THE GREAT LAKES AND HUMAN HEALTH:

AN INTERPRETIVE ENVIRONMENTAL POLICY ANALYSIS

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ABSTRACT

This thesis investigates the complexity of policy making in the Great Lakes. The International Joint Commission (IJC) is central to this investigation because of its binational position making recommendations to the Canadian and American governments under the1972 Great Lakes Water Quality Agreement. The central tenet of this research is that policy text, as a social system, reflects the social context in which it was formed.

This research uses an Advocacy Coalition Framework (ACF), frame analysis and semiotic analysis to present an interpretive policy analysis. Main data sources are key informant interviews and policy texts. An advocacy coalition framework is used to identify and structure the values within the policy subsystem. The frame analysis builds on the role of values in policy, as represented by the IJC Biennial Reports. The semiotic analysis is used to investigate the policy text at a more detailed level. Hence semiotics will bring to the forefront both 'meaning' and a 'validation of values' to the policy process (Yanow, 1996). Each of these three analyses are contextualized within a detailed description of the socio-political context to understand "policy-oriented learning" (Sabatier and Jenkins-Smith, 1997). This thesis three main findings are: values (in the form of ideologies, interests, and beliefs) play a critical role in the nature of policy making; the IJC plays a pivotal role, as policy-broker; and environmental policy change occurs through human health frames linking ecosystem and human health.

This work makes substantive, methodological, and theoretical contributions. Substantively, it provides Great Lakes policy makers and researchers with an understanding of the parameters of environmental policy, specifically how human health is being used as a catalyst for policy change. Methodologically, it addresses policy discourse, communication, policy paradoxes and policy meaning. Theory contributions arise from conceptualizing language and policy text as a social system and through policy "framing", specifically how problems are framed and re-framed in place over time.

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CHAPTER ONE: INTRODUCTION
Context and Organization of the Study

1.1 Research Context

"While the Great Lakes basin as we know it today was shaped by glaciers over 9000 years ago, the most significant change occurred within a period of less than 200 years. Over a scant two centuries, the landscape of the basin was dramatically reconstructed by human activity... with substantial environmental impacts" (Environment Canada and United States Environmental Protection Agency, 1997, 5).

Human populations living in the Great Lakes basin are faced with the uncertainty of health effects from the environment in which they live. Documented ill-health effects from persistent toxic substances found in the waters have pervaded recent policy literature about the Great Lakes area (such as Jacobson and Jacobson 1996; Johnson et al. 1998, 1999; Courval et al. 1997; Lonky et al. 1996; Mergler et al. 1997). A challenge among policy makers is with identifying the "problem" that exists and the parameters of environmental health issues. The importance of how environmental issues (Great Lakes issues) are defined and "framed" as problems presents significant challenges to what solutions and agendas (political, economic, and scientific) are set in our society.

"On the one hand, the way a problem is framed influences the way that problem is dealt with. But the opposite is also true: the feasibility of certain actions influences the way a problem is framed" (Liberatore 1995, 65).

The multi-causal nature of problems in the Great Lakes make the framing of policy

issues all that more difficult for policy makers to articulate. This research will
address the issues that foster or limit the ability of policy makers to frame problems
and solutions in the Great Lakes. It will do this through an analysis of policy
documentation and interviews with stakeholders in the policy process.

In 1909 a Boundary Waters Treaty was signed between Canada and the
United States wherein it was agreed "that the waters herein defined as boundary
waters and waters flowing across the boundary shall not be polluted on either side
to the injury of health or property on the other" (Article IV) . This Treaty
established the International Joint Commission (IJC) to serve as a binational body
to resolve disputes around the waters with three members appointed by each
country. The Commission acts as a joint body seeking common solutions rather
than as separate national delegations representing the positions of their
Governments .

By the 1950s the IJC and scientists had noticed pollution problems in the
Great Lakes in the form of algae. The algae problem was due to over-
eutrophication from fertilizers and municipal and industrial wastewater. By the
late 1960s, degradation of Lake Erie had become so extreme that reports of the
Lake as "dead" were common. Increasing awareness of serious problems in the
Great Lakes Basin stemmed from the 1969 Cuyahoga River fire, caused by
considerable oil present in its waters. Documentation mounted in the 1960s
around the widespread contamination of the Great Lakes by persistent toxic

substances such as DDT, DDE, mercury and PCBs. It was determined that all species that relied on Great Lakes fish as a major food source were being affected by these toxic chemicals; species such as cormorants, herring gulls, bald eagles and ospreys. Questions of the effect of persistent toxins on human health followed soon after and it became evident by the late 1960s that a link may exist (Colburn 1988).

Generally, the result was an environmental consciousness that manifested in 1970 in the establishment of the U.S. Environmental Protection Agency (EPA) and Canada's Department of the Environment (Environment Canada). In the Great Lakes this environmental consciousness was enhanced by the presence of the IJC which served as a major basis for the Governments of Canada and the United States to sign the Great Lakes Water Quality Agreement (GLWQA) in 1972. Under the GLWQA the IJC assesses progress "to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem" (IJC 1972, Article II). In 1978 the Agreement was revised to include a policy of virtual elimination of persistent toxic substances and further to present a philosophy for pollution control that would be zero discharge. Moreover, this revised Agreement (1978) adopted the concept of a Great Lakes 'ecosystem' defined as "the interacting components of air, land, water, and living organisms, including man, within the drainage basin..." (IJC 1978, Article I).

In the thirty years since the Agreement was signed, much has been

accomplished to reduce discharges of nutrients, persistent toxic substances and other contaminants in the Lakes. Some problems remain formidable, such as decontaminating sediments in harbors and the prevention of the further invasion of exotic species such as sea lamprey and zebra mussels. Other issues seem to grow with our understanding of them such as the bioaccumulation of persistent toxic substances. It is left up to the representatives of industry, government, environmental organizations, and other sectors to work together with the IJC, through the GLWQA, to ensure that the protection and restoration of the Great Lakes ecosystem continues.

Over the past thirty years, it will be seen through this thesis that environmental policy has become a forum to debate and understand the environment and human health nexus. Part of the debate centers on the role of scientific evidence in providing conclusive or sufficient evidence for political action. The debate also centers on the societal values that shape our approach to issues of environment and health. Therefore this research will provide policy-makers and researchers with a framework for understanding how environmental health policies are made when the health and well-being of human populations being is of prime concern.

The lakes and the species that inhabit their waters have been the subject of detailed scientific investigation for over 30 years. This science provides the most compelling evidence that exists about the health effects resulting from degradation

of the Great Lakes ecosystem. Human health evidence is more equivocal due to the complexity of gathering and interpreting epidemiological and toxicological data. Nevertheless, policy hinges in part on the examination of science because for environmental health issues, the extent to which human health is at risk needs to be evaluated. The policy process in the Great Lakes is complicated by the fact that there is an emphasis on scientific support for making effective decisions yet at the same time political agendas are being set that ignore this support.

The complexity of the Great Lakes policy system lies in, amongst other things: the nature of the evidence to assess the risk to humans; the differing political, economic, and environmental philosophies within Canada and the United States; and the distribution of power, influence and authority between scientists, government organizations, and non-governmental influences. This thesis is an investigation into the complexity of policy making in the Great Lakes. The research objectives and organization of the thesis will be discussed next.

1.2 Research Objectives

This research has four inter-related objectives:

1. a) to develop a framework for understanding how environmental health policies are made with respect to Great Lakes issues,

    b) to examine the role that human health plays in the construction and implementation of Great Lakes policy,

2.   a) to investigate the communication of Great Lakes issues through the language used by the International Joint Commission,

b) to assess the importance of the International Joint Commission in its role as advisor to both Canadian and American governments.

Objective 1 deals with the nature of environmental health policy making. Objective 1a is expected to disclose the diversity of stakeholder positions and distribution of power within the policy-making process. This will involve the inductive development of an interpretive policy analysis, specifically Sabatier's (1993) Advocacy Coalition Framework. Objective 1b addresses human health specifically to determine if it is used as a political tool to advance environmental agendas (see Burger 1990). Objective 2 deals with the International Joint Commission, a pre-eminent model of international co-operation, and puts forth a review of the IJC Biennial Reports as the critical way the IJC communicates. The communication of environmental issues is examined through objective 2a, to add depth to our understanding of policy making by asking what do policies mean. Recognizing that environmental health policy outcomes often take the form of inaction, policy language is considered to expose the issues of uncertainty for decision-makers. This is done by applying a frame analysis and semiotic analysis to the Great Lakes policy text, represented through the IJC Biennial Reports. The final objective (2b) assesses the role of the IJC in the Great Lakes policy making process. This is done inductively through a thematic analysis of the interview data.

Objective 2b differs from 1a in that it explicitly looks at what the IJC does for the policy process in relation to other institutions. The IJC claims to have apolitical status and to objectively recommend priorities for government action. This research will conclude with an understanding of the role and impact the IJC has on the world of Great Lakes policy making.

1.3 Organization of the Thesis

This thesis is organized into eight chapters. **Chapter Two** presents the three areas of literature that will inform this thesis. It begins by suggesting a conceptual framework for the thesis informed by three literatures: those on language as a 'system', social constructions of science and health, and the challenges of policy analysis in environmental health. The chapter lays the foundation for the central tenet of this research that policy language is a system and as such reflects the social context in which it was formed. The study is thus grounded in the epistemology and theory of language, health, and policy.

Chapter Three creates a research design that uses three methods of analysis as triangulation. A rationale of interview and document selections is provided, as well as the construction of an interview checklist. The qualitative methods include semiotic, frame and interpretive policy analyses. The complementarity of these methods serves to expand the breadth and scope of our

understanding of the policy making system in the Great Lakes.

Chapter Four is the first of three chapters that present the findings of the analysis for this research and fulfills objective 1a of this research and part of 2b. It presents the strategies of decision making by explaining the formal and informal structures in the process. Part of the strategy is also to expose the values held by various stakeholders and the element of working within an ecosystem health approach. This chapter concludes by unpacking our understanding of these strategies.

Chapter Five builds on the previous chapter through an analysis of the frames of the decision making and fulfills objectives 1b and 2a of the research. This chapter presents both a frame analysis and semiotic analysis of the IJC Biennial Reports. In doing so it constructs an argument for using human health as a 'hook' for environmental policy making. It concludes by connecting the ecosystem approach and values of the previous chapter with the findings of text and policy analysis. . .

Chapter Six presents a discussion of the role of science in decision making and fulfills objectives 2a and 2b . It provides an understanding of the complexity of linking science and policy, namely the notion of science as a 'truth' for policy making. The chapter then enters a discussion of communication of science in the Great Lakes and the need for establishing

measurable estimates of risk. It concludes by connecting science to the policy system.

Chapter Seven concludes the thick description of the Great Lakes policy process by offering some factors that may have affected the policy changes that are derived from the analyses. This provides a context for all four objectives of the research. It revisits the policy analysis theory from chapter 2, specifically the concept of "policy-oriented learning" (Sabatier and Jenkin's Smith, 1997). The chapter explains why the three layers of analysis (in the previous three chapters) resulted in this 'learning' and change. Therefore it brings forth the theory presented in Chapter 2

Chapter Eight is the concluding chapter to this thesis. It provides an overview of strengths in using a triangulation of methods for this study. It provides a summary of the three main findings. It provides a knitting together of each layer of analysis to demonstrate the complexity of environmental policy making processes. This chapter also presents a discussion of the contributions this work has made to theory, method, and practice. The chapter ends with a brief identification of directions for future work.

CHAPTER TWO: LITERATURE REVIEW
Epistemology and Theory of Language, Health and Policy

2.1 Introduction

The objective of this chapter is to bring together the study of language and the study of policy. In particular, this literature review will cover knowledge in three areas: language as a 'system'; social constructions of science and health; interpretive approaches to policy analysis. Language as a system is fundamental to understanding the epistemological importance of policy text. This thesis is premised on the belief that policy, as a text, is a system and is therefore part of a complex process of interdependent constructs. One predominant construct in environmental health policy is the social construction of health itself. Environmental policies are increasingly becoming arenas for environment and health discussions and thus to understand how health is defined and understood is paramount. In an attempt to piece together an epistemological framework for policy, a close look at the challenges of policy analysis reveals it is difficult to separate theory and method for policy. This chapter will present literatures within each of these three areas of language, health and policy.

The body of literature that establishes language as a 'system' is based on the perspectives of structuralism, post-structuralism, deconstruction, literary

theory and semiotics. Seminal theorists are presented as examples of works within this body of knowledge that builds an understanding of the importance of linguistic investigations of social systems. The contribution of this research is in bringing language and policy knowledge together. A rationale for the study of language epistemology from the perspective of key theorists is presented at the beginning of this chapter. Although not revisited again, this presentation of perspectives is essential to establish the complexity of bridging language and policy meaning.

Section 2.2 shows the evolution of ideas that looks beyond language as simply a structured linguistic system and towards a social semiotic system of multiple meanings and interpretations. In section 2.3 the social construction of health informs this thesis by providing a context for understanding how health and ill-health are defined in society. This is critical to address the impact of environment on health whether health is defined in terms of the absence of disease or broader determinants. It will be seen through this study how environment and health linkages play out in policy and whether the construction of such policy changes according to these definitions of health. In section 2.4 policy analysis is presented through a look at interpretive approaches to policy and advocacy coalition frameworks. This thesis utilizes both of these approaches in its analysis. This literature review presents the epistemology and theory of language, health and policy. It forms the foundation for the design of this study as a triangulation or layered sequential analysis in understanding a complex policy making system

Figure 2.1: Linking Literature to Conceptual Framework for the Thesis

Literatures Informing the Thesis

Policy Analysis

Language as a "system"

Social Construction of Science and Health

Understanding the Decision Making Process in the Great Lakes
Through the language about health in documents and interviews

STRATEGY
(Interests)

↓

Interpretive Policy
Analysis
Advocacy Coalition
Framework

↓

Values
Structure

FRAME
(Ideas)

↓

Semiotic Analysis
Frame Analysis

↓

Meaning
Assumptions

SCIENCE
(Information)

↓

Interpretive Policy
Analysis

↓

Knowledge
Truth
Proof/Estimates

**POLICY
OUTCOME**

around an environmental health issue.

