

program of assistance to harvesters adversely impacted by the Lake Winnipeg, Churchill-Nelson River Study (LWCN) Project. Several significant NFA claims and consultant reports, on the state and nature of sturgeon populations for the Nelson River in general, and more specifically those regarding Cross Lake, set in place the necessary conditions for co-management. Other conditions preceding co-management already discussed in the previous chapters include increases in the early 1970s of fisheries enforcement, charges against fishermen, and heightened conflict over access to sturgeon.

Hydro indirectly altered traditional access by creating an infrastructure of roads on the Nelson River, i.e., the Jenpeg generating station (1976). In 1977 the general public gained access to the Jenpeg road, with a winter road connecting to Cross Lake. By removing access barriers, costs of transportation and development were lowered. The period between the late 1970s to 1990s was significant for infrastructure development in many First Nation communities impacted by the LWCN Project, for example: roads, schools, airstrips, hydro and telephone systems replaced traditional processes. These modernizing influences entered First Nations at an unprecedented rate.

Many of the NFA communities responded to modernization and the impacts of environmental changes by becoming increasingly politicized. Some public policy sought to redress inequities of the past; for example *Bill C-31* (1985) sought to reinstate status to those whom the *Indian Act* had discriminated against. But the government did not concern itself with the ramifications of change. The impact of reinstatement was significant, not only for recognition of past wrongs, but also for the strains it placed on housing, education and the harvest and consumption of country foods. In the study

communities it was reported that previously excluded non-Aboriginal fishers could participate actively in Aboriginal fishing (field notes, 1997-1998).

By the late 1980s, the Federal government sought ways to alleviate the growing disparity (mostly economic, but also social) between First Nations and the rest of Canada. A DIAND Task force (1987) recommended development of cooperative management agreements between federal and provincial governments with First Nations. These conditions all combined to set the stage for alternative resource management strategies. By the late 1970s, the perception of community fishermen on the Nelson River was that all combined sturgeon harvests had drastically decreased and they blamed Manitoba Hydro for this (field notes, 1997-1998). Their perception was based on lived experience held by community fishermen. This mostly unwritten “data set” was not consulted before and during construction of “the project”, nor did it influence hydro development. Without baseline data, assessments of post hydro development impacts have been hotly debated. The degree and scope of hydro impacts on sturgeon stocks and requirements of proof for cause and effect relationships are contentious. The Manitoba Department of Natural Resources (MDNR) and Manitoba Hydro have argued for transformation of community-based knowledge into *useable* data. First Nations endorse translation of their experiences into traditional environmental knowledge on the conditions that it affirms Aboriginal and Treaty rights. If knowledge is being “discovered” by researchers and taken out of context, this will only perpetuate colonization and the utility of TEK will be lost.

In negotiation for compensation, consultants have collected Indigenous knowledge. One of the first reports produced was the Symbion (1990) study of Cree domestic sturgeon harvests at Cross Lake. The MDNR alleged that there was an increase

in domestic fishing on the Nelson River, an allegation supported by Conservation Officers (CO). The Symbion study failed to resolve the issue of domestic harvest levels.

Peter Usher and Martin Weinstein (1991) set the groundwork for analyzing the effects of LWCN Project development on Cree resource use. The study formed the basis for understanding socio-economic information and social impact assessment. According to Usher and Weinstein (1991:7), in mixed subsistence-based systems, “managers and harvester are not separated, and the management of resources and labor are integrated” in a non-hierarchical manner. They found that access was based on “more or less unrestricted access to large areas of land and water, but the access is not random;” rather it was “governed by social convention and negotiation” (*ibid.*). The study demonstrated that subsistence and commercial fisheries were adversely effected by hydro (flooding, de-watering, and altered flow regimes). The Cree employed a variety of strategies in response to the decline in sturgeon, including intensification of effort. Methodologically, Usher and Weinstein (1991:5) noted “although development projects may lead to certain predictable physical, biological, and institutional changes, how these are perceived and experienced locally cannot be predicted without reference to the historical experience, culture, and social organization of the community itself.”

Studies of the post development impacts of LWCN Project, particularly those by Symbion (1990) and Usher and Weinstein (1991), established the claim for compensation against losses to domestic sturgeon fishing by Cross Lake Band and Cross Lake Fishermen’s Association, under the NFA, claims 110 and 44. These claims included significant testimony of sturgeon fishermen. Around the same time that the study by Usher and Weinstein was released, Manitoba Hydro sponsored a study by biologist G.

Mason (1991). Mason responded to the Symbion (1990) report with criticism of its methodology and argued that the 31 interviews informally conducted by the “Cross Lake Band key communicator” did not guard against bias; interviews were not conducted by an independent third party. Mason argued Symbion sequentially reversed key questions and many of those that were asked were “loaded”, that is the questions were asked in to provoke an answer. However, Mason’s discrediting of Symbion’s fish consumption and harvest level estimates as unreliable was not as simple.

The 1992 closure of the commercial sturgeon fishery prompted studies, including biological studies. McCart (1992) argued that pre-Jenpeg sturgeon stock assessments were speculative. He argued that prior to Jenpeg, sturgeons were rare at Cross Lake and he assigned responsibility for declines to possible over-fishing. He compared Symbion and MDNR estimates of Cree harvests for Sipiwesk Lake, arguing that both pre and post Jenpeg estimates made by MDNR were “more realistic and more likely to protect what is probably a population already under stress from overexploitation” (McCart 1992:1).

Usher and Tough (1999:212) highlight three failures of MDNR in managing the Nelson River sturgeon fishery,

the ministry’s failure to ascertain the basic biological, economic, and social parameters of the fishery, which are in principle discoverable; its failure to make use of the knowledge of local Cree fishers and of the methods of the social sciences, in combination with fisheries science; and its unwillingness to recognize and acknowledge the obvious deficiencies in its own environmental and social information base to correct these deficiencies in a cooperative and timely manner.

The net effect of successive studies in the early 1990s, for conservation and sturgeon management has been negligible. Traditional knowledge and fishing institutions were not in force on the fishing grounds during this period. During the early 1990s, sturgeon-fishing communities were taking many sturgeon, as much for their tables as to make a

statement against the imposition of fisheries regulations, including restrictions to Treaty and Aboriginal rights. For Cross Lake, the protection of sturgeon fishing, rather than MDNR's approach to conservation, was gaining institutional respectability amongst First Nation leadership (field notes 1997-1998). Cross Lake Councilor Ernie Scott (1992) highlighted that during NFA arbitration hearings, community members (4 volumes, 663 pages transcribed) blamed Jenpeg for the disappearance of sturgeon. Why then did Cross Lake fishermen, well aware of these effects and the problems of increasing competition with fishermen from other communities, such as Thicket Portage, not restrict harvests at Landing River (a significant spawning site)? Part of the answer lies in MDNR's dismantling of the commercial fishery, but equally important was the inability of either MDNR or First Nations to regulate the domestic fishery. A lack of visible fisheries regulations created a vacuum. Individual Cree and Métis fishermen interpreted this breakdown in authority as an opportunity to assert Aboriginal rights without responsibilities. Furthermore, the "destruction" of the river by hydro negated possibilities for conservation, after all what would be the point of conserving what was lost? In turn, with open access of the commons and no clear management responsibility resource anarchy resulted.

Ken Cordell (1992), Manitoba Department of Northern Affairs (MDNA) recorded statements made by Cross Lake Councillor Scott at the WAPB meetings in Thompson. Scott called for an agreement with people from the surrounding areas to save sturgeon, "sturgeon stocks were hovering on the brink of extinction and called for protection of sturgeon spawning areas at Landing River." The province invited representatives of Cross Lake, Pikwitonei, Thicket Portage and Wabowden, communities who traditionally

harvested sturgeon domestically from the Sipiwesk Lake fishery, to meet in Thompson and develop a plan for joint management.

A body named the Nelson River Co-Management Group met (March 1992) to discuss the fishery and to seek funding from Manitoba Hydro (Johnson 1992). They produced a draft entitled "Interim Memorandum of understanding on Co-Management and Harvesting of sturgeon in the Nelson River. Nelson River Sturgeon Co-Management Board and Province of Manitoba." By May most commercial licenses on the Nelson River were bought out by the MDNR and the fishery was closed (except for a license on Fox Creek, suspended in 1998). Cross Lake First Nation, Manitoba Hydro and Manitoba ratified the Settlement Agreement creating the NRSCB on April 27, 1993.

In early 1992 Usher (1992) reported historical sturgeon harvest estimates for the Cross Lake Band. This report responded to criticisms raised by Mason regarding NFA claims. By re-examining witness statements (pre-Jenpeg), Usher was able to evaluate Symbion's (1991) consumption estimates, comparing the figures to MDNR estimates of productivity. Based on statements of five sturgeon fishermen, contained in sworn testimony, Usher (1992) found the annual catch per fisherman was 570 kg of sturgeon, and that there were 30 to 50 fishermen in Cross Lake. With these estimates, Usher concluded that average domestic production of 17,100 kg was reasonable, and that Symbion's pre-Jenpeg sturgeon consumption rates (4.85 kg/capita or 9482 kg total, if caught by 30 fishermen averaged out to be 316 kg each) were conservative. He further argued that Manitoba's pre-Jenpeg sustainable yield estimates, commercial and domestic combined (8830 kg), were based on assumptions about past depletions and relative productivity. Usher identified three points at issue when considering historic levels of

subsistence catches: incomplete and inaccurate historic accounts, conservative estimates of size and importance of subsistence fisheries, and poor grasp of socio-economic reasons for variations in effort. Usher (1992:8) concluded, “no single stock can be said to have been subjected to sustained over-fishing leading to depletion.” Domestic harvests were under-rated at 50% of the commercial harvest. Cree responses to the mixed economy were to redirect efforts away from fishing for alternative resources and economic opportunities. Usher (1992:12) estimated that sturgeon “fishing preoccupied people at Cross Lake for about a month (late May to late June), one approach would be to assume that sturgeon constituted about one-twelfth of total country food consumption.”

Three significant forces leading to the 1993 agreement were, debates over domestic sturgeon harvest levels, a key assertion by Cross Lake that such harvest had been negatively impacted by both Jenpeg and Kelsey hydro dams, and disagreement over the causes for sturgeon depletions. The mediation of these forces is apparent in the *Nelson River Sturgeon Management Plan* (5th Draft 1992), which established parameters for domestic sturgeon fishing on the lower Nelson River. In order to evaluate co-management, the minutes are discussed in the next section.

5.3 Minutes³⁶ of the Board: An Analysis

This section examines the evolution of co-management, as seen through associated documents created by the Board. Following a chronology of the minutes, a history of sturgeon co-management is outlined, reflecting a unique view and providing an opportunity to study the evolution of this process.

³⁶ All NRSCB minutes courtesy of Manitoba Hydro, Thompson, Manitoba. Hereafter referred to by date.

Representatives from Cross Lake, Norway House, Wabowden, Thicket Portage, Split Lake, the Province and Manitoba Hydro met to discuss the *Winnipeg River Sturgeon Co-Management Agreement* framework for the first time in April 1992. Each stakeholder outlined its position regarding sturgeon. Cross Lake identified First Nation community resistance to full closure and stated that compliance would require significant resources. The Métis community of Wabowden noted that without sturgeon, Aboriginal rights and entitlements would be worthless and argued stocks needed rebuilding. Norway House supported the need for rebuilding, signifying a sharp decrease in commercial license holders from 1991 to 1992. Thicket Portage expressed a willingness to conserve sturgeon; conservation would be “contingent on no one fishing.” These positions highlight the difficulties with harvests by multiple communities, each subtracting from the fishery. Cross Lake and Thicket Portage, in particular, were caught in a “tragedy of the commons” whereby whatever they conserved could be exploited by someone else. Community representatives expressed a desire for power sharing with MDNR. While the NRSCB was intent on having ultimate responsibility for sturgeon, MDNR and the Minister never relinquished power. This dissonance would continue to haunt the Board.

Considerable efforts were made by the MDNR to explain the need for community involvement and, ironically, for creating trust in the process (April 1992). Cross Lake and Wabowden argued for a one-year agreement with options for longer-term management of sturgeon. Thicket Portage was unclear about whether it had jurisdiction in being party to any agreement, raising the issue of Métis as potential stakeholders. Jurisdiction was debated, as were the issues of representation, decision-making and rights to manage. The MDNR representative outlined that the Board would make recommendations to the

Minister. The province and Manitoba Hydro would share funding. The MDNR focused planning on a protected spawning area at Landing River (1992). It was felt that an agent of the Board should be at the Landing River to discourage First Nations and Métis fishing. From this meeting little trust was built and community cooperation was established in the most superficial way; furthermore MDNR set the scope and scale of management.

A focus on the Landing River included investigating potential spawning areas between Whitemud and Duck Rapids, with MDNR administering “training money.” MDNR’s control of money was seen by the Wabowden representative as an approach to co-opt the Board communities. In an attempt to create distance from MDNR it was pointed out that the observer at Landing River was to work for the NRSCB not the MDNR. This distinction is important for it lays bare the tensions between the communities and the MDNR. Thicket Portage stressed that the “whole fishery should be looked at in the future as Elders from Cross Lake have indicated.” Silas Ross of Cross Lake had noted other spawning sites, such as Red Rock and Bladder Rapids. The MDNR argued for study of a few spawning areas. The presence of Elders at Board meetings challenged MDNR assumptions and de-legitimized its claim of expert status. Closure was discussed, with disagreement polarized between Thicket Portage and the MDNR.

The disagreement over fishing during spawning went to the roots of the conflict. Cree and Métis had traditionally fished during spawning, when fish were most concentrated, when the effort produced the greatest return, fishermen taking only what was needed. Fishing during spawning dated back to traditional practices. Regulation of the commercial fishery suspended the practice under the assumptions of allowing the fish

to reproduce; however there is no evidence that regulations were ever effective on the Nelson River. However, testing traditional practices and rejecting sixty years of regulations would not be an easy accomplishment. The MDNR sees no other way at conserving stocks then by protecting reproduction and habitat. This fundamental conflict may not have been fully understood by each side and went unresolved, ultimately undermining Board efforts to gather knowledge and make recommendations.

It could be argued that the initial idealism, which led to the agreement, was lost in the translation. The Board's work may have failed to produce revolutionary management, but at least it was able to include First Nation voices in the process. This is apparent in a number of ways. First, the 10 weeks of spring field activities, outlined by the MDNR, represented the training of 3 crews totaling 6 men (April 29, 1993). The stock assessment and enhancement work was fully based on scientific methods. However, Cree were themselves the field study personnel. The Board focused on the education of school-aged children and identified a need to produce sturgeon information appropriate for the north. The schools aquarium project, in part carried out by Frontier Schools Division, was successful in educating children about sturgeon fry and life history, reinforcing scientific perspectives on sturgeon with little "Aboriginal voice" (www.) There is no record that "northern material" was produced, although the NRSCB rejected using a Wisconsin DNR video.

Each Board member was mandated to gather Indigenous knowledge, but none of the Board members received training or support to do so. Harvey York, Norway House representative gathered some material, but he passed away before this material was organized into a documentary form. Research on traditional sturgeon knowledge has not

been carried out at Cross Lake or Split Lake. MacDonell (1997) conducted a study of the three Bayline communities, Pikwitonie, Wabowden and Thicket Portage, for the Board. The case studies in this thesis sought a fit with MacDonell's methodology in order to be of use to the NRSCB.

While the Board did not want to scare "fishers into hiding their catches," reports of non-compliance were a significant issue. Various communication strategies were explored, including: production of a video, letter to fishermen, enforcement of closure by community councils, TV, newspapers, local radio talk shows, pamphlet, a poster contest, and signs erected near spawning areas. The Board was concerned about access at Landing River and could not resolve how to restrict fishing. The MDNR estimated field season costs at \$38,000, and "problem communities" (Cross Lake, Norway House, Thicket Portage and Split Lake) were identified. In 1992, spring harvests were estimated at 308 sturgeon, 137 from Landing River, weighing 7,700 pounds.

The Board focused on significant harvests by Thicket Portage and Cross Lake. Lack of compliance was seen as a threat to management. Community members argued that peer pressure was the most effective means of curbing excesses. The MDNR argued that unsustainable harvests required the Board to endorse fisheries regulations, thereby supporting MDNR enforcement. Wabowden openly dismissed this report. It is significant that the Board was able to postpone MDNR enforcement. Fisheries regulations would have curtailed domestic fishing and it could be argued that it would have led to the end of the Board. Split Lake and York Landing noted changes to where they fished (downstream from Conawapa) and that they now traveled upstream. The NRSCB did not fully

document this knowledge other than noting “the people shared the harvest.” A working group was established without specific parameters.

The NRSCB next met in Thicket Portage to discuss noncompliance by fishermen (July 20, 1993). The Board acknowledged that a lack of community meetings produced a “feeling as if the closure was a decision which was being imposed, rather than one which they [fishers] were involved.” Thicket Portage residents agreed to cooperate. Métis rights were discussed in light of charges laid against Louis Pronteau (Thicket Portage). They asked for alternatives to closed seasons, such as individual limits and area closures. Such options seemed to reflect the dual influences of traditional and commercial fisheries. Traditional fisheries were based on rotation of access to fishing areas and limits to the amount of fish captured. Commercial fisheries were based on individual license and area limits. Fluctuating water levels and lack of a fish passage at Kelsey were discussed. Fishermen wanted it to be known that the sturgeon crisis was not a result of overfishing.

Macdonald (1994a) reported to the NRSCB on the decline in the commercial quotas in 1990 and rise in domestic fishing (affected by the *Sparrow* decision). Macdonald held the dual role of MDNR, Regional Fisheries Manager and administrator of the NRSCB field program. Macdonald (1994b) noted that past regulations were based on a permit, closed season (June 15), mesh size (13-inches) and quota (100 pounds). Furthermore, he noted that in 1991 the permit system was replaced with regulations to limit domestic fishing. The 1991 quotas were reduced by 50% and most of the harvest was reportedly from Cross Lake, and in particular from one fisher. Macdonald (1994a) reported that four community workers, from Cross Lake and Thicket Portage, conducted fieldwork and that there was low compliance by fishermen in 1992. A large harvest was

noted for Cross Lake, Thicket Portage and Norway House. Macdonald claimed that fishermen saw the July 1 closure as unreasonable and many ignored the date, which led to a formal charge against Pronteau. The report claims that field staff were surprised by the appearance of a Cross Lake Band Councillor setting a sturgeon net before the opening date. Twenty-five to 75 sturgeon were recorded for two Thicket Portage fishermen. With large harvests, the sturgeon population was noticeably declining by 1993 and there was a low occurrence of spawning at Landing River.

The NRSCB Working Group met in July 1993, to discuss information gathered from a First Nations workshop in Vancouver, the Cross Lake Domestic Harvest Study, review of the 1993/4 budget and field program, and to make plans for 1994/5. Board members wanted the minutes from Thicket Portage to include community complaints about Conservation Officer (CO) harassment (spring 1993). The MDNR noted that most complaints dealt with NRSCB staff. It was decided that NRSCB field workers were to be "brought in to a Board meeting to ensure that there is no confusion about their duties or the message they are to deliver." Three liaison workers (Silas Ross and Gideon McKay, Cross Lake and Joe Sinclair, Thicket Portage) were hired to meet with fishermen in other communities, although there is no record any meetings took place. The 1993 domestic harvest estimated was 209 sturgeon.

Justified by the lack of constraint shown by fishermen, the MDNR regulated conservation of the fishery in 1994. Manitoba's *Endangered Species Advisory Board* had characterized sturgeon as a threatened species. In a news interview from The Pas, Joe O'Conner, head of Fisheries Branch, MDNR, commented that MDNR wanted to save and enhance the existing stock by restricting the "harvest enough to allow the fish to

repopulate itself” (Fourre 1994). The MDNR sturgeon strategy banned sport fishing immediately and curtailed the total harvest in 1996. While the Endangered Species Committee wanted to add the sturgeon to its list as a threatened species, “we [MDNR] asked them to hold off on that, because if they did that, then no one would be able to harvest the fish.” York *et al.* (1994) noted that compliance on the Landing River ran at less than 25%. G. McVitte and J. McKay (1994) reported that “Duck Lake was fished to the ‘freezer’ by 20 domestic fishermen,” who took 63 sturgeon (up from 1993).

A spring meeting by the NRSCB at Cross Lake asked community members for guidance on opening and closing, “not to stop fishing but to conserve stocks” (April 1994). Fishermen argued there was no point regulating fishing when the fish were gone, noting that historic spawning sites such as *Ominowin* (*Aminowin*) had been degraded. Fishermen talked about cooperating with past studies and not seeing any benefits from them. Alexis Thomas, stated “we don’t do that [putting eggs into jars] we use all of the sturgeon and we used them for medicine.” Fishermen proposed limiting the catch to ten sturgeons per fisherman and closure from June 15 to August 31. The MDNR argued that such measures were ineffectual. As an alternative, yearly locations and rotating access was proposed but such alternative management practices were not adopted.

Meeting at Thicket Portage, the Board summarized its roots in the NFA settlement process with Cross Lake and the disappearance of sturgeon (April 1994). It was stressed that communities needed to work together, to support recommendations of Cross Lake to close Landing River (till June 16, quota of 10 sturgeon/fisherman) during spring. Fishermen noted that their non-compliance (1993) resulted from a lack of input into decision-making. Pikwitonei fishermen feared disappearance of sturgeon around

Arnot. It is obvious from these minutes that the NRSCB was attempting to mediate conflicts between communities of fishers and MDNR. Board representatives had no training and perhaps assumed that MDNR would cooperate with them. In any case, the community representatives were either ineffectual in gathering information or shaping the work of the Board to reflect the local communities. Either way the Board had difficulties communicating its roles in the communities.

A few days later the NRSCB met again in Cross Lake. At this second meeting a large contingent of Thicket Portage fishermen were in attendance. Board objectives were reviewed, noting changes to population distributions: "fish have moved downstream and the fishermen are following them. It is important not to clean out the stock that is left in that area." The three community meetings lead to recommendation for closure of Landing River (to June 16), avoidance of spawning areas, 5 fish per family limit and recognition by the Board of Métis rights to traditional territories (Thicket Portage and Pikwitonei).

A month later the NRSCB met to approve the 1994 budget and to discuss field operations (May 1994). The Board recommended habitat assessment for the east channel between Cross Lake and Norway House. Another crew was hired to work the Nelson River towards Bladder Rapids. Field workers wanted better equipment, identifiable insignia, handouts and pay to prepare reports. It was suggested that fishermen be rewarded for returned sample information. Board members made a presentation of their visit to the Rainy River, Manitou Rapids hatchery.

Macdonald (1994b) estimated a total sturgeon population of 1,552 to 5,020 at Landing River, and 173 to 966 at Bear Island. According to Macdonald (1994c), 1994 was the first time sturgeon spawn were collected and raised in a Manitoba hatchery, with

two of three females producing 30,000 eggs. At Rainy River 300 eggs survived to the fingerling stage, while 1,500 of those at Grand Rapids survived to the fingerling stage. Macdonald (1994c:23) claimed that “ripe and running” females’ eggs may spoil “within five hours of ripening,” while milt can be easily collected and kept on ice for hours. He (1994c:24) endorsed “the fish equivalent of a caesarian section” in order to collect the maximum eggs. The MDNR advocated against culturing sturgeon at Rainy River. One reason may have been that the hatchery was in Ontario, the costs associated with flying sturgeon back and forth would be expensive and outside of Manitoba’s jurisdiction. MDNR advocated against stocking as an alternative to limiting harvests.

Macdonald (1994d) wrote that extensive community consultation led to the closure of Landing River (to June 15). The minutes do support some degree of community consultation although to characterize them as extensive is inaccurate. Furthermore, communities were not in support of the dates proposed by MDNR. Macdonald (1994d:27) recorded 1994 harvests of 4,150 pounds (209 sturgeon) and updated to 239 sturgeon weighing 4,900 pounds (Macdonald 1994a:5). The discrepancy here is probably a result of the time frames used to describe the 1994 harvest, with the latter reflecting fishing for the entire year.

The winter meeting of the NRSCB (February 7, 1995) was focussed on Fisheries regulations. The Board was displeased at being excluded from a January 1995 meeting between the MDNR and the Assembly of Manitoba Chiefs. Furthermore, they were angry that new sturgeon regulations did not result from consultation. The MDNR argued that the province was looking for enabling legislation to save sturgeon. The Board accused MDNR of withholding information (such as planned regulations, schedule of closure,

permit system, CO instructions, results of Grand Rapids sturgeon culturing and biological data). Debate shifted to “damage control” over the regulatory announcement. The Board did not want to be seen as having closed the fishery. Silas Ross, Cross Lake, argued

we should tell the government that we don't know anything about these regulations, we were not consulted and send them back. We should tell them don't even come on our reserves. We have to use our treaty rights. If people don't want to work with our treaty rights they can go to some dark place.

A provincial meeting on sturgeon was planned for February and the Board put forward a motion for consultation. The possibilities of setting up a hatchery at Cross Lake were given limited hearing. The *Cross Lake Harvest and Consumption study* was noted as underway (Harkness, Berkes and Diamond). MacDonell was invited to begin a two-year study of the Bayline communities. The Board discussed parameters for studying traditional knowledge. It was determined that Board members should assist in arranging interviews with Elders so that sturgeon stories were collected. The Board earmarked \$5,000 for MacDonell's TEK study. While the Board wanted to protect intellectual property rights, however, no measures were set. Frontier School Division was funded \$5,000 for the aquarium project, an educational video, and funding for a teacher in service.

The spring meeting of the NRSCB concerned 1995 field activity planning (April 19, 1995), with a concentration on upgrading equipment. After pictures were taken for a pamphlet, the possible purchase of Rockwood hatchery was discussed. A meeting of the Saskatchewan River Study, Nipiwini was reported on. The Board discussed impacts from hydro, flow reversal and minimizing impacts from Kelsey. Macdonald noted that, “Kelsey has been around for a while and the sturgeon still seem to spawn successfully.” MDNR regulatory closure was discussed. Pikwitonei asked about the effect of

fluctuations on spawning. The Board asserted, "the rights of Aboriginal people must be protected, permits must be issued for non-status fishermen." New regulations were seen as MDNR's push for complete closure. The Manitoba Department of Northern Affairs (MDNA) representative pointed out that it was not only the Aboriginal fisheries at fault. A 10-mile closure limit around Landing River was discussed. The MDNR set 1995 as the biological benchmark for sturgeon, "the line in the sand" that once crossed would result in complete loss of sturgeon. Wabowden reminded MDNR that the Board was "here to protect the fish and traditional users." A study at Split Lake (by Jonathan Kitchkeesik) was mentioned briefly. Attachments to the minutes included a resolution, passed by the Board, condemning provincial fishery regulations.

At the next meeting of the NRSCB it was noted that Manitoba Hydro was made aware of the Boards concerns regarding flow (Hydro provided a 90 day forecast of proposed water levels). In a letter from MDNR to Manitoba Hydro, D. Macdonald to L. Stefaniuk (1995), a request was made to regulate flow, ensuring sturgeon spawning, especially to mitigate impacts at Bladder Rapids. A visit to the Wolf River, Wisconsin was discussed. After informal consultations it was felt that fishers were willing to leave sturgeon alone during spawning. The field program was repeated from the previous season, with efforts to tag more fish. Any eggs were to be sent to Rockwood and Grand Rapids. NRSCB passed a motion that they had no authority to suspend Aboriginal fishing rights and asked for a temporary closure from break up to June 15 for Kelsey to Sea Falls.

One communication tool used by the NRSCB was the creation of a pamphlet (June 1995). In it community cooperation was listed as important. The Board asked fishers to return tags. A brief history by Huston (NRSCB 1995:3) represented sturgeon as

a primitive relict of the prehistoric past, now in a dismal state. Both sturgeon life history characteristics and the need “to promote and develop a co-management program to ensure the proper management of sturgeon in the Nelson River tributary” were outlined. Fishers were asked not to fish during spawning from Sea Falls to Kelsey.

While rare, one example of an outsider view of the Board comes in a letter from Ron Bruch, Oshkosh Area Fisheries Supervisor, Wisconsin Department of Natural Resources, to O’Connor, Fisheries Branch, MDNR (1995). Bruch summarized his trip to the Nelson River and made some suggestions including: closing the fishery, fine tuning population assessment techniques, and inviting MDNR biologists to view management in Wisconsin. He applauded the Nelson River approach, “unless users understand and accept the need to conduct themselves in a certain way, it is not likely they will cooperate for the sake of the sturgeon.” From Bruch’s perspective the Board reports were a complement to other public relations activities, one of which was the Frontier Schools aquarium program. According to Bruch, annual population assessment, based on tagging before and during the domestic harvest, were critical to sound management (accounting for both sex and age). He argued that fishing management needed to “work through the co-management board with users to gain general acceptance of and to implement goals, harvest seasons, limits.”

At the July 1995 meeting of the NRSCB, Opaskwayak Cree Nation (OCN) presented on the sturgeon work they were involved with in conjunction with Cree in Saskatchewan (July 19, 1995). OCN noted that sturgeon fishing on the Saskatchewan River occurred mostly upstream at E. B. Campbell Dam and downstream at Moose Lake.

Significant impacts resulted from activities by Ducks Unlimited, farms and mills. Funding of the work was based on a SaskPower grant of \$100,000 in quarterly sums.

In a report by York and Macdonald (1995), the 1995 general activity chart shows net-tagging records of 170 sturgeon downstream and 160 upstream of Landing River. Compliance was rated as "relatively high," with less than 20% non-compliance. It was noted, however, that there was no way to gather information after the study season ended. This comment reveals that field activities remained more a function of top-down management than community-based. The fishing activity peaked between June 17 to July 8, with over 40 sturgeon caught (weighing over 1000 pounds). Increased monitoring resulted from a short spawn period. It was noted in the report that First Nation workers were now "biased in favor of the sturgeon," meaning they were against fishing.

Board member and field worker Sam Garson was honoured at the next meeting of the NRSCB (December 19, 1995). For a time the Board was able to resolve conflicts between community fishers and MDNR; however the Board felt the province undermined the process by retaining control over the fisheries. The MDNA noted,

it's not fair... to chastise him (Macdonald) for what the Province is doing. Before we can do anything, we must get a letter to Ottawa and others. The Aboriginal did not destroy the fishery, it was lack of action by the Province before it was too late.

Silas Ross argued,

we can't stand by and watch this happen, we have our Treaty rights, we have our children, we have to look after for their future. It's our land, but who's running it? We must fight it, the old COs used to work with us.

Norway House called for an independent biologist and reflected the majority view of the Board that the arrangements with MDNR as a stakeholder, funding agent and science advisor placed MDNR in a conflict of interest. The Board stated, "the authority has been

given to Natural Resources to enforce the laws. We are not here for that, it's offensive to have a law pass that does not sit well with us."

At the next (March 22, 1996) meeting of the NRSCB sturgeon issues continued to be politically charged. The Board argued that the *Agreement* was in place "for the sturgeon issue, not to limit Treaty, not to let the whiteman [sic] tell us what to do. We can do it like our ancestors did." The previous minutes were corrected to include the statement: "a Split Laker who had said at the previous WAPB meeting (Wildlife Advisory Planning Board) that chopped up sturgeon were seen coming out of Kelsey." The NRSCB chair asked Hydro to respond to sturgeon being destroyed in their units. The Board focussed some discussion on the wording of MDNR regulations for closure. Regulations for the coming year were discussed. Uncooperative fishermen were to be talked with and invited to a Board meeting, and it was suggested that Chief and Council could write to them.

Harvey York was honoured at the next spring meeting 1996 (May 14, 1996). \$94,000 was received from Manitoba Hydro and MDNR for the 1996 (\$117,000 for 1997) budget. Andy Miles, Manitoba Hydro, had discussed with NRSCB Chairman Scott about alleged turbine kills. Macdonald's letter to Stu Davis, the Manitoba Hydro representative on the *Cross Lake Harvest and Consumption Study*, was read. Macdonald, when asked what his problem was with the Harvest study numbers, doubted the accuracy of the study because the "harvest team never used our numbers (field survey data)." The Cross Lake researchers were invited to attend a meeting; however, Silas Ross argued,

whiteman [sic] is dragging us off our path again. These people are not fishermen only people from schools. We know what is best for us. Our elders know these things-not these people from outside... Elders are dying they won't get anything...

we have to think of our grandchildren. Look at our land its bare... Say something at meetings. Say what's right.

The Board debated changing fishing recommendations, but decided to stick with the opening dates. The MDNR stated "Hydro has not run us out of habitat. We are out of fish." Wabowden noted the need to work together for the future. Cross Lake concurred: "we have to learn not to compete with each other." Thicket Portage was putting together a school course, which used fishermen to teach about sturgeon. The Split Lake study, initiated by 6 fishermen (Kelsey to Limestone) was briefly mentioned, with 35 fish taken annually. It was reported that an MDNR tagging and cesareans killed a fish in 1995.

Responding to requests from NRSCB, Manitoba Hydro wrote, "we do not foresee fish being 'chopped up' as they pass by the turbines" (Miles 1996). This statement from Manitoba Hydro was that sturgeons, regardless of size, are not knowingly destroyed in the generating stations. Manitoba Hydro offered no evidence to support or refute the claim. The specifications of Jenpeg were alluded to and allegations by previous Manitoba Hydro employee who saw sturgeon remains in the turbines were explained away as "fish which were most likely dead before entering the station flow, trapped in the unit when it was shut down and died." Pelican populations were attracted by fast flowing water downstream from the dam and there was an abundance of food (plankton, insects, and small fish). Hydro's monitoring suggested that most fish do not move downstream. There were no known statistics on fish passing through Jenpeg. Miles concluded his letter stating that further investigation was required, the results of which would be passed to the NRSCB. Also, he stated Hydro's commitment to sturgeon rehabilitation and cooperation with the MDNR for experimental rearing, stocking and the Winnipeg River study.

At an October 10, 1996 meeting in Cross Lake the NRSCB hosted the *Cross Lake Harvest Study team* (Berkes and Paci). The *Harvest study* results were explained and the study team confirmed it would follow up on NRSCB concerns that sturgeon harvest numbers were higher than Board estimates. The Harvest study surveyed over 50% of the more active harvest households in Cross Lake through a standardized questionnaire (Berkes *et al.* 1997). This study claimed that earlier studies made in the 1980s, measured the shock of development during the 1970s. The Cross Lake Harvest study demonstrated adaptations to post development and increases in harvests (Berkes *et al.* 1997). A second letter had been sent by the NRSCB regarding the Kelsey generating station and destruction of sturgeon. *Mercredi vs. Queen* was discussed (Marcel Mercredi was charged with sturgeon fishing on June 13, 1996). The Board voted to remain neutral regarding the case. Donald McKay Sr., Cross Lake, blamed Hydro for the loss of sturgeon and Alex McLeod, Cross Lake, stated, "as long as the dams are there, you won't save the fish." It was noted that the Split Lake Management Board study showed that there was "lots of sturgeon in the Kettle area," though it was noted that dams restricted fish movements. The MDNR confirmed that it was studying the Long Spruce forebay and studying the Churchill River weir. A plaque was ordered for Cross Lake in commemoration of the life and contributions of Ernie Scott.

The main topic at the first meeting of 1997 was lack of communication and coordination of efforts. On several counts the Board was not directly meeting information needs. For instance the Board had not heard a response from Hydro (re: turbines) and Dr. Berkes (re: historic sturgeon harvests levels). Both Provincial departments present (DNR and DNA) reported they heard the *Cross Lake Harvest study team* was satisfied with their

results. Discussion focussing on the *Mercredi decision* (delivered on April 22) were preliminary for lack of information. It was noted that OCN requested NRSCB representation at a meeting of the Sturgeon steering committee, Nipiwini, Saskatchewan. There were plans to set up a sturgeon management board for the Saskatchewan River. Involvement with Saskatchewan River sturgeon management efforts was secondary to the state of sturgeon on the Nelson River. There was a break down in communication between NRSCB communities, in particular the work by Split Lake. There was general discussion on what would happen to the Board when Norway House settled the NFA, “would this Board disappear like the Wildlife Advisory Planning Board?”

Two 1997 studies provide context for the fishery. MacDonell (1997) interviewed 25 sturgeon fishermen from Bayline communities. His report examined the knowledge of traditional fisheries, commercial fishing, management, natural history and fishing practices. MacDonell (1997) concluded that the three communities evolved within an already established domestic and commercial fishery and that local knowledge was a relatively recent development. It is puzzling that he did not examine co-management in his study of the TEK of the Bayline communities or its use in management in a more general application. The second study was the 1997 NRSCB Status Report.

The NRSCB Status report (1997) strayed from NRSCB thinking, assigning the decline of sturgeon populations, “probably an abundant resource before 1920’s,” to commercial fisheries depletions, which led to final closure in 1992. NRSCB represented all the upper Nelson River communities, making annual recommendations to fishermen with the intent to conserve sturgeon. No mention was made of recommendations to the Minister. Annual harvest recommendations were seen as balancing the needs of

fishermen with conservation (centered on spawning). “It was clear that fishermen required a significant amount of input before they would agree with the Board’s recommendations.” The field program estimated the total sturgeon population downstream of Sipiwesk Lake (1993: 1,167-5,674; 1994: 1,301-3,570; 1995 1,100-2,063). MDNR negated Hydro impacts based on the impression that sturgeon were growing at the same rate as they always had. The report said nothing of turbines, draw down, mercury accumulations in fish, noise or loss of spawning habitat. Stocking was suggested as having “only a limited ability to increase the population. The most important conservation tool is to protect the natural spawners.” The report concluded with recovery potential and blamed depletions since 1993 on harvests.

At a meeting in Thicket Portage, a large contingent of fishermen was in attendance (April 15, 1997). The 1997 status report was summarized by the DNR, and Macdonald took questions from Board members regarding his report. Copies of MacDonell’s report were handed out. In responding to questions about sturgeon fishing on the Winnipeg and Saskatchewan rivers, the DNR warned, “the Winnipeg River stock was severely depleted early in the century. This river is closed to sport fishing. There is no co-management here. The advantage of [the] co-management board is it lets you have a say.” Rather than identify the work on both rivers as informal arrangements, the DNR noted that it was trying to work with Sagkeeng (Pigeon River research) and fishers on the Saskatchewan River (commercial fishing closed on Manitoba side, Saskatchewan side open with fishing at Cumberland House). The issue of reducing the five fish per family quota was raised. Comments from the floor asked if the DNR motivations were to close the fishery. Joe Sinclair argued,

we have to take care of things that are given like the sturgeon. Its easy to talk about the past, we've seen this already, that's why you should listen to elders and use the knowledge of the earth. The future has to be looked after and think about what you are doing.

A day later the NRSCB met at Cross Lake with a large community turnout (April 16, 1997). Again the 1997 status report and copies of MacDonell (1997) were distributed. It was explained that "Provincial and Hydro officials were there as resource people." Evaluation of the minutes to this point shows that this was not the case. The province aggressively shaped the direction of co-management. Questions raised by community and NRSCB representatives regarding hydro impacts were inadequately addressed. George Hamilton, Cross Lake, argued that the habitat was spoiled by Hydro,

sturgeon can't come up river due to dry rapids area like at High Hill rapids some years ago.... Sturgeon taste different now, they also feel soft, before they were hard.... We only took enough to eat.

Don McLeod, Cross Lake, noted that fishers

fed their children on sturgeon... how many sturgeon have gone through the turbines, how many can Hydro tell me this? There is also thousands of gallons of oil dumped into the water at Jenpeg... It's time to wake up from our sleep and do something... In co-management the government controls you... It's like throwing candy on the floor (a little bit) the last child gets nothing.

Cross Laker Malcolm E. McKay noted,

loads of fishermen talked before but it backfired on us, the Band took the money. I found sturgeon with cuts, marks also. If they are cut they die.

The frustration of fishermen was obvious. Community member Don McLeod challenged,

I am going out on June 16 and catch fish and I want people to stop me. Bring the statute that will fall to my side. If you have it. If not, get out of my way.

The Board explained their position and McLeod responded,

why did this con take place? Hydro should have a program to bring fish here. Hydro should be responsible for getting sturgeon to us.

While Manitoba Hydro normally remained silent, in a rare exchange with McLeod over the amount of fish destroyed by Jenpeg Mr. Johnson stated “please don’t call me a liar, I said I didn’t know” (McLeod responded, “if you can’t come here without getting mad, stay home”). Two Cross Lake elders defused the conflict. Silas Ross noted,

the claim started here. That’s why the Board is here. We don’t want people to say we failed. We need help though for the fishermen.

Charlie Osborne noted,

these meetings are for discussion and hopefully to correct the problems... We have to watch what we are doing. Don’t use a key to lock ourselves in. We have to be able to go and get our harvest.

