

**Fathoming Lake Winnipeg:
The role of commercial fishers and their local knowledge
in decision-making.**

By

Joy MacLean

A Thesis
Submitted to the Faculty of Graduate Studies
In Partial Fulfilment of the Requirements
For the Degree of
Master of Natural Resources Management

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A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of
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Abstract

Lake Winnipeg and the issue of its declining health are at the heart of this research. At stake is not only the integrity of this ecosystem but also the substantial commercial fishery that depends upon it. Finding a solution to this problem involves a complex mixture of social, economic and ecological considerations. In response to such multifaceted questions there is an increasing awareness for the role of public participation in decision-making. In recognition of this, there is a move away from top-down governance to one that acknowledges the need for innovative approaches to governance as well as the role for the participation of non-state actors in decision-making. This type of participatory governance decentralizes power in order to permit citizens the opportunity to bring to bear their knowledge in the quest for sustainable solutions. One such source of knowledge is local knowledge. Accordingly, this research explores the local knowledge about Lake Winnipeg held by its commercial fishers and how that knowledge is included in the Lake's governance. This goal is pursued through the examination of four specific objectives that are: 1) to establish the sorts of local knowledge that fishers hold and the ways in which they gained this knowledge; 2) to identify what informal and formal governance processes already exist for participation of the fishers in the governance of Lake Winnipeg; 3) to determine by what means and to what extent this local knowledge has been shared in governance processes about the Lake; 4) to identify opportunities for the incorporation of the fishers' local knowledge into the governance of the Lake.

A qualitative approach was used to address the goals of the research and included literature review, a focus group with fishers, and interviews with fishers and government personnel. Analysis revealed that the commercial fishers possess local knowledge

extending across a broad range of topics from hydrology, ecology, weather, water quality and fish diet, habitat, behaviour and morphology. This knowledge was gained primarily through personal observation, but also from other fishers, scientists, and the media.

The more formal participatory processes in which the fishers became engaged have been limited to issues relating to the fishery. These formal processes included the Lake Winnipeg Fisheries Management Advisory Board, the Manitoba Commercial Inland Fishers Federation, and the Lake Winnipeg Quota Entitlement Review Task Force. In addition to these formal processes there was also a less formal network of contact between fishers and those in government and science. This network has involved fishers sharing their local knowledge about the fishery and, to a lesser degree, about the Lake's environment more generally. Taken together, these various processes have supplied, with variable success, some opportunities for fishers to share their local knowledge and influence fishery related decisions. However, the extent of their participation has been significantly impaired by a number of critical factors. Of these, the most detrimental barrier identified was a lack of meaningfulness and transparency in the key process, the Advisory Board. This, in turn, resulted in frustration, mistrust of government, and ultimately, withdrawal from that process. Reflecting on these problems, fishers made a number of recommendations including the creation of a co-management board and the use of interviews and surveys, public meetings, and collaborative research as ways to ensure that their knowledge is shared and that their concerns and recommendations are considered in meaningful ways that influence fishery and Lake-related decisions.

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Chapter 1: Introduction

1.0 Background

Located at the centre of Canada is a body of water known as Lake Winnipeg. Called Mistehay Sakahegan, the 'Great Lake' in Cree (Russell 2000), it is the tenth largest freshwater lake in the world (Herdendorf 1990) and is of great ecological, cultural and economic significance. It is home to a wide variety of aquatic life and to the creatures that populate its shores. It is also a place rich in Aboriginal and early settlement history and holds a special place in the hearts of people as a spectacular holiday destination and natural retreat. Add to that its role in providing drinking water to a number of lakeside communities, the fact that it sustains the largest commercial freshwater fishery west of the Great Lakes, as well as its hydroelectric capacity and it is easy to recognize this 'prairie ocean' as central to life in Manitoba.

Unfortunately, Lake Winnipeg's health has shown significant decline of late. Recent scientific research indicates that the Lake is currently suffering from a multitude of problems. Foremost among these is the eutrophication that is occurring as a result of nutrient enrichment. This problem is evidenced in increasingly frequent and intense algal blooms predominated by the blue-green community of algae (LWSB Report 2006), more correctly known as cyanobacteria. Through satellite images, these blooms have been seen to cover vast stretches of the north basin and points farther south (McCullough 2005). Eutrophication not only has the potential to cause fish kills through oxygen depletion, but it is already clogging fishing nets and impairing the aesthetic appeal of the Lake. As well,

some species of algae tend to make water treatment difficult, causing taste and odour problems in drinking water (Carpenter 2003). Further, the blue-green algae have the potential to produce both neuro and liver toxins that can be harmful when consumed by humans (Kotak 1998). The problem of eutrophication has a strong terrestrial link due to human activities in a drainage basin that includes approximately one million square kilometres stretching across four provinces and portions of four states. This is a basin that contains close to six million people as well as an extensive agricultural land use base (Brandson and Duguid 2005). More specifically, the nutrient enrichment is due to nitrogen and phosphorus (LWSB 2006) that come from both point and non-point sources throughout the Lake's watershed (Brandson and Duguid 2005). In addition to the excessive input of nutrients, two further factors are seen as contributing to eutrophication. The first is the regulation of the Lake for Hydro production that commenced in the mid-1970's. Specifically, it is thought that the practice of retaining spring and summer inflows for winter power production might interfere with the flushing that occurs in a state of nature. Consequently, nitrogen and phosphorus build up in Lake sediments. The second factor relates to the dam on the Saskatchewan River that has the effect of causing sediments to settle out of the water before entering Lake Winnipeg. This clearer, more transparent water allows greater light penetration that in turn stimulates algal growth (Brandson and Duguid 2005).

Historically, relatively little scientific study has been directed to Lake Winnipeg, with some research activity occurring in 1929 followed by another round of attention in 1969 (Brandson and Duguid 2005). As early as the 1970's a government report documented the presence of eutrophication and suggested the urgent need to address this problem "to

prevent further degradation of this important water resource” (Department of Mines, Resources and Environmental Management 1974, p. 9). But since that time the problem of eutrophication has become much more serious and several other non-nutrient issues have been identified. For instance, 1991 saw the introduction of a species known as rainbow smelt and in 2005 the release of water from Devil’s Lake, North Dakota into the Red River watershed raised grave concerns over the possibility of transferring other foreign biota into the Lake. There have also been warnings of the threatened extinction of the *Physa* snail that is thought to be disappearing due to its sensitivity to pollution (Brandson and Duguid 2005). Further, the presence of brominated flame retardants (Law et al. 2006) and persistent organic pollutants have also been detected. All of these factors, to varying degrees, have impaired the health of Lake Winnipeg.

Fortunately, over the last decade or so, a concerted effort to find solutions has been undertaken. Following the 1997 ‘flood of the century’, scientific research on the Lake resumed with the formation of the Lake Winnipeg Research Consortium. The research vessel, MV Namao, has served as a platform for multidisciplinary research that is carried out each year and involves studies spanning chemical, physical and biological parameters. A science workshop was held in 2004 with the goal of creating an integrated, ecosystem-based understanding of the Lake.

Long before any of these developments though, a commercial fishery was established on the Lake as early as the 1880’s (Tough 1984). Well over a century later, its recent annual returns average roughly \$20 million annually. This level of production, involving over 900 licenses, about 80% of which are held by First Nations or Métis (Brandson and

Duguid 2005), plus crew helpers, packers, shippers and processors (LWSB 2006) demonstrates clearly that Lake Winnipeg supports of a very substantial fishery. This fishery functions under a regulatory scheme where fishing licenses are owned pursuant to a transferable quota entitlement system that sets an overall quota on the Lake as a whole but permits flexibility in the redistribution of individual quotas. These quotas are multi-species quotas that include walleye (pickerel), whitefish and sauger. While the Lake's water quality continues to deteriorate, the commercial fishery - especially the pickerel fishery - is growing (LWSB 2006). However, the nutrient enrichment is also causing problems in the fishery due to the fact that the algae are becoming attached to fishing nets. According to Manitoba Water Stewardship, this very problem is one of "the most visible symptoms of nutrient enrichment" (LWRC 2009, p. 15). Further, a continued trajectory in fishery growth may not be sustainable as water quality declines to a point where it causes adverse effects (LWSB 2006).

The preceding description sets the stage and provides the milieu in which future decisions on the management of Lake Winnipeg will be made. This milieu involves not only finding a balance in the relationship between water quality and fisheries, but also concerns relationships between government agencies, non-governmental entities and the fishers as resource users. Given these facts, there are diverse and perhaps even competing concerns to be reconciled in determining overall management goals and the many decisions that may be involved in pursuing those goals. Such issues encompass a complex mixture of questions that blur the lines between society, economy and ecology. As such these types of issues arise within the realm of "social-ecological systems" (de Loë et al. 2009, p. 11). In response to environmental problems such as those facing Lake

Winnipeg, there is an increasing awareness for the role of public participation in decision-making (Troell et al. 2005). Indeed, one of the key ideas in the literature on environmental governance is the importance of moving away from a top-down approach to one that involves non-state actors in decision-making (de Loë et al. 2009). This approach recognizes that there are limits to scientific and technical remedies in water resource management and that a sustainable future requires taking human activity into account (Ramin 2004). This type of participatory governance embraces the decentralization of power to allow citizens the opportunity to bring to bear their knowledge in the search for solutions. Connected to this, it is recognized that many sources of knowledge are needed to facilitate effective governance and that no individual alone possesses the complete repertoire of knowledge (de Loë et al. 2009) or, as Ramin (2004, p. 7) stated, “no single perspective can be sufficient to give the whole picture”. One source of such complementary knowledge is local knowledge that is often accumulated over long periods of time and results in knowledge that possesses great depth and intimacy with a specific place. As such, it represents knowledge that has great potential to complement scientific research (McGoodwin et al. 2000) and thereby strengthen management decisions (Kalikoski and Vasconcellos 2007). The Lake Winnipeg Implementation Committee reinforce this position in pointing out the need for integration and good governance in their list of recommendations (Brandson and Duguid 2005). Further, the Lake Winnipeg Stewardship Board (LWSB 2006), in its report to the Minister of Water Stewardship urged the provincial and federal governments to create a plan to collect knowledge from commercial fishers and others and to integrate this with the current scientific understanding.

Indeed, consideration of local and traditional knowledge represents a significant gap in efforts to understand and manage the Lake. Brand and Karvonen (2007, p. 4) describe local knowledge as “aris[ing] from personal experience and exploration”. As well, Olsson and Folke (2001, p.87) describe local knowledge as “knowledge held by a specific group of people about their local ecosystems”. Brand and Karvonen (2007) also point out that the generation of local knowledge does not necessarily fulfil the requirements of the scientific method. Further, local knowledge of the environment generally exists in an unwritten, oral form (Fischer, F. 2000). As a way of knowing, it is distinguished from traditional ecological knowledge that possesses a continuous historical and cultural connection with the ecosystem (Robertson and McGee 2003). So, while local knowledge can span a significant number of years, such as a lifetime, it does not normally possess the temporal and cultural depth of traditional knowledge which is passed down from generation to generation. Traditional knowledge is defined as “a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission” (Berkes 1999, p. 8). Traditional ecological knowledge is also defined as “the sum of the data and ideas acquired by a human group on its environment as a result of the group’s use and occupation of a region over many generations” (Neis et al. 1999b, p. 218). In spite of these differences between local and traditional knowledge, there is some overlap. Local knowledge includes within it traditional knowledge as a type or “special case of local knowledge” (Berkes et al. 2001, p. 29). In contrast to local and traditional knowledge, the scientific paradigm “upholds a universal, objective reality that can be broken down into component parts by an ‘impartial’ and ‘rational’ observer, and then analyzed and acted upon” (Kapoor 2001, p.

270). Scientific knowledge is generated through research that is expected to stand up to the scrutiny of peer review. This means that it must “meet accepted standards of objectivity, completeness, reproducibility, accuracy, and precision.” (Bocking 2004, p. 165).

1.1 Purpose Statement

The purpose of this research was to explore the local knowledge about Lake Winnipeg held by its commercial fishers and to determine how that knowledge is included in the Lake’s governance.

1.2 Research Objectives

Given this purpose statement, the following objectives guided the research:

- 1) To establish the sorts of local knowledge that fisherman hold and the ways in which they gained this knowledge.
- 2) To identify what informal and formal governance processes already exist for participation of the fishermen in the governance of Lake Winnipeg.
- 3) To determine by what means and to what extent this local knowledge has been shared in governance processes about the Lake.
- 4) To identify opportunities for the incorporation of the fishermen’s local knowledge into the governance of the Lake.

1.3 Methods

Using a qualitative approach this research collected data through several activities. Initially, a variety of materials about Lake Winnipeg were reviewed. This included

histories, visual art, maps, government and academic literature. This was undertaken with the aim of gaining a well-rounded familiarity with and sensitivity to both the Lake's cultural and ecological aspects.

Following this preliminary work, a case study strategy focused on the commercial fishers of Lake Winnipeg who were selected based upon the expectation that they would be a rich source of local knowledge stemming from their high level of interactions with the Lake. Participants for this case study were identified through a variety of sources that included a focus group, Lake-related entities, and the interview participants themselves. The process began with a focus group meeting aimed at identifying broad categories of local knowledge and areas of participation. Face-to-face recorded interviews were then conducted with twenty people. The goal of these interviews was to gather information on themes and topics that satisfy the research objectives. In order to achieve reliability, all of the recorded interviews were transcribed, analyzed and thematically coded. The subsequent interpretation was supported with extracts from the data. In addition, several of the participants were asked to review their own interview transcript and advised me of whether it had been correctly transcribed.

1.4 Organization

The thesis is organized into seven chapters. Following this introduction, Chapter Two provides a review of the related literature. The methods for the study are established in Chapter Three. Chapter Four provides findings and discussion related to local knowledge. Chapter Five provides findings and discussion of the existing governance processes as well as the means and extent of participation therein. Chapter Six highlights

opportunities for the future inclusion of local knowledge in the governance of the Lake. Chapter Seven draws conclusions in relation to each of the objectives and summarizes recommendations for the improvement of fisher participation in issues related to Lake Winnipeg.

Chapter 2: Managing Our Water Resources

2.0 Participatory Governance and Public Participation

The term governance has attracted complementary definitions from a variety of scholars. A broad conceptual definition is found in “the processes by which societies make decisions” (Kreutzwiser and de Loë 2010, p. 208). Governance is also described as the ways in which affairs are managed by governments, corporations, individuals and institutions including both “formal constraints such as rules, laws, constitutions, and informal constraints such as norms of behaviour, conventions and self-imposed codes of conduct.” (Brandes et al. 2005, p. 10). In discussing the Mekong River Basin, Chomchai (2005, p. 181) observed “there is no necessary connection between public participation and governance”. Indeed, a conventional approach to governance, although sometimes seeking consultation with non-state actors, typically relies on state authority and regulation, with the power over decisions resting with government (Ramin 2004). However, governance that incorporates the input of civil society in decision-making is known as participatory governance as opposed to state-centric governance (de Loë et al. 2009). Participatory governance involves decentralized decision-making. Importantly, a transition from governance to participatory governance is seen as a way to improve decision-making processes. In other words, one of the factors that affects the quality of governance is determined by who is involved in making the decisions in question. Decisions that expand the range of actors involved are seen as stronger (Kreutzwiser and de Loë 2010). By bringing non-state actors into decision-making, participatory governance democratizes and decentralizes power. As such, it marks a shift in the role of

the state that, under the traditional model of governance, “advances the stated goals... top-down bureaucracies and positivist scientific expertise” (Ferreyra et al. 2008, p. 305).

This shift moves toward a participatory approach to governance and pushes government decisions and policies to be more transparent and accountable. Accountability, besides being a goal in itself, also provides a way to support the goal of participation (McCall 2003). Due to this shift, participatory governance entails creating a set of rules that can guide the relationships between government, the private sector and civil society (UNESCO 2006). This includes the notion of subsidiarity that advocates decision-making be devolved to the lowest organizational level that is capable and competent to undertake the task. This recognizes that local people are in the best position to respond to local environmental conditions (Brandes et al. 2005). Such devolution in the decision-making process marks a significant shift in power. Indeed, the concept of power is a central theme and the extent to which this shift occurs largely determines the qualitative differences between various participatory processes. Such differences influence the extent to which any given process reflects a genuinely participatory nature.

Participatory governance ranges from more meaningful involvement of non-state actors in decision processes to shared decision-making, such as public private partnerships. Consequently, participatory governance entails implementing public participation approaches and tools. To aid in understanding and assessing the different approaches to participation within the context of decision-making, various ladders, spectrums and other typologies have been developed (Bruns 2003; Warner 2007). The seminal model, however, is Arnstein’s “Ladder of Citizen Participation” (Arnstein 1969, p. 217). This

model delineates differing degrees of public involvement based on the extent of real power-sharing. These levels move from the bottom rungs of the ladder where public relations and manipulation are the goal (non-participation), to the middle rungs where citizens may be allowed to voice their concerns but with little or no impact on the outcome (tokenism), to the top rungs wherein the process actually involves the public in negotiations and decision making (citizen empowerment) (Bruns 2003). The crux of this model is to reveal the degree to which power has been redistributed.

Another way of analyzing participatory authenticity suggests that timing of participation is a key factor and can be divided into three temporally defined categories that include normative, strategic and operational (Diduck 2004). These relate to instances where the public have input in determining what should be done, what can be done and what will be done, respectively (Diduck 2004). Public participation at an early point in the process, the normative stage, is held to be desirable so that stakeholders can influence decisions in a meaningful way (Diduck 2004; Rault and Jeffrey 2008). Conversely, when the public is consulted late in the planning process, it can be implied that the agency involved may have already reached their decision in isolation from the views of the public (Shindler and Cheek 1999). The overriding message that arises from these evaluative analyses is that while some processes claim to be participatory they may, upon closer examination, only be window dressing or masquerading as such, instead of fulfilling a truly participatory function.

Beyond the question of how the genuineness or meaningfulness of participation are influenced by the level (Arnstein 1969) and timing (Diduck 2004) of participation as set

out above, there are also a number of principles and procedures that can influence the degree of meaningful public participation. Research by Stewart and Sinclair (2007) affirmed several key components that advance the goal of meaningful public participation. These include accessible information, the involvement of multiple publics, engaging involvement through a variety of approaches, establishing an open, two-way dialogue that creates a real ability to influence decisions, and the presence of integrity and accountability. In the effort to design better participatory processes, it is hoped that these well accepted points will be incorporated and put into practice (Stewart and Sinclair 2007).

In terms of defining what constitutes public participation, one approach is to focus on its objectives or functions. Accordingly, public participation can be defined as, “any process that involves the public in problem solving or decision making and uses public input to make better decisions” (Jansky et al. 2005, p.4). Indeed, the incorporation of civil society into decision- making is viewed as a key component of public participation (Chomchai 2005). However, there is ambiguity in the literature on a clear definition for public participation. Consequently, for the purposes of this thesis, I will adopt a working definition for public participation that covers three separate objectives ranging from informative and consultative participation to decisional participation (Rault and Jeffrey 2008). Traditionally, governance in resource management has sometimes included stakeholders by consultative means (Ramin 2004) as well as informative means. Such consultation was then used by the decision-making organization doing the consultation to reach a better decision (Sinclair 2002). Participatory governance entails decisional participation, or participation in helping to make decisions by having ample opportunity

to participate in the definition of the problem or in developing decision options either through meaningful consultation or through shared decision-making.

With these three participatory functions in mind, there are a variety of mechanisms or processes that may be employed to involve the public. These range from education and outreach activities, study groups and town meetings to citizen juries, multi-stakeholder councils, public hearings, advisory boards, mediated negotiations and co-management. These are only examples. In fact, public participation has experienced a proliferation in the variety of mechanisms created and Mitchell (2010) contends that partnerships between the public and private sectors as well as with Aboriginal peoples and other non-state actors will be needed in the future. Co-management is one type of such a partnership. While Mitchell (2010, p. 14) describes this arrangement as an “actual reallocation of power and authority to citizen groups and away from elected officials or technical experts”, Berkes et al. (2001), in describing fisheries co-management sets out a more graduated version of co-management as existing on a continuum. Under this conceptualization, power-sharing arrangements vary by degree according to the particular situation, leaving room for flexibility in their ultimate design and structure. Rusnak (1997, p. 3) also found a diversity of partnerships possible stating, “The term co-management... designate[s] a wide array of arrangements for shared decision-making authority between government, resource management agencies and community-based parties.”

2.1 Benefits of Public Participation

Bearing in mind that there are quite a variety of forms and mechanisms that are available to create public participation, its benefits are described in general terms in this section.

An increasing body of literature points to the need for public participation and multi-stakeholder approaches to water management, and provides ample evidence of its wide-ranging and multiple benefits. Before considering these benefits, it is important to underscore the fact that the move toward increased public participation is, to a great extent, a response to the failures of a top-down approach to governance. One of the overarching themes of this response is that citizens are increasingly unprepared to blindly accept the views and decisions of experts (Fischer, F. 2000). Clearly, the last several decades have seen a growing awareness of environmental issues (McMillan and Murgatroyd 1994), a resistance to environmentally questionable development (Kapoor 2001), and a dwindling of public faith in the ability of science and technology to adequately deal with these problems (Nowotny 1999; Ludwig 2001; Bocking 2004). Indeed, the unwillingness of citizens to defer to professional judgement is a driving force in the move toward public participation (Fischer, F. 2000). Viewed in this light, public participation is a necessary and appropriate systemic answer to a technocratic society.

However, quite apart from the public's rejection of the technocratic model, there are many more reasons to recommend a participatory approach. For instance, in the pursuit of good governance, broader stakeholder involvement is sought so that the problems can be viewed from multiple perspectives (Ramin 2004). This acknowledges the reality that water resource issues are found in a milieu that is shaped by a diversity of stakeholder values and worldviews that typify an increasingly pluralistic society (Ferreyra et al.

2008). This inclusive approach has been seen to result in significant benefits including its role in conflict resolution (Diduck 2004). With the ever-increasing intensity of water degradation and scarcity, and the potential for conflict that this mounting pressure creates, conflict resolution is a critical goal for participation. Public participation is also recommended as an approach that can provide not only a broadened range of potential solutions (Diduck 2004) but also better quality in the decisions ultimately reached (Bruns 2003; Diduck 1999; Pereira et al. 2003; Shindler and Cheek 1999). This stems from the fact that because water resource issues are complex and multi-dimensional, they benefit from the input of a multiplicity of views and voices that only cumulatively are able to capture this complexity. This includes “a widening of the policy network” as a new way of responding to the goal of sustainable development (Berkes et al. 2003a, p.134), or sustainability, which is defined as “a relationship between dynamic human economic systems and larger dynamic, but normally slower-changing ecological systems” (Brandes et al. 2005, p.11). Another way to conceptualize this is to appreciate that, since sustainability seeks to accommodate “the triad of [e]conomic viability, [e]nvironmental protection, and social [e]quity”, there are certain tensions present that benefit from open and inclusive discussion (Brand and Karvonen 2007, p.6). Further, the deliberative process of public participation generates a legitimization, or acceptance, of the ultimate decisions that are reached (Ramin 2004; Robertson and McGee 2003; Fischer, F. 2000).

Beyond the valuable gains achieved through public participation as enumerated above, the strengthening of democracy is also a major benefit. This reinvigoration of civil society can occur as citizens, through meaningful involvement, get an increased sense of ownership for their decisions, a heightened engagement in the issues (Brandes et al.

2005) and an enhanced sense of stewardship with regard to the resource (Mackinson and Nøttestad 1998). In the process, there is great potential for previously marginalized people to become enfranchised and self-interested perspectives to be transformed into shared perspectives (Warner 2007). This approach can yield a synthesis of diverse interests into a collective vision and strategy (Jansky et al. 2005). Further, the social learning that arises through this kind of participation can create common understanding (Warner 2007).

2.2 Criticisms of Public Participation

The goal of public participation is not without its detractors who point out that it presents certain challenges and shortcomings. For instance, some argue that the inclusion of large numbers of private actors is “messy” and “unrealistic” (Rault and Jeffrey 2008, p. 10). It is also criticized from the standpoint that it is inefficient due to the delays it creates (Diduck 1999). Still others assert that public involvement is ill conceived because it allows people who may be poorly informed on the issues to make decisions. This is essentially a criticism concerning capacity. Another point of concern is that local interests might be self-serving and therefore detract from efforts that are more collectively beneficial (Jansky et al. 2005).

2.3 Public Participation and Local Knowledge

A discussion of public participation would be incomplete without a more detailed look at the interface that exists between it and local knowledge. There are many ways to explain the role of local knowledge in public participation. The first can perhaps best be explained in terms of an ethical rationale. That is to say that stakeholder involvement and

the incorporation of local knowledge into resource management is advanced from an ethical point of view (Pereira et al. 2003). This is the idea that “[w]e must acknowledge the importance of ethics and social justice in environmental problems. They cannot be resolved without the participation of those most affected” (Ludwig 2001, p. 763). The people most affected are the local people who are impacted by the decisions involving the resources in question. Public participation involves deliberation on the issues of pressing concern to such stakeholders (Fischer, F. 2000). On a fundamental level, local input is essential in these circumstances because, “Conservation planners come and go. So do the politicians they generally report to. On the other hand, the dreams for making a community a better place are born in a community and must reside there.” (Diduck 2004, p. 500). This statement makes clear the notion that an authentic concern in local matters resides in local people thereby vesting in them the right to participate. This necessitates a shift in resource management processes away from the expert to include grounding in community life (Kapoor 2001) and sets the stage for the inclusion of local knowledge.