Figure 2.1 presents the conceptual link between the literatures that inform this thesis and the organization of its analysis. The body of literature is contained within a dashed line to represent the fluidity of knowledge in this area. Understanding of the decision making process continues to draw on more than the areas represented by this thesis. However these literatures were chosen on the basis of building a foundation of expertise to draw upon for the design of a unique and 'meaningful' investigation of policy. Each area of literature review connects primarily with a specific element of the conceptual framework.

The conceptual framework is built around the three elements of decision making processes: interests, ideas, and information (Weiss, 1983). Interests are reflected in the strategies of decision making and refer to the values that underlie both the formal and informal institutional structures. Ideas are reflected in the framing of the decision making and refer to the semiotic and frame analysis of the documents (texts). Information reflects the role of science and scientific evidence in decision making and refers to scientific knowledge, the need for truth and estimates of risk for policy. Together these three elements form the building blocks or layers of understanding concerning the decision making process in the Great Lakes. In turn they impacted upon by policy change processes and impact on the policy outcome.

2.2 Language as a 'system'

Language as a system is fundamental to our vision of the world. This analysis rests on the proposition that language acts as a zipper by interlocking ideas and forming a bond which maintains the knowledges of our existence. It is a system woven with social, political, economic, and historical threads. The force of each thread, represented in the system, accounts for the power attributed to language. This research complexity can be tackled by formulating an understanding of language *as a system*. As Anderson, Hughes, and Sharrock (1986, 103) report, there "is no sense in the idea of an independent view of how things are" because all systems run together through life and need to be realized as a part of the whole. There is no way to escape language as an arena for study since it is an integral and unifying component of human existence.

Language can be viewed through a number of perspectives: structuralism, post-structuralism, deconstruction, literary theories, semiotics. Each approach carries its own understanding of what language is and how it is best penetrated. This chapter examines the notions of `meaning' and `interpretation' within each perspective. Since both these notions are becoming a part of policy analysis theory, and recent interests in policy text analysis, it is important to understanding their development through language theory. Language is more than just surfaces and depths with regards to meaning and

interpretation. It is a representation of real life dynamics, such as its social, political, or historical threads that create it. Therefore, an appreciation of language is limited by a study addressing only the structured system and must incorporate more than linguistic and textual dimensions by considering its social system network.

Atkinson (1991) proposes that all knowledge is influenced by the structure of language and all ideas are structured on pre-existing ideas. Moreover, each discipline shares in this commonality of building ideas and knowledge upon its proposed system of language and discourse. In particular, the discourse of science has contributed greatly to shaping our cognizance of the world by representing the fundamental relationship between society and nature that has evolved through the Enlightenment and industrial revolution (Atkinson, 1991, 126-163).

The triad of science, politics, and language represents a fundamental "power" structure within our society. Symbolically, power is represented through language by its author, audience, content, and context. Looking at language beyond a structured linguistic system and towards a social semiotic system involves comprehending the principles of symbols, codes, and social forces represented by language. Analysing language as a system, whether regarded as a system of arbitrary signs (Saussure), meanings (Levi-Strauss,

Lacan), signification (Barthes, Foucault), codes (Baudrillard), or symbols (Bourdieu) involves more than discerning linguistic elements. In addition to these methods of organization, examining language entails investigations of the history of ideas, types of discourse (scientific and political), framework of power, and social forces that contextualize the system.

In pursuit of a grasp on language as a system, it is the purpose of this section to establish a framework within which this research can be directed. The discussion is therefore descriptive in nature to identify the perspectives taken on understanding language, as well as, how one might direct endeavours to effectively analyse communications between members of society on specific issues such as the Great Lakes.

Structuralism

Structuralism has been defined as: "a method of investigation" (Sturrock, 1979, 2); "a style of thought" (Merquior, 1986, 2); " a theory of formal structure" (Merquior, 1986, 7); and "a philosophical method" (Anderson, Hughes, & Sturrock, 1986, 107). Despite the diversity of definitions, structuralism adheres to the prospect of attaining systematic knowledge through the distinction of appearance and reality. The principle of this separation is that surface appearances (regardless of the diversity) are distinct from the unifying

structural realities held beneath them. However, structuralism is more than simply discerning that there are surfaces and depths to knowledge. It involves conceiving of structural models "...as the infrastructure of culture at large. In other words, they [structuralists] keep looking for primary, determining qualities, as it were; but they find them *at the level of surface itself*" (Merquior, 1986, 9). Simply put structuralism is concerned with seeing the part within the whole. To acknowledge the impossibility of systematic knowledge and investigate systems by looking at the whole along with the parts, is to comply with a post-structuralist approach (Culler, 1983, 22). Structuralism and post-structuralism are not opposites. Rather the latter accepts the limitations of the former and moves forward.

Central to structuralism are the seminal contributions made by Ferdinand de Saussure. To Saussure "language is first and foremost a formal system of rules for differentiating sign" (Anderson, Hughes, & Sharrock, 1986, 104). Unambiguously, the organization of our world in language is through a system of signs. Saussure articulates that these linguistic signs are arbitrary and in addition, he contends that without difference signs have no meaning (Anderson, Hughes, & Sharrock, 1986, 103). The difference is established when signs are contrasted in larger collections of signs, namely a text. This notion of language as a system is pivotal in propelling structuralism.

For Saussure, at the heart of structuralism is the distinction between synchronic and diachronic axes of language investigation. Synchronic refers to looking at language as though it is a system of rules and principles existing at one time; diachronic refers to the changes that these systems undergo through time (Anderson, Hughes, & Sharrock, 1986, 102). This complex network for investigating language systems rests on the fundamental notion of *difference* between what is said and what is meant. Saussure's epistemology of language maintains three "systems" that follow structuralist ideologies: system of rules; system of arbitrary signs; and overall system of language.

Both Levi-Strauss and Lacan are committed to structuralism for understanding the universal properties of the human mind (Sturrock, 1979, 4). As universalists, they both adhere to the belief that there is a fundamental generality in the way all human minds are structured either in consciousness or unconsciousness. Lacan not only proposes that the unconscious mind exists, but that it is a structured system like language with a body of rules to organize our thoughts (Anderson, Hughes, & Sharrock, 1986, 125). The distinction between the pattern of language and pattern of unconsciousness is formed according to psychoanalytic epistemologies. Lacan's achievements are mainly through re-presenting Freud; for example, he discerned that our libido is to be surrendered to a system such that the ego (function of the human psyche) belongs to the

Symbolic Order (system) (Sturrock, 1979, 13).

Similarly, Levi-Strauss subscribes to the conceptualization of universal depths (meanings) to surface (text) differences, and that meaning systems are held both in language and social institutions. It is through the study of myths, totems, and kinship that Levi-Strauss discovered the workings of the human mind as belonging to systems of internal coherence and external autonomy (Sperber, 1979, 47). Levi-Strauss brought to light the significance of communication processes as a kind of language through his creative studies of myth, totem, and kinship systems. He also introduced the paradigmatic and syntagmatic properties of communication that extol the respective significance of comparison and contrast to language interpretation (Sperber, 1979, 48).

Barthes differs from both Lacan and Levi-Strauss in that he does not posit the notion of universal structures, rather he follows a relativist approach similar to Foucault and Derrida of the post-structuralist epoch. Barthes is known for his ever changing theoretical positions, avoidance of definitions, and support for whatever is plural and discontinuous (Sturrock, 1979, 52). His enemy is the DOXA, the voice of the natural, due to the fact that it alienates people by deluding them into "...believing that the social arrangements they live by are not a human product but the product of God or Nature" thus stripping people of the power to question and transform their institutions (Sturrock, 1979,

60).

In terms of language Barthes believes meaning pervades a text through

an understanding of the signification process in language systems. Structuralism

tended to mystify the arbitrariness of the sign (presented by Saussure), however

Barthes de-mystified this by bestowing a moral virtue upon this arbitrary sign

(Merquior, 1986, 183). By existentializing Saussure's view of the sign, Barthes

demarcated the DOXA as rooted in the prevailing political order, hence

adhering to the belief that outward expressions of texts reveal many sign

systems hidden in the process of signification (Merquior, 1986, 184). It follows

that the text represents a political order of our world through its surface system.

As Merquior (1986) points out, Barthes saw language not as an object in

itself but as a human experience.

> "Literature is seldom about language or literary devices and conventions
> other than in an occasional or instrumental sense; but it is constantly
> about `life', however real or imagined" (p. 181).

This is contrary to common Western Idealism whereby it is insisted that

"...there be a ghost in the textual machine, an immaterial presence of which the

text is the outward sign" (Sturrock, 1979, 77). Ideologically, Barthes addresses

the relationship between reality and language inconsistently; he journeyed along

the paths of anti-bourgeois modernism through to libertinism and ultimately

moves beyond Saussure away from the concerns of humanity (Merquior, 1986,

182-188). Consequently, he was significant in directing structuralism towards

post-structuralist endeavors that included increased preoccupation with historical

dimensions of thought.

Foucault declared himself neither a structuralist nor post-structuralist, he

insisted his work was a "discourse about discourses"; as a relativist, he resisted

the lure of a definitive ending or an origin of structure (White, 1979, 82). His

renowned insight is that cultural relativity prevails in language wherefore

knowledge can be encoded in different ways. Furthermore he believes that

principles, not meanings, are universal (Anderson, Hughes & Sharrock, 1986,

113). Foucault asserted there is no natural distinction between sign and

meaning, subject and object, signifier and signified, instead distinctions follow

paradigms of permitted versus prohibited, rational versus irrational, true versus

false (White, 1979, 85-95). In contrast to the structural language ideology of

surfaces and depths, Foucault maintained that the distinction be dissolved by

viewing language in a tropological space, infinite in difference and change. The

tropological space is " a colourless domain in language, ...which reveals in the

very interior of the word its own insidious void, barren and confined" (White,

1979, 87).

There is an absence at the heart of language that frees it from the myth

of signification and propels it into a domain of power and desire. In this

sphere,

> "... discourse unfolds `in every society' within the context of internal
> restraints which appear as `rules of exclusion', rules which determine
> what can be said and not said, who has the right to speak on a given
> subject, what will constitute reasonable and what `foolish' actions, what
> will count as `true' and what as `false'" (White, 1979, 89).

The power of language to include and exclude is fundamental to the social system of reality. Language provides the medium through which power is represented, moreover its ability to be effective or tolerated in text is only when some of it is "hidden" (White, 1979, 109). Foucault addresses language as a representation of the real. Thus it can be used as a "tool" or medium for grasping reality.

Although Althusser denies any influence of structuralism, for political reasons, he presents a social theory that follows a structuralist Marxist ideology (Craib, 1984, 125-128). Structuralist Marxism conceptualizes societies by applying structural systems through economic functionalism to human action. He argues on a political front against orthodox Marxism and on a theoretical front against humanist Marxism (Craib, 1984, 131) and states, "...the world we see is in some way `created' by the structure of the theory we employ" (Craib, 1984, 126). The structuralism of social theory is likened to a puppet theatre in that, humans are the puppets of social structure, attached to invisible strings originating at a level of economics, passing through ideological states and

working (moving) through an imaginary sense of being free, of choosing, of acting (Craib, 1984, 123-145). How are the social structures changed if humans are likened to puppets? Althusser proposes a structuralist Marxism approach to social theory. However he makes two assumptions that pose some logistical problems: first, this approach assumes humans are an effect or product of their social structures since we presuppose subjectivity in response to certain structures; second, the approach assumes the world functions in a logical and coherent manner.

Althusserian social theory is "a transformation of commonsense or ideological world" (Craib, 1984, 130). It does not adhere to orthodox structuralist `rules of transformation', instead it centres on the idea of causality and the notion that elements change with relationships. The causal connection, not complete dependence, between economics, politics, and ideology is the relative autonomy that social theory uses to push theoretical boundaries outward. The outer limit of social theory is economic determinism such that the underlying economic structure produces surface political and ideological institutions (Craib, 1984, 139).

In our day to day life it is the contradictions between all levels of structures (economic, political and ideological) that influence the overall social networking. Social networks are complicated by this connection and dependence

between all structures. Althusser's social theory argues that the structure of the economic level determines the dominant level internal to the development of society.

A structuralist approach to language provides one understanding of the ways in which meaning and interpretation represent real life dynamics, such as communications through text. This thesis is informed by structuralism's ideas of surface and depth to 'meaning'. As important is the knowledge that language is a system, however it equally important to be able to consider a social system network that better reflects the real world (such as a policy space). A layer of the analysis in this thesis is premised on the understanding of policy "meaning". Specifically, this understanding of structuralist theory informs the investigation into how policies 'mean' by the social system that created and developed the text. Deconstructionism will move us closer to conceptually understanding the fundamental epistemology of language and therefore build a foundation for understanding how social semiotic systems can give insight into policy dynamics. In bringing together the study of language and the study of policy, this thesis begins with an understanding of the language and how it can best serve policy analysis.