Fishermen wanted an end to tagging and argued three fish per family were too few. One option advanced was to close one area for a time and open another (harvest rotation, recommended a couple of years earlier). Recommendations from the floor were for compensation for loss of harvest. Fishermen called for a resolution to compensate the domestic fishermen during the spring closure for 5 years after which harvest numbers could be evaluated. The recommendations widened the schism between NRSCB and domestic fishermen at Cross Lake. Don McLeod motioned for the board to be recognized by domestic sturgeon users “to make it strong to represent the people.” In one last reconciliatory effort Silas Ross responded

we have nothing to lean on now. I’m getting old. I can’t take anything too strong now. I hoped you’d understand what we are trying to do. We never talked about compensation to try to do what we thought the Band could do. I want my grandchildren to survive. That’s why we want to preserve the sturgeon.

Chairman Smith noted, “the Board’s purpose is to educate on conservation,” to which

Greta McKay noted, “I’ve lived off the land all my life, I value the sturgeon, I’ve lived

off it.” Those with long-standing relations with sturgeon felt the loss of the fish most directly and identified loss of sturgeon as less of a biological problem than a social one.

At the next NRSCB meeting, follow-up items from both Thicket Portage and Cross Lake meetings were discussed (May 13, 1997). According to MDNR spawning had dropped off. Community recommendations were considered. Thicket Portage noted that NRSCB should move field workers out of Landing River, though the MDNA felt that such a move was a “defeatist attitude.” A motion to restrict boat traffic and move the operation was passed. The Board, through two secret ballots (majority rule), dealt with the contentious issue of setting harvest limits, eventually setting a limit of one sturgeon/family. The balloting process demonstrates a breakdown in the consensus process used by the Board to this point. Regarding the *Mercredi case*, the MDNR explained, “the judge was satisfied that the regulation was not imposed to restrict treaty rights but to preserve the rights.”

Board hiring practices were discussed and members agreed that further problems were to be dealt with immediately by the field crew foreman (October 15, 1997). It was suggested that field crews be trained, in particular, on the identification of spawning fish, and outfitted properly before going out. York Landing people initiated discussion about finding sturgeon downstream from Kelsey to Hudson Bay. This discussion evolved to questions of where sturgeon were now spawning. Joe Morris noted

sturgeon seem to be lost as Horace Saunders reports. The fishing is down all over since these dams... the sturgeon are found in creeks leading nowhere. The dams Hydro has built has altered the natural state... Elders know the nature of animals and we have to look at the past for knowledge. The young people will be poor.

The MDNR argued that information gathered by the Split Lake Board was not shared with the NRSCB because that would be “presumptuous.” Being “presumptuous” was

evidently not a problem for the MDNR when they openly discussed efforts of the Winnipeg River study (certainly no consideration was made for Sagkeeng First Nation). Documentation and sharing research findings continued to be a significant problem. After some discussion about Manitoba Hydro and the province's roles, MDNR argued "the province did not want representation of the board as such." Hubert Folster concluded,

co-management is between our communities as opposed to Co-Management between the Province and communities. We are more of an advisory board. We recommend. The Province and Hydro should comply with our recommendations.

Of the other business covered, Frontier schools was granted \$1000 for the aquarium program and the NRSCB was to meet the Cross Lake Band and Council.

Macdonald's (1997) field season summary report briefly overviewed activities at Landing River and Bear Island. At Landing River only 66 sturgeon were caught, due in part to "exceptionally high flows." A population estimate was formulated at 1,213 adult sturgeon. The report noted, "the Board should have some confidence that the population estimate is an accurate reflection of the status of the population." Just why this should be the case was not elaborated on and the high water levels seem to have not been a factor. At Bear Island, insufficient tag returns failed to generate a meaningful estimate for the Board. What the report suggested was that sturgeon were disappearing, fished out or going elsewhere. Domestic harvest estimates were rated as very low. However, the report was indifferent as to the cause, Board recommendations to fishermen or high spring water making fishing difficult. No spawn were collected at the Weir, Landing, Little Churchill and mouth of the Churchill Rivers. Approximately 100 fry were raised at the Whiteshell hatchery, supplied to Frontier School Division's aquarium program from the Winnipeg River. Fall sampling was tried for the first time and the catch successes were rated as

fairly good. The report suggested that the scale of study be reduced and reoriented to include continued harvest monitoring, improved communications with fishers, culturing, and implementation of a large scale radio tagging study. The 1997-1998 budget indicated that indeed the scale of study was reduced.

The NRSCB discussed a number of issues including the five year report at its next meeting (April 7, 1998). It was indicated that a review of the field study should start soon by a party independent of the province and NFA. The 1998 field programme was to continue on the same basis as the previous year, with tagging and netting for population estimates at Landing River. It was noted that the activities at Bladder rapids were different from Landing River and the impacts of Jenpeg were unknown. Discussion on details about Bladder rapids operations focused on establishment of a cabin (costing \$5-7,000). A fish hatchery for Cross Lake was discussed. The debate involving Wabowden, the province, and Manitoba Hydro focussed on the possibilities of portable hatcheries and the state of sturgeon culturing. It was proposed that a member of the Bear Island crew be trained at Grand Rapids hatchery in culturing, and that funds be sought for training. The previous quota and closure were retained. Joe Morris stated,

elders thought fish was there forever, this is not so now. We need to look both ways, forwards and back. That's why I sit here today to talk about the past, there was no work, we lived off the land. The elders, I've heard them and saw them at WAPB -they've said these things.

Denis Windsor, Manitoba Hydro, briefed the Board on the background of the Manitoba Hydro funded study (May 6, 1998). MacDonell summarized the study, identifying spawning (Weir River) and migration areas. NRSCB questioned the two men about alternative spawning locations, impacts of Kelsey and Jenpeg. Sturgeon movement and impediments were discussed. Harry Pronteau noted changes in fish movements with

smaller sturgeon at Landing River. He argued the state of fish populations had changed significantly in the last 10-15 years. Five field staff were hired and two others were added to work with field crew. Nick Halcrow, the Registered Trapline holder for the Bladder rapids cabin wanted a letter stating ownership would revert to him. Community posters were recommended, however “there has to be a clear distinction between the board and MDNR. The board shouldn’t have anything that says MDNR regulations.” MDNR stated that COs would avoid laying charges and would ask people not to fish. Spawn taking at the Weir and Landing Rivers, Bladder rapids and Split Lake areas were discussed and it was clarified that cesareans would not be used. Hatchery training and portable hatchery, financed by the *Fisheries Enhancement Initiative*, were discussed.

The NRSCB meeting held at Kelsey generating station focused on spawn taking for Landing River and Split Lake (SLRMB), which resulted in 4000 eggs being hatched out (July 2, 1998). Genetic studies were being conducted on sturgeon from the Weir and Landing Rivers and Gull Rapids. Comparisons between the Hayes and Churchill rivers genetics were to be resolved with test results during the winter. The work at Bladder rapids was seen as encouraging, with a 30% recapture rate. The Board wanted to focus on restocking, rather than funding further field study. No visible signs of sturgeon were found in the units at Kelsey. The Board made an \$800 contribution towards a head stone for Alex Thomas, NRSCB field worker. The significance of this, and the notation of the deaths of other NRSCB members, is that the Board was concerned with more than sturgeon; its emphasis was on the relationship to sturgeon and among fishing communities. Third party review was seen as difficult as most professionals were

involved with NFA. Tagging was discussed and alternative tags, which did less damage were recommended.

5.3.1 Discussion and Evaluation

From the perspective of Manitoba and Manitoba Hydro, the NRSCB initially served two purposes. First, by contributing and supporting the Board they discharged their responsibility regarding the depletion of sturgeon by providing for a program of conservation and enhancement of stocks. Secondly, participation of the Board diffused any legal challenges by First Nations and Métis communities by providing a mechanism, the Board, in which their concerns could be voiced (even if they were ignored). In a Manitoba Hydro inter-departmental memo, Koenig (1992) found the NRSCB demonstrated “a conservation effort to be implemented by the Bands who are going to act upon their ‘traditional’ and ‘inherent’ conservation tendencies.” Koenig identified a key issue of funding:

actions speak louder than words, were it ever to be the case that Hydro were to be found to have any liability with respect to the decline of the sturgeon stock or habitat, it would be my instruction that counsel put before the arbitrator any evidence of actions taken by Hydro to facilitate the preservation and protection.

Statements indicate that both Manitoba Hydro and the province were aware of the implications of doing nothing about sturgeon. Co-management did not mean, however, that First Nations would have an equal say or control over the study of sturgeon. An earlier draft of the Nelson River Sturgeon Management Plan (November 30, 1992) outlined five objectives for study by the NRSCB: conserve existing stocks, assess habitat, investigate the potential for enhancement, determine allowable domestic harvest and enact mechanisms to ensure compliance with management initiatives. The management

area focused on Whitemud Falls to Kelsey. In the draft, which was eventually used in the 1993 agreement, wording had changed to read, between Whitemud Falls and Kelsey are *the only remaining opportunities for domestic harvests*. While this wording is misleading, it legitimized MDNR's focus of field study. Also in this draft, the Board was to be the mechanism "to ensure that sturgeon continue to be available to meet their (First Nations and Métis) needs, now and in the future," coordinating and involving users. The rhetorical emphasis was that co-management would resolve problems.

In the final draft of the management plan, Board objectives were abbreviated to three: conservation and enhancement, information and means to manage harvests and establishing funding, and to act as an administrative body for five years. Of the fine-tuning, voluntary compliance was discussed in conjunction with regulation. Perhaps the most significant act for the Board was keeping fishers out of the courts between 1993 to 1997. On voluntary compliance, MDNR preferred strict adherence to fisheries regulations and Board members would not put money directly into enforcement. In exchange for winning voluntary compliance, communities gave up concessions in areas which they had little familiarity. For instance, on implementation of management and co-ordination MDNR took the lead. MDNR also secured its role and influence over the Board and ensured the derailment of what was a grassroots rejection of fisheries regulation. The Board was not so naive as to allow MDNR full control in the areas of funding and administration, all review was made subject to approval by a steering committee of Cross Lake and the province. This was in keeping with the origins of the claim to the NFA.

Involvement in the NRSCB did not necessarily translate into equal sharing of knowledge, responsibility, management, financing and decision making. The Board was

mandated to work with other agencies and jurisdictions. A reasonable assumption was with the presence of communities, Manitoba Hydro, and Manitoba that the Board should have known about any other sturgeon work in the province. This was a reasonable assumption that was continually tested, revealing that the Board was isolated. One example of the Board's drive to gain knowledge was the attempt to learn about aquaculture possibilities. MDNR did not inform the NRSCB of sturgeon work on the Saskatchewan and Winnipeg rivers (even the work at Split Lake did not come before the Board). The oversight reflects MDNR policy and control of sturgeon rehabilitation.

Board members were mandated to represent Board interests in their communities. It is difficult to ascertain just how representation worked. It would appear that representatives had only limited power, sharing little knowledge between communities and with the province. Board representatives demonstrated unique perspectives to the sturgeon problem during NRSCB meetings, but it is less clear that these perspectives were very influential on Board initiatives brought to the communities. Members continued to bring unique community perspectives to bear on Board decisions, however the Board failed to curtail fishing. It is unreasonable in five years that the Board would be able to get control over problems with sturgeon fisheries when the MDNR was unable to manage the fisheries after 60 years of trying.

5.4 Two Community Views of the Board

At York Landing and Norway House the perception of the NRSCB was gathered through semi-directive interviews (chapter 4). Most of the respondents interviewed did not know about Board activities and yet most felt it was doing good work. When asked

for an elaboration on what they saw as the NRSCB work on sturgeon, none of the fishermen could say. Response bias occurs when respondents answer, intentionally or otherwise, something other than the “true” answer. Response bias probably occurred during interviews on the question of co-management. Furthermore, interviewer-introduced bias results from the interviewer bringing bias into the process. Reliance on the NRSCB member at York Landing and Norway House as the community research assistant may have introduced and created response bias. An aversion to overt criticism of the work of the NRSCB representative, in what is seen as a Cree initiative, may have biased responses to the questions about Board activities.

At Norway House, most respondents had a good grasp of Board activities. This may have been, however, a result of such a small sample size. Success in cultivating contact with fishermen will continue to be a significant issue for the NRSCB at Norway House and elsewhere. Conflicts between MDNR and local fishermen will continue to be a problem. The clearest expression of this impasse is expressed in the management of fewer sturgeons. With greater than ever technological access, the Board will continue to be challenged to find a resolution to declining stocks and harvest pressures. At York Landing, responses to questions about the NRSCB were not exclusively a problem of response bias, but also a result of the lack of immediacy for community members.

The NRSCB has yet to meet in York Landing and the focus on the Sipiwesk Lake area ignore much of the Nelson River system. Such a focus does not reflect the reality that there is research being done on sturgeon on the upper Nelson River, for example *The Split Lake Sturgeon study*, which was not disclosed by Split Lake or MDNR. Research for the upper Nelson, Hayes and Churchill rivers has not been a discussed by the Board in

any detail. One interesting observation made during interviews at York Landing was the perceived role of the province in sturgeon management, with government impeding the process – a review of the minutes supports this observation.

In the face of closure on the Nelson River, from Kelsey upstream, there is growing fear that at York Landing sturgeon fishing will move downstream from Kelsey. York Landing believes they have a right to be consulted about fishing downstream of Kelsey. Similarly, for communities on the lower Nelson to begin fishing the Hayes River, these fishermen would need to talk to other communities in the immediate area. The problems of consultation and management are very complex. There are now overlapping access issues for fewer sturgeon. The Cree did not historically restrict access to regions because there was no need -there were lots of fish and people took what they needed and shared in their communities. The scarcity and the lack of formal management have created conditions of resource anarchy, motivating Bands to assert control for their resource areas, addressing social and biological concerns equally.

5.5 Summary and Conclusions

The *Nelson River Sturgeon Co-Management Agreement* covers a range of management functions. The degree to which they have been implemented has varied. The Board is still new and there are several issues they will have to address to function as originally agreed on. They must find better ways to manage the concerns of fishermen at the community level. The failure to do so is apparent in confrontations at community meetings, with local fishermen demanding recognition and rights to fish, and Board members defending a process that seeks to unite those impacted by the loss of sturgeon.

Board activities are cost-shared by Manitoba Hydro and the province. Funding is not normally a management function, but the reality is that most co-management requires stable funding. Funds must be adequate to cover all management functions. As well, funding relies on a shared supply of money and all stake-holders need to invest in the operations of the Board. The NRSCB has been funded inadequately because funding comes from Cross Lake's sturgeon claim and participating communities do not contribute directly to Board activities. It is reasonable to argue that NFA funding is money from the communities to start with. Some budget allocations, such as in education, were not spent, which indicate the Board could be doing more in these areas.

Finally, compared to past management the NRSCB is bringing social issues in to management. As well as focusing attention on the impacts of fishing, Board members continue to understand impacts of Hydro dams. One area the Board has yet to examine is the impacts of the Fisheries policy of the MDNR, the Canadian Department of Fisheries and Oceans prior to 1930, and the effects of Indian Affairs on Aboriginal fisheries.

While the majority of Board members are First Nations, their voices have been muted. In the evaluation process, a select and powerful non-Native voice has dominated, overly influencing the co-management process. The DNR perspective has directed the Board research efforts. In addition, any attempts to integrate First Nations' management, displacing the predominant fisheries paradigm has not come to pass.

These minutes are a unique archive, but they are incomplete. Future research, should seek personal papers of Board members and interviews with them to parallel provincial and Manitoba Hydro perspectives. The effort here is an initial step to evaluate the process. The measure of power sharing that occurred will be discussed in the

concluding chapter. The extent to which the Board became agents in management can be debated. Those who argue the Board should be the sole management agency would point to the fact that research between Whitemud Falls and Kelsey is under Board jurisdiction. Those who oppose such a notion would argue that the Board does not represent fishermen, acting instead as an extension of the MDNR.

Chapter 6

The Future for Lake Sturgeon in Manitoba³⁷

6.1 Introduction

In *Restructuring the Relationship*, the Royal Commission on Aboriginal Peoples (1996:672) reflected that “across Canada provincial and territorial governments have been adopting a number of strategies to increase community involvement in land and resource management decisions.” One strategy employed by governments is co-management. Co-management continues to evolve in response to the failure of government management and the desire, in this case, by First Nations to become involved in natural resource management. Co-management promises to be an improvement over government management, but it is a relatively new approach, and it does not necessarily mean a shift from scientific management. There is a need to examine how well co-management has been working. This chapter concludes the thesis with an evaluation of sturgeon co-management, in the context of the historical evolution of the sturgeon fishery and what had been gathered as TEK.

This concluding chapter first covers co-management, building on and concluding the discussion of chapter 5. This discussion is then followed by the integration of these changes as decolonization. If there is a future for lake sturgeon in Manitoba it will be through the development of social relations that can transcend many of the present barriers. Indigenous peoples will not accept the costs of transcending barriers. The sturgeon problem is not exclusively a scientific problem, historical, environmental, or

³⁷ Some of the material in this chapter has been previously published as Hannibal-Paci (1999).

cultural. All these areas contribute to the overall understanding of the sturgeon problem, and therefore each offers a partial solution to it.

6.2 Sturgeon Co-Management in Manitoba

In Manitoba, Haugh (1994) listed sixteen co-management agreements in effect during the early 1990s.³⁸ Most of the agreements in Manitoba were established on an *ad hoc* basis, and many did not evolve past the consultation stage. Douglas Barrett (pers.com 1997) believes that First Nations in Manitoba do not enjoy an effective role in management: the Minister seeks and needs information to come from the communities. For Barrett, power sharing consists of the community's input to local officials who then pass on these concerns, which should inform the Minister's decisions. In Manitoba, co-management is little more than information-sharing (Haugh 1994).

Chapter 5 dealt with the Nelson River Sturgeon Co-Management Board. The Board is not an isolated attempt at sturgeon co-management in Manitoba. An early attempt at co-management was established by the *Winnipeg River Sturgeon Management Agreement* legally referred to as the *Interim Memorandum of Understanding on Co-Management and Harvesting of Sturgeon in the Winnipeg River*. The 1992 co-operative sturgeon management agreement, funded by the province for one year, focused on co-managing the harvest of sturgeon from the Winnipeg River system. The agreement was initiated to deal indirectly with issues of Treaty fishing rights, problems with adherence

³⁸ Harvey Payne (pers.com, 1997), believes "in some situations a state of anarchy has come to exist; these are situations where sound management practices have been abandoned. As a result of the *Sparrow* decision (1990) and as a consequence of others such as *Natural Resources Transfer Agreements* (1930), alternative management, such as co-management, is required, "There is a gap between constrained Provincial regulation and First Nations control over resources." Courts have been able to untangle the rights, responsibilities, and liabilities of each party in some areas; but in any case, courts make poor resource managers.

to fisheries regulations and conservation of sturgeon. As a beginning, the agreement was based on the principles of meeting First Nations' needs and improving the management of the fishery by involving users in operational responsibilities.

The agreement formed a joint management Board, consisting of two members from Sagkeeng, two from Manitoba, and one ex-officio member from the Assembly of Manitoba Chiefs (AMC), Department of Indian and Northern Affairs (DIAND) and Department of Fisheries and Oceans (DFO). The Board was to meet periodically to make recommendations to Sagkeeng and the Province. The core working group was comprised of Sagkeeng and Manitoba Department of Natural Resources (MDNR) representatives, although the primary objectives of this group were never fully developed. The stated objectives of co-management on the Winnipeg River were to develop conservation and protection of sturgeon (stock management, habitat assessment, inspection, monitoring and assessing environmental damage), rehabilitate and enhance remaining sturgeon stocks, support scientific research and development, provide infrastructure development and upgrading, and encourage public education. A key goal was to establish limits on catches by area. The management tools of closure and the creation of a permit system, supposedly administered by the Band, were discussed but never implemented.

The agreement was not renewed after one year. The Sagkeeng First Nation has since pursued informal arrangements with the Manitoba Sturgeon Management Committee (MSMC). The MSMC is coordinating a three-year study of sturgeon funded by Manitoba Hydro, MDNR, Environment Canada, Pine Falls Paper, and the Model Forest. Terry Dick has been working with Sagkeeng First Nation since 1996 to carry out scientific research and collect data on the Winnipeg River sturgeon. The specific

objectives of this latter study were to determine spawning and rearing habitat, food preferences and sources, best methods of tagging for long term data collection and movement within natural habitat. Dick is also interested in developing culture methods for managed habitat and enhancement in the possibilities for a community-based hatchery. For Sagkeeng, this new arrangement also includes rehabilitation of populations, the development of infrastructure and educational programs.

From 1996 to 1998, informal arrangements with Sagkeeng approximated co-management. However, there is little power sharing and there is a lack of communication within the community. Sagkeeng First Nation is not consulted about changes in fishing regulations; there is no board in the community. MDNR contacts with sturgeon fishermen and elders, the exception being when they are enforcing regulations, have been minimal. The biological focus of research on Round Lake and the Pigeon River is far removed from the people on the Winnipeg River, and their knowledge has yet to be integrated with scientific study of sturgeon. There was an initial study of Ojibwe knowledge of sturgeon at Sagkeeng, but further research is required (Hannibal-Paci 1998c).

Barrett (pers.com, 1997) stated that the Nelson River Sturgeon Co-Management Board (NRSCB) has made good headway with the majority of resource users now in agreement over contentious issues, such as statistical analysis and sampling techniques. The major failure of the NRSCB, according to Barrett, is with problems of enforcement. NRSCB members are faced with community members who do not co-operate with the proposed voluntary conservation measures. Those who fish in excess are seen as not acting for the good of the sturgeon. The Board has not found a mechanism for those who choose to act for the good to the Cree or Métis in reaction to MDNR.

Except for the *Nelson River Sturgeon Co-Management Agreement*, there are no good examples of sturgeon co-management. Haugh (1994b:30) argued that “co-managers have made efforts to ensure that conservation needs have been met, but only the sturgeon management initiatives have met the requirements of the Sparrow allocation regime by reserving any harvest surplus for First Nations’ domestic needs.” In communities, such as Sagkeeng, The Pas, and Cumberland House, there are informal arrangements between government and First Nations to manage sturgeon; while in places such as Rainy River only those willing to operate businesses will be involved with sturgeon management. Rainy River First Nations/Manitou Rapids First Nation have operated a sturgeon hatchery since 1993, funding coming from the Band, Ontario Ministry and Ontario Hydro.

6.2.1 First Nations and Co-Management

Berkes (1995:207) noted, with regard to the Churchill River, Saskatchewan, that “the fundamental challenge for successful co-management is the willingness of aboriginal peoples and government agencies to work together, and the mutual recognition of the strengths of the two systems and the extent to which they are complementary.” This willingness to work together and mutual recognition in Saskatchewan is significant, and is dependent on mutual trust and respect. Ann Acco, member of Cumberland House First Nation (pers. com, 1997) believes that co-management is working for her community, even though non-Aboriginal arrogance and ignorance can stifle the process. Acco warns that it will not work unless there is an understanding and acceptance of traditional management and trespass laws, contained in for example, “traditional hunting territories” (i.e., land tenure) and the principle of “all my relations” (Acco, pers. com, 1997).

Traditional hunting territories are communally recognized lands important in accommodating portable, that is individual movable, treaty rights. In essence these are areas that have been historically used and managed by local groups. The principle of all my relations is the operational principle guiding allocation of resource use (access rights). The Cree at Cumberland House are obliged to share resources with treaty, non-treaty, Métis, and non-Aboriginal peoples "if they are hungry." "Being hungry" translates into need, and does not allow for unlimited access and restricts harvests. The operational principle that mediates disputes is, "you must hear me out," meaning that respectful discussions are required and agreement must be reached prior to hunting/harvesting from *traditional hunting territories*. Agreement over access, use and the amount of game hunted is achieved through negotiation, a central feature to traditional resource use practices. Acco noted that the process ensured reasonable conservation. Through such processes, outsiders become aware of whose land they are harvesting, and those local communities who are most directly impacted by amount of resources available will monitor these harvests.

While the Cree at Cumberland House want to manage their resources, the province of Saskatchewan has yet to support traditional approaches. There is no money or resources going into supporting traditional hunting territories or the principle of all my relations. Although there is a Cumberland House Sturgeon Steering Committee, little has been accomplished (Hannibal-Paci 1999). The Opasquyack Cree Nation (OCN) representatives continued to call for formal or informal co-management on the Saskatchewan River with the MDNR closing the Manitoba portion of the Saskatchewan River for conservation reasons (field notes, Nipiwin, 1996). Provincial biologists in

Saskatchewan are more inclined to habitat restoration and finding sources for funding than understanding Cree or Métis views of the sturgeon problem (field notes, Nipiwini, 1996). Management of remaining sturgeon populations on the Saskatchewan River are in the hands of two different resource management agencies and multiple users, none of whom are formally managing impacts on this species (Field notes, Cumberland House, 1997).

There is a fairly relevant record of sturgeon catches on the Saskatchewan River, in particular at Cumberland House since 1782 (Rich 1952), which have been ignored by resource managers. Sturgeon management in Saskatchewan shows a continued failure to manage human behaviour (Wallace 1991). Classical fisheries management, esthetics and ethics were able to manage human behaviour by directly influencing community behaviour. Years after the 1900 collapse of the commercial sturgeon fishery on Lake Winnipeg, Saskatchewan fishers continued to catch sturgeon. The situation in the Cumberland House area is now poor; fishers are not in agreement with provincial and other outsider efforts, which they consider ill conceived, uncoordinated and ineffectual (field notes, Cumberland House, 1997).

In Manitoba and other provincial contexts, no fisheries co-management agreement exhibits characteristics of institutionalized joint decision-making, with government and First Nations as equal partners managing resources at the local level. Berkes, George and Preston (1991:36) have modified Arnstein's ladder of citizen participation, to demonstrate various levels of participation in co-management. Applying this theory to co-management provides a good gauge of where these agreements are functioning. General concepts of citizen participation and control are replaced with specific

characteristics of First Nations. Furthermore, co-management is viewed in degrees rather than absolutes. With these minor changes it is safe to conclude that co-management is functioning within an arena of resource-use anarchy, where it becomes the label applied to agreements or processes that lack the recognition and full co-operation of First Nations. Few provincial co-management agreements are exclusively at the informing and consultation stage. Rarely will First Nation communities participate with provincial governments in sharing information about fisheries, if the rules and regulations run counter to their goals. In most provinces co-management functions somewhere between management boards and advisory committees, on average some degree of community involvement is at work.

6.3 Aboriginal Fishing Rights

Before 1982, Aboriginal fishing rights were subsumed under the terms of the British North America Act, (BNA) 1867, section 91(24) "Indians, and Lands reserved for the Indians." This section of the *BNA Act* sought to describe in law "Indian" rights. For many First Nations, s.91(24) eroded and subsumed Aboriginal rights under Federal jurisdiction, rights that had been earlier established by the Royal Proclamation of 1763. The Royal Proclamation established Aboriginal title and a process whereby all "Indian lands" had to be ceded to the Crown, if and when they changed hands. Along with recognition of title such rights as those associated with fishing were acknowledged and, to some degree, protected by the Crown from unscrupulous land speculators. Aboriginal rights to lands and resources were extinguishable through Treaty with the Crown. The numbered Treaties in Manitoba (1, 2, 3 and 5), are of considerable importance in defining

and constraining Aboriginal fishing rights, as are the evolution of fisheries regulations (federal and provincial) and the jurisdictional separation of “Indians and Indian Lands” and natural resources. A significant change occurred after 1982, but before this discussion some clarity is required.

Aboriginal and Treaty rights were discounted by section 109 of the *BNA Act*, which gave the original four provinces ownership of natural resources as well as jurisdiction over public or Crown lands. (The *Natural Resources Transfer Act* 1930 gave jurisdiction to the Prairie provinces.) The division of provincial and federal powers, in addition to the restrictive measures of the *Indian Act* (for example the provision that “Indians” in Manitoba could not own land from 1876-1951), interfered with Aboriginal and Treaty rights to land and resources. The *Calder* case [1973] S.C.R. 313, supported -to a degree, the Nisga’a claim that their Aboriginal title had never been extinguished, even though the Supreme Court rejected the Nisga’a claim. The *Constitution Act* and the *Charter of Rights and Freedoms*, 1982, and the *Constitutional Amendment Proclamation*, 1983, section 35(1), guaranteed Aboriginal rights and consultation on future amendments to the constitution. This constitutional recognition has led to several significant Supreme Court decisions regarding Aboriginal rights (Aboriginal Justice Inquiry 1991:60-61).

In 1984, the *Guerin* decision [1984] 2 S.C.R. 335 established that the federal government owed a fiduciary responsibility to “Indians” and set out that Aboriginal title is independent of Crown authority. Aboriginal title has been a subset of Aboriginal rights and since *Delgamuukw* [1997] 3 S.C.R. 1010, Aboriginal rights underlay all other rights. However, the title to Aboriginal land must be demonstrated by the test established by the Supreme Court on a case by case basis. *Delgamuukw* (1997) has established that where

Aboriginal title can be shown to exist; provincial (and federal) governments can not infringe on it. The implications of *Guerin* (1984) would be best expressed as manifesting a new rights discourse that eventually was expressed by the Supreme Court of Canada decision, *R. v. Sparrow* [1990] 1 S.C.R. 1075 and with *Delgamuukw* (1997).

There has been an ongoing challenge to the *Fisheries Act* by First Nations who assert fishing as an Aboriginal right (Sharma 1998:38). It is essential to acknowledge the changes after 1982, when legislation authority, expressed for example in the *Fisheries Act* and other federal and provincial Acts, were curtailed and under the scrutiny of Canadian courts. In contrast to the federal court, British Columbia courts have been reluctant to recognize Aboriginal title.

Within the post-*Sparrow* (1990) discourse, “the scheme of restricting Aboriginal rights, present for almost a century through the *Fisheries Act* and its regulations, was declared to be inadequate” (Aboriginal Justice Inquiry 1991:156). Sharma (1998) has argued that since *Sparrow* (1990), Aboriginal fishing rights appear on the surface to be recognized in legal rights to fish for food, societal needs and ceremonial purposes. When one digs more deeply, “the decision has so far proven insignificant and represents a smoke screen of the highest, order, achieved by the obfuscation of legal rhetoric” (Sharma 1998:50). The politicization of fish and fishing increased after 1990 and resulted in such diverse decisions as *Delgamuukw* (1997) and *Marshall* [1999] S.C.J. No.55.

Beyond legal debates, the issues with fish are further compounded by the fact that populations are no longer as robust and reliable as they have been. In fact, many fisheries are exhibiting serious problems such as stock failures. The fish wars are not new at all. In Manitoba sturgeon failed over a hundred years ago, predicted and warned against by First

Nation community leaders and some government officials in the 1890, close to twenty years after having signed treaties (Appendix C). The modern parallels are obvious.

Several First Nations on the Nelson River now predict the demise of sturgeon due to hydroelectric development. The concerns over development have been inadequately addressed. The province, along with Manitoba Hydro, sees fit to continue to side-step Aboriginal concerns. The rejection by fisheries officials of local knowledge has continued in a political, ecological, and historical context that is are relevant today as in the past for various fisheries, cod on the East Coast or salmon in British Columbia. The commercial viability for Manitoba sturgeon may have passed, but its ecological importance remains.

6.4 Interdisciplinary Environment

The Cree and Ojibwe who were interviewed for this study have inter-generational relations with *numao/name*, including sustained use over a significant portion of the overall range. Prolonged and constant contact by newcomers marked the beginning of the colonial period, a period that saw unprecedented changes to human-environmental relations. As a metaphor, sturgeon represents the difficult changes, but not the worst that could have resulted. Like the Plains buffalo, white pine forests and other species sturgeon may be returned from the path of destruction resulting from changing human-environmental relations. Those who were interviewed were born into a world where resources are in jeopardy. Their stories reflect changes to their cultures as much as they reflect changes to their environments and the continuity of both. In this thesis I examine a once reliable and secure fishery, now a heritage in crisis.

Environmental relationships are difficult to follow or understand from a single disciplinary perspective. The thesis has sought to develop an interdisciplinary approach to understand the sturgeon problem today, examining the historic junctures that led to the loss of sturgeon throughout most of its original range. Sturgeon serves as a theme to trace human-environment relations, from archaeology to co-management. History, biology, and resource management studies by themselves all proved inadequate to understand the sturgeon problem; what has been required is a more holistic view. The thesis has equally sought to gather Cree and Ojibwe sturgeon knowledge as traditional environmental knowledge. Sturgeon serves both as a metaphor for historic developments and a window through which changes and adaptations to the environment can be charted.

Cultural theorist N. Thomas (1994:ix) argued that, “only localized theories and historically specific accounts can provide much insight into the varied articulations of colonizing and counter-colonizing representations and practices.” Sturgeon can be traced through the local and historically specific and therefore can provide insights into social change, a metaphor for human-environmental relations and changes to them.

This study is the first study of Cree and Ojibwe traditional environmental knowledge from Manitoba (MacDonell 1996 studied Bayline Métis communities). This research is an in-depth study co-management on the Nelson River and Winnipeg River. In addition to the advancement of scholarship there is practical significance to the thesis. The research has responded to a need from First Nation communities and the Nelson River Sturgeon Co-Management Board to document sturgeon knowledge. Furthermore, the analysis of co-management, if used in a constructive manner, can serve as a powerful tool to reform co-management.

The environmental historian William Cronon stated, "Indians had lived on the continent for thousands of years, and had to a significant extent modified its environment to their purposes. The destruction of Indian communities in fact brought some of the most important ecological changes, which followed the Europeans' arrival in America" (1983:12). Sturgeon is studied to reveal environmental modifications, the destruction of First Nation communities, and the ecological changes that followed European arrival. Interdisciplinary methods have been developed in order to understand past environments. The thesis is concerned with developing a narrative of changes to human-sturgeon relationships. Rather than one inclusive voice, many competing and discordant voices echo from the past. Threads from the fabric of official historic and scientific accounts, which have blanketed academic understanding, are unraveled to find Cree and Ojibwe perspectives. Important ecological changes resulting from the colonization of North America are mirrored today by societal and individual changes to the spiritual, political, economic, historic, and legal ways of life for First Nations.

James Frideres (1988:366) suggested a theoretical model to examine the "Indian reserve as internal colony that is exploited by the dominant White group in Canada." Colonization is not a discreet historic event that is explained away with post-colonial (literary) theory, which is flawed by the assumption that colonization is over. Colonization theory is a powerful tool that can mediate the negotiated meaning of changes to human-sturgeon relations. In order to yield results from this thesis on human-sturgeon relations, traditional environmental knowledge, co-management, and disciplinary knowledge, the first four parts of Frideres' colonization theory are applied as organizing concepts: "incursion of the colonizing group into a geographic area...

destructive effect on the social and cultural structures of the indigenous group... external political control and Native economic dependence” (*ibid.*).

6.5 Colonization Theory

There have been successive frontiers in Manitoba. There has been the imposition of non-Native cultures over Native cultures. The geographic areas that cover portions of the Nelson River, the Winnipeg River, Lake Winnipeg and the Red River have responded and adapted in a variety of ways to this imposition. The colonizers have included the many different ethnic groups that settled the land and converted the resources of this area since the 1700s. The story of incursion of the colonizing group into a geographic area can be told partially through the story of sturgeon.

Cultures and environments are active ingredients in change and; therefore, they are a record of that change. But how can we read these records? It is important to understand that these records document changes in North American resource frontiers, environmental chaos, and changes to ecological systems that reflect social changes that feed back into greater environmental changes. The environmental and social consequences of contact have been the interruption of processes that were already in place. Cree and Ojibwe had established fisheries that were slowly altered by contact with fur traders. Early competition for sturgeon while rare, was expressed, for instance at Cumberland House, where fur traders set their own nets (Rich 1952). There are other instances, such as Rainy River and Grand Rapids, where fur traders represented a new market for sturgeon products (along with other country food and products) (Holzkamm and Wilson 1988). Change to Aboriginal fisheries was caused by commercialization, with

its reordering and exploitation of resources in one place, for consumption by outside groups. The history of sturgeon use searches for meaning and impacts of humans on their environments over time.

For the people and resources of the Lake Winnipeg basin, change and adaptation were common features before contact; this argument is supported by archaeological evidence. After the 1820s, the changes introduced by the settler society to “Manitoba” alarmed Aboriginal peoples. Compared to some other parts of North America, environmental changes in the Lake Winnipeg basin caused by human impacts before 1870 were not drastic and confrontational, though there were exceptions. Before the commercialization of sturgeon, the gradual, cyclic and predictable fisheries supported Aboriginal communities and carried multiple layers of meaning. Then this relationship was simplified: sturgeon became a commodity. Through commercial eyes the environment was land, property and commodity. To the men of commerce the environment was savage, wild and unproductive. If there was a manifest destiny, it was in the commercialization (and depletion) of resources and the displacement of diverse landscapes.

The second part of Frideres’ (1988) colonization theory concerns the destructive effect on the social and cultural structures of Indigenous groups. Sturgeon and sturgeon fisheries were social and cultural structures that were in some ways destroyed by colonization. The destructive effect was not homogeneous. For instance, historical comments by W. S. Tower (1908:361-2) that sturgeon was shunned and destroyed by newcomers in America were only partially true with reference to Manitoba. While sturgeon was destroyed throughout much of its range in Manitoba this was a result of

over exploitation and at no time was the fish shunned the way it was on the Hudson River. Tower's view of the Hudson River reflects a kind of reflexivity inherent in the colonization of the New World and the history produced to explain changes to the environment since contact. Except in the rarest of cases, colonizers, explorers, traders, settler, traveler or visitor, framed nature with familiar references to ones homeland, and this is especially true if one were writing, painting, or photographing for a audience back home. The civilization of the New World would be accomplished through the privileging of ideology and preferential rights given to individuals and corporations.

Bruce Trigger (1982:6) argued that "where traditional native concepts about the past are fundamentally different from Euroamerican ones, it may be necessary to differentiate sharply between the study of such beliefs and conventional ethnohistorical research." Can this concern raised by ethnohistory for differentiation liberate the heuristic, generalizing and totalitarian definitions imposed on First Nations by academics or should "we" suspend all research on First Nations? Rather than suspend "our" studies First Nations and researchers need to enter into a long-term discussion and negotiation over the limits (parameters) of research. In order to understand the destructive effects of colonization on sturgeon, Cree and Ojibwe knowledge, researchers can gather Aboriginal knowledge, what Cree and Ojibwe informants are willing to talk about. This knowledge can be combined with what is collected in published and unpublished documents.

The third part of Frideres' (1988) theory concerns the external political control of First Nations. Historian E. H. Carr (1961) wrote that history is a function of the sources and methods through which historians gathered and communicated what they learned. What historians found in research depended on where they looked, what they looked for

and what they wanted to say. The initial research focus in this thesis was to look develop sturgeon TEK for conservation purposes, gathered from knowledgeable Nelson River Cree fishermen. Research was carried out in published accounts, various archives, and in conversation with various First Nation sturgeon fishers, and the research was widened to include Ojibwe sturgeon knowledge over a larger geographic area. Political control is exercised in each of these different aspects of research in sometimes-unique ways. For example, in the archives First Nations' voices are muted, and where these voices can be read they are usually to serve a political motive of a government or other official.

Fisheries policy clearly failed to manage the reorganization of the fishery to benefit First Nations or in the interest of the broader community. The fourth part of Colonization theory deals with establishment of Native economic dependence. Before commercial for-export sturgeon fisheries, Cree and Ojibwe sustained significant domestic-commercial harvests. Dependencies were created by the separation of commercial from subsistence fisheries, skilled fishing labour from community-based fisheries. Complex sturgeon relations were narrowed to become the exclusive private property of commercial commodity.

Resources are culturally defined; in Western industrialized societies, resources are defined in utilitarian terms. In order to understand one resource, sturgeon, history, science and policy research has been brought together. The thesis forms the documentary record of dialectic between worldviews, of Indigenous peoples and western sciences, which has been and continues to be in conflict. Through increased interest in traditional environmental knowledge the conflict has diminished, but not eliminated. TEK aids in

the de-colonization of the sturgeon problem, recognizing the different social realities of environmental conflicts and changes that have spanned North American since contact.

6.6 Decolonization

To decolonize is to challenge the practices and processes of colonization. Maori theorist Linda Tuhiwai Smith (1999:22) argues, “the imperial imagination enabled European nations to imagine the possibility that new worlds, new wealth and new possessions existed that could be discovered and controlled.” The decolonizing approach in this thesis followed a trajectory from the “imperial imagination” that transformed sturgeon in Manitoba into a commercial commodity and ignored or trivialized Indigenous knowledge. For decolonization to be effective, colonization must be interrupted.

6.6.1 Decolonizing the Disciplines

Perhaps the only way to understand the *sturgeon problem* is to consider that disciplinary perspectives have fragmented the knowledge of sturgeon. Disciplines did not intend to fragment knowledge, but in the rush to specialize they have inadvertently become so narrow as to lose the big picture. The thesis has sought to construct a historic, scientific and cultural context to the sturgeon problem, re-framed by both dominant and marginal memory/knowledge. In the construction an interdisciplinary methodology forces de-colonization. By de-colonization I mean scholarship which exposes forces of the colonial, in particular colonial epistemologies within disciplines. Interdisciplinarity is a “political mission involved in de-colonizing disciplinary approaches since most disciplines are European in origin and their theoretical paradigms developed in response

to European social relations” (Vickers 1991:19). The decolonizing of social relations in North America is contingent on understanding the colonial views of the world, words that described it, and ways the New World was read by colonials.