Beyond this ethical rationale, there are many ways in which local knowledge contributes positively and demonstrably to understanding and resolving resource management issues. At one time dismissed as merely anecdotal and unreliable, local knowledge has come to be viewed as capable of contributing to scientific information (Mackinson 2001; Nursey-Bray 2002). Fischer, F. (2000) asserted that science itself is built upon the foundation of traditional knowledge that gave birth to such developments as agriculture, astronomy and architecture – all occurring before the arrival of modern science. While local knowledge does not lend itself to numerical modelling (Mackinson 2001) or spreadsheets (Mackinson and Nøttestad 1998) because it concerns itself with qualitative

understanding, as opposed to quantitative data (Berkes and Folke 2002), local knowledge has been recognized as a rich source of information that has often been overlooked. People such as fishers and hunters interact with the environment and depend on natural resources for their livelihood. As a result, they accumulate local knowledge that can complement scientific knowledge (Berkes and Folke 2002). This has proven to be the case as local knowledge supplies information on questions as diverse as fish distribution and abundance (Bergmann et al. 2004), spawning locations and currents (Johannes & Neis 2007), the health of beluga whale populations (Manseau et al. 2005), hydrological changes to wetlands (Robertson and McGee 2003) wildlife conservation (Fischer, F. 2000), sea ice changes related to climate change (Nichols et al. 2004), and crayfish habitat characteristics and ecosystem dynamics (Olsson and Folke 2001).

As well, where scientific data sets are not available on a long-term basis, local knowledge may be the only source of information on historical changes (Robertson and McGee 2003). This is relevant in the case of Lake Winnipeg that has been the subject of only intermittent scientific study occurring sporadically in 1929, again in 1969, and then many years later in the mid-1990's (Brandson and Duguid 2005). Further, local knowledge can assist science by producing baseline data, by aiding in formulating research hypotheses, by providing community-based monitoring and by demonstrating options for adaptive behaviour (Nichols et al. 2004). One of many examples that detail the rich source of knowledge represented by local knowledge, Olsson and Folke (2001) found that the local resource users in Lake Racken, Sweden understood the crayfish population not only at the level of the individual crayfish but also at the watershed level. This was evident from the variety of management practises implemented there. Further, the fishers' management

was also found to be sensitive to changes in the ecosystem and incorporated trial and error strategies as well as scientific information (Olsson and Folke 2001).

As evident from the foregoing, local knowledge is well equipped to empirically complement science and to fill scientific gaps. But it can also provide an alternative way of understanding nature (Fischer, F. 2000). On this point it is stated that, “[r]ecognition of the importance of experiential knowledge is the basis of the paradigm of adaptive management of complex ecological systems.” (Olsson and Folke 2001, p.86). That is because local, experiential knowledge supplies the link between ecological and social systems. In this way it interprets and responds to perceived changes in an ecosystem (Olsson and Folke 2001), creating a feed-back loop and a dynamic, flexible capacity to adapt to change. By virtue of this dynamic, locally developed resource management systems constitute a sort of natural experiment (Olsson and Folke 2001). For this reason local resource management practices are valuable as a complement to conventional resource management approaches which have tended to neglect the linkages between social and natural systems (Berkes and Folke 2002). The practices and lessons of adaptive management, grounded in the interactions between social and natural systems, are part of humanity’s storehouse of knowledge that can be vital to contemporary management (Ludwig 2001).

Finally, local knowledge has a critical role to play in resource management policy development. This is because although policies involve a technical component, they are also driven by normative considerations (Fischer, F. 2000). Related to this, Nowotny (1999) suggests that scientific knowledge needs to become more socially robust. The

inclusion of local knowledge holds the potential to create such social robustness. With this goal in mind, it becomes essential to gather the understandings and intentions of the local people in any given context in order to develop and implement policy that fits the particular social setting (Fischer, F. 2000). Through this type of inquiry, knowledge loses its universalistic quality due to an emphasis on more context-sensitive knowledge (Nowotny 1999). This illustrates how local knowledge is of central importance in furnishing the normative and contextual foundation upon which to build appropriate policies. In fact, the synthesis of public values into decisions has been identified as one of the main social goals of public participation (Beierle and Cayford 2002)

2.4 Entities Involved In Lake Winnipeg Issues

Under the Constitution Act of 1867, there is a division of powers between the federal government and the provincial governments in Canada. Their respective jurisdictions are sometimes separate and distinct, but in other instances are shared and overlap. This has created a great deal of complexity and ambiguity in sorting out where the various powers reside (Mitchell 2010). However, concerning powers relating to water and fisheries, in general terms federal areas of jurisdiction apply to flow regulation, water supply, pollution control, hydro development, navigation and fisheries. Environment Canada, under its Federal Action Plan for Clean Water introduced the Lake Winnipeg Basin Initiative in 2008. An important commitment under this plan is to establish a Canada-Manitoba agreement to provide a collaborative approach to Lake Winnipeg. The federal Department of Fisheries and Oceans (DFO) has as its mandate the conservation and sustainable use of Canada's fisheries resources. Pursuant to the Natural Resource Transfer Agreement of 1930, Manitoba controls the use and allocation of fish in Crown

(Manitoba) lands. While Canada retains legal authority and responsibility for fish and fish habitat conservation (Fisheries Act, Canada), some of the day-to-day management of fisheries regulation has been delegated to the province. Further, because fish are provincial property, the province, under The Fisheries Act (Manitoba) governs matters related to licensing, as well as to the transportation and marketing of fish. With regard to water, Manitoba has authority over water quality, water conservation, permitting, supply, flooding and drainage. In 2003 the Province of Manitoba created the Ministry of Water Stewardship, introduced the Lake Winnipeg Action Plan, and established the Lake Winnipeg Stewardship Board to assist the government in implementing this plan. This board has sought the public's advice through public meetings and hosted a scientific workshop in 2004 to develop ecologically relevant management objectives (LWSB 2006). As well, The Water Protection Act (Manitoba) empowers Conservation Districts and other organizations to become water-planning authorities that can develop watershed management plans.

More recently, in 2007, Manitoba created a senior advisory board called the Manitoba Water Council which is intended to oversee other advisory entities, monitor watershed management plans and act as a consultative mechanism for province-wide plans. This Council is tasked with creating consensus on the management of water quantity and quality. In addition to these initiatives, there are numerous non-government organizations involved vis-à-vis Lake Winnipeg. These include the Lake Winnipeg Research Consortium, the Red River Basin Commission, the International Institute for Sustainable Development, the Lake Winnipeg Foundation, the Manitoba Eco-Network and others

(LWSB 2009). As is evident from this list, there are several groups that are taking an interest in this issue.

Related to this diversity of interest in the Lake's issues and the challenge for coordinating the efforts of these various groups, the Lake Winnipeg Implementation Committee (LWIC) was jointly appointed in 2005 by the governments of Manitoba and Canada to advise them on how best to proceed in a joint effort to restore the health of the Lake by co-ordinating an agreement to "identify joint priorities and funding sources" (Brandson and Duguid 2005, p.10). Of particular relevance to the goal of governance, the LWIC, in one of four major categories of recommendations, underscored the need for better coordination of efforts and for formal integration. The LWIC suggested that these goals could be achieved through a Healthy Lake Winnipeg Charter. Closely tied to this recommendation was the acknowledgement that the Lake's issues are complex and that those interested represent a wide variety of views and interests (Brandson and Duguid 2005). In their recommendation to improve integration, the committee drew attention to the fact that there is a necessity of creating participatory processes that involve interested citizens (Brandson and Duguid 2005). Certainly, the Lake's worsening condition combined with the strong case for the role of public participation in securing improved resource management decisions and environmental sustainability, prompts a view that a participatory model is warranted, if not overdue.

The implementation of this participatory approach can be optimized by the presence of certain desirable characteristics. Among these characteristics is that key stakeholders be involved and that their participation is wholly legitimate (Diduck 2004). The Lake's

commercial fishers possess these characteristics. This is so because, as a group, the commercial fishers derive their livelihood from the Lake and consequently their social and economic well-being is directly dependent on the beneficial management of the Lake. By virtue of these facts they satisfy the sought-after characteristics of a participatory approach. In addition to their place as key stakeholders in the Lake's management policies, the commercial fishers are selected as a group due to the expectation that their level of interaction with the Lake will supply a quantity of local knowledge that will exceed the local knowledge possessed by groups such as cottagers or sailors whose contact with the Lake environment is not likely to be as close or regular. People whose livelihood involves their interaction in an ecosystem gain an understanding of that environment (Berkes et al. 2003b). The value of fisher's knowledge is widely recognized in the literature, as is the need to improve the collaboration between scientists and fisher's knowledge (Mackinson 2001). It is thought that this will benefit "the credibility of fisheries science but also enhance the support for any regulation that may be based upon it" (Bergmann et al. 2004, p. 374). These points are apt in the case of Lake Winnipeg. In describing the need for ongoing scientific research and the presence of important knowledge gaps, the Lake Winnipeg Stewardship Board in its report to the Minister of Water Stewardship expressed the need to gather and integrate local knowledge into the science on the Lake (LWSB 2006).

2.5 Summary

It is against the environmental and institutional backdrop described above that the role of the fishers in decisions about the management of the fishery and the Lake is set. In order to advance the sustainable management of the fishery and the Lake more generally, it is

imperative to gain a solid grasp of the actual and potential function their local knowledge and participation play in these important goals. Furthermore, from a broader perspective, “there is much need for comparative studies and sharing of experience” (Mitchell and Shrubsole 2007, p. 436). By harvesting experience in this way, the lessons of successful models can be adapted to different contexts and brought to their full potential in equitably and sustainably managing our water resources (Olson 2002).

Chapter 3: Methods

3.0 Introduction

As set out in Chapter 1, the aim of this research is to discover the sorts of local knowledge that Lake Winnipeg's commercial fishers possess and what role that knowledge has, and potentially could have, in supporting the governance of the Lake. A number of qualitative methods were employed that included a literature review, a focus group, as well as individual interviews with fishers and government personnel. Each of these steps is described in more detail below.

3.1 Case Study Strategy

The qualitative research strategy I employed was a case study that focused on Lake Winnipeg's commercial fishers. There were several reasons for my choice of this group for the case study. As established in Chapter 2, it was anticipated that fishers possess a significant amount of local knowledge about the Lake. Second, in keeping with the goals of governance, it is appropriate to include their views in order to reconcile their interests with the overall goal of the Lake's sustainable management. Since their livelihoods are directly impacted by decisions concerning the Lake, they should be involved as interested stakeholders. Further, good water quality in the Lake is key to a healthy fishery. The commercial fishers' interest in this goal coincides with the interests of other users of this resource such as those who rely on it as source water. The involvement of the fishers has the potential to enhance such parallel benefits.

3.2 Secondary Sources

I began my research by conducting a review of relevant public documents including historical, government and scientific sources related to the Lake. My rationale for this approach was threefold. First, it provided me with context for the research and this helped me to prepare for and ultimately understand the interviews better. Secondly, I hoped that participants would appreciate the fact that I was knowledgeable about this background material and that this in turn would help to create rapport between us. Thirdly, this secondary, written information had the potential to provide some form of triangulation with the facts elicited through the interviews and could thereby strengthen the reliability of the data.

Examples of secondary sources that I reviewed include:

- 1) Lake Winnipeg Science Workshop (Ayles et al. 2005)
- 2) Restoring the Health of Lake Winnipeg (Brandson and Duguid 2005)
- 3) A Profile of Manitoba's Commercial Fishery (MWS 2008).
- 4) Mistehay Sakahegan: The Great Lake (Russell 2000).
- 5) The Establishment of a Commercial Fishing Industry and the Demise of Native Fisheries in Northern Manitoba. (Tough 1984).

3.3 Focus Group

A group of five fishers participated in a focus group that was held in Gimli. These participants were identified with the help of:

- 1) The Managing Director of the Lake Winnipeg Research Consortium.

- 2) The Outreach Coordinator for the Red River Basin Commission.
- 3) Personal acquaintances in the fishing community.

Through these people I identified fishers who had knowledge and experience of both the Lake and participatory processes relating to the Lake. While this possibly created a degree of bias - by excluding from the focus group fishers who have not had a participatory role – it was nevertheless warranted to ensure that focus group participants were able to contribute to the focus group exercise covering both aspects under consideration. Further, the added degree of homogeneity in the focus group that this established was expected to promote the ability of participants to talk to each other and compare their experiences and, as a result, to demonstrate the extent of their consensus (Morgan 1997).

I moderated the focus group exercise. My approach was fairly structured since there was a pre-existing agenda for this research (Morgan 1997). This approach permitted me to gain background knowledge and to generate general interview topics based on the focus group discussion. Accordingly, the focus group exercise followed the format set out in Appendix A (Focus Group Guide). As such, it involved asking the participants to discuss the general areas and content of their local knowledge and their participation in the Lake's governance both past and present. This discussion connected directly to all four of the research objectives listed in Chapter 1, as far as practical.

Data collected during this group exercise relied on the use of an audio recording. In addition, I made use of flipcharts during the discussion. The flipcharts created a written outline of points that augmented the audio recording. They also served as cues to prompt

and focus the discussion. I subsequently reviewed the audio recording and made detailed handwritten notes on them. This focus group information provided me with an outline of local knowledge and participation topics that helped me prepare for the individual interviews.

The focus group participants recommended 32 fishers who they thought were very knowledgeable about the Lake and who could therefore participate as key informants in the individual interviews. I was able to arrange interviews with 14 of those 32 referrals.

3.4 Interviews

The bulk of the empirical data was collected using in-depth, face-to-face interviews that were audio-recorded using a small digital recorder. Before beginning each interview, a Consent Form, attached as Schedule D, was reviewed and the interviewee's signature obtained. In total, 20 such interviews were conducted ranging anywhere from one to two hours in length. The interviews fall into two main categories: 18 interviews with fishers and 2 interviews with government personnel. My focus differed between these two categories. When interviewing fishers, my focus was on gathering data on local knowledge and participation, whereas interviews with government focused more heavily on the participation aspect. Accordingly, I will deal with these two groups separately.

3.4.1 Fisher Interviews

As mentioned above, 14 of the fisher participants were referred by the focus group participants. A scientist doing research on the Netley-Libau Marsh referred one additional participant. Further, at the close of each interview, each participant was asked for names of other fishers they thought to be knowledgeable about the Lake. Of the many names

generated in this manner, three more participants were interviewed, bringing the total to 18. Unfortunately, two of these 18 interviews could not be used. In one instance the participant's health interfered with his memory and in the other instance there was technical trouble with recording. So from here on when I mention the fisher interviews or fisher participants, it will be with reference to only those 16 interviews that were usable for the purposes of this research.

Five of the participants were First Nations people. Before commencing these interviews, I offered each participant a pouch of tobacco as an expression of respect and appreciation. This gesture was made so that the research would be conducted in a culturally appropriate way (Castellano 2004). A preliminary step with all the participants involved reviewing the consent form and obtaining their signature. Then interviews began with asking the participant to give a brief history of their career on the Lake including the years and areas fished. In conjunction with this question, I displayed a map of Lake Winnipeg that both the participant and myself could refer to. The map was overlaid with a clear mylar sheet. Coloured markers were on hand and participants were invited to mark the areas of the Lake they knew as well as to illustrate their explanations. The map itself was a valuable visual aid with every participant making many references to it as they spoke.

The focus of the interviews centred on eliciting the sorts of local knowledge that the Lake's fishers gain on a day-to-day basis. This was done in a semi-structured way, with a set of questions at hand but with the flexibility to depart from these questions in order to create questions that followed the participant's direction and narrative. My decision to take this approach was in order to allow participants to begin with a topic of local

knowledge that they were comfortable with and knowledgeable about. The interview proceeded from there with me following their lead and developing the interview in a responsive manner. This open manner allowed discussion to enter areas that I had not anticipated. I also took some written notes during the interviews to highlight statements that I wanted to follow up on later in the interview. A majority of the interviews took place in the participants' homes although it was sometimes necessary to arrange an alternate meeting place. The Fishers' Interview Guide is attached as Appendix B.

3.4.2 Government Interviews

As stated earlier, two government interviews were conducted. While both of these were planned to be with one individual, both times I was asked for permission for a second person to attend. I agreed to these requests. So, in effect, while only two interviews were conducted, a total of four people were interviewed. All of these participants were employees of the Fisheries Branch of Water Stewardship. As with the fisher interviews, these were conducted in a semi-structured manner with the goal of collecting data on key points such as finding out how participants saw fishers' knowledge contributing to the Lake's governance in general and to elicit concrete examples of when this has occurred. Interviews were conducted in person at the participants' offices and were audio-recorded. The Government Interview Guide is attached as Appendix C.

3.5 Site Visits: Fishers

At the close of the first several interviews with fishers, participants were asked if there were places that they referred to that they would like to show me to give me an opportunity to better understand the content of the interview. I discontinued this question

because, for different reasons, it became impractical to follow through on. In any event, of those I did ask, three suggested either taking me out fishing or visiting a certain place along the Lake. Actual arrangements were made with only one fisher. However, high winds prevented us from going out on the day planned.

3.6 Data Analysis

My first step in this process was to transcribe the recorded interviews. I completed this task with the assistance of software called Guitar Rig II. I then reviewed the transcripts with the aim of getting a general sense of content and predominant themes. Through this process I created many *a priori* codes to use in analyzing the data. The next analytic stage of the research involved coding the data. I used software known as TAMS (text analysis mark-up system) to assist me with coding and analyzing the interview data.

3.7 Data Verification

With regard to the focus group, I followed up by sending two participants a summary of the group discussion and asked them to indicate whether or not it fairly captured the discussion. They responded that it did. With regard to the interviews, I provided three, randomly selected interviewees with copies of their own particular transcript and asked them to indicate whether or not they found their ideas were accurately recorded. All three participants responded favourably that the records were accurate. Such reviews with the participants acted as member checks. This, along with triangulation of the data with document review and between data gained through interviews, was an important step in verifying that my work was accurate.

Chapter 4: Fishers' Local Knowledge of Lake Winnipeg

4.0 Introduction

The aim of this chapter is to report the sorts of local knowledge that Lake Winnipeg's commercial fishers hold. By 'sorts' of knowledge is meant general categories of knowledge. To use a fishing metaphor, this is the data that can be caught in a researcher's 'large mesh net'. I relate the complete range of knowledge categories uncovered in order to demonstrate the scope and breadth of this knowledge. Interwoven with the description of these categories of knowledge are actual examples of data - excerpts from interviews - that illustrate and add substance to them. Using the previous analogy, this is the data that reveal themselves in a 'smaller mesh net'. This more detailed data includes not only the fishers' observations, but in some cases also includes their interpretations, or hypotheses, of their observations. Further, often embedded within these statements are pieces of information that pertain to fishers' attitudes, values and concerns. It is hoped that this inclusive approach will not only convey the range of existing local knowledge but also impart the surrounding normative aspects, thereby laying the groundwork for the subsequent chapters dealing with governance.

With regard to drawing a distinction between local and traditional knowledge, while five of the interviewees referenced throughout this and subsequent chapters were First Nations people, their verbatim excerpts are not identified as such. This is because, based on the data, it is not possible to distinguish their knowledge from local knowledge as those terms are defined in Chapter 1, and the respondents themselves did not indicate that

any of the knowledge they were sharing with me had been passed to them through the generations.

It has been said that the spatial and temporal scale of local knowledge in fisheries can rival and exceed that of scientific knowledge (Neis and Felt 2000). My interviews with sixteen of Lake Winnipeg's commercial fishers certainly support this view. In fact, of the sixteen fishers, nine had been on the Lake for fifty or more years. Several of them even had careers that extended as far back as the late 1930's and early 1940's. Taken together, the cumulative years of experience of these sixteen fishers surpassed 750 years. In terms of spatial scale, by the time the last interview was concluded I had heard about places extending from the mouth of the Red River in the south to Warren's Landing in the north as well as a long list of the fishing locales in between. In other words, their combined fishing experience spanned the entire Lake.

4.1 Fish

4.1.1 Fish Behaviour

One of the areas I inquired into was fish behaviour. Several fishers pointed out that it is difficult to actually observe fish behaviour because the fish are generally out of eyesight. In spite of this, they were able to provide ideas that were based partially on observation and that were also inferred from what they caught. Their knowledge of behaviour related mainly to feeding, spawning and migration.

Some specific examples of knowledge of fish behaviour included where particular species can be expected to be found in the water column, that certain species inhabit territories distinct from where other species are found, that seasonal changes in water

temperature and daylight influence feeding activity, that fish congregate over sand bars where the food is plentiful, that fish move to different depths of water in order to regulate their body temperature, and that the spawn gestation period retards fish activity levels.

And that seems like when the fish they quit eating and they're going into semi-hibernation like. I think that's when their eggs are developing. Like in the pickerel I'm talking about. That's when their eggs are developing. And you'll notice if you catch fish in February there's hardly anything in their gut. Even in March. And March is when the fish really start to get active. And the reason they get active in March is the days are so much longer. There's so much more light. And you'll notice the last week of March, you'll see a big improvement in your fishing and that's when they're getting ready to start looking for a place to go spawning. (Interviewee F13)

4.1.2 Fish Diet

Much of the knowledge held on fish diet was species specific. In many cases mention was made of the task of cleaning fish and finding what was in their stomachs. Knowledge of the species-specific diets included such things as the presence of pickerel and maria cannibalism, that pickerel are eating a lot of the introduced rainbow smelt, and that the addition of rainbow smelt as a food source has resulted in the fish that prey on them growing at a faster rate. Another observation pertained to the impact fish diet might have on regulating fish numbers. This is reflected in the following two quotes that revolve around the idea that an observed decline of marias may explain the abundance of other fish species.

I think that one of the major, one of the contributing factors to the amount of fish we're having right now is we used to have quite a significant burbot population in the Lake, marias. And all of a sudden, they're absolutely gone. Like you'd get 100 to a net at Grindstone and the last few years they just seem to have disappeared. And their main food is the tullibee which is also the main food of the pickerel in the south basin. So their disappearance... there seems to be lots of feed around for the pickerel. And that's again, just my observation. But no maria - who's

eating the tullibees? Well how come there's lots of pickerel around? (Interviewee F7)

And I think now they talk about all the fish in the Lake are getting more and more and maria's a bottom-feeder and I think they used to clean up on all the spawn. I think that's one of the reasons... That's my theory but I don't know what anybody else... (Interviewee F11)

Many other observations of fish diet were described in general terms without reference to fish species. Fishers commonly named such food sources as fish fly larvae, smaller fish, and bugs and plant material that wash into the Lake from the creeks and rivers. However, even for someone who fished the Lake for 60 odd years there was the occasional surprise.

I got a surprise one time. We're out here and we got a few marias, right? And there were kind of ridges in their stomachs. Like, you know? I thought, what the hell has got in their stomach? So when we were finished lifting that gang, I told the guy to hang onto a couple of those marias and we would cut them open... 30, 40 crabs! Twenty miles from land any place... That's the only time that I got them. And every maria was just loaded. (Interviewee F8)

This type of extraordinary observation – arising only once over a long span of time – seems to reinforce the notion that the broad temporal extent of fishers' knowledge is something that may not be possible through scientific observation which tends to be temporally and spatially limited (Johannes and Neis 2007).

4.1.3 Fish Cycles

The fishers' recognition of the existence of fish cycles was widespread and their ability to recollect the fluctuating highs and lows across the various species through the years was remarkable. Many references to catches are made that identify the year of the catch and sometimes even the season of the year in question. Some of these references date back as far as the 1950's and 1960's. Fishers expressed a sense that when the fishing is great it

marks the peak in a cycle that will be followed by a downturn. In relation to this there is currently a general feeling that the most recent ten years or so has been an exceptionally long and productive cycle and will possibly end very soon. All in all, the following statement nicely captured the fishers' familiarity with cycles:

From experience, I know, that if there's lots of fish around you live in fear that they'll go. And when there's no fish around you live in hope. (Interviewee F7)

In conjunction with describing cycles, fishers typically made reference to their catch effort, quantifying the fluctuating stock in terms of the number of tubs per net caught. Very poor lifts over a span of time, connected to a low in a cycle, might amount to a 1/2 tub per net per lift, or about 30 to 50 pounds of fish. A very bountiful lift on the other hand might be in the order of 14 tubs per net, or 1400 pounds. Alternatively, cycles were also quantified by the number of nets or gangs of nets that a fisher would need to set on a regular basis in order to fill their quota. These work-a-day metrics of tubs and nets were second nature to the fishers and provided a tangible gauge of the availability of fish. Such information on changes in catch effort can be helpful in scientific stock assessments (Johannes and Neis 2007).

In addition to describing their own personal effort in producing a good catch, fishers talked about the level of fishing effort Lake-wide. A point of reference on this topic related to the fact that the Lake was closed to the fishery for a year in the early 1970's. Several fishers underscored the fact that historically the fishing pressure on the Lake dropped significantly from pre-closure to post-closure times. This was depicted variously. According to one there were about 154 active whitefish boats in the north basin around

1950 whereas today there are only 6 to 8 boats. Another said that Lake-wide there is only a fraction of the fishers operating compared with the numbers prior to 1970, and one fisher estimated 13 active boats in the Victoria Beach area compared with about 30 boats in the 1970's. Some fishers mentioned the changes in fishing pressure without relating it to changes in fish abundance, while others drew a direct connection between the two.