Deconstruction

According to Derrida deconstruction is 'true' structuralism, whereby

structure is defined as "something molar, transformational, and semiotic (part

and parcel of a sign-process)" and consequently "post-structuralism is a red

herring as a label" (Merquior, 1986, 190 & 195 respectively). Recall from

Saussure that language is a system of signs, and meaning is dependent upon

difference. In Derrida's theoretical meaning system, he questions Saussure's

idea of difference between signifier and signified by arguing pure difference

does not exist; instead, he introduces the concept of differance denoting both to

differ (being distinct) and defer (present in meaning but omitted in text)

(Lamont, 1987, 589). It is inherent in this dual characteristic of difference that

interpretation is dependent upon the outward expressions of meaning. The

fundamental elements of expression are constituted in signs, symbols, and

contexts. For deconstructionists, text becomes textuality because "from the

moment there is meaning there are nothing but signs. Text, of course, is

clusters of signs. It follows that there is nothing outside the text" (Merquior,

1984, 221). For this to be true the text must be a source not only of content,

but also context and significations of the philosophies it asserts.

"Following Nietzsche, he [Derrida] argues that the philosophical enterprise is
logocentric in its attempt to ground the meaning relations constitutive of the
world in an instance that itself lies outside all rationality" (Lamont, 1987, 590).

In addition, Derrida promotes deconstruction as a method for decoding

transcendental meanings of text through a never ending process of interpretation

(Lamont, 1987, 590).   Interpretation is therefore a process of extending the

context through a re-creation of the text.

It is the goal of deconstruction,

"...to uncover the implicit hierarchies contained in any text by which an order is
imposed on reality and by which a subtle repression is exercised, as these
hierarchies exclude, subordinate, and hide the various potential meanings"
(Lamont, 1987, 590).

This concept of hidden structures within a text was put forth by Foucault as

constitutive of the domain of power and desire. Deconstruction extends this

sphere of power by enveloping the notion of "hierarchies" as "powerful attacks

on ordinary notions of authorship, identity, and selfhood" (Sturrock, 1979, 14).

Power is transmitted through language in a process which appears out of the

control of interpretation. Even so, following similarly with Lacan, Barthes, and

Foucault, Derrida focuses on the relationship power has with culture,

knowledge, and rationality (Lamont, 1987, 593). This element of power,

introduced briefly through the discussions of structuralism and deconstruction,

will be shown to be a pivotal structure within the system of language. Power

plays out in a number of ways in policy text and, as a system of language,

policy is bound to power through author, audience and players. For this thesis,

power plays out significantly for the stakeholder groups, specifically in the

consensus that determines the resulting IJC documents, texts. Through this

investigation of text and interviews with stakeholders, the strategies for decision making will show how the power of author and audience play out.

For example, the Biennial Reports are written by the IJC based on reports from their many advisory boards as well as with the direction of six Commissioners. The IJC Commissioners hold the power to choose which evidence (which voice of scientific truth) will make its way to a recommendation to both the Canadian and American leaders of the day. The power also rests upon the IJC staff that influence the decision of which stakeholders sit on its advisory boards. There is a complicated web of power that is reflected in the text, through what is written and what is left out. In addition this examples serves to show how language of policy text can be used to determine whose power, as gatekeepers of policy change, surfaces throughout a policy process. Issues of power will be discussed in detail in section 2.2.1 but they are inextricably linked with this presentation of language as an analytic tool.

Literary Theory

Phenomenology is a "brief account of seeking to explore an abstraction called `human consciousness' and a world of pure possibilities" (Eagleton, 1983, 56). For phenomenology, language is an expression of its inner meaning

thereby advocating language as independent of phenomena. This separation

between language and meaning can be traced back to the time of Husserl's

philosophical insights. Husserl proposed meaning pre-dates language by

adhering to an "intentional theory of consciousness", in contrast with literary

theory that suggests meaning is produced by language (Eagleton, 1983, 60).

Whichever way the distinction is drawn between meaning and language,

phenomenology maintains that it will keep language free from social

contamination (Eagleton, 1983, 61). For Husserl, to expand meaning beyond

the mind alone would be to lose this phenomenological account, since his

argument is that consciousness and meaning are always connected. On the other

hand, Heidegger proposes that language is a dimension of human life and as

such literary interpretation "is not something we do, but something we must let

happen" (Eagleton, 1983, 64). The phenomenological perspective of

Heidegger's epistemology follows a historical dimension rather than the

transcendental consciousness advocated by Husserl.

Hermeneutics is "the science or art of interpretation" such that all

meaning moves within a "system of typical expectations and possibilities" set

forth by its author (Eagleton, 1983, 66-67). Hirsch argues that "literary

meaning is absolute and immutable" thereby resistant to historical change

(Eagleton, 1983, 67). This theory is not supported by literary theory's notion

that meaning is produced by language yet Hirsch insists that meaning is immutable by adhering to a distinction between meaning and significance. What he proposes is that, "significances vary through history, whereas meanings remain constant; authors put in meanings, whereas readers assign significances" (Eagleton, 1983, 67). Hirsch acknowledges that in reality this distinction may never be tenable and that "meaning of language is a social matter"; however, no one aside from the author knows the meaning he/she wills, since meaning is "a ghostly, wordless mental act which is then fixed for all time in a particular set of material signs" (Eagleton, 1983, 67). Therefore according to Hirsch, `probable authorial meaning' is all that hermeneutics can achieve.

Developed through hermeneutics, reception theory examines the role of the reader/audience. A famous account of reception theory is put forth by Wolfgang Iser. Iser's reception theory addresses the "transformative power of literary works" through exposing the reader to "codes" that puts into question our beliefs and perceptions of the world (Eagleton, 1983, 79). This power of transformation presupposes an open-minded approach from the reader, however this may not always be a valid assumption regarding audiences of literature. Since "all readers are socially and historically positioned" their interpretations of texts will be intrinsically influenced by these factors regardless of their presupposed mental frame of reference (Eagleton, 1983, 83). The assumptions

are that prior to reading, the reader has internally structured a knowledge context for the text. Furthermore the text has been driven by the audience which it intended to address. The ineluctable assumptions made between author and audience pose logistic problems for reception theory that can be likened to "the old problem of how one can know the light in the refrigerator is off when the door is closed" (Eagleton, 1983, 85).

This thesis will use these arguments to create a method of investigation of policy language whereby policy is seen as a text in a particular social network system. Together the tools of language as a system and social semiotic space will reveal the underlying assumptions and values that pervade the Great Lakes policy world. The literature review to this point has only addressed the notions of "meaning" and "interpretation" from the perspective of seminal theorists in language. To capture the value of a linguistic pursuit in policy the review must now turn to the context of the language system, moving beyond the current discussion of organization of language. In understanding this "system" there are four components that will be explored next: the social construction of science, society and nature, power, and social semiotics. This next section explains the how social and political forces can be reflected in language systems.

2.2.1 Social Construction of Science

So far, the discussion has centred on different organizations of language

as a system. It now moves to the importance of context. All language, like all

ideas, has a temporal component that includes elements of development,

explanation, assumption, and symbolism (Atkinson, 1991, 58). To study the

structural system of language today it is important to understand the principles

upon which these structures were built. It has been found that,

> "...right across the history of science, there have been indications of the
> realization that all knowledge is moulded and hence influenced by the
> structure of language" (Atkinson, 1991, 52).

Science and its discourse are of particular interest because it has shaped societies

perspective on the world. When Barnes wrote, "...all scientific ideas grow via

the reconfiguration of pre-existing ideas" he understood fundamentally that

language was a product of the socially created world (Atkinson, 1991, 58). To

provide a clear understanding of the role language plays in science Atkinson

(1991) writes:

"The whole scientific project has been shaped by the structure and values that
lie within the languages that provide the basis upon which to enter into the
project in the first place" (52).

Assumptions, values, and beliefs are all carried through the historical process of

ideas that ideologically guide and entice actions in our societies.

The Enlightenment movement in 18th-century Europe restructured

societies by transforming the relationship between nature and society through

conceptualizations of science, progress, and individualism (Atkinson, 1991,

163). Ideas have been selected, sorted, and reinforced through time and as a

consequence have changed the relationship between society and nature. In the

dynamic of discerning the roles that science, progress, and individualism play in

the history of ideas, it follows that:

"...[science] has become a central aspect of the world dynamic which is lethal.
This [ecological] literature has generally acknowledged both the origins of
science in the reconfiguration of pre-existing ideas (the `history of ideas') and
the significance of social and economic change as contributing to the selection
of ideas and the orientation of the whole" (Atkinson, 1991, 131).

The meaning of economic progress has shifted over the last three centuries as a

consequence of political situations, and, inadvertently, scientific progress has

been the facilitator of economic advancement through technology (Atkinson,

1991, 152). The role of science in modern society is both socially constructed

and historically contingent (Barnes et al., 1996). The sociology of science

reveals that science is interdependent with its social, economic, cultural, and

political institutions. It cannot be separated from its societal context. Atkinson

(1991) reveals,

"...`science' is made up of many communities and ideas towards different ends
within the social and political arena. In this way they pass one another in the
night, avoiding conflict in areas where they are saying different things about the
same subject to satisfy different constituencies and aims" (p. 144).

Knowledge, ideas, and discourse are influenced by these dynamics that surround

science in society. Ideologies are based upon fundamental understandings of

how one relates, be it through discourse or action, to their world which science

has transformed.

2.2.2 Society and Nature

This thesis is about environmental policy making and as such it will

involves the distinction between what is environment and what is non-

environment. Specifically, how are humans separate from their environment?

To acknowledge that there is a distinction between nature and society is to

conform to a modernist approach. According to Latour (1993), to be "modern"

is to maintain symmetry between two dichotomous practices: 1) nature separate

from society, and 2) hybrid networks created as a product of combining nature

and society. Without hybrid networks the separation of nature and society

cannot exist, to be modern is to maintain both practices of separation and

networking (Latour, 1993, 11). The paradox of modernism is between the

work of "purification" (such as Kant, Hegel, Habermas, and phenomenology)

that maintains the polarization of nature and society, and the work of

"mediation" (such as discourse and socially constructed naturalness) through

which society and nature are linked in effect, keeping them apart through

definition (Latour, 1993, 58). Once the double symmetry or dualism is doubted then we have entered the realm of postmodernism (Latour, 1993, 7).

Nature has been defined as: "overflowing goodness of God" (Lovejoy 1936, 54); "man's instrument of power" (Lewis 1947, 40); "giant clock built by man set by creator at beginning of time" (White 1960, 124); and "basis of history" (Hegel 1975, 191) (c.f. Atkinson, 1991, on pages 131, 136, 133, 137 respectively). Such definitions of nature suggest society is disconnected from nature. In addition nature does not speak for itself, but it speaks through other forms. Who will speak for nature if it is defined as mute and separate from society? Religion? Industry? Philosophy? History? The answer according to Latour is 'Science'. Science has the power and objectivity to understand nature and report back to society about its character, dimensions, and knowledge. Due to the fact that nature cannot 'speak' for itself, it has been upheld in society that science will speak for it and tell us what we need to know (Latour, 1993, 29). Furthermore, upon society's quest to discover the unified theory of life because "God does not play dice" (Einstein c.f. Atkinson, 145), science has followed a positivist philosophy of findings. "Positive science is informed at its foundations by an assumption that beneath the complex surface everything in the universe has simple causes which it is the job of science to discover" (Atkinson, 1991, 144).

This brings us to a discussion of the power relationship between science and politics. The power of science to speak for nature parallels the power of politics to speak for people. Furthermore, in theory the ideological arena the powers of both science and politics rarely lock heads. But in practice this is not always true. It has been put forth by Latour (1993) that language and discourse (representing the modern paradigm "work of mediation") continually links both poles of natural and political powers. Through language a symbiotic functionalism exists between science and politics; reciprocally the use of science for politics and politics for science is maintained through social structures in modern society. According to Latour (1993),

> "...the representation of nonhumans belongs to science, but science is
> not allowed to appeal to politics; the representation of citizens belongs to
> politics, but politics is not allowed to have any relation to the nonhumans
> produced and mobilized by science and technology" (p. 28).

Not to belittle the complexity of this relationship, the explicit assumption in this representation discloses the interconnectedness of power structures built by modernism.

Moreover, Torgerson (1986) posits three faces of policy analysis that each represent a different relationship between science (knowledge) and politics in society. The first face is based on rationality and objective knowledge as truth that replaces politics. The second face argues all decisions are made by individuals in a social and political context, thereby resulting in politics

dominating over knowledge or science. The third face supposes knowledge is politics and rejects neither the first or the second face. These three faces of policy analysis address the power relationship between politics and science. Language and discourse of both institutions is critical to engage in an understanding of policy making. This thesis applies this third face of policy analysis to the Great Lakes. An exposure of values held by various stakeholders in the Great Lakes will demonstrate that knowledge is indeed the politics.

Science, Politics, and Language

The value our society places on scientific discourse to present the "truth" is, we argue, a natural extension of the structural dynamic of its role in the advancement and modernization of the world. Barnes comments on the sociology of knowledge such that, "[a]ll knowledge is accepted belief, not correct belief; no particular set of natural beliefs represent `the truth'" (Atkinson, 1991, 56). Nevertheless, "the truth" is idealized to such an extent in our society that to admit one's view is anything less is to devalue that view. "The issue of truth is bound up inextricably with issues of power..." and the epistemology of discourse proscribes power to scientific knowledge whereby the hand of the one leads the other (Hodge & Kress, 1988, 151).