Disciplines may be “decolonized” by interdisciplinary research, by the very act of researching from outside the arena, to seek the origins and ends of the disciplines and their specialized languages.³⁹ Not satisfied with the simplicity offered by a “rational” mechanistic view of the world, one which is understood in the language of mathematics and conventional disciplines of social and natural sciences, the thesis sought to understand and reflect the complex world as it is ordered by living memory and culture.⁴⁰ The methodology and epistemology of the research has been to understand the world as it has changed and as it came to be.

It would seem the boundaries are dissolving, Berkes (1999:38) has proposed,

[a]s traditional ecological knowledge develops into a distinctive field of its own, one may expect that boundaries will become even more blurred in time, and perhaps it will become a transdisciplinary area, one characterized by the multilevel coordination of the system of concepts used. The two intellectual roots of traditional ecological knowledge, ethnobiology and human ecology, are quite distinct with respect to the interests and backgrounds of the scholars who played a role in their development.

A transdisciplinary area is one where the original disciplines are transcended and changed. This is much more than multidisciplinary, more than interdisciplinary, where

39 The interdisciplinary approach to sturgeon research has been driven by the responsibility to produce new knowledge, which tells the story with respect both for the experiences of Cree and Ojibwe and the disciplines that have been bridged. Rigor in the interdisciplinary borrowings and bridging result from the “*theory of enoughness*” (Vickers 1991), which demands that languages, approaches, theories, and data, is applied responsibly.

40 Scientific reports were read as one reads literature and history. Biological studies are indeed a kind of literature and the older studies are historic. It is difficult to read the scientific studies of sturgeon in Manitoba and find any semblance of attention to environment and culture. Both elements are the context in which these studies were undertaken, unspoken, and mute. The audiences for these reports were other biologists and policy makers, not the general public, not First Nations communities.

the disciplines themselves remain intact. Timothy Forsyth (1998:241) argues that the use of different, “environmental knowledge and techniques in a blended natural and social science is increasingly being called ‘hybrid research’... the use of several disciplinary approaches to generate various forms of environmental knowledge about biophysical processes that are ‘externally real’ to human experience.” Such interdisciplinary “hybrid research” provides more than combined disciplinary perspectives, it reaffirms each discipline as well, showing that the knowledge produced in history, zoology, and natural resources, are instrumental in understanding the sturgeon problem. In the application of these ideas, TEK reflects a growing awareness and interpretation of Indigenous knowledge of the environment. Such knowledge is not restricted to habitat, behaviours, seasonal change, and unprecedented environmental change; but also, social, political, economic and spiritual changes. One area where this important research can be applied is to improve management. For First Nations, this represents an opportunity to decolonize western approaches, including natural resource management, to better serve the collectivist interests of First Nations.

6.6.2 Decolonizing Fisheries Management

Has fisheries policy served the public good? As I have suggested in the thesis it serves only part of the public. How the public good has been defined over time has changed. At one time the public good was defined by exclusion of First Nations. In the past ten years resources have become more and more limited. As well, the shift in fisheries policy, in Manitoba and Canada, has been increasingly towards dealing with conflicts by using more inclusive approaches. There is increasing concern not to infringe

on Aboriginal rights to fish. But is it based on recognition of Treaty rights? Indirectly Manitoba's sturgeon policy respects and affirms Treaty and Aboriginal rights, although MDNR probably does not see it as such, based on the experience with NRSCB.

Significant ethical issues arise from the collection and appropriate use of traditional environmental knowledge. Indigenous knowledge has been ignored, misrepresented and misused to legitimize scientific research and fisheries regulations in the past. Issues of authenticity and methodological considerations of utility are as important to the paradigm of TEK as is the actual knowledge itself. First Nations everywhere practice Indigenous knowledge. Traditional environmental knowledge is constituted through an interaction with researchers who write and research this knowledge. The issues of ownership, of language, of voice, how things are said, and the intersections with the dominant discourse are of grave importance. Fisheries managers must begin the process of decolonizing fisheries management by challenging the ethnocentric and racist epistemology that require managers to ignore Indigenous knowledge as anecdotal.

6.7 Conclusion

This study of traditional environmental knowledge has drawn heavily from historical, social and scientific research into Cree and Ojibwe sturgeon relations in Manitoba. Following the introduction, Chapter 2 examined and developed theory for Cree and Ojibwe sturgeon knowledge as TEK in co-management. Chapter 3 examined the history of sturgeon management in the province. In chapter 4, traditional sturgeon

knowledge was introduced as three case studies. TEK is an important part of a fuller understanding of the fishery, as an alternative to the exclusivity of science or history.

What we know of the environment depends to a great extent on culture and in particular learning from those who have knowledge, some for many generations (others for not so many) with sturgeon. The knowledge of Cree and Ojibwe could be useful in management, but as demonstrated in the previous chapter, the application and possible integration of such knowledge in Manitoba is at a standstill. The failure of government to move beyond the old scientific fisheries management thinking is a failure in creativity and adaptation, which will continue to dam the sturgeon-human relations.

As a management policy option, co-management is still in its infancy. How effective it is in resolving resource crises will depend on how it addresses the multiple factors that caused the crisis to develop.⁴¹ In the Northwest Territories, a considerable effort and commitment is currently directed toward formal arrangements, partly a result of co-management becoming enshrined in comprehensive land claims in the north. In contrast, many of the provinces seem to be focused on lesser degrees of power sharing, but higher degrees of consultation and informal arrangements. Even land claims agreements cannot resolve many multi-stakeholder disagreements. The process fails in areas where jurisdictional overlap and competing interests are inflexible. With the exception of Quebec, Labrador and British Columbia, there has been limited action by provincial authorities to negotiate comprehensive land claims.

41 The successes and failures of co-management, within Canadian politics and natural resource management will continue to be essentially formed by the experiences of both Aboriginal and non-Aboriginal peoples. In the long run, co-operation provides greater results than competition for resources. Co-management fails when the attitudes and behaviours of each party become irreconcilable. Moreover, when co-management becomes devolution of responsibility the process loses its effectiveness. For it to work, recognition of rights and obligations, transfers of adequate resources, supporting legislation and

On the Nelson River there is support for closing open access conditions (field notes, York Landing and Norway House, 1997), but who will regulate the fishery? Restricting or excluding access is becoming the cornerstone management function in both Indigenous and State systems. The difference between the two is that Indigenous systems are based on local control of access within a community of users. Even at Sagkeeng where there has been long term employment from the sports fishery, the community would favour control over fish resources (field notes, 1998, Sagkeeng). Centralized state controls tend to be disconnected from the local, outside the influences of a local group. Bankes (1995:6) noted "if enforcement is severed from management, and left with institutions of government rather than with the resource users, then it is hard to see why this model should be able to cope with the dilemmas of common property resources." The provinces continue to find it prudent to avoid shared management of common property resources due to lack of clarity on Aboriginal and Treaty rights, and also because they deny the existence of these "special" rights.

Campbell (1996:4) noted that First Nations are routinely ignored by provincial authorities and therefore are without "an enforceable position, ideally established in law and policy, which can then be formally institutionalized in the co-management process." Federal and provincial resource agencies tend to take an *ahistoric* approach to Aboriginal rights, leaving courts to delineate these for traditional lands and resources. But the courts make poor natural resource managers and Aboriginal fishers will continue to enter into conflicts with governments and natural resource industries. There are also differences

shared goals are necessary. Criticism has been that it has failed to be a cure-all, a dispute resolution mechanism to clarification treaty rights and government responsibilities.

within First Nations, in how they manage conflicts over lands and resources. Often the roots of these conflicts result from colonization.

Co-management remains a distinctively non-Aboriginal concept and process that does not guarantee full and equal participation of First Nations in resource management. In the gap between provincial regulation and enforcement and First Nations' control, resource-use anarchy reigns. Co-management is hindered by disagreements about what is to be shared and Berkes (1996:20) found "a major political problem, is that some government circles and some native groups in Canada have been moving away from the concept of co-management." If each group sees resources from their own limited perspectives then management has limited opportunities for success. When it comes to negotiating an agreement, even after all interests have been heard, provincial governments maintain Ministerial prerogative and are distanced from local groups. Ministerial prerogative inevitably negates negotiation with final decision-making powers invested in the Crown, not the people. Public interest brokerage-politics, with stakeholders pitted against each other for some say over how resources are used, can quickly sour the good faith and trust needed to establish a formal agreement. Decision-making, power, or money to implement co-management flow from outside of Aboriginal communities. This weakens partnerships in decision-making. Institutional support is essential for the resolution of conflicts; First Nations and provinces must forge relationships of trust and mutual respect.

As analysis of the sturgeon problem has revealed a lack of appreciation in the documentary evidence for traditional management institutions. The problems today have definite and knowable historical roots. Furthermore, I have identified a serious issue of

noncompliance by local-users when they are not actively involved in fisheries management. The sturgeon fishery in Manitoba represents significant and unchecked economic development. The introduction of co-management has done nothing to address these historical roots and until it does there can be no possible resolution. Given enough time, co-management may well prove to be the process by which First Nations and provincial governments can address resource-use issues. Henry Letander (pers. com,1997), elder from Sagkeeng, told me, “we can't do this alone. My chief told me we need his [Terry Dick –scientific] knowledge and my [traditional] knowledge together.” The basis for resolving failures is this shared realization: we must work together to successfully manage human behaviour within sustainable limits. Nobody knows what future sturgeon have in Manitoba. The state of scientific knowledge for the fish is fairly comprehensive, though isolated from the cultural and historic knowledge of the fish. The history of the fishery is now fairly well established, though lacking the insights of science. A significant weakness is lack of research on Traditional knowledge. Synthesis and integration of this specialized knowledge are being initiated across Canada. More work needs to be done to establish the breadth and depth of Traditional knowledge. In order to comprehend the significance of such knowledge, other cultures could be studied comparatively. Perhaps research that combines history and science, culture and ecology, will enable us to learn from the past.

References

- Abel, K. and J. Friesen
(eds.).1991. **Aboriginal resource use in Canada: Historical and legal aspects**. Winnipeg: University of Manitoba Press.
- Abele, F.
1997. "Traditional Knowledge in Practice." **Arctic** 50(4):iii-iv.
- Albers, P. and W. James
1984. "Hunting ideology and the Fur Trade: A review essay." **Plains Anthropologist** 29:73-79.
- Allain, J. and J-D. Fréchette
1993. **The Aboriginal Fisheries and the Sparrow Decisions**. Ottawa: Library of Parliament: Research Branch.
- Angel, M.
1997. **Discordant Voices, conflicting visions. Ojibwa and Euro-American perspectives on the Midewiwin**. Winnipeg: PhD thesis, University of Manitoba.
- Apffel-Marglin, F.
1996. "Rationality, the Body, and the World: From Production to Regeneration." F. Apffel-Marglin and S. A. Marglin (eds.). **Decolonizing Knowledge. From Development to Dialogue**. Oxford: Clarendon Press. 142-181.
- Aronson, S.
1988. **Selected Documents Concerning Indian Treaties in Canada and Hunting and Fishing Rights**. Ottawa: Treaties and Historical Research Center, Indian and Northern Affairs Canada.
- Arnstein, S. R.
1969. "Ladder of citizen participation." **American Institute of Planners Journal** July:215-224.
- Arthurs, D.
1982. **The Long Sault Site: Cultural Dynamics in the Rainy River Valley of northwest Ontario**. Winnipeg: MA thesis, University of Manitoba.
- Auer, N. A.
1996. "Response of Spawning Lake Sturgeon to Change in Hydroelectric Facility Operation." **Transactions of the American Fisheries Society** 125:66-77.

Axtell, J.

1979. "Ethnohistory: An Historian's Viewpoint." *Ethnohistory* 26(1):1-13

Ayles, H., S. Brown, K. Machniak and J. Sigurdson

1974. **The fisheries of the lower Churchill lakes, the Rat-Burntwood lakes, and the upper Nelson lakes: Present conditions and the implications of hydroelectric development.** Winnipeg: Lake Winnipeg, Churchill and Nelson Rivers Study Board. Technical Report.

Bajkov, A. D.

1933a. "Sturgeon --Pigeon River." **Report of Fisheries Investigation.** Winnipeg: Manitoba Department of Natural Resources, Fisheries Branch.

1933b. **Report of the Scientific Investigation of Manitoba Fisheries.** Winnipeg: Manitoba Department of Natural Resources, Fisheries Branch.

Ballantyne, R. M.

1856. **The young fur-traders.** Toronto: Ward, Lock and Company.

Balmer, A.

1983. **Zooarchaeology in the south-central Canadian shield: an assessment of its current use and potential.** Winnipeg: MA thesis, University of Manitoba.

Bankes, N.

1995. "Co-management vs. co-jurisdiction: notes for remarks." Paper presented at a conference on co-management, University of Calgary.

Baraga, F.

1992. **A Dictionary of the Ojibway Language.** St Paul: Minnesota Historical Society.

Barka, N. and A. Barka

1976. **Archaeology and the fur trade: the excavation of Sturgeon Fort, Saskatchewan.** Ottawa: Indian and Northern Affairs, History and Archaeology 7.

Beardy, F. and R. Coutts

(eds.). 1996. **Voices from Hudson Bay: Cree stories from York Factory.** Montreal: McGill-Queen's University Press.

Bellhouse, A.

1971. **Environmental and Historic Background of South Indian Lake.** Winnipeg: University of Winnipeg Press.

Benson, N. G.
(ed.). 1970. **A Century of fisheries in North America**. Washington: American Fisheries Society.

Berg, L., P. Dearden and T. Fenge
1995. "The role of aboriginal people in National Park designation, planning, and management in Canada." P. Dearden and R. Rollins (eds.). **Parks and Protected areas in Canada: Planning and Management**. Location: publisher:225-247.

Berkes, F.
1982. "Waterfowl Management and Northern Native People with Reference to Cree Hunters of James Bay." **Musk-Ox** 30:23-35.

1983. "Quantifying the harvest of native subsistence fisheries." R. W. Wein, R. R. Riewe and L. R. Methven (eds.). **Resources and Dynamics of the Boreal Zone**. Ottawa: ACUNS. 346-63.

1987. "Common-Property Resource Management and Cree Indian Fisheries in Subarctic Canada." B. McCay and J. Acheson (eds.). **The question of the commons: the culture and ecology of communal resources**. Tucson: The University of Arizona Press. 66-91.

1989. "Co-management in the James Bay Agreement." E. Pinkerton (ed.). **Co-operative management of local fisheries. New directions for improved management and community development**. Vancouver: University of British Columbia Press. 181-208.

1993. "Traditional ecological knowledge in perspective." J. Inglis (ed.). **Traditional Ecological Knowledge: Concepts and Cases**. Ottawa: Canadian Museum of Nature, International Development Research Center. 1-9.

1994. "Co-management: Bridging the two solitudes." **Northern Perspectives** 22(2/3):18-20.

1995. "The role of co-management in conservation planning." P. Jonker (ed.). **The Churchill: A Canadian heritage river**. Saskatoon: University of Saskatchewan. 202-207.

1996. "Questions in the Canadian north." **World Conservation** 96(2):20.

1999. **Sacred Ecology: Traditional Ecological Knowledge and Resource Management**. Philadelphia: Taylor and Francis.

Berkes, F. and D. Feeny
1990. "Paradigms Lost: Changing views on the use of Common Property Resources." **Alternatives** 17(2):48-55.

- Berkes, F., P. George and R. Preston
1991. "Co-Management: The Evolution of the Theory and Practice of Joint Administration of Living Resources." **Alternatives** 18(2):12-18.
- Berkes, F., P. George and R. Preston, J. Turner, A. Hughes, B. Cummins and A. Haugh
1992. **Wildlife Harvest in the Mushkegowuk Region**. Hamilton: McMaster University, TASO Report 2(6).
- Berkes, F., R. Preston and J. Turner
1993. **The Cree View of Land and Resources: Indigenous ecological knowledge**. Hamilton: McMaster University, TASO Report 8.
- Berkes, F., P. George and R. Preston, A. Hughes, J. Turner and B. Cummins
1994. "Wildlife Harvesting and Sustainable Regional Native Economy in the Hudson and James Bay Lowlands, Ontario." **Arctic** 47(4):350-360.
- Berkes, F., P. George and R. Preston, A. Hughes, B. Cummins and J. Turner
1995. "The Persistence of Aboriginal Land Use: Fish and Wildlife Harvest Areas in the Hudson and James Bay Lowlands, Ontario." **Arctic** 48:81-93.
- Berkes, F., C. Folke and M. Gadgil
1995. "Traditional Ecological Knowledge, Biodiversity, Resilience and Sustainability." C. Perrings, K. Maler, C. Folke, C. Holling and B. Jansson (eds.). **Biodiversity Conservation: Problems and Policies**. Dordrecht: Kluwer Academic Publishers. 269-287.
- Berkes, F., C. Paci, I. McDonald, K. Warkentin
1997. **Cross Lake Historic Harvest Study**. Prepared for the Cross Lake Harvest and Consumption Study Steering Committee, Cross Lake First Nation, Manitoba Hydro, and the Government of Manitoba.
- Beyette, J.
1994. **Nutimik Lake to Slave Falls Sturgeon Data Report 1983-1994**. Winnipeg: Department of Natural Resources, Operations Division, Fisheries Branch.
- Bird, B.
1984. **Problems of economic development on Manitoba Indian reserves: (with emphasis on the Sioux Valley and Norway House reserves.)** Winnipeg: Social Planning Council of Winnipeg.
- Bishop, C.
1970. "The emergence of hunting territories among northern Ojibwa." **Ethnology** 9(1):1-15.

1974. **The northern Ojibwa and the fur trade: an historical and ecological study.** Toronto: Holt, Reinhart Winston.

Black-Rogers, M.

1982. "Foreword." T. Overholt and J. Callicott (eds.). **Clothed-in-furs and other Tales: an introduction to an Ojibwa world view.** New York: University Press of America. xv-xvii.

Blakey, R.

1856. **Historical sketches of the Angling Literature of all Nations.** London.

Bloomfield, L.

1930. **Sacred Stories of the Sweet Grass Cree.** Ottawa: King's Printer.

Boulding, K. E.

1961. **The Image: Knowledge in Life and Society.** Ann Arbor: University of Michigan Press.

Boutet, D.

1993. "Interdisciplinarity in the Arts." **Harbour** 2(2):66-72.

Bray, M.

(ed.). 1970. **The journals of Joseph N. Nicollet. A scientist on the Mississippi headwaters with notes on Indian life, 1836-1837.** St. Paul: Minnesota Historical Society.

Brice, J. J.

1898. "A manual of fish culture based on the methods of the U.S. Commission of Fish and Fisheries." **United States Bureau of Fisheries.** Washington: Government Printing Office, Vol 23:189-91.

Brightman, R.

1987. "Conservation and resource depletion: the case of the Boreal Forest Algonquians." B. McCay and J. Acheson (eds.). **The question of the commons: the culture and ecology of communal resources.** Tucson: The University of Arizona Press. 121-194.

1993. **Grateful Prey: Rock Cree Human-Animal Relationships.** Berkeley: University of California Press.

Brody, H.

1981. **Maps and Dreams: Indians and the British Columbia Frontier.** Vancouver: Douglas and MacIntyre.

Broughton, J.

1995. **Resource depression and intensification during the late Holocene, San Francisco Bay: evidence from Emeryville Shellmound vertebrate fauna.** Washington: PhD thesis, University of Washington.

Brown, J.

1996. "Introduction." J. Brown and E. Vibert (eds.). **Reading Beyond Words: Contexts for Native History.** Peterborough: Broadview Press. ix-xxxviii.

Bruch, R.

June 28, 1995. Fisheries Supervisor, Wisconsin Department of Natural Resources (WDNR), to Joe O'Connor, Fisheries Branch, MDNR. Manitoba Hydro files, Thompson.

Brouwer, J.

1998. "Indigenous knowledge: the proof is in the eating of the pudding." **Indigenous Knowledge and Development Monitor** 6(3):1-4.

Buchner, A.

1979. **The 1978 Caribou Lake Project, including a summary of the prehistory of east-central Manitoba.** Winnipeg: Manitoba Department of Cultural Affairs and Heritage Resources, Historic Resources Branch, Final Report 8.

1981. **A Palaeo Lithic Camp and Kill Site in Manitoba.** Winnipeg: Department of Cultural Affairs and Heritage Resources, Historical Resources Branch, Final Report 16.

1982. **Material Culture of the Bjorklund Site.** Winnipeg: Department of Cultural Affairs and Heritage Resources, Miscellaneous Report 13.

Buckley, H.

1992. **From wooden ploughs to welfare: why Indian policy failed in the Prairie Provinces.** Montreal: McGill University Press.

Buege, D.

1996. "The Ecologically Noble Savage Revisited." **Environmental Ethics** 18(1):71-88.

Burr, B. M. and R. L. Mayden

1992. "Phylogenetics and North American freshwater fishes." R. L. Mayden (ed.). **Systematics, Historical Ecology, and North American Freshwater fishes.** Stanford: Stanford University Press. 18-75.

Burton, T.

1977. **Natural Resource Policy in Canada, Issues and Perspectives.** Toronto: McClelland and Stewart.

Campbell, T.

1996. "Co-management of Aboriginal resources." **Information North** 22(1):1-6.

Canada.

1871. **Canada Sessional Papers**, Annual Report of the Department of Fisheries, Fisheries Branch (hereafter C.S.P., Fisheries Report) 117-121.

1873. C.S.P., Fisheries Report. 187-195.

1875. C.S.P., Fisheries Report. 171-174.

1876. C.S.P., Fisheries Report. 225-226.

1877. C.S.P., Fisheries Report. 348-351.

1878. C.S.P., Fisheries Report. 309-311.

1885. C.S.P., Fisheries Report. 139-151, 297-299.

1883. C.S.P., Annual Report of the Department of Indian Affairs (hereafter Indian Affairs Report).

1888. C.S.P., Indian Affairs Report.

1895. C.S.P., Indian Affairs Report.

1898. C.S.P., Fisheries Report. Lvi-Lx.

1887. **Senate Select Committee to investigate the state of natural food products of the Northwest**. 1st session, 6th parliament, 50 V.

1916. "Conservation of Fish, Bird and Game." **Committee of Fisheries, game and fur-bearing animals**. Toronto: Methodist Book publishing house.

1957 (reprint). **Treaties 1 and 2 between Her Majesty The Queen and The Chippewa and Cree Indians of Manitoba and Country Adjacent with Adhesions**. Ottawa: Queen's Printer.

1966 (reprint). **Treaty No. 3 between Her Majesty The Queen and The Saulteaux Tribe of the Ojibbeway Indians at the Northwest Angle on the Lake of the Woods with Adhesions**. Ottawa: Queen's Printer.

1966 (reprint). **Treaty No. 4 between Her Majesty The Queen and The Cree and Saulteaux Tribes of Indians at Qu'Appelle and Fort Ellice.** Ottawa: Queen's Printer.

1969 (reprint). **Treaty No. 5 between Her Majesty The Queen and The Saulteaux and Swampy Cree Tribes of Indians at Beren's River and Norway House with Adhesions.** Ottawa: Queen's Printer.

1996. **Report of the Royal Commission on Aboriginal People.** Ottawa: Department of Supply and Services. 2(2):665-685.

National Archives of Canada (NAC), Ottawa.
Department of Fisheries. RG 23/v. 700.

Fisheries Commissioners report, hearings. RG 23/v. 366/263.

Carlander, K. D.

1969. **Handbook of Freshwater Fisheries Biology.** Iowa: Iowa State University Press.

Carmichael, P.

1979. **The Thunderbird Site, EgKx-15: A Prehistorical Petroform and Habitat Site in Manitoba.** Winnipeg: Manitoba Department of Tourism and Cultural Affairs, Historical Resources Branch, Final Report 6.

Carr, E. H.

1961. **What is History?** New York: Vantage.

Carter, S.

1980. "Agriculture and agitation on the Oak River reserve, 1875-1895." **Manitoba History.** 2-9.

1990. **Lost harvests: prairie Indian reserve farmers and government policy.** Montreal: McGill-Queen's University Press.

Casteel, R.

1976. **Fish Remains in Archaeology and Palaeo-Environmental Studies.** London: Academic Press.

Cleland, C.

1966. **The Prehistoric Animal Ecology and Ethnozoology of the Upper Great Lakes region.** Ann Arbor: Museum of Anthropology, The University of Michigan, Anthropological Papers 29.

1982. "The Inland Shore Fishery of the Northern Great Lakes: its development and importance in prehistory." **American antiquity** 47(4):761-784.

Cobb, J. N.

1900. "The Sturgeon Fishery of Delaware River and Bay." Government of the U.S.A. **Report of the Commissioner for the Year ending June 30, 1899**. Washington: Government Printing Office. 369-80.

Collette, C.

1989. "The other anadromous fish. Sturgeon stewardship is also a goal of fish and wildlife programs." **Northwest Energy News** (March/April):27-9.

Colorado, P.

1988. "Bridging native and Western Science." **Convergence** XXII(2/3):49-68.

Cordell, J.

1978. "Carrying capacity analysis of fixed-territorial fishing." **Ethnology** XVII(1):1-24.

Cordell, K.

March 17, 1992, memo to Councillor E. Scott, Cross Lake Band, Mayor John Thorne, Pikwitonei, Mayor Maurice Clemons, Thicket Portage, and Mayor Dennis Dwyer, Wabowden. Manitoba Hydro archival files, Thompson.

Coues, E.

(ed.).1897. **New Light on the Early History of the Greater Northwest. The Manuscript Journals of Alexander Henry Fur trader of the North West Co. and of David Thompson official Geographer of the same Co. 1799-1814.**Vol. I. New York: Francis Harper.

Couture, P.

1991. "Explorations in Native Knowing." Friesen (ed.). **The Cultural Maze**. Calgary: Detselig. 53-73.

Cronon, W.

1983. **Changes in the Land: Indians, Colonists and the Ecology of New England**. New York: Hill and Wang.

Cross Lake First Nation, Manitoba Hydro and the Province of Manitoba

April 27, 1993. **Settlement Agreement, between Cross Lake First Nation, Manitoba Hydro and the Province of Manitoba.**

Cross Lake First Nation

1991 (unpublished). **Proceedings (Vol. I-III), Arbitration re: claims 110 and 44.** Testimony of Cree Cross Lake sturgeon fishermen. November 4-7.

Cruikshank, J

1984. "Oral Tradition and Scientific Research: Approaches to Knowledge in the North." Association of Canadian Universities for Northern Studies (ed.). **Social Science in the North, Communicating Northern Values.** Ottawa: ACUNS. 3-24.

1997. **Life Lived Like a Story.** Vancouver: University of British Columbia Press.

Dasmand, R. F.

1976. **Environmental Conservation, fourth edition.** Toronto: John Wiley and Son Ltd.

De Rohan-Czermak, G.

1963. **Sturgeon Hooks of Eurasia.** Translated by R. Heizer. Chicago: Aldine Publishing.

Decker, J. F.

1996. "Country Distempers: Deciphering Disease and Illness in Rupert's Land before 1870." J. Brown and E. Vibert (eds.). **Reading Beyond Words: Contexts for Native History.** Peterborough: Broadview Press. 156-181.

Dewalt, B.

1994. "Using Indigeneous Knowledge to Improve Agriculture and Natural Resource Management." **Human Organization** 53(2):123-131.

Dewdney, S.

1965. **Stone Age Paintings.** Manitoba: Department of Mines and Natural Resources, Parks Branch.

1975. **The Sacred Scrolls of the Southern Ojibway.** Toronto: University of Toronto Press.

Dick, T. and A. Choudhury

1992. **The Lake Sturgeon, *Ancipenser fulvescens* (Chondrostei: Acipenseridae): An Annotated Bibliography.** Ottawa: Canadian Technical Report of Fisheries and Aquatic Sciences, 1861.

Dick, T., H. Letander, K. Morrisseau and C. Paci

1998. "Namay: A Northern Resource in Crisis." J. Oakes and R. Riewe (eds.). **Issues in the North, Vol. III.** Edmonton: Canadian Circumpolar Institute. 181-190.

- Dickson, G.
1975. **Excavations at SIL 54, Progress Report No. 1.** Winnipeg: University of Winnipeg Press.
1980. **The Kame Hills Site.** Winnipeg: Manitoba Department Cultural Affairs and Heritage Resources, Historical Resources Branch, Final Report 9.
- Doherty, R.
1990. **Disputed waters: Native Americans and the Great Lakes fishery.** Kentucky: University of Kentucky Press.
- Doubleday, N.
1989. "Co-management provisions of the Inuvialuit Final Agreement." E. Pinkerton (ed.). **Co-operative management of local fisheries. New directions for improved management and community development.** Vancouver: University of British Columbia Press. 209-230.
1993. "Finding Common Ground: Natural Law and Collective Wisdom." J. Inglis (ed.). **Traditional Ecological Knowledge: Concepts and Cases.** Ottawa: Canadian Museum of Nature and IDRC. 49-51.
- Douglas, M.
1986. **How Institutions Think.** Syracuse: Syracuse University Press.
- Dreske, F. I.
1981. **Knowledge and the flow of Information.** Cambridge: MIT Press.
- Driver, E. A. and K. H. Doan
1972. **Fisheries survey of Cross Lake (Nelson River), 1965.** Winnipeg: Manitoba Department of Natural Resources and Environmental Management, Resources Branch, manuscript report No. 73-5.
- Droshov, S., F. Binkowski, T. Thuemler and D. Mackinac
(eds.). 1996. **Culture and Management of Sturgeon and Paddlefish symposium proceedings.** American Fisheries Society: International Congress on the Biology of Fishes. San Francisco State University.
- Enns, R.
1983. unpublished. "Jackriver and Norway House District Reports (for History 7404-1)." Paper for Dr Jennifer Brown and HBCA, Winnipeg.
- Faries, R.
1938. **A Dictionary of the Cree Language.** Toronto: Anglican Church.

- Fast, H.
1996. **Subsistence in the Hudson Bay Bioregion: Land use, Economy and Ethos.** Winnipeg: Ph.D. thesis, University of Manitoba.
- Feilding, J. B.
1916. "Conservation of Canada's inland fisheries." **Conservation of Fish, Birds and Game.** Toronto: Methodist Book and Publishing House.
- Feit, H.
1969. **Mistassini Hunters of the Boreal Forest. Ecosystem Dynamics and Multiple Subsistence Patterns.** Montreal: M.A. thesis, McGill University.
1987. "Waswanipi Cree management of land and wildlife: Cree cultural ecology revisited." B. Cox (ed.). **Native Peoples: Native Lands.** Ottawa: Carleton University Press.
- Ferradas, C.
1998. "Comments." **Current Anthropology** 39(2):239-240.
- Findeis, E.
1993. **Skeletal anatomy of the North American Shovelnose sturgeon Scaphirhynchus Platyrhynchus (Rafinesque 1820) with comparison to other Acipenseriformes.** Massachusetts: Ph.D. thesis, University of Massachusetts.
- Findlay, C. S., D. Legarec, J. Houlahan, M. Sawada, R. McGillvary and B. Haas.
1996. **A Retrospective Assessment of the Rights to Lake Sturgeon (*Acipenser fulvescens*) in the lower Saskatchewan River.** Ottawa: University of Ottawa.
- Forsyth, T.
1998. "Comments." **Current Anthropology** 39(2):240-241.
- Fourre, J.
August 17, 1994. "Temporary sturgeon ban planned for next year." **Opasquia Times.** The Pas, Manitoba. Manitoba Hydro archival files, Thompson.
- Francis, D.
1992. **The imaginary Indian: the image of the Indian in Canadian culture.** Vancouver: Arsenal Pulp Press.
- Freeman, M.
1989. "The Alaska Whaling Commission: Successful co-management under extreme conditions." E. Pinkerton (ed.). **Co-operative management of local fisheries. New directions for improved management and community development.** Vancouver: University of British Columbia Press. 137-153.

1992. "The Nature and Utility of Traditional Ecological Knowledge." **Northern Perspectives** 20(1):9-12.

Freire, P.

1988. **Pedagogy of the Oppressed**. New York: Continuum.

Frideres, J.

1988. **Native Peoples in Canada: Contemporary Conflicts (3rd Edition)**. Calgary: University of Calgary Press.

Friesen, G.

1987. **The Canadian prairies: a history**. Toronto: University of Toronto Press.

Friesen, J.

1991. "Grant me Wherewith to Make My Living." K. Abel and J. Friesen (eds.). **Aboriginal resource use in Canada: Historical and legal aspects**. Winnipeg: University of Manitoba Press. 141-156.

Gaboury, M. N. and J. W. Patalas

1984. **The fisheries of Cross, Pipestone, and Walker lakes, and the effects of hydroelectric development**. Winnipeg: Manitoba Department of Natural Resources, manuscript report No. 82-14.

Gadgil, M., F. Berkes, and C. Folke

1993. "Indigenous Knowledge for Biodiversity Conservation." **Ambio** 2-3(May):151-156.

Gislason, G., J. Macmillan, J. Craven

1982. **The Manitoba commercial freshwater fishery: an economic analysis**. Winnipeg: University of Manitoba Press.

Gleach, F.

1996. "Controlled Speculation: Interpreting the Saga of Pocahontas and Captin John Smith." J. Brown and E. Vibert (eds.). **Reading Beyond Words: Contexts for Native History**. Peterborough: Broadview Press. 21-42.

Glenn, A. L.

1927. **A History of the University of Manitoba, February 20, 1877 to February 28, 1927**. Winnipeg: MA thesis, University of Manitoba.

Glover, R.

(ed.).1958. **A Journey From Prince of Wales's Fort in Hudson's Bay to the Northern Ocean, 1769, 1770, 1771, 1772, by Samuel Hearne**. Toronto: MacMillan.

- Gough, J.
1991. **Fisheries management in Canada 1880-1910**. Canada: Manuscript of Fisheries and Aquatic Sciences 2105.
- Greenblatt, S.
1991. **Marvelous Possessions: The Wonder of the New World**. Chicago: University of Chicago Press.
- Grey Owl (Archie Belaney)
1936. **Tales of an Empty Cabin**. Toronto: MacMillan.
- Gulig, A.
1995. "Sizing up the Catch: Native-Newcomer Resource Competition and the Early Years of Saskatchewan's Northern Commercial Fishery." **Saskatchewan History** 47:3-12.
- Hallowell, A. I.
1992. **The Ojibwa of Berens River, Manitoba**. Jennifer Brown (ed.). New York: Harcourt Bruce College.
- Hamilton, S.
1981. **1979 Excavations at the Stott Site (D1Ma-1): with interpretation of cultural stratigraphy**. Winnipeg: Manitoba Department of Cultural Affairs and Heritage, Historic Resources Branch.

1991. **Archaeological Investigations at the Wapekeka Burial Site (FLJj-1)**. Thunder Bay, Ontario: Lakehead University.
- Hamilton, S., W. Ferris, S. Hallgrimson, G. McNeely, K. Sammons, E. Simonds and K. Topinka.
1981. **1979 Excavations at the Stott Site (D1Ma-1): With Interpretations of Cultural Stratigraphy**. Winnipeg: Manitoba Department of Cultural Affairs and Heritage, Historic Resources Branch, Papers in Manitoba Archaeology, Miscellaneous Paper 12.
- Hanna, M.
1975. **Investigations of the MacBride-Barrington Locale, Research Report No.1**. Winnipeg: Archaeological Research Centre, University of Winnipeg.

1981. "An Analysis of Fish Scales From Aschikibokanhn FbMb-1 West-Central Manitoba." **Manitoba Archaeological Quarterly** 5(3): 20-39.

Hannibal-Paci, C.

1997. "Namew as an Under-Rated Economic Resource: A Review for Lake Sturgeon (*A. fulvescens*) in Manitoba's Archaeological Literature." **Manitoba Archaeological Journal** 7(2):77-95.

1998a. **Cree knowledge of lake sturgeon: York Landing**. Report prepared for York Landing First Nation.

1998b. **Cree knowledge of lake sturgeon at Norway House**. Report prepared for Norway House First Nation.

1998c. **Ojibwe knowledge of lake sturgeon at Sagkeeng**. Report prepared for Sagkeeng First Nation and Dr Terry Dick.

1998d. "Historical Representations of Lake Sturgeon by Native and non-Native artists." **Canadian Journal of Native Studies** 18(2):203-232.

1998e. "Officers of the HBC, Missionaries and Other Intelligent Persons in the District of Keewatin": Lake Winnipeg Sturgeon as an Aboriginal Resource." D. Pentland (ed.). **Papers of the Twenty-ninth Algonquian Conference**. Winnipeg: University of Manitoba Press. 128-149.

1999. "Securing the Future for Lake Sturgeon: The Debate About Co-Management." D. Wall, M.M.R. Freeman, P.A. McCormack, M. Payne, E.E. Wein and R.W. Wein (eds.). **Securing Northern Futures: Developing Research Partnerships**. Edmonton: Canadian Circumpolar Institute Press. 81-86.

Hardin, G.

1968. "The Tragedy of the Commons." **Science** (December 13):1243-8.

Harkness, W.

1980. **Report on the Sturgeon Situation in Manitoba**. Manitoba: Natural Resources, Fisheries Branch, MS. Report 80-3.

Harkness, W. and J. Dymond.

1961. **The lake sturgeon, the history of its fishery and the problems of conservation**. Toronto: Ontario Department of Lands and Forests, Fish and Wildlife Branch.

Haugh, A.

1994a. **Balancing rights, powers and privileges: A survey and evaluation of natural resource co-management agreements reached by the government and First Nations of Manitoba**. Winnipeg: Masters of Natural Resources Management (MNRM) practicum, University of Manitoba.

1994b. "Balancing rights, powers and privileges: A window on co-management experiences in Manitoba." **Northern Perspectives** 22(2/3):28-32.

Heacox, C. E.

1952. "King of fishes." **New York State Conservationist** (April-May):18-9.

Hennig, W.

1966. **Phylogenetic Systematics**. Urbana: University of Illinois Press.

Heuring, L.

1993. **A Historical Assessment of the Commercial and Subsistence Fish Harvests of Lake Winnipeg**. Winnipeg: Masters of Natural Resources Management (MNRM) thesis practicum, University of Manitoba.

Hickerson, H.

1970. **The Chippewa and their neighbors: a study in ethnohistory**. New York: Holt, Rinehart and Winston.

Hind, H. Y.

1971. **Narrative of the Canadian Red River Exploring Expedition of 1857 and of the Assiniboine and Saskatchewan Exploring Expedition of 1858**. Edmonton: M.G. Hurtig Ltd.

Hinks, D.

1943. **The Fishes of Manitoba**. Manitoba: Department of Mines and Natural Resources.

Hlady, W.

(ed.).1970. **Ten Thousand Years Archaeology in Manitoba**. Winnipeg: Manitoba Archaeological Society.

Hoffman, W. J.

1891. "The Mide'Wiwin or 'Grand Medicine Society' of the Ojibwa." **Seventh Annual Report of the Bureau of Ethnology, Smithsonian Institution 1885-1886**. Washington: Government Printing Office.

Holmes, L.

1996. **Elders' Knowledge and the Ancestry of Experience in Hawai'i**. Toronto: Ph.D. Thesis, University of Toronto.

Holzmann, T.

1987. "Sturgeon Utilization by the Rainy River Ojibwa Bands." W. Cowan (ed.). **Papers of the Eighteenth Algonquian Conference**. Ottawa: Carleton University Press.

- Holzmann, T. and M. McCarthy
1988. "Potential Fishery for lake sturgeon (*Acipenser fulvescens*) as indicated by the returns of the HBC Lac la Pluie District." **Canadian Journal of Fisheries and Aquatic Sciences** 45:921-3.
- Holzmann, T. and W. Wilson
1988. "The sturgeon fishery of the Rainy River Ojibway Bands." **Seeds of the past**. Smithsonian Institution.
- Holzmann, T., V. Lytwyn, L. Waisberg
1988. "Rainy River sturgeon: an Ojibway resource in the fur trade economy." **The Canadian Geographer** 32(3):194-205.
1991. "Rainy River Sturgeon: An Ojibway Resource in the Fur Trade Economy." K. Abel and J. Friesen (eds.). **Aboriginal Resource Use in Canada: Historical and Legal Aspects**. Winnipeg: University of Manitoba Press. 119-140.
- Hubbs, C. and K. Lagler
1958. **Fishes of the Great Lakes Region**. Bloomfield Hills, Michigan: Cranbrook Institute of Science Bulletin 26.
- Hudson, G.
1982. "Women's Participatory Research in the Kiyahna Tribal Area: Collective Analysis of Employment needs." **Canadian Journal of Native Studies** 2(1):147-57.
- Hudson Bay Company Archives, Provincial Archives of Manitoba (HBCA, PAM), Winnipeg.
Chemawawin -Cedar Lake journal, 1903-4. B.260/d/27.
- Chief Factor James Stuart, Fort Alexander**, 1830. E.24/1826-1831/ fo.1-39.
- Fort Alexander journal of occurrences**, 1833. B.4/a/6.
- Fort Alexander journal of occurrences**, 1863. B.4/a/8.
- Fort Alexander post journal**, n.d. C.2/A.
- Methods for cleansing, curing and preserving Isinglass**, 1791. A.64/2.
- Norway House District Records**, 1832. A.64/2.
- Roderick Mackenzie, **Fort Alexander post journal**, 1822-1823. B.4/a/5.