You know, there's more fish to be caught now in this Lake than in them days. Only the trouble was in them days that there was a lot of fishermen. There's no fishermen compared to what it was. Not compared. You know the Lake is not even used... (Interviewee F14)

Well, the decline in the fishery, say from about 1950 to 1970 when they closed the Lake. Of course, fishermen knew how much less fish they were getting out of the Lake and we had to use smaller mesh to get fish to make a living. I guess it's pretty well a fact. Well it is a fact. The Lake was over-fished. (Interviewee F1)

(Referring to high production) We don't know what's causing it, if it's just not enough fishermen on the Lake... (Interviewee F10)

When discussing cycles, a striking sub-theme emerged that focused on sudden changes in populations. These were either a dramatic drop off or, the opposite, a dramatic increase in the numbers of fish. Many of these turn-arounds were described as occurring 'all of a sudden'. Several fishers were able to attach a date to these sudden changes, pinpointing them in time. These events included the decline of sauger between the fall of 1949 to the spring of 1950, a steep decline of fish in general from 1967 into the fall of 1968, and an unspecified albeit abrupt decline in maria.

I've seen them marias so thick - you lift a net a get 400 or 500 marias out of it. And now you're lucky to see a maria or two a day. (Interviewee F11)

Sudden changes also included increases. Several fishers mentioned the tremendous amount of fish that were being caught upon the Lake's reopening following the closure of the fishery in the early 1970's in comparison to the meagre catches that were occurring before the closure.

And when they opened the Lake in '72 all of a sudden those whitefish are so thick in the north end... And the whitefish men that were fishing in 1969, the first day they set a bunch of nets and they had a hard time. The fish was so heavy all of a sudden, the whitefish, they had a hard time getting their nets up. They were used to hard-to-get fish. (Interviewee F1)

Fishers also recalled sudden losses of fish that were depicted as die-off events as opposed to cycles. Again, many of their descriptions included a lot of information such as the species, the location and the approximate date by decade. As well, all the events that the different fishers related were unique from each other. One such event was described as follows:

There was one year in those years, the Kenora went north and when it come back to Grand Rapids, around it and then sailed straight on the west side of the islands. ... was telling me they traveled one time for at least an hour, that's ten miles, with tullibeas floating on the water. Something killed them. That was in the '60's. (Interviewee F8)

The fisher who related this incident also pointed out that with a die-off event like this, you would only see the fatter types of fish whose density allows them to float on the surface and be seen, whereas heavier fish such as the pickerel would sink to the bottom where you would not notice them. Die-offs seemed to be something that the fishers found difficult to explain for the most part. However, one fisher had subsequently learned from

the Department of Natural Resources that a strain of bacteria was responsible for the carp die-off he had witnessed.

Another theme that related to cycles centred on stock distribution suggesting that certain areas of the Lake, as opposed to the whole Lake, had changed in terms of the species caught there. For instance, it was thought that the Frog Bay area was at one time predominantly sauger which had now been almost completely replaced by pickerel.

Another example describes the south basin of the Lake as historically containing some perch but not any significant amount of pickerel or sauger. One channel area fisher has observed the northward advance of a species of pickerel that he distinguishes by the shape of their heads. This example of local knowledge fits with what Neis et al (1999a, p.1950) found in that fishers can provide information on “spatial patterns in fish morphology”.

Yet another related theme described declines in specific species. There was a lot of data on the decline of the jackfish, tullibee, and maria. One person noted a marked decline of the bullheads and another observed that there were no longer mudpouts in the area where he fished. This is perhaps a good segue to the fact that when fishers discuss cycles they are also making comments about the Lake’s overall stock composition over a long time frame. One example that stands out is this observation on the sauger population.

In the 30’s everybody was wondering what a sauger was, there were only a few saugers in the Lake. Now there it’s loaded. (Interviewee F13)

4.1.4 Spawning

The fishers' knowledge relating to spawning fell into two main categories that included spawning behaviour and spawning habitat. But the data on these was so closely related that I have chosen to discuss them together.

By way of background, Fisheries Branch decides when to open the spring commercial fishing season. To do this it employs test-netting to monitor what percentage of the fish have completed spawning. Once it finds that the threshold of 80% of fish has spawned, commercial fishers are permitted to commence fishing. One of the factors in spawning is water temperature. The fishers are very well acquainted with this idea and know that when the water rises to a certain temperature in the spring, that acts as a trigger causing the fish to spawn. In the past, therefore, the opening date in the south basin was several days earlier than that in the north. This practice reflected the variations in water temperature toward the north where the winter ice cover generally remains longer than in the south. However, this staggered opening was contested by some more northerly fishers because, according to one, it was felt that by the time the north basin opened, the Freshwater Fish Marketing Corporation had already been flooded with fish. The view was that this put the northerners at a disadvantage vis-à-vis the market. Test-netting is still implemented, but for the past couple of years the spring fishery opens on the same date Lake-wide. Interestingly, one fisher pointed out that there are spatially fine-scale variations in spawning activity. The following quote describes his observation of such a variation.

There's a big difference, even. I know we were arguing over that because some guys were fishing in the bay south of Princess Harbour into Bloodvein Bay and

we were out on the north side there. And I was saying, like, they opened it the 1st of June there. And out where we were, hardly any fish had spawned in this area out here. But then one of the guys went down to Bloodvein Bay here and just about all the fish had spawned there. So I was saying to you, you know hardly any of these fish has spawned. Most of them are all full of spawn. And he said, oh, they're nearly all spawned. We were dressing there too. So I went and checked and his was, you know. They were only like a few miles apart. (Interviewee F5)

This fisher was gesturing at a map of the Lake when he explained this and the two places being compared were east and west of each other, not north and south. He subsequently suggested that the different depths of water in the two places might explain the discrepancy in spawn completion.

Fishers' knowledge on the topic of spawning was most often described species by species. In other words, there were specifics tied to a given species in terms of the season or month in which it spawned and its preferred type of habitat for spawning. For instance, the pickerel were understood to be spring spawners whereas the whitefish do not spawn until the autumn. Likewise, references to spawning habitat contained species-specific information about proximity to shore and depth of water. While the majority of the data was about the spawning locations of the most lucrative commercial species, there was also knowledge of spawning habitats of less desirable species such as the carp, sucker and mullet. One fisher's comment showed how this type of knowledge is valuable in order to avoid catching unwanted fish.

...the suckers come heavy into the shoreline to spawn in the spring. And they come so heavy it seems to me that they just crowd the pickerel out, eh. If you set more than one net away from shore - like one net is a hundred yards, 300 feet - if you set more than one net away from shore, the next net is going to have 8 tubs of suckers. And you don't want suckers. They're not even buying them at certain times of the year. There's no market on them, eh. (Interviewee F13)

Spawning habitat descriptions also contained details of the attributes fish seek.

Depending on the species in question, the conditions included substrate composition containing gravel, rock, shale, sand bars or reefs, as well as marshy areas.

The only one is the mullets that will look for more of a swampy area. The mullets and the northern pike I guess will head more to the creeks and more to the swampy areas but the pickerel, the walleyes, the saugers and the whitefish, the tullibees, they all look for sandy, gravel bottom, rocky shoreline. That's what they're looking for. (Interviewee F13)

Many of the fishers went beyond generalized descriptions of spawning habitat to name very specific places, complete with place names that they had personal experience with. Their knowledge also related to the duration of the spawn gestation period and of how places with currents are sought out by spawners. This latter behaviour was thought to occur because the current keeps the water fresh which in turn helps the spawn to hatch. One elder fisher offered a unique observation of sex-specific spawning behaviour. Referring to the pickerel, he said that he observes that the males come into the spawning area well ahead of the spawning season.

And what I think of spawning, the walleye go; they go to find their spawning area in the fall or the winter. Because in the spring time, let's say... I do a lot of angling and I do it all over... when I'm doing the angling, at the end of March it gets better and better and better up to the end of March. When angling stops, in this area here, it's full of small male fish. The male fish seem to want to go first for some reason. You'll catch more males. (Interviewee F6)

When I asked fishers about their sense of any changes in spawning habitat or any concerns they had in that regard, several different matters came up. A number of fishers expressed the concern that the hydrology of many tributaries was changing. These hydrological changes were a cause of concern because they presented a barrier to

migration, preventing access to spawning grounds. Sometimes these changes were man-made. Hydro dams were one obvious example. Another man-made change occurs when roads are built and culverts installed in a way that prevents fish from moving upstream into spawning places. At least a couple of fishers stressed the importance of fish ladders in addressing these hydrological changes. Likewise, natural hydrological disturbances were also observed: beavers were blamed for creating the same type of problem.

4.1.5 Migration

And as commercial fishermen know, if the fish don't move, we can't catch them. If the fish is just lying on the bottom, sitting there, we can't catch them because we can't make them move. You can set your net four feet in front of them. If he doesn't swim that four feet, you can't catch them. (Interviewee F15)

Many of the fishers expressed the idea that if the fish were not moving, then they could not catch them. Due to this fact, there is a relationship that exists between fish migration and landings. Because fishers are in the business of catching fish, they have a keen interest in knowing where and when the fish move and accordingly there are a lot of observations and hypotheses on this topic. It appears that fishers infer the occurrence of migrations from a confluence of the fluctuations in the quantity they are catching with when and where they are catching it.

...they would start seeing them come in from the north basin because the guys up north, further north would start getting pickerel before we did. (Interviewee F5)

And fishermen can catch them once they're coming back again in December. (Interviewee F13)

Fishers' ability to supply information on fish migrations "(through catch patterns)" has also been scientifically established (Neis et al. 1999a, p.1950). Many of the migrations

that were mentioned relate to spawning. The general habitats and the timing of those migrations were already outlined in the preceding section 4.1.4 on Spawning. This type of migration results in an annual ebb and flow of the various fish species into and out of their particular spawning grounds. Other seasonal migrations over large distances were seen to occur. Several fishers made mention of the north to south fall migration and the south to north spring migration that they see.

That's a given that the fish are going to make their round around the Lake - every three months, four months - that they're going to make a migration. You have a spring migration. You have one in the fall. Then they kind of go dormant. They're more moving slower. (Interviewee F16)

Well, you set your nets in September and you don't get very many fish. You need 12 nets to get about 3 tubs. But come October when the water is 12 degrees and 10 degrees, start getting colder, then you start getting a nice shot of fish. That's their coming back from the north again. (Interviewee F13)

Migrations over smaller distances were also observed and were thought to occur both summer and winter when fish moved into deeper water. In contrast to this view, one fisher expressed the idea that there was ambiguity in inferring (substantial) migrations from what is seen in the nets. He offered this alternate explanation which suggests fish simply sink to the bottom as opposed to moving to a new area.

So we have nets that we can set at different depths. We can fish right on top of the water. We can fish right down what we call two fathom – twelve feet – or we can fish right on the bottom or six feet off the bottom. We juggle our nets up and down. Last summer we fished alongshore here and say maybe up to a mile off the shore and I told my dad there I was going to run out 2 1/2 miles there and try at two fathoms. So what you would figure a little bit deeper water... So we bring our nets out to twelve feet and I catch fish there. So to sit there and say that fish take off and go into deeper water, well I don't believe that. I just believe that they sink down to the bottom and just sit there. (Interviewee F10)

Many of the fishers talked about several different environmental factors that have an effect on migrations. One of the key drivers was thought to be water temperature. Both rising and falling temperatures were seen as triggers for fish migrations. Further, interplay of air pressure, wind and currents is also understood to exert an influence in migrations. For example, at the time that I was interviewing one fisher, the fall season had opened but the fishing was slow. This fisher reasoned that this was because there had been nothing but south winds for a while and that what was needed to bring the fish into the area was a high-pressure system that would create a north wind and current. He went on to explain why this affects fish movement by illustrating that with a north wind on the Lake the fish can move toward the south more easily.

Pushes the water, underneath makes the current. This water from here, it all comes rushing through here. Right here it will form a big northwest wind to a big southeast wind. Water - 5 to 6 feet difference. That's a lot of water. That's how currents are created....It affects the fish. The same with a big wind when the geese are going south. You don't see them buck the wind. Some of them do. But there's a northwest wind and they're all going. Fish - same thing. (Interviewee F6)

A second fisher gave a very similar explanation, even using the same analogy of geese migrating with the wind. Another fisher explained how wind levels affect whether fish migrate into shore or not. The general rule that he followed was that a lack of wind inclined the fish to migrate into shore whereas if there was a lot of wind the fish would move offshore. He suggested that their preference for being offshore on windy days might be explained by it being less turbulent away from the shore.

Some of the fishers thought that there were some significant migrations of fish into Lake Winnipeg from some of the smaller surrounding lakes. These were thought to occur in

high water years or during flooding events that resulted in otherwise unconnected water bodies flowing into Lake Winnipeg. The sudden appearance of exceptionally large fish was taken by one as providing evidence to substantiate this theory.

I think that to start with these fish came in from somewhere when we had real high water in the spring. They weren't all raised in Lake Winnipeg I don't believe. About, I'd say, six years ago we were catching pickerel at Princess Harbour and in the spring season we got several that was over 20 pounds. And I'd never even heard of a pickerel that was that size before. But we weighed in several of them that were over 20 pounds. And we're not getting them now. We're getting still big ones but not that size. But I can't recall exactly the year but I know when we were... probably around 1990 or something in that area. I think they came in from somewhere landlocked before. They came in from the rivers because those big pickerel were not in the Lake either. We weren't getting them before that and nobody had ever heard of them. (Interviewee F5)

The Department of Fisheries at one time had a tagging program operating in which the fishers assisted by turning in any tagged fish they caught. Several of the fishers had either themselves caught tagged fish or knew of tagged fish being caught. The tagging effort resulted in many fishers seeing further indications that fish were migrating, sometimes over very large distances and in surprisingly short times. Not only were the fish known to migrate within the Lake, but one fisher himself collected a sturgeon in Travers Bay that was tagged in Minnesota.

Although not explicit, there were a number of statements by fishers that lead to the notion that there is something happening in recent times that may have a bearing on how clearly defined migrations are, or are not. Specifically, it was implied in various ways that the high abundance of fish that has been seen over the last number of years might actually obscure what were, in other less productive times, clear migrations. This may be explained by the fact that, because the fish are so prolific and, therefore, more widely

distributed than was previously seen, it is more difficult to detect surges or declines in abundance which are interpreted as migrating stocks. In other words, the amplitude in the highs and lows of fish abundance has been reduced, thereby making it more challenging to notice when fish have moved. Although this is somewhat oversimplified, it is almost as though there are fish everywhere now. The fishers' own words best illustrate the point.

If you have nice calm weather in the fall, the big pickerel will come to shore. And there's so much big pickerel right now, none of these things really have any bearing. You just throw your nets out and they're full. But years ago, they would come to shore. (Interviewee F7)

Well, it seems to me now that there's been so much around all over. Like, all the way south here they're all the same thing and all the way north. It don't seem to make much difference where they go. There used to be areas and they come in... like, normally when we fall fished - like this season coming up - they would start seeing them come in from the north basin because the guys up north, further north would start getting pickerel before we did. And then they start coming a little further south. And as time got on then they'd come further south. I honestly think that... but now it's been so much that when they set it's unbelievable. (Interviewee F5)

4.1.6 Morphology

The fishers were well acquainted with what constitutes the normal size range for the Lake's fish. With this knowledge in hand they are also attuned to the influence that mesh size can have on fish size. One fisher observed that a move from a 3-inch to a 4 1/4-inch mesh has meant that the perch are growing to a larger size. On the other hand, one fisher thought that mesh size can cause fish to become smaller, a phenomenon known in scientific terms as tropicalization. While there is a range of legal mesh sizes that can be used, the size actually put into use, by and large, is the mesh that will catch the size of fish that commands the premium price with the marketing corporation. Many of the

fishers mentioned that they had never seen so many pickerel, or pickerel of such a large size as they were seeing of late.

Well, the pickerel are a lot bigger than I've ever seen in years past. We used to catch all little ones. That's all we used to catch. Never caught any big ones. (Interviewee F11)

Because it's a tremendous amount of big pickerel now. It's an unbelievable amount the last 2 or 3 years. (Interviewee F5)

Closely related to the large size of the fish being seen were comments about how the growth rate of the fish had increased. A variety of ideas were offered to explain this enhanced rate of growth: the introduction of the rainbow smelt as a new food source, nutrients entering the Lake, and agriculturally based growth hormones were all suggested as possibilities. As well, several fishers mentioned an increasing fat content in the pickerel. It was observed that this results in it being a greasier fish to cook, that it gives a stripe up the fish's belly, that it causes frozen fillets to taste fishy after time, and that it has changed the shape of the fish by making it bigger around relative to its length.

The fishers also possess knowledge about fish shape. One fisher who had experience fishing whitefish distinguished between whitefish which had a 'hump back' and those which did not. Another fisher observed, based on shape, separate sub-species of pickerel between the south and north basins.

I see some of these small ones... you can identify them... they've got a little different head on them. (Interviewee F5)

It appears that fishers also pay close attention to whether the size structure within the stock is comprised of 'smalls', 'mediums' or 'larges'. These size categories are very important to fishers as market demands favour one size over another. Many of the fishers spoke about the relative absence of 'smalls' in recent times followed by observations of their currently rebounding numbers. It is also quite clear that fishers are aware of the range of fish sizes existing besides those that the market is calling for.

But you see even the numbers that you use on the Lake; they're very deceiving because most of the numbers come out of the commercial harvest numbers. To give you an example: this spring Freshwater Fish needed small fish. So what they did is they made the small pickerel and the saugers, they were worth about 50 cents more a kilo than the bigger fish. Their idea was they needed another 400,000 kilos. And actually when I talked to ... that spring and we had talked about this. And I said, oh you need 400,000 this spring. And he said no over the whole year. And I laughed because I said well you're going to get way more than that this spring. You do realize that? And he said well they didn't think so. And I said well what makes you think not? This is the Marketing Corporation that should have done some homework. But he says well there's no, the saugers have been down. I said well who told you that? Well, the numbers say that we haven't been catching them. I said, I don't care what your numbers said. You haven't paid anything for them. That's why you're not catching them... (Interviewee F15)

A final area related to fish morphology relates to observations of abnormalities. Some of these were described as tumours or growths. Such diseased areas were seen either while landing the fish or when it came time to dress the fish. Most of the observations that included a reference to a particular species, referred to either sauger or pickerel. Several descriptions of these growths emerged, the most graphic being 'pure white rotten like an abscess', While some fishers did not see an increase in the occurrence of tumours and were not concerned about it, others had observed a noticeable change for the worse. One way this negative change was described was by indicating the increasing frequency with

which it is seen, an example being the number of fish per given quantity of fish caught that would have a growth or the number of abnormal fish caught in a season.

You get more now. Then you'd get the odd one in your net. Now you get lots. Like doing a season you might get 20 when you might have caught one. (Interviewee F6)

Another means of describing the seriousness of the problem was to describe how an affected fish would exhibit more lesions than previously seen on a single fish.

It's been there all the time but you'd just get a small, little growth. Now they're all over, like all over the gills and the back. (Interviewee F4)

Fishers also described non-tumour abnormalities. In fact, there were quite a variety observed: they included scales being on backwards, misshapen bodies, one side of a fish being female and the other side being male, scale fungus, and the following description of 'hair' on fish.

Some of them are so hairy you don't even want to touch them. They've just got like hair on them. You wouldn't touch it. They're just almost dead. It's some... I don't know what it's from. I thought, sometimes I thought it was anglers taking the fish out and the slime froze and then they put them back and then they had no protection. But there's too much of it. There's too many. (Interviewee F6)

4.2 Hydrology

4.2.1 Migration

Many of the comments pertaining to hydrology were tied to the effects that changing hydrology has on the ability of fish to migrate into spawning areas and also on the ability of fish to migrate from smaller lakes into Lake Winnipeg. This material was covered above in section 4.1.5 Migration. I will not repeat this data except to say that both natural

and man-made impairments to migrations in either direction were brought up many times with the general understanding and concern that hydrology has an important role in fish migration and the overall robustness of the fishery.

4.2.2 Erosion

There were many observations of erosion. Further, the incidents of erosion were explained as being a combination of many factors including the presence of high water levels. In addition, wind and atmospheric pressure were observed as variables that could further raise water levels and exacerbate erosion. One fisher, whose knowledge of Big Tamarack Island reaches back into the 1930's, gave a startling description of erosion's impact there.

Big Tamarack Island and Little Tamarack Island - this used to be only in the '30's - it might have been a little more than half a mile to Big Tamarack. Now I'll say it's four miles. So that whole island is gone. (Interviewee F6)

Other thoughts on the effects of erosion drew a connection between an increase in observed erosion and an increase in observed algae. Erosion raised concern with one fisher who felt that the siltation it creates could potentially cover up the natural feed beds that are fish feeding habitats.

4.2.3 Currents

On a very practical level, fishers gain an understanding of the Lake's currents through their fishing tasks and dealing with their fishing gear. According to the fishers' descriptions, the net acts like a windsock does in indicating wind direction with the bag

of the fishing net showing the direction of the current. This fact makes the current quite visible as it is expressed in the bow of the net.

You can always tell on your nets which way the current is. (Interviewee F5)

Further, it was apparent that experience of the conditions and locations in which currents operate is valuable knowledge in managing gear. For instance, costly nets can bunch up, become torn or even lost altogether in a strong current. Likewise, anchors can end up being dragged out of position making it necessary to replace them where they belong. And if a current is strong enough it can even make it difficult to pull up the anchor line. Beyond the potential for trouble with gear, knowledge of where currents run and the fact that they may alter water temperatures can be important to know for safety reasons.

And then the current will bring a 39-degree temperature rush through there and melt whatever ice is there. Thirty-nine and it will bring it down to 32. But it will be just wide open. And there's current around different places you don't travel. You have to know. ... But there's a lot of current in these certain spots. At Matheson Island there's an island on the west side of it and on the south side of that island there's about 2 1/2, 3 feet of water and the current washes over there. It's usually wide open from the current. So if you're going to travel from Fisher Bay to Matheson Island, you have to go over the sand bar off the island otherwise you'll drop through... if the current washes over it, it brings that 39-degree temperature to the surface and that melts whatever ice is there. (Interviewee F8)

While there are many problems and perils associated with currents, they also provide some clear advantages and for this reason fishers seek them out to an extent. The reason for this is that they are understood to exert a positive influence on the catch. This is in part due to the previously stated idea that if the fish are not moving then they cannot be caught. The sense is that currents get the fish moving. But the benefits of fishing in a current were explained from many other points of view as well. One fisher observed that

the fish follow the currents and suggested that ‘thinking like a fish’ by also following the current was a good technique for improving the catch. Another fisher felt that the currents create a feeding habitat, in essence trapping fish that are lower on the food web.

The bait fish - the shiners, minnows - what they'll do is most of the shiners they're more or less drifting with the current. They're not going to swim against the current so they pretty much go the easiest route. So that current is taking them in a big circle and holding them in that area. Well, that's where your bigger fish are going to hold in that area too because there's lots for them to feed. (Interviewee F15)

Besides using currents as promising locales to set their nets, fishers also use currents to predict storm events. Several of them referred to their observation that a current causes water levels to rise and when they observe this happening – reading signs such as rocks becoming submerged – they prepare themselves for the high winds which often follow such a tell-tale current. Some fishers drew a connection between the presence of a current and the amount of dirt that would end up in a net. However, the observations on this point were on both sides. Certain locations on the Lake were described as particularly good places to find current. The narrow area of the Lake, sometimes referred to as the ‘Narrows’ or the ‘Channel’, was one such area. As well, some interesting contrasts in current were noticed across the Lake. A fisher who was very familiar with both major basins of the Lake noticed quite a difference between the north and south basins.

Very heavy currents. I noticed the currents way heavier here than they were down in the north basin. The currents are very strong here. It can be a completely flat day, there's no wind, the water's glassy and the net is so tight that you can hardly pull it over the boat. It's tight like a fiddle string and I just can't figure it out because if you've got glassy water here (indicating the north basin), there's no current. (Interviewee F13)

He went on to say that whereas he could set long gangs in the north basin, there was too much current in the south basin to be able to do that. This same fisher also drew a distinction between the east and west sides of the south basin in terms of current, saying that there is a steady south-to-north current on the east side but a general lack of current on the west side except for when there is a big storm coming in.

There were quite a number of observations of currents. Some of these observations also generated hypotheses about how the currents are created and, in some cases, altered. One of the fishers expressed a general sense that there was more current now and that this was possibly due to higher water levels in the Lake. Similarly, an elder fisher who had observed cycles in lake levels that alternated from highs to lows every 5 to 7 years, also made the observation that high lake levels cause stronger currents. Many fishers have drawn some connection between the Lake's currents and the Hydro dam at Jenpeg. These were often noticed as changes in the patterns and directions of currents that existed prior to Jenpeg's construction. For example, one such observation noted that whereas there had been at one time currents running from north to south, they now move in a northerly direction toward the outlet. He found this even more noticeable in the winter when he observes that the current intensifies as Hydro is releasing large volumes of water. Another fisher, referring to the north basin, echoed this view. He spoke of a north to south current along the east shore of the north basin that was interrupted and reversed once the Hydro project was constructed.