The network of facts (science), power (politics and economics), and

discourse (text and language) are "simultaneously real, like nature, narrated, like discourse, and collective, like society" (Latour, 1993, 6). Together the facts, power, and discourse, presents the complexity and difficulty in understanding and addressing the network of nature and society. For example, the discourse of the ecosphere is too real and too social to categorize into meaning effects (Latour, 1993, 6). At the real world table where nature and society come to speak, the roles of each is clearly represented.

"The political spokespersons come to represent the quarelsome and calculating multitude of citizens; the scientific spokespersons come to represent the mute and material multitude of objects. The former translate their principles, who cannot all speak at once; the latter translate their constituents, who are mute from birth" (Latour, 1993, 29).

The common table that brings these two spokespersons together is being lost in the power and conflict represented in the dynamics of their networking interactions. Depending on the stakes and who is elected the roles will fade in and out until their commonality is invisible resulting in their separation (Latour, 1993, 29). Despite this cynical scenario, discourse and language will always provide spokespersons with a common table at which to speak, bringing facts and power together in a collective symbiosis.

This study presents an opportunity to look closely at the discourse and policy context of many stakeholders around the issue of Great Lakes ecosystem health. Language will be presented in the form of policy texts that serve as the

"common table" between a diverse group of interests and beliefs about the nature of science around this issue. Power, I assert, is entrenched in the language and the author of the documents.

2.2.3 Power

The discussion on nature and society has advanced our understanding of language beyond a focus on structure and towards the social.

Power of the Word

The word, rather language, has the power to create a social reality through its structural systemic properties discussed in structuralism, deconstructionism, and literary theory (Bourdieu, 1991, 105). Moving past language as a structure, it has now entered the realm of a social construction by influencing human visions of and interactions with the world. Language has become an "instrument of power" to be used by all members of society in their struggle to understand, develop, and change their world and how others envision it (Bourdieu, 1991, 37). It follows from Foucault that language can be used as a tool for grasping reality through "rules of exclusion". Recall, these rules constitute the effective power of language in determining what words are "hidden" or "excluded". Thus, there is not only a power of the included word but also a power of the words are excluded from a text.

The question remains, how do words become transformed through

contexts and social reality to recreate a social vision? According to Bourdieu

(1991), words lose their discriminatory power through their popularity (p. 64).

The reputation of a particular word may become lessened or worn out due to

overuse or repetitiveness of a particular discourse thereby losing its power to

cast a vision in a new light. Trendiness of words, phrases, or languages may

result in their losing their effective persuasiveness. However as the history of

ideas has shown, language is built on assimilations and dissimilations of pre-

existing discourses through religious, political, or economic struggles

(Atkinson, 1991). Although popularization of words may reduce their ability to

change perceptions in one discourse this does not mean that these words have

lost all powers. In effect words are created in a universe of competitive

relations where their popularization leads to their reproduction into more

powerful frameworks of discourse (Bourdieu, 1991. 64). Furthermore, the

power of the word is ultimately reduced to nothing more than "the delegated

power of the spokesperson" (Bourdieu, 1991, 107). This brings the discussion

to a different perspective on the source of power for language.

Power of the Author

Returning to Foucault's "rule of exclusion", power is, in addition to

being asserted through what is and is not mentioned, declared through who

authors the words. It is often forgotten that authority comes to language from outside, and that at most language "represents authority, manifests and symbolizes it" (Bourdieu, 1991, 108). Thinking in reference to the discourse of science and the power asserted by scientists or mediators of science for politics, this representation of authority through language can be clearly conceptualized. Owing to the fact that power travels through language from its utterer/author, politics uses science's authority of discourse to uphold power and the image of power within the social reality. The political and scientific spokespersons assert their authority through language by imposing a power to their words, not necessarily because of what they are uttering but because of who they are. For example, for the International Joint Commission to use language such as 'zero discharge' of persistent toxic substances they are asserting their authority as an influential institution to recommend a policy to government Parties, industry stakeholders, environmental groups and the like. Their power lies in their position reporting directly to the government leaders and in a position to mediate science to policy makers.

Politics plays a significant role in the visioning or de-visioning of the world for society through the innate power associated with the government's position in relation to the public. Government has an authoritative power in their ability to change the vision of the world. By impacting on the values and

beliefs that the citizens hold through communication and discourse, government

holds this power to vision the future changes. It is imperative to keep in mind

that the author is astutely aware of who will listen (the audience) to the words,

therefore to politicians the audience is as critical to changing the vision of the

world as the authoritative power of the voice which utters it. The image of

power is significant particularly in politics where competitive struggles are the

crux of political change. This image of power can be understood through the

symbolic exchanges of communication, not by studying only symbols but

discerning the symbol systems (Sperber, 1979, 30).

Language is the ultimate symbol in form and context, however its power

is part of a symbolic system owing to the fact that social structures (relation

between author and audience) are what hold the power in place.

"Symbolic power -as a power of constituting the given through utterances, of
making people see and believe, of confirming and transforming the vision of the
world and, thereby, action on the world and thus the world itself, an almost
magical power which enables one to obtain the equivalent of what is obtained
through force (whether physical or economic), by virtue of the specific effect of
mobilization -is a power that can be exercised only if it is recognized, that is,
misrecognized as arbitrary" (Bourdieu, 1991, 170).

Symbolic power transcends through constructs of power (visible) and is

expressed in arbitrary (less visible) forms such as, political or scientific

discourses. Symbolic power is the power to construct reality. Politics'

visioning or de-visioning of the world is represented in a double game analogy

where the stakes are usually economic growth or social acceptance and the

conflict is a reflection of beliefs.

"It thus takes the form of a struggle over the specifically symbolic power of
making people see and believe, of predicting and prescribing, of making known
and recognized, which is at the same time a struggle for power over the `public
powers' (state administration)" (Bourdieu, 1991, 181).

As a social construct language carries the symbolic powers of the structures

which created it. The limitless nature of language, to say anything or nothing,

needs to be recognized prior to comprehending the symbolic effects it can have

within society (Bourdieu, 1991, 41). This research investigates the symbolic

power of language through a semiotic analysis of Great Lakes text.

2.2.4 Social Semiotics

Symbols according to Pierce are "any sign using an arbitrary connection

between present and absent components"; this definition is consistent with

Saussure's reference to a linguistic sign (Hodge & Kress, 1988, 27). Signs are

the fundamental building block of all semiotic pursuits and in reference to the

definition of symbols, they are similarly a category of semiotics. According to

Saussure, semiotics is the science which studies the role of signs as part of

social life, thereby constructing the basis for structuralism (studying the whole

as constituted by its parts) (Hodge & Kress, 1988, 20). As a semiotic category,

symbols undergo a process of signification whereby the symbol is signified in a

social convention through a process of learning. This signification is a social

process due to the fact that meaning is produced through symbols and people are

the interpreters of the symbol's meaning. It follows that to understand the

social process of symbolization one must examine the dynamic of signification

rather than the structural signs. Since signs do not exist in isolation

interpretation is arbitrary unless the analysis includes economic, political,

historical, social, and spatial contexts. Based upon the intrinsic social

dimension of semiotic systems, they cannot be studied in isolation. The terms

and concepts used by social semiotics defy single definitions because

mainstream semiotics has yet to agree on any set of forms (Hodge & Kress,

1988, 5).

Language and Social Force

Saussure established that "...the basic unit of language is a sign,

language is a system of signs therefore semiotic. Semiotics is not a reflection of

how the world is rather it is how we organize the world in consciousness and

language" (Anderson, Hughes, & Sharrock, 1986, 103). In addition, Atkinson

(1991) reminds us of the importance of incorporating the "aesthetic quality of

ideas" in understanding the sociology of knowledge as expressed in symbolic

interactions of science and social analysis (p. 58). The impetus for linguistic

changes cannot be examined without addressing the social forces upon which the need for change rests. The fact is that, language and social forces cannot be divorced (Hodge & Kress, 1988, 184). In keeping with Bourdieu's (1991) notion of authorship power, social forces are equally reflected through authors whereby symbolic power is attributed, as a messenger of structural social forces in society, to language.

In addition to reflecting on the author of symbolic power to understand the structures that dominate the language domain through social force, it is equally significant to address the audience receiving that message of power. "In order to sustain these structures of domination, the dominant group attempts to represent the world in forms that reflect their own interest, the interests of their power" (Hodge & Kress, 1988, 3). This follows directly from the discussion of science, power, and language such that, the collective symbiosis of facts and power are continually represented through discourse and language. Furthermore the political spokesperson is astutely aware of the power hierarchy that prevails in society.

Code of Society

Every text has a history much like the history of ideas and subsequently struggles through a process of transformations with social and historical agents (Hodge & Kress, 1988, 164). As Iser's reception theory pointed out there is a

transformative power of language to illustrate codes within a system through a set of signs and rules for their use. Codes are the networks within which society functions and are characteristically complex in their patterns and relations. As social objects, texts are produced through social processes and thus possess social effects including visions on the economic, political, and historical structures in the world (Hodge & Kress, 1988, 160).

2.2.5 Conclusion

As mentioned in the section 2.2, language as a system is woven with threads of social, political, economic, and historical fabric. A system is seen through a number of perspectives and continues to defy a simple definition or explanation. As put forth by Saussure, Foucault, Althusser, Barthes, and Derrida, in literary theory, and semiotics, there is more to be understood about how language is undertaken as a field of interactive networks. Through an investigation of social construction of science, discourse of science, framework of power and social forces of the language system it is clear that language does not function in isolation and should be studied in its social context and thus help reveal that context.

As introduced through structuralism and deconstruction, and carried throughout the discussion of contexts, the element of power is a pivotal

structure in the system of language.

"What creates the power of words and slogans, a power capable of maintaining and subverting the social order, is the belief in the legitimacy of words and those who utter them. And words alone cannot create this belief"(Bourdieu, 1991, 170)

The assumptions and knowledges of the world are maintained and expressed

through language as a structural social system.

The systems of health and subsequently environmental health are

maintained through assumptions and knowledges of a world that has shifted

from the biomedical models of health to a social construction model of health.

This shift is paramount to our understanding of where we are going in a society

of environmental health policy making. The history of our models of health

sets the stage for understanding a complicated policy text as a system.

2.3 The social construction of health.

Health has historically been defined as the absence of disease. This

conceptualization of health has dominated health research and has significantly

impacted the ways in which society has come to view methods of improving and

protecting health status. Over the past few decades the conceptions of health have

changed dramatically. Researchers have come to recognize the influence of social,

political, and economic forces on the health of individuals and whole populations.

This section will discuss the shift from a biomedical model of health to a social

construction model of health. This section will therefore build the foundations for objectives 1a and 1b of this research. It provides the basis for understanding the link between environment and health specifically why human health plays such a significant role in the process of policy making.

The biomedical model makes four assumptions about health (Curtis and Taket 1996; Mishler 1981). First, that a healthy body is one that is in its normal biological state and therefore diseases are deviations from the normal biological functioning. Second, each disease is caused by a single identifiable agent or micro-organism such as a germ. Third, diseases can attack all humans and can make anyone unhealthy. And fourth, it assumes scientific neutrality. In doing so, the roles of the physician and medicine are pivotal in assessing and returning the body to its normal biological state. This model presents the view that the body is a machine and the doctor is the mechanic that can identify and repair the problem (Engel 1977, cited in Curtis and Taket 1996). Thus rational understanding of pathogens and their symptoms is thought to lead to improvement of health.

From a biomedical perspective, biological knowledge of diseases is needed for protecting health. While more appropriate for communicable diseases, this conceptualization of health proves less effective at explaining the increase in chronic disease in western capitalist societies. It has become less acceptable to rationalize that some disease causes remain unknown because the appropriate knowledge has not been found (Jones and Moon 1987). A result of this

perspective helps form a common perception in many western societies , it is that

health status of a population reflects the amount of health care provision available.

This hypothesis has been under considerable question for some 10-15 years and

hence alternative and wider conceptualization of health are being considered

(Evans and Stoddard 1990).

For example the World Health Organization (WHO 1987) declared that

health is more than the absence of disease, in fact it is "complete state of social,

mental and physical well-being." This conceptualization of health embraces a

socio-ecological perspective of health. It conceptually moves past the traditional

biological considerations to include (and not neglect) social, political, and

economic influences on an individual's state of health.

Changing definitions of health and subsequently ill-health (disease) have

affected political and economic circumstances of the coal industry in West

Virginia. The classic example of black lung disease illustrates how social and

economic factors relate to definitions of disease (Jones and Moon 1987). What

was considered an inevitable disease in the 1930's became a work related illness in

the 1960's.

The first 'construction' of the disease was in the late 1800s when the

problem of black lung disease was identified. It was considered possible that

miners in the Pennsylvania coal fields were experiencing respiratory disease as a

result of exposure to anthracite dust and gases in the mines. At this time the

occupational hazard of mining was not acknowledged by the company doctors.

This was a reflection of the fact that the health care of miners was left to

doctors that worked for the mining industry.

The second 'construction' of the disease for miners was in the early

1900s in the bitumous coalfields of Appalachia. Again physicians were

employed by the coal companies and further identified "miner's asthma" as a

normal condition and non-debilitating. The labeling of miners, as lazy

malingers, was a common practice of those that complained of illness in

connection with their occupation. Since the condition was normal there was no

need for medical attention, concern or prevention.