- Hultkrantz, A.
1983. "Water Sprites: The Elders of the Fish in Aboriginal North America." **American Indian Quarterly** 8(3):1-22.
- Hunn, E.
1999. "The Value of Subsistence for the Future of the World" V. Nazarea (ed.). **Ethnoecology: Situated Knowledge/Located Lives**. Tucson: The University of Arizona Press. 23-36.
- Huntington, H. P.
1998. "Observations on the Utility of the Semi-directive Interview for Documenting Traditional Ecological Knowledge." **Arctic** 51(3):237-242.
- Huston, J. 1987. "Status of the lake sturgeon, *Acipenser fulvescens*, in Canada." **Canadian Field Naturalist** 101(2):171-185.
- Huston, J.
1995. "History." **Nelson River Sturgeon Co-Management Board**. (pamphlet).
- Inglis, J.
(ed.). 1993. **Traditional Ecological Knowledge: Concepts and Cases**. Ottawa: Canadian Museum of Nature and International Development Research Center.
- Ingold, T.
1987. **The appropriation of nature: essays on human ecology and social relations**. Iowa: University of Iowa Press.
- Institute for Research on Environment and Economy
1994. **First Nations Environmental Knowledge and Approaches to Natural Resources. Methodological Approach**. Ottawa: Mohawk Council of Awkesasane and the University of Ottawa, MS Report.
- Innis, H. A.
1954. **The Cod Fisheries: an International Economy**. Toronto: University of Toronto Press.
1962. **The Fur Trade in Canada**. New Haven: Yale University Press.
- International Indigenous Commission.
1991. **Indigenous peoples traditional knowledge and management practices**. Report prepared for the United Nations Committee for Economic Development.

Jacobs, W.

1980. "Indians as Ecologists and other environmental themes in American frontier history." C. Vescey and R. Venables (eds.). **American Indian environments: ecological issues in Native American history**. New York: Syracuse University Press. 46-64.

Johnson, A.

April 10, 1992. Interoffice Memorandum to Larry Stefanuik, Senior Field Supervisor Mitigation. Manitoba Hydro archival files, Thompson.

Johnson, M.

(ed.).1992. **Lore: Capturing Traditional Environmental Knowledge**. Hay River: Dene Cultural Institute and International Development Research Center.

Judson, A. T.

1961. **The Freshwater Commercial Fishing Industry of Western Canada**. Toronto: Ph.D. thesis, University of Toronto.

Keith, R.

1994. "The Ecosystem Approach: Implication for the North." **Northern Perspectives** 22(1):6-7.

Kelm, M-E.

1998. **Colonizing Bodies: Aboriginal health and healing in British Columbia 1900-1950**. Vancouver: University of British Columbia Press.

Kennedy, P.

1993. "Voices in the shadows." **The Archivist** 20(1):2-4.

Klein, J. T.

1990. **Interdisciplinarity: History, Theory and Practice**. Detroit: Wayne State University Press.

Kockelmans, J. J.

(ed.). 1979. **Interdisciplinarity and Higher Education**. Pennsylvania: Pennsylvania State University.

Kooyman, B.

1955. **An Analysis of Data Collected in 1953 and 1954 from the Sturgeon Fisheries on the Nelson and Churchill Rivers**. Winnipeg: Manitoba Department of Mines and Natural Resources, Fisheries Branch, manuscript report.

- Kormondy, E. and D. Brown
1998. **Fundamentals of Human Ecology**. Toronto: Prentice-Hall.
- Kovnats, J. S.
April 30, 1992. Memo to Karl Koenig, RE: Nelson River Sturgeon Co-management Board. Manitoba Hydro files, Thompson.
- Krech, S. III
(ed.).1981. **Indians, Animals and the Fur Trade**. Athens: University of Georgia Press.
- Kroker, S. and P. Goundry
(eds.).1993. **A 3000 year old Native Campsite and Trade Centre at the Forks**. Winnipeg: The Forks Public Archaeological Association, Inc.
- Lalonde, A.
1993. **Indigenous Knowledge Systems and Sustainable Development**. Ottawa: International Development Research Center.
- Lamb, W.
(ed.).1957. **Sixteen Years in the Indian Country. The Journal of Daniel Williams Harmon 1800-1816**. Toronto: MacMillan Company of Canada.
- Legat, A.
(ed.). 1991. **Report of the Traditional Knowledge Working Group**. Yellowknife: Department of Culture and Communications, Greater North West Territories.
- Longfellow, H. W.
1903 (reprint from 1855). **The Song of Hiawatha**. Notes by Cotterill. London: Mcmillan and Company ltd.
- Lord, J.
1984. "The Kids ate Caviar. The story of Manitoba's mighty sturgeon... then and now." **Nature Canada** 13:19-22.
- Lowenthal, D.
1997. "Empires and ecologies: reflections on environmental history." T. Griffiths and L. Robin (eds.). **Ecology and Empire: Environmental History and Settler Societies**. Edinburgh: Keele University Press. 229-236.
- Ludwig, D., R. Hilborn, and C. Walters
1993. "Uncertainty, Resource Exploitation, and Conservation: Lessons from History." **Science** 260(2):17-36.

Lytwyn, V.

1990. "Ojibwa and Ottawa fisheries around Manitoulin Island: historical and geographical perspectives on Aboriginal and Treaty fishing rights." **Native Studies Review** 6(1):1-30.

1993. **Hudson Bay lowland Cree in the fur trade to 1821: a study in historical geography**. Winnipeg: Phd thesis, University of Manitoba.

Macdonald, D.

October 31, 1991. (unpublished) **An overview of the sturgeon population in the Cross Lake, Sipiweesk Lake and Nelson River area**. Manitoba Department of Natural Resources (hereafter DNR), Fisheries Branch.

1994a. **Nelson River Sturgeon Harvest Landing River Area**. For the Nelson River Sturgeon Co-Management Board (hereafter NRSCB). Manitoba Hydro files, Thompson.

1994b. "1993-4 Sturgeon Population Estimate." NRSCB (eds.). **Field Activities Report to the Board** (draft), 4-21. Manitoba Hydro archival files, Thompson.

1994c. "1993-4 Landing River Spawn Taking." NRSCB (eds.). **Field Activities Report to the Board** (draft). 22-25. Manitoba Hydro archival files, Thompson.

1994d. "Sturgeon Harvest." NRSCB (eds.). **Field Activities Report to the Board** (draft). 26-28. Manitoba Hydro archival files, Thompson.

May 2, 1995. Letter to Larry Stefaniuk, Manitoba Hydro. Manitoba Hydro archival files. Thompson.

MacDonald, I.

1994. **Mapping Harvest Areas, Extent of Land Use and Subsistence Fishing Sites of the Cross Lake First Nation**. Winnipeg: MNRM thesis practicum, University of Manitoba.

MacDonell, D.

1992. **Final Results of the Lake Sturgeon Radio Telemetry Studies Conducted on the Lower Nelson River Between 1986 and 1992**. Winnipeg: North/South Consultants.

1993. **Lower Nelson River tributary studies: Weir, Roblin, and Kaiskwotasine rivers and Broken Creek**. A report prepared for Manitoba Hydro by North/South Consultants.

1997. **The Nelson River Lake Sturgeon Fishery From the Perspective of the Bayline Communities of Pikwitonei, Thicket Portage, and Wabowden**. Winnipeg: MNRM practicum, University of Manitoba.

MacKenzie, J. M.

1997. "Empire and the ecological apocalypse: the historiography of the imperial environment." T. Griffiths and L. Robin (eds.). **Ecology and Empire: Environmental History and Settler Societies**. Edinburgh: Keele University Press. 215-228.

Mackinac, D.

1996. "Preface." S. Droshov, F. Binkowski, T. Thuemler and D. Mackinac (eds.). **Culture and Management of Sturgeon and Paddlefish symposium proceedings**. American Fisheries Society: International Congress on the Biology of Fishes, San Francisco State University. 3-4.

MacNeish, R. S.

1958. **An Introduction to the Archaeology of Southeast Manitoba**. Ottawa: National Museum of Canada Bulletin 157.

Maguire, P.

1987. **Doing Participatory Research: a feminist perspective**. Amherst: University of Massachusetts.

1991. "Peter Rindisbacher (1806-1831)." J. Burant (ed.). **A Place in History: Twenty Years of Acquiring Paintings, Drawings and Prints at the National Archives**. Ottawa: Ministry of Supply and Services. 17-22.

Malihot, J.

1993. **Traditional Ecological Knowledge: the Diversity of Knowledge Systems and Their Study**. Background paper no. 4. Montreal: Great Whale Review Support Office.

Manitoba, Manitoba Hydro-Electric Board, Northern Flood Committee, and Canada (Department of Indian Affairs and Northern Development)

1977. **Northern Flood Agreement**. www.hydro.mb.ca/mitigation/nfa/

Manitoba

1983. **Five Year Report to the Legislature on Wildlife for the year ending March 31, 1983**. Winnipeg: Manitoba Department of Natural Resources.

1985. **The Prehistory of the Lockport Site**. Winnipeg: Manitoba Department of Culture, Heritage and Recreation. Historic Resources Branch.

1991. **Strategy for the Management of Manitoba's Fish Habitat**. Winnipeg: Department of Natural Resource, Fisheries Branch. Manitoba Hydro files, Thompson.

1991. **Public Inquiry into the Administration of Justice and Aboriginal People (Report of the Aboriginal Justice Inquiry of Manitoba)**. Commissioners A.C. Hamilton, C.M. Sinclair. Vol. I The Justice System and Aboriginal People. Winnipeg: Queen's Printer.

1994. **Sturgeon Management Discussion Paper**. Winnipeg: Department of Natural Resource, Fisheries Branch. Manitoba Hydro files, Thompson.

Marchak, P, N. Guppy, and J. McMullan
1987 (eds.). **Uncommon property. The fishing and fish processing industry in British Columbia**. Toronto: Methuen.

Marglin, S. A.
1990. "Toward the Decolonization of the Mind." F. Apffel-Marglin and S. A. Marglin (eds.). **Dominating Knowledge**. Oxford: Clarendon Press. 1-16.

Marr, G.
1993. "Vertebrate Fauna other than Fish." S. Kroker and P. Goundry (eds.). **A 3000 year old Native Campsite and Trade Centre at the Forks**. Winnipeg: The Forks Public Archaeological Association. Inc. 93-139.

Martin, C.
1978. **Keepers of the Game**. Berkley: University of California Press.

1979. "The Metaphysics of Writing Indian-White History." **Ethnohistory** 26(2):153-9.

Martinez, D.
1996. "First People: Firsthand Knowledge." **Sierra** 81(Nov-Dec):50-51,70-71.

Mason, G.
1991. **Cross Lake Band of Indians Domestic Sturgeon Fishing Claim Proposed Basis for Settlement (Final)**. Prairie Research Associates. Manitoba Hydro files, Thompson.

Mayden, R. L.
1992. "Explorations of the Past, and the dawn of systematics and historical ecology." R. L. Mayden (ed.). **Systematics, Historical Ecology, and North American Freshwater fishes**. Stanford: Stanford University Press. 3-17.

Mayekiso, M.
1999. "Economic Realities and the Commons." **The Common Property Resource Digest** 50:4-5.

Mayer-Oakes, W. J.

1967. "Prehistoric human population history of the Glacial Lake Agassiz region." W. J. Mayer-Oakes (ed.). **Life, land and water**. Winnipeg: University of Manitoba. 339-378.

1970. **Archaeological investigations in the Grand Rapids, Manitoba, Reservoir 1961-1962**. Winnipeg: University of Manitoba Press.

McCart, P.

1992. **Nelson River Sturgeon Fishery Maximum Sustainable Yield and The Impact of Hydroelectric Development**. Aquatic Environments for Manitoba Hydro, Thompson.

McCarthy, M.

1988. **Grand Rapids, Manitoba**. Manitoba: Culture, Heritage and Recreation, Historic Resources.

McCay, B.

1987. "The culture of the commoners: historical observations on old and new world fisheries." B. McCay and J. Acheson (eds.). **The question of the commons: the culture and ecology of communal resources**. Tucson : The University of Arizona Press. 195-216.

McDaniels, T., M. Healey and R. Paisley.

1994. "Cooperative fisheries management involving First Nations in British Columbia: an adaptive approach strategy design." **Canadian Journal of Fisheries and Aquatic Sciences** 51:2115-2125.

McEvoy, A. F.

1988. "Toward an Interactive Theory of Nature and Culture: Ecology, Production and Cognition in the California Fishing Industry." D. Worster (ed.). **The Ends of the Earth: Perspectives on Modern Environmental History**. Cambridge: Cambridge University Press. 211-229.

McLeod, K. D.

1987. **Land Below the Forks. Archaeology, Prehistory and History of the Selkirk and District Planning Area**. Winnipeg: Manitoba Department of Culture, Heritage and Recreation: Historic Resources Branch.

McMullan, B. F.

June 22, 1993. Interoffice memo to L. Stefanuik , Mitigation Thompson Office. Manitoba Hydro archival files, Thompson.

McTavish, W. B.

1954. **Investigation of sturgeon on the Nelson River**. Winnipeg: Manitoba Department of Natural Resources, Fisheries Branch.

- McVitte, G. and J. McKay.
1994. "Bear Island Field Report." NRSCB (eds.). **Field Activities Report to the Board** (draft). 11-13. Manitoba Hydro archival files, Thompson.
- Melville, E. G.
1997. "Global developments and Latin American environments." T. Griffiths and L. Robin (eds.). **Ecology and Empire: Environmental History and Settler Societies**. Edinburgh: Keele University Press. 185-198.
- Merchant, C.
1998. <http://www.cnr.berkeley.edu/departments/espm/facultyinfo/merchant.htm>
- Meyer, D. and P. C. Thistle.
1995. "Saskatchewan river rendezvous centers and trading posts: continuity in a Cree social geography." **Ethnohistory** 42(2):403-444.
- Michelson, T.
1919 (ed.). **Ojibwa Texts collected by William Jones**. New York: G.E. Stechert and Co.
- Miles, J.
A. May 23, 1996. Manager Environmental Planning Department, Manitoba Hydro, to Ernest Scott, Chairman NRSCB. Manitoba Hydro archival files, Thompson.
- Milloy, J. S.
1991. "The Early Indian Acts: Developmental Strategy and Constitutional Change." J. R. Miller (ed.). **Sweet Promises: A Reader on Indian-White Relations in Canada**. Toronto: University of Toronto Press. 145-154.
- Milton, K.
1993 (ed.). **Environmentalism: The view from Anthropology**. London: Routledge.
- Moodie, S.
1991(reprint). **Roughing it in the Bush**. Toronto: McClelland and Stewart.
- Morin-Labatut, G. and S. Akhtar.
1992. **Traditional Environmental Knowledge: A Resource to Manage and Share**. Development with Equity and Ecological Security: Strategies and Institutions for the 21st Century. Rome: Society for International Development and Istituto Italo-Latino Americano. Conference paper.
- Morris, A.
1971 (reprint). **The Treaties of Canada with the Indians of Manitoba, the Northwest Territories and Kee-WA-Tin**. Toronto: Coles.

Morton, W. L.
1957. **One University: A History of the University of Manitoba 1877-1952.** London: McClelland and Stewart.

Mosindy, T. and J. Rusak
1991. "An Assessment of Lake Sturgeon Populations in Lake of the Woods and the Rainy River 1987-1990." Ontario: Ministry of Natural Resources, Lake of the Woods Fisheries Assessment Unit Report 1991:01.

Nakashima, D.
1991. **The Ecological Knowledge of Belcher Island Inuit: a traditional basis for contemporary wildlife co-management.** Montreal: Ph.D. thesis, McGill University.

Nash, R.
1970. "The Prehistory of Northern Manitoba." W. Hlady. (ed.). **Ten Thousand Years Archaeology in Manitoba.** Winnipeg: Manitoba Archaeological Society. 77-92.

1975. **Archaeological Investigation in the Transitional Forest Zone: northern Manitoba, southern Keewatin, North West Territories.** Winnipeg: Museum of Man and Nature.

Nazarea, V.
1999. "A View from a Point: Ethnoecology as Situated Knowledge." V. Nazarea (ed.). **Ethnoecology: Situated Knowledge/Located Lives.** Tucson: The University of Arizona Press. 3-20.

Nelson River Sturgeon Co-Management Board.
April 10, 1992. Sturgeon Meeting, Minutes (hereafter NRSCB, minutes). Mystery Lake Hotel, Thompson. Thompson: Manitoba Hydro archival files and DNR archival files.

November 30, 1992. **Management Plan** (4th draft). Manitoba Hydro archival files, Thompson

December 17, 1992. **Management Plan** (5th draft). Manitoba Hydro files, Thompson.
April 29, 1993. NRSCB, minutes.

June 15, 1993. NRSCB, minutes (Thompson).

July 20, 1993. NRSCB, minutes (Thicket Portage).

February 23, 1994. NRSCB, minutes (Working Group).

April 1994. **Field Activities Report to the Board** (draft). Manitoba Hydro, Thompson.

April 6, 1994. NRSCB, minutes (Cross Lake).

April 13, 1994. NRSCB, minutes (Thicket Portage).

April 25, 1994. NRSCB, minutes (Cross Lake).

May 4, 1994. NRSCB, minutes (Thompson).

September 14, 1994. NRSCB, minutes (Thompson).

February 7, 1995. NRSCB, minutes.

April 19, 1995. NRSCB, minutes (Thompson).

May 3, 1995. NRSCB, minutes (Thompson).

June 1995. **Nelson River Sturgeon Co-Management Board**. Manitoba Hydro, Thompson.

July 19, 1995. NRSCB, minutes (Thompson).

December 19, 1995. NRSCB, minutes.

March 22, 1996. NRSCB, minutes.

May 14, 1996. NRSCB, minutes (Thompson).

October 10, 1996. NRSCB, minutes (Cross Lake).

1997. **Nelson River Sturgeon Co-Management Board Status Report**, Thompson.

1997. **1997 Filed Season Summary Report**. DNR files, Thompson.

March 6, 1997. NRSCB, minutes (Thompson).

April 15, 1997. NRSCB, minutes (Thicket Portage).

April 16, 1997. NRSCB, minutes (Cross Lake).

May 13, 1997. NRSCB, minutes (Thompson).

October 15, 1997. NRSCB, minutes (Thompson).

April 7, 1998. NRSCB, minutes (Thompson).

May 6, 1998. NRSCB, minutes (Thompson).

July 2, 1998. NRSCB, minutes (Kelsey Generating Station).

Newell, D.

1993. **Tangled webs of history: Indians and the law in Canada's Pacific coast fisheries.** Toronto: University of Toronto Press.

Newell, D. and R. E. Ommer

1999 (eds.). **Fishing Places, Fishing People: Traditions and Issues in Canadian Small-Scale Fisheries.** Toronto: University of Toronto Press.

Nichols, J. D. and E. Nyholm

1995. **A Concise Dictionary of Minnesota Ojibwe.** Minneapolis: University of Minnesota Press.

Nicholson, B.

1978. **An analysis of Faunal Remains Recovered by Amateur Salvage Operation at Duck Bay on Lake Winnipegosis FbMb-1.** Winnipeg: Manitoba Department of Tourism, Recreation and Cultural Affairs, Historic Resources Branch, Papers in Manitoba Archaeology, 7.

Nickolsky, G. V.

1963. **The Ecology of Fishes.** London: Academic Press.

Norman, J. R. and F. C. Fraser

1949. **Field book of giant fishes.** New York: Putnam's and Sons.

Notzke, C.

1994. **Aboriginal Peoples and Natural Resources in Canada.** North York: Captus University Press.

Ohmagari, K. and Berkes, F.

1997. "Transmission of indigenous knowledge and bush skills among the Western James Bay Cree women of subarctic Canada" **Human Ecology** 25:197-222.

Ono, R. D., J. D. Williams and A. Wagner

1983. **Vanishing fishes of North America.** Washington: Stone Wall Press.

Ontario, Ministry of Natural Resources, C. H. Oliver

1987 (eds.). **Proceedings of a workshop on the lake sturgeon (Acipenser fulvescens).** Ontario: Ministry of Natural Resources. Ontario Fisheries Technical Series, 23.

- Osherenko, G.
1988. **Sharing power with Native users: Co-management regimes for native wildlife.** Ottawa: Canadian Arctic Resources Committee.
- Ostrom, E.
1999. **Self-Governance and Forest Resources.** Indonesia: Center for International Forestry Research. 20.
- Overholt, T. W. and J.B. Callicott
1982 (eds.). **Clothed-in-furs and other Tales: an introduction to an Ojibwa world view.** New York: University Press of America.
- Paci, C., K. Ladner and G. Hill
1995 (unpublished). **Interdisciplinarity from the Products Perspective.** Sudbury: Laurentian University, Learning and Teaching in Canadian Studies conference paper.
- Paci, C.
1995. "As the Crow Flies: An initial understanding of Traditional Environmental Knowledge." Ottawa: Graduate Research Essay, School of Canadian Studies.
- Patalas, J. W.
1988. **The effects of commercial fishing in lake sturgeon (*Acipenser fulvescens*) populations in the Sipiwesk Lake area of the Nelson river, Manitoba, 1987-1988.** Winnipeg: Manitoba Department of Natural Resources.
- Peers, L.
1991. "Changing resource-use patterns of Saulteaux trading at Fort Pelly, 1821 to 1870." K. Abel and J. Friesen (eds.). **Aboriginal resource use in Canada: historical and legal aspects.** Winnipeg: University of Manitoba Press. 107-118.
1994. **The Ojibwa of western Canada, 1780-1870.** Winnipeg: University of Manitoba Press.
- Pettipas, K.
1978. "An ethnohistory of The Pas area, prehistoric - 1875: A study of Cree adaptation." L. Pettipas (ed.). **Directions in Manitoba Prehistory.** Winnipeg: Papers in honour of Chris Vickers. 169-232.
- Pettipas, L.
1970. "Early man in Manitoba." W. M. Hlady (ed.). **Ten Thousand Years, Archaeology in Manitoba.** Winnipeg: Manitoba Archaeological Society. 5-28.

1977. "A bit of Manitoba Archaeology." **Papers in Manitoba archaeology.** Winnipeg: Department of Tourism, Recreation and Cultural Affairs, Historical Resources Branch, Miscellaneous Papers 4:55-74.

1995. **Aboriginal migrations: a history of movements in southern Manitoba.** Winnipeg: Museum of Man and Nature.

Pierson, R. R.

1991. "Experience, Difference, Dominance and Voice in the Writing of Canadian Women's History." K. Offen, R. R. Pierson and J. Rendall (eds.). **Writing Women's History: International Perspectives.** Bloomington: Indian University Press. 79-106.

Pinkerton, E.

1989 (ed.). **Co-operative management of local fisheries. New directions for improved management and community development.** Vancouver: University of British Columbia Press.

1989. "Introduction: Attaining Better Fisheries Management through Co-Management - Prospects, Problems, and Propositions." E. Pinkerton (ed.). **Co-operative management of local fisheries. New directions for improved management and community development.** Vancouver: University of British Columbia Press. 3-28.

Pinkerton, E. and M. Weinstein

1995. **Fisheries that work. Sustainability through community-based management.** Vancouver: Report to the David Suzuki Foundation.

Pomeroy, R. and F. Berkes

1997. "Two to tango: the role of government in fisheries co-management." **Marine Policy** 21(5):465-480.

Pomeroy, R. and J. Williams

1994. **Fisheries Co-management and Small-scale Fisheries: A Policy Brief.** Makati City: International Center for Living Aquatic Resources Management and Fisheries Co-management Project.

Posey, D. A.

1998. "Comments." **Current Anthropology** 39(2):241-242.

Priegel, G. R. and T. L. Wirth.

1971. **The lake sturgeon, its life history, ecology and management.** Wisconsin: Department of Natural Resources publication, 240-70.

Prince, E. E.

1898. "The food of the sturgeon." **Canadian Sessional Papers**. Department of Marine and Fisheries, no.10:Lvi-Lx.

Provincial Archives of Manitoba (PAM), Winnipeg.

District of Assiniboia General Quarterly Court Reports, 1868-72. MG2 B4-1.

Lt. Gov. JC Schultz Papers, Keewatin Ledger. 1888. MG12 E1.

Lt. Gov. JC Schultz Papers, Keewatin Book. 1890. MG12 E1.

Lt. Gov. JC Schultz Papers, pp.3846-7945. 1888-1893. MG12 E1.

Minutes of Council of Assiniboia, 1833. MG1 C2.

Minutes of Council of Assiniboia, October 27, 1862. MG1 C2.

Minutes of Council of Assiniboia, November 18, 1860. MG1 C2.

Quimby, G.

1960. **Indian Life in the Upper Great Lakes 11,000 B.C. to A.D. 1800**. Chicago: University of Chicago Press.

Ray, A. J.

1974. **Indians in the fur trade: their role as trappers, hunters, and middlemen in the lands southwest of Hudson Bay, 1660-1870**. Toronto: University of Toronto Press.

1996. **I have lived here since the world began: an illustrated history of Canada's native people**. Toronto: Key Porter Books.

Rathburn, R.

1895. "Embryology of the sturgeon." **Report of the US Fisheries Commission for 1893**. Washington: Government Publishing Office.

Rettig, R., F. Berkes and E. Pinkerton

1989. "The Future of Fisheries Co-Management: A Multi-Disciplinary Assessment." E. Pinkerton (ed.). **Co-operative management of local fisheries. New directions for improved management and community development**. Vancouver: University of British Columbia Press. 273-287.

Richardson, B.

1975. **Strangers Devour the Land**. New York: A. Knopfing Company.

- Rich, E. E.
1949 (ed.). **Isham's Observations and Notes, 1743-1749**. Toronto: Champlain Society.
- 1952 (ed). **Cumberland House Journal and Inland records, 1775-82. Second Series. 1779-82**. London: Hudson Bay Record Society
- Riedlinger, D.
1999. "Climate Change and the Inuvialuit of Banks Island, NWT: Using Traditional Environmental Knowledge to Complement Western Science" **Infonorth**. 430-432.
- Roberts, L.
1991. "Faunal Analysis of the 1984-1986 Excavations at the Lockport Site, EaLf-1." **Manitoba Archaeological Journal** 2(1):1-13.
- Robin, L.
1997. "Ecology: a science of empire?" T. Griffiths and L. Robin (eds.). **Ecology and Empire: Environmental History and Settler Societies**. Edinburgh: Keele University Press. 63-75.
- Rostlund, E.
1952. **Freshwater fish and fishing in Native North America**. Berkeley: University of California Press.
- Rotstein, A.
1972. "Trade and politics: an institutional approach." **Western Canadian Journal of Anthropology** 3(1):1-28.
- Roussow, G.
1957. "Some considerations concerning sturgeon spawning periodicity." **Journal of Fisheries Research Board Canada** 14:553-72.
- Royer, L. M., F. M. Atton, and J-P Cuerrier
1968. "Age and growth of lake sturgeon in the Saskatchewan River delta." **Journal of Fisheries Research Board Canada** 25:1511-6.
- Rupert's Land Research Center
1992. **An Historical Overview of Aboriginal Lifestyles: The Churchill-Nelson River Drainage Basin**. Winnipeg: University of Winnipeg for Manitoba Hydro.
- Rusak, J. A. and T. Mosindy
1997. "Seasonal movements of lake sturgeon in Lake of the Woods and the Rainy River, Ontario." **Canadian Journal of Zoology** 75(3):383-95.

Ruyle, E. E.

1972. "Genetic and Cultural Pools: Some suggestions for a Unified Theory of Biocultural Evolution." **Human Ecology** 1:201-215.

Ryan, J. and M. P. Robinson

1990. "Implementing Participatory Action Research in the Canadian North: A Case Study of the Gwich'in Language Cultural Project." **Culture** X(2):57-60.

Sagkeeng First Nation and the Manitoba Department of Natural Resources

March 2, 1992. **Interim Memorandum of Understanding on Co-Management and Harvesting of Sturgeon in the Winnipeg River**. Sagkeeng First Nation and Department of Natural Resources Fisheries Branch.

Schenck, T.

1997. "The Algonquian Totem and Totemic: A Distinction of the Semantics Field" D. Pentland (ed.). **Papers of the Algonquian Conference**. Winnipeg: University of Manitoba Press. 341-364.

Schoolcraft, H.

1856. **The myth of Hiawatha, and other legends, mythologic and allegoric, of the North American Indians**. London: Trubner and Company.

Scott, E.

February 20, 1992, to Chief and Council, Cross Lake. Manitoba Hydro archival files, Thompson.

June 1994. **Nelson River Sturgeon Co-Management Field Trip to Rainy River (Ontario)**. Manitoba Hydro archival files, Thompson.

April 4, 1995. **Sturgeon Steering committee (Saskatchewan River)**. Nipiwini, Saskatchewan. Manitoba Hydro archival files, Thompson.

Scott, W. B.

1977. **Fish Remains from the Cloverleaf Bastion of the Fort at Coteau-du-lac, Quebec**. Ottawa: Canada Department of Indian and Northern Affairs and Parks Canada, History and Archaeology 12.

Scott, W. B. and E. Crossman.

1973. **Freshwater fishes of Canada**. Ottawa: Fisheries Research Board of Canada Bulletin 184:82-89.

- Seig, W.
 (ed.). 1990. **Acting and Reflecting: The Interdisciplinary turn in Philosophy.** Dordrecht: Kuwer Academic Publishing.
- Sharma, P.
 1998. **Aboriginal Fishing Rights, Laws, Courts, Politics.** Halifax: Fernwood.
- Sherry, E. and Vuntut Gwitchin First Nation
 1999. **The Land Still Speaks: Gwitchin Words about Life in Dempster Country.** Old Crow: Vuntut Gwitchin First Nation and Erin Sherry.
- Shiva, V.
 1993a. **Monocultures of the Mind: Understanding the Threats to Biological and Cultural Diversity.** Ottawa: International Development and Research Center.
- 1993b. "The Seed and the Earth: Biotechnology and the Colonization of Regeneration." **Ecodecision** Dec/Sept.:30-35.
- Sillitoe, P.
 1998. "The Development of Indigeneous Knowledge: A New Applied Anthropology." **Current Anthropology** 39(2):223-235.
- Simonds, E.
 1993. "A Study of the Fish Remains." S. Kroker and P. Goundry (eds.). **A 3000 year old Native Campsite and Trade Centre at the Forks.** Winnipeg: The Forks Public Archaeological Association, Inc. 142-187.
1994. "Preliminary Analysis of Fish Remains." S. Kroker and P. Goundry (eds.). **Archaic Occupations at the Forks.** Winnipeg: The Forks Public Archaeological Association, Inc. 137-186.
- Simons, I. G.
 1974. **The Ecology of Natural Resources.** London: Arnold.
- Skaptason, J.
 1926. **The Fish Resources of Manitoba.** Winnipeg: Manitoba Industrial Development Board.
- Smith, B.
 1988. "An Ethnohistorical Evaluation of the Role of Bison and Fish in the Social Organization of Northern Plains and Parkland Native Society: 1790-1850." **Manitoba Archaeological Quarterly** 12(1):13-25.

1991. "The historical and archaeological evidence for the use of fish as an alternative subsistence resource among northern Plains Bison Hunters." K. Abel and J. Friesen (eds.). **Aboriginal Resource Use in Canada: Historical and Legal Aspects**. Winnipeg: University of Manitoba Press. 35-50.

Smith, H. M.

1914. "Passing of the Sturgeon." **Reports of the US Commission of Fisheries for 1913**. Washington: Government Publishing Office. 66-7.

Smith, L. T.

1999. **Decolonizing Methodologies: Research and Indigenous Peoples**. New York: Zed.

Sopuck, R. D.

1987. **A study of the lake sturgeon (*Acipenser fulvescens*) in the Sipiwesk Lake area of the Nelson River, Manitoba, 1976 to 1978**. Winnipeg: Manitoba Department of Natural Resources Manuscript Report No. 87-2.

Speck, F.

1935. **Naskapi. The Savage Hunters of the Labrador Peninsula**. Oklahoma: University of Oklahoma Press.

Spence, W. J.

1918. **University of Manitoba, historical notes, 1877-1917**. Winnipeg. [s.n.].

Spry, I.

1983. "The tragedy of the Loss of the Commons in Western Canada." I. Getty and A. S. Lussier (eds.). **As long as the sun shines and water flows: a reader in Canadian Native Studies**. Vancouver: University of British Columbia Press, 203-227.

1991. "Aboriginal resource use in the Nineteenth Century in the Great Plains of modern Canada." K. Abel and J. Friesen (eds.). **Aboriginal resource use in Canada: historical and legal aspects**. Winnipeg: University of Manitoba Press, 81-92.

Starr Jordan, D. and B. W. Evermann.

1914. **American Food and Game Fishes. A popular account of all the species found in America North of the equator, with keys for ready identification, life histories and methods of capture**. New York: Doubleday, Page and company.

Steinbring, J.

1965. "The Sturgeon Skin Jar." **Manitoba Archaeological Newsletter II (2):3-6**.

1978. "Ethnological identification in rock paintings of the Canadian Shield." **Studies in Manitoba rock art 11, rock paintings.** Winnipeg: Department of Tourism, Recreation and Cultural Affairs, Historical Resources Branch, Miscellaneous Papers 8:3-34.

Stevenson, M.

1996. "Indigenous Knowledge in Environmental Assessment." **Arctic** 49(3):278-291.

Stewart, A.

1930. **Early Assiniboine Trading Posts of the Souris-mouth Group 1785-1832.** Winnipeg: The Historical and Scientific Society of Manitoba.

Stone, L.

1900. "The Spawning Habits of the Lake Sturgeon (*Acipenser rubicundus*)." **Trans American Fishery Society** 29:118-28.

Sunde, L. A.

1959a. **The Sturgeon Fishery in Manitoba, with Recommendations for Management (Analysis of Nelson River data 1953-1956).** Winnipeg: Manitoba Department of Natural Resources, Fisheries Branch.

1959b. "The Royal Fish." **Fisheries Bulletin** 2:20-3.

1961. **Growth and Reproduction of the Lake Sturgeon (*Acipenser fulvescens Rafinesque*) of the Nelson River in Manitoba.** Vancouver: MSc. thesis, University of British Columbia.

Swanson, G. M., K. R. Kansas and S. M. Matkowski.

1990. **A report of the fish resources on the lower Nelson River and the impacts of hydro development, 1988 data.** Manitoba: Department of Natural Resources, Fisheries MS report no. 90-18.

Symbion Consultants

1990. **Cross Lake Band of Indians domestic sturgeon fishing claim proposed basis for settlement (Final Report).** Prepared for the Cross Lake Band of Indians, Manitoba. Manitoba Hydro archival files, Thompson

Taché, A.

1870. **Sketch of the North West of America.** 1868, translated to English by Cpt. D. R. Cameron.

Tamplin, M.

1977. **Prehistoric Occupation and Resource Exploitation on the Saskatchewan River at the Pas, Manitoba.** Tucson: Ph.D. thesis, University of Arizona.

- Tanner, A.
1979. **Bringing Home Animals: Religious Ideology and Mode of Production of the Mistassini Cree Hunters.** New York: St. Martin's Press.
- Tanner, N.
1981. **On Becoming Human.** New York: Cambridge University Press.
- Tanner, J.
1994 (reprint). **The Falcon: A narrative of the captivity and adventures of John Tanner during thirty years residence among the Indians in the interior of North America.** New York: Penguin.
- Thom, B., Sto:lo Nation and K. Washbrook
1997 (unpublished). "Co-Management, Negotiation, Litigation: Questions of Power in Traditional Use Studies." Paper prepared for the Annual Meeting of the Society for Applied Anthropology, Seattle. Available at <http://home.istar.ca/~bthom/sfaa.htm>.
- Thomas, N.
1994. **Colonialism and culture: Anthropology, Travel and Government.** Princeton: Princeton University Press.
- Thomson, A.
1998. **Traditional Ecological Knowledge.** Ottawa: First Nations Forestry Program.
- Threader, R. and C. Brousseau
1986. "Biology and Management of Lake Sturgeon in the Moose river, Ontario." **North American Journal of Fisheries Management** 6:383-390.
- Thuemler, T. F.
1988. "Movements of young lake sturgeon in the Menominee River, Wisconsin." **American Fisheries Society Symposium** 5:104-9.
- Tisdale, M. A. and S. Jamieson
1982. **Investigations at Wapisi Lake 1972-1976.** Winnipeg: Manitoba Department of Cultural Affairs and Heritage Resources, Historic Resources Branch, Final Report 11.
- Tough, F.
1984. "The establishment of a commercial fishing industry and the demise of native fisheries in northern Manitoba." **Canadian Journal of Native Studies** 4(2):303-320.
1987. **Fisheries economics and the Tragedy of the commons: the case of Manitoba's inland commercial fisheries.** Geography Department Discussion Paper No.33. Toronto: York University.

1989. **Depletion by the market: Commercial and resource management of the Lake Winnipeg sturgeon fisheries.** Winnipeg: Treaty Aboriginal Rights Research Center.

1996. **'As their natural resources fail': Native peoples and the economic history of northern Manitoba, 1870-1930.** Vancouver: University of British Columbia Press.

1999. "Depletion by the Market: Commercialization and Resource Management of Manitoba's Lake Sturgeon (*Acipenser fulvescens*), 1885-1935" D. Newell and E. Ommer (eds.). **Fishing people, Fishing Places: Traditions and Issues in Canadian Small-Scale Fisheries.** Vancouver: University of British Columbia Press. 97-120.

Tower, W. S.

1908. "The Passing of the Sturgeon: A Case of the Unparalleled Extermination of a Species." **Popular Science Monthly** LXXIII: 361-371.

Treaty 7 Elders and Tribal Council, W. Hildebrandt, S. Carter, D. First Rider.

1996. **The true spirit and original intent of Treaty 7.** Montreal: McGill-Queen's University Press.

Trigger, B.

1982. "Ethnohistory: Problems and Prospects" **Ethnohistory** 29(1):1-19.

Tsuji, L. S.

1996. "Cree Traditional Ecological Knowledge and Science: A Case Study of Sharp-Tailed Grouse, *Tympanuchus phasianellus phasianellus*." **Canadian Journal of Native Studies** 17(1):67-79.

Tsuji, L. S. and E. Nieboer

1999. "A Question of Sustainability in Cree Harvesting Practices: The Seasons, Technological and Cultural Changes in Western James Bay Region of Northern Ontario, Canada." **Canadian Journal of Native Studies** 19(1):169-192.

United Nations Conference on Environment and Development (UNCED)

1992. **Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992.** Earth Charter, also known as Rio Declaration. www.igc.apc.org/habitat/agneda21/rio-dec.html

Urquhart, W. T.

1873. "Report on the fisheries of the province of Manitoba." **Canada Sessional Papers.** Marines and Fisheries, no.8:193-195.

Usher, P. J.

1991. "Some Implications of the Sparrow Judgement for Resource Conservation and Management." **Alternatives** 18(2):20-21.

1992. **Estimating Historical Sturgeon Harvests on the Nelson River, Manitoba.** P. J. Usher Consulting for The Cross Lake Band of Indians, Savino and Co.

Usher, P. J. and F. Tough

1999. "Estimating Historical Sturgeon Harvests on the Nelson River, Manitoba" D. Newell and E. Ommer (eds.). **Fishing people, Fishing Places: Traditions and Issues in Canadian Small-Scale Fisheries.** Vancouver: University of British Columbia Press. 193-216.

Usher, P. J. and M. S. Weinstein

1991. **Towards assessing the Effects of Lake Winnipeg Regulation and Churchill River diversion on Resource Harvesting in Native Communities in Northern Manitoba.** Canadian Technical Report Fisheries and Aquatic Science, Department of Fisheries and Oceans, 1794.

Van Kirk, S.

1980. "Fur trade history: some recent trends." C. M. Judd and A. J. Ray (eds.). **Old trails and new directions: Papers of the third North American fur trade conference.** Toronto: University of Toronto Press. 160-173.

van Marrewijk, A.

1998. "Indigenous knowledge: the proof is in the eating of the pudding." **Indigenous Knowledge and Development Monitor** 6(3). Available at <http://www.nuffic.nl/ciran/ikdm/6-3/reaction.html>

Van West, J.

1990. "Ojibwa fisheries, commercial fisheries development and fisheries administration, 1873-1915: an examination of conflicting interests and the collapse of the sturgeon fisheries of the Lake of the Woods." **Native Studies Review** 6(1):31-66.