There's a lot of current. It's different now than it was before. Like I said, the current used to come down here and now it's flowing the other way. We never noticed it until all of a sudden the current's going different.' Cause Jenpeg is

*taking the water out so the water flow changed a bit. Everything changed.
(Interviewee F4)*

Two other elder fishers who had firsthand experience fishing in the north basin at the time the channels were cut for Hydro also spoke about this topic but held opposing views on whether that development had caused a change in the currents.

Another attribute that was observed to have an influence on currents were land formations. Specifically, points of land were seen to create back eddies. The analogy of water moving down a stream and curling around a rock was used to describe this dynamic. The same thing is happening on a much larger scale in the Lake when a current passes a point of land and is redirected into a circular motion, or back eddy. The result is a very large circular movement of water that may be as much as 3/4 of a mile across. One other fisher mentioned the impact that the shoreline shape can have on currents. This was related to a man-made structure known as the Hecla Causeway.

It was also very common for discussions about current to touch on knowledge of wind. One combination of currents and wind is widely understood and described as ‘wind-against-the-current’. This is the idea that currents create waves in one direction while the wind simultaneously creates waves in another direction. It is very clearly described in the following quote.

... it always seemed like if it's a north wind, it's a south current. The current's against the wind. At Frog Bay anyway. I noticed at Frog Bay that the current always seems to be the opposite of the wind. That's what they say about Lake Winnipeg. The waves will always run two different ways. Waves will always run two different ways on Lake Winnipeg. (Interviewee F12)

Air pressure was also observed as a factor in the creation of currents.

I notice when there's a big high pressure system, and maybe low pressure over the south basin and high pressure, we get a tremendous north current. Especially in the winter. You'll say, how come we're getting a north current? The water should be flowing the other way. But it's more barometric pressure than wind in lots of cases. (Interviewee F7)

You know the current in the winter? ... they talk about a north wind making the water come up, rise. Most of it is atmospheric pressure. There's a high-pressure area here and low here, if it goes down an inch, it will come up a foot in the south end. And at times, sometimes, everything's frozen over; sometimes we have a hard time to get the anchor line up because the net is so heavy... With the current, yeah. (Interviewee F8)

There's always a current, a bit of a current. And they're driven by high or low air pressures. You get a high pressure in the north basin and it shoves all the water to the south basin. You get a low pressure, it comes back. Plus the wind helps... You can have a strong current and no wind. And that's because you get high pressure on the north side, it shoves the water south. (Interviewee F16)

4.3 Wind

While knowledge of wind received some mention in the observations on hydrology, there was a large quantity of data relating to wind that sets it apart as a separate category of local knowledge calling for a detailed treatment. Like their knowledge of currents, fishers' knowledge of wind is grounded in the fact that they must contend daily with the natural elements, wind being one of them. Also, like currents, wind is seen to play a role in fishing success. As one fisher pointed out, wind gets the fish moving, basically pushing them around the Lake. And not just the fish are subject to this force, but the fishers themselves are as well.

I'm happy if it's blowing cause it makes us move quicker on the Lake. It kind of helps out with the directions and which way you're pulling the net and stuff like

that - you gotta lift in from out or out from in - or how fast you're gonna go, you know. The faster the wind, the quicker you move, (Interviewee F10)

4.3.1 Wind Events

It was common for fishers to recollect specific wind events. Because it is the practice to lift once a day and sometimes even twice a day during open water season, fishers are very aware of how long their nets have been set for. It is on occasions where there are fierce, continuous winds that fishers have to stay onshore and are prevented from retrieving their nets.

Usually you get a 3-day blow and your nets get ruined and all the fish in there die. When there's lots of fish, you just live in fear if you get more than 5 or 6 boxes of fish to a net. That's just impossible to lift when it's really windy. So you just hope there's not too much fish. (Interviewee F7)

They recalled these times very clearly often providing details such as the number of days it blew, the direction from which it blew, and an indication of the year in which the wind event occurred. Incidents like this seem to be engrained in memory – perhaps because they usually cause a lot of trouble and extra work.

We got a storm that probably blew for 5 days. And we couldn't get out to get our nets. We couldn't get out of our harbour to lift our nets. So and there was really nothing we could do. But once we were able to get out, my husband actually went out, he teamed up with another guy from Frog Bay and they went out one day ... it was still blowing pretty hard. But if you can team up with somebody it makes it easier. So they went out and they just pulled the nets into the boat and brought them into shore and cleaned them out. But that fish was horrible. Oh, it was awful. Like, I told my husband, I said, like I can't believe that people do this purposely. Like, you know people would leave their nets that long so the fish gets to this shape and then go out there and try and clean it out. Like, why would you want to do that? Like, not only to the fish but to yourself. That just made us sick to have to... like there was nothing we could do. Like if we could have been out there we would have been out there but there was no way we could even get out of the

*harbour. It was blowing... I think it blew from the northeast for five days.
(Interviewee F12)*

Certainly high winds have the potential to result in loss of gear and the chore of disposing of rotten fish, but they are also remembered for the threat they pose to personal safety. This included knowledge of how a wind from a particular direction in a particular area could swamp a boat.

4.3.2 Wind Intensity

Many of the observations concerning the intensity of the winds on the Lake were stated in terms of changes over time and for the most part winds were perceived to be on the increase. Another way that changes in wind were quantified was to specify the number of years over which the period of change was observed or to give details of how fishers have had to make changes to cope with intensifying winds.

We used to have winds long ago – they didn't bother our harbours. We had natural harbours then too. Now we have to build them higher because our harbours, the water's coming right over the top of them. (Interviewee F4)

The specific observation related below shows how increased wind intensities can also make navigating a boat more difficult.

... the winds are stronger now than when I did start. Just because you fill up your boat and you're coming in and you're coming in against a storm. Well that storm shouldn't be there. But it seems that it's there more often. (Interviewee F10)

4.3.3 Wind Direction

You'll get, if you talk to a fisherman, he'll say, well if we get a good northwester' we're going to get a lot of fish. That's been always. And this year we never had

any. We never had any northwest wind. And we don't have any fish. (Interviewee F6)

As this statement suggests, wind direction is understood by fishers to be a factor in the success of their catch. And when discussions turned to the topic of wind, wind direction was very often something that had been observed and thought about. Beyond references to wind direction that related to landing fish and those that were tied to specific wind events, observations of wind direction were described in terms of trends. These trends fell into two categories. The first was long-term trends of unspecified length and the second was short-term trends described as occurring within the last year. Again, actual examples of this knowledge illustrate the point.

Long-term trends:

... there's more southeast wind now. Before there was hardly any southeast winds. We didn't really need a breakwater but now we have to fix it up. (Interviewee F4)

I can remember years ago, for years and years they used to say in August we used to get a big northwest wind and I never see that northwest wind. It seems to have died away with the different climate changes. That completely changed from 40's, 50's into the 60's. It completely changed. It changed a little bit, little bit, little bit more. And I don't see that anymore. (Interviewee F6)

Short-term trends:

... well, we're seeing more and more south and west wind, for sure: especially this last year. (Interviewee F9)

We haven't had a north wind for a month. When you're commercial fishing, south wind, south wind, you don't get anything. North wind when a high pressure moves, you start getting fish right away. (Interviewee F6)

4.3.4 Wind Duration and Variability

Fishers provided a lot of data about wind that described wind duration or how many days, typically, winds are expected to blow. This included intense, stormy winds and lesser winds which were noticeable, but in which a person could still continue to fish. There were also observations of a recent trend toward extreme variability in wind both spatially,

You know you'll get 90 kilometre winds sometimes but just in spots. But years ago, if you had a storm, you get the whole area. So that spotty environment like clouds... we have a thunderstorm come up... cumulus clouds... but now it's... you can have a storm at one place on the Lake and the next place the wind is a different direction altogether. That's one big change I notice. (Interviewee F6)

and temporally,

Shifting constantly. It'll blow until dinner from the north and then bang it goes around to the south. It's making a complete 180 turn. (Interviewee F13)

Connected to this temporal aspect were several comments expressing the sense that winds seem to come up more suddenly than they used to. There were also several indications that the wind was simply blowing on more days, in other words more constantly, than previously observed.

I see a change in the weather, a big change in the weather from when I used to fish when I was younger. I can't understand why we're having this change but you know I can remember as a young fisherman, you get a blow. And maybe that blow would last 3 days. You'd have a heck of a mess in your nets but then the weather would be nice for a week or 10 days. Now it's altogether different. We seem to get a blow every third day. We're really fighting the weather now in the summertime. It's really harder fishing now because it's so much harder to hang onto your net when you're getting these winds all the time. (Interviewee F13)

... every day seems to be, just every day it blows, blows, blows eh. You still can get out but you're fighting with that wind all the time, (Interviewee F9)

Apart from all the changes being witnessed, consistency was also a theme when talking about wind. Sometimes fishers would describe winds that continue to be reliable. Such discussions of wind were often fixed to one season or another, usually summer or fall, showing that they have knowledge of what the normal wind directions and intensities are on an annual basis and that these winds still hold true.

4.3.5 Wind and Water Levels

One final area of local knowledge relating to wind has to do with the effect wind has on water levels. Out on the Lake as they are, fishers make many observations of how water moves and lake levels change and there were a number of comments on the dramatic effect that wind has on water levels, causing them to rise significant amounts over relatively short periods of time.

The wind makes a big difference. Like the water can come up about four feet with a north wind. Especially where we are. We're just north of the Narrows here. So all that water comes from north basin, it can't get through here fast enough. If it blow a couple of days it will still get down here, down to Gimli but if it's only one short blow we pack up here. It piles up down here. The water will shoot up about 4 feet in a matter of a couple of hours. (Interviewee F5)

This phenomenon is also well recognized around the Lake and is also described in the scientific literature as the seiche effect (Einarsson and Lowe 1968).

4.4 Water Quality

A large part of fishers' comments on water quality pertained to observations of algae. One subset of this is knowledge of how the overall quantity or prevalence of algae has changed in historical terms. In fact, every participant, but one, contributed information of this type. Occasionally a fisher would refer to water quality conditions that were told to

them by someone else who had fished before their time. But generally speaking, fishers related historical changes that they personally witnessed over their own fishing careers. It is relevant to note that the fishers interviewed were of widely varying ages and as a result of this had a range of experience on the Lake with some observations stretching as far back as almost 70 some years, but in other cases only 15 or 20 years. Therefore, the time span on which they draw and, accordingly, the perspectives on which they base their comparisons differ one from another. For this reason I have included parenthetical references on excerpts to show the time frame being considered.

Among these historical recollections were some very vivid memories of the presence of algae which, when travelled through, looked like ‘pea soup’ or ‘summer fallow’. Some even included details of where they were seen such as ‘inside the dock at Hecla,’ and a reference to the time frame such as ‘when I was a little kid going to school’. A detail such as this latter one makes it possible to at least roughly locate in time when this bloom occurred, the late 1930’s in this case. These types of historical observations were sometimes made to convey the idea that the algae on the Lake lately are nothing new. Other times they were offered as a glimpse into water quality of past times without drawing any kind of comparison to current conditions.

(From a fisher who began fishing the Lake in 1939) I seen years ago pollution... I don't know if it's pollution. It's algae. Green algae. I remember in 1939 at Matheson Island. In 1939 the algae was so thick in the Lake. And that's where we got our water out of to drink. Well, everybody did. We used to have to strain all the water to drink or to cook. It was just like paint. Because in 1939 it was very low water and I could remember the water like paint, green paint. They call it blue algae. When it dries on top it's blue but it's green... It didn't happen like that again for quite some time, for quite a few years. Off and on years, (Interviewee F6)

Another fisher communicated that algae have always been present on the Lake but that the situation is worsening lately. His observation is limited to a specific location on the Lake where he fishes.

(From a fisher who began fishing in 1965) And right now I think with this algae in the water we're seeing a lot of now, but there's always been a certain amount of algae in the water for years and years as far as I can remember. My dad used to go north and there was years that he used to tell me that we had to quit white-fishing and that was because the algae was heavy. And that season used to go until the beginning... all of July as well. And then they just have to quit. And he used to tell me if the trip was really bad, eh. For sure we're seeing a little more right now but, like especially here in the south part of it, maybe that Frog Bay area, we've seen a lot more than we ever did. (Interviewee F9)

Most of the fishers with less than 45 years experience on the Lake offered very similar observations to one another, describing the last few years as a time when they have noticed more serious algae problems than previously. None of the fishers with more than 45 years fishing experience mentioned the same period of time as a time of worsening algae. In this older group of fishers, the 1950's stood out as notable for the presence of algae. Separating these two age groups in this way may not be warranted ultimately because some of these older fishers have been retired for the last number of years and this may explain why the recent algae is not mentioned. On the other hand, even though they are retired, they generally seem to keep an active interest in the fishery and have contact with those who are still actively fishing.

Within their reflections on general trends of algae, the fishers also revealed a large amount of knowledge on the factors that cause algae blooms. Many references were made to the role that air and water temperatures play, with an understanding that heat

stimulates algae growth. Mention was also made of the effect of wind and how that might impact whether the algae is visible or not.

... we don't get it every year now either so it could just be the case of depending on your weather conditions a lot too... but if it's blowing a lot it's all mixed up in the water and you don't really see it. And then if you get calm water and warm then it comes up to the surface. (Interviewee F5)

Other observations connected a proliferation of algae with low water levels and a lack of rainfall. Sunlight was also mentioned as a key ingredient in algal growth. This was observed both during open water season,

Because when you get a hot, sunny summer, you get lots of sunlight, lots of heat, water temperature comes up, you get a bigger algae bloom.

as well as in the wintertime,

One year we were fishing Humbug Bay here and there was dirt and heavy dirt in the nets. And in the middle of February the mild spell melted a lot of the snow. There was hardly any snow on the ice. Then we got a blanket of snow, about 8 or 10 inches and we hadn't pulled all the nets up and the dirt cleaned off. It was almost as if they needed the sunlight to grow, right? (Interviewee F8)

... like they say the ice, if there's no snow on the ice early then it'll grow, eh. The sun shines through. (Interviewee F11)

The relationship between light penetration and algal growth observed by fishers on the Lake has also been established scientifically (Brandson and Duguid 2005).

It was common for fishers to distinguish between algae they observe in the spring and fall seasons when they are fishing on open water and the 'winter dirt', as it is called, that they observe when the Lake is covered with ice. Winter dirt was described as 'rotting algae'.

Apart from this understanding that it is decomposing algae, several fishers gave quite detailed descriptions of it. Winter dirt was widely despised as making a winter lift a difficult task as well as cutting down on the fish that would be caught.

But in the 60's, like in Humbug Bay. Here's Humbug Bay here. The dirt was so heavy in the nets that every mesh was a window. You know, it just hung together. You couldn't tell what a fish was. You had to rinse it in the hole. If you pulled up the nets, they'd freeze. Two guys had a hard time to get it on the sleigh. It was so heavy with dirt and that. But we've never seen it that heavy. (Interviewee F6)

Your nets can bog down in the winter and you can't lift them. (Interviewee F2)

... it just seemed to come and that would cut down the fishing a lot. In the winter you used to get maybe one or two - a good lift first and then gradually this would come and the fishing would drop off. (Interviewee F1)

In addition to their understanding of algae, fishers also shared knowledge of water quality more generally. Some fishers seemed to use the terms algae and pollution interchangeably while others distinguished algae as merely one type of pollution. Knowledge of both the sources and manifestations of water pollution was prolific. First, the sources of water pollution will be outlined. The data is very clear that fishers identify the Lake's many tributaries as major sources of pollution. In conjunction with this, agriculture - both of livestock and otherwise - was thought to be implicated. Related to this terrestrial influence, there was widespread awareness of increased agricultural drainage and the negative impact this practice is having on water quality.

(Regarding an observation of a decline in water quality) Like when I was at home, when I was young, I used to go to my grandpa's dock and I'd look in the water. I'd sit there for hours watching these fish swim. Now you go and sit there, you can't see nothing but dirt. It's grey. You can't see nothing. You can't see the bottom. We used to be able to look down and see the clear water. (Interviewee F4)

I think, you know, one thing that happened to Lake Winnipeg is when the farmers wanted ditches. They started making ditches and they made the ditches and nothing stopped the water. It just went straight off the farmlands into the Lake. Down the ditches into the rivers and a lot of pollutants from the farmlands got in there and it's worse now. That's what happened. There was lots of trees before. There was - every little bit of farmland - it wasn't ditched into the water, into the Lake or a river. The drainage has done it. (Interviewee F6)

Although agriculture received the most notice, it was far from being the only pollution source mentioned. In fact, the collective list of sources named by fishers reads like a litany of hazards and includes: pulp mills, insecticides, pesticides, Winnipeg sewage, cottage development sewage, dumped garbage, leaching petrochlorophenol from Hydro poles and railway ties, treated wood in docks, erosion due to high Lake levels, leaky septic tanks and fields near the Lake, refuse dumped in the Lake by boaters, road salt and gravel dust control products. In addition to these factors, one elder fisher saw firsthand the carp's destruction of wetlands and concluded that this had a negative effect on water quality.

When carp came into Lake Winnipeg, they root into the reeds and they kill all the bulrushes and stuff. Netley Marsh which is very, very large - and that marsh, it's just like a sewage plant. It cleans the water up. It really cleans the water up. Now there's no... the carp cleaned all the weeds up and the high water from the rain and so-called Hydro controlling the Lake, all the weeds are gone. All the water coming down the Red River come into that marsh. It's gone. There's nothing to clean it up. So out into the Lake. Grand Beach marsh, Scantebury all in that big area, Beaconia, Grand Marais and in around here at Washow Bay had a lot. And Sandy Bar at Riverton, eh, had a lot of marsh in there. All that system is all gone because the carp took all the weeds away. Took all the plants away. That's what killed a lot of the Lake. There's nothing there to clean the water. (Interviewee F6)

The water purifications function of coastal lake marshes has also been scientifically established (DU 2009). Besides their ideas on causes for water quality problems, fishers also provided firsthand descriptions of the many forms and manifestations of pollution

they encountered on the Lake. These ranged from the flotsam and jetsam such as plastic bags and cans that became entangled in their nets,

When our net's on the bottom it pretty much sweeps up everything that's on the bottom. It ends up in the net. (Interviewee F12)

to descriptions of how the water itself interacts with the nets.

... when I first started, you know your nets would basically stay clean during the season. And over the last maybe five or six years, it's almost like the top 6 or 7 feet of the net has almost a brownish scum on it. I've never seen that before. But it's sort of the norm. (Interviewee F7)

... it almost seems like a child's bubble toy sometimes. There'll be like a skim between the mesh and it won't form a bubble of course but it will be just like a film over the entire mesh, just here and there, when the conditions are just right - almost kind of a soapy quality to it. (Interviewee F7)

Finally, there were many comments made about the effects of water pollution. These can be roughly divided into three categories including impacts on fishing, impacts on drinking water, and impacts on the fish health.

With regard to its effect on fishing, it is thought by some that the fish avoid the algae.

This translates into a fisher's need to find water that is clear of algae in which to set his nets, and to observe how the algae moves from one place to another as this will determine the fishing success.

... when the algae comes in, you can see it, actually see it. And we have our nets beside it. Where the algae is there's no catching the fish. That algae pushes the fish... If we know there's algae we don't even go close to it. We set in the bays where there's not really that much. That algae pushes that fish down in towards the bays and that's where there's a lot of fish. And then when the algae is gone you go back and set again. (Interviewee F4)

Another fisher gave a very similar explanation of this effect, but with an additional insight that it might not simply be algae the fish are avoiding, but the algae-coated mesh of the nets that are more visible to the fish.

And a lot of the older fishermen say if there's dirt, there's no fish. If you get the dirt then there's no fish. They figure that it's because the dirt gets caught in the nets and then the fish can see your nets so they're not going to get caught in them. Or else they just stay away from the dirt. They don't like the dirt and avoid it. But that's what they say – if there's dirt, there's no fish. (Interviewee F12)

Many of the fishers offered information about using the Lake water for drinking. Those who were elder fishers, whose history with the Lake was extensive, talked about commonly using Lake water as their drinking water both onshore and off.

Back then the water was really good in the Lake because we used to just, on the whitefish boats, we'd go on the Lake. You never took water. Why take water? You're on it. It was good water to drink. It was nice and clear. Everybody drank the water. Everybody drank that water around the Lake. There was no place that you couldn't drink the water. (Interviewee F6)

Their descriptions of how they dealt with algae in these circumstances practically matched each other word for word. When algae was present in the water, it was the custom to strain it through a dishtowel before consuming it.

Well, that algae, I know it doesn't matter where you were, it would be heavy. And if you wanted water to make tea or cook with, you had to take a dishcloth and put it over a pail and strain that water through and that green stuff would just stick to that cloth. (Interviewee F11)

It is fair to say that by and large the fishers saw a decline in how potable the Lake water is. Several fishers said there was no way they would drink the water now given the level of pollution. Those who do still drink it today, qualified this by adding that they would only do so well offshore and some would only drink it in the winter. One fisher who had used it recently to make tea in the wintertime, lamented its degraded quality this way:

Oh yeah. We boil it and make tea, eh. But the last two years we've been taking bottled water out and I tell the boys, I said, I bet your grandpa would turn over in his grave if he had seen this... having to buy water to bring out to the Lake. Because we used to take pails out on the Lake and bring water home. (Interviewee F3)

While on the topic of water quality, I tried to get a sense from the fishers of whether they connected water quality to the health of the fish. There was a great array of responses to this inquiry and some degree of difficulty in interpreting the answers. The reason for this is the ambiguity that stems from the fact that the term 'health' was used to describe not only the individual health of any given fish, but also the abundance of the stocks as a whole. Adding further vagueness, the term 'quality' was used as a synonym with 'health'. Because of the way the term quality was used it was connected more with fish marketability. In spite of this lack of clarity, a number of fishers clearly expressed the idea that poor water quality has the potential to have a negative impact on fish health. However, an increase in algae was not necessarily viewed as negatively impacting the fishery. In fact, for some, observations suggested just the opposite - that as the algae increases so does the fish abundance.

... because of the quality of the fish. That's our main thing. If it's going to start affecting our fish, the quality, because I mean we do harvest the fish out of the Lake and our major point is the quality. And so far we haven't encountered any

problems to the fish. So it's not being... now, I know that people say that we have algae, that it's less oxygen for the fish, stuff like that, but now if there's less oxygen that would be less fish, right? Fish would start dying off and they wouldn't reproduce. Well, the stocks on Lake Winnipeg for the fish is unbelievable. So if the algae is causing this, we say bring more algae. It's bad to say it like that but a lot of fishermen have said that. If that's the reason why, like this fish is, we've got record numbers of fish in the last little while. (Interviewee F10)

In summary, the fishers have much firsthand experience with algae and other evidence of water quality impairment. Fishers have to deal with various conditions year-round and in a very concrete way, from gauging where to place their nets to struggling with befouled nets. Their observations possess significant time depth and the resulting ability to make comparisons, identify trends and anticipate factors. They also demonstrated knowledge of the culprits that undermine water quality and a great sense of a terrestrial-aquatic link in this connection.

4.5 Ways in which fishers gained knowledge

There are many ways in which fishers gained their knowledge. I will begin by reviewing the various sources including, briefly, other fishers, the media, scientists and personal observation. According to the definition set out earlier in this thesis, local knowledge is experiential. Pursuant to that definition, whether or not knowledge in general is also local knowledge depends on its source, meaning that only knowledge gained from personal experience and from the personal experiences of other fishers qualifies as local knowledge. The corollary of this is that the knowledge that is not gained in an experiential fashion, such as through the media and from scientists, is not local knowledge. However, there is very likely some blurring of these lines. Olsson and Folke (2001) found that local ecological knowledge is reshaped by scientific information.

Adding yet another perspective on how these different sources of knowledge co-exist, Neis et al. (1999b) contend that fishers put more trust in knowledge gained firsthand and from other fishers than they do in knowledge gained from the larger network. With these distinctions and subtleties in mind, the following sets out in more detail the various sources of knowledge.

Fishers learn a great deal from their fellow-fishers. This happens cross-culturally as when a First Nations fishers and non-native fishers work together.

I started working with white men and stuff like that. Exchanging things, stories and stuff. (Interviewee F2)

Knowledge is also gained from family members. Many of the fishers that I interviewed grew up in a fishing family so their instruction was under the guidance of a parent or a grandparent.

I never got much schooling but them are my three biggest teachers... was my two grandfathers and my father, plus my mother. So that was my teachers. That was my professors, my scientists. I learned from them. (Interviewee F3)

Sometimes a fisher would find himself in the position of being not only a recipient of this type of knowledge but also a bearer of it.

I always tell my boys: Know, I said, why you seen me doing this? That's the way I was taught to fish, I said. I go for a place where I find a good bottom to set my nets. (Interviewee F14)

Other lessons, such as this one on migration, are learned from family members by virtue of the stories they relate as opposed to one-on-one work.