After the second world war there was yet another construction of black

lung among Appalachian coal miners. At this time social and economic changes

were taking place, resulting from trade unions that developed health care

provisions for the workers, independent of the coal companies. This led to the

recognition of evidence linking respiratory illnesses of miners to the

occupational hazards of mining. In fact, the union-sponsored physicians were

able to compile evidence showing that the illness was debilitating and deadly.

Consequently, the unions were able to label the illness as work related and

demand compensation from employers. Of significance to this illustration of the

changing social construction of black lung is that the changes took place over

decades. Moreover, this example provided a clear illustration of how changes in what constituted disease were in response to political, economic and social pressures.

In Canada, the Lalonde report (1974) began to redirect conceptualizations of health by identifying biology, lifestyle, environment, and health care as key aspects. Despite the report's intention to address all four aspects, the document focused predominantly on lifestyle aspects of health (Evans et al., 1994). It was put forth that health was the result of lifestyle "choices" made by the individual. For instance, lifestyle factors such as smoking, diet, and exercise are considered individual choices that may contribute to or result in poor health. It is important when considering lifestyle factors of health that recognition be given to the wider social forces that affect individual choice. By focusing on personal choices it was assumed that individuals are in control of disease and that the risk of getting a disease is controllable (Tesh 1988). From a social constructionist perspective of health, this is not the case. Health cannot be separated from its social, political, and economic context.

Research that attempts to utilize this perspective includes the materialist epidemiological approach, that seeks to understand the role of capitalist social organizational process in the production of healthy miners (Jones and Moon 1987) . Cigarette consumption is a good example of the role of wider social forces on health. Research strongly shows that cigarette consumption is

associated with lung cancer. Smoking is often seen as a matter of personal

choice. Explanations of consumption are seen in lifestyle terms of individual

responsibility. However, lifestyle explanations of smoking do not take into

account the social pressures, commercial inducements and the role of capitalism

in creating and promoting such consumption. Economic dependence of

government on the tobacco industry provides a clear indication of the state's

role in maintaining power over the contributing explanations of ill-health (Jones

and Moon 1987).

The wider social forces affecting health are addressed in the Canadian Epp

Report (1986), in which health was seen not only as the result of individual

concerns but also the result of group, community, and wider social concerns that

relate to biological and social well-being. The broader issues that are seen as

connected to health are; healthy environments, levels of public participation, social

inequity, and the development of wide-ranging healthy public policies. To

elaborate, healthy public policy is intended to make all public policy-makers more

cognizant of human health in their directions and actions (Crombie 1992). In so

doing it is believed that the health status of a population will improve.

As mentioned previously, the biomedical model of health still dominates in

many societies including Canada. The changes in the conceptualization of health

through the publication of the Lalonde and Epp reports are advancements that

parallel these dominant views of health. Researchers (epidemiology, medical

geographers, health related fields such as nursing) are becoming increasingly

aware of the broader determinants of health. Such researchers are trying to

overcome the epistemological limitations of the biomedical model of health in an

effort to better inform policy for protecting and improving population health. To

explain social phenomena of ill-health, more macro understandings of social

structures need to be addressed in addition to the micro considerations of

individual biologies (Jones and Moon 1987, 323).

The Canadian federal government committed to this broader

determinants of health specifically through the 1994 launch of the National

Forums on Health (NFH). In 1997, the NFH released a document titled Canada

Health Action: Building on the Legacy. This document extended the Lalonde

and Epp report notions of health as connected to social and economic

environments. This NFH report puts forth conceptualizations of health as

connected to living and working conditions, physical environments, biological

and genetic endowment, personal health practice, coping skills, health services,

and others. Within this federal framework of understanding the links to health,

new ideas begin to emerge for policy; such as, healthy economies, healthy

environments, and health public policy. Thus as Smith's (1981) work shows,

the health of miners is not only explained by their adoption of a clinically

diagnosable ailment (pneumoconiosis) but by the societal process that exposes

miners to such dangers. Social contexts lie beyond advocating individual lifestyle changes. There are larger social, political, and economic forces at play in determining individual and population health.

The literature around the social construction of health informs this thesis in the manner in which human health and ill-health are defined in society. When health is defined in terms of broader determinants of health, the impact of environment on health is different than if health is defined as only the absence of disease. For example, if "health" of the Great Lakes refers only to the absence of disease found in the lakes this is different from an "ecosystem health" whereby health is interconnected with a range of functions within the lakes, including socio-political or economic factors. New meanings are created through each definition of 'health' and subsequent definition of 'environment' that is connected to health. It will be seen through this study 1) how environment and health linkages play out in policy and 2) whether the construction of such policies change according to these definitions of health.

2.4 Policy Analysis Theory

Policy analysis is presented in this literature review chapter to discuss the nature of policy and the study of policy for environmental health. Policy analysis is "organized knowledge" (Pal 1992) yet it does not follow one theory or one method. Analysts work towards answering the questions, what is to be done and

why was it done? Some theory in policy analysis addresses the ontological

question of what problem exists and how it exists. Method shapes the manner in

which a policy is recognized, implemented and subsequently evaluated (for applied

policy analysis). Section 2.4 will show how three frameworks seminal in the Great

Lakes policy process (ecosystem approach, zero discharge, and sustainability)

exemplify the challenges of linking theory and method. Section 2.4.1 and 2.4.2

will delve into the perspectives maintained in this thesis for understanding the

process of policy making in the Great Lakes.

Environmental health policy addresses concerns of the health and well-

being of human populations in particular physical and social environments. Policy

implementation takes place in a complex interdependent system of economic,

political and social spheres. Environmental policy theory tries to reflect this

system with the development of environmental health frameworks. Working

within frameworks such as ecosystem, zero tolerance, and sustainability results in

problems at the policy implementation phase. The practice or implementation of

policy is dependent upon answering the questions what is to be done and why?

For environmental health policy, what is theoretically envisaged (through concepts,

terms, frameworks, and other possible constructs) is not always reflected in

practice. In fact, policy practice most often cannot encompass the

conceptualizations and shifts demanded by policy.

In terms of practice, policy needs to be clear about what is to be done. This

is where policy falls short particularly in environmental health policy. There are difficulties resulting from the fact that stakeholders within a policy system may not maintain similar conceptual lenses for viewing a particular policy issue (Hogwood and Gunn 1984). This limitation aside, policy can be thought of as an outcome of bargaining and compromise over ideas, assumptions and theories. Such negotiations influence the environmental health policy process (Smith 1992).

A theory that has dominated much of the policy work in Great Lakes issues is the ecosystem approach. It has played out in a number of policy implementation strategies and is an excellent example of the distinction between theorizing a policy problem and setting up methods to implement the concept. In recognition of the fact that Great Lakes policies were not resulting in much action, the International Joint Commission decided in 1978 that the approach to Great Lakes issues needed to expand to include humans and biota more explicitly. This presented a clear shift in Great Lakes stakeholders' conceptualization of water quality issues, namely that humans are connected to the environment. This shift in thinking recognized the limitations of a purely chemical view of water quality and provided a means through which evidence of environmental degradation of the lakes could better result in policy action. In essence the ecosystem approach was created to mobilize the political will of decision-makers through pressure from interested publics (Allen, Bandurski and King 1992).

The ability of 'ecosystem health' to be used as an intellectual construct in

guiding solutions in the real world can be seen in the following examples of the

Remedial Action Plan (RAP) for Hamilton Harbor. Upon the IJC's

recommendation, RAPs were initiated in 1985 as a binational effort to restore

water quality in the Great Lakes Basin (Crombie 1992). Hamilton Harbor is one

of the 43 areas of environmental concern around the Great Lakes in which

remedial action plans have been developed. RAPs serve as a test, in that they

were developed under the premise of putting the ecosystem approach into practice

(Colborn et al. 1990).

As a virtually enclosed body of water, Hamilton Harbor is especially

vulnerable as pollution is not diluted in the waters of Lake Ontario. Due to

industrial activity and urban growth, the Harbor became increasing polluted.

However through the RAP and its ecosystem approach to decision-making for

pollution problems in the water, improvements resulted. After two decades of

destruction of bird and fish species and habitat Hamilton has a more positive future

for its harbor with the return in number of many bird and fish species to the

ecosystem. Stakeholders (such as industry) played and continue to play an

important role in remediating the waters. What is left as one of the largest

challenges, apart from sediment loading, is the loading of ammonia from sewage

treatment plants, with costs estimated at $9 million per annum to control. The

ecosystem approach brought forth a conceptual framework that enabled all

stakeholders to feel included in finding a solution to the issues at hand. It

considered the perspectives of biology (fish and bird species), economy (industry, government), politics (policy and support), and sociology (recreation, leisure, and well-being). However due to its broad nature, the framework of an ecosystem approach does not always play out so well in practice. As a concept it provides simplicity and approachability that enables one to do almost anything with it (as will be seen through the interviews).

A concept that is used in environmental health policy as an underlying philosophy for achieving standards of persistent toxic substances is "zero discharge". It is a concept because it proposes "zero" as an achievable goal without considering the reality of economic and political dependence on toxic substances in the Lakes. This is primarily a political conceptualization in that the powerful symbolism associated with the term "zero" motivates decision-making and is clearly linked to practice procedures. In theory zero discharge implies no tolerance of persistent toxic substances and that in terms of implementation all that is needed is a "ban" of toxins. However identifying toxic substances in the environment presents some difficulty because they are not always associated with point sources (such as industrial effluent). Substances of toxicity can flow through non-point sources, as seeping through groundwater. In addition bans are difficult or near impossible to act on in practice. For example, DDT (an insecticide) was identified by the IJC as a persistent toxin and subsequently banned in the Great Lakes. The concentration of DDT dropped following the ban; however, evidence

of new DDT in the lakes has been found. It is thought that the new DDT is reaching the lakes through long range air transport from Central and South America (Colborn et al. 1990).

Another component linking policy implementation and policy objectives is power distribution within the system. How power is distributed in a policy system like the Great Lakes determines the extent to which theories (conceptualizations of the policy problem) are implemented (Weiss 1983). The idea of policy 'framing' addresses some of these challenges by exposing the way in which an issue is conceptualized (linked to values) and subsequently plays out in the policy (Schon and Rein, 1994). If we consider the concept of sustainability and the problems of implementing it we can see the distinction between what is intended and what is done through policy. 'Sustainability' was introduced through the World Commission on Environment and Development in 1987. It envisioned consideration of past and future generations in approaching environmental issues (Regier and Hamilton 1990). More explicitly it put forth the notion of balance in decision-making and policy formation between social, economic and environment factors. In practice, sustainability encounters problems such as differences in stakeholder interests, inability to reach consensus, inadequate resources and lack of enforceable standards (Crombie 1992).

From a policy perspective, personal blame as a cause of ill-health such as lifestyle decisions is fraught with road blocks at the implementation stage. All

policy has incorporated in it ideological assumptions about how the world should work (Lomas, 1988). In the case of health protection, it is commonly assumed that people will respond in a rational manner to evidence of something posing an ill-health effect. An example of a policy that addresses a challenge for protecting health is Health Risk Determination (Health and Welfare Canada 2000). This policy depicts the problem of assuming rational decision making by the public based on evidence of risk from their natural and build environments. The Canadian Health Protection Branch has set out to illustrate that a part of understanding the science is understanding risk, therefore people should understand what and how risk is to be interpreted. The policy concludes on a note of individual responsibility for managing health risk. This assumption of rationality among the public makes implementation of such policies extremely difficult to justify and convey. The public does not limit its decision-making to rational scientific understanding.

Policy in practice cannot ignore the interdependent and interrelated system of economy, politics and society. This is one of the greatest challenges for policy to overcome at the stage of implementation. The common question of policy analysis is what is to be done? If the theoretical position of a policy asserts an unrealistic or intractable position then practice is found to be difficult. The frameworks of ecosystems approach, sustainability, zero discharge and rational decision-making are examples of instances where theory and practices need to be

integrated.

2.4.1 Interpretive Policy Analysis

Since the distinction between theory and method is unclear in policy

analysis, the rationale for adopting and adhering to an interpretive approach will be

discussed in this section. A growing body of literature on interpretive policy

analysis argues for the importance of language in policy; such as, policy 'meaning'

(Yanow, 1996), 'framing' (Roe, 1994), 'claims' (Dunn, 1981), 'crafting' (Majone,

1989), 'rhetoric' (Throgmorton, 1991) and others. This section builds a

foundation for the semiotic, thematic policy analysis that lies ahead. Section 2.4.2

will present the ideas of a specific policy framework that will add a layer of depth

to the investigation of the Great Lakes policy making process. Meaning will be

derived through an understanding of language and policy systems.

Dunn (1981) considers policy from a legalistic perspective whereby policies

are structured as arguments and claims. The "crafting" of policy surfaces in 1989

with Majone's intent to highlight the arbitrary ways in which policies come into

being. Considering 'not only what is said but how it is said', policy analysis began

to move beyond the traditional approaches towards an interpretive approach

(Yanow 1992). Rational comprehension models are being questioned because of

their limitations in practices such as linear approaches to policy making.

Interpretive approaches responded to the need for analysts to consider the

"framing" process of policy (Roe 1994). This means that the social and cultural

contexts of how a policy "means" need to be explored (Yanow 1993). Yanow

argues that through an understanding of how meaning is actively understood by

both the writer and reader of policy, there is a clear validation of values and beliefs

that underlie that policy.