Vickers, J.

1991 (unpublished conference paper). **Where is the Discipline in Interdiscipline?** Ottawa: Carleton University, Rob McDougall Symposium on Interdisciplinarity.

Waddell, J.

1970. **Dominion City: Facts, Fiction and Hyperbole.** Steinbach: Derksen.

Wagner, M.

1985. **T.A.R.R. Center Domestic Harvesting Survey**. Winnipeg: Treaty and Aboriginal Rights Research Center.

1991. "Footsteps Along the Road: Indian Land Claims and Access to Natural Resources." **Alternatives** 18(2):23-27.

Wallace, R.

1991. **Species recovery plan for lake sturgeon in the lower Saskatchewan river (Cumberland Lake area)**. Saskatchewan: Fisheries Branch, Parks and Renewable Resources, Technical Report 91-3.

Warkentin, K.

1994. **Quantifying the Annual Subsistence Harvest of the Cross Lake First Nation**. Winnipeg: MNRM thesis practicum, University of Manitoba.

Warren, W. W.

1984 (reprint). **History of the Ojibway People**. St. Paul: Minnesota Historical Society.

Waugh, E., N. LeClaire and G. Cardinal

(eds.). 1998. **Alberta Elders' Cree Dictionary**. Edmonton: University of Alberta Press.

Wavey, R.

1993. "International Workshop on Indigenous Knowledge and Community-based resource management: Keynote Address." J. Inglis (ed.). **Traditional Ecological Knowledge: Concepts and Cases**. Ottawa: Canadian Museum of Nature and International Development Research Centre. 11-16.

Weiskel, T. C.

1988. "Toward an Archaeology of Colonialism: Elements in the Ecological Transformation of the Ivory Coast." D. Worster (ed.). **The Ends of the Earth. Perspectives on modern environmental history**. Cambridge: Cambridge University Press. 141-171.

Wenzel, G. W.

1999. "Traditional Ecological Knowledge and Inuit: Reflection on TEK Research and Ethics." **Arctic** 52(2):113-124.

Williams, G. and A. M. Johnson.

1967 (eds.). **Saskatchewan Journal and Correspondence 1795-1802**. London: Hudson Bay Record Society. XXVI.

Williams, G.
1969 (ed.). **Andrew Graham's Observations on Hudson Bay 1767-1791**. London:
Hudson's Bay Record Society.

Williams, M. L.
1953 (ed.). **Henry R. Schoolcraft Narrative Journal of Travel**. Michigan: Michigan State
College Press.

Wilson, J., J. Acheson, M. Metcalfe, P. Kleban.
1994. "Chaos, complexity and community management of fisheries." **Marine Policy**
18(4):291-305.

Winnipeg Free Press
1908. (Christmas pamphlet) "Caviar from Lake Winnipeg: With some account of the history
of caviar 1908." Rbc. F. 1060. W72 box 1 8 -C.1. Winnipeg: Legislative Library.

World Commission on Environment and Development (Brundtland Report)
1987. **Our Common Future**. London: Oxford University Press.

Worster, D.
1988. "Doing Environmental History." D. Worster (ed.). **The Ends of the Earth.
Perspectives on modern environmental history**. Cambridge: Cambridge University Press.
289-307.

Wright, J. V.
1976. **Six Chapters of Canada's Prehistory**. Ottawa: National Museums of Canada,
National Museum of Man.

York, H., M. Pronteau, A. Dick and J. Crait.
1994. "Report on Sturgeon Activities in the Landing River Area." NRSCB (eds.). **Field
Activities Report to the Board** (draft). 2-10. Manitoba Hydro archival files, Thompson.

York, H. and D. Macdonald
July 1995. **Field Report on 1995 Mid Nelson River Sturgeon Monitoring to the
NRSCB**. Manitoba Hydro archival files, Thompson.

Interviews and other personal communications

Acco, A.

1997. Band member. Cumberland House First Nation, Cumberland House.

Barrett, D.

1997. Policy Analyst. Manitoba Department of Natural Resources, Winnipeg.

Beady, R.

1997, 1998. Band councilor. York Factory First Nation, York Landing.

Beardy, I.

1997. Band member. York Factory First Nation, York Landing.

Beardy, F.

1997. Band member. York Factory First Nation, York Landing.

Beardy, T.

1997. Band member. York Factory First Nation, York Landing.

Berkes, F.

1996, 1997, 1998, 1999, 2000. Professor. Natural Resources Institute, University of Manitoba, Winnipeg.

Boubard, J.

1998. Band member. Sagkeeng First Nation, Fort Alexander.

Brown, J.

1996, 1997, 1998, 1999, 2000. Professor. History Department, University of Winnipeg, Winnipeg.

Buchner, A.

1997. Archaeologist. Manitoba Department of Culture and Heritage, Winnipeg.

Burant, J.

1996. Archivist. National Archives of Canada, Ottawa.

Chepeski, A.

1997. Consultant. Taiga Institute, Kenora.

Dansfor, S.

1998. Band member. Sagkeeng First Nation, Fort Alexander.

- Dick, T.
1995, 1996, 1997, 1998. Professor. Zoology, University of Manitoba, Winnipeg.
- Folster, H.
1997. Research assistant and Band member. Norway House First Nation, Norway House.
- Fontaine, D.
1998. Director, Environmental Directorate. Sagkeeng First Nation, Fort Alexander.
- Fontaine, K.
1998. Band member. Sagkeeng First Nation, Fort Alexander.
- Fontaine, M.
1998. Research assistant and Band member. Sagkeeng First Nation, Fort Alexander.
- Friesen, J.
1996, 1997, 1998, 1999. Assistant Professor. History, University of Manitoba, Winnipeg.
- Guimond, R.
1998. Band member. Sagkeeng First Nation, Fort Alexander.
- Hannibal-Paci, C.
Field notes, Cumberland House, 1997.
- Field notes, Norway House, 1997.
- Field notes, Nipiwini, 1997.
- Field notes, York Landing, 1997.
- Field notes, Sagkeeng, 1998.
- Hannibal-Paci, T.
1998. Cartographic archivist. Provincial Archives of Manitoba, Hudson's Bay Company Archives, Winnipeg.
- Lafort, L.
1998. Band member. Sagkeeng First Nation, Fort Alexander.
- Letander, H.
1996. Band member. Sagkeeng First Nation, Winnipeg.

- Letander, W.
1998. Band member. Sagkeeng First Nation, Fort Alexander.
- McKay, D. Sr.
1995. Band member. Cross Lake First Nation, Cross Lake.
- Payne, H.
1997. Consultant to First Nations and adjunct professor. University of Manitoba, Winnipeg.
- Saunders, Horace
1997. Band member. York Factory First Nation, York Landing.
- Saunders, Howard
1997. Band member. York Factory First Nation, York Landing.
- Skeet, J.
1998. Band member. Sagkeeng First Nation, Fort Alexander.
- Starr, D.
1998. Band member. Sagkeeng First Nation, Winnipeg.
- Steinbring, J.
1996. Professor. Archaeology, University of Wisconsin, Madison.
- Syms, L.
1996. Archaeologist. Manitoba Museum of Man and Nature, Winnipeg.
- Tough, F.
1996, 1999. Professor. Native Studies, University of Saskatchewan, Saskatoon.
- Vance, G.
1997. Native liaison specialist. Ontario Ministry of Natural Resources, Northwest region, Thunderbay.
- Wastesicoot, O.
1997. Research assistant and Band member. York Factory First Nation, York Landing.

APPENDIX A: Sturgeon Archaeology in Manitoba

**NAMEW AS AN UNDER-RATED ECONOMIC RESOURCE:
A REVIEW FOR LAKE STURGEON (*ACIPENSER FULVESCENS*)
IN MANITOBA'S ARCHAEOLOGICAL LITERATURE**

**Christopher Hannibal-Paci
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Introduction

More often than not, archaeologists are left with mere fragments of the past. Some of these fragments have been accorded greater value and attention as objects of inquiry than others. In the process of valuing some artifact classes over others, we have frustrated attempts to understand more fully the relationship of human adaptations to ecological systems.

The significance of understanding past ecological systems cannot be denied. Archaeological arguments most often represent reasonable conclusions about such things as precontact human behaviour, organizations and movements in relation to their environments. Other times, these arguments reveal more about the epistemology of our methods of inquiry than anything else. Fully understanding the place human populations have held as parts of ecosystems may

require a radical re-visitation of past conclusions. For example, very few data are available in the archaeological literature regarding inland fishing, and this has led to an acceptance that discounts fish resources.

Cleland (1982:761) has argued that for the upper Great Lakes, the relationship between environment and precontact cultural adaptation remains poorly known. Archaeologists use terms such as "big-game hunters", "caribou-eaters" and "bison hunters" to describe complex and diverse subsistence strategies because of a lack of adequate evidence and narrowly-focussed insights for conceptualized cultural assemblages. Smith (1991:42) has argued that "unless an environmentally sensitive, regionalized approach is taken and the actual utilization of these resources adequately assessed, this information will remain obscured by over-generalizations regarding the universality of bison dependence during all seasons and in all places, and the supposed cultural unity of northern plains tribal groups under the core-culture-area concept." An *environmentally sensitive, regionalized approach* to understanding resource utilization and precontact cultural adaptation underscores the arguments in this paper.

Balmer (1983:12) has indicated that the predominant paradigm for archaeology is the chronological model, "using ceramic vessel morphology and decoration as the main distinguishing feature." Although Simonds (1994:140) argues that "there is great value in studying fish remains from archaeological excavations because of the important contributions they can make in the interpretation of a site", historical geographer Frank Tough (personal communication, 1996) has noted that fish remains do not serve as a significant marker for prairie archaeologists, and that fish remains have been passed over for larger artifacts. Hanna (1981:36) observed that "many sites contain little or no fish material. However, this does not justify merely appending them as 'Fish' to the bottom of an otherwise detailed faunal analysis."

Balmer (1983:25), elaborating on the scarcity of faunal analysis, noted that the "paucity of comparative data in the literature and a lack of incentive to produce data that other researchers can use for comparative purposes" hinders such research. As a case in point, Casteel (1976) estimated the sizes and age of fish from such residue as scutes. Trace remains such as scutes and spines are invaluable, but have been *under-rated* in most archaeological reports to date. Balmer's critical thesis on the use of zooarchaeology in the south-central Canadian shield revealed problems with recovery, analysis and reporting of faunal remains. She argues that "faunal remains from excavations in the study area have usually been included as a minor section of the report. They have occasionally been used to provide some evidence of seasonal occupation and or activity and a suggestion of the general subsistence base" (Balmer 1983:17).

Lukens (in Mayer-Oakes 1979:315-321) bucked the trend towards recording ceramic and other "more valid cultural data", under pressures from potential loss, over faunal analysis. Furthermore, Lukens was more interested in answering questions regarding environmental change than making assumptions about cultural assemblages. The majority of Manitoba digs have been "archaeological rescue research" or salvage operations in areas usually affected or to be affected by changes in water levels due to hydro development. Balmer (1983:24) lists more "valid" cultural data such as ceramics, lithic remains and evidence of hearth and house structures; according to her, (1983:16), the "implicit assumption of this method of analysis is that ceramics constituted an integral and important enough part of the culture which produced them that they could be equated with social groups, and that changes in the ceramics would reflect changes in the rest of the culture." When faunal remains have been considered, the most significant remains are those of larger mammals such as buffalo (*Bison bison*).

Arthurs (1982:107) noted that the Long Sault in the Rainy River valley was a "spring

fishing site for much of its 3000 year existence." Moreover, he argued that the "tools reflect activities such as processing of game more than fish, and this inference is supported by the faunal assemblage" (Arthurs 1982:104). Surprisingly, fish processing at the Long Sault Site is interpreted as a lesser activity compared to the processing of big game, despite the fact that Rainy River area was/is known as a significant sturgeon fishery. Balmer (1983:36) stated, "sturgeon was formerly available in large numbers in the Lake of the Woods and was exploited in the early historic period. Sturgeon, White-fish, and Lake trout were all fished commercially as well by both the Native and commercial companies."

Problems in Preservation and Sampling

In Manitoba, the archaeological record for sturgeon is fragmented, poorly representing the use of sturgeon during the last 4000 years. To reconcile the apparent difference, we must consider that general trends have been argued, often on the basis of very small samples. Balmer (1983:126) suggests that "the absence of large amounts of fish bone from sites thought to be good fishing locations must be viewed with caution until more is known about the reasons for the scarcity of these remains."

Syms (personal communication, 1996), discussing recent excavations at The Forks, stresses the difficulties of faunal analysis. The use of screens small enough to detect minute traces in large amounts of soil takes an enormous amount of time and energy. The return on such costly analysis may reveal very little of the precontact environment, population and human use. For example, Barka and Barka (1976:55) note that "only a glimpse of the diet of the Sturgeon Fort occupants is provided by more than 5,000 animal bone fragments recovered from the site for only 17% of this animal bone could be identified, the remaining fragments were so small as to be unidentifiable."

The problem with preservation and disproportionately low representation of fish remains is indeed problematic. In northern Manitoba, at the Kame Hills Site, "fish remains only accounted for 2.5% of the faunal remains recovered from HiLp-1, which is unusual since Southern Indian Lake (SIL) has a very high productivity for fish" (Dickson 1980:38). Dickson noted that the significance of fish was most likely under-represented in the SIL sample, as fish are considered to be the most reliable food source: "whitefish, red sucker and pickerel which are caught year round in the lake" are the primary species listed by Dickson (1978:16). Interestingly, sturgeon are not mentioned, although of the toponyms listed on the SIL Map Zones, *Sturgeon Narrows* is the only reference to fish species (Dickson 1978:152). Moreover, excavations at SIL 257 (Hanna 1975:94-96) seem to support an argument against sturgeon use at SIL. One interesting aspect, however, is Hanna's find of a antler harpoon head similar to others found in the northern boreal forest interpreted as having been used for fishing sturgeon (MacNeish 1958). Comparatively, at the Wapisu Lake Site 80 kilometres west of Thompson on the Rat River system, Tisdale and Jamieson (1982:50) noted "fish remains are more numerous than avian. Minimum numbers were not estimated since the most abundant fragments are scales and vertebrae. Northern pike and sucker are the only distinguishable types."

Steinbring, Syms and Buchner all note the difficulty of examining a site for sturgeon remains, and that the lack of data on fish result from low survival rates in the archaeological record. As Findeis (1993:5) acknowledged, "the fossil record of sturgeons is poor, largely because their dominantly cartilaginous skeletons do not fossilize." Steinbring (personal communication, 1996) elaborates, noting that "soil acids break it up, and only very large pieces like ganoid scales and pectoral plates from sturgeon will be present." Barka and Barka (1976:56), in their study in Saskatchewan, found an indistinguishable quantity of fish remains "insignificant, but this is

undoubtedly due to poor preservation since fish bones would decay very rapidly. A handful of sturgeon plates and scales were found." In contrast, Scott (1977) found fish, including sturgeon (*A. fulvescens* and *A. oxyrhynchus*), to comprise almost 30 percent of the bones found at the (Iroquoian) Coteau-du-lac, Site, in Quebec, dating from around the late 1770s.

While the archaeological record appears largely barren of significant fish use, reports for most of the excavations include limited faunal analysis sections. Nicholson (1978:5) noted for FbMb-1 at Duck Bay that "the relative scarcity of fish and small mammal remains in the present sample can be attributed to the orientation of volunteers, who were specifically looking for artifacts, and to the use of large mesh screens." Without standardized controls, which include collecting faunal remains, faunal analysis will continue to reflect an incomplete picture of past ecological-social systems. Like searching for the proverbial needle in a haystack, examining fish remains, associated artifacts, features and sites requires a great investment of resources. Faunal analysis has long been an under-developed field of inquiry, but one worthy of our attention.

In order to discuss the under-rated state of faunal analysis within a broad context, I refer to several studies including those by Cleland (1982), Balmer (1983) and Smith (1991). The Manitoba literature to be discussed includes that dealing with the Tailrace Bay Site (Lukens 1967; Mayer-Oakes 1970), the transitional forest zone (Nash 1975), the Tyrrell Sea beach (Wood, Trott and Pettipas 1976), the Notigi Lake Site UNR 23 (Wiersum and Tisdale 1977), the Stott Site (Tisdale 1978; Hamilton *et al* 1981; Hamilton 1984), the Caribou Lake Project (Wheeler 1978; Buchner 1979), the Thunderbird Site EgKx-15 (Carmichael 1979), South Indian Lake (Dickson 1975; Hanna 1975; Wood 1983), the Karne Hills Site (Dickson 1980), the Sinnock Site (Buchner 1981, 1984), the Wapisu Lake Site (Tisdale and Jamieson 1982), the Bjorklund Site (Buchner 1982), the Lockport Site (Historic Resources Branch 1985; Roberts 1992), and The Forks Site (Simonds 1993, 1994). It is my hope that this paper will stimulate development of a useful methodology for further inquiry and give some insight into sturgeon fishing, human adaptations and resource use. The recent scholarship of Roberts (1992) and Simonds (1993, 1994) can be seen as addressing weaknesses of past faunal analysis. Many discussions with Drs. Steinbring, Tough, Syms and Buchner, and the guidance and editorial assistance of Leo Pettipas, assisted me greatly in developing this paper.

Historical Accounts

What leads us to think that sturgeon-fishing may have been important in precontact times to begin with? To answer this question, one need only consult the historic record pertaining to the subject. The early postcontact period offers a far greater wealth of artifacts and evidence for sustained sturgeon use. Documentation since the beginning of the European contact period in Manitoba -- that is, sometime after inland penetration in the 1730s -- indicates that sturgeon was processed into pounded sturgeon, pemmican, oil and isinglass. Regarding isinglass, Jones and Jones (1978:94) noted that "the Cree call this substance *wanaman*. One informant recalled that an old man had told him that ... ochre was mixed with something from inside the sturgeon to make paint." Other uses of the fish included the stretching of skin for drums and fashioning the skin into jars (Steinbring 1965).

Stewart's (1930) discussion of early trading posts relied on the written accounts of Sieur de la Vérendrye, Alexander Henry, David Thompson, Peter Fidler, Daniel Harmon and John McDonnell. Before 1816, the Red and Assiniboine rivers were the main travel corridors to the plains, through to Lake Winnipeg from an eastern route presented by the Winnipeg River. These rivers and lakes not only supported the transportation of goods and furs, but also furnished in what

appears from some accounts to have been a boom and bust cycle of flesh and fish. In 1805 Daniel Harmon (in Lamb 1957:90) wrote that at the Pine Fort, below the confluence of the Assiniboine and Souris rivers,

the river at present being so low (as we have not had a drop of Rain since last Autumn) and we having such a number of Crafts with us we drive the Sturgeon upon the Sand-banks where there is but little water, and there we kill any number we please, which are excellent eating.

Peter Fidler (in Stewart 1930:35) noted in 1819 that,

Sturgeon which passes by here (Brand House) about 10th May every Spring would afford a very ample supply for many people Some of them ascends as high as shell river more than 800 miles by the River. — The natives frequently make fences of wood to prevent their descent to Lake Winipic and by this means preserve a constant and very ample supply for Summer.

Henry Youle Hind (1971:289) recorded that in 1857,

observing numbers of fish rising at grasshoppers in the Souris, we stretched a gill net across the mouth of the river, and succeeded in taking pickerel, gold-eyes, and suckers, the grey and the red. In a second attempt we caught a tartar; a huge sturgeon got entangled in the meshes of the gill net, and before we could land him he succeeded in breaking away and carrying a portion of the net with him.

Historians (Lytwyn 1993; Peers 1994; Tough 1996) have advanced discussions of human-animal relationships based on archaeological records. Archaeologists have also used archival and other historical evidence to support discussions of human-animal relations. For instance, Syms (personal communication, 1996) noted that significant weir sites at Fort Ellice on Beaver Creek and on the Assiniboine River were documented in the Pembina post journals of Alexander Henry the Younger, 1804-6 (see also Peers 1994:70). In contrast, much of the scientific knowledge about sturgeon is fragmented, dependant on disciplinary specialization and experimenters' question(s) during specific field seasons. Biologists and zoologists simply ignore the historic and archaeological record accumulated to date.

Pre-Palaeo-Indian

Ichthyologists believe sturgeon to be one of the few surviving prehistoric fishes in existence today. The fish has changed little despite environmental changes. Norman and Fraser (1949:89) have noted that "fossil remains (scutes, pectoral spines and fragments of bones) date back to the Pliocene period." Findeis (1993:33) determined *A. albertensis* Lambe, 1902, to be from the upper Cretaceous of Alberta. Simonds (1994:153) noted that "glaciation in the province [of Manitoba], dating up to about 8,500 years Before Present (B.P.) ..., prevented not only people from inhabiting the area, but also faunal populations such as fish." According to Simonds (1993:146), "with the retreating ice sheet, many fish populations would move northwards into the newly-created habitats, leaving a distinctive fish community behind." This last point becomes important in the following section.

Palaeo-Indian

We know little of the early precontact history and significance of sturgeon use in North America. While sturgeon has been around since the glacial retreat after the Pleistocene Epoch some 12,000 years ago, evidence of human use is limited. Scott Hamilton's (1991) study of a burial site at Wapekeka, Ontario places Aboriginal occupation of the Hudson Bay Lowland at about 7000 years ago. Most estimates date human use of sturgeon in North America from 6000 to 11,000 years ago; however, what do we know of sturgeon use in Manitoba and surrounding areas during this time?

Sturgeon migrated into the Lake Agassiz basin, adapting and expanding to the fullest extent of its range. Its biogeography may have continued to expand had it not been for large-scale 20th Century enterprises such as commercial industrial fisheries and hydro-electrical development that adversely affected populations and habitat.

Sturgeon are believed to have migrated north from the Mississippi drainage. The details of this migration into the fish's present range have yet to be demonstrated. While we are left without much evidence of such migrations, it is known that around 18,000 years ago the entire area which comprises the present range for sturgeon was under several kilometres of Laurentide ice. As the glacier began to melt, Lake Agassiz formed in its wake. The lake grew and continued to change over the next 4000 years. We can assume from the limited records available that sturgeon migrated progressively northward with the melting of the glacier and the formation of proglacial lakes.

According to Pettipas (1970:13), Lake Agassiz is believed to have been inhabited by a variety of fish life, including sturgeon, an inference based both on fossil evidence and biological consideration. He cites Coleman's (1941:171) report of "a large bony plate of a sturgeon" from an Agassiz beach near present-day Fort Frances, Ontario. Hubbs and Lagler (1958:7), in discussing the source of the original postglacial fish population of the Great Lakes, suggest that several migration routes were involved, including one "from the Northwest, by early passage through the connections with the upper Mississippi basin (and possibly from glacial Lake Agassiz of the Winnipeg region to the Hudson Bay drainage and thence southward to the Great Lakes) ...". O'Brien's (1976) study of Methodist Point Park indicated sturgeon remains and human occupation that possibly span 11,000 years.

Nonetheless, a human-sturgeon connection in Palaeo-Indian times remains elusive. Decades ago, Quimby (1960:41) hypothesized an "Aqua-Plano" culture with a hunting-and-fishing economy centred around the glacial lakes (including Agassiz). Inclining somewhat in that direction, Cleland (1982:768) concluded that "Indians who first entered the upper Great Lakes region about 12,000 years ago may have fished occasionally, [but] there is no indication in the archaeological record that they did".

Broughton's (1995) studies of Emeryville Shellmound vertebrates on San Francisco Bay hint at more positive prospects, but his conclusions are specific to the species *Acipenser transmontanus*, both spatially and temporally, and cannot be generalized. It is important that scholars continue to test, research, debate and advance theories regarding the "former natural environment". It is equally important to refrain from over-generalizations.

Archaic

Sustained fishing in the North is being considered by Syms in light of found tools,

sturgeon harpoon heads and a bone scraper fashioned like a sturgeon from a Nelson House burial site dating to 2000 BC. Simonds (1994:164, citing Tamplin 1977) noted that "detailed faunal summary for The Pas Reserve site, in which he reported that the highest density of fish remains were recovered from the Archaic occupation dated at 1240 B.C.", and that sturgeon comprised 1% of the total fish remains.

It is important when reconstructing precontact use of sturgeon to realize that such use would have varied over both time and space. Lukens (in Mayer-Oakes 1970:307) identified 83% of fish bone identified from 4500 years of occupation at the Tailrace Bay fauna to be that of lake sturgeon. At the Forks, 80% of the total number of artifacts recovered during excavations were fish remains (Kroker and Goundry 1993:i). Both Steinbring (personal communication, 1996), who cited evidence for sturgeon at Whitemouth Falls and Bjorklund to 3000 BC, and Arthurs' (1982:107) work at Rainy River, can be used to suggest that sturgeon was an important resource in subsistence cycles for at least the last 4000 years. In his study of east-central Manitoba, Buchner (1979:100-106) noted sturgeon remains with the Pelican Lake and Laurel assemblages; however, he cautioned that, for Pelican Lake, "sturgeon may have been taken in early spring sometime before the sites' population moved westward onto the grassland for the summer."

Steinbring (personal communication, 1996) stated that sturgeon remains were not found in the lowest levels at Whitemouth Falls and Bjorklund, although the area was "hot sturgeon country" in the historic period. Steinbring was not surprised to find sturgeon remains in very early times (1000-3000 BC at least), adding that there is often a fair bit of fish bone in the later levels, but never in the deeper deposits.

Woodland and Early Postcontact

As Mayer-Oakes (1967) ascertained from digs at Grand Rapids and upriver at Cross Lake, and as was elaborated upon by Meyer and Thistle (1995), a considerable amount of fishing took place during later periods. Mayer-Oakes (1967:347) has provided a sound summary of economic trends within the Woodland period:

with Nutimik [a precontact culture complex dated at 1000 AD] and all later foci [Manitoba 1350 AD and Selkirk 1750 AD] the faunal remains suggest presence of an environment essentially like that of today. Fish bones predominate in the animal remains from the last three foci. Group size apparently increases as seasonal food resource concentration brings nomadic bands together briefly as macro-bands (as known from the historic Cree). This pattern seems clearly to be related to environmental locale as some Manitoba focus groups are known to exist on the grassland plains to the west for bison hunting purposes, while other Manitoba focus groups are lake and riverside fishers in the woodland country.

Hanna (1981:37) concluded that "during spring, fish were especially important as, by this time, bison had returned to the grasslands and hunting conditions in the forest were not favourable. Fish provided a highly concentrated and easily harvested food resource and probably constituted the main element in the diet at this time of year." Smith (1991:42) pointed out "the importance of bison has not been over-rated so much as the alternate subsistence resources and their effect on plains lifeways have been under-rated."

The Forks Site, Lockport and the Tailrace Bay Site are significant for the amount of fish remains excavated at each. In a comparative manner, each may hold promise for some

understanding of the importance of fish resources to cultural adaptations, lithic developments and environmental changes, including ecological succession. In each of these sites, a lake sturgeon (*Acipenser fulvescens*) identification is assigned to existent scutes and other remains. However, Rostlund (1952) argued that shovelnose sturgeon (*Scaphirhynchus platyrhynchus*) also occurred in the Red and Assiniboine rivers. No attempt has thus far been made to distinguish these two species from each other, nor has any attempt been made thus far to refute or support Rostlund's (1952) finding.

An interesting conclusion reached by Buchner (1981, 1982, 1984) for the Winnipeg River is the apparent orientation towards big game, notably bison. Buchner (1982:108) observed that "despite the overall high numbers of bones of small animals [49% beaver and 23.3% sturgeon], a major proportion of food was supplied by the larger animals such as moose and bison." Without a doubt, the efficiency and caloric value of one moose far exceeds of a beaver, however, sturgeon may be a different story. Historical accounts rate a sturgeon's value much higher than Buchner seems to suggest, and it is odd that one of the most productive rivers for sturgeon, the Winnipeg, would lead archaeologists to classify precontact populations as bison hunters.

The Lake Winnipeg drainage system, primarily the Lake Winnipeg catchment with water flowing in from the west via the Saskatchewan River system, from the south via the Red River system, and from the east along the Winnipeg River system, straddles several major vegetational zones, including boreal forest, mixed woodlands, parkland and grassland. Mayer-Oakes (1967:359) concluded that historical materials uncovered at the Tailrace Bay Site at Grand Rapids "span the total range of European contact". Although no drastic environmental changes since Nutimik Focus times are indicated, "animal bone remains from the Tailrace Bay Site (Lukens 1964, 1966) support the general evidence for sequential change from large game hunting to fishing which MacNeish has presented."

During studies of the Tyrrell Sea beach ridge, Wood (*et al.* 1976) concluded, "by virtue of their shallow depths, the lakes and streams associated with the Tyrrell Sea Beach Ridge are comparatively unproductive of fish as compared with the Churchill and Nelson Rivers and the lower reaches of the streams flowing into the Bay." This conclusion supports an earlier study of Chipewyan "Caribou-eaters" in the area bordered to the south by the Churchill River (Nash 1975). Do both studies under-rate the use and importance of sturgeon? There is no supporting evidence to suggest that the Chipewyan fished sturgeon before European contact. The journals of Samuel Hearne, 1769-1772, note a variety of fish including a species the "Northern Indians" call *Shees*, which Hearne described as resembling a pike (*Esox lucius*) except for the mouth which "much resembles that of a sturgeon" (Glover 1958:160). Biological estimates of the Churchill River fish populations by Skaptason (1926:19), Harkness and Dymond (1961:15) and Scott and Crossman (1973:85) indicate significant populations of sturgeon for the postcontact period. For South Indian Lake, Bellhouse (1971:8) makes an enlightening observation: "it is the lake that furnishes the most reliable food source, great numbers of whitefish, red sucker (which is smoked) and pickerel are taken year round and an occasional trout is also caught. The plentiful northern pike or jackfish are thought impalitable [sic] and are ignored as a possible staple." Bellhouse is silent on the matter of sturgeon harvests and consumption at SIL (the commercial sturgeon fishery was closed from 1961 to 1970).

Carmichael (1979:79) noted that "while no fish bone was actually recovered, it is argued ... that the brown compacted area of Feature #1 [at Egkx-15] was composed primarily of decayed fish remains. Most fish bone is soft and under acidic Boreal soil conditions deteriorates rapidly." Very few archaeological studies have had the resources available to examine more closely the "brown compacted area", and have had to rely on associated artifacts to support opinions that fish were a

significant dietary component. For instance, Carmichael (1979:83) supported his claims by "the recovery of several scrapers from its peripheral boundaries Janzen (1968:101) has pointed out that unifacial tools are closely associated with fishing stations ...", and Simonds (1993:164) suggests that "some of the lithic tools recovered in association with the fish remains should be examined with this function in mind." Sturgeon were most probably fished for a considerable span of time; however, relatively little is known about precontact use in the Hudson Bay province (Lake Winnipeg basin). This knowledge can be drawn from several sources, synthesizing archaeology, history, geography, zoology and fisheries management using an interdisciplinary perspective.

The report on Bjorklund (Buchner 1982) revealed significant sturgeon remains; however, there was no analysis beyond the basic statement. Buchner (personal communication, 1997) stated that the 1979 publication and others over the last 10 to 15 years suggest sturgeon played a far more important role in precontact societies than was previously thought. This extends to peoples hitherto conceived of as big-game hunters with a grasslands-oriented subsistence base.

At the Stott Site, located seven miles west of Brandon, "bison was the most obvious meat source, but did not likely enjoy this prominence for the entire year. Both aquatic and diffuse land animals were also exploited, and plant foods undoubtedly supplemented diet during the warm seasons" (Tisdale 1978:31). For the grassland-oriented hunters, Smith (1991:42) stated, "at present there is no evidence indicating the relative amount and, therefore, economic importance of fish and vegetables consumed in relation to bison and other large mammals."

Artifactual Evidence

Besides fish remains themselves, artifacts can shed light on precontact human-sturgeon relations. These were involved in the harvesting, consuming and trading of fish. Barka and Barka (1976:59) described an artifact found at the Sturgeon Fort Site as "a large fish hook with a round shank and a cone-shaped hook. The hook had apparently been barbed at one time ... measuring three and one eighth inches in length. it may have been used to catch large fish such as sturgeon." Lipsert (1970) discussed a sturgeon in a net pictograph (Fig.1) from the Crooked Lake Site, Basswood River, Minnesota (Dewdney and Kidd 1962). She described a fishing technique whereby a large net made of willow bark was drawn between two canoes until a sturgeon entered the bag and the opening was closed.

A similar technique is discussed in Rostlund (1952), and George E. Finlay (c. 1848) sketched this technique in *Sturgeon fishing-Red River*. Of interest in the Finlay sketch is the use of a short club, possibly carved of wood, with a heavy round head. The club is used to deliver a killing blow to the sturgeon which is suspended in a net held between two canoes. This image does not quite square with Longfellow's romantic notion of *Hiawatha's Fishing*, but it does illustrate the collective effort involved in taking such large fish. Mason (1966:292), while rather dated, has pointed out "the savage man's skill in fishing is undoubtedly, and has always been the admiration and envy of the civilized. The gill-net, the fish-trap, the weir, the pound, the tide trap are well known to the aborigines of all the continents." In contrast, Smith (1991:44) argued, "the use of nets is probably an historic European innovation to the plains area and, as a consequence, most of the fishing would have to have been done during periods of open water when application of the weirs or traps or pen-traps would be possible." Nets are problematic, in that organic materials leave no significant record and it is difficult to know if plains archaeologists have watched for such artifacts as net-sinkers. Without standardized archaeological records, assumptions abound!

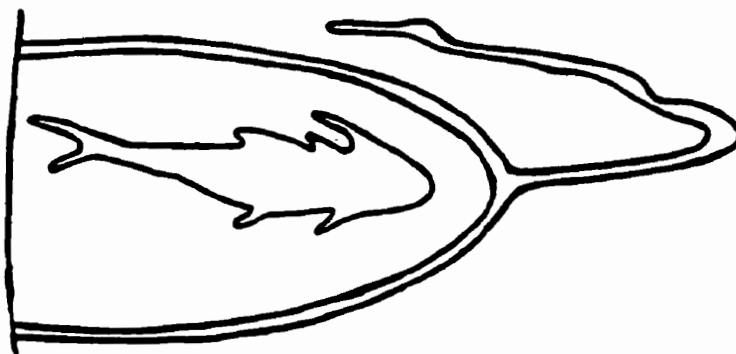


Figure 1. "Sturgeon in a net" pictograph recorded by Selwyn Dewdney. From Lipsett 1970:185.

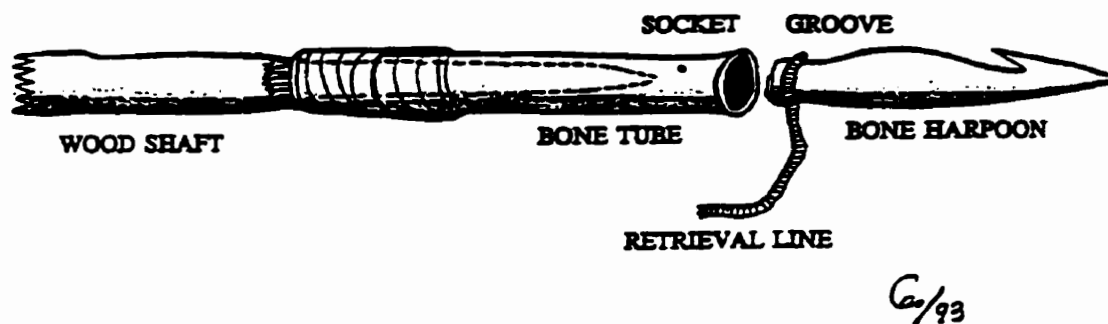


Figure 2. Hypothetical reconstruction of tube-socket toggling harpoon from The Forks. Drawing by Geoff Marr, from Kroker and Goundry 1993:126.



Figure 3. Large bone fishing harpoon head from southeastern Manitoba, ca. 3000 years old. Drawing by D.W. Laverie, from Wright 1976:46.

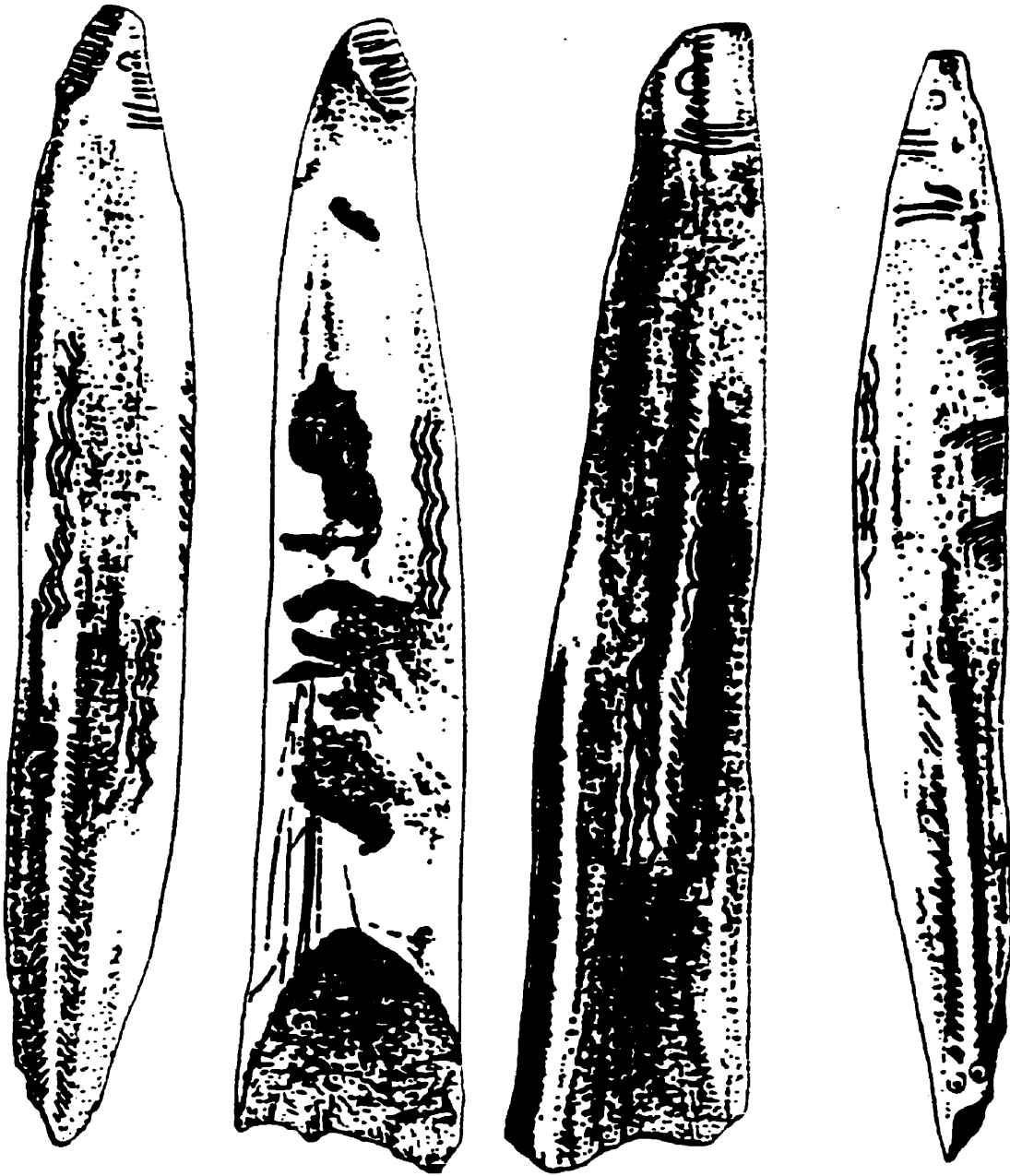
Indigenous peoples' technologies such as harpoons and spear constructions, weights and floats indicate sophisticated and practical adaptive technologies for harvesting fish species. Marr (1993:119) noted, referring to a harpoon head (Fig. 2) found at The Forks Site: "this toggling harpoon was likely used for spearing fish. When the fish was speared, the point would remain in the fish and become free from the shaft socket, so that the line would be used to draw in the fish." MacNeish (1958) noted a similar multiple-barbed antler harpoon design (Fig. 3), fragmentary examples of which were also recovered at SIL 257 (Hanna 1975) and at Nelson House (Syms, personal communication, 1996).

Upon occasion, both Cree and Ojibwe fashioned utilitarian objects with added decorative attributes of fish motifs. Sometimes objects used in the processing of game and fish were empowered with such designs, thus reinforcing human-animal relationships. For instance, Syms (personal communication, 1996) noted the recovery of a bone scraper, shaped and decorated in what he interpreted to be the form of a sturgeon (Fig. 4). The scraper may recall the owner's prowess in relations to harvesting the fish, or else it may have been used as a tool for removing fish scales. Other representations of sturgeon, in the form of rock paintings or pictographs, as shown in Figure 1, may recall success in catching large fish, or may represent vision quests or dreams.

