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**APPLICATION OF AN ENVIRONMENTAL MANAGEMENT
SYSTEMS APPROACH TO FISHERIES: A CASE STUDY OF THE
FISHERY OF THE CHIPPEWAS OF NAWASH FIRST NATION**

by

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Abstract

This study explores the potential contribution of the environmental management systems approach to fisheries management. A review of fisheries management literature was conducted, and a case study was used, to develop an understanding of the limitations of current fisheries management systems in light of major environmental and social challenges facing fisheries. The case study used was the commercial-subsistence fishery of the Chippewas of Nawash First Nation, which is located at Cape Croker, Ontario. A review of literature on environmental and natural resource management was conducted to identify modern approaches to implementing best practices for natural resource management. Environmental management systems approaches are currently being used in some natural resource sectors to address the environmental management and everyday business concerns affecting their operations. The knowledge gained from an investigation of these environmental management systems approaches was used as a basis for developing a fisheries management process. The proposed fisheries management process was designed to bring vision, organization, consistency, and accountability to the strategic planning and day-to-day operation of fisheries. The fisheries management process provides a basis to identify, prioritize, and address significant management issues, and to verify and report on the effectiveness of management practices. Guidelines on how to implement the fisheries management process are provided, including specific recommendations for the Nawash Council on how their existing fisheries management system can be improved.

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CHAPTER ONE: INTRODUCTION

1.1 Purpose and Outline of the Study

The goal of this study was to recommend a method to help fishery managers evaluate and improve the quality of their management systems, and thereby enable them to demonstrate that they are working toward improvement of their management practices with the ultimate goal of protecting fishery resources. The study focused on the potential contribution of the environmental management systems (EMSs) approach to fisheries management. The following objectives were used to collect information for this research:

1. Provide a summary of environmental and social challenges that are faced by fishery managers, within the fishing industry as a whole, and by First Nation fisheries in particular.
2. Identify management strategies based on the EMSs approach that are being used in other natural resource industries to address similar challenges, and evaluate their strengths and weaknesses.
3. Recommend a fisheries management process that incorporates knowledge gained from the investigation of the EMSs approach that is being used in other natural resource industries.
4. Using the Chippewas of Nawash First Nation Fishery as a case example, demonstrate how the proposed fisheries management process can be tailored to suit a particular context.

A description of the methods that were used to achieve these objectives follows. First, current literature on fisheries management was reviewed and a case study was examined with a view to fostering an understanding of current fisheries management issues. The case study used was the commercial-subsistence fishery of the Chippewas of Nawash First Nation at Cape Croker, Ontario. The Nawash Fishery faces many of the social and environmental challenges that typically characterize fisheries, particularly First Nation fisheries in Canada. Anthropological field methods, including informal interviews

and participant observation, were used to collect and verify information, and to gain insight into the particular management challenges that face the Nawash Fishery. Next, a review of environmental and natural resource management literature was undertaken to identify potential elements that could be incorporated into a fisheries management process based on the EMSs approach. Finally, the fisheries management process that was developed in this study was used as a basis for providing specific recommendations to the Nawash Council.

This document was written to foster an understanding of the environmental and social challenges that characterize fisheries, particularly First Nation fisheries in Canada, and is intended for those who are interested in fisheries management. This study will be useful for fisheries management authorities desiring to establish or maintain their credibility within the fishing industry and with the public. In addition, because the application of the proposed fisheries management process is discussed in the context of a First Nation fishery, this study could be particularly useful for First Nations striving for self-determination in the management of their fisheries.

1.2 Case Study: Chippewas of Nawash First Nation Fishery

The Chief and Council of the Chippewas of Nawash First Nation manage a commercial-subsistence fishery off the shores of the Saugeen (Bruce) Peninsula of Lake Huron, in the Province of Ontario, Canada. In 1993, an Ontario lower court ruling (*R. v. Jones-Nadjiwon*) confirmed that the Chippewas of Nawash First Nation have Aboriginal and Treaty rights that include the right to fish on a commercial-subsistence basis in their traditional fishing territory. The Ontario Ministry of Natural Resources, which is the government body responsible for managing Ontario's fisheries, can not infringe or deny this right unless such action can be justified on the grounds of conservation.

In June of 2000, the Nawash Council entered into a four-year fisheries co-management agreement with the Ontario Ministry of Natural Resources in an attempt to resolve an ongoing dispute over the determination of parameters for commercial fishing in the First Nation's territorial waters. The dispute centres around two issues: 1) the lack of knowledge and understanding about the ecology and behaviour of targeted fish species;

and 2) the absence of a formally established, mutually-agreeable conservation ethic. The Nawash Council has invested considerable time and resources toward resolving these issues, placing particular emphasis on scientific channels to argue their position. However, the inability of these parties to trust one another's management practices, the result of historical differences and a perception of hidden agendas, hampers the process of co-operative decision-making.

1.3 Scope of the Study

My personal affiliation with Nawash enabled me to define the scope of my research. I am a Band Member of the Chippewas of Nawash First Nation. Although I have never resided at Cape Croker for extended periods, I have had occasion to visit relatives and go camping there. In 2000, I approached the Nawash Council and expressed my interest in pursuing research with respect to their Fishery. The Nawash Council was receptive to my proposal, and decided that my efforts would be best directed towards recommending ways for them to improve the Nawash fisheries management system.

More specifically, through my study, I would provide the means to incorporate formal management standards (e.g. total quality and environmental management standards) into the existing fisheries management system. As a result of this study, a fisheries management process was developed which will enable the Nawash Council to ensure accountability in the decision-making process (e.g. by recommending procedures for documenting and monitoring management decisions), and place them in a better position to demonstrate their credibility in matters of fisheries management. This study does not promise to resolve ongoing conflicts or bring the Nawash Fishery up to particular standards (e.g. ISO 14001 standard for environmental management, sustainable fishing standards). However, it is hoped that implementing the process will make this objective possible, if so desired by Nawash.

The scope of this study was limited by the question: Can environmental and quality management concepts be incorporated into a fisheries management process to help fishery managers evaluate and improve the quality of their fisheries management systems, and if so, on what basis should improvement be evaluated? The fisheries management process

developed here deals with aspects of fisheries management at the level of organizational planning. More specifically, it provides a basis for evaluating the adequacy of fisheries management systems, including policies, procedures and decision-making frameworks, according to current thought on what constitutes best practice for environmental and natural resource management. Due to the broad range of environmental, social, and economic conditions in which fisheries operate, specific methods for managing fish stocks were not evaluated or prescribed in this study, nor were methods for conflict resolution recommended. Although these tactical, or operational, aspects of fisheries management are highly important in achieving fisheries management objectives, they are beyond the scope of this study. The fisheries management process developed in this study is presented in the form of general guidelines and, if implemented, will have to be adapted on a case by case basis to suit local conditions and specific management systems. As such, the case study is used to test the relevance of the EMSs approach to fisheries, and its applicability in a particular context, namely that of a First Nation fishery.

1.4 Rationale

The goal of fisheries management is to regulate fishing effort in such a manner that the economic and social benefits of fishing can be maximized without compromising the future productivity of fishery resources. That said, a high level of uncertainty and conflict typically characterizes fisheries and creates imperfect management conditions (Harris 1995). In addition, fishery managers typically face time and resource constraints, and are frequently required to make decisions without having complete knowledge and understanding of the implications of those decisions. Given those realities, management system inefficiencies and shortcomings may go undetected or unreported, fisheries failures could occur, and the credibility of fishery managers could be undermined.

A fisheries management process, complete with measures and criteria, is needed to help fishery managers evaluate the quality of their management systems. Such a process would enable fishery managers to modify any aspects of their management systems that are ineffective or inconsistent with their fisheries' values or objectives, current conditions, or new information. Regular or periodic evaluation of fisheries management systems can

also provide fishery managers with a basis for making claims about the adequacy of their management practices to interested parties.

Strategies have been developed in the forestry and agriculture sectors using environmental management concepts such as Total Quality Management. Similar management concepts could be used by fishery managers to monitor the environmental compatibility of their fishing operations, keep track of new developments that will affect their operations, manage information effectively, and evaluate and improve their fisheries management systems. Literature pertaining to the application of quality and environmental management concepts to fisheries is sparse and merely suggestive. Further inquiry into the potential benefits of applying the EMSs approach to fisheries is necessary (Sproul 1998a).

1.5 Organization of Thesis

This document is comprised of six chapters. In Chapter Two, the research methods that were used in the conduct of this study are described in detail. In Chapter Three, a general summary of responsibilities and challenges facing modern fisheries management is provided. Environmental management strategies based on the EMSs approach currently being used in natural resource industries are examined in Chapter Four, including major concerns with respect to their implementation. In Chapter Five, important background information on the case study is provided and the current Nawash fisheries management system is described. The management process that was developed in this study, and its practical application in the context of the Nawash Fishery, is discussed in Chapter Six.

CHAPTER TWO: RESEARCH METHODS

2.1 Introduction

The aim, in this chapter, is to outline the methods used to conduct this study. The purpose and scope of the literature review, case study, and field methods are described. In addition, ethical considerations and limitations of the study are discussed.

2.2 Literature Review

A literature review was conducted to gather information for this study. Three topics were researched in the literature review. First, a review of academic and industry-generated literature pertaining to fisheries management was conducted to help define the nature and scope of the issues facing fisheries managers. The material reviewed included academic journals and books, and literature from international organizations such as the United Nations Food and Agriculture Organization. The findings of the fisheries management literature review are presented in Chapter Two.

Second, a review of literature on environmental and natural resource management was conducted to facilitate a general understanding of modern approaches to best practices for natural resource management. More specifically, management strategies based on the EMSs approach currently being used to address management challenges within the agriculture, forestry and fishing industries were examined as a basis for developing a fisheries management process. The findings of this review are discussed in Chapter Three.

Finally, literature pertaining specifically to the history of the Nawash Fishery was reviewed. The review covered relevant legal literature and case rulings such as the *Constitution Act* (1982), *R. v. Sparrow* [1990] and *R. v. Jones-Nadjiwon* (1993). Types of materials reviewed included books, unpublished papers (written by Nawash community members) and Internet websites. Background and historical information on the Nawash Fishery is provided in Chapter Five.

2.3 Conferences

Between March 7-9, 2000 I attended the International Boston Seafood Show in Boston, Massachusetts, where I spoke with a number of people who were affiliated with the fishing industry. Specifically, I spoke with representatives from the Marine Stewardship Council, Ocean Trust, the National Fisheries Institute (US), NOAA/National Marine Fisheries Service (US), the Canadian Food Inspection Agency, and a First Nation company from Alaska that harvests and processes smoked salmon and halibut using traditional methods. The Keynote Address, entitled "The Millennium State of the Fisheries Summit", featured the top US and FAO fisheries scientists. Topics discussed included the current status of the world's fishery resources and the global political climate surrounding the management of fisheries.

I also had the opportunity to attend a conference on First Nations and Fisheries Management, held between October 11-12, 2000 in Halifax, Nova Scotia. The conference was organized by the Atlantic Policy Congress, an organization that acts in the interests of the Mi'kmaq, Maliseet, and Passamaquoddy in matters pertaining to the self-determination and empowerment of First Nations. The speakers, including Chiefs, government representatives and academics, discussed a wide range of issues relating to fisheries management in the context of Aboriginal and Treaty fishing rights. In addition to the presentations and panel discussions, a number of issues were discussed during in-depth group discussion sessions. These group sessions were highly informative and useful for the purpose of this study because I was able to gain insight into the dilemmas that First Nations other than Nawash were facing in the management of their fishery. The group discussions provided an opportunity to discuss the practicality of using an environmental management system to address First Nation fisheries management challenges.

2.4 Chippewas of Nawash First Nation: Case Study

Berkes and Folke (1998) emphasize the importance of the case study approach in understanding long-term evolutionary changes in resource management systems resulting from particular social, economic and ecological contexts. Stephenson and Lane (1995) propose that applied case studies on specific fisheries should be conducted to facilitate the

evolution of management models designed to facilitate integrated management, anticipatory decision-making, and consensus building. Further, they demonstrate how case studies can facilitate an understanding of local-level decision-making processes, including how communities identify, prioritize, and address community problems. Case studies can provide insight into the practical benefits of the EMSs approach for particular fisheries, as well as how EMS can be incorporated into a comprehensive fisheries management process that can be adapted on a case-by-case basis.

In Canada, case studies are needed which address the potential benefits of EMS for Aboriginal (First Nation) fisheries, and how environmental management concepts can be applied to Aboriginal fisheries. A case study was used as a basis to determine whether environmental management strategies that are being used in other natural resource industries can be used by the Nawash Council to improve their ability to address the specific management challenges that face them. Furthermore, a case study was a means to ensure that any proposed fisheries management process would have potential utility for the fishery managers involved: to simply develop the process without demonstrating how it can be applied in a specific context would not be particularly useful. The sub-sections that follow provide a more detailed account of what the case study entailed, including the types of field methods used, the duration of field study, and ethical considerations.

2.4.1 Field Methods

When I started my field research, I was informed by Nawash fisheries management personnel that Nawash fisheries management system documentation may be lacking in some instances and that the Nawash Fishery operates using an informal institutional structure. The Nawash Fishery operates in a community setting, therefore it was necessary to learn about the community's politics to gain a more complete picture of how the Fishery is managed, and why, before making any recommendations as to how the management system could be improved. Had I worked only with Councillors and Nawash fisheries management personnel, my ability to gain insight into the behaviour and structure of the community would have been limited. Instead, I decided to use field methods from cultural anthropology, a method of social research, to gather information for the Nawash

Fishery case study. Specifically, informal interviews, a document review, participatory action research, and participant observation were used to gain first hand knowledge of various aspects of the Fishery. Cultural anthropologists often use some or all of these methods to ascertain rules of behaviour, have access to persons or groups, understand relationships, study alliances and conflicts, learn about a group's history, and test the opinions of informants against one another (Friedrichs and Lüdtkke 1975).

Informal interviewing, as opposed to structured interviewing, was the principal method of collecting information about the Nawash Fishery. Casual and in-depth conversations with Nawash Councillors, fishermen, fisheries management personnel, and community members concerning fishery-related issues, provided insight into the management challenges that are faced by the Nawash Fishery. Generally speaking, most individuals were willing to share information and express their views, either openly or privately, provided that their identities would not be revealed.

Documentation is an important feature of any formal management system. Documents used by the Nawash Council for the purpose of managing their Fishery were reviewed to gain an understanding of the Fishery and its existing management. This document review also helped to determine the extent to which fisheries management practices were documented. For example, minutes of Nawash Council meetings were useful because they provided a record of decisions that have been made by the Council, as well as the discussions that lead to each decision.

Participatory Action Research was also used to foster understanding of current and past fisheries management issues and to develop the proposed fisheries management process. Fletcher (1999: 1) states that:

Participatory Action Research brings together investigation, education and action at the community level in ways that allow people to address concerns within their lives and their communities.

Participatory action research is not a specific method; rather it is a general approach to investigation designed to facilitate development, or action, through open discussion and planning. Proponents of Participatory Action Research believe that learning can occur in an informal environment through observation, and that active involvement in the lives of those being studied can facilitate the researcher's understanding of various points of view.

Participant observation also enables facts to come forth in natural settings (Friedrichs and Lüdtkke 1975). In this case, participant observation involved participating in key fishery-related activities such as fishing and Harvest Assessment, and was used to gain first-hand insight into the behaviour and activities of fishermen and other management personnel. Direct participation in fishery and community social activities also facilitated the development of informal relationships with fishermen, management personnel, and other community members. I had to consider that statements made in interviews are not always in accordance with the actual behaviour of those interviewed (La Piere 1934; Kutner et. al. 1952; Linn 1965). Direct observation enabled verification of information that was gathered in the interviews as well as in the document review (e.g. the existence of undocumented procedures or policies, whether procedures are being implemented, and their level of effectiveness).

One noteworthy problem with anthropological field methods such as participant observation is that they have the potential to produce endless quantities of research material (Friedrichs and Lüdtkke 1975). Prior to beginning the field research component of the study, I compiled a general list of information that would be required to generate a case description and to develop implementation guidelines for the proposed process. This list provided me with direction and purpose, enabled me to systematically gather information, and served as a basis for keeping track of my progress.

The next task was to identify potential sources of information; people who possessed a good understanding of the Fishery that could be beneficial for my study. Friedrichs and Lüdtkke (1975: 198) distinguish between 'key persons', 'informants' and 'experts'; as follows. *Key persons* are "persons in strategically well-situated positions around which the happenings in the field crystallize on account of the persons' instrumental or expressive importance (authorities, opinion-leaders, influential, popular, informed or qualified persons)". *Informants* are persons who "dispose of an especially good (above average) knowledge of the parts of the field (persons, hierarchies, rules of behaviour, accommodations, etc.) important for the observation's aims". Finally, *experts* "compose that subgroup of informants which dispose of this knowledge on account of their formal position or rather instrumental role". Key persons and experts, namely

persons occupying positions of responsibility in the operation and management of the Nawash Fishery, were instrumental in the formulation of the proposed fisheries management process and guidelines. Through a discussion and planning process, as well as through informal interviews, they played a role in the following capacities:

1. Provided background information and helped to familiarize me with various aspects of the operation and management of the Fishery.
2. Identified the management needs of the Fishery; based on personal knowledge and experience.
3. Assessed whether the elements of the proposed management framework are useful and feasible in a practical sense.
4. Provided recommendations for further development and implementation of the management framework.

In addition, many community members (i.e. informants), helped me become familiar with fishing and management practices, and understand the social norms of the community. Key barriers to effective management of the Nawash Fishery were identified with the help of various Councillors, the Fisheries Management Biologist and the newly-formed Saugeen Ojibway Fisheries Management Board.

I often wrote notes during Nawash Council sessions and other fishery-related meetings if I felt that the information was neutral or common knowledge - I used my own judgment in this regard. When I was in doubt, I would verify whether the information should be held in confidence with the source. Throughout the Nawash Fishery case study period, my field notes useful for determining the relative importance of information, recalling events, identifying trends and verifying information.

2.4.2 Ethical Considerations and Duration of Field Research

The Nawash Council consented to this study by approving a Band Council Resolution (Motion No. 345) (Appendix I). The Human Ethics Review Committee of the Faculty of Graduate Studies of Dalhousie University approved the proposal for this research project on January 28, 2000 (Appendix II). Shortly thereafter, the field research

component of the study began, taking place between February 2000 and February 2001. All fisheries management personnel were informed of the study prior to the field study period. It was openly understood that the identities of people who voiced their opinions and the details of private conversations or documents would not be revealed in this study. A letter was circulated to every household within the Nawash community to provide further details of this study. The frequency and duration of visits to Cape Croker varied considerably throughout this period. Shorter visits lasted from one to three days; longer ones lasted from one to two weeks. All visits were planned according to the schedules of key individuals and/or the occurrence of important activities or meetings.

As a member of the Chippewas of Nawash First Nation, I was welcomed into the community by most people. Community members and fisheries management personnel were helpful in providing accommodations and were very hospitable. However, having never lived at Cape Croker, I was regarded as somewhat of an outsider. Therefore, I had to gain a certain level of trust; trust that had to be renewed on an ongoing basis, which meant that I had to spend a significant amount of time at Cape Croker during the study period. In total, approximately 60 days were spent in the community. While I was away from Cape Croker, I remained in contact with fisheries management personnel through e-mail and by telephone.

The more time I spent at Cape Croker, the more people seemed comfortable, even eager, to share their views about the management of the Nawash Fishery. Nonetheless, I constantly had to assure people that the particular details of the community's internal politics would not be included in my study and that our conversations would be held in confidence. It was also necessary to diversify the range of people with whom I stayed and visited in order to avoid giving the perception that I was allied with particular individuals. My on-Reserve accommodations variously included a small, remote, rented apartment, the houses of new-found relatives, and a rented trailer. I also stayed at the off-Reserve apartment of the Assessment Biologist on occasion.

2.5 Limitations

The limitations of this study were most closely associated with the particular conditions surrounding the Nawash Fishery. It would have been beneficial to have multiple perspectives regarding many of the issues surrounding the management of the Nawash Fishery and the implications of certain events (e.g. Ontario Ministry of Natural Resources, Department of Indian Affairs and Northern Development, non-Native commercial and recreational fishermen). However, there tends to be a high degree of mistrust of outsiders among many First Nations. Some of the circumstances that have led to mistrust of government agencies in the case of Nawash have been described in this study. Out of respect for the trust that was afforded to me by Nawash, I relied on community members and fisheries management personnel to help shape my understanding of the fisheries' challenges. I am confident that Nawash community members recognized the importance of giving me an honest portrayal of historical and current conditions to enable me to propose a useful process for managing their Fishery. Perhaps future studies will provide additional insights into the perspectives of other stakeholders in the Laurentian Great Lakes fisheries.

2.6 Summary

In this chapter, a detailed description of the research methods used in this study is provided. To summarize, a literature review was conducted to gain an understanding of current fisheries management issues, the approach taken by other natural resource industries to address similar management issues, and background and historical information on the Nawash Fishery. A case study on the Nawash Fishery was used to facilitate an understanding of local-level decision-making processes and to assess the practical benefits of EMS for the Nawash Fishery.

CHAPTER THREE: FISHERIES MANAGEMENT

3.1 Introduction

In this chapter, modern perspectives on fisheries management are discussed, and a wide range of management problems that can, and commonly do, impede the fisheries management process are examined. Also discussed are some of the limitations of current fisheries management systems in terms of their ability to facilitate adequate responses to management problems. The impact of environmental politics on fisheries management is highlighted throughout this chapter as a precursor to a discussion of EMS in the next chapter.

3.2 Fisheries Management

A *fishery* is a term used to describe the collective enterprise of taking fish, usually used in conjunction with reference to the species, gear or area involved (Bureau of Rural Sciences 1999); or a system consisting of three interacting elements: biota, habitat and humans. *Biota* refers to targeted and non-targeted species. *Habitat* includes the living and non-living environment in which biota live. The *human* element of fisheries includes the social and economic factors that determine fishing effort. Fisheries can be classified as being either marine or inland. Marine fisheries are those which operate within sea waters, whereas inland fisheries operate in waters existing inland including lakes, ponds, streams, rivers, natural or artificial watercourses and reservoirs, and coastal lagoons and artificial water bodies (FAO 1999b).

In Canada, a marine/inland distinction is used to separate jurisdiction in fisheries management. The federal Department of Fisheries and Oceans manages Canada's marine fisheries and oversees the management of inland fisheries. Provincial governments are charged with the day-to-day management of inland fisheries within their own borders, including management of diadromous species. *Diadromous* species are fish which undertake spawning migration from ocean to freshwater or vice versa (Harvey et al. 1998). *Anadromous* species spend their adult life in the sea but swim upstream to

freshwater spawning grounds in order to reproduce (UN 1997). *Catadromous* species, such as eels, spawn in the ocean but live part of their lives in freshwater (FAO 1999b).

Management is defined as “the art or science of determining, coordinating, and utilizing human and material resources to reach the goals and objectives of the organization” (Barber and Taylor 1990: 367). External social, political, scientific, technical, and economic values also influence the decision-making process. Generally speaking, the purpose of fisheries management is to determine the productive capacity of particular stocks and regulate fishing effort accordingly to avoid depleting their populations. The accepted scope of fisheries management responsibilities has been broadened to include ecosystem-level thinking and social considerations. The ‘systems approach’ is based on the notion that fisheries do not exist in isolation and, therefore, should not be managed as such. Rather, fisheries comprise part of a greater system, an environment, in which the implications of human activities are diverse, complex and interrelated. Fishery managers are now expected to focus greater attention on the maintenance of fish habitat, the relationships between species, the effects of fishing on non-target species and the aquatic environment, and the economical, cultural, and political implications of fishing for interested parties (Chesson and Clayton 1998).

Fisheries management is defined by the Food and Agriculture Organization of the United Nations (FAO 1997b: 7) as:

The integrated process of information gathering, analysis, planning, consultation, decision-making, allocation of resources and formulation and implementation, with enforcement as necessary, of regulations or rules which govern fisheries activities in order to ensure the continued productivity of the resources and accomplishment of other fisheries objectives.

Hanson (2000:20) describes what he considers to be essential criteria for effective fisheries management systems. He states:

Governance extends, of course, to patterns of enforcement, interpretation of the law in a dynamic and equitable fashion, and to mechanisms for achieving shared objectives through partnership, consultation and clear lines of communications. These are powerful points that can make a huge difference in whether fisheries management is successful—or not.

Hanson's perspective on fisheries management is consistent with the definition provided by the FAO, but also reflects changing views on fisheries management; specifically, the increasing expectation that fishery managers incorporate social considerations when formulating objectives.

Fisheries management is best described as a process comprised of strategic and tactical elements. A *strategy* is defined as a "careful plan or method" (Gove 1993: 2256) or "the art or skill of careful planning towards an advantage or desired end" (Brown 1993b: 3085). For the purpose of this study, a *fisheries management strategy* is defined as a methodology for planning and decision-making designed to help fishery managers determine, prioritize and achieve the goals and objectives of fisheries. A *tactic* is defined as an "action or manoeuvre" (Brown 1993b: 3201), which is "carried out in immediate support of" a strategy (Sykes 1976: 1176). Tactics, as they pertain to fisheries management in this study, refer to the specific methods, rules, and institutional frameworks that are used at the operational level to achieve a fishery's goals and objectives.