According to Yanow (1993, 46), language consists of "artifacts" in

which meanings are embedded. Moreover the four main properties of these

artifacts are: symbolic relationships, contexts, multiple meanings, and tacit

knowledge. Of particular interest are the complexities of the artifacts that

acquire and convey `meanings', since they are directly linked to the policy

outcome in terms of action or inaction. The intent of a policy may be to convey

a univocal message or meaning from the policy-maker. But because meaning is

expressed in the form of language and language is symbolic by its nature then

meanings are multivocal and subject to multiple interpretations by the audience (

and the author can use this of course) (Yanow, 1993, 55). In light of such

complexity, it appears neither words nor `facts' alone allow for an

understanding of consensus policy language. As decision-makers are faced with

the complex challenges of the policy world, analysts can help by broadening

their lenses to address the social reality of multivocal meaning and multiple

interpretations. In this way, the partial attachment to what is seen as a

consensus document may become apparent. The documents investigated during

this study's analysis are considered consensus documents from the International Joint Commission Boards and as such represent the many voices of stakeholders. The voice of the resulting text is one voice but the multivocal meaning and interpretations lie beneath the surface.

Policy analysis can be seen as an interpretive inquiry, "a self-understanding of the social agents" (Healy, 1986, 386). Its aim is to understand, in other words, to enlighten. This understanding leads to knowledge accumulation and the recognition of the importance of contexts (Brunner, 1982, 125). Interpretive policy analysis or inquiry is "flexible and revisable" making it best suited to address multiple meanings and interpretations associated with policy language (Healy, 1986, 390). The key principle underlying this inquiry is that the analysis of policy documents must be cognizant of both context and form that lend themselves to multiple interpretations and meanings.

> "On the interpretive account, this plurivocity of interpretations derives from the fact that social reality cannot be apprehended in a contextless, culture-free way, but depends rather on the situated perspectives of both the social actors and the observer who seeks to understand their social world" (Healy, 1986, 387).

Taking context and culture into account, interpretive analysis accepts the multiplicity of meaning associated with language artifacts and the symbolisms through which meanings are embedded. One of the consequences of multiple

meanings is that the interpretations of documents are as equally complex as

social reality itself. Nevertheless,

> "...human beings are essentially makers of meaning; they are purposive
> agents who inhabit symbolically constituted cultural orders, who engage
> in rule-governed social practices, and whose self-identities are formed in
> those orders and through those practices" (Jennings, 1983, 27).

So multiple meanings do not imply an infinitude of meanings. Analysis of

policy language allows structures and phenomena, around which different

meaning systems may appear, to emerge. It is clear that an investigation of

policy must accept multiple interpretations just as it accepts the diversity of

participants and decision-makers as in stakeholder analysis. Taking into account

the many meanings by different stakeholders allows assumptions and values to

surface. Exposing values are an indication of whose interpretations or

'meanings' are justified in policy language.

Yanow (1993, 55) proposes an interpretive policy analysis of the

language artifacts to anticipate multivocal meaning and uncover multiple

interpretations. Thus policy statements go beyond `facts' and `truths': the code

or metanarrative. They are matters of assumptions and hence interpretations. A

revealing of symbolic objects and symbolic acts of the agencies that implement

the policies helps unleash the basis of interpretations of policy assumptions

(Yanow, 1993, 56). An analysis of policy facts is limiting. "When we limit

ourselves to policy `facts', which may or may not be implemented, we omit

much that may be of interest from a meaning-ful perspective" (Yanow, 1993, 56). Meaning is not fully represented by or conveyed from facts. It is a product of the social reality surrounding those facts often found in the taken-as-givens or assumptions of policy documents. Interpretive policy analysis is then the alternative to traditional (positivist) approach to policy analysis, that deals only with observable facts. It asks: how does a policy acquire and convey meaning? (Yanow, 1993, 41). This exercise, as Roe (1994) points out, is not merely `academic'. The importance of interpretive analysis lies in the direct effect that policy interpretation has on policy's ability to effectively articulate, implement, and regulate a desired decision.

Majone (1989) argues that the tools must recognize that policy language presents more than just facts and truths for it to be the "craft of persuasion". A policy demands and relies on its ability to persuade a particular audience to envision a particular reality as a problem, solution, or in need of change. Most importantly the crafting is dependent upon the distinct discourses and artifacts being used. The craft of persuasion is envisioned differently by different policy analysis approaches. Policy analysis as science sees no need for persuasion since all decisions are based on rationality, on fact and logic, although all decision-makers are not scientists nor do they follow one logic only (Torgerson, 1986). Applied policy analysis provides advice to clients, yet its failure often to

persuade leaving the analyst accused of being "incompetent, impractical, and illegitimate" (Throgmorton, 1991, 153-4). To turn this fate around requires inter alia an understanding of persuasion. Persuasion is dependent upon both the tools (language artifacts and discourse) it employs as well as the audience to whom it is hoping to persuade. So to be persuasive, these tools themselves require examination in a method that reveals the basis of interpretation. In this way policy analysis becomes critical not only of policy practice or language but aware of its own frameworks -- a position close again to that suggested by Roe (1994).

Throgmorton (1991) argues that policy analysis itself is in a complex rhetorical situation created by the intersection of three audiences: scientists, politicians, and lay advocates. How do analysts persuade audiences as radically diverse as these? (Throgmorton, 1991, 154). To understand rhetoric, it is thus necessary first to determine the audiences to whom the discourse is being directed and then the discourse from which the rhetoric is created. In other words, to reveal policy assumptions first requires an understanding of how rhetoric operates. Yet Throgmorton would appear to have us recognize rhetoric to dismiss it. "Rhetoric interferes with good decision-making"(Throgmorton, 1991, 158), apparently assuming that decisions are fundamentally made on facts alone, adhering to the positivist approach of policy analysis. Further,

"Good decisions should be based on logic and facts, not glib talk, and good analytical reports need only be methodologically sound, be presented in accord with the five point framework [the basis of rational decision-making] and be brief, clear and timely" (Throgmorton, 1991, 158).

Like a `recipe' for good decision-making, Throgmorton makes the world subject to systematic knowledges (`ingredients') which are only part of the story. There is a dominant rhetoric or meaning-system (Parkin, 1971) but meaning cannot be systematically controlled. "Meaning is not universal or determinate; it depends on context and on the perception and interpretation of the participant" (Yanow, 1993, 47). The complexity of the multivocal meaning and multiple interpretations are embedded in language and thereby theoretically accessible to examination and amenable to textual analysis in which `glib talk' is a pertinent object of examination. "Glib talk" seems to refer to moral and value judgements made by policy makers about the "rightness" or "wrongness" of a particular line of action or thinking. It manifests meaning and is configured by context. As such the "principle of contextuality" suggests, "the observer himself [sic], as an interested participant in political and social process, adds to the unreliability of indices" (Brunner, 1982, 122). In another form, `unreliability' is a different set of meanings and assumptions. To "remove the ideological blinders from our eyes" Laswell (1976, 220) affirms that the only way to address the issue of multiple interpretations is to reveal

values and morals in an analysis of policy (c.f. Torgerson, 1985, 243),

especially, we would argue, of policy language. Contexts invariably include the

culture through which values are historically recreated regarding an issue.

Surrounding cultural attributes are significant for the decision-makers

understanding of the task at hand (Yanow, 1987, 108). Context and culture are

not explicitly stated within a particular policy, yet are understood or taken-as-

given through the language chosen to be included and excluded. The values

underpinning a policy may be revealed through making explicit the tacit

(implicit) knowledges. Such an investigation would require using analytic tools

(such as semiotics and framing) to uncover the "silences" of a policy meaning

(Yanow, 1992b). Through the understanding of cultural linkages the "silences"

are revealed, since policy cultures are embedded in policy language. "Artifacts,

together with their underlying beliefs and values, constitute the culture of the

organization" (Yanow, 1993, 47).

2.4.2 Advocacy Coalition Framework

Policy formulation and implementation is "a culture conditioned exercise"

(Jasonoff 1991), with the policy world responding to the societal values that

contextualize the issues. Values are considered fundamental to explaining the

process in that they constitute: ideologies, conceptualizations of how things

"ought" to be; beliefs, understanding of what the causal relationship "is"

regarding an issue; and interests, how a group or individual "wants" things to be

(Lomas 1990). Historically, policy making has been a rational process of

priority setting, option analysis and cost-benefit considerations. Today,

contemporary policy analysis acknowledges the role of values in policy making.

In fact modern policy making has been defined as, that which considers

" the increasing complexity of both society and government; the importance of
information and expert knowledge; the reliance of government and nongovernment
actors to both formulate and implement policy; shifts in class structure, values, and
social groups; economic and cultural globalization; political culture of diversity;
and new international standards" (Pal 1997, 198).

Two relatively new and fundamental concepts in understanding the role of values

are the notions of policy communities and policy networks. They perhaps only

offer a new terminology to the already existing idea of interactions between policy

actors or players in the process (Lindquist 1996). However, this thesis research

utilizes the idea of policy communities in so far as it presents a conceptual frame to

pull together all the key components of policy making, not including everyone

active in the policy field and therefore not conforming to a policy network analysis

of patterns and interactions in the polity (Pal 1997). This study posits that to

understand policy making in the context of environmental health the policy

community is a reflection of stable and dynamic factors that change over a decade

or more through the formation of coalitions. The community within the Great

Lakes policy process consists of the International Joint Commission, Government,

Industry, Environmental Groups, interested public, the media and academia. The

web of interests among these players will unfold through the use of Sabatier and

Jenkins-Smith's 1993 Advocacy Coalition Framework (ACF). ACF holds that the

policy field is marked by competing advocacy coalitions that are determined on the

basis of shared beliefs about the policy area.

Although it is part of the 'policy network' literature, ACF approaches

networks completely differently. As Paul Sabatier (1993) describes it:

"The advocacy coalition framework (ACF) has at least four basic premises: (1)
that understanding the process of policy change — and the role of policy oriented
learning therein — requires a time perspective of a decade or more; (2) that the
most useful way to think about policy change over such a time span is through a
focus on "policy subsystems," that is, the interaction of actors from different
institutions who follow and seek to influence governmental decision in a policy
area, (3) that those subsystems must include an intergovernmental dimension, that
is, they must involve all levels of government (at least for domestic policy); and,
(4) that public policies (or programs) can be conceptualized in the same manner as
belief systems, that is, as sets of value priorities and casual assumptions about how
to realize them" (16).

ACF is characterized predominantly by its emphasis on ideas and values in

the policy process. This framework assumes that the structure of beliefs systems is

at the center of understanding policy and its actors. Beliefs systems have three key

elements: deep core beliefs, near core beliefs and secondary aspects of beliefs.

Deep core beliefs consist of fundamental axioms about human nature and priorities

among values. These beliefs are very difficult to change through policy arguments.

Second, near core beliefs center on the distribution of power or authority and one's policy position on substantive conflicts. These beliefs are difficult to change but may respond to information changes. Third and final, secondary aspects of beliefs comprise fiscal allocations, interpretations of policy, and administrative rules: all of which are comparatively easy to shift or change.

The ACF framework for policy change is made up of four components; stable parameters which do not change easily, external events, constraints, and policy subsystems consisting of the coalitions and policy brokers. Coalitions are "composed of people from various government and private organizations who share a set of normative and causal beliefs and who often act in concert" (Sabatier 1993, 18). The framework is interested in "policy oriented learning" (Sabatier 1993). "Most changes in policy subsystems occur because of external shocks, but instrumental learning is important, especially if the goal is better public policy" (Pal 1997, 207). ACF is an useful framework for mapping out the players, issues, and debates in a policy subsystem. It includes ideas, values and the impact of scientific expertise on a policy system. Coalitions "get around the more rigid and insular conceptualizations in the network literature that divides subsystems into decision makers and attentive, but important, publics" (Pal 1997, 207). In the case of the Great Lakes ACF is appropriate since there is only one identifiable policy broker, the IJC. As well there are only two coalitions around the broad ecosystem approach to environmental health issues and a relationship of patterns between

coalitions would be limiting for this analysis. Most important for this research are

the questions of why and how this policy subsystem communicates environmental

health through policy.

In the Great Lakes policy subsystem the stable factors (that remain the

same for the duration of the policy of inquiry) are the nature of water quality as

a collective good, the geographic constraints of the Great Lakes Basin, the

political boundaries, and the legal structures upon which the Great Lakes policy

process is reliant. Dynamic factors are the socio-economic factors of the Great

Lakes region, the governing coalitions, and the policy domain within which the

coalitions function. Interests may change according to these dynamic factors

through a reassignment of the power structures within society, individual

material circumstances, or changes in role assignments.

With reference to ecosystem health in the Great Lakes policy process,

beliefs center on the multitudinous causes of ill-health, that can often paralyse

social and political responses. It has been found that "...the ambiguous

evidence and ill-formed problem definitions that lead to this diversity of

interpretation create disparities and tensions across these institutions" (Linden,

1994, 167). Untangling the policy-system web according to coalitions can help

explain the basis of these tensions.

Advocacy coalitions are the result of "people from a variety of positions

(elected and agency officials, interest group leaders, researchers, etc) who share

a particular belief system and now show a non-trivial degree of coordinated

activity over time" (Sabatier & Jenkins-Smith, 1993, 25). The assumptions that

underlie our beliefs reflect our fundamental value of how things "ought" to be

(Lomas 1990). In contrast to beliefs, our ideologies are difficult to resolve and

are non-testable. Considering the ecosystem health framework, the

International Joint Commission acknowledges how people's fundamental (deep)

values are affected by this perspective.

"Ecosystem health internalizes human well-being as part of the environment,
while a human health focus internalizes environment for industry and
community well-being. The strength of the metaphor or paradigm is clear.
Ecosystem health sees humans as integral parts of nature. The metaphors
resonate strongly with core values about ourselves, our identity and our place in
the world" (IJC 1995, 79).