Summary

This review of the archaeological record for sturgeon has revealed some very interesting facts regarding fish remains in general and Aboriginal use of sturgeon in particular. However, a fuller knowledge of sturgeon fishing remains contingent on re-examining the collected ethnographic materials from the postcontact period, along with archaeological materials from early times. Often, conventional reconstructed views of Aboriginal relationships with sturgeon – for instance specialized use within seasonal harvesting activities – result from what can be gathered far from an emic perspective. With regards to the northern plains bison hunters, Smith (1991) argued that historical accounts often are misleading for their underestimation of alternative subsistence resource use. The myth of the "big game hunter" colours how Cree and Ojibwe societies have been studied. Syms indicated that a "big game bias" had been dominant throughout much of the earlier archaeological work in Manitoba, prioritizing the types of artifacts to be looked for. The established collections of many museums, such as the one at the Manitoba Museum, advance the view that the types of artifacts displayed are usually those which were available in great numbers and fairly easily discerned in the mix. In fact, what continues to be displayed depends on what is looked for when excavating in the first place. Many factors, including past studies and demands of collectors/collections, will continue to shape the direction of archaeology in the near future.

In Manitoba, the evolving patterns of Cree and Ojibwe sturgeon fishing were radically altered by settlement of Metis and Europeans in the late 18th and early 19th centuries. During this period, the Cree and Ojibwe in the Lake Winnipeg basin continued their subsistence-commercial harvesting activities, acted as harvesters, processors and wage labourers in the fur trade economy, and eventually became industrial fishermen. The written record provides better, albeit incomplete, documentation of Aboriginal use of sturgeon in the Lake Winnipeg basin since the 1770s. Not surprisingly, the historical, ethnographic and archaeological records suggest that Cree and Ojibwe around Lake Winnipeg utilized the fish to a very great extent. However, future archaeological finds, and ongoing re-examination of past excavations, will continue to expand knowledge about fishing, one aspect of human-ecosystem relationships. The degree to which traditional patterns and adaptations of seasonal harvesting have been interrupted could stand as a paper unto itself and has not be the focus here. Interpreting the archaeological literature reveals, no doubt, a desire to understand the place sturgeon played within Cree and Ojibwe society in the Lake Winnipeg basin.



S. LEVACY

Figure 4. Antler carving in the shape of a sturgeon from Wapisiu Lake. Drawing by Shirley Levacy. Courtesy of Manitoba Museum of Man and Nature.

Reiterating some of the conclusions made by Cleland (1982) and Smith (1991) regarding fish use in general, the record of human-sturgeon relationships is equally unclear for the Lake Winnipeg basin.

Conclusions

In an overview of the cultural history of Manitoba, it is noted at the University of Manitoba's anthropology web site that "while history normally draws on written sources, archaeologists have unearthed an articulate unwritten record of Manitoba's past in the form of ancient aboriginal artifacts and settlements. This record reveals a 12,000 year story of human survival and accomplishment in a challenging environment and a long cultural heritage that influences and enriches the lives of present day Manitobans" (Anon 1997). This source lists the major developments for the period as the settlement by "Paleoindian big game hunters", establishment of "Archaic stone age communities", and accomplishments of "Woodland cultures" (Anon 1997). Oversimplified comments such as these illustrate the possible dangers of strictly adhering to disciplinary precepts. Fully understanding the place human populations have held as parts of ecosystems may require a radical re-visitation of past conclusions. While the archaeological record is notably wanting in significant analysis regarding fishing, most digs do include limited analysis on faunal remains. Like searching for a needle in a hay-stack, sorting fish remains, associated artifacts, features and locating fishing sites require a great investment of resources. Faunal analysis has long been under-developed, or to borrow Brian Smith's term under-rated. *An environmentally sensitive, regionalized approach* to understanding resource utilization and precontact cultural adaptation underscores the arguments in this paper. This critique of archaeological literature in Manitoba has revealed somewhat constrained discussions about human adaptations, and hence precontact use of Lake Sturgeon (*Acipenser fulvescens*).

References Cited

- Anon
1997 [Http://www.umanitoba.ca/faculties/arts/anthropology/Manitoba/overview.html](http://www.umanitoba.ca/faculties/arts/anthropology/Manitoba/overview.html)
- Arthurs, D.
1982 *The Long Sault Site: Cultural Dynamics in the Rainy River Valley of Northwest Ontario*. MA thesis, University of Manitoba. Winnipeg.
- Balmer, A.
1983 *Zooarchaeology in the South-Central Canadian Shield: An Assessment of Its Current Use and Potential*. MA thesis, University of Manitoba. Winnipeg.
- Barka, N. and A. Barka
1976 *Archaeology and the Fur Trade: The Excavation of Sturgeon Fort, Saskatchewan*. *Indian and Northern Affairs, History and Archaeology* 7. Ottawa.
- Bellhouse, A.
1971 *Environmental and Historic Background of Southern Indian Lake*. *Churchill Diversion Archaeological Project Technical Report 1*. University of Winnipeg. Winnipeg.

- Broughton, J.
1995 Resource Depression and Intensification During the Late Holocene, San Francisco Bay: Evidence from Emeryville Shellmound Vertebrate Fauna. PhD thesis, University of Washington. Washington.
- Buchner, A.P.
1979 The 1978 Caribou Lake Project, Including a Summary of the Prehistory of East-Central Manitoba. *Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Papers in Manitoba Archaeology, Final Report 8*. Winnipeg.
1981 Sinnock: A Paleolithic Camp and Kill Site in Manitoba. *Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Papers in Manitoba Archaeology, Final Report 16*. Winnipeg.
1982 Material Culture of the Bjorklund Site. *Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Papers in Manitoba Archaeology, Miscellaneous Paper 13*. Winnipeg.
1984 Investigations at the Sinnock Site, 1980 and 1982. *Department of Culture, Heritage and Recreation, Historic Resources Branch, Papers in Manitoba Archaeology, Final Report 17*. Winnipeg.
- Carmichael, P.
1979 The Thunderbird Site, EgKx-15: A Prehistoric Petroform and Habitation Site in Manitoba. *Department of Tourism and Cultural Affairs, Historic Resources Branch, Papers in Manitoba Archaeology, Final Report 6*. Winnipeg.
- Casteel, R.
1976 *Fish Remains in Archaeology and Palaeoenvironmental Studies*. Academic Press. London.
- Cleland, C.
1966 The Prehistoric Animal Ecology and Ethnozoology of the Upper Great Lakes Region. *University of Michigan Museum of Anthropology, Anthropological Papers 29*. Ann Arbor.
1982 The Inland Shore Fishery of the Northern Great Lakes: Its Development and Importance in Prehistory. *American Antiquity 47(4):761-784*.
- Coleman, A.P.
1941 *The Last Million Years: A History of the Pleistocene in North America*. University of Toronto Press. Toronto.
- Dewdney, S. and K. Kidd
1962 *Indian Rock Paintings of the Great Lakes*. University of Toronto Press. Toronto.
- Dickson, G.
1975 Excavations at SIL 54. *Churchill Diversion Archaeological Project Progress Report 1*. University of Winnipeg. Winnipeg.

- Dickson, G.
1980 *The Kame Hills Site. Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Papers in Manitoba Archaeology, Final Report 9.* Winnipeg.
- Findeis, E.
1993 *Skeletal Anatomy of the North American Shovelnose Sturgeon Scaphirhynchus platyrhynchus (Rafinesque 1820) with Comparison to Other Acipenseriformes.* PhD thesis, University of Massachusetts. Amherst.
- Glover, R. (ed)
1958 *A Journey from Prince of Wales's Fort in Hudson's Bay to the Northern Ocean, 1769, 1770, 1771, 1772.* The MacMillan Company of Canada Ltd. Toronto.
- Hamilton, S.
1991 *Archaeological Investigations at the Wapekeka Burial Site (FLJ-1).* Lakehead University. Thunder Bay.
- Hamilton, S., W. Ferris, S. Hallgrimson, G. McNeely, K. Sammons, E. Simonds and K. Topinka
1981 *1979 Excavations at the Stott Site (DIMa-1): With Interpretations of Cultural Stratigraphy. Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Papers in Manitoba Archaeology, Miscellaneous Paper 12.* Winnipeg.
- Hanna, M.
1975 *Investigations of the MacBride-Barrington Locale. Archaeological Research Centre Research Reports 1.* University of Winnipeg. Winnipeg.

1981 *An Analysis of Fish Scales from Aschikibokahn FbMb-1, West-Central Manitoba. Manitoba Archaeological Quarterly 5(3):20-39.* Winnipeg.
- Harkness, W. and J. Dymond
1961 *The Lake Sturgeon. The History of Its Fishery and Problems of Conservation.* Ontario Department of Lands and Forests, Fish and Wildlife Branch. Toronto.
- Hind, H.Y.
1971 *Narrative of the Canadian Red River Exploring Expedition of 1857 and of the Assiniboine and Saskatchewan Exploring Expedition of 1858.* M.G. Hurtig Ltd. Edmonton.
- Historic Resources Branch
1985 *The Prehistory of the Lockport Site.* Manitoba Culture, Heritage and Recreation. Winnipeg.
- Hubbs, C. and K. Lagler
1958 *Fishes of the Great Lakes Region. Cranbrook Institute of Science Bulletin 26.* Bloomfield Hills, Michigan.

- Jenzen, D.R.
1968 *The Naomikong Point Site and the Dimensions of Laurel in the Lake Superior Region. University of Michigan, Museum of Anthropology, Anthropological Papers 34.* Ann Arbor.
- Jones, T. and L. Jones
1978 Preliminary Report of Rock Painting Investigations in Northern Manitoba, 1972. *Department of Tourism, Recreation and Cultural Affairs, Historic Resources Branch, Papers in Manitoba Archaeology, Miscellaneous Papers 8:77-104.* Winnipeg.
- Kroker, S. and P. Goundry (eds)
1993 *A 3000 Year Old Native Campsite and Trade Centre at The Forks.* The Forks Public Archaeological Association, Inc. Winnipeg.
- Lamb, W.K. (ed)
1957 *Sixteen Years in the Indian Country: The Journal of Daniel Williams Harmon, 1800-1816.* The MacMillan Company of Canada. Toronto.
- Lipsett, B.M.
1970 Comparative Study to Determine the Origin of Some Canadian Shield Rock Paintings. In *Ten Thousand Years: Archaeology in Manitoba*, ed. by W.M. Hlady, pp. 181-189. Winnipeg.
- Lukens, P.
1964 Progress Report, Tailrace Bay Fauna. Unpublished manuscript on file at the Laboratory of Anthropology, University of Manitoba. Winnipeg.

1966 The Vertebrate Fauna from the Tailrace Bay Site, Grand Rapids, Manitoba. Unpublished manuscript on file at the Laboratory of Anthropology, University of Manitoba. Winnipeg.

1967 The Tailrace Bay Site Fauna. In "Life, Land and Water", ed. by W.J. Mayer-Oakes. *University of Manitoba, Department of Anthropology, Occasional Papers 1:313-322.* Winnipeg.
- Lytwyn, V.
1993 *Hudson Bay Lowland Cree in the Fur Trade: A Study in Historical Geography.* PhD thesis, University of Manitoba. Winnipeg.
- MacNeish, R.S.
1958 An Introduction to the Archaeology of Southeast Manitoba. *National Museum of Canada Bulletin 157.* Ottawa.
- Marr, G.
1993 Vertebrate Fauna Other Than Fish. In *A 3000 Year Old Native Campsite and Trade Centre at The Forks*, ed. by S. Kroker and P. Goundry, pp. 93-139. The Forks Public Archaeology Association, Inc. Winnipeg.
- Mason, O.T.
1966 *The Origins of Invention: A Study of Industry Among Primitive People.* MIT Press. Cambridge.

- Meyer, D. and P. Thistle
1995 Saskatchewan River Rendezvous Centres and Trading Posts: Continuity in a Cree Social Geography. *Ethnohistory* 42(2):403-444.
- Nash, R.
1975 *Archaeological Investigations in the Transitional Forest Zone: Northern Manitoba, Southern Keewatin, N.W.T.* Manitoba Museum of Man and Nature. Winnipeg.
- Nicholson, B.
1978 An Analysis of Faunal Remains Recovered by an Amateur Salvage Operation at Duck Bay on Lake Winnipegosis, FbMb-1. *Department of Tourism, Recreation and Cultural Affairs, Historic Resources Branch, Papers in Manitoba Archaeology, Miscellaneous Paper 7.* Winnipeg.
- Norman, J.R. and F.C. Fraser
1949 *Field Book of Giant Fishes.* Putnam's and Sons. New York.
- O'Brien, R.
1976 An Archaeological Survey of Methodist Point Park Reserve. *Ontario Ministry of Culture and Recreation, Historical Planning and Research Branch, Research Paper 9.* Toronto.
- Peers, L.
1994 *The Ojibwa of Western Canada, 1780-1870.* University of Manitoba Press. Winnipeg.
- Pettipas, L.
1970 Early Man in Manitoba. In *Ten Thousand Years: Archaeology in Manitoba*, ed. by W.M. Hlady, pp. 5-28. Manitoba Archaeological Society. Winnipeg.
- Quimby, G.
1960 *Indian Life in the Upper Great Lakes 11,000 B.C. to A.D.1800.* University of Chicago Press. Chicago.
- Roberts, L.
1992 Faunal Analysis of the 1984-1986 Excavations at the Lockport Site, EaLf-1. *Manitoba Archaeological Journal* 2(1):1-13. Winnipeg.
- Rostlund, E.
1952 *Freshwater Fish and Fishing in Native North America.* University of California Press. Berkeley.
- Scott, W.B.
1977 Fish Remains from the Cloverleaf Bastion of the Fort at Coteau-du-lac, Quebec. *Department of Indian and Northern Affairs and Parks Canada, History and Archaeology* 12. Ottawa.
- Scott, W.B. and E.J. Crossman
1973 *Freshwater Fishes of Canada.* Fisheries Research Board of Canada Bulletin 184. Ottawa.

- Simonds, E.
1993 A Study of the Fish Remains. In *A 3000 Year Old Native Campsite and Trade Centre at The Forks*, ed. by S. Kroker and P. Goundry, pp. 142-187. The Forks Public Archaeological Association, Inc. Winnipeg.
- 1994 Preliminary Analysis of Fish Remains. In *Archaic Occupations at The Forks*, ed. by S. Kroker and P. Goundry, pp. 137-186. The Forks Public Archaeological Association, Inc. Winnipeg.
- Skaptason, J.B.
1926 *The Fish Resources of Manitoba*. Industrial Development Board of Manitoba. Winnipeg.
- Smith, B.
1988 An Ethnohistorical Evaluation of the Role of Bison and Fish in the Social Organization of Northern Plains and Parkland Society: 1790-1850. *Manitoba Archaeological Quarterly* 12(1):13-25. Winnipeg.
- 1991 The Historical and Archaeological Evidence for the Use of Fish as an Alternative Subsistence Resource among Northern Plains Bison Hunters. In *Aboriginal Resource Use in Canada: Historical and Legal Aspects*, ed. by K. Abel and J. Friesen, pp. 35-50. University of Manitoba Press. Winnipeg.
- Steinbring, J.
1965 The Sturgeon Skin Jar. *Manitoba Archaeological Newsletter* 2(3):3-6. Winnipeg.
- Stewart, D.A.
1930 Early Assiniboine Trading Posts of the Souris-mouth Group 1785-1832. *Transactions of the Historical and Scientific Society of Manitoba, New Series, 1927-1930*. Winnipeg.
- Tamplin, M.
1977 Prehistoric Occupation and Resource Exploitation on the Saskatchewan River at The Pas, Manitoba. PhD thesis, University of Arizona. Tucson.
- Tisdale, M.A.
1978 Investigations at the Stott Site: A Review of Research from 1947 to 1977. *Department of Tourism, Recreation and Cultural Affairs, Historic Resources Branch, Papers in Manitoba Archaeology, Final Report 5*. Winnipeg.
- Tisdale, M.A. and S. Jamieson
1982 Investigations at Wapisu Lake 1972-1976. *Department of Cultural Affairs and Historic Resources, Historic Resources Branch, Papers in Manitoba Archaeology, Final Report 11*. Winnipeg.
- Tough, F.
1996 *'As their natural resources fail': Native Peoples and the Economic History of Northern Manitoba, 1870-1930*. University of British Columbia Press. Vancouver.

Wheeler, C.

- 1978 *The Caribou Lake Project 1977. Department of Tourism, Recreation and Cultural Affairs, Historic Resources Branch, Papers in Manitoba Archaeology, Preliminary Report 5.* Winnipeg.

Wiersum, W. and M.A. Tisdale

- 1977 *Excavations at UNR 23: The Notigi Lake Site.* Manitoba Museum of Man and Nature Publications in Archaeology. Winnipeg.

Wood, W.

- 1983 *The Terminal Woodland Period at Southern Indian Lake. Department of Culture, Heritage and Recreation, Historic Resources Branch, Papers in Manitoba Archaeology, Miscellaneous Paper 15.* Winnipeg.

Wood, W., C. Trott and L. Pettipas

- 1976 *An Archaeological Reconnaissance of the Tyrrell Sea Beach, Manitoba. Department of Tourism, Recreation and Cultural Affairs, Historic Resources Branch, Papers in Manitoba Archaeology, Final Report 3.* Winnipeg.

Wright, J.V.

- 1976 *Six Chapters of Canada's Prehistory.* National Museums of Canada, National Museum of Man. Ottawa.

APPENDIX B: Representations of Sturgeon.

HISTORICAL REPRESENTATIONS OF LAKE STURGEON BY NATIVE AND NON-NATIVE ARTISTS

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Abstract / Résumé

Discussions of landscapes in the earliest accounts of traders in northern Ontario and Manitoba depict a land rich in resources. Native people, who lived in these spaces where the Europeans travelled and settled, saw the world through their own eyes. But what did these groups see? This paper discusses changing representations of lake sturgeon (*Acipenser fulvescens*), noting differences in the stories and images presented by Native and non-Native people.

Les discussions sur les paysages du Nord de l'Ontario et du Manitoba retrouvées dans les anciens récits des marchands de l'époque décrivent un pays riche en ressources naturelles. Les peuples autochtones qui vivaient dans ces grands espaces, visités et colonisés par les Européens, percevaient ce pays bien différemment. Ce texte présente les perceptions changeantes de l'esturgeon des lacs tout en notant les différences entre les images et les contes créés par les autochtones et ceux créés par les blancs.

Introduction

Doctoral research into Cree, Ojibwe and scientific knowledge of lake sturgeon (*Acipenser fulvescens*) in the Lake Winnipeg basin has led to the present study of sturgeon representations.¹ Lake sturgeon is one of seven species of sturgeon, five of which can be found in North America, has always been important to the Native peoples who shared the fish's original range. The settler societies which began forming in North America after 1600 tended to view sturgeon as a nuisance fish, likely as sturgeon were notorious for destroying nets intended for other fish varieties. By the time settlement at Red River, present day Winnipeg, during the 1820s began, sturgeon was valued as a country food, important in the lives of both Native and non-Native inhabitants of the region. While by no means homogeneous both Native and non-Native peoples viewed sturgeon through their own eyes. What each group saw was reflected in stories and visual representations, only a fraction of which are available today.

The original range for Lake Sturgeon (see Figure 1) is thought by scientists to include: the Great Lakes basin, Mississippi drainage, and the Hudson Bay province. This paper will examine the Native perspectives from two generalized groups of Cree and Ojibwe in and around the Lake Winnipeg system. The dates for these representations can not be established with certainty, however, they most probably pre-date contact in the region. Non-Native perspectives come to us from newcomers to the interior mostly between 1750-1850s. Interestingly, in the 1850s, there was a marked change in how the fish was valued by both groups. Sturgeon became sought after for its high commercial value; that value which it previously held in the lives of both Native people and other local inhabitants was gradually displaced by an international demand for commercial sturgeon products.

The first sturgeon fishery in North America was established in Virginia in 1626. This fishery closed and Atlantic sturgeon did not emerge as a commercially viable commodity. According to Tower,

in those days of none too abundant food supply, the sturgeon apparently was not often eaten until many years after the colonies were established...the roe was regarded as worthless except as feed for hogs...few people of the better class would eat the flesh, it being the food of servants and negro slaves (1908:361-362).

This account is not consistent with what can be learned regarding the history and place of the sturgeon in the lives of both Native and non-Native people in Manitoba.² A pre-1850 focus on the Red River settlement and the

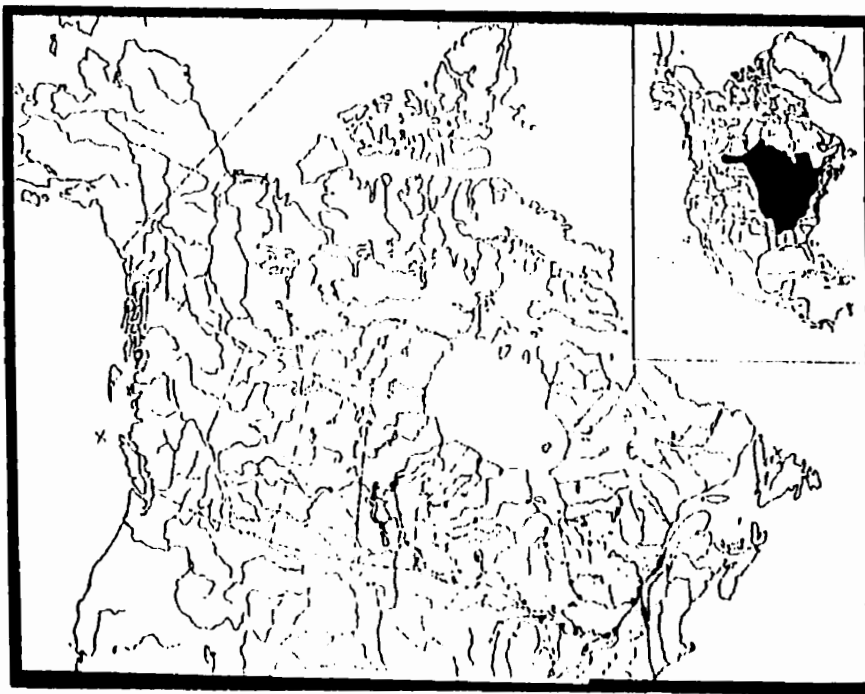


Figure 1: Organizational chart of health services for the Moose Factory Zone (Mushkegowuk Territory). Open boxes represent health services already under Weeneebayko Health Ahtuskaywin control (First Nation Regional Health Board). Open ovals represent health services still under University of Toronto, Faculty of Dentistry control. Shaded ovals represent health services still under Medical Services Branch, Health Canada control. The organizational structure of James Bay General Hospital (JBGH - shaded box) is not presented graphically. The Wing Director, Director of Patient Care, and Clinical Coordinator from JBGH Attawapiskat Wing and the Wing Director and Support Services Director from JBGH Fort Albany Wing report to the JBGH Chief Executive Officer located in Moosonee. Modified from various sources (Medical Services Branch Ontario Region, 1996; Weeneebayko Health 1996c)

surrounding region gamers access to both written and visual descriptions in the journals of traders and explorers. While I am interested in gathering representations of past landscapes, it is important to consider the times in which image were rendered, as such keeping in mind the sensibilities of the day. Furthermore, distinctions between unique perspectives, while important features of this study, are less important than what can be, in general, discerned from them. For example, while Ojibwe and Cree artists may interpret sturgeon motifs, representations were made for select audiences following conventions unique to the audience, i.e. pictographs of sturgeon were rendered to attract other Cree and Ojibwe to fish in a location or to stay away.) These accounts force us to see the land through their eyes, a land rich in resources. Representations tell us something of the ways in which the land was seen and shaped. The people who guided and shared the voyages of these early explorers/traders, and the others who lived in the spaces through which explorers/traders passed—and sometimes settled in—saw the world through their own eyes. These peoples, the Ojibwe and Cree in particular, saw and depicted the world as they experienced it. While these later accounts come in a variety of forms, this paper refers primarily to selected sacred stories, pictographs and Midewewin songs. What can the combination of written texts and visual images tell us today about the people who created them? Following an analysis of naming, illustrations and stories, this approach may have some utility when applied to the history of relations between and among humans and other species.

Naming

Cultural critic Stephen Greenblatt says that colonists followed a trajectory “from legal ritual through the experience of the marvellous to the mystical understanding and appropriate power of naming” (1991:83). To name is to evoke. A whole set of cultural constructs and representations of what it means to be what is named can form a powerful relationship and always occurs within an act of/to control. For the newcomers to North America, the act of naming evolved within a learning process. Initially, naming of objects, people and places, was based on personal knowledge and comparisons with previous cultural experience or training. The power to name or rename provided the clean slate on which colonizers could etch their image. However, after a time, comparisons of Old and New world species would converge as scientific classification usurped naming for *god and country*. As explorers, traders, missionaries, and settlers became more accustomed to their new landscapes, the motivations for naming changed. Readers interest in toponyms (place-names) will be interested to learn that the Cree addressed sturgeon as *Namay Namaew*, while the Ojibwe used

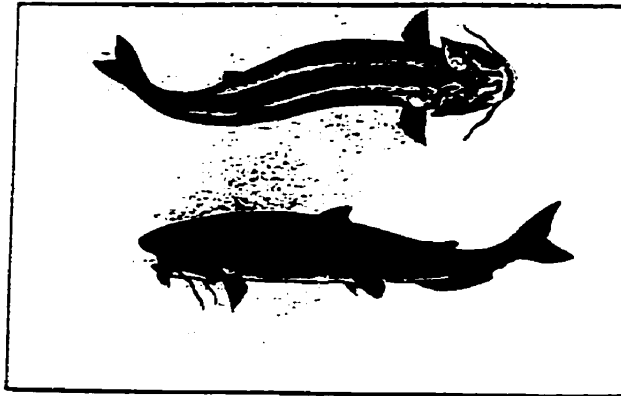


Figure 2: Peter Rindisbacher, *A Catfish from Red River, Manitoba, ca. 1821*. National Archives of Canada C-1988-250-27.

*Name.*³ Depending upon the training of the observer, sometimes the most recent Latin name was included in descriptions.⁴ The earliest accounts of sturgeon by explorers/traders interchange Native names with common English or French terms.

Europeans were familiar with sturgeon. A typical European representation advertising sturgeon is the 1811 print, *Sturgeon & Smelts*, not used extensively in this study of lake sturgeon. It none-the-less shows sturgeon captured for the table from Neptune's depths. In fact, the sturgeon harpoon suggested in the illustration would not have enjoyed widespread usage in neither Old nor New worlds (see Blakey, 1856; Rostlund, 1952; De Rohan-Csemak, 1963). In Europe and Asia several species of sturgeon have been fished for many generations, for example Beluga sturgeon (*Huso huso*). A well established European tradition/relationship with sturgeon, I argue, is the reason why the Native name for sturgeon was neither adapted nor adopted.

Elliot Coues' editing of Alexander Henry's journal included a footnote on fish names (Coues, 1897:444). As may be expected, due to its value during Coues time, sturgeon is at the top of the list. The fish was an important food to a population surviving in what Henry called the *Greater North West*. An example of the above argument on naming is provided by

Coues notation on a fish *Lachishe*, from French *la queshe*, taken from the Ojibwe *nacaysh* (*Ibid.*). A noteworthy comparison is to the freshwater drum, a lesser fish in the lives of those requiring fish as sustenance. The drum is listed a *male achegan* or *maleachegan* from the Cree *malashefaneh*.⁵ The fresh water drum was new to Europeans and of lesser value to them, so adoption and adaptation of the Cree meant little. Naming rested on economic motivations, sturgeon did not remain *namay* or some variant thereof for it was already a known commodity.

Illustration

Besides naming, there is illustration. A fine representation of the sturgeon from 1821 is *Sturgeon from Red River, Manitoba* by Peter Rindisbacher (National Archives of Canada/C-001927).⁶ The painting is stark while at the same time characteristically rich in detail. The figure is placed against a white background, similar to a scientific study. Realism and detail inform this impression, with sensory receptors, barbels and other physical features true to life. The form is simple, yet accurately accounts for the fish's unique characteristics: for example, scutes are readily apparent while the overall curve of the body tells us something of its movement. According to Major-Marothy, Rindisbacher

proceeded to make a visual record of many aspects of life...His method of working,...was to repeat, seemingly upon demand, various scenes from an established repertoire (1991:17).

Interestingly, similar studies of catfish (see Figure 3), buffalo and other scenes were made by Rindisbacher and reproduced throughout his works. However, sturgeon did not reappear in any of his collected and known paintings.

The significance of the sturgeon to the newly arrived Selkirk settlers at Red River can be factored into this discussion of the painting. The artist did not render the image along the Nelson River and Lake Winnipeg, although he would have been producing sketches on the way down to Red River from York factory. Rindisbacher and his family would have relied on sturgeon for their sustenance throughout the trip. The significance of the painting to the Red River may be linked to a gift given by Chief Peguis' people to the newly arrived immigrants. Chief Peguis met the Selkirk settlers who were under the guidance of Reverend John West. Josephy notes that West had joined the group at York Factory in August of 1821 and travelled with them to his mission, established a year earlier at Red River (1970:44). West's diary records that Chief Peguis gave the newcomers "a good supply of fresh and dried sturgeon" (*Ibid.*). The significance of this fish, at a time when the newly

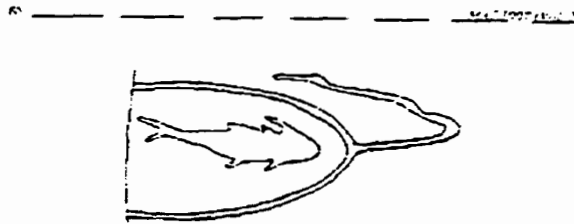


Figure 1. Stylized Lake Sturgeon created by Selwyn Dewdney. From *Letters*, 1970, 163.

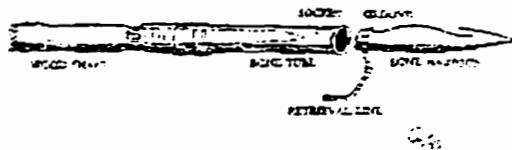


Figure 2. An historical reconstruction of a fishhook from the Lake Sturgeon. Drawing by Gerald M. Hill, from *Historical Journal*, 1970, 121.



Figure 3. Lake Sturgeon fishing harpoon, and fishhook, showing elements of Lake Sturgeon. Drawing by D. W. Jones, from *Water*, 1970, 121.

Figure 3: Historical Indigenous fishing technology. Hannibal Paci, 1997.

arrived settlers were most in want, must have had a profound, yet short-lived, influence on the young artists' imagination.

Some of the earliest document representations of sturgeon made by the Aboriginal people of northern Ontario and Manitoba are pictographs. Of particular interest are several images noted by Brenda Lipsett for the purpose of making comparisons with Ojibwe material culture (see Figure 3). The first image is an incised sturgeon taken from a Mide song, on birch bark, found at Leech Lake by William Hoffman (Lipsett, 1970:184-185). Reading Hoffman's description reveals little about the image, although he does note that sturgeon images rarely appear (1891:296-297). The first image in Figure 3 is a pictograph titled *sturgeon*, cited as being found by Selwyn Dewdney in 1965 (Lipsett, 1970:184-185).⁷ Ojibwe and Cree representations of sturgeon are mostly abstract and stylized, the fish is, in contrast to newcomers representations, not based on exacting details. This lack of realism signals that sturgeon was represented, not for comparisons, rather as it was experienced. Lipsett gathered 3 images of Ojibwe and Cree to suit her assertions of Ojibwe material culture. The Midewewin sturgeon was collected by Hoffman (1891) as part of a song, the image was imbedded in a larger story and was taken out of context by Lipsett. "Sturgeon in a net", originally a minor reference in Dewdney and Kidd (1962) is an Ojibwe pictograph. The third image, "sturgeon" at Hansen Lake was not referenced, however, Cree informants at Cumberland House identified a Hansen Lake, Saskatchewan, where there are pictographs. In searching Lipsett's reference to "sturgeon" all that could be found in Dewdney (1975) was a totemic representation which included sturgeon. The Ojibwe incised birch-bark shows a profile of sturgeon clan, quite unlike the other 3 images. Thus it would appear that the Cree and Ojibwe represented sturgeon as it suited their needs—to identify the object and convey the intended meaning; this is a sturgeon, I caught a big sturgeon here, I dreamt of sturgeon, or we are sturgeon clan. The pictograph titled *Sturgeon in a Net*, documented as coming from the Great Lakes by Selwyn Dewdney and Kenneth Kidd (1962:16),⁸ apparently reflects the fact that Ojibwe of the late 19th century fished for sturgeon by trailing a large open net, much like the pictographic image. The movements of the fish and the net combined to close the trap when a sturgeon entered the net. This technique will be discussed later in this paper.

A. Hultkrantz has argued that

where fishing is a conspicuous part of tribal economy the supernatural beings that protect the fish or provide good luck in fishing are propitiated. The supernatural master of the fishes

is an adequate religious response to the worries and wishes of the fishing population (1983:2).

While it may be true that these images represent game guardians and therefore symbolize the *other than human realm*. With the exception of the image from Hoffman, there are alternative explanations.⁹ The sturgeon images collected by Lipsett may also be markings to indicate where large fish were caught or re-tellings of either vision quests or dreams. Regardless, there is no support for Hulkrantz's thesis of a supernatural master of fishes in these images and I can find no evidence to support this romantic notion of a *master of the fish* (perhaps the roots are with Longfellow's *Hiawatha*). The Hoffman image may conform more closely with the spirit of Hulkrantz's assertion. Hoffman documented the sturgeon image from one of

several series of pictographs from birch bark songs found among the effects of a deceased Mide priest, at Leech Lake (1891:294).

Interestingly, Hoffman mentions showing the songs to "many Mide priests from various portions of the Ojibwa country" (*ibid.*) and notes that all he could learn from his informants was that they were "Grand Medicine":

no suggestions were offered beyond the merest repetition of the name of the object or what it probably was meant to represent. The direction of their order was mentioned (*ibid.*).

Rather than speculate further as to the meaning of sturgeon in this Mide song, I will simply note that representations of sturgeon—and fish in general—are indeed rare. Beyond speaking of the mystical and religious realm, sturgeon pictographs reveal something of sturgeon fishing technology. E. Rostlund (1952) noted the pre-contact use of nets and other technology for sturgeon fishing in North America. Two harpoon heads (bone-antler, see Figure 3) and Richard Preston (metal, see Figure 4) were used to spear sturgeon.¹⁰ The latter was used in commercial sturgeon fishing. Few Cree and Ojibwe fishers had the opportunity to participate in commercial sturgeon fisheries (see Tough, 1996). Cree informants at York Landing (previously York Factory) had never seen the use of spears, with sturgeon fishing accomplished mostly using nets and snag-lines. Generally, harpoons and weirs seem to have been replaced by the use of snag-lines and nets. Ojibwe at Sagkeeng, however, knew of the use and construction of harpoon heads. It is likely that bone harpoons were replaced, regionally, by metal ones, just as country made net materials were replaced by twine. The innovation of metal harpoon heads shows an adaptation of European items into Native technological form.



Figure 4: Reproduction of unilateral square-barbed metal harpoon courtesy of Richard Preston.

Sturgeon in a Net described by Lipsett occurred through a technique whereby "a large net made of willow bark is drawn along between two canoes. Once the sturgeon enters the bag, the opening is closed" (Lipsett, 1970:184). This fishing technique is in a way illustrated by George Finlay's pen and ink drawing, *Sturgeon Fishing, Red River* (Glenbow Museum/1928 F.B. 58.24.29, [ca. 1848]) (Figure 5). Finlay, an ensign with the 6th Regiment posted to Fort Garry in 1846, captured sturgeon in context, vastly different from the previously mentioned paintings by Rindisbacher. It is an interesting drawing and reflects Mason's generalization that

the savage man's skill in fishing is undoubtedly, and has always been the admiration and envy of the civilized. The gill-net, the fish-trap, the weir, the pound, the tide trap are well known to the aborigines of all the continents (1966:292).¹¹

Finlay's sketch raises two significant questions: was the scene staged or imaged and if so to what ends, and Native artists almost always remain anonymous. In the previous discussion of pictographs and Mide song, artists remain nameless. Europeans, on the other hand, constructed particularly portable images with signatures and usually dates. For the newcomers, images were made to tell a story of the New world which included the author as witness on the frontier.

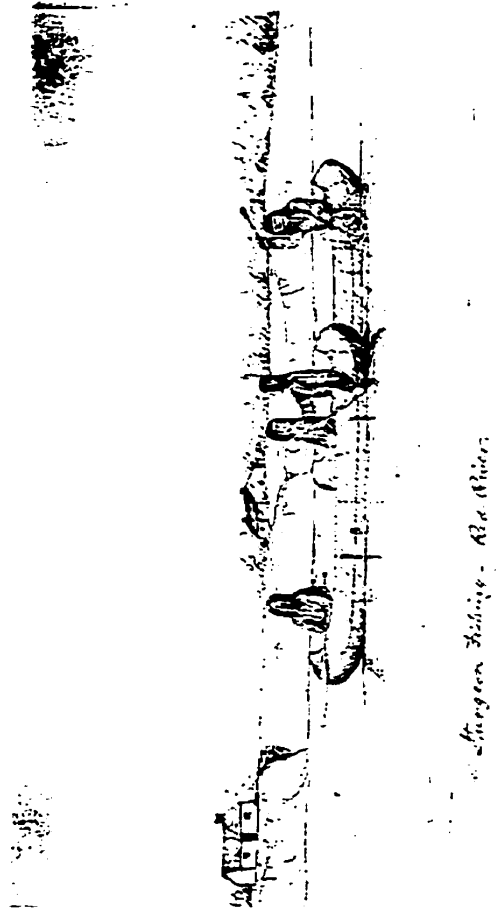


Figure 5: George E. Finlay, *Sturgeon Fishing-Red River*. n.d. [1848] courtesy of Glenbow Museum CN:58.24.29 PHN 1928.

Another painting by Rindisbacher, *Summer view in the Environs of the Company Fort Douglas on the Red River: drawn from nature, July 1822*, illustrates colonizing fishing technology and better reflects that artists' work (National Archives of Canada/copy negative 65-19).¹² Rindisbacher's stylized Ojibwe motifs are both romantic and sentimental. More than any other Canadian artist Rindisbacher's work best typifies 1820s Red River from the eyes of the colonizer. Métis are shown only slightly more advanced than the land locked Ojibwe, while influences of Europe, boat in full sail, epitomize the grand social evolution necessary for civilizing the wilderness. These sentiments reflect a myopic ethnocentric vision of Red River settlement. Rindisbacher's paintings neglect the rich and varied cultures whose landscapes he whitewashed over.

Unfortunately, nets made of organic materials, such as willow root, have not left significant traces and archaeologists mostly search for remnants such as net-sinkers. While it is difficult to argue conclusively that Cree and Ojibwe utilized similar fishing technology, there seems to be a general trend to suggest that as well as utilizing nets, Cree and Ojibwe used spears with detachable harpoon heads. MacNeish, writing of a site at Cemetery Point in the Whiteshell area of Manitoba, noted that a unilateral square-barbed antler point was used exclusively for sturgeon (1958:129-131). For a more in-depth discussion of the archaeology of sturgeon, see Hannibal-Paci, 1997.

Stories

In addition to the illustrations discussed above, several sacred stories can be juxtaposed with journal accounts of explorers and traders. Comparison with texts gives us further insights to the place sturgeon held in the lives of Native people. William Warren, writing well over a hundred years ago, cautioned

that much has been written concerning the red race by missionaries, travellers and some eminent authors; but the information respecting them which has thus far been collected, is mainly superficial. It has been obtained by transient sojourners among the various tribes, who not having a full knowledge of their character and language, have obtained information through mere temporary observation—through the medium of careless and imperfect interpreters, or have taken the accounts of unreliable persons (1984:24).

Mary Black-Rogers argues that the *story*, meaning the sacred stories, contain all the learning necessary to understand the Ojibwe (Overhold and Callicott, 1982:xv-xvii). One such story, documented by William Jones,

recorded a tale whereby a youth travelled for six years with the Chief of the sturgeons at Black Sturgeon River (Michelson, 1919:245-248). In a sacred legend of the Sandy Lake Cree, Ray and Stevens re-tell a transformation story of "a foolish young sturgeon" into *Me-zha*, the first *Ling* (1971:63).¹³ The Ojibwe at Lake Nipigon and the Long Lac area told Dewdney that "a really big sturgeon with a red belly and a box-shaped head" referred to as "evil snake sturgeon" would, if consumed, either transform a person into "a snake or be smothered by them" (1975:33). Within both Cree and Ojibwe cosmology the sturgeon occupied a complex and varied place. The Cree often referred to big sturgeon as grandfather. Sacred stories demonstrate both the social and religious value of Aboriginal-sturgeon relations. One example is an oral story which appears as *The Birth of Wisahketchank and the Origin of Mankind, The Chase, and The Rolling Skull*. The first version was apparently recorded from a telling by Louise Moosomin at Battleford, Saskatchewan in 1925, and included both Cree and English texts, the latter credited to Bloomfield (1930:8-20). The second version is credited collectively as having been told by the Cree at Sandy Lake, but does not have a Cree text. It was recorded by Ray and Stevens (1971:48-63). The third and last version was told by Wasagunackank at Bois Fort, and includes both Cree and English texts. It was published by Michelson in a volume of stories collected by William Jones (1919:405-415). These variations on a theme illustrate something of the world views of Cree and Ojibwe.