The tactics used to govern fisheries vary from one fisheries management system to another. The characteristics of fisheries management systems are determined by the scale and purpose of fisheries, and by their unique cultures and histories. For example, a government body in charge of managing large-scale commercial fisheries, such as the US National Marine Fisheries Service, may institute a formal decision-making framework consisting of an advisory committee of fisheries scientists, a forum for public consultation, and a management body comprised of policy makers whose decisions are guided by social politics (Miller and Gale 1986). Alternatively, a small, community-based Aboriginal fishery may institute a less formal decision-making framework consisting of a committee of elders, a committee of fishers, and a management body comprised of the Band Chief and Council.

The degree to which fisheries are 'managed' is variable from low to high, depending on the simplicity or complexity of their decision making processes and the amount of physical, financial and human resources allocated to addressing management problems such as biological uncertainty and jurisdictional conflict. The quality of

management provided is also variable from low to high, depending on the ability of fishery managers to provide leadership and make decisions in a reliable and credible manner.

Notably, the degree to which a fishery is “managed” is not necessarily a measure of the quality of its management practice. For example, the fact that a fishery is highly managed does not necessarily mean that it is well managed. A fishery manager may allocate considerable resources to research, enforcement and conflict resolution, but fail to bring vision, organization, consistency and accountability to the management process. The Canadian Department of Fisheries and Oceans is a good case in point. Despite the DFO’s heavy investment in scientific research and public consultation, the potential for bureaucratic and political interference in the DFO’s decision-making process is widely discussed in fisheries management literature, particularly in the context of recent fisheries collapses in Canada which occurred under the DFO’s management (e.g. Hutchings et al. 1997; Healey 1997; Doubleday et al. 1997).

The FAO stipulates that (1997b: 65), at the very minimum, any fisheries management body should have the capacity to fulfill the following functions:

- *collect, collate and analyze information on the status of the stocks, the nature of catches and landings and the nature of the fishery;*
- *collect, collate and evaluate information on the economic and social importance and impact of the fishery;*
- *in conjunction with other relevant authorities, consider the impact of the fishery on the management of the geo-political zone (e.g. coastal, catchment, economic grouping) as a whole, and the impacts of other activities in this zone on fisheries;*
- *liaise, discuss and make joint-decisions with all groups interested in the fishery;*
- *facilitate the formulation of policy relating to the fishery;*
- *coordinate the formulation of management objectives and management measures, taking cognizance of the preceding factors listed above;*
- *review the objectives and management measures on a regular basis; and*
- *implement the measures, requiring monitoring, control and surveillance of the fishery.*

Predetermined and well-defined values, goals, and objectives are essential components of effective decision-making (Barber and Taylor 1990). The role of the fisheries manager is to control the use of fishery resources according to predetermined organizational (internal) values, taking into consideration external human and ecological interests (Barber and Taylor 1990). *Values* are enduring beliefs, standards, or judgmental assumptions that determine the worth of an entity to an individual or in a particular situation (Andrews and Waits 1978). Alternatively, values may determine whether a particular mode of conduct is personally or socially preferable over another (Rokeach 1973).

A set of values upholds an ethic and influences goals. An *ethic* is a broadly defined standard used to determine actions or behaviour; “the proper behaviour of people toward each other and toward other species and nature” (Freedman 1998). *Goals* are ideals, driving factors, ends, or accomplishments for which managers formulate plans, devise strategies and direct organizational activities (Barber and Taylor 1990). They are broad in their scope by definition and are not operationally feasible without supporting objectives. *Objectives* are “specific, measurable, and verifiable statements of intermediate tasks that must be accomplished to attain a goal” (Barber and Taylor 1990: 368). Performance measures, or indicators, provide a basis for evaluating progress toward meeting objectives. To summarize, ethics, values, goals and objectives constitute an hierarchical decision-making framework, or process, in which one level promotes satisfaction of another. This process enables managers to move from the general to the more specific in strategic planning.

A major problem facing fisheries today is that planning tends to occur largely at the tactical rather than the strategic level (Rothschild 1973). Barber and Taylor (1991: 1) summarize the importance of goals, objectives, and values in strategic planning:

Objectives help define goals, identify conflicting activities, guide elements of the decision-making process, and ensure accountability of personnel within an organization. Without clearly defined goals and supporting objectives, goal displacement often occurs. Goal- and objective-setting are influenced by values. Values are personal standards as to what is good or bad, fair or unfair, and hence influence our decisions. The more incongruent the participants' values are in an organization, the more difficult it is to determine and reach an organization's goals and objectives.

Barber and Taylor (1990) suggest that a lack of understanding of the concepts of values, goals, objectives, and their interactions is a common error in fisheries management. Holden (1995: 6) indicates that fisheries frequently fail to establish objectives. He states: "Setting objectives may appear obvious but it is an almost universally ignored procedure. Because it is not done there are no criteria by which to decide whether management is successful". Consistent with this assertion, Hilborn (1987:4) states: "Most people involved in resource management recognize that many decisions are implemented with little or no evaluation or monitoring. We explore but we never know where we went or what we learned". Serchuk and Smolowitz (1990) emphasize the need to define long-term management goals accompanied by specific biological, social and economic objectives and targets (or goals and objectives, as defined in this study) for meeting them. In many cases, fisheries have been managed using objectives that lack specificity, definitiveness and operational feasibility (Lane 1992).

Stephenson and Lane (1995) point to the absence of an appropriate framework and methodology for fisheries management decision-making that permits operational, social and economic objectives to be reviewed and analyzed in conjunction with biological objectives. A conservation ethic, accompanied by a set of values (e.g. biological, ecological, economic, social), should be defined to direct the management of Canada's fisheries (Crawford and Morito 1997; Oliver et al. 1995; Callicott 1991). That said, Crawford and Morito (1997) indicate that defining a conservation ethic for Canadian fisheries will be difficult because the conservation values of First Nations, commercial fisheries, recreational fisheries, environmental protection organizations, fisheries biologists, fishery managers and the general public may vary.

The FAO Code of Conduct for Responsible Fisheries (1995) outlines ethics and broad standards for fisheries management designed to ensure sustainable exploitation of aquatic living resources with due respect for biological, technical, economic, social, environmental and commercial aspects of fisheries (FAO 1995; Article 2). The Canadian Code of Conduct for Responsible Fishing Operations (1998), which is consistent with the FAO Code of Conduct for Responsible Fisheries, outlines general standards for all commercial fisheries operating in Canadian waters. Implementation of the Canadian Code

of Conduct for Responsible Fishing Operations will “contribute directly to the conservation of stocks and the protection of the aquatic environment for present and future generations of Canadians” (1998: 1).

The FAO (1997a) recommends that fishery managers should make a commitment to work toward the long-term conservation and sustainable use of fisheries in formally established fisheries management policies. Furthermore, the FAO recommends that fishery managers should establish clearly defined conservation and sustainability objectives, accompanied by specific management actions and an appropriate institutional framework. Effective management institutions necessarily include effective communication, interaction, and feedback networks (FAO 1997b). New information, knowledge and understanding should be effectively communicated through appropriate channels to the various operational units of the fishery, interested parties, other agencies, and the public.

3.3 Challenges Facing Fisheries

Fisheries make an important contribution to food supplies, employment and culture. That said, fishery resources are exposed to more natural and human stresses than ever before and a significant number of the world’s exploited fisheries are fully exploited, over-exploited, depleted, or in need of recovery (FAO 1997b). For example, habitat degradation and loss, biodiversity loss, over-fishing and pollution are generally associated with a decline in the quantity and/or quality of fish, and have significantly eroded the carrying capacity of fishing environments globally (FAO 1999). Consequently, the way that fisheries are managed has become a global concern (FAO 1999).

A number of problems hinder the ability of fishery managers to make decisions in an effective and timely manner. First, fishery managers must consider a growing number of complex environmental factors that affect, and are affected by, fisheries management decisions. Second, fisheries are characterized by high levels of environmental, social and economic uncertainty. Third, fisheries management decisions are subject to increasing public scrutiny. Finally, fishery managers commonly face jurisdictional disputes and user conflicts.

Current literature on fisheries management indicates that modern fisheries management systems are ill equipped to deal with these problems (e.g. Larkin 1978; Magnuson 1991; Lane 1992; Pearse and Walters 1992; Hilborn et al. 1993; Parsons 1993; Stephenson and Lane 1995; Caddy 1997; FAO 1997b; Hutchings et al. 1997). As a result, fishery managers are being challenged to address the inadequacies of their decision-making processes so that they will be in a better position to anticipate and respond to the management problems facing them, particularly environmental issues. A more detailed summary of the factors that contribute to the need for fisheries management reform follows.

3.3.1 Environmental Issues

The idea that fisheries need to be formally managed emerged late in the nineteenth century when governments were faced with the realization that aquatic resources do not exist in infinite abundance (Harris 1995). Off the coast of Labrador, intense commercial whaling had significantly reduced the number of right whales, and the great auk, an avian species, had been hunted to extinction. Throughout Canada's East Coast, increases and decreases in commercial landings of groundfish indicated periods of scarcity and abundance; however, at the time, it seemed that the level of commercial harvesting was insufficient to endanger fish populations (Harris 1995). By the late 1980s there was no doubt that the rapid and uncontrolled exploitation of aquatic resources, made possible with technological innovations (e.g. global positioning systems, radar, echo-sounders, more powerful vessels and improved harvesting methods), were having serious environmental and resource ramifications (FAO 1997b).

The environment is now commonly regarded as the third most important issue in international politics after global security and international economics (Porter and Welsch Brown 1996). Environmental politics, played out at the international level in various international fora, most notably at 1992 United Nations Conference on Environment and Development, have significantly influenced fisheries management, and, according to Hoel (1998: 239), fisheries management "is increasingly regarded as a subset of environmental politics". Traditional concerns in fisheries management, such as sustainable harvest levels,

are compatible with environmental concerns (Hoel 1998). Consequently, a number of formal international environmental agreements, such as the North Sea Conference, have been revised to include fisheries management issues in addition to traditional pollution issues (Statement of Conclusions 1997).

Currently, the most pressing environmental issues with respect to fishery-related activities are the nature and scale of harvesting practices, and selectivity of gear (FAO 1997b). Fishing techniques such as trawling increase the level of by-catch, discards and environmental degradation, which, in turn, affects the abundance and behaviour of targeted and non-targeted fish species. According to the FAO (1999:19), "the single most important issue and preoccupation for the future of inland fisheries is the degradation of the environment and loss of fishery habitats".

A number of factors contribute directly to the degradation and loss of critical habitats, nurseries, spawning grounds and feeding areas that sustain fishery resources. These factors include increasing urbanization, agricultural, forestry and fishing practices, and industrial activities. Furthermore, pollutants that enter the hydrological cycle through run-off, rainfall, surface waters and aquifers directly affect the health of fishery resources (and the health of humans who regularly consume fishery products) by enabling toxic contaminants such as methylmercury and organochlorines to bio-accumulate in the food chain (Government of Canada and the United States Environmental Protection Agency 1995). Impacts on fishery resources such as habitat loss, invasion of exotic species, restricted range, over-exploitation, and disease may also be caused by natural influences (FAO 1999).

Changes in climatic cycles, caused by natural factors and human activities, can also influence the ecology and abundance of fishery resources (FAO 1999). For example, variations in rainfall can alter the amount of available living space and nutrient cycles, which could make fish more or less vulnerable to exploitation by humans. Variations in temperature can affect metabolic rates, growth rates and behaviour, and alter both the movements and reproduction of fish. Climatic changes, such as global warming, can significantly influence the amount of fish available for capture.

Environmental issues can be global and trans-boundary in scope, multi-disciplinary, and value-laden, which creates a number of problems for managers who are trying to frame the scope of their environmental responsibilities (Bansal and Howard 1997). To deal with environmental issues, the FAO (1997a: 14) suggests that fishery managers should focus on the following three components of fisheries systems:

1. *Management of the fishery - regulation oriented activities concerning the activities of the fishers and their social and economic context such as licensing, control of mesh size, setting of closed seasons, control of markets, subsidies, etc. Management policies here should be aimed at: a) limiting access to the fishery so that excess effort is avoided; and b) limiting the use of destructive and harmful fishing gears.*
2. *Management of the fish - control over the magnitude and size of the fish population by stocking, introduction of new species and other enhancement techniques as appropriate. Management here is aimed at establishing the most cost-effective approaches for enhancement.*
3. *Management of the environment - this is pursued at two different levels: a) negotiating and arranging for adequate environmental conditions of water quality, quantity, timeliness of flow, habitat diversity etc.; and b) promoting physical improvements to improve the support capacity for fish.*

The FAO (1997a) emphasizes that, of these three processes, the first (management of the fishery) characterizes the conventional approach to management, and that there is a need to concentrate on all three components.

3.3.2 Uncertainty

High levels of environmental, social, and economic uncertainty typically characterize fisheries. Hilborn (1987) tells us that there is uncertainty with respect to the productive potential of fish stocks, the consequences of resource exploitation, the availability of financial and other resources, and the outcomes of political decisions. A major impact of the rise of environmentalism in recent years is the increasing acceptance of the legitimacy of new actors and environmental concerns in fisheries management (Hoel 1998). New actors, such as environmental agencies, create political uncertainty by bringing new perspectives and questioning the conventional wisdom of fisheries management. The degree to which uncertainty impedes fisheries management decision-

making is highly variable from one fishery to another because fisheries differ in size, intensity and complexity. These differences relate to the type of gear used, the number and type of species that are being targeted, the number of fishers, the geographical scope of the fishery, environmental and social conditions, and the availability of information about fish species.

The FAO (1996: 8) states that changes in fisheries systems are “slowly reversible, difficult to control, not well understood, and subject to changing environment and human values”. Fishery managers are required to anticipate and respond to changing conditions and new information, such as changing views on management philosophy, advancements in biological assessment methods, new regulations, and changing environmental factors, on an ongoing basis. Current fisheries management systems have been criticized on the grounds that they fail to provide an adequate framework for addressing the variability of fisheries systems (Larkin 1978; Magnuson 1991; Lane 1992).

Fluctuations in natural systems, particularly in aquatic environments, are not well understood. As a result, it is difficult to pinpoint specific factors that cause the status or behaviour of fishery resources to change. However, failure to monitor and control anthropogenic and natural fluctuations, at least to the extent that is possible, can result in over-harvesting of fishery resources or other negative environmental implications that could threaten the continued productivity of fisheries. The United Nations, in its International Code of Conduct for Responsible Fisheries (FAO 1995) and the Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks, recommends the precautionary approach for dealing with uncertainty in fisheries management. The following excerpt from the FAO's *Technical Guidelines: Precautionary Approach to Capture Fisheries and Species Introductions* (1996: 6) describes the precautionary approach:

The precautionary approach involves the application of prudent foresight. Taking account of the uncertainties in fisheries systems and the need to take action with incomplete knowledge, it requires, inter alia:

- a) *consideration of the needs of future generations and avoidance of changes that are not potentially reversible;*

- b) *prior identification of undesirable outcomes and of measures that will avoid them or correct them promptly;*
- c) *that any necessary corrective measures are initiated without delay, and that they should achieve their purpose promptly, on a timescale not exceeding two or three decades;*
- d) *that where the likely impact of resource use is uncertain, priority should be given to conserving the productive capacity of the resource;*
- e) *that harvesting and processing capacity should be commensurate with estimated sustainable levels of the resource, and that increases in capacity should be further contained when resource productivity is highly uncertain;*
- f) *all fishing activities must have prior management authorization and be subject to periodic review;*
- g) *an established legal and institutional framework for fishery management, within which management plans that implement the above points are instituted for each fishery; and*
- h) *appropriate placement of the burden of proof by adhering to the requirements above.*

Implementation of the precautionary approach requires expansion of fisheries research and an increase in the parameters to be monitored (Hoel 1998).

The precautionary approach has become an important aspect of resource and environmental management in general. Principle 15 of the United Nations Conference on Environment and Development Rio Declaration (United Nations Conference on Environment and Development 1992) states:

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious damage, lack of full scientific uncertainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

The vagueness of such statements increases the potential for divergent interpretations with respect to the responsibilities that apply to resource managers (Hoel 1998: 240). So called "soft law" arrangements, such as the FAO Code of Conduct for Responsible Fisheries, are not legally binding, but have significant political significance

(Hoel 1998: 248). Current trends indicate that the public will play an increasingly influential role in determining acceptable levels of fisheries' exploitation and, as a result, fisheries agencies will face increasing social pressure to adopt low-risk policies (Walters and Pearse 1996).

3.3.3 Public Involvement

Public perceptions regarding the adequacy of management practices and the credibility of management authorities have been significantly altered by reports in the media of mismanaged fisheries. The Canadian public have witnessed or experienced first-hand the implications of recent fisheries losses, particularly the economic hardship endured by fishing communities in the Atlantic Provinces after the collapse of the Canadian cod fishery in the early 1990s.

Public involvement in resource management has increased steadily since the 1970s (Culhane 1981). The rise of environmentalism in international politics and the public domain instigated the increasing expectation for openness and participation in fisheries management on a scale that is much higher than that traditionally practiced in the fisheries sector (Hoel 1998). The 1992 United Nations Conference on Environment and Development was a breakthrough for non-governmental organization influence in the international environmental arena (Doherty 1995). The transparency principle is now mandated in international fishing agreements that were developed in international environmental fora. For example, the 1995 Straddling Stocks Agreement, which requires openness in decision-making and participation by non-governmental organizations, was conceived of at the United Nations Conference on Environment and Development.

Although interest groups and the public continue to demand greater input into the management of natural resources, current fisheries management systems fail to accommodate effective participation by these parties (Pearse and Walters 1992; Hilborn et al. 1993). Stephenson and Lane (1995) suggest that there is a need to define the contributions of stakeholders in a structured decision-making framework that facilitates information sharing.

There is increasing pressure on governments to rationalize and improve the (cost) efficiency of management (Parsons 1993; Stephenson and Lane 1995). Fishery managers are expected to communicate fishery objectives, accountability and progress with respect to the achievement of fishery objectives to affected and/or interested parties. In light of existing or potential damage to their credibility, fishery managers are realizing the need to rationalize decisions and to accommodate the increasing public demand for greater influence in decision-making. Resource managers in the United States, such as those of the National Marine Fisheries Service (NMFS) and the United States Forest Service (USFS), have grown accustomed to public scrutiny (Miller and Gale 1986). In Canada federal fisheries management authorities are currently suffering from the effects of negative publicity, due, in large part, to the recent collapse of the Atlantic cod fishery. To recover from this, Canadian fisheries management authorities must be able to demonstrate that they are both committed to protecting the environment and structurally fit to manage fisheries.

Caddy (1997: 1) submits that the "lack of a clear division of powers and of an internal system of checks and balances is perceived as a deficiency of many current resource management systems". Lane (1992) asserts that modern decision-making approaches lack consistent accountability (e.g. from year to year). Hutchings et al. (1997) point to the potential for bureaucratic and political influences to interfere with scientific research and the dissemination of scientific information. They propose that fisheries scientists should be independent of political decision-making bodies. In addition, they suggest that scientific information upon which management decisions are based should also be made available to the public and, more importantly, that it should be released to the public at the same time that the politicians receive it.

In its Code of Conduct for Responsible Fisheries, the FAO (1995) recommends that scientific data be independently reviewed by credible third parties, and that basic information be made available to the public owners of the resource. Transparency in decision-making combined with public consultation mechanisms affords the public an opportunity to review and evaluate the information, thus impeding the ability of politicians to disregard scientific advice and make inaccurate claims concerning the quality of the

information. Failure to incorporate accountability mechanisms into fisheries management systems could cause the credibility of fisheries management authorities and/or institutions to be compromised if management practices cannot be justified to concerned parties, such as the public, environmental groups, and consumers.

3.3.4 Jurisdictional Disputes and User Conflicts

Watersheds are rarely contained within political jurisdictions and there are often competing interests between different users concerning the exploitation of fishery resources. The issue of control over the management of fisheries, including the determination of user rights, is frequently a major point of conflict. In Canada, Federal, Provincial/Territorial and First Nation fisheries management authorities represent the interests of subsistence, recreational and commercial fishers in Canadian waters. Many stocks move between Canadian and American waters, which are managed by Federal, State, and Tribal authorities. Given these realities, there is significant potential for jurisdictional and user conflict on many fronts.

There is no doubt that fishery resources are finite and that they must be afforded some degree of protection if fisheries are to be sustained. Conflict has a tendency to arise when outcomes of alternative management options, such as how fish populations will be affected at a given harvest rate, are disputed. This uncertainty may stem from a lack of scientific information, disagreement as to the interpretation of existing information, conflicting information, or a lack of credible information if, for example, the methods of obtaining the information are contested. The legitimacy of the perspectives of various interest groups, particularly environmental perspectives, in fisheries management decision-making creates competition for influence among actors, thereby increasing the potential for conflict to arise in fisheries management (Hoel 1998).

In Canada, the United States and Mexico, 364 fish taxa are listed as being endangered, threatened or of special concern (Williams 1997, cited by FAO 1999). Fish travel freely across boundaries and, as a result, are exposed to a number and diversity of environmental hazards, including habitat loss, exotic introductions, restricted range, over-exploitation and disease. A root cause of conflict between competitive user groups is

disagreement about the degree to which stocks need protection from human stresses, particularly human predation. Another related problem is determining the best means to provide protection for fish against the particular stresses in question. Addressing these concerns will require a concerted effort at local, regional, national and international levels.

In North America, freshwater fishery resources are used primarily to support the recreational fishing industry rather than commercial fishing (FAO 1999). Commercial food fisheries that are based on wild stocks from large rivers and lakes are dependent on natural reproduction and tend to be at or exceeding the limits of sustainable yield (FAO 1999). Conflict is common where both recreational and commercial fisheries occur, largely due to the fact that recreational fisheries rely heavily on the use of enhancements to improve yields. The use of enhancements has implications, not just for recreational stocks, but also for commercial fish populations. Enhancements are techniques, such as introductions and stocking, that are used to increase the production of food fisheries, generate income, control pests (aquatic weeds and mosquitoes), and restore collapsed fisheries, particularly recreational fisheries that have been subject to over-exploitation and environmental degradation.

In the 19th Century, as fishing technology improved and the demand for fish products increased, salmon stocks in the US Pacific Northwest were declining (Lichatowich 1999). In response to these stock declines, the US Department of Fish and Fisheries opened hatcheries on the Columbia River, which enabled commercial harvesters to meet the increasing market demands. Fisheries managers of the day believed that conservation laws designed to protect salmon habitat would be too difficult and expensive to enforce, and that hatcheries would make salmon compatible with development and habitat degradation. Today, salmon are extinct in almost 40 percent of the rivers where they once spawned (Lichatowich 1999). As scientists speculate as to the causes of these extinctions and the present declining state of many other salmon populations in the Pacific Northwest, the implications of the use of hatcheries are being closely examined. A controversial political debate over the issue centres around the benefits of using an ecological approach to salmon conservation versus the benefits of using hatcheries to support the commercial harvest. Lichatowich (1999) suggests that the reliance on

technology, rather than on ecological conservation (e.g. protection of spawning grounds), accelerated the decline of the salmon stocks. Furthermore, he suggests that the Canadian's commitment to protect the natural capacity of the Fraser River to produce salmon, instead of relying on hatcheries, is a significant reason that salmon runs on the Fraser River are in considerably better condition than the runs on the Columbia River.

The FAO (1999) foresees enhancements as an increasingly important element of fisheries management in the future, despite the fact that information on the success of enhancement techniques is lacking. The implication is that there is increased potential for user conflicts to arise.

3.4 Summary and Conclusion

In this chapter, the concept of fisheries management was introduced, the problems facing fisheries were reviewed, and the limitations of current fisheries management systems were highlighted. To summarize, fisheries management is the process of determining and controlling the use of fishery resources according to the environmental, social, and economic values of human society. Generally speaking, current fisheries management systems do not enable fishery managers to adequately address the factors that constrain the fisheries management process. These factors include environmental issues, uncertainty, public involvement, jurisdictional disputes, and user conflicts.

Current literature on fisheries management indicates that fisheries management systems should include the following six requirements. First, clearly defined values, goals, and objectives should be established to guide the decision-making process. Doing so will help fishery managers reconcile their goals and objectives with those of external human interests (Barber and Taylor 1990). Second, the process for determining values, goals, and objectives should facilitate analytical decision-making that enables consideration of conservation, environmental, economic, and social objectives (Hutchings et al. 1997; FAO 1997b; Stephenson and Lane 1995). Third, fishery managers should develop policies aimed toward the long-term conservation and sustainable use of fisheries, incorporating the precautionary approach advocated the FAO (1996). Such policies should be accompanied by specific management measures and appropriate institutional frameworks

(FAO 1997a). Fourth, procedures should be in place to identify the views of stakeholders and interested parties (FAO 1997b; Stephenson and Lane 1995). Fifth, fisheries management systems should be evaluated periodically to determine whether they are functioning effectively in light of policy commitments (FAO 1997b). Finally, in response to high levels of environmental, social and economic uncertainty, fishery managers should institute adaptive measures that will enable them to anticipate and respond to changing conditions and information on an ongoing basis (FAO 1997b; Lane 1992).