The Great Lakes policy system is an excellent example of how advocacy

coalition frameworks can help our understanding of environmental health policy

processes. The advocacy coalitions present informal structures for decision-

making that are dependent upon the interplay of ideologies, interests, and beliefs

to formulate and implement policy. As Weiss (1983) states, "where you stand

on a situation depends on where you sit" (237) and where you sit involves the

societal structures to which you are expected to abide and the values that you

hold.

2.5 Conclusion

This chapter bridged the gap between the study of language and the study of policy. Considered together, language and policy, form a powerful body of knowledge around understanding the importance of policy text in constructing a policy analysis. A framework is created by looking beyond language as a structured linguistic system and towards a social semiotic system of multiple meanings and interpretations. This overlaps nicely with the framework of an interpretive policy analysis whereby 'meaning' is the central tenet of teasing out the many assumptions and values within a policy subsystem.

This thesis is an investigation into the policy process of an environmental health context. Thus this literature review presented an understanding of the social construction of science and health. The social forces at play in an environmental health context stem from society's beliefs about science and conceptualizations of health and the environment. The next chapter will build on this foundation formed in the literature review by detailing the design and method of analysis that will be used.

CHAPTER THREE: RESEARCH DESIGN
Integration of Methods

3.1 Introduction

As the literature review illustrated, understanding the policy world is made complex by multiple interpretations and meanings. A research design matching the depth of investigation needed is one that draws on the multidisciplinary tools of medical geography, sociology, political science, and epidemiology. This research combines three methods of analysis; frame analysis, semiotic analysis, and interpretive policy analysis.

Cresswell (1994) identifies five purposes for combining research methods in a single study: triangulation to seek converging results, complementarity for overlapping facets of phenomena, developmental to help inform one method by another, initiation for contradictions and new perspectives, and expansion to add scope and breadth to a study. Triangulation is the convergence of multiple perspectives for cross-checking data and interpretation (Krefting, 1990, 219). Triangulation is used to assess the trustworthiness or merit of the qualitative inquiry. To understand the complexity of policy making in an environmental health context, the triangulation of methods provides an opportunity to investigate all three elements of policy (interests, ideas and information) together. Although the

interaction between interests, ideas and information is constant and iterative, it is useful to investigate each element separately before putting the three together to see how they affect policy. This study will layer three methodologies to provide a thick description of the policy learning process that has occurred in the Great Lakes over the last 30 years.

This chapter is organized in three sections: interviews, documents and analysis. Section 3.2 will present the details of the participant selection process. Section 3.3 will present the interview process. Specifically, the design of the interview checklist will be linked to the four research objectives for this thesis. Section 3.4 will present the rationale for document selection. Section 3.5 presents the qualitative analysis methodology of this thesis by detailing the thematic, semiotic and frame analysis undertaken using the interview and document data. Table 3.1 identifies the data sources used and their connection with the plan for analysis. Interviews, documents and networking within the Great Lakes stakeholder community provide the three data sources for this study.

Table 3.1: Data Sources and Plan of Analysis

Data Source	n	Analysis Plan
Interviews	27	thematic analysis interpretive policy analysis
Documents	627 pages of text (10 Biennial Reports)	semiotic analysis frame analysis
	301 pages of text (7 IJC Workshop documents)	thematic analysis interpretive policy analysis
Networking	2 IJC Biennial Meetings 6 conferences and workshops	interpretive policy analysis context building

3.2 Participant Selection

Participants were selected on the basis of their affiliation with specific

stakeholder groups in the Great Lakes policy system: International Joint

Commission (IJC), Environmental Groups, Government, Native Community and

Academia. Participants were also selected from both Canada and the United

States.

Participants were selected for two sets of interviews; one set of initial

contacts from different stakeholder groups were conducted to familiarize the

researcher with the Great Lakes policy network, and the other set of interviews

with key informants were to establish an information-rich case for this study

(Patton 1990). The first set of interview participants were selected using a

"purposive sampling procedure" (Patton 1990, 169) beginning with a member of

the IJC Windsor who was known to a research colleague at McMaster University.

Other contacts were made by attending the Seventh Biennial IJC Meeting in 1995.

Participants were considered suitable for interviewing by fulfilling two criteria.

First, they had to currently be a member of an IJC advisory committee. Second,

they had to represent different stakeholder groups or positions within the Great

Lakes. Table 3.2.1 details the number of initial interviews conducted by

respective affiliation and country. A total of 8 initial interviews were conducted

from October 1994 and February 1996. All eight participants agreed to an

informal interview. The initial interview participants are listed in Appendix A with

an asterisks beside their name. The principle purpose for selecting these

participants was to determine who the key informants would be for this study.

Table 3.2.1: Initial Informal Interviews Conducted (#)

Contact Groups	Canada	United States
IJC	1	1
Environmental Groups	3	0
Government	1	0
Industry	1	0
Native Community	0	0
Academia	1	0
Total	7	1

A list of 58 potential key informants (see Appendix B) resulted from the

co-operation and expertise of the initial interview participants and networking

done by the researcher at various conferences, meetings and workshops (see Table

3.2.2 for a list of network building done by the researcher). Table 3.2.3 identifies,

by location and key informant group, the number of participants originally

identified for participation (n=58) and those included in the final sample (n=27).

Further, Appendix A identifies the key informants by name.

Table 3.2.2:   Network Building: Meetings, Conferences and Workshops Attended by Researcher

Date	Network	Sponsor
September 1995	Seventh Biennial IJC Meeting Duluth, Minnesota	International Joint Commission
1996	Workshop on Social Science Approaches to Environmental Health in the Great Lakes Ecosystem Hamilton, Ontario	Environmental Health Program, McMaster University Great Lakes Health Effects Program, Health Canada
May 1997	Health Conference Great Lakes/ St. Lawrence Montreal, Quebec	U.S. Agency for Toxic Substances and Disease Registry Health Canada
May 1997	Meeting of the Working Group on Ecosystem Health Burlington, Ontario	IJC Science Advisory Board
November 1997	Eighth Biennial IJC Meeting Niagara Falls, Ontario	International Joint Commission
February 1998	International Association of Great Lakes Research Symposium	IAGLR
June 1998	GLU public hearings Hamilton, Ontario	Great Lakes United
October 1998	State of the Lakes Ecosystem Conference Buffalo, New York	Environment Canada U.S. EPA

Table 3.2.3: Solicited and Actual* Key Informant Interviews (#)

Key Informant Group	Canada		United States		Total
	Solicited	Agreed	Solicited	Agreed	Agreed
IJC Staff	5	5	2	3**	8
IJC Commissioners	3	1	4	0	1
Environmental Groups	8	4	5	2	6
Government	10	4	8	2	6
Industry	2	1	2	1	2
Native Community	1	1	1	1	2
Academia	5	1	2	1	2
Total	34	17	24	10	27

* actual informants includes the 7 initial contacts made (see Table 3.2.1)
**2 American IJC Staff agreed to an email interview only

The reason given by the thiry-one potential participants who declined to be interviewed included being too busy (15), not interested in participating in a research study (5), not available because retired or on leave (4), questioned the use of the data after the interview would be conducted (5), and simply never returned the researcher's many calls (4). Two potential participants who declined to be telephone interviewed because they questioned the use of the data did agree to a structured electronic mail response to a faxed copy of the question checklist. In all cases, respondents agreed to be cited by affiliation to organization only and

their names are left out of the text of this thesis but included in the citation list

(Appendix A and B).

3.3 Interviews

All interviews were conducted by the researcher. Initial interviews were

conducted over the period from October 1994 to February 1996 either face-to-face

(5) or via telephone (3). Each interview was between 90 and 180 minutes in

length. The initial interviews took the form of "informal conversational format"

(May 1993) around general topic areas. This format was used to allow the

informant the opportunity to pursue ideas on their own terms, using their own

language. The areas of discussion were as follows: area of interest and work in the

Great Lakes, environmental health issues around the Basin, the International Joint

Commission, and specifically who the key players were in the policy system. With

the permission of the respondent, interviews were tape recorded and transcribed

verbatim and entered into NUDIST, a qualitative software package.

Since each of the initial informants had considerable knowledge and

understanding of the Great Lakes community, specifically the policy arena, these

informal conversations allowed the researcher to gain access into this domain with

little difficulty. In fact, consistent contact remained between one informant in

particular at the IJC for the duration of the study and proves to be an invaluable

gatekeeper to knowledge and understanding of the Great Lakes. Gilchrist (1992)

argues such a special bond between researcher and informant is necessary for developing a valid account of the processes learned through the research.

The second set of interviews, 19 in total, were conducted face to face (11), via telephone (6), or via electronic mail (2) from November 1997 to April 1998. Each interview took from two to three hours to carry out. The interview took a "semi-structured" format (Miller & Crabtree, 1992). A standardized open-ended interview checklist was used (see Appendix C). The checklist was constructed to explore five main topics: 1. Contributions to the Great Lakes policy process (what are the issues, the policy process and their role in this process), 2. The role of science vis-a-vis other factors in Great Lakes decision-making, 3. The connections between environment and human health in Great Lakes policy making, 4. The effect of the IJC on the policy process, 5. differences in the way the American and Canadian systems are set up to deal with environmental health issues that arise in the Great Lakes. Table 3.3 links the checklist questions (and their constructs) with the four objectives of this research and the elements of the conceptual framework presented in section 1.5.

Table 3.3: Link between research objectives and research design

Checklist Questions	Constructs	Framework (2.5)	Research Objectives
1	context	strategy	1a
2	context	strategy	1a
3	context	strategy	1a
4	influence/contribution	Values	1a
5	fact-knowledge	Values	1a
6	influence/contribution	Values	1a
7	IJC documents	Frame	2a,
8	agenda setting	Frame and Science	1a, 1b
9	fact -knowledge	Science	1a, 1b
10	agenda setting	Science, truth	1a, 1b
11	influence/contribution	Strategy and Science	1a, 1b
12	binational dimension	Structure	1a, 2b
13	context	Link I-I-I*	1a
14	IJC	Policy Outcome	1a, 2b

* link between Interests, Ideas, and Information

Further interviews were not conducted beyond the total 27 because the

sample was deemed adequate due to data saturation. Data saturation refers to the

point at which the researcher feels they have achieved "the same (or similar)

information on repeated inquiries" (Leininger, 1994, 106). For this study, data

saturation resulted from consistency among informants in providing information

that linked their views with those of other stakeholders. Informants were

extremely knowledgeable about the small community of policy makers and

decision makers in the Great Lakes and were able to offer several linkages of views

similar to their own and of views that differed. In cross-checking the interview

responses to questions, the data had become linked together around the issue of

policy making processes. This is not to say that there is no room for further

learning because there is still much to learn and investigate. However within the

confines of a doctoral time line and set of research objectives, the data became

saturated after 27 interviews.

3.4 Documents

In accordance with research objective 2a, documents were selected that

communicated Great Lakes issues to policy makers. The original Great Lakes

Water Quality Agreement of 1972 and its revisions in 1978 and 1987 were the first

to be selected because they form the basis for the IJC's involvement in the Great

Lakes. All ten IJC Biennial Reports (totally 627 pages of text) from 1982 to 2000

were included since they represent the most comprehensive summary of the

priorities and recommendations to policy-makers. The Biennial Reports provide

the advice of the Great Lakes Water Quality Board, Great Lakes Science Advisory

Board, and the Council of Great Lakes Research Managers. The Biennials were

selected as the sole focus of the frame analysis and semiotic analysis based on the

importance the stakeholders place on them in the policy process. As part of the

interview, stakeholders were asked if they consider the Biennial Reports to be one

of the most important documents in terms of making policy or decisions in the

Great Lakes? All respondents answered yes. In fact the Biennials' importance

was grounded in its inclusion of public input. This inclusion of the public

separated the Biennials from being just another report to inform policy makers on

the Great Lakes. The IJC Biennial meetings frame the Great Lakes issues for

policy makers. They set the tone and persuade decision makers in setting agendas

and implementing policy. For stakeholders the Biennials:

- "... tended to be a focus of the debate. So I think they've played an important role in moving environmental policy along" (IJC Ottawa).
- effective tools in "precipitating the political debate" (IJC Windsor)
- "historically they have been very important in highlighting the key issues in moving the governments towards action and commitment" (Great Lakes Research Consortium)
- "push them [Parties] towards their goals" (Environment Canada)

The International Joint Commission libraries in Ottawa and Windsor were

explored to identify reports or documents that represent attempts by the IJC to

persuade policy makers and non-expert readers about Great Lakes issues.

However none were as widely used and distributed as the Biennial Reports. In

accordance with this study's objectives, which center on IJC practice, reports were

excluded on the basis of not fitting within the agenda of this research. Excluded

from this study's frame and semiotic analysis are: specific strategy reports, reports

that do not represent the collective views of the International Joint Commission,

preceeding literature from meetings or workshops held in the Basin, reports that

deal with issues other than water quality (such as air quality), assessment reports,

opinion reports, scientific papers, and RAP or LAMP reports. The interviews

substantiate this decision to focus solely on the Biennial Reports. A justification

for using the Biennial Reports is fleshed out in chapter five when the analysis of

the reports is coupled with the interview data.

3.5 Qualitative Analysis

Three methods of qualitative analysis were utilized for this study: thematic

analysis, semiotic analysis and frame analysis.