... my dad tagged fish, stuff like that, and he's told me that - this is before I started fishing - that they tagged the fish at the mouth of the Red River and the next day they picked it up over at Arnes. So they move. So some fishermen swear by it. (Interviewee F10)

There are also casual places where fishers congregate as part of their work discussing the catch and sharing stories. This can happen at a fish station where fish are collected for transport,

Well, last spring is when we really noticed it. We started getting them. I got one there just over 20 pounds and we never ever heard of it. And everybody was taking pictures and weighing it. And then one of the ... boys there, ... he came in with one just a little bit bigger. And then we weighed in six there and I saw more. We were running the station at... at the time. (Interviewee F5)

or it can happen at the end of the fishing day, as everyone is packing up their gear and heading home. From this excerpt it is evident that the knowledge shared in this fashion has very practical application to the fishing effort.

It's a close-knit.... the fishermen at Victoria Beach is close-knit. Everybody, if we get in at the same time we're always talking. We discuss stuff like did you get any dirt today or stuff like that. So if one guy gets it we would know. Like who's getting it, what area, like the small area we all fish we kind of know. (Interviewee F10)

Another more formal occasion for exchanging ideas is when fishers gather at the various meetings that concern the fishery.

... at every meeting, would stand up and say, we have to fish the small fish. Hammer the small fish hard. Don't use bigger nets because the fish will always come back if you don't. (Interviewee F7)

This was one way that even fishers who lived far apart were able to share their thoughts with each other. But there were also other networks for sharing their knowledge across the vast distances of the Lake.

I used to have a good friend of mine at Grand Rapids, but he passed away. I used to get lots of information from him about what's happening around there. It was always very interesting to me anyways. (Interviewee F9)

It was apparent from many of the fishers' comments that there is a good deal of respect for the elders as a source of knowledge in the fishing community. This was reflected in many of the rules that fishers recite.

There was a rule that the old-timers always said: if in June stay under, fish under 5 fathoms, under 30 feet, and in July and August, over. Stay over 30 feet. (Interviewee F8)

Part of what fishers accomplish as they share knowledge back and forth between each other appears to be that they test their ideas out on each other.

Well, you talk to guys and see what they have to say... what their theory is and what your theory is. (Interviewee F11)

On some matters fishers find a good deal of agreement. Such was the case for one fisher on the observed trend of increasing winds.

... it seems that everybody else has the same idea that it's more severe wind... (Interviewee F5)

But agreement is not a given. It seems that ideas and theories make their way around the fishing community where they are thought about and either accepted or rejected. Fishers

readily shared with me the ideas of other fishers. Sometimes they questioned the validity of these ideas. But the fact that, in spite of their doubts, they even mentioned them suggests they are prepared to withhold judgment to some extent. One explanation for this open-mindedness can be explained by the humility with which fishers presented their knowledge. Far from trying to make their ideas unassailable, fishers very frequently qualified their statements by saying it was only their own personal view. This came out in many different ways.

That's just my own thought. (Interviewee F2)

The thing from my perspective anyway... (Interviewee F7)

I don't think so but I might be wrong there. (Interviewee F9)

Somehow, that's my thinking. Like I said, I could be completely right out of it but that's the way I feel anyways. (Interviewee F10)

Further, the process of considering new ideas can take a long time. One fisher related how, forty years ago, one of his peers promoted the idea that fishers should catch the smaller fish in order to ensure a sustainable population. All these years later, the fisher who related this to me is still considering that idea in light of new, emerging information. Suffice it to say that fishers comprise an ongoing wellspring of ideas that, through a mostly informal network, are shared, tested and ultimately deemed credible or not.

I talk to different guys, different fishermen. Fishermen all have different ideas for one thing. (Interviewee F11)

You get ideas on it. Everybody has their own ideas. You're never sure. You listen to other people and some of it sounds kind of far-fetched. Then you start thinking

*about it and maybe it does carry some weight somewhere along the way.
(Interviewee F5)*

Aside from learning from each other, fishers also pick up information through a variety of other sources. One was the media. Several had gained awareness of some Lake issues in this fashion. A number of fishers were knowledgeable about the threat of Asian Carp as seen on a Discovery Channel documentary that was being shown by the Freshwater Fish Marketing Corporation. One fisher corroborated his observations on wind with sailors who also saw an increasing trend. Quite a large source of knowledge came from the provincial fisheries biologists and the Lake Winnipeg Research Consortium who study the Lake. Information from these scientific sources was mentioned in connection with many topics including fish health, migration, oxygen depletion, spawning habitat, cycles, the impact of rainbow smelt, test-netting and the size of spawners.

Outside of these sources, the bulk of fishers' knowledge was acquired firsthand through personal observation. Not only is this fact implied in the vast majority of the data, as often identified in the findings outlined above, it is also expressly stated to be so. Fishers acquired a tremendous amount of knowledge during their innumerable fishing excursions that spanned the seasons, the decades, and the Lake. It came from what they saw with their own eyes and even what they smelled and tasted in some instances. It came through the physical toil demanded in lifting a heavy net. In lean years it was accompanied by disappointment and worry over the struggle to make a living.

All we knew was fishing. I had a grade 11 education but by that time I was up in years and then of course when you have the fishing gear, complete fishing outfit, the boats and everything else and no one to sell it to, no one to buy. So you had to keep going. (Interviewee F1)

As has been described in the sections preceding this one, whether in good times or bad, fishers' success depends on their knowledge and ability to accurately judge the natural conditions, anticipate where stocks are and read the myriad signs that must be calculated and responded to. They interpret what they encounter and they make decisions by drawing on what worked, or did not, last time. It is knowledge that accrues over time as experience is gathered.

I never wrote nothing down. It's just by memory. I used to try and get my dad to write because he could write. We never went to school, until grade 3 or something like that. But anyways, you know when you come to think of it you've got to use your head. It's nothing they could teach you by paper. But we learned a lot and we learned a lot after a while. (Interviewee F2)

As one government person put it, fishing on Lake Winnipeg is a task that requires initiative and an independent spirit.

... their job entails them, themselves having to get up in the morning, no one's telling them to do it. If they don't do it they won't get paid. The pay cheque doesn't come if you call in sick. And so they're out there in the worst of the worst, sometimes the best of the best, making their money. (Interviewee G4)

Clearly, fishing is a business. For that reason there is a very practical motivation to learn about the fish and the environment. This is primarily to improve the catch. But the fishers also demonstrated a deep curiosity about what they observed that goes beyond the goal of landing fish. Neis et al. (1999b, p. 221) referred to this as "knowledge for its own sake". In the course of the interviews, fishers posed many questions that continue to perplex them. This curiosity and this impulse to better understand their environment was quite apparent. An example of this curiosity came from a fisher who had observed the die-off of one particular species and who wondered what it could be that caused only one species

to die off without affecting other species. Further, many fishers who see an unprecedented abundance of fish in the Lake currently are looking for ways to explain that phenomenon. Practicality and curiosity as set out above, while not sources of knowledge are nevertheless implicated in knowledge acquisition. They can be viewed as the motivators, or the ‘why’ – why knowledge is sought in the first place.

The data also point to certain attitudes having an influence on how knowledge is expressed. Two in particular came to the forefront. One was fishers’ recognition that they did not always have explanations for their observations. The second is that many aspects of the Lake are seen as unpredictable. These two are closely related because they both involve uncertainty. The former occurred when fishers made observations that they are at a loss to explain.

(On fish cycles) But sometimes it goes faster than what you realize. I don’t know what happens to them sometimes. (Interviewee F5)

(On fish migration) The fish are an animal that’s hard to figure out. (Interviewee F1)

(On fish spawning behaviour) How nature works is a mystery. (Interviewee F4)

The theme of unpredictability often arose in the context of noting the remarkably strong fishery that exists today and following that with a warning that it could change very quickly. Both of these excerpts were from elder fishers who had seen for themselves how quickly a reverse in abundance can happen.

They’re plentiful right now. But happens one of these days that’s finished. There’s sauger but the sauger can be gone just like pickerel. (Interviewee F2)

I say to the young fishermen today that I know, make the most of it while it lasts because it can change in one season. (Interviewee F1)

The very fact that many facets of the Lake remain inexplicable or unpredictable may act like a filter through which knowledge is gained thereby causing fishers to qualify their knowledge. Instead of stating their understanding as hard and fast conclusions, it is rather more often expressed in open-ended and tentative terms. In this way it exhibits a certain amount of humility.

4.6 Challenges in using Local Knowledge

As outlined in Chapter 2, there are many reasons for seeking and incorporating local knowledge. That is not to say, however, that there are no difficulties with trying to understand it and incorporate such knowledge into decision-making, especially if it stands in contrast to other forms of knowledge such as scientific. One point of caution relates to the fact that, similar to what occurs in science, fishers' observations tend to be more reliable than the interpretations of those observations (Johannes and Neis 2007; Bergmann et al. 2004). In spite of this, the utility of gathering such interpretations for their potential insight is recognized (Johannes and Neis, 2007; Stanley and Rice 2007). Further, the fact that it takes a great deal of dedication and work to convert local knowledge to a form that can be synthesized with science (Baelde 2007) must also be borne in mind. There may even be times when the interests of the fishers may interfere with their full and candid sharing of their knowledge. This problem was highlighted above in the context of water pollution and the fear that its disclosure might result in a closure of the Lake. Another problem arises due to the fact that there is sometimes a reluctance to give local knowledge the same respect that science receives (Mackinson

2001). This is not a critique of anything inherent in local knowledge, yet it represents a significant barrier and can make using local knowledge difficult just the same. In sum, any endeavour aimed at making use of local knowledge should be aware of these potential difficulties.

4.7 Summary

In summary, not unlike Lake Winnipeg itself, the scope of local knowledge identified through this research was broad but not deep. The emphasis was on generating an overall sense of the extent of local knowledge as opposed to the details contained within any given category. By utilizing this inclusive approach, it has been revealed that the Lake's fishers are indeed a rich source of knowledge. In large measure, this knowledge arises in the enterprise of fishing, finding its utility in creating more successful fishers. Knowledge of fish behaviour, diet and cycles proves valuable in knowing when, where and how many nets should be set. Knowledge of when and where fish move, related through the topics of migration, spawning, currents, and wind is also key in ensuring a good catch. Knowledge of wind and currents also guides decision concerning safety and avoiding trouble with gear. Likewise, knowledge of water quality and, more specifically, that the presence of algae can negatively impact a lift and befoul nets, is also well used.

In addition to outlining categories of local knowledge, this chapter has examined the ways in which fishers' knowledge was acquired. This included sources of acquisition such as fellow fishers, media, scientists, and personal observation. Two motivations for gaining knowledge that emerged were practicality and curiosity. Further, an attitude of humility seems often to be at work in shaping how fishers express their knowledge in a

tentative manner. Taken together, this diversity of knowledge constitutes a rich source of information that has significant potential to complement existing scientific data and to contribute to decisions concerning the Lake. This complementary relationship arises in a number of ways. One is the historical perspective that the fishers' knowledge provides. As well, some examples such as knowledge of the seiche effect and of the role of light in algae production show how local knowledge can corroborate scientific knowledge. Further, Chapter 5 will illustrate how when local knowledge contradicts scientific knowledge, that disparity becomes an important prompt for closer scrutiny of the scientific data. Johannes and Neis (2007, p. 44) recognized these complementary aspects and noted, "Paying particular attention to areas of agreement and disagreement between scientific and fishers' knowledge can contribute significantly to improved understanding and to advancing the knowledge of both groups." It is the juxtaposition of these different sources of knowledge that has the potential to create insights (Johannes and Neis 2007).

It is very likely that more extensive research into the local knowledge of Lake Winnipeg's commercial fishers could reveal that within each of the categories of knowledge outlined above – and probably others - exist more detailed observations, finer distinctions, more intricate interconnections, and deeper understandings. Such research should be conducted so that this untapped knowledge can be brought to light and shared in efforts to better understand and manage the Lake.

Chapter 5: Participation in Lake decision-making

5.0 Introduction

This research considered participatory processes and opportunities both of a formal and informal nature. However, the different processes that were identified by fishers did not always fall neatly into one category or the other. Rather, they arose along a continuum of formality. An example of a very formal process would be a board meeting at the Ministerial level. Those attending such a meeting would be elected or appointed fisher representatives and formal resolutions and minutes would be in order. At the other end of the spectrum, the very informal end, a participatory process could consist of a dockside chat with the fisheries biologist. Existing somewhere in the middle of this range were organized and scheduled meetings that were open to attendance by all interested fishers. These meetings might be convened by a government agency or crown corporation, or by the fishers themselves. It should be noted that, while this research sought to uncover fishers' participation in Lake governance relating to fisheries, water quality and the Lake's environment more generally, the various processes that follow all concerned themselves with fisheries issues only. As these processes are highlighted, I will discuss the means and extent of the inclusion of fishers and their local knowledge in that particular process where applicable. Since these aspects of participation are shaped by factors that inhibit participation, such barriers will also be reviewed.

5.1 Lake Winnipeg Fisheries Management Advisory Board

Navigating a lake in a sailboat requires many changes of direction, commonly known as tacks. In order to make headway into a wind, several changes of tack keep a sailboat moving in the desired general direction. As any sailor will know, each time a boat comes about, turning into the wind, there is room for error in making that turn. Often the result of such an error is that the sails do not refill with wind. Instead they luff aimlessly, leaving the boat temporarily adrift. This situation is referred to as being 'in irons'. This loss of forward momentum and direction came vividly to mind as I heard fishers describe the state of what they identified as their most vital participatory mechanism, the Lake Winnipeg Fisheries Management Advisory Board (the Advisory Board). The duties of this board as set out in its terms of reference were fourfold. The board provided 'a continuing review of fisheries management practices', made 'recommendations to the Director of Fisheries regarding proposed changes to the Lake Winnipeg management practices which in the opinion of the board would benefit the commercial fishery in the long term', 'inform[ed] the Director of Fisheries of commercial fishermen's concerns and advice related to the Lake Winnipeg commercial fishery', and 'act[ed] in an advisory capacity to the Director of Fisheries on all aspects of the commercial fishery'. Motions of the board were carried by a simple majority vote. The stated responsibility of board members vis-à-vis commercial fishers in general was 'to inform the fishers in their area of the proceedings of board meetings and to ensure that commercial fishermen's views and concerns are reflected at board meetings.' This structure restricted the Advisory Board to an advisory role to government. While it established consultative participation, decisions ultimately rested with the government and were therefore state-driven. This

board existed for about 40 years and, according to one fisher who was involved with it for most of that time, it went through many stages, originally involving only the south basin and then later including the north basin. In its most recent incarnation, the Advisory Board included a representative from 12 separate Community Licensing Areas around the Lake as well as a representative from the Whitefish Consortium. In 2007 the Advisory Board was dissolved on the initiative of the fishers.

So that's why finally all the members – I wasn't there at that time – came walking into the Minister's office and they had a bit of a meeting and then said, well that's it. We all quit. And they walked out because nothing was happening. (Interviewee F13)

The long list of reasons fishers offered for abandoning the Advisory Board reads like a lexicon of the barriers to participation that related to a lack of meaningfulness. Seven of the 16 fishers interviewed were representatives for their respective community areas on that board. These seven had firsthand experience with this process and it is mainly from their experiences that I draw insight into the workings and ultimate demise of the Advisory Board.

In the most general terms, it was a sense of frustration that caused fishers to withdraw from this process.

They were not getting no results. We decided, heck, what's the use of having a board? (Interviewee F4)

... it was usually elected from your community to start with and from there you go up... and finally when you wouldn't accept it anymore, then they'd put some younger guy in. And he thought he was going to raise hell and put props under it. And then it took a while to find out that maybe the same thing... I still think it's still happening the same way. (Interviewee F5)

More specifically, frustration resulted when it looked as if a consensus had been reached and agreement on an item had been achieved only to end in lack of progress and disappointment.

...but even when they come up with some consensus... somebody gave a little here and somebody gave a little there... well you thought they had some kind of an agreement but it still very seldom ever... (Interviewee F5)

One particular fisher who had about 30 years experience on the Advisory Board pointed out that the process often lacked meaningfulness. When asked if the board had been successful with some issues, his response was far from a resounding 'Yes'. His weariness with the process was almost palpable.

Well, like I say, sometimes you thought you did but most of the time afterwards you found out that it had already been in the works before you... Well it's the same with a lot of this political stuff. Same with these roads they're building on the east side now. They're having meetings on them after they've already decided where they're building them and stuff. They're having meetings on them now. If they're going to take input from anybody well, you'd almost think they'd want it before it. That's the feeling we got from it. I sat on them boards for 30 years at least... on all the different boards. (Interviewee F5)

It is apparent that the government also recognizes the need for meaningfulness and that it was lacking in the Advisory Board process.

There was obviously, when the old board dissolved, there was a lot of mistrust and it was very uncomfortable. And so it took a long time even to get the fishermen to think about rejoining or having any kind of structure because it was quite distasteful towards them and that's why they dissolved it. Obviously why would they want to reform unless it was meaningful? (Interviewee G1)

These statements reflect an accumulation, a history, of negative experiences and the resulting negative attitudes and atmosphere of mistrust that typified fishers' view of

dealing with government. This mistrust frequently came to light in fishers' references to a period in the early 1970's when the Lake was closed due to the presence of mercury.

When they closed the Lake and said... they closed the Lake and said there was mercury pollution in the fish. I don't believe it one second. (Interviewee F6)

Other fishers had other experiences that led them to question the integrity of government.

(Referring to enforcement turning a blind eye on illegal behaviour) Well, these goddamned governments. There's guys work there for wages. They're very prone to take bribes. (Interviewee F8)

Resouces ... department, you know - they put out their scare tactic. And next season it's proved wrong. (Interviewee F15)

Sometimes the negative attitude toward government seemed to stem from a perception that the government does not act consistently or even-handedly in its governance of the Lake.

Well you know they treat every community different. Before it was a lake. Now it seems every community is getting into their own rules and regulations. Like, Berens River for one is very strong on residency. Then you get a place like Manigotogan, Hollow River that are a locked-in area. Their licenses have to stay in their area. They can't sell outside but they also can't buy in. So then you have the rest of Lake Winnipeg which can sell licenses anywhere. So there's so many different things. You know you have people from Gimli that own quota in the channel area. How did all of this happen? (Interviewee F16)

On other occasions the complaint is that government decisions are politically driven instead of being guided by other more reasonable considerations. One fisher who was a representative on the Advisory Board for about a decade cited politics as the reason that he cannot be bothered with pursuing issues anymore.

Not any more. In the end when I found it was so much politics, I said forget it. (Interviewee F6)

Another fisher, using the example of how a recent protest fishery was handled by government, expressed the same distaste for what he perceived to be purely political decisions.

Because if they want to play politics and whatever, they'll play politics. I'm not a big political guy. I never claimed to be and I don't want to be. It just gets my blood boiling sometimes when I talk about it. It gets to be so stupid. And a prime example is what happened in Grand Rapids. If that was me that went over 20,000 pounds, I would have been almost out of business. They would have taken all my quota plus I would have had the cost of the fine, so much plus \$2500... I probably would have had a \$30,000 or \$40,000 fine. For the Minister to sit there and say, oh well, that was a protest fishery. (Interviewee F15)

As it turns out, the government is not unaware of these attitudes and the challenges they present.

(Referring to fishers) There are some that are very hostile. It doesn't matter what you say. Because you're government you can't be trusted and you're wrong. (Interviewee G1)

It also became quite evident that there are strong regional differences across the fishery between fishers in one area and fishers in another area. This creates divisiveness within the fishing community. Such divisions could be found from east to west,

... you look at the west side. And I went to a meeting on the west side there one day in Gimli. And this one guy said oh, we had a very depressing summer. I said, yeah, gee, I drove over a little early... I drove around your communities here and I seen \$100,000 boats and million dollar homes. I said, oh that looks depressing. I said, why don't you come to the east side. That's what you call depressing. You know there's nothing. He didn't know. (Interviewee F3)

I know in Gimli there's quite a bit of animosity against each fisherman. They don't all get along as compared to the guys on the east side. Everybody gets along. There's no fighting. (Interviewee F10)

as well as from north to south.

In my mind, particularly in the north, yes. In the south it's different. It's a different type of fishing that happens in the south basin versus the north basin. This is my opinion. The south basin is more based on economy and trying to make as much money as possible with the fishery. The north basin, it's more of a lifestyle. This is what you do. A lot of those communities have nothing but fishing. And they treat that as that is who they are. It's not what they do. It's who they are. (Interviewee G2)

Well, in the South Basin. Well, they've opened the South Basin for a few years four or five days ahead of us 'cause... they didn't do it these last two years 'cause we protested quite a bit to try and get it all done at the same time because these guys would fish for a week, five days there, and catch all they could and by the time we started, the marketing board wouldn't take it all. We were left... (Interviewee F11)

There was always kind of a what you call a controversy between the south basin and the channel area. And then the guys in the north basin, they figure we're all crooks down here. Although at times I think they have got the short end of the stick too you know. (Interviewee F5)

One fisher suggested that the lines that separate the Lake into three regions – north basin, channel, and south basin – are to blame in dividing the fishers and pitting one region against another.

...the fishermen really need to find out if they can take that line out so they can go fishing... it's not going to change much in where we're going to go. But the lines create problems for everybody... It doesn't really help anybody. What it's doing is it's separating this group of fishermen from that group. They're fighting each other all the time. (Interviewee F4)

Sometimes the differences were not thought to be so much regional as community based.

Both fishers and people in government held such a view.

From a community perspective, they're not seeing the impacts for another community. Because you can have opposing opinions on how to proceed from one community to the next. (Interviewee G3)

Some fishers, some places want community... they want more economic development in the area so they want community quotas put in their area. (Interviewee F15)

(Referring to changes to quotas) And as far as I'm concerned, the guys in our area now, we're basically saying we don't want any changes. Because we don't see anything coming down the pipe that's going to benefit us at all. (Interviewee F15)

You can't, for some reason you can't all get along. In some communities some of them can't get along so how do you expect the whole Lake to get along. Six hundred and forty or 650 whatever. (Interviewee F6)

With regard to the proper functioning of the Advisory Board, many comments were made that reveal that fishers see it as highly improper when the government acts unilaterally instead of consulting with the Advisory Board.

Even if you came up with a consensus on something, it was very seldom acted on. And we would sit on these boards and then they'd come out and change some regulation on something and it hadn't even come up at our meeting, you know.... It hadn't been presented at all. When we were sitting on the board, and everybody would be up in arms, how come you let this go by? Well, we didn't let it go by. We never even saw it. Somebody took it directly to the Minister and that's where it went. This is the feeling. That's partly why I quit a lot of them too. Because you know you got the idea it wasn't going anywhere. (Interviewee F5)

Then he started going overboard. Using his own power and that. And I had a good chewing match with him. I gave him a call over the phone. So I gave him a piece of my mind.... That was... He was no damn minister of mine. ... said no, me and the boys said it's okay. But his boys, his cronies, eh? Not the Advisory Board.

*Because that thing should have gone to the Advisory Board not to his boys.
(Interviewee F2)*

In addition, the following statement suggests that when a regional goal is accomplished by short-circuiting the appropriate process, the result is that the process is undermined and a precedent is set for ignoring the process in the future.

The thing is like the Grand Rapids thing and whatever else. The last meeting we had, I got home and the next day I found out they changed 220,000 pounds of quota from Playgreen Lake to Lake Winnipeg. So they do stuff like that and the rest of us we weren't consulted about that at all. None of the rest of the reps on the Lake even knew what was happening. So for them to say we'll keep in contact with you, I mean it's a crock. So these guys are accomplishing what they want to do without the management board. So if you have a system that's working, why would you want to change that? Why would I want to participate with you when I can go to the Minister myself? (Interviewee F15)

There were also factors that inhibited participation that had nothing to do with poor working relationship or mistrust. Sometimes it was simply a matter of practicality. For instance, mention was made of meeting schedules that do not take into account the time-intensive effort required in commercial fishing.

The problem with fishing is you're working seven days a week and you never know whether you'll have time to belong to any organization. It's difficult because in the fall for sure you just cannot commit. I mean there may come a time when you can take 5 or 6 hours for a meeting but there's a chance that you might not be able to. (Interviewee F7)

*And then they reschedule our meetings to meet them. We're on the Lake fishing.
(Interviewee F4)*

A couple of fishers also mentioned a factor that can best be described as a societal trend or shift in community ethos. These individuals saw the level of participation in

community as being on the decline in more general terms with decreased participation in Lake issues being merely one example of this larger picture.

It's the same as everything else. Same with the Legion here. The older guys are disappearing and nobody is picking up the reins, eh? (Interviewee F5)

Pretty hard to get people involved in a lot of things... If you're interested it's okay. If you're not, you're not. That's about the size of it. And you know it's the same thing in a community. Nowadays, people don't, a lot of people don't want to get involved. I don't know why it is. Like when I was younger, we used to have to cut pulp. A bunch of us would cut pulp. But now there's nobody... well, the thing is you can't get nobody to work. That's my opinion. (Interviewee F11)

Another potential source of problems for participatory processes was pointed out by some in government who said that fishers do not want to be seen to dissent from what their peers are saying. In other words, there is a sense of solidarity within the fishing community. The result of this could be that group dynamics tend to foreclose open lines of communication making it more difficult for some individual fishers to express their divergent views freely.

I mean you can get more information out of them as well but they won't speak out in front of their peers. You almost have to be one on one. (Interviewee G2)

I've even had one fisher tell me that they really enjoy talking to me but just know that when we're in a meeting we'll have to be against you, he said. I mean he was joking around but he meant it. I know he meant it. If I'm in a meeting and I'm up speaking, he'll have to be confrontational... (Interviewee G1)

In contrast to this view, one fisher clearly recalled taking a stand at a public meeting on the question of fish migrations.