Throughout this chapter, the impact of environmental politics on fisheries management was discussed. In the following chapter, environmental management strategies that are being used in other natural resource industries to address similar management challenges are described, and concerns with respect to their effectiveness are evaluated. The purpose of this exercise is to identify elements that can be incorporated into a fisheries management process based on the EMSs approach. The fisheries management process is proposed in this study is presented in Chapter Six. Also in Chapter Six, the relationship between the six requirements for effective fisheries management, mentioned above, and the environmental management strategies, examined in the next chapter, will be discussed.

CHAPTER FOUR: ENVIRONMENTAL AND NATURAL RESOURCE MANAGEMENT

4.1 Introduction

In this chapter, the concept of EMS is introduced, and concerns with respect to the adequacy of EMS are discussed. In addition, examples of environmental management strategies that are currently being used in natural resource industries, specifically, the forestry, agriculture, and fishing sectors, are provided.

4.2 Environmental Management Strategies

Welford (1998) indicates the following two trends in the business-environment arena. First, environmental legislation that is aimed toward providing a greater degree of environmental protection from business and development activities is becoming increasingly stringent. Second, there is an increasing social expectation that companies reveal information about environmental risk and uncertainties pertaining to their operations in their annual reports (Welford 1998).

Cascio (1996: 3) states that the “compatibility of environmental protection and economic development is no longer seriously questioned”. He also states that many companies, anticipating more stringent environmental legislation, are seeking to develop environmental policies that will enable them to stay ahead of regulation. Furthermore, companies are realizing that by improving their environmental performance they can increase the efficiency of their operations and possibly gain a competitive advantage in the market place.

Recently, a number of environmental management strategies have been developed by governments, non-governmental organizations, and industries to help managers realize their everyday business and environmental goals. For example, EMS are designed to help organizations improve their environmental performance and operational efficiency, and as a basis for environmental reporting to interested parties. The EMSs approach is described in the following section.

4.2.1 Environmental Management Systems

An environmental management system is a generic, flexible, management framework that is designed to bring organization, consistency, and accountability to environmental management. *Environmental management system* is formally defined as (ISO 14001 1996):

Organizational structure, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the environmental policy.

An EMS is the facet of an organization's overall management system that is used to identify, prioritize, address, monitor, review, and communicate the immediate and long-term environmental implications of products, services, and/or processes (Cascio 1996). EMSs are based on the principles of Total Quality Management (Deming 1982), an approach designed to foster continual improvement of the environmental management process. The International Organization for Standardization (ISO 14001 1996) defines continuous improvement as:

Process of enhancing the environmental management system to achieve improvements in overall environmental performance, in line with the organization's environmental policy.

By focusing on continual improvement of their EMSs, organizations can move closer to optimal environmental performance one step at a time. It is generally recognized that achieving environmental perfection is impossible for any organization; thus, continual improvement is considered to be the most feasible solution (Cascio 1996). The rate and extent to which continual improvement of the system is achieved is left to the discretion of the implementing organization.

The Total Quality Management approach to environmental management follows what is known as the Deming Cycle (1982), otherwise referred to as the "Plan-Do-Check-Act Cycle". The Deming Cycle is a management process that applies business management concepts to environmental management. It involves four steps.

First, organizations must plan to implement the EMS. This involves identifying significant environmental risks, opportunities, impacts, constraints, and legal obligations; and devising an environmental policy and goals that are suited to the organization's

specific needs and available resources. In addition, an environmental management plan should be devised in which goal-specific objectives, a schedule, and responsibilities for carrying out necessary actions are specified in detail. Cascio (1996: 26) states: "Planning is critical. As the axiom suggests: If you fail to plan, you plan to fail".

The second step involves putting the plan into action. This implementation stage involves: allocating physical and financial resources; assigning accountability and responsibility for specified actions; ensuring appropriate training; establishing communication, reporting and documentation procedures; and developing the necessary institutional structure to support the EMS.

Third, organizations must check the effectiveness of their EMSs in terms of meeting stated objectives and targets by conducting environmental audits and monitoring and measuring environmental performance on an ongoing basis. The environmental policy provides a basis for monitoring the effectiveness of the EMS. Third-party environmental audits are essential to the EMSs approach, as they are an important method of monitoring continuous improvement processes (Cascio 1992). Third-party verification of EMS effectiveness also ensures that the results of the environmental audit are credible, reliable and objective (Welford 1998). According to Cascio (1996: 27), "what gets monitored gets measured and what gets measured gets managed".

The final step can also be regarded as the beginning of this cyclical process. It requires that organizations' management review and update their environmental policies, objectives and plans in light of changing conditions and new information obtained through environmental auditing and monitoring practices. The purpose of the management review and update is to foster continuous improvement of the EMS.

EMSs are generic and flexible, meaning that they are applicable to organizations of any type, size and level of complexity in any location. If properly developed, implemented and maintained, an EMS has the potential to do the following:

- deliver compliance with legal requirements, government or corporate policies, industry codes of practice, or agreements;
- improve overall efficiency (i.e. reduce waste, resource use, costs);
- increase predictability and consistency in managing environmental obligations;

- foster greater competitiveness; and
- develop better relationships with regulators, insurers, consumers, and other interested parties.

Recent reports suggest that improving internal management system efficiencies, waste reduction and proactive regulatory compliance are the primary motivations behind the adoption of EMSs (Cascio 1996).

Considerable effort has been devoted to standardizing EMS development and implementation methods. Many organizations have developed and implemented EMSs using a common process, but the effectiveness of these EMSs, in terms of their ability to improve environmental performance and harmonize environmental management into existing institutional structures, is highly variable (Netherwood 1998). The first EMS standard, called BS 7750, was published by the British Standards Institution in 1992. Other national attempts to standardize EMSs include IS 310 in Ireland, NF X30-200 in France, UNE77-801 (2)-94 in Spain, and CSA-Z750 in Canada. In 1997, BS 7750 was superseded by the International Organization for Standardization's (ISO) international EMS standard, ISO 14001. The British EMS standard, BS 7750, provided the foundation for the European Community's Eco-Management and Auditing Scheme (EMAS), which represents a similar attempt to harmonize EMS approaches, although it is a regulation rather than a standard.

There are no legal requirements forcing countries or specific organizations to adopt the ISO 14001 international EMS standard. However, according to Cascio, it has become a requirement within certain countries and industries. He states (1996: 3):

... all indications today are that standards are being accepted very quickly on a broad front. The great expectation is that ISO 14000 will become the engine for fostering the environmental ethic within organizations.

Welford (1998) suggests that many companies now regard environmental management as a means to secure a competitive advantage as opposed to viewing it as just a passing phase.

ISO 14001 stipulates five general requirements, or phases. First, an environmental policy must be established, documented, and communicated to employees and the public.

It must include a commitment to continual improvement, prevention of pollution and regulatory compliance, and a framework for setting and reviewing environmental objectives and targets.

Second, a plan must be developed to implement the EMS. In this planning phase, organizations must take the following steps:

- establish procedures for identifying significant environmental aspects pertaining to the organization's activities;
- identify legal and other requirements, and make same available to the public;
- establish and document objectives and targets consistent with the policy; and
- establish an environmental management plan for achieving stated objectives and targets.

Third, the organization must prepare for the formal implementation and operation of the EMS. This is the process of implementing, controlling, measuring and reassessing the system. Specifically, the implementation and operation phase involves defining, documenting and communicating roles and responsibilities, emergency response procedures, and procedures for operational controls.

Fourth, procedures must be established for checking and corrective action, including for:

- regular monitoring and measuring of the areas covered by the objectives and targets;
- dealing with non-conformance issues;
- identifying, maintaining and disposing environmental records; and
- conducting periodic environmental (EMS) audits.

Finally, to make sure that the EMS remains effective and suitable for the organization, the EMS must be periodically reviewed by management. Subsequently, the need to modify the EMS, where applicable, must be addressed. This may involve setting new objectives and targets, formulating new procedures, and allocating new roles and responsibilities.

Rather than implementing a formal EMS, many companies have implemented environmental management strategies which incorporate EMS elements, particularly environmental auditing or environmental performance evaluation (EPE). Environmental auditing and EPE can be used separately or as part of a more comprehensive monitoring and evaluation strategy. Companies may choose to implement environmental auditing and/or EPE programs as a means to introduce a more comprehensive EMS into their operations in the future.

Environmental auditing first emerged as a management tool in the mid-1970s in the United States as a defensive response by American companies to evaluate their environmental performance against increasingly demanding federal and state environmental regulatory requirements (Cascio 1996). Since the 1970s, the practice of environmental auditing has become a regular part of corporate environmental management in Canada. A 1991 study revealed that a sample of 57 of 75 (76%) private sector companies across Canada had already implemented environmental auditing programs (Thompson and Wilson 1994). The use of environmental auditing has increased significantly, due, in large part, to the 1993 publication of the European Community's Eco-Management and Auditing Scheme (EMAS), and the 1996 publication the ISO 14001 standard for EMS (Welford 1998).

In recent years, numerous environmental auditing standards have been developed to define minimum expectations for environmental auditing and assist organizations in setting up environmental auditing programs. Currently, the Canadian Environmental Auditing Association, which was recently accredited by the Standards Council of Canada, is the only environmental body in Canada that can certify environmental auditors. The qualification criterion for the Canadian Environmental Auditing Association certification program is based on the international environmental auditing standard, ISO 14012. The Canadian Environmental Auditing Association also offers certification programs for Certified Environmental Auditors (CEA) and Certified Environmental Sustainable Forest Management Auditors [CEA (SFM)].

Thompson and Wilson (1994:606) formally define an *environmental audit* as:

... a systematic, periodic review of management systems, policies, and practices of corporations, institutions and governments with respect to how they affect the

environment and consumption of resources, followed by adjustments and corrections where appropriate.

Environmental auditing is process-oriented. It is used to periodically review (e.g. every one to five years) the effectiveness and appropriateness of an environmental management system in light of changing conditions and circumstances. Specifically, environmental auditing can be used to do the following (Welford 1998):

- improve employee awareness of the organization's environmental management concerns;
- alert management to environmental training needs;
- identify environmentally based opportunities for gaining a competitive advantage; and
- increase credibility by communicating the status of the organization's environmental management system to external parties.

Environmental audits should include four basic components: 1) verification of compliance with regulatory requirements; 2) verification of conformance with company and industry standards; 3) evaluation of management in the conduct of routine environmental affairs; and 4) preparation of an action plan to correct identified deficiencies (Thompson and Wilson 1994: 606). The inclusion of a corrective action plan effectively changes the nature of the environmental audit from simply being an exercise in the identification and description of deficiencies, to a process of problem solving. Corrective action plans can be prepared by environmental auditors, or by managers and environmental auditors co-operatively. The importance of the corrective action plan is that managers can benefit from the knowledge and experience of environmental auditors, who may be able to identify more effective solutions.

Typically, environmental auditors belong to three different professions: environmental science, engineering, and management/accounting. Environmental auditing requires education and training at three levels (Thompson and Wilson 1994). First, senior managers must have a general understanding of the purpose and benefits of auditing for strategic planning purposes. Second, coordinators must be able to understand environmental auditing principles and protocol, and possess information collection,

analysis and report writing skills. Finally, technicians and specialists should be able to provide expert field knowledge and information.

Properly trained in-house staff, external consultants, or a combination of both, can conduct environmental audits. To ensure that the audit results are objective, auditors (both external and in-house) should be independent of the activities or processes being evaluated. External environmental auditors can provide expert knowledge and experience, and often carry more credibility with external parties (e.g. stakeholders) than in-house staff. That said, in-house staff often have technical field knowledge, knowledge of daily practices, familiarity with facility personnel, and better access to information. Due to their ongoing presence, in-house staff are better able to ensure that action items are being implemented as planned. A combination of external and in-house environmental auditors is ideal, but either type is adequate when used alone (Thompson and Wilson 1994).

Environmental auditing is similar to environmental performance evaluation (EPE); however, there are some key differences (Welford 1998). First, environmental audits are conducted by objective people who are independent of the management system, whereas EPEs are often conducted internally by the same people who are responsible for applying the practices and procedures being evaluated. Second, environmental audits are periodic and conducted every one to five years, whereas EPEs are used to gather information in a consistent manner over time (i.e. continuously, monthly or quarterly). Third, environmental auditing involves looking at data and documentation in a 'slice of time', whereas EPE involves a complete examination of all documentation. Finally, environmental audits are used to verify conformance (or non-conformance) to established audit criteria, whereas EPEs produce quantified information with respect to the environmental performance of an organization. To summarize, environmental auditing is a periodic, third-party evaluation and verification process, whereas EPE is a continuous internal monitoring practice.

Environmental performance evaluation is formally defined as (ISO 14000):

Process to measure, analyze, assess, report, and communicate an organization's control of its environmental aspects, based on its environmental policy, objectives and targets.

Environmental data gathered through the EPE process can be compared to performance criteria set by management. The information can then be used to achieve the following (Young 1998):

- identify and prioritize environmental impacts;
- determine baselines from which specific objectives and targets can be established;
- identify the need for corrective action;
- identify opportunities for improved efficiency;
- measure environmental performance against established standards; and
- evaluate the continuing stability, adequacy and effectiveness of management systems.

EPE can also be used as a basis for reporting environmental performance improvements and non-conformances to government, industry, the public, and other interested parties. It is used most often among companies that operate within “command-and-control” regulatory systems where they must regularly evaluate their environmental performance against regulatory requirements and report the results to authorities. Many companies also use EPE voluntarily to identify and manage environmental aspects that fall outside the realm of legislative requirements, such as opportunities for reducing waste, raw materials, and costs (Cascio 1996).

A complete EMS, according to the ISO 14001 international EMS standard, requires both environmental auditing and EPE. However, although EMSs often result in improvement of environmental performance, there are no guarantees in this respect. EMS standards do not specify environmental performance criteria or benchmarks. With respect to the adequacy of EPE as an environmental monitoring tool, Young (1998) expresses the concern that current approaches to EPE are not sufficient to provide an accurate or full picture of environmental performance because they tend to focus on short-term indices rather than long-term sustainability indices. Performance indicators will not provide an accurate picture of environmental performance over time unless they fulfill scientific, functional, and pragmatic requirements. Indicators must be ecologically-significant, quantifiable, transparent, reproducible, comprehensive, policy relevant, comparable, and

economically justifiable (Walz 2000). To provide guidance on the design and use of EPE, the International Organization for Standardization (ISO) published an EPE standard in 1999, known as ISO 14031. Young (1998) suggests that there is a need for universal adoption of EPE standards and independent verification of performance measures to accredit EPE results.

Conformance to EMS standards does not necessarily equate with superior environmental performance or mean that a minimum standard of environmental performance has been met, although, presumably, sound environmental management will lead, indirectly, to improved environmental performance (Tibor and Feldman 1996). EMSs do not require organizations to deal with *all* environmental implications that result from their practices and procedures. Welford (1998) believes that, because EMSs are self-regulated in terms of the rate of environmental improvement, achieving sustainable practices will take a significant amount of time in all but the most environmentally conscious organizations. On the other hand, Sandgrove (1997) suggests that even limited or shallow policy commitments are a positive step in the right direction. Ultimately, the success of an EMS which is based on voluntary enrollment depends on the organization's ability (and willingness) to integrate environmental responsibilities into the existing management structure.

Both internal and external influences, particularly economic factors, can determine the success or failure of an EMS (Netherwood 1998). Cascio (1996:98) expresses the importance of planning prior to implementation of EMSs with particular reference to ISO 14001:

We are convinced from years of experience in environmental management implementation that a company or facility should not undertake a halfhearted or "minimalist" approach to ISO 14001. Either do it well, or don't waste your money and time.

Management systems should reduce the potential for human error to occur through specification and proper implementation of procedures and responsibilities, and fulfillment of training requirements. Welford (1998:9) suggests that failure to plan and execute plans effectively can cause weaknesses in an EMS:

Inadequate management systems have been the cause of environmental damage and have cost firms and organizations heavily in terms of clean-up costs and damaged reputations. At the extreme we can think of disasters such as the Exxon Valdez oil spill and the Union Carbide explosion at Bhopal, where the environment became irreparably damaged in its turn due, at least in part, to inadequacies in systems which were supposed to prevent such disasters.

A scarcity of resources may prompt the decision to abandon environmental commitments made in the environmental policy, thereby causing the EMS to become nothing more than a paperwork exercise (Netherwood 1998). In some cases, willingness to devote resources to environmental initiatives may be less than adequate to support the EMS. Another related possibility is that the financial and staffing arrangements are swiftly and haphazardly thrown together during the EMS development process, a practice that is particularly common among organizations that view environmental issues as being a short-term trend. Netherwood (1998:52) states:

When it becomes apparent that the environment will cost money within an organization, commitment can be swiftly withdrawn, policies can remain unfulfilled and promising environmental initiatives can be curtailed.

Low morale and apathy regarding an EMS can result from short-sighted planning if adequate resources are not provided to support the EMS. If resources become available in the future, re-establishing the EMS may prove to be a difficult task. A number of factors can impact the resourcing of an EMS, including (Netherwood 1995):

- competing demands for investment capital within the organization;
- the integration of environmental management with other 'higher priority' matters (such as health and safety or quality management) rather than planning a budget specifically for environmental management;
- external political influences, including votes (in the case of governments), environmentalism, lobbying groups, and changes in the political climate; and
- internal political influences, including the agendas of individuals involved in the development of the EMS, and the difficulties experienced by newcomers, deployed to implement the EMS, in dealing with hidden organizational rules and red tape.

Netherwood (1998) also identifies individual and personality factors as influences on the operation of EMSs. Individual and personality factors include resistance to outside interference, 'buckpassing', denial of responsibility, a disparity in motivation among staff, and the generation, by individuals, of barriers and bottlenecks along the communication chain within the EMS. In addition, while effective leadership is important, barriers can occur when individuals are associated with environmental management if there are personality clashes or the individual is suspected of having a hidden agenda where environmental management is concerned. Netherwood (1998) proposes that these problems can be curtailed by clearly establishing responsibilities, assessing resistance to environmental management prior to making personnel management decisions, developing a good understanding of the best ways to facilitate change within the organization, training staff, and fostering a sense of ownership of the environmental management process.

In making a determination as to whether or not to implement an EMS, O'Laoire and Welford (1994) recommend that managers consider the costs of implementing an EMS, as well as the costs of *not* doing so. The latter may include market exclusion, customer damage claims, reduction of turnover, increased insurance costs, and possible legal costs and fines. The costs associated with implementing EMSs are highly variable, depending on the particular characteristics of the implementing organization.

For example, the costs associated with conducting environmental audits are variable, depending on such factors as the nature of activities conducted at the facility, the scope of the audit, and the type of environmental audit (i.e. in-house versus public). Thompson and Wilson (1994) suggest that the benefits of environmental auditing may exceed the costs of doing so, especially when there is potential for legal prosecution. The potential costs of *not* doing environmental audits may include fines, lost production time, clean-up costs, and lost consumer and investor confidence (Thompson and Wilson 1994). Despite the benefits of environmental auditing, companies tend to identify cost as being a barrier to environmental auditing (Thompson and Wilson 1994).

In addition to the cost factor, companies commonly identify the following barriers to environmental auditing (Thompson and Wilson 1994):

- uncertainty over the benefits of environmental auditing;

- reluctance to find out what problems exist;
- fear of adverse publicity;
- fear of personal performance appraisal among management and staff;
- satisfaction with current environmental performance; and
- fear of legal problems resulting from failure to implement measures to correct environmental management system deficiencies that were identified through the environmental auditing process.

Thompson and Wilson (1994:608) suggest that the arguments against environmental auditing are “weak at best, and possibly even detrimental to the company in the long-run”.

Additional costs associated with implementing an EMS include the costs of planning, implementing measures for evaluating and improving environmental performance, training, documentation, and certification. Through effective planning and adequate consideration of the cost and benefits associated with EMSs, organizations can avoid the potential pitfalls associated with the EMSs approach.

4.3 Environmental Management: Examples from Natural Resource Industries

The articulation of sustainable development concepts in international fora has resulted in the creation of broad guidelines for decision-making in natural resource management. In 1987, the World Commission on Environment and Development formally defined *sustainable development* as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

In 1992, at the United Nations Conference on the Environment and Development, an action plan for achieving sustainable development on a global scale was outlined in the international (non-binding) agreements Agenda 21 and the Rio Declaration (United Nations Conference on Environment and Development 1992). Since the latter portion of the 1990s, international attention has been focused on translating sustainable development concepts from the theoretical to the practical realm (Chesson and Clayton 1998).

Further articulation of sustainable development concepts in national and industry-specific forums, coupled with the international standardization of environmental management methods, has brought natural resource industries closer to making sustainable

development concepts operational. Currently, environmental management strategies are being developed and implemented quite rapidly in some natural resource sectors. If this trend continues, environmental management concepts will play an increasingly important role in natural resources management in the future. For example, there is already evidence which suggests that EMSs are becoming standard practice in forest based industries (Cross 1999; Newbold et al. 1997). Changing market-based expectations, coupled with a growing realization of the potential benefits that can be achieved through responsible environmental management practices, has forced natural resources sectors to become more responsive to the EMSs approach. Examples of environmental management strategies, as applied in the agriculture, forestry, and fishing industries, are provided below.

4.3.1 Agriculture

A number of national and industry led initiatives have been undertaken to promote environmentally responsible farm management, with a view to ensuring that agricultural production will be economically and socially beneficial in the long-term. Initially, EMSs were not very well received within the agriculture industry. According to Newbold et al. (1997), there has been a low uptake of EMSs in agriculture, largely because their relatively high administrative costs make them unsuitable for many smaller farm operations with limited resources. Further, they state: "The agricultural community has shown no commitment to these systems, possibly because most have not identified market benefits and see it as a time consuming paper exercise" (Newbold et al. 1997: 1). Although EMSs have not been widely adopted as a process-oriented environmental management tool, fundamental EMS principles have been applied to performance-oriented management systems for agriculture. Three examples are provided below.

In the UK, a performance-oriented management system for agriculture, known as Environmental Management for Agriculture, has been developed. It is a computer-based evaluation system that provides technical support and information to help agricultural advisors analyze decisions made on the farm and track environmental performance. The Environmental Management for Agriculture program requires that farmers commit to the

objectives of continuous improvement and regulatory compliance, assess key environmental impacts of business, set objectives and targets for improvement, develop and implement a management plan to meet those objectives, and undertake an annual review/audit of activities to assess environmental performance. Recently, a collaborative agreement has been reached between the developers of Environmental Management for Agriculture and another performance-oriented management tool for agriculture, known as the LEAF Audit, to work towards common goals (University of Hertfordshire and LEAF, date unknown).

The LEAF (Linking Environment and Farming) Audit is a management tool designed to help farmers in the UK assess the environmental performance of their farming practices. Environmental performance is monitored on an ongoing basis, and evaluated against the principles of Integrated Farm Management, a whole-farm approach to sustainable agriculture. Farmers are given a series of self-assessment forms for auditing which cover the following areas: organization and planning; soil management and crop nutrition; crop protection; pollution control and waste management; energy efficiency; landscape and wildlife features; and animal husbandry. Farmers are asked to fill out the forms on an annual basis and to state targets for action for the upcoming year. Once LEAF receives the information from farmers, it is analyzed and used, by LEAF, to develop a comprehensive performance report for the farmers. The report (LEAF 2001):

- makes recommendations for improvement of environmental performance;
- highlights priority areas, strengths, and weaknesses;
- provides assistance in setting targets for the next year;
- assesses conformance with legal and insurance requirements;
- compares farm performance against other farms;
- helps identify cost-saving operations; and
- identifies training requirements.

The information provided to farmers is drawn from a knowledge base of various documents, including Codes of Good Agricultural Practice (UK), LEAF Documents, and research papers. Farmers can expect to receive feedback from LEAF within three months

of sending in their auditing forms. They also receive a statistical analysis of all previous audits at the end of each year. The continuous two-way flow of information enables farmers to assess the ongoing improvement of their farms' performance. Together, the LEAF Audit and the Environmental Management for Agriculture program provide a more comprehensive approach to environmental performance auditing on the farm.

In Canada, a number of provincial- and industry-generated guidelines for implementing Environmental Farm Plans have emerged to introduce the EMSs approach to agriculture with a view to helping farmers monitor and improve the environmental performance of their farming operations. For example, the Atlantic Environmental Farm Plan Initiative was undertaken in the Atlantic provinces to help farmers reduce the environmental impacts of farming operations throughout the Atlantic region (Newfoundland & Labrador Federation of Agriculture 1996). The initiative is based on the voluntary commitment of farmers to the Environmental Farm Plan process. Farmers who commit to the Environmental Farm Plan process receive a workbook designed to help them determine the level of environmental risk associated with specified aspects of their operations, including farm buildings, livestock and manure management, soil and crop erosion, and sensitive ecological areas. Farmers must then determine what action should be taken, if any, to minimize environmental risks. They must develop an action plan that includes specific goals for minimizing environmental risks, and specific actions and timeframes for achieving those goals. The case-specific focus of the Environmental Farm Plan process enables farmers to devise an action plan that is suitable to their specific operational needs and resources, including their particular goals and priorities.