The story tells of a woman whose husband discovered that she had taken a snake for a lover. The husband devised a plan to address her infidelity. He goes to the tree where he had seen her summon the snake. He does the same, but then slays the snake. The husband tricks his wife by sending her out to fetch some meat while he cuts up the snake into a pot of boiling water. After the wife returns, the husband feeds her the broth, thus tricking her a third time. The wife flies into a rage upon learning that she has eaten her lover, and the husband then beheads her. The narrative follows the rolling skull of the wife as it pursues her two sons. (The youngest is usually *Wisahketchank*, to use Bloomfield's term.) They attempt to stop the rolling skull with magic gained from either their father or grandfather/mother whom they meet during their escape. Three barriers which they throw in the skull's path do not stop it. Finally, however, they are forced to cross a river with help from an animal that happens to be there at the time. Two of the three versions end with the rolling skull being dropped in the river, becoming/named by the courier as either sturgeon or sucker.

Journal accounts present an interesting and telling comparison with these sacred stories. For example, the manuscript journals of Alexander Henry the Younger from 1799 find Henry's party at Lake Namekan, referring

to a place at a fall where the Ojibwe speared sturgeon (Coues, 1897:17). Henry related the importance of sturgeon there, and later observed, on August 3,

we found several Indian fishing. They had a great many sturgeon and various kinds of small fish, a few of which were exchanged for liquor (*Ibid.*:20).

A few days later Henry's party found people who were most probably Ojibwe at Rat Portage, "making canoes for sale and trading sturgeon and dried berries for liquor" (*Ibid.*:23-4). Twenty years later, Henry R. Schoolcraft noted a sturgeon fishery in his 1820 journal in country to the south, stating that

the fishery is of great importance to the Indians of the region, and appears to have been known to them from the earliest times, and has been constantly resorted to without an apparent diminution to the quantity taken (Williams, 1953:120).

Schoolcraft also noted how those people whom he called *Chippeway Indians*, led by Chief Black Eagle, presented his party with

some fresh sturgeon (*accipenser* [sic]) which are caught in abundance in that river [River aux Sables] and received in return some tobacco and whiskey (*Ibid.*:74).

The similarities between Schoolcraft's account and Reverend John West's entry concerning Chief Peguis' gift are intriguing. The exchanges of country food, in this case sturgeon, as symbols of the land's sustenance are similar to other gift exchanges marking alliances. Neither journalist noted the political or economic significance of these exchanges, however, mentioning only the food value which sturgeon held for them.

Discussion

As the sturgeon was transformed from an item of gift exchange to trade commodity, it played a much different role than it had in the Native subsistence economy. Of interest here was a shift in social relations at posts and later at settlements. The demand for the creation of a fishing class is one example of this change. For example, at Fort Alexander, Roderick Mackenzie noted on July 1822, that *L'Esperance*, the post's fisherman, arrived

this morning, from the Fishery with a number of women and all his fishing implements; in the morning, he set two sturgeon nets (HBCA B.4/a/5, Fort Alexander, 1822-1823).

Later, in 1863 at the same post, Auguston Manville was sent "off to the mouth with 2 new sturgeon nets to hunt for the Fort" (HBCA B.4/a:8. Fort Alexander journal of occurrences, 1863). While the transformation of Cree and Ojibwe society to meet the growing needs of the sedentary populations is not the focus of the present paper, suffice it to say the distinction of fisherman was significant.¹⁴

Two maps help to illustrate my arguments regarding race relations and differences between Natives and non-Native worldviews. Philip Turnor (1778, PAM/HBCA G.1/22) sketched a map to illustrate the route from York Factory on the Hudson's Bay coast to Cumberland House Post on the Saskatchewan River. Both the Hayes and Nelson River routes are shown, though not identified as such, exclusive of other physical features. The grid lines dissect the landscape and erase the historical presence of the Cree and Dene. In contrast, Cha chay pay way ti (1806, PAM/HBCA E 3/4 fo. 13d) sketched a map for Peter Fidler, illustrating the route from Cumberland House to Split Lake on the Nelson River. This map is a much different view of the same route illustrated by Turnor in 1778. However, Cha chay pay way ti choose to show three routes (the Nelson, Burntwood and Hayes Rivers). The Cree informants knowledge of the river either ended at Split Lake, the page ran out, or Fidler was only interested in these inland routes. According to Tammy Hannibal-Paci, cartographic archivist with the HBCA, it's likely the later as we cannot conclude that Cha Chay actually physically drew the image in the journal. It is more likely that Fidler re-copies the information conveyed by Cha Chay into his journal as space permitted. Place-names are mostly Cree, the dashes representing portages, detail is more-or-less drawn from and for a need to navigate over time. Unlike Turnor's map there are no grid lines and the lakes are relatively the same shape.

Further to arguments of race relations two paintings by Rindisbacher and Finlay. First, Peter Rindisbacher (*Summer view in the Environs of the Company Fort Douglas on the Red River, 1822, NAC CN 65-19*) is an early snap-shot of Red River society. On the West bank stands a stylized motif, popular with Rindisbacher, of an Ojibwe family. However, this man with two children shows up in several of the artists other paintings. They appear in place, naturalized on the bank in the woods. None-the-less, the Natives' stare guides the viewers eyes to "their" fellow country men, possibly Métis fishers. These fishers are obviously more *civilized* in dress and use of European fishing implements. Perhaps the artist best reflected the ideas and hopes of his day for the acculturation of First Nations in Red River. Perhaps the painting reflects his fear of the *dying savage*. Speculation aside, the two men and boy in the boat troll and angle for fish while in the

distance another boat in sail approaches. The heroic feel of clouds and open spaces mirror the brave possibilities of the colony. The conflict is subtle and represented from a distinct perspective, reflecting the settlers' aspirations and feelings as Rindisbacher understood and reflected them to a non-Native audience.

In comparison with Rindisbacher's painting is another of Red River fishing by George E. Finlay (*Sturgeon Fishing-Red River*, n.d. Glenbow CN:58.24.29 PHN 1928). I have dated this simple sketch to 1848, around the time when Finlay was stationed at Red River. The painting is a study of Ojibwe sturgeon fishing (see Figure 5). It is probably much closer to reality than the previous painting. The painting shows 4 individuals in 2 canoes.¹⁵ In interviews with informants at Sagkeeng, Manitoba, the canoes were identified as Ojibwe in construction. The technological skill of co-ordinating a drag-net between 2 canoes is common practice to the Ojibwe and the innovation of clubbing sturgeon is not unique to Red River. During the Canadian Red River exploring expedition of 1857, Hind mentions a weir on the Pike River, "an Indian sits beside it all night with a wooden mallet in his hand, with which he strikes the larger fish on the head to prevent them jumping out" (1971:491).¹⁶ However, neither Ojibwe nor Cree informants could identify this technique of striking sturgeon on the head while in a net. There is no ethnographic material on this technique, nor is there a trail of artifacts to support the clubbing of sturgeon. In fact, Cree and Ojibwe reported reverence shown to sturgeon by not striking the fish while in the water and thus offending other fishes. A practical component was also that sturgeon could seriously threaten life and property if the fish were not killed with one blow. Finlay probably took artistic licence with or had the fishers stage the imaged scene.

The size of the sturgeon in Finlay's sketch is very interesting. It seems like a small sturgeon, one which would not have yielded a great return to four men and their families. Sturgeon fishing on Red River was accomplished mostly with weirs and wooden pens, thus ensuring a fair return on fishing effort. Perhaps Finlay unwittingly captured the decline of the fishery, we know that by the 1860s sturgeon populations on the Red River were seriously threatened by overfishing and incursions of development.

In the constructed images by non-Natives we see static and fixed hopes and dreams: houses erected on the stark banks of the Red River. The advance of civilization is suggested, yet the fishers pursue traditional practices. The audience adopts the watchful eyes of the ensign/artist. Perhaps, these fishers were catching and supplying fish to the soldiers, the pose may have been staged, or this picture represents an everyday occurrence recorded for posterity sake. What is most striking is the uneasy

tensions of colonization were mediated. Natives played many roles: labour, wives, friends, enemies, suppliers of services and country food, makers of goods, informants of land knowledge, boatmen, guides, and fishers.

Equally, the painting by William Armstrong (*Indian Settlement at Sault Ste. Marie Ontario with the Canal in the background*, 1869 NAC 1970-188-2230) illustrating an organized Ojibwe fishing village (see Figure 6). Along with wigwams there are dip nets, drying racks, and other material representations. A degree of affluence and permanence is suggested. Ojibwe and Cree located at secure and stable fisheries, seasonal gatherings were supported by the abundant supply of fish, other game and plants. The figures fishing in the canoe look toward the canal with an empty net.¹⁷ In contrast, the photo, *Lifting sturgeon out of net* (August 6, 1909 NAC RD 000059), shows 2 men pulling a sturgeon out of a tidal net. Informants at Norway House identify the boat as a "Pointer" (see Figure 7). The 2 men, as opposed to the women and child using a dip net in the painting by Armstrong, are commercial fishermen. The difference between Native and non-Native are clear in these two images: family and work together, family and work separated. For the Ojibwe subsistence fisheries did not mean the separation of domestic and commercial fishing. Race relations are expressed through such features of the sturgeon fishery as the imposition of scale fishing, displacement of Native fisheries, and the de/valuation of sturgeon for the accumulation of personal wealth.

A distinction can be made between Native and non-Native representations of sturgeon in that each was used specifically within cultural context. The images by Rindisbacher (Figures 2 and 8) and Finlay (Figure 5) show the old world Europe, portable New world illustration removed from their place of origin. The pictographs, whether set on stone or incised on birch-bark, were also created to document and describe, but they were not created strictly as objects of trade and commerce. The fish was intimately linked with the spiritual/religious Mide practices and daily/seasonal patterns of Cree and Ojibwe lifeways. Whether sturgeon was made a spectacle of scientific study or a statement of what and who were here, these images played a role both in capturing and making sense of the world for vastly different audiences. These images all played a role in the on-going cultures that also made sense of this world. These images reflect human-sturgeon relationships, serving a variety of purposes.

Conclusions

Susan Moodie titled her experiences in the natural landscape of Canada as *Roughing it in the Bush* (1991). The "bush" has long been a primary source for the collection of symbols and images to represent our national



Figure 6: William Armstrong, *Indian Settlement at Saull Ste. Marie Ontario with the Canal in the background, 1869.* National Archives of Canada 1970-188-2230.



Figure 7: Photographer unknown, *Lifting Sturgeon out of net*, August 6, 1909. National Archives of Canada, RD 000059.

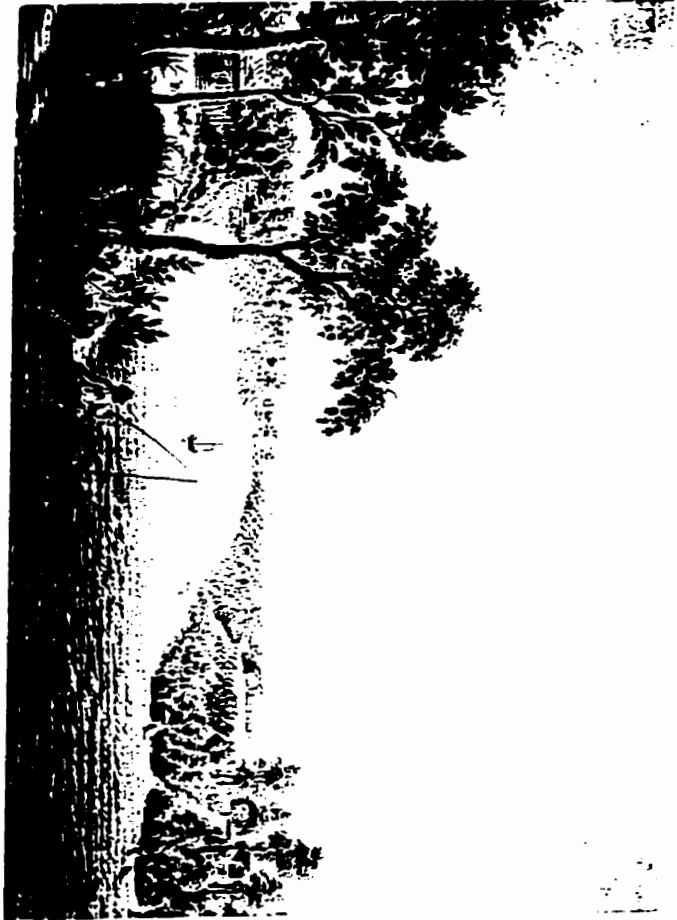


Figure 8: Peter Rindishbacher, *Summer view in the Environs of the Company Fort Douglas on the Red River*. Drawn from *Nature*, 1822. Courtesy of National Archives of Canada. CN 65-19.

consciousness, i.e. bison, maple leaf, beaver, etc. While Canadians continue to be fascinated by the concept of *the Bush*, most have never *roughed it* outside of the cities and regions we inhabit. As such it is not surprising that little debate has gone into discussions of human-nature relations.¹⁸ Nature and geography seem merely as the back drop to human experiences, history. We can, however, learn much by studying human-nature relations. In fact, studying these landscapes may well prove to be a powerful tool for understanding the past. Studying landscapes to understand the past is not new. A case in point is Martin's (1978) speculative historical examination of Indian-animal relations. He argued that the Algonquians he studied waged war on animals as their cultural sanctions against wildlife overkill were eroded by contact, disease and the fur trade. There was very strong reaction to his thesis and book, with a response edited by Shepard Krech III (1981). Krech III noted that understanding human-animal relations was a function of what he termed the "traditional religious belief system" of the Algonquians, and he criticized what he felt was Martin's failure to interpret history correctly. Regardless of the legitimacy of these two claims, it is clear that Martin's arguments and the continued critique of them resulted from a lack of prior discussion about human-animal relations.¹⁹

Another useful tool for understanding landscapes is historical ecology. A relatively recent paradigm, historical ecology provides a methodology from which past landscapes, framed by complex and evolving ecosystems, can be understood. Such an approach can often prove unyielding, especially when researching human relations beyond the bounds of an ecosystem, over an extended period, or when the focus is on a specific species.

Both Rostlund (1952) and Cronon (1983) provide a methodological matrix towards an epistemology of human-species relations. Furthermore, traditional ecological knowledge (TEK), concerned primarily with examining human-nature relations, also serves as an important paradigm. In study of Cree and Ojibwe knowledge of lake sturgeon (*Acipenser fulvescens*) in the Lake Winnipeg basin, scientific knowledge has yet to be made stronger by including TEK. It is as Cronon noted:

Indians had lived on the continent for thousands of year, and had to a significant extent modified its environment to their purposes. The destruction of Indian communities in fact brought some of the most important ecological changes which followed the Europeans' arrival in America. The choice is not between two landscapes, one with and one without human influence, it is between two human ways of living, two ways of belonging to an ecosystem (1983:12).

Sturgeon were never a nuisance at Red River and the surrounding region. Like those living here before them, the earliest explorers, traders and missionaries relied on the fish for their sustenance. This study of Native and non-Native representations of sturgeon reveals that these culturally different people saw the fish in different ways. Human-sturgeon relations changed from sturgeon being simply one feature of Native subsistence economies to being used commercially in the fur trade and commercial fishing. Not surprisingly, in the transition sturgeon lost something of its spiritual significance in Aboriginal cosmology, shifting from the *other than human realm* to an earthly one. With the commercialization of the sturgeon fishery, the fish took on an even greater economic value, although it took over a hundred years of commercialization and depletion for the fish to be seen as a precious commodity. The representations discussed reveal something of race relations within a context of diminishing resources. Sturgeon became more precious to both Native and non-Native as sturgeon disappeared from lakes and rivers. Causes for the disappearance are complex: pressures of over-fishing, habitat loss due to hydro-electrical development, and other human developments negatively impacted the species. Today the sturgeon no longer inhabit the lakes and rivers it had traditionally. It is now so rare in much of its former range that it is protected as a threatened species. Although the values associated with the great fish have changed over time, it remains for many a special creature within complex ecological and cultural systems.

Notes

1. An earlier draft of this paper was presented at the Manitoba History Conference, May 10, 1997, at the Museum of Man and Nature, Winnipeg. The current course of interdisciplinary research which informs the paper crosses boundaries of history, zoology and fisheries theory. I would like to thank Dr. Laura Peers (University of Winnipeg) for the first sturgeon image, Jean Friesen (University of Manitoba) and Jennifer Brown (University of Winnipeg) for helping to shape parts of this paper. The author gratefully acknowledges access to the invaluable collections of the Hudson's Bay Company Archives and the Provincial Archives of Manitoba, Winnipeg. Tammy Hannibal-Paci, cartographic archivist HBCA, added significantly to discussions of maps and proof read the final document. The Winnipeg Art Gallery assisted in performing a C.H.I.N. search, which located sturgeon paintings at the Glenbow Museum (Calgary), Edmonton Art Gallery, University of British Columbia (Vancouver), and Musee de Civilisation (Quebec City). Dr. Terry Dick (University of Manitoba) provided valuable insights on lake sturgeon and made available his library of "grey

literature". Insights provided by community members of Norway House, Cross Lake, York Landing, Cumberland House and Sagkeeng are greatly appreciated.

2. The paper reflects only historical representations of lake sturgeon. The intaglio print owned by R. Ackermann's Repository of Arts and C. Publications, *Sturgeon & Smelts* 1811, housed at Musee du Deminarie du Quebec was discussed in a superficial way (see Figure 14). In addition, contemporary representations of sturgeon, such as Susan A. Point and Paddy Peters (see Figure 13), have not been included in great detail. Peters image of spawning sturgeon is a good example of boreal forest imagery and a rare example of fish motifs. Pacific coast artists have, in general, not been included for these are representations of White or Pacific sturgeon (*Acipenser transmountanous*). Moreover, sturgeon artifacts, harpoon heads and items with sturgeon motifs, were not discussed in great detail in this paper, but are discussed in Hannibal-Paci (1997).

Relatively little is known from the Cree and Ojibwe perspectives. Previous studies to have focused on commercial fisheries and Aboriginal fisheries include Rostlund (1952), Judson (1961), Lytwyn (1990), Van West (1990), Cieland (1982), Tough (1984; 1987a; 1987b; 1992; 1996), and Gulig (1995).

3. James Isham in *Isham's Observations and Notes* (Rich. 1949), noted the importance of *Nemau* while stationed on Hudson Bay from 1743-1749. One of Isham's successors, Andrew Graham, also recorded sturgeon as *Nemew* (Williams, 1969). The Ojibwe spelling listed here is from Baraga (1992:269).
4. Before 1850 most of the journals contain collected and translated Aboriginal words to which the editors of published journals often added Latin nomenclature as a service to their audience.
5. Coues (1897) list, at footnote 6, includes the fresh water drum as *Haplodintus grum*.
6. According to archivist Jim Burant (e mail communication), the inscription on the original, in pen and brown ink, is faded and now illegible, but read in German: *recto: Ein Stvrfisch von dem rothern Fluss. Nach de Natur gezeichnet; in pencil, glued on mat: A Sturgeon/Sturio: from the Red River. Drawn from nature 27* (the number 27 is circled).
7. Hansen Lake is not mentioned in *Stone Age Paintings*, Hansen Lake was known to have some rock paintings and was considered to be a good sturgeon lake.
8. This pictograph comes from the Crooked Lake site, Basswood River, Minnesota.

9. The *other-than-human* realm builds on A. Irvine Hallowell's observation that Ojibwe relations with *other-than-human beings* was exclusive of the physical: "the locus of personal identity and experience is the soul"(1992:84-5).
10. Dick Preston (personal communication, 1997) noted that the artifact was given to him by Malcolm Diamond, Chief at Waskatanish (Rupert House, Quebec), used during the late 1950s for sturgeon fishing at the mouth of the Broadback River.
11. Many scholars argue that specific species were harvested through diverse fishing technology as an adaptive strategy for Cree and Ojibwe during seasonal rounds, ie. sturgeon spring fishing and whitefish fall fishing. Interestingly, Brian Smith has argued "the use of nets is probably an historic European innovation to the plains area and, as a consequence, most of the fishing would have to have been done during periods of open water when application of the weirs or traps or pen-traps would be possible" (Abel and Friesen, 1991:44).
12. Rindisbacher also painted *Winter fishing on the ice of the Assynoibain and Red River. Drawn from nature in December 1821, Manitoba*, found in Peers (1994:127).
13. *Me-Zha* is a meriah. The female sturgeon *Nah-may* in the story carries out a plan passed onto her by her favored suitor *Kama-chad-sick*, to get rid of the younger sturgeon by tricking him into eating her eggs. In the story this is forbidden by *O-ma-ma-ma*, who instead of killing the young sturgeon, transforms him into a meriah, thus serving as a lesson to others.
14. For discussions of changes in this region see Tough (1996) and Peers (1994).
15. Finlay may have undersized the sturgeon in this image, focussing instead on the act of fishing not the fish. It is important to remember that on average sturgeon of 6-8 feet were common and to land such a fish several men would be required.
16. In addition, other early visitors describe sturgeon fishing. Harmon is unique in his description on the Assinboine River, of Cree/Ojibwe beaching sturgeon, running them like buffalo onto sandbars.
17. Foreshadowing with what we know of depletions of fisheries in the wake of colonization and development.
18. What do we know of the past cycles of nature, a natural geography which includes people? When researching and writing history, human actions are often taken out of context. The land is more than a backdrop to the human history etched upon it. A most interesting and

under-developed part of Canadian history is the whole area of human-animal relations.

19. Albers and James argued, "attempts to explain... human relations by resorting to either the monolithic forces of ideology or to Western philosophies of utilitarianism and pragmatism continues to tell us more about the intellectual commitments of the observers than it does about the creative ways in which native peoples have attempted to survive the intrusion of conquest cultures" (1984:78).

References

- Albers, P. and W. James
1984 *Hunting Ideology and the Fur Trade: A Review Essay. Plains Anthropologist* 29:73-79.
- Baraga, Frederic
1992 *A Dictionary of the Ojibway Language*. St Paul: Minnesota Historical Society.
- Blakey, Robert
1856 *Historical Sketches of the Angling Literature of all Nations*. London.
- Bloomfield, Leonard
1930 *Sacred Stories of the Sweet Grass Cree*. Ottawa: King's Printer.
- Burant, Jim
1996 E-mail Communication. Ottawa, National Archives of Canada.
- Cleland, Charles E.
1982 *The Inland Shore Fishery of the Northern Great Lakes: Its Development and Importance in Prehistory. American Antiquity* 47:761-784.
- Coues, Elliot (Editor)
1897 *New Light on the Early History of the Greater Northwest. The Manuscript Journals of Alexander Henry Fur Trader of the North West Co. and of David Thompson Official Geographer of the Same Co. 1799-1814* Vol. 1. New York: Francis Harper.
- Cronon, William
1983 *Changes in the Land: Indians, Colonists and the Ecology of New England*. New York: Hill and Wang.
- De Rohan-Csermak, Geza
1963 *Sturgeon Hooks of Eurasia*. Translated by R. Heizer. Chicago: Aldine Publishing.

- Dewdney, Selwyn
 1975 *The Sacred Scrolls of the Southern Ojibway*. Toronto: University of Toronto Press.
- 1965 *Stone Age Paintings*. Manitoba: Department of Mines and Natural Resources, Parks Branch.
- Dewdney, Selwyn and Kenneth E. Kidd
 1962 *Indian Rock Paintings of the Great Lakes*. Toronto: University of Toronto Press.
- Dick, Terry and Anindo Choudhury
 1992 *The Lake Sturgeon, *Ancipenser fulvescens* (Chondrostei: Acipenseridae): An Annotated Bibliography*. Ottawa: Canadian Technical Report of Fisheries and Aquatic Sciences 1861.
- Greenblatt, Stephen
 1991 *Marvellous Possessions: The Wonder of the New World*. Chicago: University of Chicago Press.
- Gulig, Anthony
 1995 Sizing up the Catch: Native-Newcomer Resource Competition and the Early Years of Saskatchewan's Northern Commercial Fishery. *Saskatchewan History* 47:3-12.
- Hallowell, A. Irving
 1992 *The Ojibwa of Berens River, Manitoba*. Jennifer Brown (Editor). New York: Harcourt Brace College.
- Hannibal-Paci, C.
 1997 Name as an Under-Rated Economic Resource: A Review for Lake Sturgeon (*Acipenser fulvescens*) in Manitoba's Archaeological Literature. *Manitoba Archaeological Journal* 7(2):77-95.
- Hind, H.Y.
 1971 *Narrative of the Canadian Red River Exploring Expedition of 1857 and of the Assiniboine in Saskatchewan Exploring Expedition of 1858*. Edmonton: Hurtig.
- Hoffman, William J.
 1891 The Mide'W'win or "Grand Medicine Society" of the Ojibwa. *Seventh Annual Report of the Bureau of Ethnology, Smithsonian Institution 1885-1886*. Washington: Government Printing Office.
- Hudson's Bay Company Archives (HBCA)
 1778 G.1\22 Philip Tumor.
 1806 E.3/4fo.13d Peter Fidler.

- 1822-23 B.4/a/5, Fort Alexander.
- 1863 HBCA B.4/a/8, Fort Alexander Journal of Occurrences.
- Hultkrantz, Ake
- 1983 *Water Sprites: The Elders of the Fish in Aboriginal North America. American Indian Quarterly* 7:1-22.
- Josephy, Alvin M., Jr.
- 1970 *The Artist was a Young Man: The Life Story of Peter Rindisbacher*. Fort Worth: Amon Carter Museum.
- Judson, A.T.
- 1961 *The Freshwater Commercial Fishing Industry of Western Canada*. Doctor of Philosophy dissertation, University of Toronto.
- Krech, Shepard III (Editor)
- 1981 *Indians, Animals and the Fur Trade: A Critique of Keepers of the Game*. Athens: University of Georgia Press.
- Lipsett, Brenda McGee
- 1970 *Comparative Study to Determine the Origin of some Canadian Shield Rock Paintings*, pp. 181-190, in W.M. Hlady (Editor): *10,000 Years of Archaeology in Manitoba*. Winnipeg: Manitoba Archaeological Society.
- Lytwyn, Victor
- 1990 *Ojibwa and Ottawa Fisheries Around Manitoulin Island: Historical and Geographical Perspectives on Aboriginal and Treaty Fishing Rights. Native Studies Review* 6(1):1-30.
- Major-Marothy, Eva
- 1993 *Historic Images of Canada's First Nations. The Archivist* 20:5-7.
- 1991 *Peter Rindisbacher (1806-1831)*, pp. 17-21, in Jim Burant (Editor): *A Place in History: Twenty Years of Acquiring Paintings, Drawings and Prints at the Natural Archives of Canada*. Ottawa: National Archives of Canada.
- Martin, Calvin
- 1978 *Keepers of the Game: Indian-Animal Relationships and the Fur Trade*. Berkeley: University of California Press.
- Mason, O.T.
- 1966 *The Origins of Invention. A Study of Industry Among Primitive People*. Cambridge, Massachusetts: MIT Press.
- MacNeish, Richard
- 1958 *An Introduction to Archaeology in Southwest Manitoba*. Ottawa: National Museum of Canada.

- Michelson, Truman (Editor)
1919 *Ojibwa Texts Collected by William Jones*. New York: G.E. Stechert and Co.
- Moodie, Susanna
1991 *Roughing it in the Bush*. Toronto: McClelland and Stewart.
- Overholt, T.W. and J.B. Callicott (Editors)
1982 *Clothed-in-furs and Other Tales: An Introduction to an Ojibwa World View*. New York: University Press of America.
- Peers, Laura
1994 *The Ojibwa of Western Canada, 1780 to 1870*. Winnipeg: University of Manitoba Press.
- Preston, Richard
1996 *Personal Communications*.
- Ray, Carl and James R. Stevens
1971 *Sacred Legends of the Sandy Lake Cree*. Toronto: McClelland and Stewart.
- Rich, E.E. (Editor)
1949 *Isham's Observations and Notes, 1743-1749*. Toronto: Champlain Society.
- Rostlund, E.
1952 *Freshwater Fish and Fishing in Native North America*. Berkeley: University of California Press.
- Scott, W.B. and E.J. Crossman
1973 *Freshwater Fishes of Canada*. Ottawa: Fisheries Research Board of Canada.
- Smith, B.J.
1991 The Historical and Archaeological Evidence for the use of Fish as an Alternative Subsistence Resource Among Northern Plains Bison Hunters, pp. 35-50, in Kerry Abel and Jean Friesen (Editors): *Aboriginal Resource Use in Canada, Historical and Legal Aspects*. Winnipeg: University of Manitoba Press.
- Tough, Frank
1996 *'As Their Natural Resources Fail': Native Peoples and the Economic History of Northern Manitoba, 1870-1930*. Vancouver: University of British Columbia Press.
1992 Conservation and the Indian: Clifford Sifton's Commission of Conservation 1910-1919. *The Canadian Journal of Native Studies* 8(1):61-73.

- 1987a Fisheries Economics and the Tragedy of the Commons: The Case of Manitoba's Inland Commercial Fisheries. *Discussion Paper 33*. Toronto: York University.
- 1987b *Native People and the Regional Economy of Northern Manitoba: 1870-1930s*. Toronto: PhD dissertation, York University.
- 1984 The Establishment of a Commercial Fishing Industry and the Demise of Native Fisheries in Northern Manitoba. *The Canadian Journal of Native Studies* IV(2):303-320.
- Tower, W.S
- 1908 The Passing of the Sturgeon: A Case of the Unparalleled Extermination of a Species. *Popular Science Monthly* LXXIII:361-371.
- Van West, J.J.
- 1990 Ojibwa Fishery, Commercial Fisheries Development and Fisheries Administration 1873-1915: An Examination of Conflicting Interests in the Collapse of the Sturgeon Fishery of the Lake of the Woods. *Native Studies Review* 6(1):31-66.
- Warren, William W.
- 1984 *History of the Ojibway People*. St. Paul: Minnesota Historical Society.
- Williams, G. (Editor)
- 1969 *Andrew Graham's Observation on Hudson Bay 1767-1791*. London: Hudson's Bay Record Society.
- Williams, M.L. (Editor)
- 1953 *Henry R. Schoolcraft Narrative Journal of Travel*. Michigan: Michigan State College Press.

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APPENDIX C: Historical Sturgeon Commons.

“Officers of the HBC, Missionaries and Other Intelligent Persons in the District of Keewatin”: Lake Winnipeg Sturgeon as an Aboriginal Resource

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The history of colonization for aboriginal resources will be discussed through a case study of Cree and Ojibwe inland lake sturgeon (*Acipenser fulvescens*) fisheries in the Lake Winnipeg basin, for the period 1872–98. To understand the place of sturgeon in Cree and Ojibwe communities around Lake Winnipeg, and the impacts of commercialization, an interdisciplinary approach is required — gaps in knowledge occur and are bridged by borrowing from specialized studies reflecting a variety of disciplinary perspectives.¹

Archaeologists have found evidence of sturgeon use in North America dating back 6000 to 11,000 years ago (Mayer-Oakes 1967, O'Brien 1976). Limited excavations in Manitoba indicate that sturgeon has been an important subsistence resource for at least 4000 years (Arthurs 1982; Steinbring, personal communication, 1996). There are, however, problems with recovery, analysis and reporting of sturgeon remains for this area. Sturgeon remains do not last; the fish has a mostly cartilaginous skeleton which decomposes, leaving only trace remains such as scutes and spines. However, Frank Tough (personal communication, 1996) credits the lack of evidence to archaeologists' disinterest in fish remains. In Manitoba, faunal remains have been underrated in most archaeological excavations and therefore have provided relatively little insight into prehistoric fisheries (Hannibal-Paci 1997). This gap can be bridged using historical and ethnographic information to provide a fuller account.

¹ Conversations with people at Sagkeeng, Cumberland House, and Cross Lake compelled me to search primary and secondary historic and scientific sources for data regarding aboriginal sturgeon use, otherwise aboriginal perceptions on the fishery are extrapolated from non-aboriginal writings. Kennedy (1993:2–4) cautions, “when seeking an accurate and reliable source of information on historical events and a balanced interpretation of them, how much reliance can we place on the words recorded by traders, missionaries and officials?” I suspect we can best balance historical and other assumptions using good scholarship.

Ethnographic information can be helpful in reconstructing the relative abundance or scarcity of a resource, its security and place in regional aboriginal economies. Norval Morrissette (1965:34) recorded that sturgeon was viewed as a staple for the Ojibwe, noting, "at the lake called Mesinama saha-gun, which is now under many feet of water due to the Hydro dam at Pine Portage, the Ojibway Indians used to go to feast on sturgeon... The old and the young prepared smoked sturgeon and put it away in birch bark containers for the long winter months ahead." While the complex of sturgeon fisheries indicate that Ojibwe would feast on sturgeon and store a significant amount of smoked sturgeon for later use, changes in the use and value of land and resources resulted from contact. The earliest period of contact history could not predict the changes in the use and value of sturgeon. In the mid to late 1700s, Hudson's Bay Company (HBC) officers James Isham (1949) and Andrew Graham (1969) both recorded that the Cree produced a variety of pemmican made with sturgeon.² Sturgeon was a popular traditional food, and like bison and other animals it was prepared in a variety of ways. According to Donald McKay Sr. (personal communication, 1995), sturgeon roe was cooked in bannock, and caviar, a delicacy, was made from the eggs. Sturgeon oil, high in vitamins, was rendered by boiling the flesh and skimming off the separated oil which was added to bannock and meats.

Sturgeon was mostly consumed fresh (boiled, baked, made into a soup, etc.), and the fish could be tethered and kept alive until needed. The processes of sun-drying, smoking, or pounding into pemmican meant that sturgeon could be preserved and kept for some time. Isinglass, which made a strong glue and was used in fining beer and wine, was processed through drying and pounding the swim bladder. W. T. Urquhart (1873:193-5) found "a considerable quantity of oil is made in the country. It is not exported, but is used as a machine oil and found to answer the purpose remarkably well." Jack Steinbring (personal communication, 1995) also recorded the use of oil for lamps and for softening hides during tanning. The Ojibwe, in particular, used sturgeon oil in the production of sturgeon pemmican or added it to dried foods to make them more palatable. The oil

² Graham noted that *raheggan* (recorded by Isham as *ruhiggan*) was mixed with animal fat or sturgeon oil and berries, such as saskatoons.

was readily stored in birchbark containers or "jars" made of sturgeon skin³.

Cree and Ojibwe views of the Lake Winnipeg sturgeon fishery are scarce. Mostly we have accounts from "Officers of the HBC, Missionaries and other intelligent persons in the District of Keewatin".⁴ As chair of the Senate select committee investigating natural food products — or *country food* as it was referred to in the fur trade — Lieutenant Governor Schultz was a magnet for "information regarding the existing natural food products of the Northwest Territories, and the best means of conserving and increasing them."⁵ Limited as they are, these records reveal two things: the fish held an important place within seasonal harvesting activities (supporting the archaeological evidence that sturgeon played an integral role in aboriginal subsistence rounds), and the fish was traded commercially well over a hundred years before commercial industrial fisheries were established on the lake. These two points afford insights into present-day resource conflicts. In the Lake Winnipeg region, many Cree and Ojibwe scheduled seasonal rounds, in part, to take advantage of sturgeon spawning, and they traded sturgeon products without causing a failure of the fishery. The significance of land tenure and resource use has not been adequately discussed in previous historical discussions of the fisheries.

In 1888, Indian Commissioner James Stewart reported that there were three major fish companies based in Selkirk, Manitoba. The C. W. Gauthier Company had been in operation "for some years, and appears to be the most extensive", operating fishing stations at Swampy Island, Little Saskatchewan and Black Bear Island. The company operated two steamboats and 12 fishing boats, employing about 200 men, "half Ontario and half half-breeds and Indians" who were paid \$25–80 a month. Stewart

³ Sturgeon skin is leathery and has five rows of scutes instead of being entirely covered over with scales. The fish grows large and jars made from it could hold a lot and readily withstand the wear and tear of travel. Although the use of sturgeon jars may have been localized, Cree residents of Cross Lake, Manitoba, have also described the use of the skin for containers and to make drum skins.

⁴ This phrase comes from a questionnaire circulated in 1888 by John Christian Schultz, Lieutenant Governor of Manitoba and Keewatin, chair of the Canadian Senate's select committee investigating the state of natural food products in the Northwest.

⁵ Unless otherwise noted, archival material comes from the Provincial Archives of Manitoba, Historic Archives (PAM, HA), MG 12 E1, Lt. Gov. J. C. Schultz papers. (1887:7820). Schultz found "over one half of the food of the Indians of that district consist of fish."

reported that the summer catch of 2000 tons was sent to Windsor, Ontario (PAM, MG 12 E1, 3838). The other two large fish companies were the W. Robinson Company and Roberts, Fisher and Wright. The W. Robinson Company, formerly Clark, Reid and Company, operated fishing stations off Swampy Island, at the Little Saskatchewan, and at Grand Rapids, with three steam vessels and ten fishing boats which required the labour of 150 "Canadians from Ontario with the exception of about ten Icelanders". These men were paid between \$35-40 a month, and the "fish caught by this firm all exported to the U.S., viz. to Minneapolis, Detroit and Buffalo" (PAM, MG 12 E1, 3839). The Roberts, Fisher and Wright Company operations were centred on Reindeer Island and the Little Saskatchewan, with two fishing boats employing five men who were paid \$35 a month. The 6000 pounds of fish caught by this company in 1888 were sent to Detroit and Buffalo. Stewart noted that "HBC, the Mission stations, and different parties of half breeds and Indians fish at general points but this is for local wants". The *half breeds* Stewart referred to were descendants of Cree and Ojibwe women and North West or HBC men. The Indians, Ojibwe and Cree, were from Fairford, Lake St. Martin, Jackhead, Fisher River, Hollow Water, Bloodvein, Berens River, Poplar River, Warren's Landing, Norway House, and Grand Rapids.

A similar report was made by G. D. McVicar. Apparently referring to communities along the west shore of Lake Winnipeg, the Cree at Grand Rapids and the Ojibwe around Lake St. Martin, McVicar reported two extensive fishing operations and one smaller one. These companies used "50 miles of gill nets. They employ about two hundred and fifty white men to manage their steam boats and fishery boats and also about three hundred Indians with scoop nets" (PAM, MG 12 E1, 3848). In contrast to earlier estimates, McVicar listed quite a few more people employed in the fishery and interestingly noted that Indians were using labour-intensive and less technically advanced scoop nets. These early reports warned that "the Indians seem very much alarmed at the prospects of the fish being all taken out of the lake" (PAM, MG 12 E1, 3486).

J. V. Begin, commanding officer of the Grand Rapids detachment of the North-West Mounted Police, wrote to Schultz, "Indians are getting alarmed... and said that there will be no fish in few years to come. They also request to see you here soon and speak to you about the fish business" (PAM, MG 12 E1, 4028). He added, "the Chief [Peter Beardy] and one



Figure 1. Lake Winnipeg and the original boundaries of the province of Manitoba, from *Laurie's map of the North-West Territories* (1870).

councillor [Joseph Atkinson] wanted me to tell you that they did not approve of the white men coming here" (PAM, MG 12 E1, 4303). In early 1890, Chief Beardy and councillors Atkinson and Peter Blackie asked for amendments to the law "so as to protect us in the future" (PAM, MG 12 E1, 3846). As early as 1888 resentment had been expressed by Ojibwe at Poplar River and Berens River, but the effects of dwindling fish stocks had yet to reach the Cree at Norway House on the Nelson River. According to McVicar, "the information I was able to gather in reference to the fish supply in the lakes was of such a contradictory character that is hard to decide whether the whitefish (and sturgeon) are being taken at such a rate as to necessitate greater protection than present exists." McVicar concluded that "the supply of fish in Lakes Winnipeg and Manitoba is being yearly diminished at such a rate that in a few years it will bring about such a scarcity as to seriously interfere with the supply of food for the Indian populations on these Lakes" (PAM, MG 12 E1, 3848).

In 1889, Fisheries Inspector R. La Touche Tupper reported that the catch of whitefish was the largest on record, and "the general impression has been that the area of the lake is so great the fish, practically, are exhaustless." As he warned, however,

the contrary is the case; the greater half of the lake is extremely shallow and holds no feeding grounds or sufficient depth of water... compared with the catch of the companies, that of the Indians, half breeds and whites who have to look to their catch as their principal food supply is small... only fishing the *outer edges* of the feeding grounds. The fish companies with large boats, steam tugs, freezers for storing &c., are fishing where the native cannot fish. They are emptying the store which the native only took the surplus from. [PAM, MG 12 E1, 4111]

A contrasting view regarding fishing at Norway House was recorded by HBC officer Horace Belanger, who reported "very few sturgeon are killed above Warren Landing [in Lake Winnipeg], a very few fished on the [*illegible*] and I am not aware that they are decreasing." He wrote, "I have no reason to believe as far as I learned that fish caught in our localities are being made improper use of. All that are killed are required for the maintenance of the peoples as well as the dogs" (PAM, MG 12 E1, 4119).