...right in this hall here, uh, about twenty years ago, I guess, we were having a meeting here and there must have been about 60 or 70 fishermen and ... this

biologist... they said we should close the Lake down cause there were no fish – and there wasn't – very little. And they said, oh, the fish don't migrate from up north down this way. This is what the guys said. They said we should close the Lake down. Somebody said well if you close it down you're never gonna get it opened again. So I was standing by where that pillar is there and I got up and I said, let me hear you guys, I said, we tagged fish at George's Island, I said, and we had those fish down here, I said, in a matter of six weeks. From George's Island to here and a lot of these guys just looked at me. I said, and there's such a big area out there not fished, I said, there's gotta be fish. (Interviewee F11)

The foregoing discussion gives an overview of some of the obstacles fishers faced in terms of participation. I have enumerated these barriers because they provide a participatory context and help to explain and set the stage for understanding the means and extent of participation and knowledge sharing that actually occurred. Indeed, in spite of these challenges, there were positive indications that the Advisory Board was a venue for fishers to share their views and concerns. This fisher described the process as an opportunity for fishers to voice their thoughts and to formalize their ideas through the making of resolutions.

Oh yeah. That [Advisory board] helped. It did help because some of the fishermen would say we want this and I'm there to speak for the amount of fishermen that are in the area. And you had your say. You had resolutions. You read your resolutions. If they were passed, they passed. If they didn't pass, you'd have to bring them up the next year. So that's how that worked. (Interviewee F6)

Very often during the interviews with fishers, when answering inquiries about how they would characterize their involvement in Lake related issues, they completely bypassed talking about the opportunities they had had to share their knowledge and instead focused on whether their input had resulted in anything concrete. In other words, they seemed to put an emphasis on whether or not their ideas translated into policy and characterized their success by that measure as opposed to the opportunity to participate, share ideas,

make suggestions that are considered and perhaps rejected. It was often necessary for me to probe deeper to discover that they had actually voiced their concerns and knowledge, but had simply been unable to persuade others of their position. Such was the case for one representative who urged his colleagues to address water quality problems.

...when I was the representative for the ... area for commercial fishermen, I said to the board when we were talking, I said we have to do something about this pollution. They said don't say nothing about pollution. They'll close the Lake and we won't be able to fish. They wouldn't go along with me at that time... They shut me down because they thought they would close the Lake. Well I said you might as well close the Lake because some day they will close the Lake if you don't do anything about it now. It should have been done then. It would have been a lot better off now. (Interviewee F6)

One government person noted such a distinction between participation and participation that results in implementation.

The advisory board was functional... with fishers, they just felt that they were sending a lot of resolutions in and my understanding was they weren't getting as much as they thought they should be through that process. Rightly or wrongly. (Interviewee G3)

Nevertheless, in terms of the defunct Advisory Board, fisher representatives did manage to successfully contribute to policy developments. Some of those mentioned by fishers included putting in place the regional lines on the Lake, the spring test-netting program, and changes regarding retirement licenses. Sometimes success, instead of creating innovation, came in the form of maintaining the status quo. This was the case in stopping a proposed change in the quotas.

We were successful at that time, yeah, at not getting our quotas cut... There were lots of meetings along the Lake. Like they had meetings along the Lake.

One significant policy document that fishers helped to develop is called Administrative Procedures that relates to motions dating back to the 1980's. It contains policy on matters such as partially fished quota transfers, helper's permits, license suspensions, and the recent whitefish optimization program. This particular document was referenced many times during interviews with government personnel.

So their fingerprints are all over this sort of thing. So I guess there's no bright line between what's been created by the department and what's been created by the fishers. It's been hand-in-glove the whole way. And this is continuously updated. (Interviewee G1)

I think a very good example of how fishermen contribute to the management of the resource is evident in the Administrative Procedures. This was done in the days of the Advisory Board. However, these administrative procedures were either directly contributed by fishers recommending a certain procedure be put in place or, if they were directed or developed by government to fishers, they were consulted. (Interviewee G3)

It was a document that was produced by fisheries branch staff and fishers working in cooperation to establish it. So to me that is one of the strongest examples. (Interviewee G4)

The data surrounding the creation of items in this document are vague. At a minimum, the data do establish that this document was generated with the input of fishers and sometimes even at the instigation of fishers. But it appears that, while fishers were being consulted on these matters, those in government retained the exclusive decision-making role so, while there was consultative participation, this did not amount to shared decision-making. An example illustrates this point. The whitefish optimization program was something that was initiated by the fishermen. This was done by a general request that there be a mechanism for 'fishers to be able to bring in whitefish as incidental catch that will not be applied to their quota' (Interviewee G4). The background to this is that under

a multi-species quota, fishers were looking for a way to ‘maximize the highest price fish [pickereel] within it, the quota’, (Interviewee G3). So this program would create more economic opportunity for fishers by allowing them to bring to the market whitefish over and above the quota. According to a government interviewee who described this process, the decision to grant this request was in the government’s hands. As a sidebar, it was suggested that another factor that came into this decision was the fact that the Freshwater Fish Marketing Corporation (FFMC) also wanted more whitefish.

A few of these Administrative Procedures set out some background information that helps give them some context. However, there is no indication in the document itself as to whether or not they are in any way based on local knowledge. Further, in the course of this study, only a very small amount of data emerged connecting local knowledge to these particular procedures. With regard to the Administrative Procedures, there was mention by one government interviewee of the fact that their department (Fisheries) takes local knowledge into consideration in determinations of sustainability,

“Maybe not a direct number but they’ll be able to provide you with a lot of local knowledge in the sense of where stocks are. You know, where fish migrate... those types of things and how those are incorporated into decisions...” (Interviewee G3)

and that, although many of the policies were developed before he was involved in Fisheries, his understanding was that local knowledge was used in their development.

On the question of whether and to what extent local knowledge came into other processes outside of the Advisory Board, there was reference by a respondent in Fisheries about the practice of rechecking their data in instances where fishers’ knowledge contradicted it. In

addition, there were a few other non-specific indications by fishers that they had shared their knowledge with biologists and others in government through very informal contacts. But the details of what this local knowledge related to exactly, how it came to be shared, and what materialized from its inclusion are mostly missing. In only a few instances are such details provided. For example, one fisher used his local knowledge to influence the actions of his local band council on an issue concerning the preservation of spawning habitat. Another fisher had the opportunity, at a public meeting involving fishers and a Fisheries biologist, to share his knowledge on the topic of migration. Other than these examples that trace a clear line between local knowledge and participatory processes, the data are vague on this point.

Further, the idea that the Administrative Procedures were a strong example of the role fishers played in contributing to policy development was somewhat tempered by one fisher according to whom only a small percentage of Advisory Board resolutions generated within the last few years of its existence actually influenced policy.

Before we met, we passed all our resolutions. We voted on them. They were presented to the government or to the representative of the government. I don't think 10% of them got past that person. Until we actually dissolved the corporation and said we will not meet, and when we do meet we won't meet with the government, unless we meet with the Minister. (Interviewee F16)

And, while this fisher did not dispute that some of those Administrative Procedures did indeed involve the fishers, he points out that these were in many instances rather hollow victories, as many have not been given proper force and effect.

If that was followed, you wouldn't have people with 40 quotas. If it was followed, you'd have a lot of people that wouldn't qualify for fishing. (Interviewee F16)

Up to this point, for the most part, I have been summarizing the experiences of the seven fishers who were, and in some cases still are for the interim, Community Area Representatives on the Advisory Board. But this neglects the question of how the Lake's fishers in general participated vis-à-vis the Advisory Board. In that regard, many fishers who belonged to the general membership described the role of their board representative as being that of a conduit: a person who could come back to the community and share with them what he or she had learned at the board level. Whether this was accomplished or not seemed to depend to a large extent on the person in that leadership position. Sometimes there were solid lines of communication as described by this fisher who was a representative for about 10 years.

I used to have meetings. We'd have a fish meeting where all the guys would come. In my garage, we'd have a fish meeting and say what is your concern. What do you want? I'm there taking what they want. (Interviewee F6)

However, apparently this type of attentive and responsive leadership was not always the case. There were some complaints about incompetent and even negligent representation.

Other people seem to have their own interests at heart because they belong to whatever group and they get that knowledge and rather than disseminate it to the rest of the... you know the people that aren't on the... they keep it to themselves. Or they have their little power vacuum... (Interviewee F7)

He represents fishermen and then he won't tell them nothing. He won't tell what is going on. He's just looking after his own agenda. (Interviewee F8)

And then it depends on your leadership too. If you've got leaders that are going to be at a meeting somewhere and bring something back to the community. And be able to do that. (Interviewee F3)

These comments highlight that for representation to work properly, there needs to be someone who is genuinely engaged in that position and is prepared to act as an intermediary between the board level and the community level. Other reasons were suggested for why a representative system might not be useful. One of these related to cultural differences.

In Cree culture it is not appropriate even for that representative to go back to the community and say, this is what I've been told from researchers or from government. They don't get up on a soapbox and talk like that. That's just not culturally welcomed. (Interviewee G2)

In addition to these concerns over how and where representation works well, the question of whether there should be any form of representation whatsoever also came up.

I've heard fishermen actually saying they prefer not having a board so that they can go directly to the Minister. They don't need to fetter their thoughts and ideas through a board. They can go directly to the Minister... They find it more beneficial to themselves to have direct access to the Minister. So for them, having a board would diminish their ability to have their communication line. (Interviewee G1)

In contrast, there were those who saw a representative system as the only efficient and workable approach to take.

(Referring to the practice of fishers phoning up the Deputy Minister and others in government) That was the idea of starting up the Advisory Board. So the Minister couldn't waste time on 90 people a day. That was the purpose of the Advisory Board. (Interviewee F2)

Instead of having, whatever, 500 people up here phoning you up, you're going to have one. I'm not saying there's anything wrong with 500 people phoning us. That's what we do. But we can just say, hey, this is something that should go through the board... (Interviewee G3)

The issue of the role for representation also came up for discussion in the focus group exercise. The overriding point made there was that formal avenues of representation - as opposed to everyone speaking for himself or herself - are important in order to get things done. This included the idea that the government pays attention to numbers and that the government is aware of its obligation to consult with people and that informal processes are not adequate in that regard.

5.2 Resource Management Board

To the degree outlined above, the Advisory Board was a consultative mechanism that functioned to include fishers in issues concerning the fishery. But, in the end, the numerous frustrations with that process outweighed its successes and ultimately resulted in the fishers literally walking away. In spite of that unequivocal action, it would be incorrect to say that the fishers gave up hope of finding a workable process. Far from it. In fact, one of the last requests made by the Advisory Board was to look toward the future and impress on the government the need for a new process that would be more responsive to the fishers.

(Referring to fisher initiatives) The Resource Management Board, that whole initiative to establish, was another. There was a number of resolutions... where the former advisory board put that resolution forward and that they be replaced by a management board where fishers have a direct and equal partnership role in the management decision making process. And that's what we're trying to do. (Interviewee G4)

Currently, negotiations are ongoing to reach agreement on the structure and operation of a new co-management board, generally referred to as the Resource Management Board. Primarily, these negotiations involve those representatives from the defunct Advisory

Board and government. This group of fisher representatives has legal counsel acting on their behalf in the negotiations and, over the past couple of years, these representatives have met a handful of times with the Minister of Water Stewardship to work on a Memorandum of Understanding (MOU). This MOU has gone through several drafts and, as of the writing of this thesis, continues to be a work-in-progress. The process of formalizing the MOU entails the community representatives consulting with their community fishers. It seems that this formative stage itself faces some participatory challenges. One government person explained that some in the fishing community question the intentions of government in establishing this new board.

There's a lot of contention over that MOU over the last eight months. My opinion is a lot of it is not to do with what is in the content but more as what it symbolizes... I mean it's more contentious as a political tool. They're seeing it as a tool to use politically rather than actually getting down to business... (Interviewee G2)

A lingering mistrust of government was underscored by one fisher who, acting as a representative on the negotiation of the MOU, questioned the meaningfulness of government requests for feedback from the fishing community.

So last time ... phoned me he asked me to have a meeting. And I said I'm not having a meeting until you give me a final draft and say this is it. Because I'm not going to call a meeting every month and rehash this whole thing over and over and over again... He just wanted the reps to have input from their people and he wanted basically to rubber-stamp this new amendment they made. But to me, the thing is, well you're making amendments all the time. And I'm not having meetings. You're just retroactively making them so why do I need to have a meeting over this one? And even if I do have a meeting over this one, that's not saying two weeks from now you're not going to send me another amendment, because we weren't expecting to get this one. So how many time are you going to amend this thing? (Interviewee F15)

This statement also suggests that, in addition to a lack of trust, part of the reluctance to consult with the broader fisher community might stem from impatience with how long this process can go on for. An interesting comment made by another fisher in a separate context may elucidate this lack of tolerance for protracted processes.

*(In response to being asked if he would be interested to get involved in water quality issues) What's the sense of going and doing something and it's sitting in the cooler for two or three years. Right? Let's get it done and get the problem solved. That's like... I mean what any fisherman... that's our mentality. Get out there and get the job done and get back to shore. Get your work done.
(Interviewee F10)*

Aside from these brief glimpses into the development of a future mechanism for fisher participation, at this juncture I will not go into any more depth on the MOU and the fledgling co-management board. I will return to discuss them in Chapter 6 where I will consider this new board in the context of the future of participation.

5.3 Lake Winnipeg Fisheries Quota Review Task Force

The Lake Winnipeg Fisheries Quota Review Task Force (hereinafter the Task Force) was set up to conduct a biological review of the fishery in order to establish sustainable harvest levels for the Lake. The Task Force was made up of three scientific advisors, three Lake Winnipeg fishers and a committee chair. Their work involved the seven of them discussing and synthesizing their knowledge pertaining to the sustainable harvest issues. It also involved traveling around the Lake to consult with fishers on the question of increasing quotas. These meetings, which occurred in October and November of 2009, sought to collect fishers' observations through discussions and through the completion of

a survey. It appears that this process of consulting with the fishers was in response to the fishers wanting to have some input on the quota review.

Well, one of the really good things because of communication and the challenge we're facing talking with fishers, the Lake Winnipeg Task Force was developed. Because one of the concerns fishers have always said is that you're doing the work and telling us, right, but we want to get our own perspective on it. Which is fine, in terms of that. So we work with fishers. So things such as the MOU to develop the fisheries resource board, the Task Force, is because of discussions with fishers to do it a different way. Times have changed. This command and control type structure from way back... rightly or wrongly in today's world you've got to work in partnership with these guys. And that's what we've been doing. (Interviewee G3)

The final report of the Task Force is due in the spring of 2010. Although government interviewees referenced the Task Force, none of the fishers interviewed mentioned attending its meetings. One of the people involved on the Task Force committee indicated that approximately 72 fishers participated in the Lake-wide meetings, representing somewhere between 5% and 10% of fishers. The Task Force's original Terms of Reference established it only for a short time period. However, there is now the likelihood that the Task Force will remain in place as a resource to the Resource Management Board once it is operational.

5.4 Manitoba Commercial Inland Fishers Federation

Manitoba Commercial Inland Fishers Federation (MCIFF) has been in existence since the late 1960's when it was called the Manitoba Fishers' Association. As a province-wide entity, its focus is mainly on fisheries issues, although in recent times its work was also linked to the Lake Winnipeg Stewardship Board and the environmental issue of nutrient enrichment. This group figured prominently in the focus group discussion as being an

entity that historically achieved major changes in the fishery – changes that were driven by the fishers themselves. Among these, MCIFF was credited with the creation of the FFMC that replaced the private fish companies. I was later to discover through the individual interviews – especially among fishers whose careers straddled both pre and post FFMC times - that this change from private companies to a single desk FFMC was highly regarded as a move that financially benefited the fishers. Not only did it guarantee fishers a buyer for their production but it also increased profit margins and provided advance notice of prices for the coming season.

It's not like today when we have the Freshwater Fish Marketing Corporation that gives us a stable price. Also, we know the price we're going to get when we go out fishing. As the years went by I started thinking about on Lake Winnipeg... there's about 8 or 9 fish companies on the Lake. Each had a big freight boat and some of them had a small freight boat also. Fish stations were on every bay and point on Lake Winnipeg which leads to the fact that there was too much... the overhead was so much on the Lake to keep these companies going, the boats on the Lake, the fish stations, the offices in Winnipeg. Naturally all of this had to come out of the fish. So I'm not blaming everything on the fish companies. It's just the fact of the matter was all of these expenses of fishing Lake Winnipeg had to come out of producing. (Interviewee F1)

Focus Group participants also pointed out that it was MCIFF that was instrumental in implementing the Transferable Quota Entitlement System that is in place today as well as a Fisherman's Loan Program that made it possible for fishers to utilize quota entitlements as collateral for loans. The practice of test-netting that is now carried out by the Province was also identified as something that originated with MCIFF. The effectiveness of MCIFF really stood out in the focus group discussion. This effectiveness was explained as relating to the context in which MCIFF's efforts arose. Specifically, it was suggested that at the time of these various developments, fishers could hardly make a living. In fact,

many were leaving the fishery and the fishing communities themselves were emptying out. In essence, these circumstances simply made it a good time to make some changes.

In terms of the level of participation in MCIFF, about one third of the fishers indicated that they were involved to some degree with MCIFF, a few as board members and another few who attended their meetings. Very little data emerged on MCIFF to reveal how it functioned, but one fisher had a very positive estimation of its ability to build bridges not only between distant fishers but also between fishers and government.

That worked good... Because it's the first time that people could be face to face with one another. It was the first time I could sit face to face with ... instead of me sitting way back in Berens River and calling him names... You change. Your feelings for him is changed. His attitude is good. He has the same problem as you have. (Interviewee F2)

It worked out good. We started to know the government. We were sitting there with lots of guys with suits and neckties on. They'd come out in the bush with their shirt. Yeah, they were good. (Interviewee F2)

According to several fishers, MCIFF has undergone a change in focus in recent years and is currently headed in a direction that has alienated many. One major thrust in MCIFF's current policy direction appears to involve a move away from the FFMC. This issue seems to be causing a rift and a decline in support for MCIFF with the result being a loss of members and decreased participation.

I started getting involved with the Inland Commercial Fishermens' Federation but I pulled out of there. It's too political... It seems like small groups have an agenda that they... that's not for all the fishermen. It seems like it is but it seems like it's mostly for the Metis Federation. You know, they may have a good thing going for themselves but it's not what I'm interested in... and it's also, I'm a strong backer of the Corporation, Freshwater Fish. And anything that will harm that I will not support in any way. (Interviewee F16)

5.5 Other Participation

While fisheries issues comprised the main focus of both the Advisory Board and MCIFB and therefore received most of the attention there, to a lesser degree environmental issues also entered into the Advisory Board discussions and included broaching topics like the impacts of Devil's Lake and problems caused by agricultural drainage. In this way, fishers' concerns and knowledge about non-fisheries issues such as water quality and the environment entered the Advisory Board process to a very small extent.

However, besides fisheries related entities, there are also governmental and non-governmental groups who involve themselves directly in water quality and environmental issues. Of these groups, quite a number of the fishers were aware of the Lake Winnipeg Research Consortium and the fact that it conducts research on the Lake. A number of fishers had had the opportunity of casually sharing their ideas with that entity. Other fishers were aware of such groups but had not had any contact with them nor participated in them in any way. The remainder of the fishers were completely unaware that such entities even existed.

At the very informal end of the participatory spectrum, most of the fishers had had the experience of communicating with people in the Fisheries Branch either personally or by phone or letter. These types of contacts extended to Ministers and Deputy Ministers, the Director of Fisheries, and to the regional fisheries managers and biologists.

Well, I've talked to these biologists and told them my idea just like I'm telling you, eh? (Interviewee F13)

Well, I explained the same thing what I'm saying here today, eh? What I know and how long I've been and how I seen this Lake Winnipeg. (interviewee F14)

Those fishers who were First Nations people also found opportunities to share their knowledge with the Southern Chiefs Organization, in one instance, and at the reserve level more generally. In fact, one individual successfully put a halt to work that he deemed to be detrimental to the Lake. It was a striking example of the participatory role for local knowledge.

I told the council... see what they were doing... every spring they had these workers, crews, money they had to train... what they were doing was they were cleaning along the Lake, along the river, they were brushing. I said, you don't do that... Taking all the trees from the river. I said why are you taking all that stuff out? Well, they said we got nothing else to do. I said put them in the ditch but leave that bush there. The reason for that is the spawn will go into that to the reeds and that brush is there. I said, save habitat for them. When you take it out, I said, where are they going to go? They never thought about that. So now that stopped. (Interviewee F4)

From the government perspective, contact with fishers was often on an individual basis. Again, these were quite casual, day-to-day interchanges where Fisheries personnel hear from a fisher about what they are experiencing. They use this information with a view to correlating it with and checking it against their own findings,

And we'll widen our eye a little if they tell us something that's not reflected in the data we've collected because obviously that's interesting to us. We have to tailor our data or have we not noticed it in our data? Have we not analyzed our data in a way that... but that's the limit of my experience. (Interviewee G1)

and, as described earlier, to help in determinations of sustainability. These are clearly ways that local knowledge is used to complement scientific knowledge.

5.6 Summary

To date, it appears that fishers' participation in the issues affecting the Lake is, by and large, limited to fisheries issues. And even within this area of governance, the level of their participation has suffered for the many reasons previously set out. In fact, out of the sample of 16 fishers, two people have experienced only very informal participation and another three people have experienced no participation whatsoever. These five comprise almost one third of the fishers interviewed. In this context of low involvement, there were several generalized complaints that were not directed at any given process in particular, but which in different ways prevented fuller participation. These included a lack of information, a lack of invitations and notices, and the problem of inconveniently scheduled meetings.

While it is not possible to definitively determine whether this poor level of participation is representative of the Lake's fishers in general, I did receive one outside opinion on the composition of my sample. This came in the form of a comment by a government interviewee whose sense was that my sample was extraordinary to the extent that it involved fishers who were interested to share their ideas with me whatsoever.

(Referring to fishers who would agree to be interviewed by me) I mean in my mind those are sort of, those are not what I would call typical fishermen. Those are fishermen who would actually accept an invitation to have a discussion like this. In my mind there's a whole other group out there that I refer to as the rank-and-file fishermen who essentially do their work and don't say anything ever. Those are the ones I meet, that I talk to... They're not really interested in engaging in... they're not even interested in engaging with someone like yourself researching. These people have a much more simplified version of life. They get up in the morning and they fish and they sell their fish and go home. They have a lot of different perspective than what you may interview. (Interviewee G2)

There are two considerations that counter this concern and permit confidence in this research sample. First, since the data show that mistrust exists between fishers and government, it is very conceivable that this government person was not the recipient of fishers' views on participation because there was no rapport on which to base sharing that type of information. Secondly, it is likely that this government person has never attempted to approach fishers about their views on Lake-related issues and participation. In any case, he did not say that he had tried. Therefore, his conclusion is most likely based on mere assumption and not on actual data.

With the decline and abandonment of the Advisory Board, the last five years or so have been particularly lean years in terms of fisher participation. As can be seen from the data presented in this chapter, the Advisory Board did provide a consultative mechanism to the extent that it was a place where fishers voiced their concerns and ideas, and presented resolutions for consideration by the Director of Fisheries. There was also some level of success in translating those ideas into policy. However, it is clear that this board operated in an advisory capacity only and did not enter into a shared decision-making role. This conclusion is supported by the wording of the terms of reference that govern the board as set out above. It may also be inferred from the fact that many board resolutions were not being translated into policy. Further, the fact that it was common practice for fishers to contact Ministers, Deputy Ministers and other government personnel directly could be interpreted as their tacit understanding of where the real *locus* of power and authority was located. Similar to the Advisory Board, the Task Force served a consultative function. The other more informal processes reviewed above filled a mix of consultative and informative roles.

While there was a degree of public participation occurring, the very foundation of public participation – meaningfulness - was often lacking. This was for a number of reasons. There was the problem of the government sometimes consulting with fishers only after a course of action had already been decided upon. This method, described in the literature as participation that occurs during the operational stage, lacks authenticity (Diduck 2004). This lack of authenticity did not escape the fishers' notice. Similarly, there were also occasions when government acted unilaterally, circumventing the Advisory Board process entirely. Such occurrences blatantly ignored the established participatory process and appeared at times to be aimed at achieving political ends. In so doing, government unequivocally failed to achieve meaningfulness in public participation. In a similar vein, the government was seen to act inconsistently in its treatment of different groups and communities. This is likely closely tied to the criticism of government making political decisions that are viewed as arbitrary instead of being based on the merits and the facts. In any event, such an approach to decision-making has also served to undermine the meaningfulness of the process and deepen the mistrust by fishers.

Further, many fishers perceived that they were not achieving a satisfactory impact on outcomes. While on the surface it appeared that they were being given an opportunity to voice their concerns, they often felt that those same concerns were not being translated into outcomes. Instead, they felt that agency administrators were disregarding them and were making decisions that did not take them into account. Tangible outcomes are important for participants to see and are an indicator of accountability (Shindler and Cheek 1999). These circumstances also suggest that a genuine sharing of power was not actually occurring and that what was at play was merely an exercise in tokenism, as

Arnstein (1969) defined that term. This problem might have been mitigated had fishers been given some explanation for how their concerns and resolutions were being dealt with. But such transparency was apparently not forthcoming and this situation led to a large measure of frustration and mistrust. Indeed, the ability to see how input is incorporated into decisions is vital to a transparent process (Stewart and Sinclair 2007).