The criteria for measuring environmental performance in the Canadian and UK examples differ, but the evaluation processes are complimentary. Environmental Farm Plans enable farmers to evaluate the environmental performance of their farming operations on a continuous basis and, if necessary, institute measures that will minimize environmental risk in a timely fashion. The Environmental Management for Agriculture program and LEAF Audit also help farmers/agricultural advisors measure and improve environmental performance; however, both use an external process and annual evaluations to do so. Third-party verification of environmental performance brings credibility to the

evaluation process and enables farmers to benefit from the knowledge and experience of external auditors.

One set of criteria could be used for internal and external performance evaluation purposes, and to tailor ISO 14001 for agricultural purposes. In this scenario, internal and external performance criteria and methods would be applied as part of an overall EMS, and would be evaluated periodically as part of the overall EMS process through third-party environmental audits. Australia is currently developing ISO 14001-compliant EMS guidelines for agriculture through a pilot project in which farmers complete on-farm modules, monitor the implementation process, and assist in the development of EMS guidelines (Cross 1999). The next section summarizes how forest-specific performance standards have been used to implement process-oriented EMS standards for the Canadian forestry industry.

4.3.2 Forestry

The Canadian forest industry is one of the largest international suppliers of forest products and an active supporter of Sustainable Forest Management certification (Canadian Sustainable Forestry Certification Coalition 2000). The ISO 14001 international EMS standard is the most widely used standard for forest certification in Canada. Although EMS standards are voluntary, they are becoming a requirement for doing business within the forestry industry. The Canadian Sustainable Forestry Certification Coalition (2000: Online) reports that the “Canadian forest industry is determined to maintain its competitiveness in the marketplace”, and that responsible forest management “has become an essential element of market place acceptance”.

The Canadian Standards Association’s voluntary Sustainable Forest Management system standards, CAN/CSA-Z809-96 (Canadian Standards Association 1996), were developed to assist forestry organizations “maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social and cultural opportunities for the benefit of both present and future generations” (Canadian Sustainable Forestry Certification Coalition 2000). The Sustainable Forest Management systems (Canadian Standards Association 1996) standards are comprised of two components: 1) a

management system framework that meets international standards for EMSs (i.e. ISO 14001); and 2) a set of performance requirements that were approved by the Canadian Council of Forest Ministers, in 1995, called the CCFM Sustainable Forest Management Criteria and Critical Elements. Implementing organizations are subject to independent, third-party audits by a certification body that has been accredited by the Standards Council of Canada.

In addition to meeting the requirements of the ISO 14001 standard, the Canadian Standards Association Sustainable Forest Management system standards require public participation throughout the management process, and continual improvement of both the management system and field performance. Field performance is measured against the standard's 21 critical Elements and Performance Indicators that are set by the implementing forestry organization. These requirements are consistent with the ISO 14061 Technical Report (ISO 1998), a guide developed by the International Organization for Standardization for the forestry industry to facilitate the implementation of EMSs.

For forest product companies that are already using ISO 14001 in a particular area of their operations, a corporate-wide system for environmental management, which includes field operations, is the next logical step toward standardizing management practices. And, because ISO 14001 represents the minimum standard for environmental management, it is a good starting point for the implementation of more rigorous standards, such as the Canadian Standards Association Sustainable Forest Management systems standards. The Forest Stewardship Council is another certification initiative that is widely used in the Canadian forestry industry (Forest Stewardship Council 2000). Two region-specific examples of forest certification initiatives include the Pan European Forest Certification (Pan European Forest Certification 2001) and Malaysia's National Timber Certification Council (National Timber Certification Council, date unknown).

Forestry is an example of a natural resource industry that has adopted a comprehensive environmental management approach that incorporates international, national, and industry-specific standards to measure and improve the quality of management practices and environmental performance. In this regard, forestry is more advanced in its refinement of environmental management strategies than agriculture,

where process-oriented standards have not been formally established. The use of environmental management strategies in the fishing industry will be examined in the next section.

4.3.3 Fishing

Performance monitoring and third-party auditing schemes are being implemented in the fishing industry because methodologies have been developed for doing so; however, a methodology for implementing a comprehensive EMS that incorporates performance monitoring and third-party auditing has not been developed for fisheries. In fisheries management literature, few direct references are made to the potential benefits of applying environmental management concepts in fisheries management. Stephenson and Lane (1995) propose that the concept of Total Quality Management (Deming 1992) could be applied to fisheries management to facilitate decision-making that enables consideration of multiple objectives and the views of stakeholders and interested parties. Sproul (1998b: 4) suggests that “to facilitate global acceptance and implementation of ‘sustainable fisheries (and aquaculture) principals’, they should be framed within a broad arena of environmental management standards”. Furthermore, with reference to ISO 14000, he proposes that the fishing industry “is well suited to implement various aspects of an international EMS, whether at the level of a vessel, a firm or the complete fishery” (Sproul 1998a: 141). The idea of implementing sustainable fisheries standards, in conjunction with international EMS standards, should be explored (Sproul 1998a). An example of an Australian methodology devised to help fisheries measure progress with respect to Ecologically Sustainable Development, and an example of an international third-party auditing scheme used to evaluate fishing practices against sustainable fishing criteria, are provided below.

In 1998, the Australian Bureau of Rural Sciences published a report entitled *A Framework for Assessing Fisheries with respect to Ecologically Sustainable Development* (Chesson and Clayton 1998). The purpose of the report was to recommend a framework to help fisheries systematically organize information and assess progress with respect to Ecologically Sustainable Development. *Ecologically Sustainable Development* is formally defined as:

using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased (Commonwealth of Australia 1992).

The premise of the concept of Ecologically Sustainable Development is that the costs and benefits of fishing activities should result in a net increase in the quality of human life. The procedures for implementing the Ecologically Sustainable Development assessment framework include four steps: 1) identifying fishery-related impacts (human and environmental); 2) setting objectives relating to each of the identified impacts; 3) specifying indicators for assessing progress in terms of meeting the specified objectives; and 4) evaluating opportunities to improve future performance with respect to Ecologically Sustainable Development. The Ecologically Sustainable Development assessment framework is a practical methodology for measuring performance with respect to achieving fisheries management goals and objectives on an ongoing basis. Measurement of performance over time provides a basis for future planning and decision-making, and reporting on progress.

In 1996, the Marine Stewardship Council (MSC) developed the MSC Principles and Criteria for Sustainable Fishing (www.msc.org) through an international consultation process. The Marine Stewardship Council is an international, non-profit, non-governmental organization, whose mandate is to promote sustainable marine fisheries and responsible fishing practices worldwide through a voluntary, market-based certification and labelling scheme. The MSC Principles and Criteria for Sustainable Fishing, the standard against which fisheries' eligibility for certification is measured, are based on the FAO Code of Conduct for Responsible Fisheries (1996). Eligibility for certification to the Marine Stewardship Council's sustainable fishing standard can only be determined by independent, third-party auditors who have been accredited by the Marine Stewardship Council. The Marine Stewardship Council certification guidelines are based on the ISO 14010 and ISO 14011 international standards for environmental auditing. Notably, the scope of the MSC Principles and Criteria for Sustainable Fishing extends only to fishing practices up to the point that fishery products are landed. The Marine Stewardship Council suggests that the ISO 14001 international EMS standard can be used as a complementary program to the Marine Stewardship Council certification and labelling

scheme; specifically, to document and evaluate the impacts of post-landing activities. Similarly, Sproul (1998a) proposes that ISO 14001 could be used as an overall management framework for implementing the MSC Principles and Criteria for Sustainable Fishing.

As in the agriculture industry, the fishing industry has developed methods for evaluating environmental performance, including methods for systematically documenting and organizing information, planning, and evaluation. Criteria and methods specifically designed to evaluate the effectiveness of fisheries management systems have not been developed.

4.4 Summary and Conclusion

The purpose of this chapter was to identify trends in natural resource management with respect to the use of environmental management strategies. A literature indicates that environmental management strategies are increasingly being adopted within natural resource industries. EMSs are widely used for forest management, and are gaining increasing acceptance in the agriculture industry. The fishing industry has been less responsive to EMSs, perhaps because there is uncertainty over the potential benefits of the EMSs approach.

An EMS is the facet of an organization's overall management system that is used to address and communicate the immediate and long-term environmental implications of products, services and/or practices. Skeptics of the EMSs approach argue that there is potential for EMSs to become too bureaucratic and costly. To implement an EMS successfully, organizations must be able to integrate environmental responsibilities into the existing management structure, plan and execute plans effectively, determine appropriate criteria and benchmarks for performance, and foster organization-wide commitment to continuous improvement.

The above mentioned concerns regarding EMSs are not insurmountable. The goals of natural resource managers can be realized through commitment to continuous improvement, effective short- and long-term planning, proper execution of plans, efficient gathering and use of information, and third-party verification of environmental

performance and management systems. The fishing industry can benefit from the experience of the agriculture and forestry industries, in which strategies have been developed for improving environmental performance and the effectiveness of natural resource management systems. As an introduction to the fisheries management process that is proposed in this study, a description of the Nawash fisheries management system, and historical information about the Nawash Fishery, are provided in Chapter Five.

CHAPTER FIVE: CASE DESCRIPTION AND BACKGROUND

5.1 Introduction

This chapter provides background and historical information on the Nawash Fishery. A brief account of the Fishery's characteristics, including its geographical location, target species, and gear type, is provided. The current institutional structure and accountability of the Nawash fisheries management system and a summary of significant historical aspects of the Nawash Fishery are discussed. In addition, the current legal framework concerning the Aboriginal and Treaty fishing rights of Nawash is described. Finally, some of the major challenges facing the Nawash Fishery are highlighted, including the circumstances that led to the recent signing of a co-management agreement between Nawash, the Chippewas of Saugeen First Nation (Nawash's sister community, hereafter referred to as 'Saugeen'), and the Governments of Canada and Ontario. Finally, the economic importance of the Nawash Fishery and its future outlook are discussed.

5.2 Nawash Fishery Characteristics

The Chippewas of Nawash First Nation occupies Reserve No. 27, known as Cape Croker, or *Neyaashiinigiing* (translated as "point of land surrounded by water"). Cape Croker is located on the eastern shore of the Saugeen (Bruce) Peninsula of Lake Huron in the Province of Ontario, Canada (Figure 1). Under the provisions of the 2000 Fishing Agreement, the commercial-subsistence fishing range of Nawash extends approximately seven kilometres from the shores of the Saugeen Peninsula, which acts as a divide between Georgian Bay to the east and Lake Huron's Main Basin to the west.

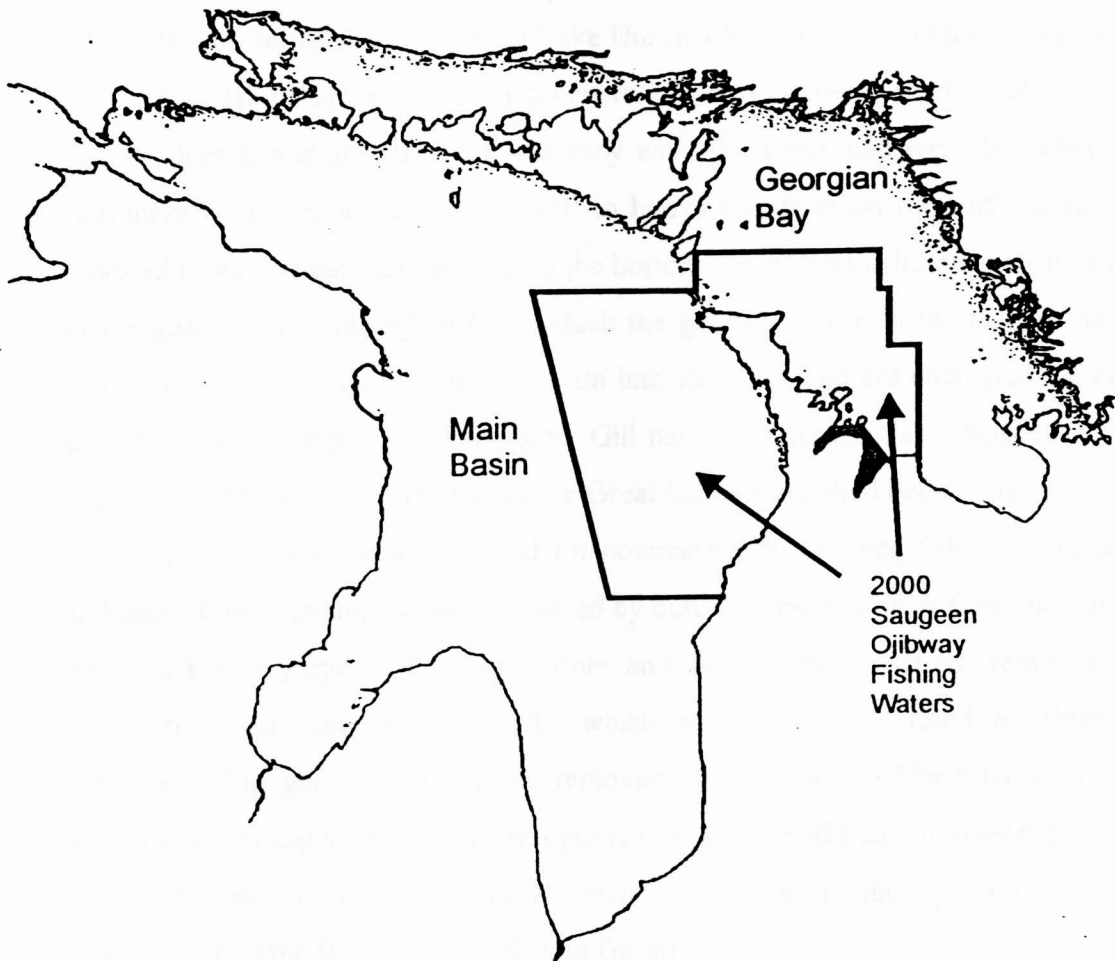


Figure 1

Map of Lake Huron showing the Saugeen Ojibway Fishing Waters as defined in the 2000 Fishing Agreement. Shaded area indicates traditional waters where the Saugeen Ojibway retain fishing rights, yet have agreed not to fish commercially for the term of the Fishing Agreement.

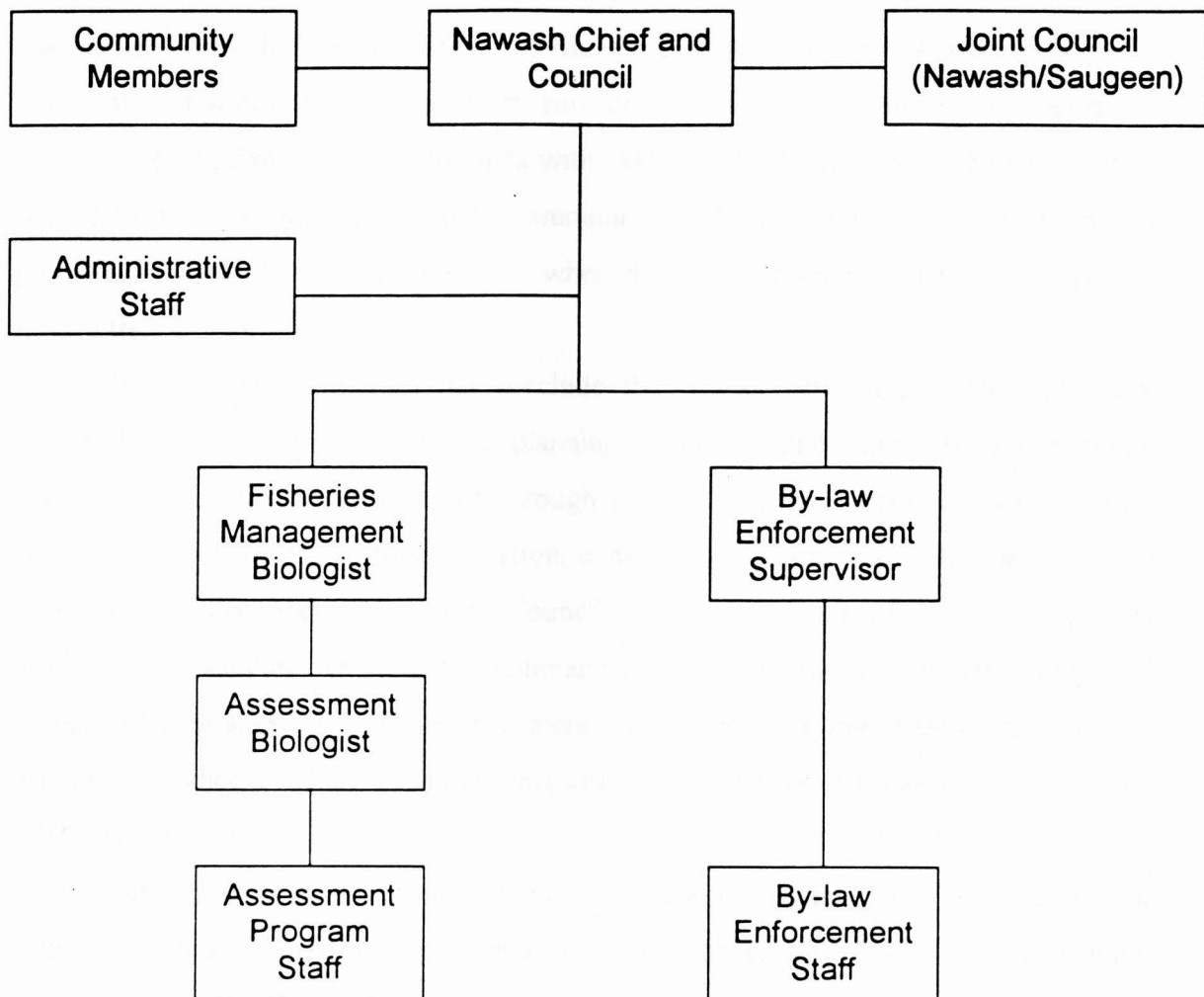
The principal target fish species of the Nawash Fishery are lake whitefish (*Coregonus clupeaformis*) and bloater chub (*Coregonus hoyi*). In accordance with seasonal onshore migration patterns, the peak harvests of lake whitefish occur in the spring and the fall spawning season. Bloater chub, a smaller cousin of lake whitefish, inhabit the deeper offshore waters of Lake Huron's Main Basin and Georgian Bay.

Nawash fishermen employ gill nets to harvest targeted species. Gill nets are set at varying depths, and are stretched vertically with floats and lead weights. They are kept stationary with lines at each end linked to buoys that float on the surface, and anchors attached to lines at each end leading to the bottom. Flags on the buoys indicate ownership of the gear and provide a line from which the gear is lifted into the boat to harvest the catch. Fish are captured when they swim into the mesh and are entangled, or caught by the gills when attempting to back out. Gill nets are a traditional fishing gear that were used by the Aboriginal inhabitants of the Great Lakes watershed before European contact.

Two types of boats are used for commercial-subsistence fishing purposes: punts and tugs. Punts are small vessels powered by outboard motors or by fishermen using oars. They are typically operated by two people, and the gill nets are set and removed by hand. Tugs are larger commercial vessels, which are typically operated by three to five fishermen. The gill nets are set and removed using a winch. The Nawash fishing fleet includes twenty-eight tugs and fifteen punts (the number of boats in operation at any one time may vary according to seasonal, environmental, economic or political conditions), and is currently the largest fishing fleet in Ontario.

5.3 Institutional structure

The Nawash Fishery is community-owned and operated. As such, it is managed under the leadership of the Nawash Council, the community's elected representatives. The Council includes the Chief and 9 Councillors, who are elected every 2 years. Figure 2 depicts the current institutional structure of the Nawash fisheries management system.

Figure 2: Institutional Structure of the Nawash Fishery

The Nawash and Saugeen Fisheries are jointly managed under the authority of the Joint Council. The Joint Council is comprised of representative of the Nawash and Saugeen Councils. As a consequence of having shared Treaties, particularly fishery-related ones, the two communities are closely affiliated and have common interests in the management of their fisheries. Most importantly, the two communities share the right to fish in their traditional fishing territory surrounding the Saugeen Peninsula (Figure 1). Due to ongoing fishery-related conflicts with external parties, it is in the best interest of the Nawash and Saugeen Councils to communicate regularly and, to the greatest extent possible, implement common strategies when dealing with external parties on fishery-related issues.

Joint management does not preclude the Nawash or Saugeen Councils from independent action (e.g. organizational planning, developing and implementing programs). However, all decisions are finalized through the joint decision-making process. Joint management is a forum for communication, consultation, partnership and, when the need arises, crisis management. The Joint Council has authority over all aspects of fisheries management, including mediation and communication/consultation with external interested parties, fisheries assessment, and enforcement. In Figure 2, the Joint Council is shown to the right to indicate that its authority emerges from, but does not supersede that of the individual Council.

The role of each individual working for the Fishery is significant, more so than in larger organizations, making the potential for both negative and positive influences high. For example, due to the highly political and crisis-oriented climate in which the Fishery has been forced to operate, the Fisheries Management Biologist has become increasingly important in the management of the Fishery as a whole. He was hired as a specialist but his role is now inextricably connected to all aspects of the Fishery, including fishery politics. Since the Fisheries Management Biologist started working with Nawash in 1993, he has become instrumental in providing direction and technical advice to the Council, and has assumed increasing responsibility and influence in the management of the Fishery.

The institutional structure of the Nawash Fishery has undergone a number of changes recently. In addition to the ongoing development of the Assessment Program, a noteworthy change was the formation, in 1999, of the Saugeen Ojibway Fisheries Management Board (SOFMB). The SOFMB consisted of representatives from Nawash and Saugeen, some elected and some appointed. The SOFMB was charged with the day-to-day management of the fisheries, but has been temporarily dissolved for various reasons.

Three significant reasons were that: 1) the Board's mandate and responsibilities were not properly defined; 2) the Board was not given appropriate authority to implement policies, procedures and programs; and 3) there was a lack of management expertise among Board members. These factors impeded the ability of the SOFMB to plan effectively and reduced their credibility within the Nawash and Saugeen communities. The Nawash Council has indicated their intent to appoint a new Fisheries Management Board (in conjunction with Saugeen) to support the continued implementation of a joint fisheries management plan. The above mentioned problems which led to the dissolution of the first joint fisheries management board must be addressed in future planning.

5.4 History of the Saugeen Ojibway Nation Territories

Historically, fishing played a key role in the survival, social organization, and culture of First Nation peoples in Canada. In Ontario fishing is thought to have constituted the primary source of food among First Nations because it was reliable year-round (Rogers and Smith 1994). Social norms relating to the gathering and distribution of food fortified community solidarity (Driver 1969), and the symbolic importance of fish is evident by their frequent portrayal on cultural artifacts and in stories. Since the introduction of the European diet and culture in the 1600s, the relative economic and social importance of fishing has diminished in First Nation communities. However, the importance of fishing for subsistence, ceremonial, and commercial purposes is increasing among First Nation fishing communities.

Since time immemorial the ancestors of the Anishnabek Nation, otherwise known as the Ojibway, lived, hunted, and fished in the Saugeen territory, which comprises

approximately 2 million acres of land on the Saugeen Peninsula and the Saugeen Fishing Islands. Fishing was practiced year-round (Rogers and Smith 1994) and formed the basis of the Ojibway diet, economy (Schmalz 1991; Rogers and Smith 1994), social organization, and culture (Driver 1969).

In 1836, almost 1.5 million acres of these inhabited lands (the territory south of a line that extends roughly from present-day Owen Sound to Southampton) were ceded to the British Crown (Treaty No. 45 1/2) in the first of ten land surrenders that took place between 1836 and 1854. Sir Francis Bond Head, the Lieutenant Governor of the day, made a promise to the Nawash and Saugeen First Nations, known collectively as the Saugeen Ojibway, that "he would remove all the white people who were in the habit of fishing on their grounds" (cited in *R. v. Jones-Nadjiwon* 1993:437). However, encroachment continued.

In subsequent surrenders, particularly No. 72 (1854), most of the Saugeen Peninsula was ceded to the Crown, but at no time were Saugeen Ojibway fishing rights surrendered. The Saugeen Ojibway retained 90 Saugeen Fishing Islands in Lake Huron. Today, the Saugeen Ojibway live as two separate communities on three reserves comprising only a small portion of their original territory. These reserves are Reserve No. 27, known as Cape Croker, and Reserves No. 28 and 29, known as the Saugeen reserves (jointly managed under one council). Although they have been separated into geographically distinct communities, known as the Chippewas of Nawash First Nation and the Saugeen First Nation respectively, they still constitute one Nation.

In return for the ceded lands, the federal government made a promise to the Saugeen Ojibway that their rights to hunt and fish in their traditional territory would be protected. The right to fish was understood by the Saugeen Ojibway as being a community right, rather than an individual right. When the British Crown issued fishing licenses to the Saugeen Ojibway in the 1850s, they were issued to the communities as a whole in the name of their Chiefs. Consequently, fees pertaining to the Fishery, including legal fees for the defense of fishing rights, are paid with community funds.

Beginning in the 1830s, encroachment on the unceded Saugeen Ojibway territorial waters by non-Natives prompted Nawash to file numerous grievances with the

Department of Indian Affairs. Non-Native commercial fisheries had caused serious declines in the fish stocks of the Great Lakes to the point where fishing as a commercial enterprise was no longer viable (Schmalz 1991). To compound this problem, the Saugeen Ojibway fishing grounds were subject to periodic restriction by the Department of Indian Affairs. Laws prohibited commercial fishing by Natives, even in their own unceded waters. Furthermore, the government restricted the establishment of facilities, such as wharves, required by Nawash to make a viable living from fishery resources (Schmalz 1991). Despite these factors, Nawash continued to fish for the next fifty years.