One question that Belanger's statement raises is why were the reports from Norway House different from those on other parts of the lake? Geography offers part of the explanation. In addition both biology (life history characteristics) and knowledge of Cree practices offer insights. Scientific data suggest that sturgeon live relatively close to where they are

born; as such sturgeon populations are relatively local, distinct from other populations within the overall biogeography. In other words, sturgeon around Norway House may be distinct from populations further south at Grand Rapids. Before 1890 sturgeon populations around Norway House were not fished by commercial companies, not until stocks in the south basin of Lake Winnipeg were exhausted. In addition, the Cree at Norway House maintained traditional fishing practices and this explains why these populations were unaffected. In 1890, Cuthbert Sinclair, justice of the peace at Oxford House, noted:

as far as my knowledge goes the fish taken at the outlet of the Lake about Norway House and vicinity are secured by common nets. And as far as I can learn the Indians belonging to the place have among themselves prohibited the closing of the channel with nets. [PAM, MG 12 E1, 4278]

The Cree managed the Nelson River fishery to satisfy local needs. Local needs should not be taken as strictly subsistence, however, as a large portion of the catch would have been traded commercially as isinglass and as processed or unprocessed sturgeon for consumption. At less well established communities such as Cumberland House, the HBC encouraged small scale commercial fishing and retarded commercial fisheries by setting their own nets. The HBC introduction of European fishing technology, metal hooks and fishing nets, did not mean immediate rejection of traditional technology: the adoption of European fishing technology and processes was far more gradual than commonly assumed (see Rostlund 1952, Cleland 1982).

The October 1889 fishery report by Dr. Orton (PAM, MG 12 E1, 4096) noted that the "depletion of Lake Winnipeg, [*illegible*] especially of White-fish and Sturgeon is surely and rapidly taking place, which, if the present rate of catch is continued, will not last, over five or six years"; he noted that "the catch of sturgeon at the mouths of Bloodvein and Pigeon River is considerable, pound nets being made use of. White-fish nets, as well as those used for sturgeon, are left in the water during Sunday, but not lifted that day." Pound nets were fashioned so to create an impassable barrier except for a tunnel which lead into the pound; both pound nets and Sunday fishing were, according to the *Dominion Fisheries Act*, prohibited. In spite of these observations Orton was optimistic, stating, "the decrease of fish does not as yet much affect the welfare of the Indians, or other inhabitants in Keewatin."

Local information indicated that sturgeon populations on Lake

Winnipeg were greatly diminished from the mouth of the Red River to Pigeon Bay near Berens River. According to R. L. Tupper, "they have been heavily fished this summer. It will not take long to fish out the lower northern half of the lake" (PAM, MG 12 E1, 4113). Tupper's views were supported by Angus McKay, Indian Agent at Berens River, who noted that commercial operations were to blame for diminished stocks at the mouth of the Pigeon River. McKay reported that "at the rate of the present catch by large companies, it is believed that the lake will be depleted of white fish and sturgeon in less than five years" (PAM, MG 12 E1, 4100).

A significant problem identified by fisheries observers was spoilage caused by leaving fish in the water too long. Dr. Orton found that "nets were often left unvisited for days in stormy weather as well as over Sunday" (PAM, MG 12 E1, 4130). J. V. Begin observed, "it is a great shame to see the destruction of fish here [at Grand Rapids], on account of nets being too long in the water"; he reported that the Robinson Fish Company "has a great establishment here... they are catching fish in great quantity, but I am sorry to say they are not much particular if fish is destroyed or not... and do not know anything concerning the Fish law of this District" (PAM, MG 12 E1, 4026).

There are no known records from the Lake Winnipeg fishing companies to show that these companies were indeed aware of fisheries laws or had a longterm interest in the lake. Those investigating the fisheries such as Dr. Orton and James Stewart recorded important details about the industry, however. Both men were discussing the fishery from the perspective of outsiders scrutinizing the fishery for a limited period. Dr. Orton was able to present a detailed picture of the role of aboriginal fishermen:

about one third of those employed were Indians and was told by some of them that they received two cents each for their fish and were paid in goods from the stores of the firms, and that their boats and nets were provided for them by companies free of charge. Some of the Indians were among the most skilful and successful of the fishermen and made as much as six or even ten to twelve dollars/day. [PAM, MG 12 E1, 4131]

Furthermore, statements from various chiefs and councillors affected by commercial fishing companies were also collected and represented. For example, Chief Shoo Anderson of St. George's Island informed Orton

the Indians were not benefited to any great extent by the employment they got some were it was true, but this was more than counterbalanced by the

difficulty experienced in all procuring their winter supply and he feared this difficulty would increase, they now had to use jackfish and other inferior fish to a considerable extent in consequence of the increasing scarcity of whitefish and sturgeon. [PAM, MG 12 E1,4132]

The Cree and Ojibwe statements came mostly from highly respected chiefs and councillors, and are perhaps among the first post-treaty attempts by band leaders to communicate with an increasingly bureaucratized government.

Chiefs and councillors from the east shore of Lake Winnipeg were interviewed in 1889 by Ebenezer McColl, the Inspector of Indian Agencies,⁶ who travelled up the lake with Colin Inkster, sheriff of Manitoba and president of the Fish and Game Protection Society, on the steamer *Aurora*. In ten days the two men visited Brokenhead, Fort Alexander, Black River, Hollow Water, Loon Straits, Dog Head, Fisher River, Berens River, and Norway House. McColl asked Inkster to record whatever the Indians said about the fisheries. They are represented as having said that "it was only a matter of a few seasons when it would be impossible to get whitefish and sturgeon and that already they had to depend largely upon pike or jackfish which were very inferior as food." Inkster wrote that, except at Norway House, "in all these Reserves the invariable reply was they are scarce and getting scarcer every year." When asked why, the Indians answered "the whiteman with their big nets are taking all the fish out of the lake" (PAM, MG 12 E1, 4079–85).

Various missionaries in the district of Keewatin claimed to be presenting Cree and Ojibwe views about the commercial fishing companies in 1889, and officials claimed to present the translated speeches, verbatim in some cases, of Cree and Ojibwe around Lake Winnipeg. However, such representations, should always be viewed with caution and a critical mind. Frank L. Hunt, former preacher to the Indians at Lake St. Martin, stated, "during the past winter the Chiefs and headmen of the three Indian Reserves met in council at my house at St. Martins Lake. From them... the threatening conditions were laid directly at the door of the fish companies their equipment and through depletion of the waters each occurring season [*sic*]" (PAM, MG 12 E1, 4224). A letter from Reverend George Brown,

⁶ Judson (1961) wrongly identifies McColl as McCool of the Indian Department and suggests that he was an alarmist who misled Schultz into believing that most of the commercial companies' labour came from outside the Lake Winnipeg–Manitoba–Keewatin region, i.e., from the United States.

Episcopal missionary in the Fairford district, described the fishery and the state of the *poor Red Man*. After having *tripped* to Lake St. Martin, Brown met Philip Charles Anderson, son of the chief at Sandy Bay, who apparently told him, "Alas! No fish this Autumn" (PAM, MG 12 E1, 4238). Reports were also issued on behalf of the Poplar River Ojibwe through J. W. Butler, missionary, who wrote, "I have just returned from a visit to the Band of Indians at Poplar River, in conversation with their headman he spoke as follows (I give the interpretation just as given to me by my interpreter)":

I watched my grandfather and my father walk, and I have walked like them, but I see nothing for it, there is no fur and no deer... the fishermen came here last summer, and we hear they are coming next summer to fish here. It troubles me much, my people do not want them to come, because the fish is all we have to look to for a living, we have no rabbits, no deer, no cat only fish. [PAM, MG 12 E1, 4241]

Most of the Cree and Ojibwe protests were recorded by men sent out by Lieutenant Governor Schultz to report on the fishery and state of *country food* in the district. Dr. Orton, in particular, was able to elicit responses from the Ojibwe at Fairford, settlers in the area, and other government agents. Dr. Orton wrote, "Chief Woodhouse said his people would soon be starving... their reserves had been selected on account of the fish supply at hand for food and this was being taken away from them and insinuated that it was bad faith in part of Government to permit this destruction of their chief means" (PAM, MG 12 E1, 4133). Dr. Orton also reported that "Mr. Martineau agent at Narrow's seemed to have paid a great deal of attention to the subject and told me he had frequently represented in his reports the disastrous results which were occurring to many of the Indians in his agency who depended on fish for food" (see also Tough 1996). Equally, a number of representations on behalf of the Cree and the Ojibwe were made by officials not commissioned by the Lieutenant Governor. For example, Angus McKay at Berens River reported:

Chief Berens (listed on Treaty as Nah-wee-kee-sick-quah-yash) requests me to report that he, as well as other Chiefs, Headmen and Indian Bands living on the shores of Lake Winnipeg South of Berens River and within Treaty number five are greatly alarmed at the rapid and steady depletion of that Lake of whitefish and sturgeon wherever professional fisherman have been at work. [PAM, MG 12 E1, 4099]

During November 1889, the Federal government in Ottawa responded to the claims made on the behalf of the Indians on Lake Winnipeg for new

legislation. Charles Tupper, the Minister of Marine and Fisheries, wrote to Edgar Dewdney, the Minister of the Interior, that a difference of opinion about the Lake Winnipeg fishery was evident. Tupper stated, "I would hesitate long on legislation against exports. Increased guardianship might do a good deal. I am discussing this with Dewdney since we might use his Indian Agents a good deal" (PAM, MG 12 E1, 4156). Dewdney, who was responsible for Indian affairs, passed along Tupper's view, adding "the Minister of Marine thinks nothing but an impartial investigation can determine the true state of affairs. He and I may next year visit the locality ourselves" (PAM, MG 12 E1, 4165).

One source for the difference in views was, evidently, Alex McQueen, Inspector of Fisheries in the district. In his 1889 report McQueen disagreed with claims made against the fishery — he characterized McColl and Stewart as men "discussing a question in which they have no experience" — and blamed the Indians for a lack of fish, noting that "their practice of capturing large quantities of them on the spawning beds... will do more to exhaust the fisheries than anything that can be done by the legitimate prosecution of the trade" (PAM, MG 12 E1, Keewatin Ledger, 11 February 1889). Furthermore, McQueen argued, the fisheries question was "asked on behalf of 4,396 Indians, in the Province of Manitoba, of whom only 3,670 individual men, women and children derive benefits from the fisheries." Noticeably absent is criticism of Indian Agents and other federal government officials. For example, McKay had reported,

unless prompt and effective measures are adopted by the Government in order to stop the destruction of whitefish and sturgeon caused by large fishing companies, the bands of Indians living along the lake shores in Treaty Five will have to depend on the Department for food. [PAM, MG 12 E1, 4099]

One claim by Indian Agents that could not be overlooked by the Fisheries Department was the call for exclusive Indian fishing reserves. McKay produced a map "showing the proposed reserves for fishing grounds for Indians. The area already depleted and the parts now being rapidly depleted of whitefish and sturgeon have nearly disappeared from all the rivers where a few years ago they were plentiful" (PAM, MG 12 E1, 4588/4488). Fisheries Department officials argued that exclusive fishing reserves would be detrimental to the fledgling industry, and in this regard McQueen suggested that "if the Indians were aware that the setting apart of reservations would cut them off from the trade, they would never desire

a change from the present system" (PAM, MG 12 E1, Keewatin Ledger, 11 February 1889).

The introduction of commercial fishing on the lake brought open access where there were once communal fisheries. Cree and Ojibwe fishing stations, as institutions, involved common property rights, and it is likely that proprietorial rights to sturgeon, as with beaver, bison, geese, and other game, would have involved some form of social control. Communal control over fisheries access could no longer be enforced through social sanctions. Moreover, commercial fishing curbed domestic production. In 1890, Schultz repeatedly asked Ottawa for protection of the Lake Winnipeg fishery, because "if sturgeon and White-fish continue to be caught at the present rate at or near the mouths of the Rivers mentioned [Berens, Winnipeg and Nelson] you must arrange for the supply of a portion of the food necessary for the supply of these Indians" (PAM, MG 12 E1, 4551). However, the government seemed either unwilling or unable to do anything about the existing state of affairs. For example, although L. Vankoughnet, Deputy Superintendent General of Indian Affairs, wrote

long before any fisheries by white men were established on Lake Winnipeg and other waters of Manitoba or the Northwest Territories this department had furnished to the Department of Fisheries full descriptions of all the fisheries in these parts which it was advisable should be reserved from licence for the use of the Indians. (PAM, MG 12 E1, 4886-7]

It seems that bureaucratization, jurisdictional cross-circuiting and isolationism meant that even if the depletion of sturgeon had been acknowledged by one department it would not necessarily be by another.

Political motivations and a desire to conserve fish stocks appear to have influenced the decisions of senior civil servants in Ottawa and elsewhere. Discussions of McQueen's report between Hayter Reed, the Indian Commissioner for Manitoba and the Northwest Territories, and Edgar Dewdney, the Superintendent General of Indian Affairs, resulted in a conservative reassessment: "it may be that we have been somewhat unnecessarily alarmed about the danger of depleting the waters." To his credit, Reed maintained that "the fact remains that the fish are being driven away from the shores where our Indians cannot follow and catch them" (PAM, MG 12 E1, 3989). Federal perspectives sharply contrast with those expressed by Lieutenant Governor Schultz. In his 1890 report, Schultz warned:

if sturgeon and white-fish continue to be caught at the present rate in or

near the mouths of the rivers mentioned [Nelson, Winnipeg and Berens rivers], you must arrange for the supply of a portion of the food necessary for the support of these Indians and that when once pauperized and degraded. [PAM, MG 12 E1,4551]

To his credit Schultz actually visited the Ojibwe at Berens River and the Cree at Norway House, something the Ministers of Fisheries and Interior did not do. At Berens River, Chief Jacob Berens and his chief councillor presented the Ojibwe case:⁷

I must tell you that they have, like myself, lived here from childhood, and over these barren rocks our fathers before us went down to their canoes and skiffs to set their nets among the islands at the mouth of this river. We had always plenty of fish to eat, and we have, like them, learned to depend upon it almost entirely for our food. [PAM, MG 12 E1, 4579-80]

Chief Berens suggested the fishing companies fish farther out in the lake: "why does he come to spread his nets just at our feet, and take away the food from our children's mouths?" The Ojibwe certainly understood the concepts of fisheries management and access, and the fact that the technique of blocking off rivers with nets was not sustainable and did them great injury. At Berens River Schultz was only able to guarantee that if the Ojibwe did not behave and observe the new fishing laws he would take offenders away in chains. The Lieutenant Governor also guaranteed that he would convey Ojibwe concerns to Ottawa. At Norway House statements made by the chief and council supported the fundamental arguments made by the Ojibwe at Berens River; however, the Cree were more future-oriented and had a less confrontational attitude, no doubt because they had not yet felt the full effects of the fishing companies:

We dread the approach of these white fishermen, we have heard from relatives at Poplar River, and the Great Saskatchewan how quickly their fishing affects the supply of small nets of the Indians, and we dread every day hearing a report that... they will come and build an ice-house at the station at the beginning of the river where it is so narrow, and if they stretch their nets across there as they have done at the Saskatchewan and Poplar River, what are we to do?

Sounding very much like a page out of fur trade negotiations, Chief Balfour added:

grant us a little more twine than is now given, it is much needed by us, do that and keep away the fishermen and we will manage to get along but we

⁷ Chief Berens began with an allusion to having met Schultz earlier. A. I. Hallowell (1992:31) records that Jacob Berens, then a young boy, met Schultz at White Dog after his escape from Louis Riel, in 1869.

very much fear from the reports of the Indians from other parts of this lake. [PAM, MG 12 E1, 4579-80]

Chief Balfour's statement is consistent with comments recorded at Norway House by Horace Belanger:

the Indians... live well, as the fish which consists of white, jack and sturgeon is still plentiful, but with a tendency to decrease as reported to me by the Chief and councillors saying that the fish companies are killing too many of them in Lake Winnipeg they are afraid that it will effect also their fishing places, like other points on the lake reported to them by Indians in these localities. [PAM, MG 12 E1, 4867]

Increasingly, the Cree and the Ojibwe called for some sort of protection of the fishery. From what he could gather from Ojibwe elders at Lake St. Martin, Frank L. Hunt wrote, "fishing should be strictly limited to the late fall and winter seasons and then under jealous inspection" (PAM, MG 12 E1, 4229). A dispatch sent from Grand Rapids to Norway House in 1890 demonstrated an attempt to unify Cree around the northern portion of the lake, in order to maintain fish stocks for Cree use. Both Grand Rapids Chief Beardy and councillor Atkinson requested, "give us a help in regard to having this fish preserved in the lake, for we are the people who see how the fish are destroyed" (PAM, MG 12 E1, 4310). Schultz, having personally visited Berens River, reported:

stretching of sturgeon nets by the fishermen of Swampy Island where there is an ice-house, had, in spite of the many protests made by those Indians last year, again been stretched across the mouth of Beren's River, and with their better appliances were killing a large number of sturgeon, and so interfering with the yield of the ordinary Indian fishing... when these fish should be very plentiful there were caught scarcely enough to support life. [PAM, MG 12 E1, 4552]

Commercial fishing companies employed many Cree and Ojibwe, creating an alternative way of earning a living, though many were paid in goods rather than money. Nevertheless, many observers claimed that some of the wealthiest labourers were Native. What was meant by *wealthy* must fall within late Victorian views of Natives as materially and morally poor. The changes caused by this new wealth can only be imagined; many accounts suggest that it was not necessarily shared. Furthermore, Native labour, although not as portable as capital, could grudgingly pick up and move where fishing camps moved. The environmental and socio-economic impacts on aboriginal communities and their resources were compounded by a race for larger boats and more efficient technology, yielding greater

quantities of fish. Communities which relied on fish along with other naturally occurring resources unknowingly paid rent on behalf of industrial companies. Competition for scarce resources increased and sped up the destruction of the fishery, even in the face of collective protests. Sturgeon fishing could not be stopped because of a lack of state fishing regulations based on good scientific understanding of the fish.

Once in place, Fisheries regulations were not enforced until a fisheries organization was established. Regulation was mostly in response to a decline in fish stocks in 1900. In 1890, David Chastellaine, Master of the HBC post at Dogs Head, wrote:

I left Warrens Landing, viz., on the 5th October, and my slow progress gave me the opportunity of seeing the Indians engaged in the fishing, and every one of these Indians assured me that up to that time they had not got half as many as they had got to the same date last year, and they very much feared starvation this winter. I was surprised also to find that many fish-boats were still engaged up to as late as the 20th of October; the ordinary white people's fish-boats were putting down their nets and catching considerable quantities and taking them to Selkirk to market. Although I suppose this to be against the law. [PAM, MG 12 E1, 4874]

The commercial fishery on Lake Winnipeg can be best characterized as operating within a state of resource anarchy. That is, in the absence of either Native or governmental means to control access, the fishery was in the hands of outside commercial interests, intent on reaping the greatest share of fish possible. Despite the anarchy created by commercial nets, Native communities clearly understood the link between increased commercial exploitation and the loss of subsistence fisheries, and were persuaded not to take the law into their own hands. Not that there were no threats of violence — Butler warned, “the HBC man at Poplar River told me that he believes there will be trouble if the fishing co. fish sturgeon on these waters next summer” (PAM, MG 12 E1, 4242). He did not specify whether it was the HBC or the Ojibwe at Poplar River who would give the fishing companies trouble.

No significant changes occurred in the fishery for 1891 and 1892. In 1893 and 1894, however, influenza and measles greatly affected the fishing ability of both the Cree and the Ojibwe. In December 1893, J. K. McDonald, at the HBC post at Oxford House, reported that “an epidemic of measles which attacked every band member under my supervision has caused great distress to the Indians” (PAM, MG 12 E1, 6426). Dr. Stuart recorded some deaths at Norway House in March 1894. Although

influenza was not epidemic, Stuart noted "loss of fish due to measles and now starvation and severe colds at Oxford House" (PAM, MG 12 E1, 6448). Rev. John Semmens noted *la grippe* at Island Lake, Gods Lake, Oxford House, and Poplar River, with measles at Nelson House, in the spring of 1894 (PAM, MG 12 E1, 6467).

E. E. Prince (1898:lvii) stated that "sturgeon are of such vital importance for the sustenance of the Indians — 'It is to us Indians,' a Blackfoot hunter is recorded to have said, 'in the water, what the buffalo was on land'." There is no indication that Prince, the Dominion Commissioner of Fisheries, spoke with any Blackfoot, nor with the Cree and Ojibwe around Lake Winnipeg. Ethnographies of the Blackfoot characterize them, with the exception of Fish eaters band, as adverse to eating fish, preferring instead to eat buffalo (Rostlund 1952). Prince may, however, have borrowed this colourful phrase from W. T. Urquhart's 1872 report on the Manitoba fisheries, where he reported that sturgeon, "as an Indian hunter said to me, 'is to us in the waters what buffalo is on the land'" (Urquhart 1872:195). Regardless, Prince (1898:lvii) lamented that "no special code of protective regulations has been formulated in Canada", going on to argue that failures of the fishery were a result of a lack of enforcement of fishing regulations and not overfishing by the Cree and Ojibwe.

In the reorganization from Native fisheries to commercial industrial fisheries, historical records reveal significant exchanges between government officials and representatives of Cree and Ojibwe bands. Fur trade records before and after 1887 indicate that sturgeon played an important role in trade with the Ojibwe and Cree. All indicate that there were conflicts over how the fishery was valued and viewed. Cree and Ojibwe called for protection of their fish resources from pressures caused by industrial fisheries in which they played a significant role as labour. While the Ojibwe wanted to take an active role in protecting their fishery, threatening to cut nets to allow the passage of fish, the Cree were more reserved. The common link between communities around the lake was that their concerns were ignored while the supply of fish was depleted.

The introduction of industrial commercial fishing after 1887 created waves of change. The most significant change was the marginalization of Native fishing for strictly commercial pursuits. The material value of sturgeon increased as American markets grew and American supplies of sturgeon disappeared. Native responses to these changes in value will

require further research, some of which will form part of my Ph.D. thesis. The commercialization of sturgeon meant extinguishment of aboriginal title, the creation of open access conditions, and the attraction of foreign capital and technological capabilities to reap larger shares of shrinking stocks for growing foreign markets. The open-access fishery was unregulated and recommendations usually included the caveat "fisheries department should carry on its administration in full cooperation and sympathy with the fishing industry" (Feilding 1916:92).

It was the influence of commercial interests rather than scientific knowledge that informed management decisions. Even though Native fishing rights were recognized by treaties, these rights were marginal. Fisheries officials such as Inspector McQueen discredited colonial administrators who represented Native fishing interests. Treaty negotiators recognized the importance of fish to the communities around Lake Winnipeg; reserves were chosen for access to local fisheries. Chief Berens was quoted as saying, "when we made this Treaty, it was given us to understand that although we sold the Government these lands, yet we might still hunt in the woods as before, and the fish and the waters should be ours as it was in our Grandfather's time" (PAM, MG 12 E1, 4571). Contemporary Ojibwe argue that this was Schultz's own rhetorical construction — that the land was never sold and that Berens never said they sold it.

The displacement of aboriginal sturgeon fisheries meant sturgeon no longer held a significant place in the Native subsistence round and economy. Not only was the fishing and harvesting of sturgeon radically changed, but the fundamental relationship between the species and human populations also changed. The fish was no longer exclusively the property of Indians and halfbreeds; sturgeon was bartered year round as part of the new cash economy. Denied the necessary capital, aboriginal people could not access what had once been a reliable and secure resource. The creation of bigger boats and new fishing technologies meant that Indian near-shore fisheries collapsed. The requests for big boats and attempts to amass capital to finance them were thwarted by government officials. On the west coast some aboriginal fishermen were able to produce enough wealth to buy large boats and compete with non-aboriginal fishermen, but the vast majority of west coast peoples supplied labour to the canneries. Inland Cree and Ojibwe fishers were denied the ability to compete in the industrial fishery much the same way that aboriginal farmers were subjugated.

Aboriginal people were considered fine seasonal labourers, but were denied equality and respect. In many ways, a form of social darwinism supported economic slavery, limiting the choices available to aboriginal people. To be generous, Indian Affairs and Fisheries administrators were practical in their approach to the fisheries, justifying their policies on the basis of conservation of fish stocks. Neither group could foresee the tenacity of aboriginal cultures in the face of poverty and repression.

Conventional representations of aboriginal resource use have produced one-dimensional pictures of western plains people hunting buffalo, boreal forest people hunting moose, and in the north Dene and Inuit hunting caribou. Modern historians, anthropologists and ethnographers have added to this imagined picture by including aboriginal use of lesser resources. The image of western plains and boreal forest peoples hunting big game, such as deer, wild fowl, and various fur bearers comes closer to reality; however, it ignores the fact that these people relied a good deal on fish. Similarly, in the north Dene and Inuit are pictured hunting seals and bears, with references to fish use rare. Ecologists and archaeologists are adding indirectly to historical discussions about aboriginal resource use, noting that a host of resources were utilized, depending on abundance, effort and preference. The case of the Lake Winnipeg sturgeon fisheries is only a small part of this little discussed resource relationship.

Until 1870 the general tone of life in Keewatin was guided by the political economy of subsistence and commercial pursuit of furbearers and other specialized resources within a mercantile system. Seasonal movements remained a guiding force for most inhabitants. Helen Buckley (1992) argued that over 125 years of Canadian Indian policy has caused Indians to become dependent on the state. Buckley claims that the bureaucratization of Indian Affairs allowed reserves to survive in isolated rural locations with insufficient economic bases, and that the separateness, dependency and rents in the social fabric are keys to understanding aboriginal underdevelopment. It would appear that for reserves around Lake Winnipeg, stable resources were keys to geographic choices, resources that were depleted by a lack of policy to maintain them.

Indian Affairs policy to protect, civilize and assimilate Indians, according to Irene Spry (1983), was successful only with the transformation of common property to open access and private property. Before widespread settlement could be initiated, access to land and the exclusive

conversion of hunting grounds to farmlands and fisheries needed to be accomplished. Like farming, fishing is based on growth and yield. While farmers prepare fields and plant seeds, fishers manage by taking only a portion of the stock. Hunters and gatherers tended to the readiness of animals, fish, and plants to be harvested. In the reorganization of tribal lands, the steady and sustainable use of the productivity of the land was lost to its rising monetary value — riches were privately drawn from natural stocks. If private property was a means of securing resources, it was equally a process whereby great wealth could be accumulated based on knowing how to use capital.

As this case study has shown, aboriginal people were restricted from competing in the new system. Similarly, Sarah Carter (1983) maintains that by 1895 Indian policy discouraged use of labour-saving machinery and production for market, claiming that Indians were to remain peasant farmers, producing only for their own tables. In 1890 the most significant staple for the Cree and Ojibwe around Lake Winnipeg was fish. As the fish stocks shrank away from historical locations, aboriginal fisheries, including some technology and institutions, fell by the wayside. Prevented from becoming commercial industrial fishers, the Cree and Ojibwe were denied an important staple and trade item. Similarly, Diane Newell (1993) found the politics of west coast fisheries regulation after the 1870s undermined Indian fishing and fisheries, and displaced a complex and richly held regional resource. Of course, the Pacific coast fishery allows greater latitude for an examination of the complex politics of fisheries management than a single-species fishery offers. Historical studies of single-species inland fisheries are relatively scarce. Holzkamm, Lytwyn and Waisberg (1988), responding to an absence of historical discussions regarding inland fishing, argued that the Ojibwe did not place great demands on the fish resources of Lake of the Woods and Rainy River. They subjected the sturgeon fishery to in-depth analysis, as an example of aboriginal use of fish "not only when big-game was scarce."

The crux of fisheries regulation in Manitoba, after 1890, was government restriction of aboriginal peoples' access to fish through definition. Jean Friesen (1991) argues that Native fisheries became domestic and commercial and that fishing was restricted by the imposition of fishing licenses, seasons, and (later) designated areas, undermined treaty rights. The post-treaty period is characterized by the subjugation of Indians under

provincial legislation and Fisheries Departmental regulations. While Friesen (1991:153) argues that the Indians sought "through their treaty... to secure some of the economic independence that is essential to political autonomy", the government had something else in mind.

Treaty research is adding significantly to historical and political discussions about land, settlement and resource use. For instance, Holzkamm, Lytwyn and Waisberg (1988:195) found that sturgeon fisheries were "of great significance to Ojibway subsistence, commerce, society, and religion". They argue that treaty promises were not kept and that government policy and inaction disrupted Ojibwe management of the fishery. Accordingly, mismanagement of the fisheries allowed fishing companies to over-exploit the resource leading to the collapse of a major resource base of the regional economy.

The signing of Treaty 1 was delayed as a result of Ojibwe being away fishing for sturgeon at Rainy River. Treaties 1 and 2, signed in 1871, mirror deteriorating fisheries on the Red, Assiniboine and Winnipeg Rivers. Treaties 3 and 4 were also settled under conditions of resource scarcities. Soon after signing the treaties, the Crown noted the difficulties and costs of implementing their promises, and sought solutions to make reserves self-sufficient. While some reserves were able, after a time, to become self-sufficient, they usually attracted the attention of neighbouring settlers and industrialists who claimed government support was unfair and disadvantaged settlers.

In the many conflicts over land and resources, Indian Affairs learned political lessons of cultivating support, presenting a positive public image, and finding alternative interpretations of treaty promises. As wards of the state, Indians did not have political clout and therefore opposition to Indian policy was ignored. Seen as indications of the lazy ungrateful attitude which was believed to be typical of Indians, protests were rarely heeded. Instead of merely managing and implementing Indian policy, the institutionalization of Indian affairs quickly became a means of creating employment for many non-Indians.

Arthur J. Ray (1996:1) claims that "many of Canada's Indigenous people define themselves in terms of the homelands that sustained their ancestors." If aboriginal identity is defined by the forces of landscape and environment, is there any way of relating how the definition and the relations to homeland sustained their ancestors? Furthermore, those who

colonized those homelands have not found them sustainable. Historians and geographers can map the environment through human–animal relations by revisioning the meanings of land and sustenance as functions of aboriginal resource use. Scholarly debate about aboriginal resource use is of historical and current political significance. Reconstructing historical geographies of aboriginal peoples requires the use of a variety of nets, set in a variety of places. Non-aboriginal scholars can form an outsider's understanding of this geography by examining historical records and by talking with the people whose history is represented in them. Scholars need to challenge scientific assumptions about relations between humans and other species, by going to the roots of current knowledge.

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REFERENCES

- Arthurs, David W. 1982. *The Long Sault: cultural dynamics in the Rainy River valley of northwest Ontario*. M.A. thesis, University of Manitoba.
- Buckley, Helen. 1992. *From wooden ploughs to welfare: why Indian policy failed in the prairie provinces*. Montreal: McGill-Queen's University Press.
- Canada. 1887. *Senate select committee to investigate the state of natural food products of the Northwest*. Ottawa: Queen's Printer.
- Carter, Sarah. 1983. Agriculture and agitation on the Oak River Dakota reserve, 1875–1895. *Manitoba History* 6:2–9.
- Cleland, Charles. 1982. The inland shore fishery of the northern Great Lakes: its development and importance in prehistory. *American Antiquity* 47:761–784.
- Feilding, J. B. 1916. Conservation of Canada's inland fisheries. *Conservation of fish, birds and game* (Toronto: Methodist Book and Publishing House), 81–92.
- Friesen, Jean. 1991. Grant me wherewith to make my living. *Aboriginal resource use in Canada: history and legal aspects*, ed. by K. Abel and J. Friesen. (Winnipeg: University of Manitoba Press), 141–156.
- Graham, Andrew. 1969. *Andrew Graham's observations on Hudson's Bay 1767–91*, ed. by Glyndwr Williams. London: Hudson's Bay Record Society.
- Hallowell, A. Irving. 1992. *The Ojibwa of Berens River, Manitoba: ethnography into*

- history, ed. by Jennifer S. H. Brown. Fort Worth: Harcourt Brace Jovanovich.
- Hannibal-Paci, Christopher. 1997. Name as under-rated economic resource: a review for lake sturgeon (*Acipenser fulvescens*) in Manitoba's archaeological literature. *Manitoba Archaeological Journal* 7(2):77-95.
- Holzmann, Tim, Victor Lytwyn and Leo Waisberg. 1988. Rainy River sturgeon: an Ojibway resource in the fur trade economy. *Canadian Geographer* 32:194-205.
- Isham, James. 1949. *James Isham's observations on Hudsons Bay 1743*, ed. by E. E. Rich. Toronto: Champlain Society.
- Judson, A. T. 1961. *The freshwater commercial fishing industry of western Canada*. Ph.D. thesis, University of Toronto.
- Kennedy, Patricia. 1993. Voices in the shadows. *The Archivist* 20(1):2-4.
- Mayer-Oakes, William J. 1967. Prehistoric human population history of the glacial Lake Agassiz region. *Life, land and water: proceedings of the 1966 conference on environmental studies of the glacial Lake Agassiz region*, ed. by W. J. Mayer-Oakes (Winnipeg: University of Manitoba Press), 339-378.
- Morrisseau, Norval. 1965. *Legends of my people, the great Ojibway*, ed. by Selwyn Dewdney. Toronto: McGraw-Hill Ryerson.
- Newell, Diane. 1993. *Tangled webs of history: Indians and the law in Canada's Pacific coast fisheries*. Toronto: University of Toronto Press.
- O'Brien, R. 1976. *An archaeological survey of Methodist Point Park reserve*. Historical Planning and Research Branch Research Paper 9 (Toronto: Ontario Ministry of Culture and Recreation).
- Prince, E. E. 1898. The food of the sturgeon. *Canada Sessional Papers, Marine and Fisheries*, no. 10, lvi-lx.
- Provincial Archives of Manitoba (PAM), Winnipeg. MG 12 E1. *Schultz papers*.
- Ray, Arthur J. 1996. *I have lived here since the world began: an illustrated history of Canada's Native people*. Toronto: Key Porter Books.
- Rostlund, Erhard. 1952. *Freshwater fish and fishing in Native North America*. Berkeley: University of California Press.
- Spry, Irene. 1983. The tragedy of the loss of the commons in western Canada. *As long as the sun shines and water flows: a reader in Canadian Native studies*, ed. by Ian Getty and A. S. Lussier (Vancouver: University of British Columbia Press), 203-227.
- Tough, Frank. 1996. *'As their natural resources fail': Native peoples and the economic history of northern Manitoba, 1870-1930*. Vancouver: University of British Columbia Press.
- Urquhart, W. T. 1873. Report on the fisheries of the province of Manitoba. *Canada Sessional Papers, Marine and Fisheries*, no. 8, 193-195.

APPENDIX D: Correspondence and contact letter.

Christopher Hannibal-Paci

University of Manitoba, Natural Resources Institute
Winnipeg, Manitoba R3T-2N2
Tel: (204) 474-8287
Fax: (204) 261-0038
email: cpaci@umanitoba.ca

September 9, 1997

Norway House
Box 218
Norway House, MB
R0B 1B0

Fax: 359-6080

Subject: Sturgeon research

Dear Chief and Council,

I have been studying Cree, Ojibwe and scientific knowledge of lake sturgeon (*namay*) in the Lake Winnipeg basin and the possibilities for co-management since 1994. My research brings historical documents together with community knowledge and the data biologists have amassed.

I would like to come to Norway House to talk with some of the people about *namay*. I am asking your permission to talk with older people in the community who have experience with sturgeon and any changes they have noticed. I have a general outline of questions that have been approved by the University of Manitoba's ethics committee which I include for your reference. I hope to gather stories, local knowledge of the land, past and present relations with sturgeon, possibly mapping traditional use and changes, as well as bringing together family photos and histories of sturgeon use with scientific knowledge.

Out of respect I will produce a report for the community, to be used as you see fit. I will also be using information I gather in my research and would be honored to provide Norway House with a copy of my PhD thesis when it is completed. In addition, I would gladly organize either a workshop or any other format the community would like to have. I am not working with the Nelson River Sturgeon Co-Management Board but I will make information I gather available to them if the community would like, and the Co-Management Board requests.

I will follow up this brief note with a phone call.

Warmest regards,



Christopher Hannibal-Paci

cc. Norway House, sub-office 305-260 St. Mary Ave, Winnipeg, MB

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September 12, 1997

Norway House
Box 218
Norway House, MB
R0B 1B0

Fax: 359-6080

Subject: Sturgeon research

Dear Chief Ronnie Evans and Council members,

I appreciate the opportunity to study lake sturgeon (*namay*) and the possibilities for co-management in Norway House. I will bring some historical documents to the community and am very interested in gathering community knowledge with the data biologists have amassed.

I will be flying to Norway House on October 1st, at 4:45 PM on Perimeter. I appreciate your assistance in finding community members I should talk with. I hope to talk with some of the old and young people about *namay*. Again I thank you in advance for granting permission to talk with community members who have experience with sturgeon and any changes they have noticed. Management of sturgeon can be made better by including stories and local knowledge of the land held by the people who have had a close relationship, past and present, with sturgeon. Although I will only be staying until October 4, leaving on Perimeter at 12:30, I hope to map traditional sturgeon use and changes, as well as assemble family photos and histories of sturgeon use with scientific knowledge.

I look forward to working with Norway House in the near future.

Warmest regards,



Christopher Hannibal-Paci

APPENDIX E: Consent form and semi-directive interview format.

Cree, Ojibwe and scientific knowledge of lake sturgeon in the Lake Winnipeg basin and the possibilities for co-management

Field study interview consent:

The purpose of this study is to document Cree and Ojibwe experiences with lake sturgeon (*Acipenser fulvescens*) co-management and traditional knowledge of *namay* (lake sturgeon) held by residents on the Nelson, Saskatchewan and Winnipeg rivers. The information collected may be included in a report that will be used to foster interest in lake sturgeon in these communities, and ultimately to assess current management strategies. The study is being conducted by a researcher from the Natural Resources Institute, University of Manitoba.

The interview will consist of questions regarding your knowledge of *namay* (lake sturgeon), history of the sturgeon fishery and sturgeon co-management. The interview will last as long as you have information to provide and are willing to answer questions. It is entirely up to you whether you wish to participate in this study and you may terminate the interview or withdraw from the study at any time. An honorarium will be provided for participating in the study.

Your knowledge of *namay* (lake sturgeon) is very important. The information provided by you will increase knowledge of sturgeon stocks and help to conserve them for future generations.

Please feel free to ask any questions you may have about the study. The study advisor/contact is as follows:

Dr Fikret Berkes
Natural Resources Institute
University of Manitoba
430 Dysart Road
Winnipeg, Manitoba
R3T-2N2
(204)474-6731, fax (204)261-0038

Before we begin, you are asked to verbally agree, indicating that you are willing to participate in the study.

Consent: The study has been explained to me and I agree to be interviewed. I understand that the interview is entirely voluntary, and that I can refuse to answer questions or stop the interview at any time.

Thankyou.

Cree, Ojibwe and scientific knowledge of lake sturgeon in the Lake Winnipeg basin and the possibilities for co-management: Field study

Interview Number:

Date of interview:

Name:

Place:

Date of Birth:

Place of Birth:

Occupation:

Interview Guide

- When did you start fishing sturgeon? Where were you living?
- Who did you fish with? Where did you fish?
- What kinds of sturgeon have you caught?
- How did you fish for sturgeon? How did the person who taught you to fish, fish?
- What was life like in the fishing camp?
- How long did you fish for sturgeon at each location during a season?
- Where did you catch the most sturgeon and at what time of the year?
- How big were the sturgeon?
- Where do sturgeon go and what do they eat ?
- Have you ever seen sturgeon spawning and afterwards have you see baby sturgeon?
- What were the different uses for sturgeon?
- How did you cook/eat the sturgeon, were there different cuts (what did you throw away)?
- How was fishing organized?
- What are your memories of the commercial sturgeon fishery?
- Was access to fishing locations restricted?
- What were rules for sturgeon fishing and did they differ from the way your father fished?
- Is there a difference between government regulations and the way your father('s father) fished?
- Can you show respect and disrespect towards sturgeon?
- How many people fished where you fished? How were conflicts resolved?
- How did the catch fluctuate during the year and from year to year?
- Are there places where you once caught lots of sturgeon but can no longer?
- How many types of sturgeon have you caught?
- Do you still fish? Where do you go and how do you fish?
- Have you taught your children to fish?
- How big are the fish and how do they taste?
- What can be done to ensure there are sturgeon here for your grandchildren?
- Is sturgeon co-management working?
- Can you tell me any of the old stories about sturgeon?