In terms of the wider community of fishers who were not participating directly on the Advisory Board, there was some dissatisfaction with the quality of representation in some instances. Specifically, there was concern that some representatives did not properly fulfil their role of conduit between the board and community. Although not expressly stated by any interviewees, this very problem may explain why there are many fishers who make direct contact with the government as opposed to relying on their representatives. A representative system such as this clearly relies on strong links through the individual representatives. A weakness in this area can have serious implications. In spite of this, there are measures that can address this problem and these are considered in Chapter Six.

Taken together, the participatory experiences outlined in this chapter show unequivocally that the governance of Lake Winnipeg and its fishery has thus far not involved shared decision-making, but rather informative and consultative public participation, and by no means a strong form of that. The task of remedying the current problems is considerable. It appears that government has recognized the lack of meaningfulness and that attempts are tentatively underway to create a participatory process that includes shared decision-making. This remedy comes mainly in the form of the proposed Resource Management Board that is discussed in the next chapter.

Chapter 6: The Future of Governance

6.0 Introduction

From the data revealed in Chapters 4 and 5, it is evident that the Lake's fishers are not only a valuable source of local knowledge, but also show a significant level of interest in Lake issues. Their interest most often expressed itself in the form of a concern. One concern that emerged was that the fishery be managed in a way that is sustainable.

We want to be a sustainable resource. I want to be able to finish my fishing career off knowing that the fishing is going to be there for another hundred years. (Interviewee F15)

Look, let's let these fish spawn. Let's think about our grandchildren. (Interviewee F3)

(Referring to a quota increase) Right now I think Lake Winnipeg probably could stand an extra 10 to 20%...But you've got to be careful that you don't take it into a tailspin and end up where we were in the '60's. (Interviewee F16)

It also seems that those in government are aware of fishers' concern with sustainability.

I mean, they understand the concept of sustainability like the rest of us, eh. They want it for their kids and the future. We all do. (Interviewee G3)

Other more specific concerns related to interrupted spawn migration routes, the effects of drainage on water quality, and the risk of exotic species. As they talked about these various concerns, many of the fishers also offered specific policy and management ideas, ways they saw to improve the Lake and its fishery based on their experience and knowledge. These ideas ran the gamut from improving water quality,

I'd like to see them run the, handle the water run-off the same as they do in Finland... Nobody's allowed to drain directly into any river or stream or lake without putting a berm in front of it for it to go over to create a settlement and take that stuff back into the farmer's fields. They get a lot of stuff settling and cleaning out. So they're cutting down the amount of chemicals and silt, everything that's going into the lakes. (Interviewee F16)

to controlling quota entitlements,

Now if they do want to alter things or add and subtract quotas, well that should be done on a separate entity. So here's our quota, the original quota hard working people bought and paid for. That's a Class A quota never to be touched. If you want have stuff to play with, that's Class B quota. You could take that Class B quota... (Interviewee F15).

Apparently, sometimes fishers share their policy ideas with Fisheries personnel.

... there's a few guys in... here that will come in with papers that they've gotten off the internet and say, have a look at this, You know - some policy in another country. (Interviewee G1)

This statement was followed by pointing out that this is by far the exception to the rule and that generally speaking the average fisher's world *'is fairly small as far as their work world'* (Interviewee G1), so the number of fishers who would engage at this policy development level is characterized by this source as being fairly limited. A similar view was advanced by a fisher who answered in this way to the question of how to improve fisher participation.

I would think it would be very difficult. I don't see... because it's almost been an occupation of default. If you can't get into an apprenticeship or something else or do something... it's sort of bringing up the poor, disenfranchised people who aren't inclined to do stuff like that. (Interviewee F7)

Contrary to this view, the weight of the data shows that many fishers - with their knowledge, interest, concerns and ideas - are not only able, but also willing to engage in Lake related issues. With this in mind, this chapter will consider ways to increase meaningful participatory opportunities as well as to consider the emergence of a completely new participatory governance process known as co-management.

6.1 Resource Management Board

The image of the sailboat trying to refill its sails and gain some forward momentum returns at this point because it comes close to describing the place in which fisher participation currently finds itself. This is a period of time when fishers are between formal boards. The Lake Winnipeg Fisheries Management Advisory Board (the Advisory Board) is no longer in existence and the Resource Management Board (the RM Board) has not yet been constituted. It is difficult to predict how long this state of limbo will last, but judging from clause 17 of the RM Board's memorandum of understanding (MOU) that requires the board to provide its initial report to the Minister by March 31, 2010, it is safe to say that it is taking considerably longer than expected to get this board up and running. According to one community representative, he doubts whether it will ever materialize.

(Referring to finalizing the MOU) The one time we had a consensus, we had it all written up and they said yeah, well we're going to take this back and write it all up and the next time we come maybe we'll have a big deal. Within two weeks there was five communities sent in a letter of protest and it was Poplar River, Berens, Norway House. And Poplar, Berens, Norway House all agreed to it in the meeting. That was four communities, five all together, I think Dauphin River, that basically protested that they didn't like this idea of the co-management deal. I just don't think it's going to happen. (Interviewee F15)

There were other indications of resistance to the formation of a co-management board.

There's a lot of contention over that MOU over the last eight months. My opinion is a lot of it is not to do with what is in the content but more as what it symbolizes... I mean it's more contentious as a political tool. They're seeing it as a tool to use politically rather than actually getting down to business as to what is in that. That's my own opinion. (Interviewee G2)

...you know, some things we don't agree what they [Fisheries] propose for the fishermen, eh? You know, it [the Advisory Board] already happened a few years back and it didn't work and now they're bringing it back again, eh? (Interviewee F14)

Nonetheless, for many other fishers, the new RM Board is viewed as the hope for the future of their participation. This abiding hope is captured in the following statement.

I hope it works because we've got lots of concerns. If we can get that thing going then we can maybe get something done about our concerns. (Interviewee F3)

This statement contains within it several ideas that carry a lot of import. The first idea is that fishers have many concerns. Secondly, it is implied that fishers want those concerns to be dealt with in a real, meaningful way. And last but certainly not least, it is implied that there is an expectation that this new RM Board holds promise to answer those concerns. It is this promise that this chapter will consider.

6.1.1 Meaningfulness & Transparency

In order to better understand how this future RM Board intends to function, key terms of its most recent draft of the MOU are described below.

- 1) The preamble states that it 'seeks to provide opportunities for meaningful participation by users of fishery resources in decision making processes'.

- 2) Clause 2 sets up the structure of the board and establishes four seats for fishers, two for scientific advisors and one for a neutral chair.
- 3) Clauses 6 and 8 taken together make it incumbent on the board to consult with those affected by its deliberations and to fulfil their responsibilities in the best interests of the public, their collective communities, and the viability and sustainability of the fishery as a whole.
- 4) Clause 9 requires that their decisions shall be by consensus and that these decisions are to be sent to the Minister for consideration.
- 5) Clause 11 requires that board decisions will be based on scientific knowledge and local and traditional knowledge.
- 6) Clause 12 requires the Minister to provide written reasons in the event that she does not accept a consensus decision of the board.
- 7) Clause 13 requires the Minister to keep the board informed about all issues respecting the Lake, including all environmental issues.

In the course of this research it became apparent that fishers are hopeful not only that this new co-management board will become a reality but that when it does, it will not face the same problems that occurred vis-à-vis the Advisory Board. To a great extent, therefore, many view the RM Board as promising an improved mechanism for fisher participation because they sense that the new arrangement will create a more direct line of communication with the Minister and therefore increased meaningfulness.

Before they used to do it... they take it to the Minister and the Minister says, nah, I'll have nothing to do with that. Now they have to listen to this board cause it's

there for that purpose. And if they say we want it to go through, do it this way or whatever, the Minister will say okay, let's try it. (Interviewee F4)

I think at least with the MOU if you had it in place, the Minister if you bring something up to her, this is what we think should be happening with the Lake. And if she doesn't agree with you or whatever, she has to acknowledge it and she has to give you written reasons why, whereas we never had that before. (Interviewee F15)

From a practical point of view, if the requirement of the Minister to provide written reasons in the event that she does not accept a consensus decision is adhered to, it should go a long way toward ensuring that fishers are not left wondering what happened to their resolutions and what is going on behind the scenes, questions that plagued the previous process and ultimately caused a lot of frustration. From a more theoretical standpoint, this requirement for written reasons denotes a move toward a model that requires the Minister to be more accountable for his/her decisions to the Board, but without sharing full decision-making authority. Government interviewees' comments confirm this understanding that the proposed structure of the new board does represent at least a move toward a model of more shared decision-making with fishers play a greater role in the actual decision-making relating to the management of the Lake's fishery.

Basically, what's going to happen now is we're going to a new form of management or a variation on the old form where the fishers have greater participation in the management of the Lake. And what has developed as a goal is a board where there's four fishers involved – co-management board – and then scientists who I think are meant to be independent of government... Then representing government there will be the Assistant Deputy Minister of Conservation and the Assistant Deputy Minister of Water Stewardship. So that would be the board that would make recommendations to the Minister. (Interviewee G1)

And so the way it's supposed to be, and I think everyone's hoping, when a resolution from the board goes to the Minister for her or his decision, it's going to

be developed in total partnership. It's not just, oh this is a resolution from the branch perspective or the fishers. It's going to be from both. And it's going to be a board resolution which consists of fishers and government reps. (Interviewee G4)

In the interim, as negotiations proceed toward finalizing the MOU, there are positive indications that communications have already improved and that this bodes well for the new process in terms of achieving the much sought after meaningfulness.

And I give ... a lot of praise or whatever for stepping up and facing the music. She's no walkover but we got to voice our concerns with her. She listened and she promised to get back to us within 30 days. And most of the time she did. (Interviewee F16)

Up until She's actually come and sat down with the fishermen – okay, we want to work this out. (Interviewee F10)

The MOU preamble, by expressing the intention to create meaningful participation, adds to this expectation and can be seen as a key statement of intent in establishing the overarching goal and tenor of future proceedings.

6.1.2 Inclusiveness

Beyond these general indications, several fishers made comments pertaining to the specifics of how they see the new RM Board functioning properly and what their expectations were in that regard. In a couple of instances strong emphasis was put on the role of representatives to the board, urging that the wider membership of fishers must somehow be included in the process. This was thought to require vigilance on the part of board representatives in consulting with member fishers and in getting knowledge back and forth from the RM Board to the grassroots level and back to the RM Board. In

connection with this, it was recommended by one fisher that there be voting on matters at the community level.

(Referring to the proposed 4 fisher representatives under the MOU) I don't understand what 3 or 4 people can do which will satisfy the majority of the fishermen unless everything is voted on in the areas and that person is representing the people. You know, you can't have one person go and say well I think that this area should have a community license and the other ones individual licenses. Or even for extra quota... It's got to be voted on by the people. (Interviewee F16)

This very concern has been at least partially addressed in the MOU through a structure that creates four regional sub-committees (called Fishers' Committees) that will each nominate one representative to the Management Board. Further, the twin duties of consultation and good faith that are made incumbent upon the RM Board members, while not incorporating a vote at the community level, also address the concern stated above.

However, considering the large number of people involved in Lake Winnipeg's commercial fishery and the fact that there are only a handful of people who will make up the RM Board, it would be advisable to provide some support for this consultation requirement. This might be achieved through assisting with information mail-outs and ensuring that relevant notices are sent to license holders. In any event, careful thought and attention needs to be given to the details of how board representatives can be facilitated to be more effective liaisons. If this does not happen, wider fisher participation, and therefore inclusiveness, will likely suffer.

6.2 Enhancing Participation

6.2.1 Practical Considerations

Up until now I have focussed on the structure, spirit and intent of the draft MOU and proposed RM Board. When this board is finalized, it will almost certainly become a main channel for fisher participation. But aside from this mechanism, there are other, more general ways to improve opportunities for participation by addressing those aspects that impeded past participation. While some of these impediments, such as poor working relationships and mistrust are not easily remedied, others are more straightforward and therefore solutions are more attainable. I will consider these first. For instance, consideration should be given to the reality that during open water season, fishers are on the Lake lifting their nets once or twice a day and often seven days a week. For obvious reasons then, meetings called during those two periods of time will not garner high attendance.

Another area for improvement falls under the category of doing a better job of providing information. Many of the fishers were unaware of the various entities dealing with Lake issues. Further, even when they were aware, their knowledge was only quite vague and minimal. Some fishers felt that it would be nice to know more about what was going on. This did not always translate into getting involved necessarily, but rather reflected a desire to be kept apprised of Lake related issues and activities.

Well, it would be nice to know what's going on and what they're doing. I don't know how they would get it out to let people know... Because I mean once it's gone, it's gone. You know what I mean? Like I said, it's our livelihood. It's how we make our living. If it's gone then we have no more living... They could send out notices. Like I don't think I've ever got a notice of any kinds of boards that

are forming or anything like that. It would be nice to know what they're actually doing, if anything, to help it. (Interviewee F12)

The only time we get a little bit of information is at our meetings. Like Freshwater Fish will put out a little bulletin once a year about what they're doing... what fishermen right across Canada... but as far as Resources themselves, they don't tell us very much. (Interviewee F13)

From the Fisheries Department perspective it would appear that efforts to provide ongoing information have been made.

And the other thing we did was we have sent mail-outs to all licensed fishermen to advise them things pertaining to the MOU and the Lake-wide board so... Lots of time what we get from fishers rightly or wrongly is comments that well we didn't know about this. So we've tried to do a lot more, I like to use the phrase direct marketing, but getting right to the fishers, here's the status update, what's happening. So there's been mail-outs on that. So you know it's, to me it's also to assist the reps from the communities if possible to provide information to those fishers out there... But the more we can communicate the better. We've always taken that approach in Fisheries. The good and the bad, but you know...we've been doing that for years. Recently with the MOU and the development of that and other things. We just want to make sure that fishers are aware of what's happening on the Lake. A simple letter, one page letter. This is what's going on. (Interviewee G3)

Apart from some discrepancy between these versions of the provision of information, it appears that both fishers and government recognize and agree on the importance and the need for keeping the fishers informed and up to date. Of course, written material is only one way to disseminate information. Another is in person. It seems that quite a lot of communication is achieved through the venue of the FFMC that coordinates a fairly regular circuit to the different fishing communities around the Lake. These community meetings were something that most fishers were well acquainted with and which they regularly attended. Not surprisingly the main agenda for these meetings is market related and is geared to inform fishers of prices and limits for the upcoming season. Interestingly,

it is also the practice to occasionally combine other presentations in conjunction with these FFMC meetings. A number of fishers mentioned that they had heard from representatives of the Fisheries Department as well as from the Lake Winnipeg Research Consortium at these meetings. It appeared that this was quite a vital point of contact for fishers with these non-FFMC entities. As such, they presented opportunities for fishers to speak firsthand with these people, learn about the science on the Lake, and get some opportunity to share their ideas too. In terms of ensuring that fishers are kept informed about Lake developments, these meetings present an existing delivery vehicle onto which all sorts of information could readily be piggybacked. Given the logistical difficulties involved in meeting with people from such a vast area as Lake Winnipeg, this presents a ready network that perhaps should be looked at more closely in order to utilize it as a method for sharing information with fishers. Providing information is important because gaining knowledge of the issues and entities involved on the Lake could be an important first step in ensuring that fishers have an opportunity to participate.

In addition to utilizing the FFMC meetings as a venue for other presentations and discussions, making sure that notices or invitations are sent out to fishers may also improve participation. Aside from those fishers who were elected or appointed as community representatives, most of the fishers who have been involved in more informal ways did so on their own initiative. For such fishers who do not have a formal connection to an established process, it might be that sending out a simple invitation to attend a public meeting would serve to increase their involvement. One fisher brought up the idea of an invitation in this way.

*I wouldn't say I'm not interested. It's just you know there isn't the opportunity. No one says come out to the conservation society or anything like that.
(Interviewee F7)*

Another suggestion was the idea of paying an honorarium to fishers to come out to meetings to share their knowledge. The fisher who suggested this had had a positive experience with this approach in connection with Model Forest meetings where he claimed that it resulted in many people being involved that otherwise would not have been. This might point to the fact that, for some, the expense of attending meetings prevents their involvement or, alternatively, an honorarium could be interpreted as a show of respect for their time and contribution.

6.2.2 Relationship Building

While considerate scheduling and the provision of information to fishers can likely be improved upon by taking some simple measures such as are outlined above, the problem of poor relationships between fishers of different regions as well as between fishers and government is somewhat more intractable. Such relationship problems pose a substantial challenge and may take a good deal of time to overcome. However, it may be that there is no other way to build these relationships than to start with building these relationships. This is more than mere tautology. What this means is that people need to meet with each other in spite of these bad feelings. The alternative, not meeting, clearly leads nowhere. Further, the benefits of face-to-face meetings were evident from the data. As fishers talked about meeting with others - either other fishers or government – what they sometimes gained from that was a greater sense of understanding the ‘other’. Turning the old adage ‘familiarity breeds contempt’ on its head, these opportunities to become more

familiar offer the possibility of bringing people together to some degree. These two excerpts, respectively, show how a south basin fisher learned about the challenges faced by north basin fishers and how another fisher became better acquainted with people in government.

Like the meeting lasts all day. Sometimes it goes two days. And in between breaks, you talk to one another. And these guys here have a big problem over here because they don't have pickerel licences. Like we have pickerel licences. They have mainly whitefish licences. And whitefish licences you're only allowed a certain percentage of pickerel. (Interviewee F13)

(Referring to his experience on the board of MCIFF) We started to know the government. We were sitting there with lots of guys with suits and neckties on. They'd come out in the bush with their shirt. Yeah, they were good. (Interviewee F2)

6.2.3 Other Participatory Mechanisms

Fishers also contributed a variety of concrete ideas on how to increase their opportunities for participation. A couple of fishers recommended that in depth, personal interviews would be a good way to gather ideas from fishers and incorporate their knowledge. Further, it was said to be especially important to talk to older fishers in order to get some historical context for the Lake that was felt to be lacking from current scientific endeavours. Surveys were another method that was mentioned, although not everyone thought they would garner a large response. In their favour though, it was pointed out that a survey is something a fisher can fill out at his or her convenience so avoids the problem of finding time to attend a meeting. In addition to this, some fishers gave the impression that they were not inclined toward participating in a public setting and that a survey method would suit them better than a meeting. In contrast, several fishers also liked the idea of public, community-based meetings either in a town hall format or in a workshop

style. It was thought that this type of mechanism would give fishers a chance to speak, to learn about the science on the Lake, to ask questions and generally to compare and test ideas or, as one fisher put it, *'that way they'll see their shortfalls and I'll see my shortfalls.'* (Interviewee F14). This statement captures the notion that reciprocity in knowledge sharing is also an aspect of meaningful participation (Kapoor 2001).

The suggestion by fishers that in-depth interviews be done is an interesting one because when fishers discussed their participatory opportunities they commonly referenced the concerns and requests that they raised, but there was only rare mention of actual details of knowledge shared. This suggests that when knowledge enters participatory processes it may already be embedded within, and therefore obscured by, concerns and policy suggestions. This fact is mentioned in order to point out what seems to be a significant lack of opportunity for sharing local knowledge as another form of empirical data or data that complements scientific data. An example of how such an intersection of local knowledge and science might work can be found in the work of the Task Force as described in Chapter Five. This type of participation could create a significant platform for the inclusion of local knowledge in its supportive role of providing data upon which decisions concerning the Lake and the fishery are based. Perhaps future science-fisher partnerships could be modelled after it. Other than the Task Force, there does not appear to be a venue where it is the expressed intent to gather local knowledge in order to synthesize it with scientific knowledge and the overall understanding of the Lake. This is a glaring omission in the Lake's participatory fabric. Since policy formulation should rest on sound science, and since local knowledge has potential to complement science, it seems that it is at this level that a connection should also be made with local knowledge.

This type of knowledge co-production should be carried out in addition to other participatory mechanisms that involve fishers at the policy and management level.

Another way that fishers, government and science can work together is through collaborative research. This very suggestion was made by a fisher who envisaged that such an arrangement could directly involve fishers in current Lake research.

I just think that... just kind of hoping that this Winnipeg Research Consortium, if they're going to do the research I think they should have some more commercial fishermen. I know that they have two commercial fishermen on the boat but why not consult more with the fishermen in the area. You know. Find out what's going on that we see from day to day. (Interviewee F10)

This same fisher was approached by someone in the Fisheries Department to assist with tagging efforts and his response shows an interest in getting involved that way.

He asked me to volunteer to go and do that some time for him. I was jokingly saying I'll come if you pay me and stuff like that. But I was busy with my job over the summertime. I never had an opportunity to go out and do that with him. But come to think of it, it would be nice to find out and stuff like that. To do it. To experience it and see what kind of data they come up with. (Interviewee F10)

While some fishers were dismissive of scientific findings, at the same time they also often gave the general impression that they enjoy conversations and comparing notes with scientists.

(Referring to contact with the Fisheries biologist) We were phoning each other all the time. Whenever I got questions to ask him about the health of the fish or water and that, like I talked to him because he's knowledgeable on that. He's not shy to share, eh? (Interviewee F3)

Related to this intersection of science and fishers, it came to light that there is a management effort coming to the fore in fisheries worldwide, known as certification or eco-certification. The sense is that it is only a matter of time before certification for Lake Winnipeg will become a reality. It has been earmarked by the Minister of Water Stewardship as an important step to take and, according to one government respondent, is generally well received by the fishers. Certification of Lake Winnipeg fish, like other products under environmental seal, establishes the sustainability of the product - in this case qualifying the Lake as a sustainable fishery. As it turns out, Lake Winnipeg's move to become a certified fishery will dovetail nicely with the above suggestion for more collaborative research. That is because certification will require new research to be undertaken and this research, which involves collecting whitefish samples, will be accomplished with the help of the Lake's fishers. This comes about because it is indicated that within Fisheries, there is a chronic shortage of manpower to complete research to the extent that they would like to. One government respondent lamented the lack of human resources this way.

Lake Erie used to be the walleye capital of North America and now it's actually Lake Winnipeg. They have twenty biologists. We have one. (Interviewee G2)

It was further explained that FFMC recognizes this situation and, because it sees the value of certification in market terms, has offered to provide funding to hire fishers to assist with this eco-certification project. Consequently, some collaborative research will soon be underway on Lake Winnipeg.

We're working towards certification for all our lakes. So that's the Minister's vision and it's a good one. She wants to ensure market share and value for the

fishers by having these lakes acknowledged as being sustainable, the way we're fishing. And also FFMC is taking this on too. They want certified fisheries. Apparently, they have more money at their disposal than we do and they have offered to, next year, we don't have the resources to go out and sample whitefish actively. We're very good at monitoring the pickerel and the sauger populations but whitefish are a little far off shore and we're already, we have such a small crew and we have so many responsibilities that we're not able to do the whitefish. And it hasn't been the focus of the fishery. FFMC wants eco-certification and they want more whitefish going through their plant as well... And they've offered to pay or contract fishers to go out and get those whitefish samples for us. And then they would ice them and they would use our nets or the nets we prescribed and the location that we selected. And then take the entire contents of the nets, ice them and send them down to us. (Interviewee G1)

It is unclear whether or not this type of collaborative research supplies a truly participatory format for fishers. On one hand it seems that this type of arrangement reinforces a long-standing knowledge hierarchy. Fishers are not being included to share their knowledge but rather as data gatherers working on terms established by science. On the other hand it does establish a new interface between scientists and fishers. Accordingly, it presents a unique opportunity to work together on a common task. In that way it has the potential to build relationships and open the door to future collaborations that may ultimately lead to a more genuine inclusion of local knowledge.

Taken together, the sheer variety of the participatory suggestions offered by fishers seems to indicate that perhaps no single method will suit all fishers and that a better approach might be to employ a number of these methods in conjunction with each other. Providing a variety of appropriate tools and methods is, in fact, essential to creating meaningful public participation (Stewart and Sinclair 2007).

6.3 Summary

As can be seen from this and the previous chapter, there is much room for improvement in including fishers and their local knowledge in decisions concerning the fishery and the Lake more generally. Chapter 5 set out the means and extent that this knowledge has been shared in the past, enumerated the ways in which full participation was undermined, and showed how that led to an atmosphere of frustration and mistrust. In light of those crippling problems, future efforts must diligently avoid those past mistakes.

Above all, future processes must, at the most fundamental level, strive to be meaningful, transparent and inclusive. A variety of participatory methods and mechanisms may be employed in pursuing these goals (Innes and Booher 2004; Petts 2003; Beierle and Cayford 2002). Besides supplying the initial impetus for the creation of the RM Board, the fishers suggested a number of mechanisms they think would be beneficial. Among these are in-depth interviews with fishers, giving special attention to the older fishers who possess an historical perspective on the Lake. Indeed, this historical facet is identified by the literature as one of the ways that local knowledge complements scientific data sets (Robertson and McGee 2003). As well, surveys, public meetings in a town hall or workshop format, and collaborative research were also ways that fishers suggested for creating more participation. It is clear from the literature that providing a variety of tools in this way – suitable to a variety of people and needs - helps to create meaningful participation (Stewart and Sinclair 2007).