In 1889, an agent of Indian Affairs reported (Canada 1889) to the Dominion government:

... that the apprehension of our Indian population of the destruction of their valuable fisheries upon which they chiefly depend for subsistence is not unfounded and that unless something is done to avert the impending calamity these self-supporting Indians of this superintendency will become as destitute and dependent upon the Government for support as their kindred in the North-West Territories have been since the disappearance of the buffalo.

Further, he reported that:

- *The superintendent considers the fisheries owned by the Indians.*
- *The Indians are self-supported by the fisheries.*
- *The fisheries are being destroyed (by the non-Indians).*
- *The Indians are protesting the destruction.*
- *The loss of the fisheries will cause destitution.*
- *Once the fisheries are destroyed, the Indians will have to depend upon the government for support.*

In 1896, Nawash sought protection of their fishing rights from the Department of Indian Affairs to no avail (Schmalz 1991). The government continually imposed restrictions on the Nawash Fishery at the request of non-Native settlers. Again, Nawash responded in protest (Band Resolution, 1902, cited by Schmalz 1991:222):

... this Band solemnly protests against diminution or curtailment of their rights and privileges, which from time immemorial they have peaceably enjoyed and that the reasons assigned for reducing the area are considered to be insufficient, unacceptable and unjustifiable; and the band looks for a speedy restoration of

their undoubted rights with as little delay as possible through the Department of Indian Affairs their rightful protector and guardian of their rights.

Currently, the Federal Government of Canada has responsibility for managing Canada's fisheries under the authority of the Fisheries Act. The Government of Canada also has a fiduciary duty to protect the Aboriginal and Treaty fishing rights of Canada's Aboriginal peoples. The responsibility for managing Ontario's fisheries has been handed down from the Government of Canada to the Ontario Ministry of Natural Resources (OMNR). Accordingly, the OMNR has enacted provincial legislation (Ontario Game and Fish Act) and regulations (Ontario Regulations and Ontario Fishery Regulations) for managing Ontario's fisheries. Given these legislative realities, the ability of the Federal Government to fulfill its fiduciary duty to Aboriginal peoples has been called into question. The development of contemporary understandings of Aboriginal and Treaty fishing rights, and the implications of these developments for Nawash, are explained below.

5.5 Legal Framework

Section 35(1) of the Canadian *Constitution Act*, 1982 recognized and affirmed existing Aboriginal and Treaty rights, leaving the challenge of interpreting the meaning of Section 35 to the courts. Recently, a number of court decisions brought First Nations' fisheries issues to the forefront and led to more definitive understandings of these rights in the context of fishing. These included *R. v. Sparrow* (1990), *R. v. Badger* (1996), *R. v. Van der Peet* (1996), *R. v. Gladstone* (1996), *R. v. N.T.C. Smokehouse* (1996), *Delgamuukw v. British Columbia* (1997), *Simon v. The Queen* (1985), and *R. v. Marshall* (1999a; 1999b).

Although many of these Canadian court cases led to more definitive understandings of Aboriginal and Treaty fishing rights, the nature of these rights remains clouded in ambiguity and controversy. As a result, conflict regarding the determination and allocation of harvests has increased between Native and non-Native fisheries interests. These conflicts have been an impediment to the management of First Nations' traditional and commercial fisheries (Royal Commission on Aboriginal Peoples 1996). The resolution of these issues is of paramount importance among Canada's First Nations. The Nawash

Fishery is a good case in point. The economic, cultural and physical importance of the Lake Huron fisheries to Nawash prompted the Nawash Council to allocate considerable time, money, and resources to the defense and practice of its Aboriginal and Treaty fishing rights.

Before the Constitution Act of 1982 came into effect, the restriction of Aboriginal fishing rights posed a very real and significant threat to First Nation fishing communities because of the potential for serious negative social and economic ramifications. One effect of Section 35(1) of the Constitution Act of 1982 was the revival of hope in many First Nations that the Crown would be true to its word by upholding their Treaties. For Nawash, this hope faded quickly. In the early 1990s, the OMNR imposed a small quota on the Nawash Fishery. The quota restricted their catch of lake trout, on which they chiefly depend, to such a degree that it resulted in the imposition of economic hardship on the Nawash community. The income derived from the quota was said to be barely sufficient to feed even one family, yet it was to be divided among all of the fishermen to support themselves and their families.

Eight years after the Constitution Act of 1982 entrenched existing Aboriginal and Treaty rights, the Supreme Court of Canada ruled in the *Sparrow* case. *Sparrow* was the first case to deal specifically with the issue of Aboriginal rights in the context of Section 35. The decision had important implications for the management of fisheries in Canada for two reasons. First, it confirmed the authority of Section 35(1) of the *Constitution Act*, 1982 over Federal fishing laws and regulations. Second, it led to a more definitive legal understanding of the nature and scope of Aboriginal rights in Canada (Royal Commission on Aboriginal Peoples 1996).

Sparrow legally entrenched the priority right of Canada's First Nations to fish for subsistence, ceremonial, and cultural purposes over non-Native commercial and recreational harvesters. The ruling applied only to First Nations that have existing Aboriginal fishing rights, and stipulated that these rights may be subject to restrictions for conservation reasons. A significant implication of the *Sparrow* decision is that the Government of Canada must now consider Aboriginal perspectives on conservation in fisheries management decision-making (Crawford and Morito 1997). In addition,

although the *Sparrow* decision was limited to Aboriginal subsistence fishing rights, it laid the foundations for future Supreme Court cases that dealt with commercial fishing rights, including *Van der Peet*, *Gladstone*, *N.T.C. Smokehouse*, and *Marshall*.

Sparrow provided the analytical framework for the case of *R. v. Jones-Nadjiwon* (1993), also known as the Fairgrieve decision, in which charges, laid against Nawash fishermen for harvesting more than their quota of lake trout, were dismissed. The court, in the *R. v. Jones* decision, considered three questions:

1. Was there an existing Aboriginal or Treaty right to fish commercially?
2. If so, did the lake trout quota infringe or deny those rights?
3. If there was an infringement, had it been justified on the ground of conservation?

In the final judgment, Ontario's fishing licensing scheme was deemed unconstitutional and unenforceable against Nawash. Judge Fairgrieve found that the licensing system ignored the nature of the Nawash Fishery and existing Aboriginal and Treaty rights. The ruling included the designation of a fishing zone, and recognized that that Saugeen Ojibway have Aboriginal and Treaty rights, which include the right to fish for trade and commerce, within that zone.

Consistent with the *Sparrow* decision, Judge Fairgrieve found that there was an unfair allocation of resources to sport fishermen. The government had not fulfilled its fiduciary duty to Nawash. The provincial government failed to regulate the recreational fishing before restricting the Nawash Fishery when "conservation" was deemed necessary. Moreover, the quota imposed on Nawash fishermen by OMNR was found by Judge Fairgrieve to have contributed to the increase in unemployment and poverty at Cape Croker. Thus, the court held that the infringement caused undue hardship. These factors were deemed to be an unjust infringement of s.35 (1). The OMNR was ordered to negotiate and consult with Nawash regarding the management of their Fishery. In effect, the expectation of Judge Fairgrieve was that the two sides would enter into a co-management agreement. A co-management agreement would not be reached until 2000 (sub-section 5.6).

A direct impact of the *Jones-Nadjiwon* decision was the enactment of Nawash council By-law 13-96, which further delineated the management responsibilities of Nawash. Under the authority of the Indian Act, First Nation Councils can enact by-laws pertaining to matters that are within the jurisdiction of their reserves, including fish preservation, protection and management. Once Council by-laws are officially enacted by the Minister of the Department of Indian Affairs and Northern Development (by-laws can be vetoed by the Minister within 40 days of notification), they become federally recognized. The implication is that Councils can pass by-laws without consulting the DFO or Provincial regulatory bodies.

Currently, by-laws represent an important tool for First Nations to exert their Aboriginal and Treaty rights. However, the parameters defined in the recent Supreme Court decisions (particularly, the affirmation of the priority right of conservation over Aboriginal and Treaty rights in *Sparrow*), will undoubtedly raise questions regarding the parameters of Nawash By-law 13-96. The position of the DFO and the OMNR is that the need to regulate Canada's fisheries in the interest of conservation prevails over all else, including Aboriginal and Treaty rights. In all likelihood, many First Nations would agree on this point; however, at present, there is no consensus as to the meaning of the term "conservation" (Crawford and Morito 1997).

Nawash By-law 13-96, *For the Preservation, Protection and Management of Fish*, became effective January 1, 1999. It gave Nawash the authority to control their own Fishery and implement their own conservation practices within the zone established in *R. v. Jones-Nadjiwon*. Management responsibilities outlined in the Nawash By-law include the regulation of Nawash fishermen and the collection and analysis of fishery data. The Council established a By-law Enforcement Program in 1996 to enforce the provisions of By-law 13-96.

The need to define conservation values for fisheries management was recognized by the Supreme Court of Canada in the case of *R. v. Sparrow* (1990). The Nawash Council has emphasized the need to define the term "conservation" with respect to fisheries management for two reasons. First, it provides a focus for making decisions geared toward the long-term protection of the environment. A healthy environment,

including healthy fish populations, is essential to the welfare of the Nawash community, both culturally and economically.

The second reason relates to the OMNR's legal right, as determined in the case of *R. v. Jones-Nadjiwon* (1993), to intervene in the management of the Nawash Fishery for conservation purposes. Nawash claims that, unless a clear definition of the term conservation is formalized, the OMNR has no legal basis to restrict Nawash Treaty fishing rights or to challenge their management scheme. However, this has not prevented the OMNR from doing so thus far. According to Nawash (Chippewas of Nawash 1999: Online):

Although the term "conservation" is used frequently by the Ontario Ministry of Natural Resources (OMNR) and sportsmen's groups, nobody has presented an operational definition of conservation, or a functional conservation ethic. Instead, "conservation" has become a political tool, which is shaped and re-shaped to serve the needs of the party defining the term. There can be no rational discussion of fisheries conservation, when the basic values and principles are not clearly understood and accepted.

As long as there is no clear definition of conservation, jurisdictional issues will not be resolved. Nawash has made a determination that conservation values will play an important part in the management of their Fishery, but, as yet, they have not formalized their own operational definition of conservation. Nor has an agreement been reached between Nawash and the OMNR on the term conservation and its implications.

5.6 The Road to Co-operative Fisheries Management

"To put it simply, the Band desires to be the master of its own house. It desires to make and carry out its own management decisions in respect to those resources over which it has control" (Chippewas of Nawash First Nation unpublished document: 20).

Following the *Jones-Nadjiwon* decision (1993), mediated discussions between the Nawash Council and the OMNR were held in an attempt to negotiate a co-management agreement. However, the lack of trust and understanding between the two groups gave rise to frustration, thereby impeding reconciliation.

Since 1983, the Owen Sound Bay and Colpoys Bay (shaded area in Figure 1) have been closed to commercial fishermen by the OMNR to provide an exclusive recreational

fishery zone. The Owen Sound and Colpoys Bays are part of the Saugeen Ojibway territorial waters. Nawash fishermen refrained from fishing in these waters until 1995, at which time fishing was resumed in what Chief Akiwenzie stated was a move to test the 1993 court ruling (Wright 1995).

As expected, tension between Nawash and non-Native recreational fishermen was strong. The OMNR abided by the court ruling despite complaints from non-Natives. The Nawash Council's political tactic was effective in drawing attention to the need to resolve outstanding management issues relating to the exercise of the rights of Nawash to fish in their territorial waters. However, by 1996, negotiations had ceased due to failed attempts to produce an equitable solution that was agreeable to both parties.

In 1997, a mediator, Judge Stephen Hunter, was hired and talks resumed. These discussions included representatives from the Department of Indian Affairs and Northern Development, the Department of Fisheries and Oceans, the OMNR, and the Saugeen Ojibway. These negotiations led to the signing of a four-year formal fishing agreement on June 22, 2000. The following statement, taken from the agreement, summarizes its purpose:

This Agreement is intended to provide the means by which short term commercial fishing activities can be regulated and management issues addressed while discussions between the parties continue toward resolving long-term cooperative fisheries management issues.

There are some benefits to be accrued by Nawash in signing the Agreement. First, the Agreement includes provisions for the exchange of information for the purpose of stock assessment. The intent is to use this information to facilitate improved management of the Nawash Fishery for the benefit of all parties. Second, the Agreement contains protocols for setting total allowable catch and enforcement measures through a collaborative process. The implication is that Nawash fishermen can continue to fish, within the terms of the agreement, without having to contend with the looming threat of legal challenges as a result of the OMNR taking unilateral action against Nawash.

Despite these benefits, Nawash was hesitant to sign the Agreement because, in their opinion, the OMNR has not shown good faith in past negotiations and dealings with Nawash. The OMNR has been accused by Nawash of using coercive tactics and, in the

process, infringing on Nawash's existing Aboriginal and Treaty fishing rights. In this particular case, underlying the proposal of the Fishing Agreement was the threat (stated clearly in a letter to Nawash from John Snobelen, the current Ontario Minister of Natural Resources, Ministry of Natural Resources 2000) that the OMNR would impose, rather than negotiate, a licensing scheme on the Nawash Fishery.

Nawash considered this licensing scheme as being unfavourable because it reduced the Aboriginal share of the total allowable catch (TAC) to 50 percent, despite the fact that the TAC was previously being negotiated at almost 100 percent. The OMNR's proposed licensing scheme was not considered constitutionally-valid by Nawash on the grounds that the fisheries allocation of 50% is not consistent with the *Sparrow* and *Gladstone* Supreme Court of Canada decisions which call for a priority allocation. The OMNR offered no apparent justification for the 50 percent allocation.

Many Nawash fishermen supported the Fishing Agreement because they feared that, without it, the OMNR would issue a 'stop-buying' order to fish buyers, essentially paralyzing the Native fisheries with detrimental consequences for the fishermen and their families. In this scenario, commercial fish buyers would face charges if they did not adhere to the OMNR's ban. The OMNR previously demonstrated that it has the willingness and the power to support such action. The OMNR imposed a ban on the purchase of native fish to commercial fish buyers after having laid charges on Nawash fishermen (1989) prior to the trial (*R. v. Jones-Nadjiwon*, 1993). The ban effectively choked the market for Native fishermen for two years and caused serious hardship for the Nawash community because all fishing activities virtually ceased with little or no other means of support. Once the ban was lifted, many people had to borrow money in order to resume fishing.

A similar incident occurred in December of 1999 when the OMNR issued a stop-buying order without prior notice following an unsuccessful mediated discussion between the OMNR and the Saugeen Ojibway. As a result of these particular situations, and countless other real or perceived injustices over the years, there is a high degree of mistrust between Nawash/Saugeen and the Province of Ontario.

It should also be noted that many Nawash community members felt that their right to fish should not have to be recognized by the courts because it is an inherent right, rather than a given one. Having to implement a management system that is based on non-Native understandings and frameworks is, in the opinion of some people, an infringement of this right. Thus, there has been some resistance to certain aspects of the new management scheme, such as having to gather biological data using non-traditional methods. Others feel that they must accommodate non-Native understandings in order to exercise their fishing rights and avoid conflict.

The signing of the fishing agreement raised other issues for Nawash as well, namely, what are the legal implications with respect to Nawash Aboriginal and Treaty fishing rights? According to the *Jones-Nadjiwon* decision, the OMNR has the right to regulate the Aboriginal fisheries to ensure conservation, given that measures have already been taken to restrict non-Native fisheries. A fisheries co-management agreement cannot extinguish treaty rights.

From the OMNR's standpoint, the Fishing Agreement was a necessary measure to ensure conservation. It will be used to curtail two problems pertaining to conservation of the fish stocks: 1) over-harvesting of fishery resources; and 2) the lack of information to properly assess stocks, a result of the refusal of the two First Nations to report to the OMNR on their catches. One of the terms of the agreement is that the First Nations will voluntarily refrain from fishing in the Owen Sound and Colpoys Bays (Figure 1).

Although no concrete evidence exists to substantiate the claim that fish populations are in fact being over-harvested, there is general agreement within the Nawash community that this issue needs to be addressed. The lack of information is not disputed. However, the authority of the OMNR to impose a reporting relationship whereby Nawash reports its catches and other fishery-related information to the OMNR is disputed by the Nawash.

The legally-established right of the Nawash First Nation to manage their own Fishery gives them the authority to collect and analyze their own fishery data, and to use this data to implement their own licensing scheme. Although Nawash has developed a fisheries management plan, including an Assessment Program, and a By-law Enforcement

Department, the OMNR asserts that a Fisheries Agreement is necessary until the management plan is fully operational for conservation reasons.

After weighing these issues, Nawash signed the Fishing Agreement and is now accountable to the terms established therein. Consideration was given to protecting the immediate needs of the fishermen and the resolution of conflict. Conflict has been a continued impediment to the management process as considerable time and resources are allocated to resolving outstanding issues. From the perspective of Nawash, the Agreement provided Nawash with an opportunity to get its own house in order, so to speak, so that it may fully exercise its Aboriginal and Treaty fishing rights in the future.

Hanson (2000) agrees that co-management agreements between First Nations and Federal/Provincial Government(s) hold promise for the development of improved management models based on trust and partnership. However, he points out that institutional and technical innovation, and consistent compliance by all signatories with the terms of fishing agreements, are required. Consequently, the success of this management approach will depend on the level of commitment and leadership put forth by the parties involved.

5.7 Environmental Issues Facing the Nawash Fishery

Lake Huron (including Georgian Bay) is the third largest of the Laurentian Great Lakes ecosystem by volume (3,540 cubic kilometres) and the second largest by surface area (59,000 square kilometres) (Government of Canada and the United States Environmental Protection Agency 1995). In addition to receiving input from runoff, precipitation, and groundwater (in the form of base flow from tributaries), Lake Huron receives water from Lake Superior via the St. Marys River and from Lake Michigan via the Straits of Mackinac. Its drainage area, which includes parts of Michigan and Ontario, is 134,000 square kilometres (Government of Canada and the United States Environmental Protection Agency 1995). Lake Huron retains its water for approximately 22 years before flowing to Lakes St. Clair and Erie via the St. Clair and Detroit Rivers. The shoreline, including the shores of its more than 30,000 islands, measures 6,157 kilometres and is characterized by shallow sandy beaches to the south, cobble beaches to

the north and rocky shores in the Georgian Bay region (Department of Environmental Quality 1999).

The Saginaw Bay watershed, which is located in Michigan on the eastern side of Lake Huron, is extensively farmed and hosts the Flint/Saginaw/Bay City metropolitan area. In addition, a major centre of industrial activity is located in Sarnia (Ontario) to the south of the lake where it meets the St. Clair River. Relative to the other Great Lakes, the Lake Huron basin has a low population density (approximately 2.5 million people live in the basin), and a low degree of industrialization. However, settlement along the shores of Lake Huron is expected to increase dramatically in the future.

According to the Department of Environmental Quality (1999), the geography of Lake Huron makes its waters vulnerable to a number of human-induced environmental problems. First, the large watershed can deliver non-point pollutants to the open waters via tributaries. Second, the large surface area of Lake Huron (and its watershed) can allow airborne pollutants to deposit directly into the open waters (and via tributaries). Third, the long retention time of the lake water can lead to accumulation of pollutants. Finally, the anticipated population growth can threaten the remaining high-quality habitat within the Lake Huron basin. Consequently, the biodiversity of Lake Huron is threatened by exposure to a number of stresses. These stresses include degradation of historical habitat in tributaries and near-shore habitat; eutrophication (excess nutrients) in localized areas; effects of harmful exotic species; effects of over-fishing; and impact of persistent toxic contaminants (Department of Environmental Quality 1999).

Lake Huron's ecological well-being is greatly affected by the health of its tributaries, which provide critical habitat for spawning and young fish. Many tributaries have been severely degraded as a result of dams, sedimentation, non-point source pollution and land-use practices. Important high-value coastal wetlands have also been lost: over 20 percent of US coastal wetlands (estimates for Canadian coastal wetlands are not available) (Department of Environmental Quality 1999).

Shoreline habitat loss is attributed to agricultural, recreational, urban, and industrial development. Despite such losses, a significant amount of historical fish and wildlife habitat is still present in the Lake Huron basin and the fishery is deemed to be

relatively healthy (Department of Environmental Quality 1999). The Bruce Peninsula is among the areas that have been designated as being of high quality habitat. The traditional fishing islands of the Saugeen Ojibway, which are located along the western shore of the Bruce Peninsula, host one of Lake Huron's largest spawning grounds for lake whitefish. Consequently, fisheries scientists suggest that the area should be afforded special protection (Akiwenzie and Roote 2000).

Exotic species are also a major source of concern in the Great Lakes region. They can prey on native species, compete with them for food and habitat, and increase the cycling of persistent bio-accumulative chemicals in the food chain, thereby threatening the diversity and abundance of native species and the stability of aquatic ecosystems. Sea lamprey, carp, smelt, alewife, and zebra mussels have caused changes in aquatic habitat, and plant and fish populations, and thereby contributed to a loss of biodiversity in the Great Lakes (Government of Canada and the US Environmental Protection Agency 1995). Crawford (1997) suggests that non-indigenous salmonoid species (e.g. chinook salmon, coho salmon, rainbow trout, brown trout), stocked under the license of the OMNR for recreational fishing, are disruptive to the Great Lakes ecosystem. He argues that these introduced species pose an ecologically significant threat to native species, particularly native brook trout and lake trout (harvested by Nawash fishermen).

Contaminant concentrations are considered to be low in Lake Huron as compared to those of Lakes Michigan, Erie, and Ontario. However, contaminants found in fish taken from the open waters of Lake Huron are being closely monitored in both Canada and the United States as indicators of pollutants in the ecosystem. Contaminants are known to bio-accumulate and bio-magnify in the food chain, which poses a threat to wildlife and human health. Major sources of contaminants include sediments contaminated by historic discharges, airborne deposition, industrial and municipal discharges, and surface runoff.

One environmental aspect of Nawash fishing that has the potential to cause adverse environmental impacts is selectivity of gear, namely, the use of gill nets. Environmental impacts include discards, catch by lost or abandoned gear (ghost-net fishing), and catch of non-target species. Gill net fishers use the size of the mesh, water

depth, and location to target fish of a certain species and size. In addition to catching targeted species, various non-targeted species also become entangled in the gill nets incidentally. The number of fish that are returned to the water alive is dependent on several factors, including water temperature, water depth, the way the fish are handled, the length and duration of net set, and twine diameter. The ability of fish to detect (i.e. see and smell) nets can increase if material (e.g. algae, weeds, mud) accumulates on the netting; hence, cleanliness of the nets is also a factor. To avoid even the slightest odour on nets, it is believed that Anishnabe fishermen historically used to clean them meticulously with a solution made with sumac leaves. Today, nets are cleaned in the open water with laundry detergent. The significance of the environmental impact of the modern method for cleaning nets has not been determined.

Ghost-net fishing is a major cause of concern in the Laurentian Great Lakes. Historically, Nawash fishermen used gill nets made of natural fibers that decomposed over time, such as bark fiber cord and nettle stalk twine. Currently, Nawash fishermen use gill nets made of synthetic, manufactured twine, which makes them more efficient; however, they also last longer when lost. Over-fishing and the production of waste (e.g. 'blood water' on docks) are other potential environmental impacts caused by Nawash fishing.

5.8 Biological Uncertainty

One of the major problems that exist in the Lake Huron fisheries is a lack of accurate and reliable information. There is a high level of uncertainty with respect to the discrimination and geographic distribution of lake whitefish populations in Lake Huron. It is not known whether lake whitefish that are harvested in the Saugeen Ojibway traditional waters follow larger migratory populations that move throughout Lake Huron, or whether they constitute smaller, distinct migratory populations. In addition, the population structure and dynamics of both lake whitefish and bloater chub are major sources of biological uncertainty. To compound the lack of information, there is little communication and information-sharing between the OMNR and Nawash. Although the flow of information has improved somewhat in recent years, their skepticism of one another's management practices remains a barrier to effective communication.

Shortly after the Nawash Fisheries Management Biologist was hired, the Chippewas of First Nation Fisheries Assessment Program was initiated to gather data on the Fishery. The Fisheries Management Biologist develops capabilities for and oversees harvest assessment, field assessment, total allowable catch development, fisheries assessment, age determination, and population modeling. An Assessment Biologist was hired in 2000 to assist with the development and implementation of assessment programs, such as the larval fish trawl program, the index gill-netting program, the fish-tagging program, the fish genetics program, and the commercial assessment program. Nawash community funds, which are allocated to the Nawash Council by the Government of Canada to fund community services, are used to support fisheries management programs. Additional funds may be available to the Joint Council to support implementation of the 2000 Fishing Agreement if the Joint Council's budgetary proposal is approved. The reliance of the Nawash Fishery on external sources of funding necessitates effective planning and the ability to demonstrate appropriate use of funds.

The purpose of the Nawash Biological Assessment Programs is to gather and analyze fishery data to generate new knowledge about the status and behaviour of fish stocks. The commercial assessment program involves the collection of effort and gross harvest data on all landed catches, and biological data on a random sub-sample of the total landed commercial catch. Using this information, and that which is obtained through collaborative research efforts, the Council can determine parameters for fishing to protect the long-term health of the fish populations of Lake Huron.

Currently, there is no agreement between the OMNR and Nawash with respect to accepted scientific methods of assessing fish populations in Lake Huron or the methods for determining total allowable catches. Thus far neither party has shown willingness to concede that the other's approach to management is valid, making it difficult to generate a working relationship based on trust. There is a need for accurate data on which both Nawash and the OMNR can rely. To this end, the Government of Canada, the OMNR, and the Saugeen Ojibway are attempting to resolve biological uncertainties through ongoing mediated discussions. An improved understanding of lake whitefish and bloater

chub populations will place the Nawash assessment staff in a better position to co-ordinate their harvests with population dynamics.

5.9 Social Challenges

A major challenge facing the Nawash Fishery is the resolution of conflict with the OMNR. Ongoing conflict is the direct result of the historical and legal circumstances surrounding the Nawash Fishery described above, particularly the legal recognition of Nawash Aboriginal Treaty fishing rights. Discord is perpetuated by the highly skeptical nature of both parties concerning the adequacy of one another's management practices.

Two technical reports, prepared for Nawash by Dr. Steve Crawford, the Nawash Fisheries Management Biologist and Research Associate at the Axelrod Institute of Ichthyology (University of Guelph), suggest that there is a need to improve the existing fisheries management practices for Lake Huron. Crawford (1996) points to a number of fundamental problems in the way that the OMNR manages the commercial fisheries. Specifically, he suggests that there is an absence of a documented fisheries management plan, violation of scientific methods, inadequate biological data to discriminate fish populations, lack of population production estimates, and an inability to prescribe safe harvest limits. Crawford also indicates that the negative effects of stocking pacific salmon far outweigh the benefits gained by the recreational fishing industry. To date, Nawash and the OMNR have not resolved these issues.

Another social challenge facing the Nawash Council is the need to address pressure from within the Cape Croker community to improve the fisheries management practices. Interviews with Nawash fisheries management personnel and other community members revealed a number of strengths of the current fisheries management system. Fisheries management personnel and other community members also perceived a number of weaknesses and recommended how the management system can be improved. These opinions, described below, are not necessarily widely accepted, but were expressed by key persons, informants, and experts (Friedrichs and Lüdtké 1975) who were well-informed about the Nawash Fishery's management.

The Council is strong in the area of crisis management. Within recent history, particularly in the years leading up to the Jones-Nadjiwon decision (1993), and in the post-Jones-Nadjiwon era to the present, the Council has been faced with a number of legal/political decisions which had to be addressed with urgency. The need to defend Nawash Treaty fishing rights in particular, has arisen on numerous occasions. Disputes between Nawash and non-Native fishermen have become quite volatile at times and, in such situations, the Council has become adept at maintaining its poise and objectivity. The Council places the Fishery among its highest priorities and, when contemplating major decisions, devotes considerable time to consideration of the social, economic, environmental, and legal implications of its decisions.

Although the Council is adept at dealing with urgent and other management issues, more attention should be given to the day-to-day operation of the Fishery to ensure that all functions are being carried out properly. A fisheries management board, comprised of individuals trained in fisheries management and representatives from the Joint Council, should be formed to carry out the daily management of the Fishery. The board would act in an advisory capacity to the Council, thereby placing the Council in a better position to prepare for and respond to more critical management issues. The Council would also be better equipped to deal with urgent management issues if a Nawash fisheries management policy was established. Such a policy should be used to guide decision-making, keep the Fishery's actions on par with Nawash community values, and align organizational activities and stakeholder expectations.

The development of programs, such as the By-law Enforcement and Fisheries Assessment programs, indicates the Council's long-term vision of reducing the Fishery's vulnerability to legal disputes by meeting the expectations of external parties for fisheries management, particularly by investing in surveillance and regulation and fisheries science for conservation purposes. Through the Assessment programs, good work is being done toward building a scientific information base. The Council should continue to strengthen this capacity.

The Council is well informed and genuinely concerned about environmental issues. Fisheries management personnel and Council members often attend conferences and

meetings that address issues pertaining to their Fishery (e.g. bio-technical meetings and fisheries conferences) and Lake Huron. The Council conveys pertinent information to the Nawash community at community meetings. The Council's investment in research, both through the assessment program and with external parties, also fosters awareness of fisheries management issues within the Nawash community, particularly awareness of environmental issues.

Council affiliations with universities and involvement in research projects aimed at reducing uncertainty with respect to Lake Huron ecology, fisheries, and their management are a positive step toward establishing credibility. For example, in collaboration with the University of Guelph, McGill University, and Ontario Power Generation, Nawash is analyzing the available information on the ecology and management of lake whitefish (*Coregonus clupeaformis*) to develop hypotheses about changes in lake whitefish populations in Lake Huron over time. The knowledge gained through this, and other research projects, will improve the decision-making capability of the Council and provide a basis for justifying conservation-related decisions.

Credibility and accountability in decision-making are a major concern within the Nawash community. Due to the small size of the community, community politics are highly influenced by social and familial relationships. In addition, Councillors and fisheries management personnel can assume dual roles. For example, some Councillors are also fishermen. As a result, there is potential for polarization of interests and conflicts of interest to occur in the decision-making process. There is a perception that those who are involved in decision-making could have a vested interest or hidden agendas where the Fishery is concerned. In addition, although community meetings facilitate two-way communication between fisheries management personnel and interested community members, there is frustration, particularly by some fishermen, that the Council does not incorporate their views in the decision-making process.

The Council should consider increasing community involvement/input, where appropriate, to promote a more open and accountable decision-making process. Furthermore, fishermen and other interested community members would like to have access to the information upon which management decisions are based, the results of

management decisions, and the justification for management decisions. The Council should also institute a process for third-party monitoring and measurement of the adequacy of its management practices. This would provide a basis for establishing credibility within the Nawash community and with government agencies and the public.

There is a perception within the Nawash community that responsibility and accountability for some positions is not adequately specific and/or motivation is lacking where leadership is required. Responsibilities and accountability for each position should be documented in job descriptions and fisheries personnel should regularly report to the Council on their progress toward meeting established goals.

Finally, there is a need to establish formalized procedures for vessel and fishing safety. A number of fishing accidents occurring within recent memory, some resulting in death, could have been prevented if adequate controls were in place (e.g. through regulation, monitoring, and enforcement). These incidents should be reported and documented, and the Council should actively encourage fishing safety to prevent fishermen from taking risks when setting and removing nets and fishing in extreme bad weather.

5.10 Economy

The *Jones-Nadjiwon* decision (1993) paved the way for Nawash to exercise their Aboriginal and Treaty rights to fish for commerce and subsistence, thus providing hope for future economic stability. The Nawash Fishery is in recovery after suffering severe economic losses as a result of the conflict between Nawash and the OMNR prior to the *Jones-Nadjiwon* decision (1993). Since the decision, there has been a growth in fishing by Nawash. The estimated value of the Fishery, in terms of annual income, is between two and three million dollars) (Chippewas of Nawash Planning Office 1997).

The Cape Croker reservation has a population of approximately 700 (Chippewas of Nawash Planning Office 1997: 5). Approximately 330 people are involved in the workforce, 70 of who are involved with the Fishery in some capacity (1997: 18). The Fishery makes up a significant portion of the workforce (approximately 21 percent). Consequently, the unemployment rate is highly sensitive to any changes that affect the

number of people employed in the Fishery. A change in the number of working fishermen can cause the unemployment rate to fluctuate between 50 and 70 percent (1997: 21).

Ownership or operation of fishing vessels characterize direct employment in the Fishery. Indirect employment includes involvement in a supportive capacity such as net mending and mechanical repair or involvement in the Fishery management system. Indirect fishery-related benefits are accrued from two restaurants and a gasoline station that are located on Cape Croker and run by Nawash community members.

The current outlook for the Fishery is promising. There is significant potential for economic development of the Fishery in the areas of processing, packaging, and marketing. Nawash fish are primarily sold to five local wholesale fish buyers at a minimum value because the Fishery has not developed the capabilities to process, package or market its products. Such developments could enable the Fishery to compete in markets that are currently inaccessible. According to the Chippewas of Nawash Planning Office (1997: 29): "eventually, if not already, fishing will be the clear leader in terms of dominating local enterprise".

5.11 Summary

To date, the Chippewas of Nawash have successfully defended their Aboriginal and Treaty rights to fish in their traditional waters of Lake Huron (Walters 1998). These fishing rights are now legally protected from Provincial encroachment (*R. v. Jones-Nadjiwon* 1993); however, the ability of Nawash to exert those rights continues to be challenged. The lack of trust between Nawash and the OMNR has often created an atmosphere of hostility and worked to the detriment of the Nawash Fishery. Consequently, the Nawash Council has devoted significant time and resources towards the development of a credible fisheries management system.

According to Nawash fisheries management personnel and other community members who are knowledgeable about the Nawash Fishery's management, future action toward improving the fisheries management system should focus on policy development and better transparency and accountability in decision-making. To be more specific, Nawash community values should be defined in a fisheries management policy to guide

decision-making, information on which management decisions are based should be made available to interested parties, the effectiveness of management practices should be verified by an independent third-party, and the Council should report on the effectiveness of its fisheries management system. These management issues could be addressed through implementation of an environmental management system. Guidelines for applying an environmental management system to fisheries is provided in the following chapter.

CHAPTER SIX: PROPOSED FISHERIES MANAGEMENT PROCESS

6.1 Introduction

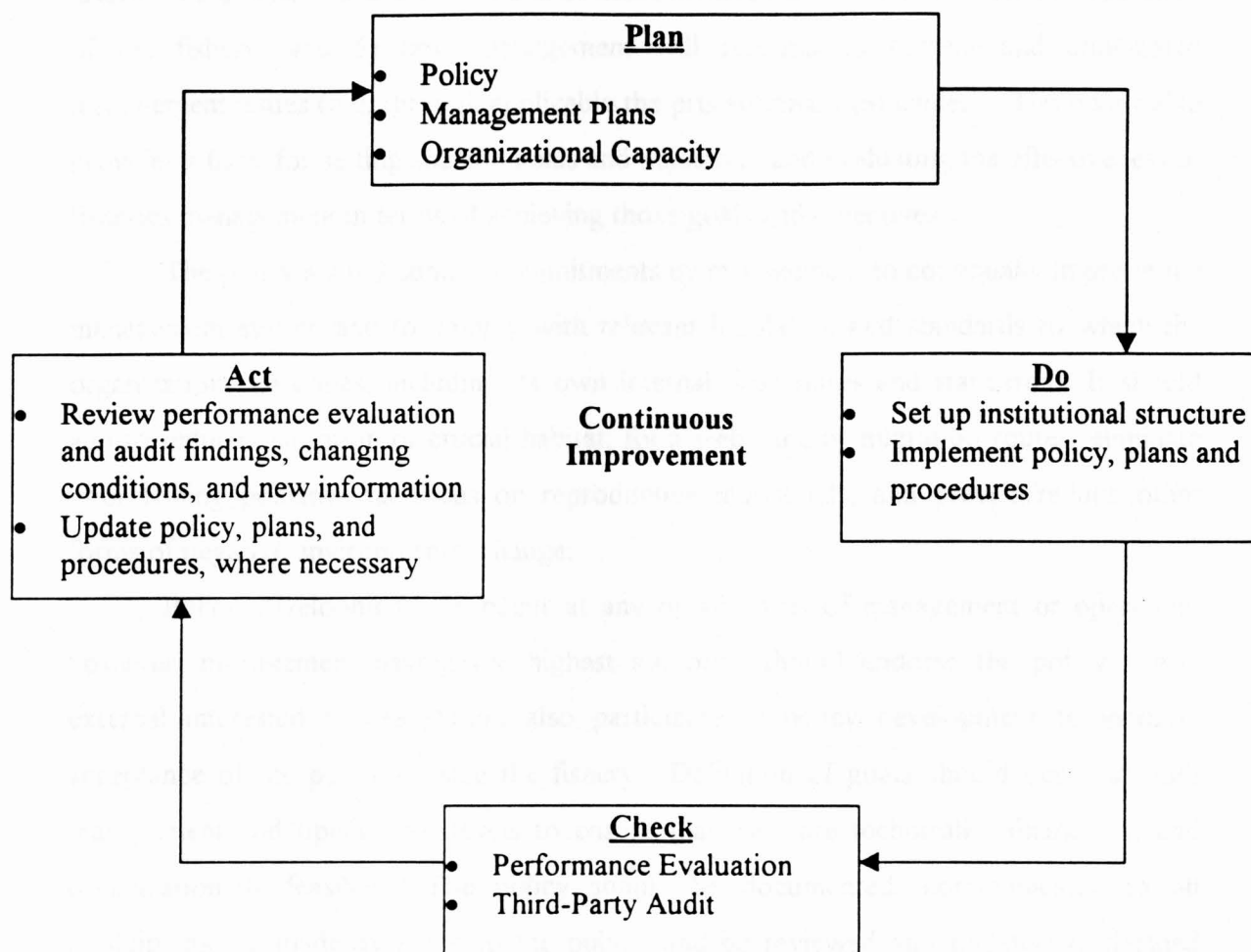
The aim of this study was to develop a long-term strategy for fishery managers to help them identify, prioritize, and address environmental management issues, as well as monitor, evaluate, and improve management practices. In the preceding chapters, responsibilities and challenges facing modern fisheries management were summarized, environmental management strategies that are being used in the agriculture, forestry, and fishing industries were examined, and a case study, the Nawash Fishery, was introduced. In this chapter, the fisheries management process that was developed in this study is described and specific actions for improving the Nawash fisheries management system are recommended. Topics for future study are also recommended.

6.2 Criteria and Elements

Current thought as to what constitutes best practice for fisheries management is well established in industry codes of practice, technical guidelines on fisheries management, and fisheries literature. These sources indicate that fisheries management systems should meet six basic requirements. First, they should provide direction in decision-making through formally established values, goals, and objectives (Barber and Taylor 1990). Second, they should facilitate analytical decision-making that enables consideration of multiple objectives, including environmental, economic, and social objectives (Hutchings et al. 1997; FAO 1997b; Stephenson and Lane 1995). Third, they should include a policy, accompanied by specific management measures and an appropriate institutional framework, for long-term conservation and sustainable use of fishery resources (FAO 1997a). Fourth, fisheries management systems should include procedures for identifying the views of stakeholders and interested parties (FAO 1997b; Stephenson and Lane 1995). Fifth, they should include procedures for evaluating the effectiveness of fisheries management practice according to policy commitments (FAO 1997b). Finally, fisheries management systems should be adaptive to suit changing

conditions and new information, such as industry adjustment to legislation and changing market conditions (FAO 1997b; Lane 1992).

To meet those fundamental criteria, a fisheries management process was developed which incorporates environmental management system elements, as described in Chapter Four. The process is based on the Deming Cycle (1982), also known as the "Plan-Do-Check-Act Cycle", which is a process used to foster continuous improvement of management practices (Figure 3). The "plan" component involves developing and committing to a fisheries management policy, and formulating plans and procedures to implement the policy. The second component, "do", involves putting plans into action by developing the appropriate organizational capacity (i.e. reporting and communication channels, accountability mechanisms, resources). The third component, "check", involves evaluating the degree to which objectives and targets are being met through ongoing monitoring and measurement of environmental performance and regular third-party audits of the fisheries management system. Finally, management must "act" by reassessing and updating environmental policies, procedures, and plans in light of changing conditions, new information, and the findings of monitoring and auditing practices. The various elements of the process are described in below, and guidelines on implementation are provided.

Figure 3: A representation of the proposed fisheries management process

6.2.1 Fisheries Management Policy

The purpose of the fisheries management policy is to communicate the following information to internal and external interested parties: 1) the fishery's mission, and its environmental, economic, and social values; 2) the position of management with respect to significant fishery-related issues; 3) the commitment of management to addressing those issues; 4) the behavioural expectations of those involved in the management and operation of the fishery; and 5) how management will respond to current and anticipated management issues (e.g. through applicable the precautionary principles). The policy also provides a basis for setting specific goals and objectives and evaluating the effectiveness of fisheries management in terms of achieving those goals and objectives.

The policy should contain commitments by management to continually improve the management system and to comply with relevant legislation and standards to which the organization subscribes, including its own internal procedures and standards. It should aim to reduce disruption of crucial habitat, food webs and/or migration routes, eliminate poor fishing policies that focus on reproductive individuals, and prevent/reduce other forms of negative environmental change.

Policy development can occur at any or all levels of management or operation; however, management having the highest authority should endorse the policy. Any external interested parties should also participate in policy development to increase acceptance of the policy outside the fishery. Definition of goals should occur at both management and operational levels to ensure that they are technically, financially, and organizationally feasible. The policy should be documented, communicated to all participants, be made available to the public, and be reviewed and updated as deemed appropriate by management. Policy changes should reflect changing conditions, such as the introduction of new legislative requirements. Notably, if significant changes are made to the policy on a regular basis, particularly modification of the organizational mission or values, the policy may become useless as a guiding document.

6.2.2 Fisheries Management Plan

Management plans should provide a practical basis for ensuring that policy commitments are met. They should specify priorities, goals and goal-specific objectives, actions for attaining goals and objectives, time-frames, resources required, and responsibility for carrying out actions and reporting on progress. They should also specify precautionary measures, contingency plans, and mechanisms for emergency decisions, where applicable. The allocation of responsibilities and the establishment of reporting relationships should facilitate clear lines of communication and prevent gaps in the institutional structure, thereby decreasing the potential for functions to be overlooked.

A necessary step in developing a management plan is to identify and prioritize significant issues, concerns, and environmental impacts over which the fishery has control and influence (Cascio 1996). The significance of issues, concerns, and environmental impacts should be determined according to their relative importance to one another, as measured by prevailing standards, regulatory requirements, and societal values (Sadar 1995). This analysis will provide a basis for setting goals and goal-specific objectives. All goals and objectives must be consistent with the environmental, economic, and social values of the fishery. Where the fishery's policies and practices are at odds with those of other management authorities, there is potential for conflict to arise. Thus, in the determination of goals and objectives, consideration should also be afforded to the values of external parties (Barber and Taylor 1990). Ideally, external parties should participate in the goal- and objective-setting process to reduce the potential for future conflict, perhaps through mediated discussions if necessary.

Consultation with external parties in decision-making could generate useful information required for planning purposes by promoting understanding of the diversity of values, goals, and objectives of different interest groups (Sadar 1995). Understanding the concerns of external parties provides a basis for building credibility and trust, a necessary step towards reducing conflict. Input should also be sought from all levels of the fishery in order to ensure feasibility of the action plan and foster commitment (Cascio 1996). Decisions regarding the nature and scope of goals, appropriate time-scales, and how the goals should be achieved, measured and documented should be made at the appropriate

operational levels. This will increase personal involvement in the planning and implementation process and make operational staff feel as if they are making a contribution to the management process. All management plans should be endorsed by management prior to implementation (Cascio 1996). Once management plans have been approved, management's rationale for rejections or revisions should be documented and these records kept for future reference.

6.2.3 Organizational Capacity

To put the policy and plan into action, management should ensure that an appropriate institutional structure (e.g. management body, fishermen's committee, committee of elders, enforcement unit) is set up, authorized, and documented (e.g. in organizational charts), and that communication and reporting channels are established. In addition, management and operational procedures should be defined to specify the methods for achieving policy commitments, goals, and objectives. A list of procedures required to implement the fisheries management process is provided in Table 3, Section 3.3.1. All procedures should be developed by the people who are charged with implementing them, and they should be endorsed by management with the highest level of authority. Procedures should be documented and easy to understand, and available to all employees and other relevant parties.

Once the institutional structure and procedures are established, specific responsibilities should be delegated to employees to ensure that they fully understand their role within the organization, particularly with respect to the implementation of the proposed fisheries management process (Welford 1998). To assist with the planning and implementation of the proposed process, a list of responsibilities is provided in Table 1. Accountability, schedules, and the resources required to carry out each action item should be determined and documented, and the appropriate authority should be given.

The delegation of responsibility is especially important in smaller organizations, where the potential exists for gaps to occur due to a lack of commitment by only one person. Ideally, responsibilities should be integrated into job descriptions and performance measurement (Gilbert 1993). Once employees' roles and responsibilities have been

established, authority must be delegated to managers to enable them to allocate the human, physical, and financial resources required to carry out assigned duties.

Establishment of responsibility and accountability goes hand in hand with training and is essential if the policy is to be implemented successfully. Training should be incorporated into the organization as an ongoing process and promote a sense of responsibility among staff. A one-time training exercise is inconsistent with the goal of continuous improvement (Welford 1998).

In addition to ensuring that training requirements are met, fishery managers should conduct research and gather information on the status of stocks, the nature of catches and landings, and the social and economic impact of the fishery (FAO 1997b). Furthermore, because fisheries exist as part of larger natural systems, managers should also consider the impact of the fishery on the management of the watershed as a whole, and the impacts of other activities on the fishery (FAO 1997b). To facilitate the integration of new information, knowledge, and understanding into the decision-making process, internal and external communication channels should be established.

All information pertaining to the policy, procedures, plans, institutional structure, and scientific research should be documented, maintained, and organized to provide a basis for measurement and verification of stated objectives, and to audit the effectiveness of the fisheries management system. The documentation system should enable the personnel to identify, access, and update documents and records as needed.

Table 1: Responsibilities for Implementing the Proposed Fisheries Management Process

Designate responsibility to oversee the implementation of the fisheries management system
Formulate the fisheries management policy
Review/revise the policy in accordance with procedures
Communicate the policy to employees and interested parties
Educate personnel about the fisheries management process and their role within the organization
Keep track of and document fishery activities
Identify real and potential environmental impacts, including social and economic impacts, of fishery activities
Quantify the significance of impacts, and rank them according to their level of priority
Establish goals, objectives, and performance indicators
Oversee the development of management plans
Ensure institutional structure and resources to implement management plans
Review and revise management plans
Develop the budget for the fisheries management system
Approve the budget for the fisheries management system
Formulate a list of documents that should be kept for record-keeping and monitoring purposes
Develop a record-keeping and documentation system, i.e. to develop, identify, review, revise, authorize, make available, keep track of and store documents and records
Maintain the record-keeping and documentation system
Develop performance criteria against which the fishery's performance can be evaluated
Monitor and measure the fishery's performance in terms of achieving the goals and objectives outlined in the management plan
Formulate a list of management activities (e.g. training programs) that should be regularly or periodically audited by a third-party and reviewed by management
Develop performance criteria against which the management system can be audited
Co-ordinate audit efforts
Communicate management system inefficiencies and propose measures to rectify them
Approve any modifications to policy, procedures and plans
Keep track of new regulations and requirements
Obtain permits and licenses
Develop compliance plans
Identify training needs and develop training programs
Investigate, monitor and keep records of non-compliance
Investigate, monitor and keep records of accidents
Identify the areas where emergency preparedness and response measures may be required
Prepare procedures for emergency preparedness and response
Co-ordinate emergency response efforts
Ensure continual improvement
Develop and implement methods to recognize/reward good practice
Develop methods for employees to communicate their concerns and suggestions, and for responding to their concerns and suggestions
Encourage employees to communicate their concerns and suggestions for improving management practice
Identify and communicate the expectations and opinions of interested parties to management
Communicate with interested parties
Seek opportunities for competitive advantage and product development (e.g. opportunities for value added)

6.2.4 Monitoring and Performance Evaluation

Performance evaluation, in the context of the fisheries management process described here, is used to monitor, measure, and evaluate progress with respect to achieving policy commitments, goals, and objectives. Performance evaluation uses indicators to track progress in a consistent manner over time. Chesson and Clayton (1998) suggest that indicators are intended to be used for illustrative purposes only; thus, even relatively crude data can be used to determine whether progress is being made. For example, total catch (retained plus discarded) of non-targeted species could be used as a gross indicator of the direct effects of fishing on non-targeted fish species. Although total mortality is a very poor indicator of the effects on the individual fish species or populations, it is sufficient to enable a determination of trends with respect to the entire collection of non-targeted species.

Performance evaluations should be conducted internally by the same people who are responsible for applying the practices and procedures being evaluated (Welford 1998). Evaluation should be ongoing, or conducted at short-term intervals (e.g. weekly, monthly), and produce quantified performance information. The results of performance evaluations should be documented and reported to management on a regular basis. Regular updates will enable management to address management system deficiencies and incidences of non-conformance (e.g. with regulatory requirements), and modify management plans.

6.2.5 Management System Audit

Regular management system audits provide a basis for reviewing and updating policies, plans, and procedures. In order to ensure that the fisheries management system is operating efficiently, it should be regularly and systematically evaluated by an objective third-party (Netherwood 1998). An objective third-party simply means someone who is independent of the particular areas being audited. Management should “check” the effectiveness of the management system in terms of meeting stated goals and objectives by conducting regular management system audits. The audit itself must examine all elements

of the management system, including the policy, overall structure, designated environmental roles and responsibilities, procedures and plans, as well as the day-to-day operating procedures and documents pertaining to the environmental performance of the fishery. Variances from any planned aspect of the management system should be identified and the reasons for them determined and explained. A sample auditing checklist is provided in Table 3. The FAO recommends that fisheries management systems should be audited every one to five years (1997b).