In addition to satisfying the need to be inclusive, the participatory mechanisms suggested by the fishers also offer potential to build relationships between fishers, scientists and

others in government. As described in Chapter 5, a feeling of mistrust currently predominates fishers' view of government. Needless to say, this is very detrimental to future participation. In order to restore trust to these relationships, time, patience and lots of opportunity to interact will be needed (Margerum 2007; Shindler and Cheek 1999). Related to these goals of restoring trust and good relations, conflict resolution is described as a significant benefit of an inclusive approach (Diduck 2004). This offers hope that through including fishers in various formats, regional barriers can be overcome and all involved will come to better understand each other's concerns and interests, thereby paving the way for compromise and agreement.

Current efforts to establish the RM Board appear to be paying attention to the lessons of the past. Significantly, this board's very composition, of four fishers and two scientific advisors, brings local knowledge squarely into the process and is a strong indicator that there is a move away from state-driven management and a move toward shared decision-making process. It appears to give currency to the notion that local people are in the best position to deal with local environmental conditions (Brandes et al. 2005) and creates an opportunity for including context-sensitive knowledge (Nowotny 1999). Beyond this key issue of board composition, not only is it the expressed intent of the MOU preamble to create a meaningful process, but its substantive clauses also take steps toward creating transparency and accountability, two key participatory goals (McCall 2003). Specifically, the requirement for the Minister to give written reasons in the event that she does not accept the consensus of the board has the potential to create such accountability and transparency.

From a number of perspectives the Lake's commercial fishers and their local knowledge should be included in the Lake's governance. In addition to the ethical rationale of including those most affected by decisions (Ludwig 2001), the benefits of this approach are manifold including creating a wider range of solutions to choose from (Diduck 2004), promoting fairness and justice (Pereira et al. 2003), and establishing legitimacy for decisions (Ramin 2004; Robertson and McGee 2003; Fisher, F. 2000). Further, as shown in Chapters 4 and 5 respectively, local knowledge can be used to corroborate or, alternatively, to prompt a review of scientific knowledge. In addition to these benefits, there is also a strong indication that many of the fishers are also prepared and willing to contribute to the decision-making processes. After all, as those who are impacted by decisions concerning the Lake, it is Lake Winnipeg's commercial fishers who have a huge stake in how the Lake is managed and who must therefore be given a place at the table.

See, the management of this Lake has to come from us. It has to come from within. It has to come from the fishermen. (Interviewee F3)

Chapter 7: Conclusion and Recommendations

7.0 Overview

The purpose of this research was to explore the local knowledge about Lake Winnipeg held by its commercial fishers and to consider how that knowledge is included in the Lake's governance. This goal was pursued through the examination of four specific objectives that were: 1) to establish the sorts of local knowledge that fisherman hold and the ways in which they gained this knowledge; 2) to identify what informal and formal governance processes already exist for participation of the fishers in the governance of Lake Winnipeg; 3) to determine by what means and to what extent this local knowledge has been shared in governance processes about the Lake; 4) to identify opportunities for the incorporation of the fishers' local knowledge into the governance of the Lake. A qualitative approach was used to address these objectives that included a literature review, a focus group with fishers, and semi-structured interviews with fishers and government personnel. This chapter sets out the key findings and conclusions, and makes recommendations for improving the role that commercial fishers' and their local knowledge play the governance of Lake Winnipeg.

7.1 Past Experience

In mythology, Janus is the god of doorways. With his two faces facing in opposite directions - both backwards and forwards - he symbolizes beginnings and endings. By establishing as two of my research objectives the goals of understanding existing participatory processes and of identifying opportunities for future participation, I find

myself also looking both towards the past and into the future. First, a look back is called for.

At the more formal end of the spectrum of governance processes, fishers participated in the Lake Winnipeg Fisheries Management Advisory Board (the Advisory Board) and the Manitoba Commercial Inland Fishers Federation (MCIFF). Although the fishers interviewed did not provide data on participation in the Lake Winnipeg Quota Entitlement Review Task Force (the Task Force), it also provided a means for fisher participation. There were also more informal participatory means that put fishers in contact to varying degrees with those inside and outside of government. These processes spanned a variety of interchanges and Freshwater Fish Marketing Corporation (FFMC) community meetings often provided a venue for a flow of information between government and non-government scientists and fishers. Fishers also took the initiative to personally contact people at the reserve band council level and at all levels of the Fisheries Branch and Water Stewardship.

In spite of these various points of contact, the predominant perception of the fishers is that for at least the last several years they have been provided with only poor opportunities for meaningful input. Generally speaking, inclusiveness suffered with a significant percentage of fishers not involved in any type of formal process whatsoever. This situation appears to have arisen due to practical barriers such as lack of information, inconvenient meeting schedules, and some problems with inadequate representation. Further, processes were focused on fisheries issues, with water quality and environmental issues arising only in a tangential manner, as opposed to intentionally. The Advisory

Board was identified as a main channel for fisher participation. However, that board functioned only as a consultative body where fishers shared their concerns and recommendations with government that then took those into consideration in reaching its own independent decisions, as opposed to shared decisions. Further, fishers found that the successes of this key public participation process were greatly overshadowed by its many failures. Essentially, the many reasons given by the fishers for the demise of the Advisory Board all pointed to a lack of meaningfulness in the participatory processes used. Fishers indicated that often their contributions resulted in little or no impact. Such tokenism cannot be seen as a true redistribution of power (Arnstein 1969). Other data pointed toward the fact that fishers' input was sought too late in the process to have any meaningful influence on the decisions. This scenario suggests a lack of authenticity in participation by virtue of the fact that it only occurred late in the decision-making stage (Diduck 2004). Even more damaging than these examples of late consultation were instances when the government circumvented the established process and entirely bypassed any consultation at all. In addition to these problems, accountability and transparency were missing when fishers were not given explanations for how their recommendations were being considered by the government. Related to this was the perception that their recommendations were not being translated into tangible outcomes. Accountability is a key component in creating better participatory processes (Stewart and Sinclair 2007). All of these circumstances combined to undermine meaningfulness. The lack of meaningfulness, in turn, incited in fishers a growing frustration, a mistrust of government, a loss of faith in the process and finally, complete withdrawal.

7.2 A Look Forward: Recommendations

7.2.1 General improvements to governance of the Lake and its fishery

General criticisms surrounding participation in Lake related issues related to two broad themes. The first involved practical barriers to greater participation. Within this theme, inconvenient scheduling of meetings, lack of information on Lake entities and activities, lack of notice or invitation to attend related meetings, and lack of funding to encourage attendance were all mentioned as factors. Generally speaking, these barriers reduced the degree of inclusiveness of fishers. Accordingly, consideration should be given to how to address these practical problems with the goal of increasing the number of fishers who have an avenue for meaningful public participation. The second general theme involved relationship barriers. This was described as poor relations between fishers and those in government as well as between fishers of different regions. It is recommended that the problems related to misunderstanding and mistrust be ameliorated by increasing the opportunities for these people to meet with each other and get to know each other better. Many of the recommendations that follow would provide such opportunities.

Beyond these matters, there is yet another major area for improvement. The data revealed that there is a virtual absence of fisher participation on Lake-related issues that lie outside of fisheries issues. Such broader issues relate to concerns such as the Lake's water quality and its ecological integrity. In fact, other than in some very minor and tangential ways, there was no mention of any process concerning the Lake's environment aimed at eliciting fishers' local knowledge and participation. Even the Task Force, which deliberately sought local knowledge, was focused on a fishery issue: namely, quota entitlement. Given fishers' local knowledge of environmental issues as well as the

multiple concerns they expressed over such things as water quality, the risk of exotic species, and the ramifications of altered hydrology, their participation is noticeably missing. Further, the fact that the health of the Lake and the health of the fishery are inextricably linked also points to the need to involve fishers and combine these areas of governance in a more integrated way. It is conceivable that the MOU clause requiring the Minister to keep the RM Board informed about all environmental issues will serve to initiate the integration of these related issues. It is also possible that the creation of a Healthy Lake Winnipeg Charter (Brandson and Duguid 2005), or a similar multi-stakeholder entity, could provide an opportunity for fisher participation on broader Lake issues. However, for the time being this sort of development is only speculative. Nevertheless, this question merits further attention and some of the mechanisms proposed below could begin to address this apparent gap.

7.2.2 Specific improvements to governance of the Lake and its fishery

‘... participation remains an empty word until procedures are set in place to make it real and effective.’ (Rault and Jeffrey 2008, p. 72)

This insightful statement serves as a reminder that talking about participation is not enough. It is also necessary to set up concrete mechanisms and tools in order for participation to actually occur. The Lake’s fishers, both as experienced governance participants and in other cases as non-participants, have a firsthand vantage point on the ways in which opportunities for their participation may be enhanced and they made very concrete suggestions on how this could be achieved. Accordingly, recommendations for the future of both improved public participation and for participatory governance are set out below.

7.2.2.1 Public Meetings & Collaborative Research

Some fishers promoted the ideas of using public meetings and collaborative research as participatory mechanisms. Such meetings are envisioned as opportunities where fishers can learn more about the science being done on the Lake and also provide fishers with a chance to share their knowledge. Considering that a degree of mistrust and poor working relations exist between fishers and government, such interactions could provide the much needed relationship building. It appears that the FFMC schedules frequent meetings around the Lake and that these meetings are widely attended by fishers. It would be worth considering this venue as a way to create a nexus between scientists, government personnel and fishers. Again, this approach might serve three purposes at once. It could provide more information to fishers on Lake-related issues, bring local knowledge into the exchange, and strengthen interpersonal relationships.

Collaborative research can probably also advance these three goals. One version of this type of research, as suggested by fishers, involves enlisting the help of fishers in various data gathering efforts such as the whitefish sampling in connection with eco-certification. But another type of collaboration that could better draw on local knowledge would be the type of partnership currently being undertaken by the Task Force. This is an entity that sought to synthesize science and local knowledge. Accordingly, it could provide a model that could be expanded on or used to inform similar endeavours. As indicated in the literature, local knowledge can add to the knowledge base that management decisions are drawn upon (Kalikoski and Vasconcellos 2007). Further, Rusnak (1997) asserts that there is a greater likelihood for the success of co-management where the data collection and analysis responsibilities are shared between the state and local resource users. As an

added benefit, the reciprocal channels of information that this arrangement would create are viewed as an important aspect of meaningful participation (Kapoor 2001).

7.2.2.2 Interviews & Surveys

Fishers also suggested the use of interviews and surveys as ways to increase their participation. These are direct means of accessing local knowledge that in turn could be used to advance a fuller understanding of the Lake and thereby improve the information upon which decisions are based. Personal interviews are recommended by Neis et al. (1999a) as a way to gather large amounts of information that can be used in several ways to assist scientific assessments. Perhaps interviews could be part of the repertoire of tools implemented within collaborative formats, like the Task Force described above. Such an entity, also called a “bridging organization” (de Loë et al. 2009, p. 26), could then be responsible to summarize the data and provide reports to the RM Board. This could serve to assist that board in its decision-making role and to ensure fulfilment of the memorandum of understanding (MOU) clause stipulating that decisions of the board be based on local and traditional knowledge.

7.2.2.3 Co-management

At the top of the list of participatory governance opportunities sits the fishers’ request for a co-management board, the Resource Management Board (RM Board). It was the expressed request of the outgoing fisher representatives to the Advisory Board that a new entity be established to create a co-management board ‘*where fishers have a direct and equal role in the management decision-making process*’ (Interviewee G4). While the RM Board is still in its formative stages, the fisher representatives have been involved in its

negotiation and the draft MOU offers positive indications that it will be a valuable participatory mechanism. Several MOU clauses in particular suggest that there will be both a positive shift toward securing a more inclusive and meaningful engagement of fishers generally in the governance of the fishery and that fishers' involvement will move beyond a mere advisory role to a new framework that creates a form of shared decision-making. This means that fishers will also share with government a greater responsibility for managing the fishery. This increased role for fishers in the decision-making can be expected to enable the inclusion of their perspectives on management issues, thereby broadening not only the range of values and views being considered (Ramin 2004; Ferreyra et al. 2008) but also increasing the range of potential solutions and facilitating opportunities for the resolution of conflicting interests (Diduck 2004). It can also be anticipated that management directions will gain in legitimacy and acceptance (Roberson and McGee 2003; Fischer, F. 2000) because future management directions will authentically reflect the views of fishers. Greater feelings of ownership and engagement in the issues (Brandes et al. 2005) as well as an increased sense of stewardship towards this resource may also be strengthened through this new process (Mackinson and Nøttestad 1998). The involvement of fishers in making decisions about the fishery will bring into the discussion the normative considerations (Fischer, F. 2000) and public values (Beierle and Cayford 2002) that are necessary to develop appropriate policies.

In addition to the more general responsibility that is mentioned above, the new structure that is created by the RM Board clearly places a duty on board members to consult with their wider community of fishers and to act in their best interests and in good faith toward those people. Nevertheless, this link in a representative system proved to have problems

under the Advisory Board and it remains potentially vulnerable. For this reason, I would urge two approaches. The first approach is vis-à-vis the RM Board. This approach is to put in place methods that will facilitate board members in fulfilling their consultation duties. These methods could include helping them with providing information to members and with coordinating community meetings. Perhaps it would also be helpful to provide a budget and a protocol for this aspect of the board's work. The second approach is vis-à-vis the wider community of fishers and involves focussing more directly on providing meaningful informational and consultative opportunities for them to participate directly, as opposed to through a representative, in Lake issues. This approach could involve all of those recommendations listed above such as public meetings and collaborative research. The main point is that both of these approaches to participatory governance - meaningful public participation and shared decision-making through a co-management board - should be simultaneously pursued in order to create an inclusive and durable participatory framework for fishers.

7.3 Final Comments

Lake Winnipeg has undergone tremendous change in its recent history. At one time the exclusive home to Aboriginal peoples who practiced subsistence fishing, during the 1880's the Lake was converted to a capital-intensive commercial fishery supplying fish to private companies exporting to a largely American market (Tough 1984). Many more changes can be traced over the years in the fishing gear used as well as the fishery's licensing and marketing structures. Significantly, the Lake has also been converted to a reservoir for Hydro production. Further, fishers have been witnesses to many changes in the relative abundance of a number of species both temporally and spatially. Over

roughly the last decade, the Lake has become extremely productive as a fishery, with descriptions of its fecundity conjuring up images of water that is absolutely teeming with fish. At the same time, within the last twenty years, the Lake has experienced the introduction of the rainbow smelt and there is currently the threat of the introduction of other exotic species.

Severe and widespread eutrophication is another significant change that is being seen on the Lake and is evidenced in algal blooms of increasing intensity and frequency. These blooms are so prolific that they can even be seen through satellite images. On a more human scale, they are evident in the fouled nets that fishers have to contend with. But beyond these manifest effects in impairing fishing and the aesthetic appeal of the Lake, eutrophication also represent a huge threat to the fishery due to the potential for fish die-offs caused by oxygen depletion.

In addition to these indications of poor health, there are a number of tensions present that also call for a new approach to governance. These tensions exist between an essentially Aboriginal, whitefish based fishery in the north basin and a more lucrative, mostly non-Aboriginal, pickerel- based fishery in the south basin. Tensions also extend to a lingering mistrust of government by fishers in general. Further, based on the fishers' many comments on the economic importance of a robust fishery and their dependence on that industry, fishers underscore the fact that the economic aspect is for them a critical consideration. While the increasing eutrophication currently parallels an increasingly productive fishery, the threat that this is not sustainable looms large. The fishers' many

references to the idea that this cycle could end at any time without notice, reinforces this point.

In spite of these multiple tensions, it is possible and necessary to navigate through these complex issues to achieve the goal of sustainably managing the Lake and its fishery. In fact, sustainability of the Lake's fishery is stated as a foundation of the MOU. As well, government interviewees also emphasized that sustainability is the overriding concern in the work they do. The fishers also expressed a conservation ethic and concern to protect the Lake and an economically viable fishery for future generations. Further, the literature is clear that participatory governance and expanding the network of people involved in determining policy directions has a critical role to play in sustainability (Fischer, F. 2000; Berkes et al. 2003a). It is time to address this much altered Lake as well as these strained relationships. It is time to reconfigure the way the Lake and its fishery are governed. This means that it is imperative that participatory governance, encompassing meaningful participation and shared decision-making, be pursued with utmost effort and dedication.

In pursuing this goal, participatory tools and mechanisms such as those outlined above are essential to actually give people a way to become engaged. But there is something else that is needed. The other essential ingredient is the ability of people to work together. In the context of Lake Winnipeg this is a concern due to the fact that there appears to be a history of negative participatory experiences – the frustration and mistrust that fishers expressed. In light of this, the greatest challenge for future participation is to set aside the problems that plagued the past and to give renewed participation and the promise of a co-management partnership a fresh chance to work. Of course, this is easier said than done.

But it would be a great shame if the worst were assumed. Listening carefully to the many people I talked to, it became evident that there is an undercurrent of optimism that an improved climate for shared decision-making is on the horizon.

Finally, local knowledge like that gathered through this research has great potential to advance the understanding of the Lake and its fishery and to improve the decisions that flow from that understanding. Chapter 4 illustrated that this knowledge extends to topics of the Lake's fish, ecology, hydrology, weather, and water quality. In essence this is knowledge that fishers have gleaned from their life's work on the Lake. It is knowledge that is tested through its utility in the fishing effort as well against the ideas of other fishers and scientists. Like other studies that have considered fishers' knowledge of fisheries (Zwanenburg et al. 2000; Maurstad 2000) and their environment (Fischer, J. 2000; Sutton 2000), this study has illustrated that Lake Winnipeg's fishers are a source of knowledge about their fishery and environment. Local knowledge is recognized for its potential to complement scientific knowledge (McGoodwin et al. 2000). This potential was illustrated in Chapters 4 and 5 through examples of local knowledge corroborating scientific ideas such as the role of light penetration in algae production. As well, local knowledge has been identified as a source of information on historical changes (Robertson and McGee 2003) and this aspect is pertinent in the case of Lake Winnipeg where there is a dearth of historical scientific study. Further, local knowledge can provide data that assists scientific assessments (Johannes and Neis 2007; Neis and Felt 2000) and this occurs in the context of Lake Winnipeg in determinations of sustainability and in prompting closer scrutiny of the scientific data. This is knowledge that is unique and much of it is impossible to duplicate. And, apart from the odd scribble in a logbook, it is

knowledge that resides in human memory as opposed to written form. As such, it is by its very nature vulnerable to being lost. This fact was underscored when, on my very first interview, I learned that the person I was interviewing had recently suffered health problems that made it difficult for him to share his knowledge and understanding of the Lake. This is a poignant reminder of the ephemeral nature of experiential knowledge and a reminder that, in order to learn from the fishers, the time to begin is now. Time is of the essence.

Appendix A: Focus Group Guide

- 1 An introduction of my research plans and goals that includes an explanation of why I am hosting a focus group. I will then set out the meeting agenda, format and duration so that people have an idea of what to expect.
- 2 A round of introductions from the participants along with a brief statement or two about their history and experience with the Lake.
- 3 Begin to elicit information that addresses the research objectives by asking the following questions and giving an opportunity for discussion amongst the group. I will write down the answers on a flip chart that everyone can see and refer to. Below are some examples of questions and lines of inquiry:
 - a) Tell me about times over the course of your work as a fisher when you have been asked for your input on questions concerning the Lake. These could be informal occasions or could occur in the context of a private meeting such as a board meeting of some sort.
 - b) Also tell me about times when you have taken the initiative, as opposed to having been invited, to attend a public meeting or conference in order to have an opportunity to share your views on Lake related issues.
 - c) I will go back through both of these lists generated under a) and b) and have participants identify how it was that they became aware of these opportunities/how these opportunities arose.
 - d) I will follow this by asking for feedback on:
 - i) what the role of the people/person was that they spoke to - was it a government employee, a scientist, a member of the general public etc.
 - ii) what sense participants got about how their contributions were received – was the audience attentive, interested, surprised, dismissive, etc.
 - iii) whether they were subsequently contacted by anyone to follow up on their statements.
 - iv) whether they are aware of any consequences or action being taken based on what they said.
 - v) what the main point or subject of their contribution was and whether it related to knowledge they'd gained about the Lake through their work in the fishery or otherwise.
 - vi) in what manner they gained that knowledge exactly – whether it was through first-hand experience, through discussion with others, through reading the newspaper or scientific reports or through some other means.

vii) whether they would like to have greater opportunities to share their knowledge about the Lake.

viii) the categories of knowledge they have about the Lake that stem from their work as fishers (ie: currents, erosion, water quality, Lake levels, fish population dynamics, extreme weather events etc.) and how this knowledge has been or could be shared in relation to processes concerning the Lake.

ix) identify where they feel there is a need for their input and advice possibly by considering management or policy decisions that they feel were misdirected.

x) look at what they recommend as a way to ensure that they can actively participate and have an opportunity to share their knowledge (a corollary to this is to explore what factors they think deter their participation) .

- 4 Ask the group if there is anything that I have not asked about that they feel should be touched on by the focus group.
- 5 Ask the group to generate a list of approximately twenty-five commercial fishers who they think would likely be willing to participate in this study and whose opinions would be respected as representative of the fishing community.

Appendix B: Interview Guide - Fishers

- 1 Please give me a brief history of your career as a fisher such as when you began fishing and whether you grew up in a fishing family.
- 2 (Referring to a map of Lake Winnipeg) Please indicate to me the general areas of the Lake that you have become familiar with as a fisher.
- 3 What sorts of things do you observe and learn about the Lake on an everyday basis? (Note: If this is too vague to stimulate responses, I will suggest a number of topics that they may comment on such as currents, wetlands, fish migrations, spawning habitat, effects of exotic species, loss of biodiversity, predator-prey relationships, etc.)
- 4 What governing bodies such as boards or committees have you been involved with as a fisher that relate to the Lake's water quality, fishery, or environmental health in general?
- 5 How did you become involved?
- 6 Are you aware of other groups that you personally have not been involved in but that do include the participation of commercial fishermen/women?
- 7 How did you hear about the work of these groups?
- 8 Beyond these formal processes that you have talked about, are there also informal ways that you are involved in these issues?
- 9 Does that process or point of contact (either formal or informal) give you an opportunity to share your knowledge of the Lake?
- 10 Please tell me about how you shared your knowledge.
- 11 Did it give you an opportunity to share your knowledge and ideas about the Lake?
- 12 Can you suggest ways to improve the involvement of fishermen/women in the various bodies that govern the Lake?
- 13 Are there other fishers who are very knowledgeable about the Lake that you recommend I talk to?

Appendix C: Interview Guide - Government

- 1 By way of background, please give me a brief description of your role and duties vis-à-vis Lake Winnipeg.
- 2 Please tell me about how you have been involved with the Lake's commercial fishers.
- 3 How do you see fishers' participation in the Lake's governance and how is their local knowledge used?
- 4 Have fishers been involved in policy development? If so, please describe how that occurred and give me specific examples of what policy or regulation resulted from that process.
- 5 Who else would you recommend I interview to learn how fishers participate in Lake related decision-making processes?
6. Request copies of any documents or literature that will aid me in understanding the governance structure and process.

Appendix D: Consent Form

(Printed on U. of M. letterhead)

CONSENT FORM

RESEARCH PROJECT TITLE -

FATHOMING LAKE WINNIPEG: DOES THE GOVERNANCE OF LAKE WINNIPEG INCLUDE THE LOCAL KNOWLEDGE AND PARTICIPATION OF ITS COMMERCIAL FISHERMENT?

RESEARCHER: JOY MACLEAN for Master of Natural Resources Management Thesis

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and understand any accompanying information.

1. This research aims to understand the nature of the local knowledge of Lake Winnipeg's commercial fishermen and to what extent this knowledge is incorporated into the decision-making processes concerning the lake. It is hoped that this research will advance the sustainable management of the lake as well as contribute to the understanding of participatory processes.
2. Your participation in this research will involve responding to the researcher's questions to the extent that you are able and willing to do so.
3. The risk involved in this research is minimal meaning that it is not greater than that which a person would experience in everyday life.
4. The interview is expected to require between 60 and 90 minutes and will be recorded on a small audio-recording device. The researcher will also take written notes of the interview. The interview will take place at a location that is mutually agreeable between you and the researcher.
5. The material collected will be analyzed and interpreted by the researcher and will become part of the written thesis document. However, the thesis will not in any way allow others to identify the data you gave with your identity unless you specifically request this. Further, to protect confidentiality, all interview material will be kept in a locked office for the duration of the project and will be completely disposed of at the completion of the project. The only other person besides the researcher who will have access to this material will be the researcher's advisor, Dr. John Sinclair.

6. There will be no monetary compensation for your participation.

7. Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in this research project and that you agree to participate as a subject. In no way does this waive your legal rights nor release the researchers or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any question you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent so you should feel free to ask for clarification or new information throughout your participation.

Principal Researcher: Joy MacLean 204.389.5090
Advisor: Dr. John Sinclair 204. 474.8374

This research has been approved by the Joint Faculty Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at 204.474.7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Participant's Signature _____ Date _____

Researcher's Signature _____ Date _____

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