6.2.6 Management Review

The management review enables management to revisit the initial planning stage of the management process. The purpose of undertaking a management review is to ascertain the ongoing suitability and effectiveness of a fisheries management system in light of changing conditions, and new information obtained through performance evaluation, auditing, research, and consultation with interested parties. The review enables management to identify internal and external pressures for change, and develop an action plan to improve the management system. The management review should cover each of the fisheries management system elements. As a result of the review, a management report should be produced which identifies specific opportunities for improvement (e.g. technical innovation, training). Where necessary, policies, plans, and procedures should be updated or modified. The management report should also specify the rationale for any changes made to policies, plans, or procedures.

6.3 Recommendations for the Nawash Fishery

In the following section, the Nawash fisheries management system is evaluated against the proposed fisheries management process, and action for future improvement of the Nawash fisheries management system are recommended.

6.3.1 Formally Establish a Fisheries Management Policy

The mandate of the Nawash Council is to manage Cape Croker for the benefit of the Nawash community. Nawash community members who were actively interested in the Fishery tended to be well-informed about the goals of the Nawash Council and the decision-making process. Those who relied primarily on word of mouth generally received outdated or incorrect information and, in some cases, were unsure as to how or why particular decisions were made. It is recommended, in this study, that the Nawash Council formally endorse a fisheries management policy in accordance with the criteria outlined in Table 1. The policy should be made available to internal and external interested parties at the Nawash Band Office. Most important, the Nawash Council should formulate and endorse a mission statement which communicates the primary goal of the Nawash Council with respect to managing the Nawash Fishery, and a set of principles or values that will be used to guide decision-making in a manner that is consistent with that primary goal.

The legal framework surrounding Nawash Aboriginal and Treaty fishing rights offers a good starting point for the Council to develop a fisheries management policy. According to the Ontario Court ruling *R. v. Jones-Nadjiwon* (1993), Nawash has Aboriginal and Treaty rights which include the right to fish for commercial-subsistence purposes in their traditional fishing areas. The OMNR can restrict Nawash fishing in these traditional waters for conservation reasons. Nawash By-law 13-96, *For the Preservation, Protection and Management of Fish*, gave the Nawash community the authority to control their own fishery and implement their own conservation practices within the zone established in *R. v. Jones-Nadjiwon* (1993). Currently, however, there is no consensus on the meaning of the term 'conservation'.

Above all, the Nawash Council should formally endorse a mission statement and a set of conservation values consistent with the Nawash Council's definition of 'conservation' and the precautionary approach outlined in the Food and Agriculture Organization's Technical Guidelines on the *Precautionary Approach to Capture Fisheries and Species Introductions* (1996). This conservation ethic will provide the Nawash Council with a basis for decision-making in matters that fall within their jurisdiction, as

outlined in the *Jones-Nadjiwon* decision and By-law 13-96. Inclusion of this conservation ethic in a fisheries management policy will make the Nawash Fishery decision-making process transparent to internal and external interested parties. Furthermore, it will give external interested parties, such as the OMNR, an opportunity to incorporate Nawash values into their own policies and plans, and perhaps build more trust.

6.3.2 Devise a Fisheries Management Plan

The Nawash Fishery planning process is systematic, organized, and consistent. Decisions are approved in Band Council Resolutions, which are signed by a quorum of Councillors. Although decisions are made according to a predetermined and reliable process, they are not documented in a central fisheries management plan which specifies the Council's priorities, goals and goal-specific objectives, actions for attaining goals and objectives, time-frames, resources required, and responsibility for carrying out actions and reporting on progress. This is not to say that the Council does not have goals, but the goals of the Council are not always apparent to the Nawash community and external parties, and there is no basis for tracking progress with respect to achieving them.

It is recommended, in this study, that the Council determine which issues, concerns and environmental impacts are most significant given the Fishery's obligations (e.g. industry standards, agreements, regulatory requirements) and values, and the views of internal and external affected parties (Sadar 1995). With respect to the most significant issues, concerns and environmental impacts, the Council should, in priority sequence, oversee the formulation of goals and objectives, and the development of appropriate management plans. The rationale for decisions, or exclusion of alternatives, should be documented. It would be sufficient to record the decision-making process in the minutes of Council meetings. The Council should consider the views and needs of external interested parties prior to endorsing the management plan, particularly the Nawash community and the OMNR. Table 3 outlines criteria that can be used to implement the management plan.

6.3.3 Develop the Organizational Capacity to Implement the Policy and Plan

The Fishery is among the Council's highest priorities. However, the Council also has other priorities that draw their attention away from the Fishery. The Nawash Council is very effective when it comes to making and implementing decisions in a timely fashion, particularly during crisis situations, but the Council does not play a significant role in the daily management and operation of the Fishery. The Council relies on the Nawash Fisheries Management Biologist to provide technical and management advice, which leaves the Fisheries Management Biologist with less time to oversee the Nawash Fisheries Assessment Program. To rectify this problem, the Nawash Council indicates that they intend to appoint a Fisheries Management Board to manage the Fishery's daily operations, including overseeing the implementation of management plans. This revised institutional structure, which includes the addition of a Fisheries Management Board, is shown in Figure 4.

Figure 4: Revised Institutional Structure of the Nawash Fishery

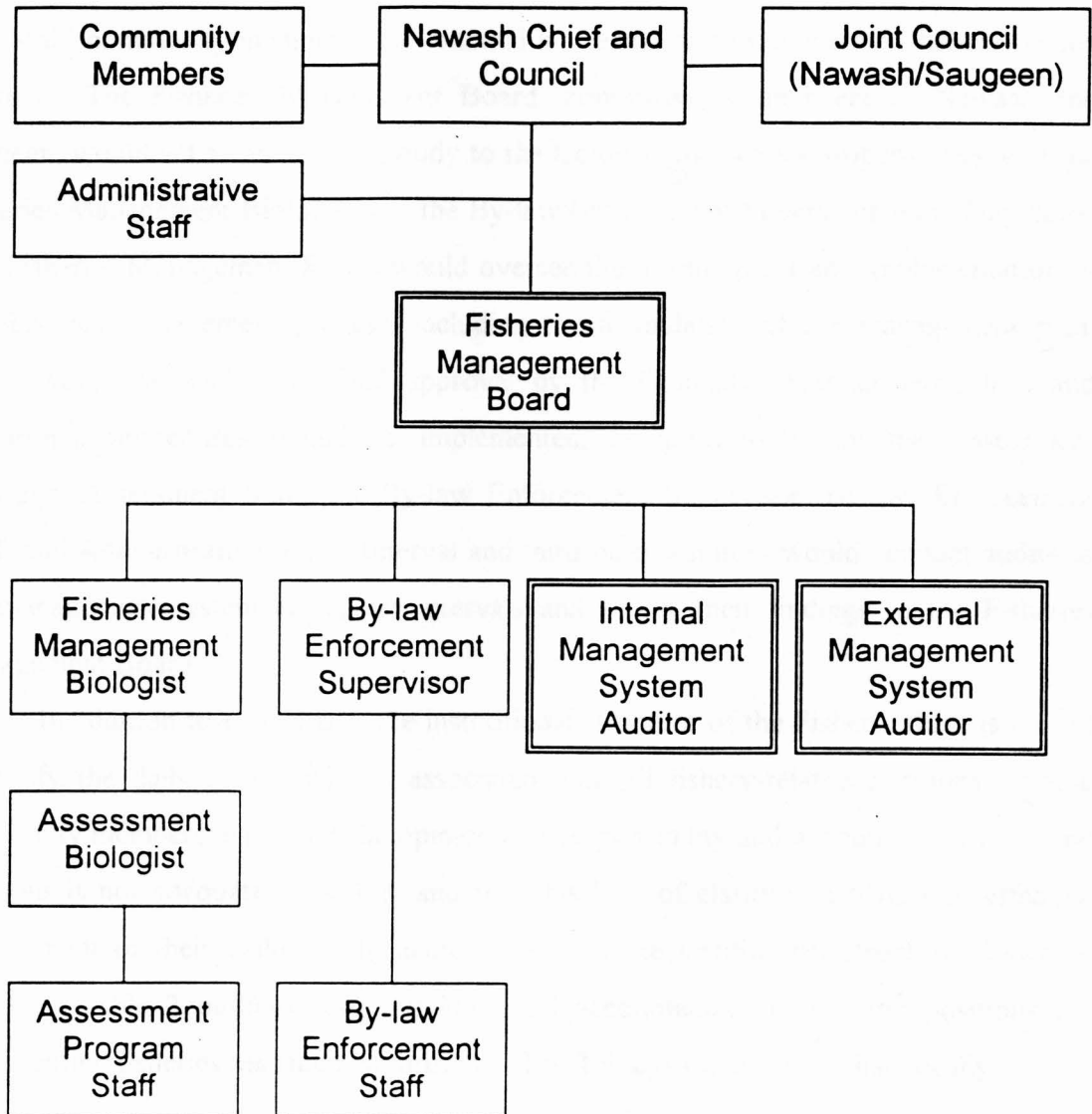


Figure 4 depicts a reporting and communication structure for the Nawash Fishery that is designed to facilitate implementation of the fisheries management process described above. Functions that have been added to the existing institutional structure are shown in double-lined boxes. In this scenario, the Council would continue to act in the interest of Nawash community members (fishermen included), and be responsible for communicating with staff, community members, and external interested parties concerning fishery-related matters. The Fisheries Management Board, comprised of members of Nawash and Saugeen, would act as an advisory body to the Council, and work co-operatively with the Fisheries Management Biologist and the By-law Enforcement Supervisor on a daily basis. The Fisheries Management Board would oversee the development and implementation of the fisheries management process, including the formulation of the management plan, which would be subject to final approval by the Council. Management plans and operational procedures would be implemented, as appropriate, by the Assessment Biologist, Assessment Staff, the By-law Enforcement Supervisor, By-law Enforcement Staff, and Administrative Staff. Internal and third-party auditors would conduct audits of the management system at regular intervals and report their findings to the Fisheries Management Board.

In addition to formalizing the institutional structure of the Fishery, there is a need to clarify the daily responsibilities associated with all fishery-related positions. Some community members expressed the opinion that responsibility and accountability for some positions is not adequately specific, and that this lack of clarity is a barrier to effective management of their Fishery. In accordance with the institutional structure shown in Figure 4, Table 2 outlines responsibilities and accountability to specific positions for implementing fisheries management process. The Table is organized alphabetically.

Table 2: Responsibilities and Accountability for Implementing the Proposed Fisheries Management Process

Administrative Staff

- Ensure that the fishery's management policy is available to all relevant parties
- Maintain an index of current documents
- Maintain an index of obsolete documents
- Maintain a document log
- Receive, respond to, and keep track of requests for information
- Prompt removal and storage/disposal of obsolete documents and records from points of use

Assessment Biologist

- Oversee the implementation of assessment-specific management plans, including the monitoring of specific fishery performance indicators
- Develop and enforce operational procedures
- Co-ordinate the collection of fishery data (e.g. biological) as per the requirements of the management plan
- Identify training needs and report them to the Fisheries Management Biologist for consideration
- Maintain relevant environmental management documents (e.g. documents that pertain to operational procedures for assessment, technical reports, monitoring, communication, training, and environmental/biological information)
- Inform the Administrative Staff of said documents to enable them to update the document index

Assessment Program Staff

- Carry out operational procedures
- Gather field data for monitoring fishery performance as per the provisions of the management plan

By-law Enforcement Staff

- Enforce regulatory, and other, requirements
- Document incidents of non-compliance and report them to the By-law Enforcement Supervisor
- Carry out operational procedures

By-law Enforcement Supervisor

- Develop and enforce operational procedures
 - Recommend future objectives for the By-law Enforcement Program to the Fisheries Management Board
 - Identify and communicate training needs to the Fisheries Management Board for their consideration
 - Monitor progress towards the achievement of By-law Program objectives
-

Table 2 (continued)

Council

- Maintain relevant fisheries management documents (e.g. documents that pertain to monitoring, communication, training, enforcement activities, and operational procedures for By-law enforcement)
- Inform the Administrative Staff of said documents to enable them to update the document index
- Define the fishery's management policy (e.g. long-term strategic goals) and procedures (e.g. policy guidelines)
- Provide organizational support to implement the management policy (e.g. institutional structure and resources)
- Review and approve or reject management plans that have been proposed by the Fisheries Management Board on an annual basis
- Select external auditors and consultants
- Deal with political situations relating to the fishery, such as communications with the media or government
- Review the fishery's performance, the views of interested parties, new scientific and technological information, and legal and other requirements on an annual basis to determine improvements that can be made to the fishery's management policy, plan, and procedures
- Update the policy, plan, and procedures as necessary
- Communicate regularly with the Fisheries Management Board with respect to management issues
- Provide the Fisheries Management Board with fisheries management documents for record-keeping purposes, including those pertaining to conservation values, the management policy and procedures, approved management plans, communication, the results of third-party audits, and management reviews
- Inform the Administrative Staff of documents that have been given to the Fisheries Management Board for record-keeping, to enable them to update the document index

External Management System Auditor(s)

- Conduct an annual independent audit of the fisheries management system
- Report audit findings to the Council
- Recommend ways to improve the fisheries management process

Fisheries Management Biologist

- Report to the Fisheries Management Board on issues pertaining to the Fishery's management (e.g. training needs, progress toward meeting Assessment Program objectives)
 - Provide scientific and technical assistance to the Fisheries Management Board, including recommending fishery management plans
-

Table 2 (concluded)

-
- Consult and collaborate with the scientific community
 - Consult with parties that affect, or are affected by, the fishery on a regular or periodic basis
-

Fisheries Management Board

- Oversee the implementation of the fisheries management process
 - Select internal auditors
 - Keep track of when quality management audits are due
 - Delegate responsibility to implement management plans
 - Report to the Council on the status of the fisheries management system twice annually (e.g. internal audit results)
 - Identify and keep track of significant environmental impacts, potential emergency situations, regulatory and other requirements, and training needs
 - Maintain environmental management documents, including results of environmental impact assessments and performance evaluations, audit results, management reviews, communications, training records, the management policy and procedures, management plans
 - Inform the Administrative Staff of documents that will be maintained for the fishery management system
 - Consult with the scientific community
 - Consult with parties that affect, or are affected by, the fishery on a regular or periodic basis
 - Formulate management plans annually
 - Formulate objectives for the By-law Enforcement Program annually
 - Report to the Council on the status of the fishery management system
 - Advise the Council on fisheries management issues
-

Internal Management System Auditor(s)

- Conduct an annual audit of the fisheries management system
 - Report audit findings to the Fisheries Management Board
-

All responsibilities outlined in Table 2, as well as other daily responsibilities, should be documented in job descriptions to ensure that fisheries management personnel and staff understand their duties, and their role within the Fishery as a whole. Inclusion of responsibilities into job descriptions will increase accountability by clarifying the responsibilities of individuals, thereby reducing the potential for anyone to deny responsibility. The Council will have to identify any additional training requirements needed to carry out the responsibilities outlined in Table 2.

Through investment in the Nawash Fisheries Assessment Program, the Council continues to develop the capacity to understand the status of targeted fish populations, the nature of catches and landings, and the economic impact of the Fishery. In addition, the Council has formed a number of partnerships with various external parties. This communication with external parties improves the ability of the Council to ascertain the impacts of the Fishery on the Great Lakes ecosystem, and the impacts of other activities on the Fishery, at least to the extent that is currently possible given the limited understanding of the Great Lake ecosystem. The Council should continue to actively pursue such partnerships, and develop procedures to facilitate communication with external parties for research and capacity-building purposes.

Nawash fisheries management and operational personnel are mindful of the need to document fishery-related activities and management decisions. Certain types of documents and records, such as operational procedures, legal and historical documentation, and Fisheries Assessment Program documentation, are easy to locate because certain individuals keep track of them or store them in one place. However, not all Fishery documents are easy to locate. When the Saugeen Ojibway Fisheries Management Board (SOFMB) was operational, they started to compile and organize fishery-related documents and records, including correspondence with external parties, the minutes of Council and SOFMB meetings, Nawash Fishery historical and legal records, research materials, and fisheries management protocol. The effort of the SOFMB should be continued, and procedures should be developed for organizing, keeping track of, and updating all Nawash Fishery documents and records (see Table 3, Section 3.3.3).

6.3.4 Monitor and Evaluate Performance on an Ongoing Basis

Once the policy, plans, and organizational capacity have been developed, as stipulated above, the Council will be able to evaluate the effectiveness of the fisheries management system in terms of its ability to facilitate the achievement of policy commitments, goals, and objectives. The Council should implement procedures for measuring performance on an ongoing or regular basis. Performance evaluation will provide the Council with a basis for reporting on progress with respect to achieving

Fishery objectives, such as objectives for the By-law Enforcement and the Assessment Programs, to interested parties. If positive progress is reported, or the Council can demonstrate how it intends to improve the existing system and follows through, skepticism regarding the adequacy and benefits of fisheries management programs and practices could be reduced. The Australian methodology for measuring progress with respect to the achievement of fishery goals (Chesson and Clayton 1998) could be used in the development of performance evaluation guidelines.

6.3.5 Conduct Regular Third-Party Management System Audits

The Nawash fisheries management system has changed significantly since the *Jones-Nadjiwon* decision in 1993 and continues to evolve. Currently, however, the Council has no basis for reporting on the effectiveness of the fisheries management system. It is recommended, in this study, that the effectiveness of Nawash fisheries management system should be determined through internal and external third-party audits, conducted annually. International standards and other established methodologies should be considered in the development of procedures for hiring auditors and guidelines for conducting audits. For example, the ISO 14010, ISO 14011, and the MSC Certification Methodology (1998) could be used as a basis for developing audit guidelines.

External auditors should be completely independent of the Fishery and have either professional auditing experience or expert knowledge of fisheries management, especially First Nations fisheries management issues. It is recommended that internal audits be conducted once a year. By conducting audits on an annual basis, as opposed to auditing every two to five years, for example, the Council will be able to measure progress at relatively short intervals and correct management system deficiencies in a timely fashion. As the management system improves and becomes more established, audit frequency can be reduced. Furthermore, it is recommended that internal audits be conducted once a year, 6 months apart from external audits. This will enable the Council to determine whether corrective actions or other improvements are being implemented as planned. Nawash fisheries management personnel could act as internal auditors, but should not

evaluate aspects of the fisheries management system that fall within the scope of their responsibility.

6.3.6 Review and Update the Fisheries Management System Annually

The Council should implement procedures for conducting reviews of the fisheries management system to ensure its continuing suitability, adequacy, and effectiveness. Management reviews should be conducted annually, after external audits, as a basis for improving fisheries management practices. The information reviewed by the Council, specified in Table 3, Section 3.7, should be documented in a manner that is easy to understand. Interested parties should be given an opportunity to review the information before the Council makes any revisions to the policy, plans, or procedures. This will give them an opportunity to voice their opinions as to how the Council should proceed. The Council's final report, which documents any modifications, and the rationale for same, should also be made available to interested parties.

6.4 Checklist

Table 3 is a checklist intended to improve understanding of the elements and criteria of the fisheries management process described above, and to help the Nawash Council implement the process, should they decided to do so. The guidance in this checklist is based on the Deming Cycle (1982) and current notions regarding best practice for fisheries and environmental management as described in Chapters Three and Four. The checklist is designed to allow comparison of the existing fisheries management system against the criteria of the fisheries management process. This comparison can be used to identify management system elements that could be implemented by the Nawash Fishery to help improve the overall fisheries management process. The checklist is intended to be a 'living' document, which can modified for practical reasons or to meet changing standards for fisheries management. Auditors should recommend changes to the checklist, where applicable, to be considered for review by the Council.

Table 3: Fisheries Management Process Checklist**3.1 MANAGEMENT POLICY**

The Council has formally defined the term 'conservation'.

The Council has formally approved a set of conservation values.

The Nawash Fishery has a fisheries management policy.

The policy is documented.

The policy reflects Nawash community values.

The Council has endorsed the policy.

The policy is reviewed annually by the Council as per the requirements of the management plan.

The policy is available to community members and other interested parties.

All fisheries management personnel are familiar with the policy.

The policy is simple and intelligible to a general audience.

The policy specifies:

- the overall vision or primary goal of top management (i.e. mission statement);
 - standards, principles or codes to which the Fishery subscribes (e.g. conservation ethic, Canadian Code of Conduct for Responsible Fishing Operations);
 - the Council's commitment to achieving its long-term goals;
 - the parameters with respect to the application of the management policy (e.g. to whom it applies, geographical boundaries of the Fishery);
 - the Fishery's institutional structure and decision-making process, particularly the process for setting and reviewing fisheries management goals and objectives;
 - management's position with respect to significant fisheries management issues;
 - the behaviour that is expected of persons who are, or will be, implementing the policy;
 - details pertaining to the aquatic ecosystem, its status, any particularly sensitive areas or features influencing or affected by the Fishery and actions required to address them;
 - elements relating to the Fishery's past environmental conditions and expected direction;
 - arrangements and responsibilities for monitoring, control, surveillance and enforcement;
 - specific constraints (e.g. details of any undesirable by-catch species, their conservation status and measures taken to reduce this as appropriate);
 - stakeholders and/or interested parties; and
 - when the policy is to be reviewed by the Council (e.g. every 1st of January; after every emergency situation), and, in the event the policy is modified, how it is to be communicated to those who will be implementing it.
-

Table 3 (continued)

The Council's long-term strategic plan includes the following goals, including to:

- comply with applicable legal requirements, and with voluntary programs or agreements to which the Fishery is a party;
- continual improvement of management practices;
- support a precautionary approach to fisheries management;
- manage the Fishery on watershed basis;
- improve knowledge and understanding of the biology of targeted and non-targeted fish stocks;
- improve knowledge and understanding of the migratory patterns of targeted species;
- improve knowledge and understanding of Lake Huron ecosystems;
- prevent long-term irreparable over-fishing;
- prevent or minimize mortality of non-targeted catch;
- eliminate or reduce fishing practices that are destructive to fish habitat; and
- reduce catch by lost or abandoned gear (ghost net fishing).

The views of stakeholders and/or interested parties have been considered in the formulation of policy goals.

3.2 MANAGEMENT PLAN

The Fishery has a written management plan.

The Council has approved the management plan.

Input was sought from appropriate Fishery personnel to ensure feasibility of the action plan.

The management plan specifies the following:

- Nawash Fishery conservation values and policy commitments;
- goals for meeting each management policy commitments and addressing significant issues, concerns and environmental impacts;
- goal-specific objectives, and time-frames for achieving them;
- indicators for comparing actual performance against stated objectives;
- actions/methods required to achieve objectives;
- the person(s) charged with overseeing and implementing actions;
- resources required;
- the date of the next performance evaluation and the person responsible for conducting same; and
- approval of the plan by the appropriate authority (e.g. Band Council Resolution Motion #; Councillor signatures).

The parties who have been delegated responsibility for carrying out specific actions understand the scope of their responsibilities and the accountability that applies to them.

Table 3 (continued)

Goals and objectives stipulated in the management plan are consistent with Nawash Fishery conservation values and policy commitments
Training needs are addressed in the management plan.
Where applicable, activities and processes outlined in the management plan are subject to an environmental assessment to determine potential environmental impacts, including social and economic impacts, where possible.
The location, timing, magnitude, duration, level of risk, and irreversibility of identified environmental impacts have been determined to the extent possible.
The likelihood or probable frequency of occurrence of identified environmental impacts has been determined.
Potential cumulative effects of said environmental impacts have been determined.
The results of the environmental assessment are documented and reported to the Council.
The results of environmental impact assessments are considered in the finalized management plan.
Fishery personnel and fishermen understand the ramifications of significant environmental impacts.
Control measures that have been instituted eliminate or reduce the likely occurrence of impacts to an acceptable level, and/or improve the response capabilities of Fishery personnel to address them once they have occurred.
Potential emergency situations have been identified and communicated to relevant parties.
Relevant parties understand the procedures for emergency response and preparedness.
3.3 ORGANIZATIONAL CAPACITY
An institutional structure is in place to implement the policy.
Responsibility and authority has been delegated to (an) individual(s) with management-level authority to oversee implementation of the fisheries management process.
The responsibilities of the Council and Fishery personnel with respect to implementing and carrying out the fisheries management process are specified in writing.
Appropriate authority has been designated to the Council and Fishery personnel to fulfill their responsibilities, particularly for those performing duties that have significant environmental impacts.
Responsibility and authority has been designated to (a) specified individual(s) to perform an investigation and institute necessary corrective measures if any elements of the fisheries management process have not been fulfilled.

Table 3 (continued)

The Council and Fishery personnel understand their responsibilities and the consequences of non-conformance.

The reporting structure is formalized in writing (e.g. in an organizational chart endorsed by the Council).

The Council has approved a long-term financial plan that supports implementation of the fisheries management process.

The financial plan is not dependent upon political terms of office (e.g. Council elections).

Sufficient resources and personnel are available for the implementation/ongoing maintenance of the fisheries management process.

3.3.1 Procedures

The Fishery maintains procedures for:

- communicating with internal and external parties to educate them on the Fishery's policy and plans, facilitate a two-way participatory dialogue about interests, priorities, concerns and advice, and enable this information to be incorporated into the decision-making process;
 - receiving, responding to, and keeping track of requests for information;
 - assessing and evaluating how successful procedures for external communication are in terms of reaching appropriate stakeholders and interested parties and incorporating their concerns into the decision-making process, and to determine how the procedures can be improved;
 - identifying aspects of Fishery-related activities, products or services (within the Fishery's control and influence) which have or could have direct or indirect environmental impacts, or are likely to affect the achievement of an environment-related goal (e.g. waste reduction);
 - eliminating, reducing or controlling adverse environmental impacts resulting from the implementation of the policy, procedures or plans, including restitution for any damage to the environment caused by such impacts (e.g. by restoration or compensation);
 - identifying, maintaining, disposing of, or storing Fishery documents and records, including training records and the results of audits and management reviews;
 - monitoring and measuring the areas covered by goals and objectives on an ongoing basis, and regularly reporting the results to the Council;
 - keeping track of information regarding applicable regulatory and voluntary requirements, and making the information accessible to internal and external parties;
 - checking conformity with applicable legislative requirements, and investigating and addressing incidents of non-conformance;
 - conducting regular third-party audits of the fisheries management system to ensure that it is implemented as planned;
-

Table 3 (continued)

-
- conducting an investigation and instituting corrective measures if any elements of the management system have not been fulfilled to an acceptable standard;
 - conducting management reviews of the policy, procedures and plans as appropriate (including how the review should be conducted, and who is responsible for conducting the review and reporting the findings to the Council) to enable the Council to verify compliance with policy commitments and identify opportunities for improvement; and
 - documenting any changes to the policy, plan, or procedures.
-

Procedures for conducting management system audits specify:

- the process for selecting and hiring internal and/or external auditors/consultants;
 - the areas and activities to be reviewed;
 - the methods for conducting audits;
 - the frequency and expected duration of audits;
 - the person(s) responsible for conducting audits and their title;
 - the person(s) responsible for communicating the results of audits to the Council; and
 - that the results of audits shall be documented.
-

All activities and processes outlined in procedures have been reviewed to identify potential environmental impacts.

Procedures that have been approved by the Council are informed by the results of the environmental impacts assessment.

Procedures for identifying environmental impacts take into account the following:

- normal operating conditions;
 - irregular operating conditions;
 - incidents, accidents, and potential emergency situations; and
 - past, present, and future activities.
-

3.3.2 Training, Research, and Communication

Standards are adopted for the competency, training, and skills of all fishermen and Fishery personnel who are affiliated with the Nawash Fishery

Training needs have been identified to ensure effective implementation of the fisheries management process (e.g. raising employee awareness, auditing).

Training needs are addressed as per the provisions of the management plan.

The Fishery consults and collaborates with the scientific community in an effort to address significant fishery-related issues.

Table 3 (continued)

Communication channels are established to facilitate the transfer of information between the Council, Fishery personnel, fishermen, and other interested parties.

The Council consults with parties that affect or are affected by the Fishery, on a regular or periodic basis, with respect to the suitability of its goals for the Fishery, and the level to which they are being achieved.

The information that is gathered through Nawash research programs improves the ability of Fishery personnel to make decisions.

Communication and consultation facilitate the continuous improvement of management practices (i.e. information that is gathered through communication and consultation efforts is incorporated into the management process).

3.3.3 Documents and Records

The Fishery maintains indexes for both current and obsolete documents that specify:

- the names and type of documents that are maintained by the Fishery;
 - where or how they can be obtained;
 - when they were received or developed, and, if applicable, when they were last reviewed and updated by the Council;
 - the revision number; and
 - the person(s) responsible for their review and update.
-

The following information is documented:

- the management policy;
 - management procedures;
 - management plans;
 - operational procedures;
 - organizational charts; and
 - scientific reports.
-

Records are kept which cover the following:

- modification of the policy, procedures or plans, including the justification for such changes;
 - monitoring and performance evaluation;
 - the results of audits;
 - the results of management reviews, including the Council's rationale for rejections or revisions of management plans proposed by Fishery personnel or other interested parties;
 - communication with internal and external parties, including type of information that was exchanged, the date, and the parties involved;
-

Table 3 (continued)

-
- training activity; and
 - environmental impact assessments;
-

Documented accounts of actual or potential environmental impacts should specify the location, timing, magnitude, frequency, duration, level of risk, irreversibility, and potential cumulative impacts.

Confidential documents are effectively secured.

All obsolete documents are removed from their point(s) of use.

All documents are legible and dated (i.e. date of creation or last revision).

Documents are standardized (e.g. standard format, Chippewas of Nawash First Nation logo).

Documents are identifiable and kept in an orderly fashion.

3.5 PERFORMANCE EVALUATION

Compliance with applicable regulations and legislation, and other voluntary requirements is monitored.

Performance indicators are established for all goals and objectives outlined in management plans.

Performance indices are quantifiable, transparent, reproducible, comprehensive, policy relevant, comparable and economically justifiable.

Performance indicators are continuously monitored.

The Fishery's performance in terms of meeting stated objectives is measured at regular intervals.

The degree to which procedures are being implemented is monitored on an ongoing basis (e.g. records of non-conformance are kept).

The results of performance evaluations are independently verified.

3.6 THIRD-PARTY AUDIT

All fisheries management system elements are regularly and systematically evaluated to ensure that they are operating efficiently in terms of meeting stated goals and objectives.

Audits are conducted by a third-party (i.e. someone independent of the particular areas being audited).

The results of audits include recommendations for future action.

Variances from any planned aspect of the management system have been identified and the reasons for why determined and explained.

3.7 MANAGEMENT REVIEW

The following items are (1) reviewed by the Council at defined intervals, or following emergency situations; and (2) used to determine improvements that can be made to the Fishery's management policy, procedures and plans:

- the results of audits;
-

Table 3 (concluded)

-
- the results of performance evaluations;
 - the views and concerns of internal and external interested parties;
 - new scientific information and technology;
 - Fishery activities, particularly new activities, and their environmental impacts; and
 - applicable legislation and the requirements of voluntary programs or agreements.
-

Management system deficiencies discovered through the auditing process are corrected. If deficiencies have not been corrected, plans are developed for future action in this respect, or the Council's rationale for not doing so is documented.

It is recommended that the Council develop a plan to introduce the process in stages, beginning with development and formal endorsement of a fisheries management policy. Following policy development, effort should be concentrated on developing the appropriate organizational capacity, particularly formation of a Fisheries Management Board since it plays a fundamental role in the implementation and ongoing maintenance of the process. Once the process is implemented, performance monitoring and auditing requirements will be the most demanding in terms of the planning, time, and resources required. That said, the Fishery is relatively small with a simple organizational structure and will not require complicated performance monitoring and auditing procedures.

6.5 Further Study

This study provides a basis for future planning and development of fisheries management systems that rely on the EMSs approach. Further studies in this subject area might address the effectiveness of EMSs as applied to fisheries. Documenting implementation of the process through applied case studies could serve to demonstrate how the fisheries management process could be tailored to suit the conditions of different types of fisheries, and generate further guidance on implementation.

In particular, it would be useful to examine the types of indicators used for performance evaluation and auditing purposes. The continuous refinement of indicators will occur as fisheries become more adept at evaluating the effectiveness of their management systems over time. An inventory of indicators for measuring progress with

respect to conservation, environmental, social, and economic objectives would be useful to provide fisheries managers with examples and alternatives in the selection of indicators. Some initiative has been taken in the development of indicators for fisheries. The most comprehensive and valuable effort to date has come from Nova Scotia, where sustainability indicators, including ecological, socioeconomic, and institutional indicators, have been selected for measuring progress with respect to sustainability. As part of the Genuine Progress Index (GPI) analysis for Nova Scotia, these indicators will be used to incorporate factors such as ecosystem health, fishery resilience, and resource depreciation into future decision-making. Future studies might address the possibility of incorporating the GPI valuation method into EMSs designed for fisheries as part of the performance evaluation component.

A follow-up study on the costs and benefits of implementing an EMS, both initially and over a longer-term basis, would be worthwhile. Furthermore, an assessment of the costs and benefits associated with different types of fisheries, according to their size and function, could help fisheries managers determine whether implementing an EMS is beneficial given the particular nature of their fishery.

6.6 Closing Remark

The Chippewas of Nawash have demonstrated throughout their long history of fishing in the Saugeen-Ojibway territories that they are committed to protecting their tradition of fishing for cultural and economic reasons. Recently, in their attempt to deal with conflict, environmental uncertainty, and a new legal framework concerning their Aboriginal and Treaty fishing rights, the Nawash Fishery has undergone a number of significant changes. Their active participation in the development and outcome of this study is testament to their willingness to adapt to changing circumstances and to seek opportunities for self-improvement with respect to the management of their Fishery. Their actions exemplify the type of leadership needed to execute the proposed management process successfully.

References

- Akiwenzie, R. and R. Roote. 2000. Saugeen Ojibway Joint Fisheries Co-Management Program: A management plan submitted to Department of Indian Affairs and Northern Development. A Draft produced August 17, 2000. Unpublished.
- Andrews, R. N. L. and M. J. Waits. 1978. Environmental values in public decisions: a research agenda. University of Michigan, School of Natural Resources, Ann Arbor, MI.
- Bansal, P. and E. Howard (eds.). 1997. Business and the Natural Environment. Butterworth-Heinemann, Oxford, UK.
- Barber, W. and J. Taylor. 1990. The Importance of Goals, Objectives, and Values in the Fisheries Management Process and Organization: A Review. *North American Journal of Fisheries Management*, 10(4): 365-373.
- Berkes, F. and C. Folke (eds.). 1998. Linking Social and Ecological Systems: Management practices and social mechanisms for building resilience. Cambridge University Press, Cambridge, UK.
- Brown, L. (editor) 1993a. The New Shorter English Dictionary, volume 1. Oxford University Press, New York, NY.
- Brown, L. (editor) 1993b. The New Shorter English Dictionary, volume 2. Oxford University Press, New York, NY.
- Bureau of Rural Science. 1999. Glossary of Fishery Terms. Commonwealth of Australia. <http://www.brs.gov.au/fish/gloss.html>
- Caddy, J. 1997. Checks and balances in the management of marine fish stocks: organizational requirements for a limit reference point approach. *Fisheries Research*, 30:1-15.
- Callicott, J. B. 1991. Conservation ethics and fishery management. *Fisheries*. 16: 22-28.
- Canada. 1889. Sessional Papers. Indian Affairs, No. 11.
- Cascio, J. (ed.). 1996. The ISO 14000 Handbook. ASQ Quality Press, Milwaukee, WI.
- Chesson, J. and H. Clayton. 1998. A framework for assessing fisheries with respect to ecologically sustainable development. Bureau of Rural Sciences, Canberra, Australia.
- Chippewas of Nawash Planning Office. 1997. Chippewas of Nawash Profile and Demographics. Unpublished document.

Chippewas of Nawash. Date unknown. A Plan for Development of Potential Cape Croker Band Fishery Resources. Unpublished document.

Chippewas of Nawash. 1999. Dibaoudjimoh on the Web.
<http://www.bmts.com/~dibaoudjimoh/>

Commonwealth of Australia. 1992. National Strategy for Ecologically Sustainable Development. Australian Government Publishing Service, Canberra.

Constitution Act, 1982, c. 35(1).

Crawford, S. 1996. A biological review and evaluation of the OMNR Lake Huron Management Unit Commercial Fisheries Management Program.
<http://www.uoguelph.ca/~scrawfor/>.

Crawford, S. 1997. A review and ecological evaluation of salmonine introductions to the Great Lakes. <http://www.uoguelph.ca/~scrawfor/>.

Crawford, S. and B. Morito. 1997. Comment: Toward a definition of conservation principles for fisheries management. *Can. J. Fish. Aquat. Sci.* 54: 2720-2723.

Cross, A. 1999. District farmers lead environmental management research. NSW Agriculture, Media release 08 September. New South Wales, Australia.

Canadian Standards Association. 1996. A sustainable forest management system: specification document. National Standard of Canada No. CAN-CSA-Z809-96, x + 12 pp.

Canadian Sustainable Forestry Certification Coalition. 2000. <http://www.sfms.com/>

Culhane, P. 1981. Public lands politics : interest group influence on the Forest Service and the Bureau of Land Management. Johns Hopkins University Press, Baltimore, Maryland.

Delgamuukw v. British Columbia, [1997] 3 S.C.R 1010.

Deming, W. 1982. Quality, productivity, and competitive position. MIT Centre for Advanced Engineering Study, Cambridge, MA.

Department of Environmental Quality. 1999. Lake Huron Initiative. State of Michigan Department of Environmental Quality, Office of the Great Lakes.
<http://www.deq.state.mi.us/ogl/huron.html>

Doherty, A. 1995. The role of nongovernmental organizations and UNCED. In B. Spector, G. Sjostedt and I.W. Zartman, eds. *Negotiating International Regimes*. Graham & Trotman/Martinus Nijhoff, London, 283 pp.

Doubleday, W.G., D.B. Atkinson, and J. Baird. 1997. Comment: Scientific inquiry and fish stock assessment in the Canadian Department of Fisheries and Oceans. *Can. J. Fish. Aquat. Sci.*, 54: 1422-1426.

Driver, H. 1969. *Indians of North America*, 2nd edition. University of Chicago Press, Chicago, IL.

FAO. 1995. *Code of Conduct for Responsible Fisheries*. Food and Agriculture Organization of the United Nations, Rome, Italy. 41p.

FAO. 1996. *Precautionary Approach to Capture Fisheries and Species Introductions: FAO Technical Guidelines for Responsible Fisheries. No.2*. Food and Agriculture Organization of the United Nations, Rome, Italy. 54p.

FAO. 1997a. *Inland Fisheries: FAO Technical Guidelines for Responsible Fisheries. No. 6*. Food and Agriculture Organization of the United Nations, Rome, Italy. 41p.

FAO. 1997b. *Fisheries Management: FAO Technical Guidelines for Responsible Fisheries. No.4*. Food and Agriculture Organization of the United Nations, Rome, Italy. 82p.

FAO. 1999. *Review of the State of the World Fishery Resources: Inland Fisheries*. FAO Fisheries Circular No.942. Food and Agriculture Organization of the United Nations, Rome, Italy.

FAO. 1999b. *FAO Fisheries: Glossary*. <http://www.fao.org/fi/glossary/default.asp>. Last updated January 1999. Site accessed August 2001.

Freedman, B. 1998. *Environmental Science: A Canadian Perspective*. Prentice-Hall Canada, Scarborough, ON.

Fletcher, D. 1999. *Introducing Participatory Action Research: An Interactive Workshop*. Presented by David Fletcher, Holistic Community Pursuits (International), Halifax, NS.

Forest Stewardship Council. 2000. *Forest Stewardship Council: Principles and Criteria. Document 1.2, revised February 2000*. <http://www.fscoax.org/principal.htm>. Oaxaca, Mexico.

Friedrichs, J. and H. Lüdtkke. 1975. *Participant Observation: Theory and Practice*. Saxon House, D. C. Health Ltd., England, UK.

Gilbert, M. 1993. *Achieving Environmental Management Standards: a step-by-step guide to meeting BS 7750*, Pitman, London, UK.

Gove, P. B. (editor). 1993. *Webster's Third New International Dictionary*. Merriam-Webster Inc., Springfield, MA.

Government of Canada and the United States Environmental Protection Agency. 1995. *Great Lakes Atlas: An Environmental Atlas and Resource Book*, third edition. Government of Canada, Toronto, Ontario. United States Environmental Protection Agency, Great Lakes National Program Office, Chicago, IL.

Hanson, A. 2000. *Fisheries Management Now and for the Future*. Presentation to the Atlantic Policy Congress of First Nation Chiefs Conference "First Nations Fisheries Management: Making Treaties Work" 11-12 October 2000, Halifax, NS.

Harris, L. 1995. The East Coast Fisheries. (pp. 130-150) In: B. Mitchell, ed., *Resource and Environmental Management in Canada: Addressing Conflict and Uncertainty*. Oxford University Press, Toronto, ON.

Harvey B., C. Ross, D. Greer, and J. Carosfeld 1998. Action before extinction. An international conference on conservation of fish genetic diversity. Vancouver, British Columbia, Canada, 16-16/02/1998. World Fisheries Trust, Victoria, BC.

Healey, M.C. 1997. Comment: The interplay of policy, politics, and science. *Can. J. Fish. Aquat. Sci.*, 54: 1427-1429.

Hilborn, M. 1987. Living with Uncertainty in Resources Management. *North American Journal of Fisheries Management* 7(1): 1-5.

Hilborn, R., E. Pikitch, and R. Francis. 1993. Current trends in including risk and uncertainty in stock assessment and harvest decisions. *Canadian Journal of Fisheries and Aquatic Science*, 50: 874-880.

Hoel, H.A. 1998. Political Uncertainty in International Fisheries Management. *Fisheries Research*, 37: 239-250.

Holden, M. 1995. Beverton and Holt revisited. *Fisheries Research*, 24: 3-8.

Hutchings, J., Walters, C. and R. Haedrich. 1997. Is scientific inquiry incompatible with government information control? *Canadian Journal of Fisheries and Aquatic Science*, 54: 1198-1210.

ISO. 1996. *ISO 14001 Environmental Management Systems: Specification with Guidance for Use*. International Organization for Standardization, Geneva, Switzerland.

ISO. 1998. ISO 14061: Information to assist forestry organizations in the use of Environmental Management System standards ISO 14001 and ISO 14004. International Organization for Standardization, Geneva, Switzerland.

Kutner, B., Wilkins, C. and P. Yarrow. 1952. Verbal Attitudes and Overt Behaviour Involving Racial Prejudice, *JASP*, 47, pp. 649-52.

La Piere, R. 1934. Attitudes vs. Actions, *SF*, 13, pp.230-7.

Lane, D. 1992. Regulation of commercial fisheries in Atlantic Canada: a decision perspective. *Optimum*, 23: 37-50.

Larkin, P. 1978. Fisheries Management: an essay for ecologists. *Annu. Rev. Ecol. Syst.* 9: 57-73.

LEAF. 2001. Linking Environmental and Farming: Integrated Farm Management. <http://www.leafuk.org/LEAF/default.asp>

Lichatowich, J. 1999. Salmon Without Rivers: A History of the Pacific Salmon Crisis. Island Press, Washington, D.C., 352 pp.

Linn, L. 1965. Verbal Attitudes and Overt Behaviour: A Study of Racial Discrimination, *SF*, 43, pp.353-64.

Magnuson, J. 1991. Fish and fisheries ecology. *Ecol. App.* 1: 13-26.

Marine Stewardship Council. 1996. Principles and Criteria for Sustainable Fishing. Marine Stewardship Council. London, UK.

Marine Stewardship Council. 1998. MSC Certification Methodology. Draft - Issue 1. Marine Stewardship Council, London, UK pp.27.

Miller, M. and R. Gale. 1986. Professional Styles of Federal Forest and Marine Fisheries Resource Managers. *North American Journal of Fisheries Management*, 6(2): 141-148.

Ministry of Natural Resources. 2000. Letter to Chief Ralph Akiwenzie, Chippewas of Nawash. March 22, 2000.

National Timber Certification Council. date unknown. Sustainable Forest Management and Timber Certification. <http://www.mtc.com.my/forestry/ntcc.html>. Site accessed August 2001. Kuala Lumpur, Malaysia.

Netherwood, A. 1995. Environmental Reviews and Environmental Management Systems: methodologies and organizational impacts, unpublished Ph.D. thesis, Department of Environmental Management, University of Central Lancashire, Preston, UK.

Netherwood, A. 1998. Environmental Management Systems. (pp. 37-60) In: Richard Welford, ed., *Corporate Environmental Management: Systems and Strategies, second edition* Earthscan Publications Limited, London, UK.

Newbold, M., Lewis, K., Tzilivakis, J., Finch, J., Kähö, T. M., Skinner, J., and K. Bardon. 1997. Options for Informal Environmental Management: The Agriculture Industry Highlighted, *Eco-Management and Auditing* 4: 22-27.

Newfoundland & Labrador Federation of Agriculture. 1996. Atlantic Environmental Farm Plan Initiative. <http://enterprise.newcomm.net/agricult/efpi/>. Last updated March 20, 1996, Mount Pearl NF.

O'Laoire, D. and Welford, R. 1994. The EMS in the SME. (pp. 199-209) In: Richard Welford, ed., *Corporate Environmental Management: Systems and Strategies, second edition* Earthscan Publications Limited, London, UK.

Oliver, C. H., Shuter, B. J., and Minns, C. K. 1995. Toward a definition of conservation principles for fisheries management. *Can. J. Fish. Aquat. Sci.* 52: 1584-1594.

Pan European Forest Certification. 2001. Pan European Forest Certification Framework: Common Elements and Requirements. Technical Document. Amended January 26, 2001, Luxembourg.

Parsons, L. 1993. Management of marine fisheries in Canada. *Can. Bull. Fish. Aquat. Sci.* No. 120.

Pearse, P. and C. Walters. 1992. Harvesting regulation under quota management systems for ocean fisheries: decision making in the face of natural variability, weak information, risks and conflicting incentives. *Marine Policy* 16: 167-182.

Porter, G. and J. Welsh Brown. 1996. Global Environmental Politics. Westview Press, Boulder, 208 pp.

R v. Vanderpeet [1996] 2 S.C.R. 507

R. v. Badger [1996] 1 S.C.R. 771

R. v. Gladstone [1996] 2 S.C.R. 723

R. v. Jones-Nadjiwon (1993), 14 O.R. (3d) 421

R. v. Marshall [1999a] 3 S.C.R. 456

R. v. Marshall [1999b] 3 S.C.R. 533

R. v. N.T.C. Smokehouse [1996] 2 S.C.R. 672

R. v. Sparrow [1990] 1 S.C.R. 1075

Royal Commission on Aboriginal Peoples. 1996. *Restructuring the Relationship, Part Two. Report of the Royal Commission on Aboriginal Peoples. Supply and Services* Canada, Ottawa, ON.

Rogers, E., and D. Smith (eds). 1994. *Aboriginal Ontario: Historical perspectives on the First Nations*. Dundurn Press, Toronto, ON.

Rokeach, M. 1973. *The nature of human values*. The Free Press, New York, NY.

Rothschild, B. 1973. Questions of strategy in fisheries management and development. *J. Fish. Res. Board Can.* 30: 2017-2030.

Sandgrove, K. 1997. *A to Z of Corporate Environmental Management*. Earthscan Publications Ltd, London, UK.

Schmalz, P. 1991. *The Ojibway of Southern Ontario*. University of Toronto Press, Toronto, ON.

Serchuk, F., and R. Smolowitz. 1990. Ensuring fisheries management dysfunction: the neglect of science and technology. *Fisheries*, 15: 4-7.

Simon v. The Queen, [1985] 2 S.C.R. 387

Sproul, J. 1998a. Green Fisheries: certification as a management tool. (p.137-147) In: T. Pitcher, J. Hart, and D. Pauly, eds., *Reinventing Fisheries Management*, Kluwer Academic Publishers, Boston, MA.

Sproul, J.T. 1998b. *Science and Research: Sustainable Fisheries Certification & Labeling Protocol*. Working paper. Fisheries Centre & Sustainable Development Research Institute, Vancouver, B.C.

Statement of Conclusions. 1997. Intermediate Ministerial Meeting on the Integration of Fisheries and Environmental Issues. 13-14 March 1997, Bergen, Norway, Ministry of the Environment, Norway, 92 pp.

Stephenson, R. and D. Lane. 1995. Fisheries Management Science: a plea for conceptual change. *Can. J. Fish. Aquat. Sci.* 52: 2051-2056.

Sykes, J. B. (editor) 1976. *The Concise Oxford Dictionary of Current English*. Oxford University Press, Oxford, GB.

Thompson, D. and M. Wilson. 1994. Environmental Auditing: Theory and Applications. *Environmental Management* 18(4): 605-615.

Tibor, T. and I. Feldman. 1996. ISO 14000: A Guide to the New Environmental Management Standards. Irwin Professional Publishing, Chicago, IL. 237pp.

United Nations. 1997. Glossary of Environment Statistics. Studies in Methods, Series F, No. 67.

United Nations Conference on Environment and Development. 1992. Report of the United Nations Conference on Environment and Development: Agenda 21, UN, New York, NY.

University of Hertfordshire and LEAF. date unknown. Environmental Management for Agriculture (EMA) & Linking Environment An Farming (LEAF). Information leaflet by the University of Hertfordshire and LEAF. UK.

Walters, C. and P. Pearse. 1996. Stock information requirements for quota management systems in commercial fisheries. *Reviews in Fish Biology and Fisheries*, 6: 21-42.

Walters, M. 1998. Aboriginal rights, Magna Carta and exclusive rights to fisheries in the waters of Upper Canada. *Queen's Law Journal* 23(2): 301-368.

Walz, R. 2000. Development of Environmental Indicator Systems: Experiences from Germany, *Environmental Management* 25:613-623.

Welford, R. (ed.). 1998. Environmental Issues and Corporate Environmental Management. (pp.1-12) In: *Corporate Environmental Management: Systems and Strategies, second edition*, Earthscan Publications Limited, London, UK.

Williams, C. 1997. Sustainable fisheries: economics, ecology and ethics. *Fisheries*, 22(2): 6-11.

Wright, J. 1995. Ministry, Natives in stalemate over bay. *The Sun Times*. Owen Sound. Wednesday, August 2.

Young, W. 1998. Measuring Environmental Performance, Environmental Issues and Corporate Environmental Management. (pp.150-176) In: Richard Welford, ed., *Corporate Environmental Management: Systems and Strategies, second edition*. Earthscan Publications Limited, London, UK.