3.5.1 Thematic Analysis

All twenty seven interviews were tape recorded, transcribed and entered

into NUD.IST, a qualitative data management computer program. The data were

coded by the researcher. In an attempt to cross check the coding and

interpretation of codes, three transcribed interviews were given to another

researcher to code. Codes were then checked for clarity and consistency in

meaning and similarities in data theme analysis. Coding was consistent on 90% of

codes between both researchers. This high consistency among codes was due

primarily to strong connection between the research objectives and the checklist of

questions. Thus both researchers were looking for similar theme structures. The interviews chosen for cross-checking were from participants that were experienced with being interviewed. The result of all the coding was a total of 119 codes.

Member checking was done by email and fax to all the participants to allow participants the opportunity to check that the interpretation of data was valid (see Appendix D for a copy of the letter sent). Each participant was given the opportunity to read the transcript from their interview and/or read the empirical chapters of this thesis. Only one participant requested to read the transcripts from their interview and all others agreed to let the researcher's interpretation of the results stand without further interaction.

Data were organized according to 4 predetermined theme areas: institutional structure, science and policy, role of science and human health. The 119 codes were created in NUD.IST as they emerged from the data within each branch of analysis. Appendix E shows a copy of the NUD.IST output for all codes. A total of 20110 lines of text were collected and analyzed. Each of the four over-riding Nudist theme areas correspond to a layer of analysis within the research. The institutional structure data are the first layer of the interpretive policy analysis using an advocacy coalition framework. The data from the human health area are the second layer of analysis done through a frame analysis and a semiotic analysis. The third layer of analysis pertains to the role of science and includes an in-depth look at the data around science and policy and the role of

science. The thematic analysis thus forms the basis for all further investigations and triangulation of these three layers of analysis. It provides the foundation of knowledge to advance understanding of policy making within the Great Lakes case study.

3.5.2 Semiotic Analysis

For this study a semiotic analysis includes the development of a schema to be used in guiding an analysis of text (policy) and intertext. Since "a policy reflects the context in which it was formed", its language can be considered a map to understanding why a policy issue is envisioned and framed in a particular way (Torgerson 1986). To 'frame' a policy is to make explicit assumptions regarding what the issue is and what is considered the solution or intended form of action. This analysis uses the Great Lakes Biennial Reports as a text to decipher environmental health policy language in all its complexity of codes and meanings. This section deals with three points; first, the use of semiotics in analyzing consensus documents; second, the limitations in analyzing language; and third, formal development of a schema for semiotic analysis.

IJC Biennial Reports are the result of a consensus between a diversity of stakeholders making assignment of 'authorship' difficult. The resulting policy reflects the reconciliation of different interests, beliefs, and ideologies about what problem exists and how they should be addressed (Sabatier 1993). The limitation

of science in establishing unequivocal links between environment and health presents a major difficulty in decision making. In light of the uncertainty surrounding environmental health debates, a consensus is formed on more than facts; since facts and values cannot be separated (Stone 1988). Although, this is the case with all policy domains, it is more clearly the case for low level environmental exposure such as biological contamination of drinking water versus for a high level exposure such as an industrial accident. The semiotic schema must uncover the storylines that connect the facts and values. The schema must bring forth the stable assumptions that lay beneath their consensus. Recall Yanow (1992) argues that despite a policy's intention to provide a univocal position, its symbolic nature holds it to multiple interpretations. The need for an analytic tool to uncover policy meaning in light of its multiple interpretations underlies the importance of focusing on language in the analysis of policy.

It is clear that judgements are being made throughout the policy process. The outcome cannot be based on facts alone, since the facts may all be interpreted differently (mean different things to different stakeholders). Those with a vested interest, or something to gain from a fact, will advocate and interpret the problem differently than someone sitting in a defensive position, having something to lose. How these differences are reconciled are reflected in the language, the policy, that is produced.

For example, Great Lakes policies have used a storyline that asserts

individual action for the collective good. This has been couched in the Great

Lakes Water Quality Agreement (1992) philosophy that, "what we do to the Great

Lakes, we do to ourselves and to our children." Individual action for collective

good is a difficult motivating factor when differences in self-interests and beliefs,

identify different causes to a problem (Stone 1988). It is understandably hard for

people to bear private costs for the collective good. However, appeals to

protecting human health (ours and our children's), through the ecosystem health

framework, is an effective linguistic tool for attacking interests and provoking

reaction. Ecosystem health appeals to self interest by implying a human health

focus rather than acting to protect the health of the entire ecosystem. This example

illustrates the power of language to reveal the nature of stakeholder positions in a

policy process. This investigation then will reveal the assumptions and values that

frame they way a problem is considered by the different stakeholders. It is an

effective approach to policy analysis whether for theory or practice because it

makes tangible and manageable the problems that seem unresolvable (Roe 1994).

By understanding how the policy "means" in the context of the social processes

that went into creating it, implementation and action are better understood.

A semiotic analysis can also examine how power is distributed in a policy,

specifically the use of metaphors to create particular visions of the world. "When

we signify things through one metaphor rather than another, we are constructing

our reality in one way rather than another" (Fairclough 1992, 194). The power in

this ability of language lies in the fact that the metaphor carries with it already established associations of contextual importance. For example, ecosystem health is a metaphor used by Great Lakes policy to mobilize political action. Parallels are being drawn between the absence of disease defining humans "health" and the subsequent absence of degradation defining ecosystem's "health" (Ross et al. 1997). Human health concern is then transposed to ecosystems.

Of course "analysts are not above the social practice they analyse; they are inside it" (Fairclough, 1992, 199). As beings of our own analysis in which language is used to analyse language, interpretive and analytical limitations must be confronted. To compensate for these limitations the analysis undertaken in this research addresses both text (the written form) and intertext (the factors shaping our understanding of the text). Fairclough (1992) concurs that this coupling of text analysis and intertext analysis (disclosing power relations) is effective in overcoming these analytical limitations. An analysis of text and intertext provides a tool with which the social world (as a universe of symbolic exchanges and artifacts) can be deciphered (Bourdieu, 1991, 37). This challenge of constructing or deconstructing the social world through the texts that represent it is multifaceted as "...the meaning of words and the wording of meanings are matters which are socially variable and socially contested, and the facets of wider social and cultural processes" (Fairclough, 1992, 185). This

analysis thus attempts to decipher the environmental health policy language in

its complexity of codes and symbolic artifacts in Great Lakes Biennial Reports.

Text analysis centres on the structural and systematic qualities of a text

in that it aims to establish an understanding of the technical and grammatical

aspects of writing. Beyond this rigorous evaluation of written material is

intertext analysis that grounds meaning, interpretation, and cognition of text as

communication. As the "ambivalence of text", an intertext analysis captures the

structures and practices that shape our dynamic social world by highlighting the

uncertain interpretations of text (Fairclough, 1992, 104). Together, text and

intertext present a full picture of policy by addressing the presentation, context,

and implications of a text.

Semiotic Schema

Figure 3.5.2 is the semiotic schemata designed for the investigation of

text and intertext, adapted from Iannantuono and Eyles, 1997. It involves six

major components: communication of environmental health system, units of

analysis, formal analysis, comparisons, penetration for text, and perspectives.

The six components of the schema and their respective sub-components are

based on semiotic properties provided by Manning (1987). The semiotic

principles have been particularized for environmental health text analysis.

The communication of "environmental health" system demonstrates how

`environmental health' is communicated to people and the channels through which its communication is presented in text. It has five subcomponents, namely (i) *affective symbolism*, i.e. symbolism within the text that affects the orientation and general emotion of environmental health communication; (ii) *shared values*, i.e. values shared by the public about environmental health communication; (iii) *orientation of contact, outline problems*, i.e. a system of contact displayed in the text about the communication of environmental health systems; (iv) *metalinguistic (social) aspect*: the social aspects of language in text that lets people know what code is being used to communicate environmental health concepts; and (v) *shared understanding of codes*, language used to let people know what code is being shared in the communication of environmental health.

Secondly, the units of analysis are the modes within the text used to identify the meanings of environmental health. It has two subcomponents, namely (i) *codes*, the set of signs and rules within the text that are required to understand the meaning of environmental health. They are often not explicitly visible to the reader and unconsciously constructed through culture; and (ii) *mode of syntagms*, the language used to identify environmental health (syntagm is the new text resulting from the combination of text elements (see Leeds-Hurowitz 1993). For example, the syntagm "environmentally benign" combines

a human health attribute of relief from tumors to the environment. This type of combination presents a new text that enables us to conceptualize the environment in a new way and broaden our perspective on health.

Thirdly, formal analysis represents the semiotics of environmental health text. It has four subcomponents, namely (i) *paradigms (associational contexts)*, the context used to understand the syntagm identifying environmental health; (ii) *rules of generalizations*, cultural in nature, the rules used to conceptualize environmental health in text; (iii) *constitutive conventions*, when one meaning rests upon another meaning and allows a set of signs to be understood; and (iv) *themes*, recurring concepts and understandings throughout the text that may include metaphors relating to environmental health.

Fourthly, comparisons allow the cross-checking of environmental health policy language to establish meaning. There are three subcomponents, namely (i) *patterns (cognitive clusters) of thinking*, ways of thinking about environmental health policy problems; (ii) *link to assumptions*, assumptions about roles and tasks within a society for dealing with environmental health policy problems, and the assumptions of interpretation perspectives; and (iii) *signifiers and signified*, elements of signification in environmental health policy language such that, the signified is dependent on the context or perspective.

Fifthly, the penetration of text points to an understanding behind the

language. It has two elements, namely (i) *surface versus underlying meaning*, comparing what words are denoted in the text with their connotative (not necessarily universal) meanings adapted from Iannantuono and Eyles, 1997.; and (ii) *semiosis in meaning*, changes throughout the text in meaning or conceptualization of environmental health. Finally, perspectives refer to different points of view within society about environmental health. There are three subcomponents, namely (i) *shared rules, cultures*, underlying rules which make the issue of environmental health universal across cultures; (ii) *action implementation*, perspectives taken regarding responsibilities for action; and (iii) *context*, knowledge or a level of understanding assumed by the language which is not explicitly verbalized in the text. The application of this schema will be seen in chapter five. All six components and their respective sub-components will be identified and analysed for the Biennial Reports.

Figure 3.5.2: Schemata design

1) **Communication of "environmental health" system**: how environmental health is communicated to people and the channel through which its communication is presented in text.

    i) *affective symbolism:* affect the emotion of communication

    ii) *shared values:* values shared by public about environmental health communication

    iii) *system of contact:* approach method

    iv) *metalinguistics:* social aspect used by text

    v) *shared understanding of codes:* how are codes revealed in communication of environmental health

2) **Units of Analysis:** the modes within text used to identify the meaning of environmental health

    i) *codes*: signs and rules needed to understand meaning of environmental health

    ii) *mode of syntagms*: new text

3) **Formal Semiotic Analysis:** semiotics of environmental health text

    i) *paradigms* (associational contexts): context used to understand syntagms

    ii) *rules and generalizations*: cultural context that affect conceptualization of environmental health

    iii) *constitutive conventions*: one meaning rests on another

    iv) *themes:* recurring concepts and understandings

4) **Comparisons:** cross-checking of environmental health policy language to establish meaning

    i) *cognitive clusters*: ways of thinking about environmental health policy problems

    ii) *link to assumptions*: assumption of roles and tasks within society

    iii) *signifier and signified*: signified is dependent upon the context

5) **Penetration of Text:** understanding behind language, textual implications

    i) *surface versus underlying*: text with connotative meanings (not universal)

    ii) *semiosis in meaning*: changes throughout text of meaning of environmental health

6) **Perspectives:** different points of view within society about environmental health

    i) *shared rules, cultures*: rules which make the issues of environmental health universal across cultures

    ii) *action implementation*: responsibilities for action

    iii) *context:* level of understanding assumed by language

3.5.3 Frame Analysis and Policy Frames

"Understanding how policy problems are defined and how they may or may not provoke policy responses is critical to understanding environmental policy making" (Fiorino 1995, 165). As Colebatch (1998, 11) argues policy "labels what we see so that we can make sense of it in a particular way". Yet the structure (such as the framing) of policy problems is "the most important but least understood aspect of policy analysis" (Dunn 1981, 98). The structure, otherwise referred to as the frame, is most important because solutions or answers to problems are dependent upon the definition of the problem. Frame analysis is a method that can be used to expose problem definitions (and assumptions) and thus the basis for setting problem solutions. As Entman (1993) articulates, framing is an interpretive policy analysis process that serves four functions; to define a problem, to diagnose causes, to make moral judgements and to suggest remedies. In all these functions, the identification of frame salience is found whereby one piece of information is made more noticeable, meaningful or memorable to audiences, resonating with a particular system of belief (Entman 1993). Through emphasizing values, frame analysis emphasizes the underlying assumptions of policy positions.

Frame analysis can thus be a way of isolating problem definition and suggested actions through explaining facts, values, and context through identifying core linguistic concerns/prompts. To understand frames is thus to understand

social reality (Goffman 1986). "The social world is ... a kaleidoscope of potential realities, any of which can be readily evoked by altering the ways in which observations are framed and categorized" (Entman 1993, 232). Policies depend on their framing to create a vision of the world.

The manner in which a policy is framed influences the "shaping of laws, regulation, allocation decisions, institutional mechanisms, sanctions, incentives, procedures, and patterns of behaviour that determine what policies actually mean in action" (Schon and Rein 1994, 32). Thus policy frames carry important consequences throughout the polity and civil society. Frames, through their tacit and explicit constructs, reveal the underlying structures of belief, perception and appreciation. In sum, "a policy frame is the frame an institutional actor uses to construct the problem of a specific policy situation" (Schon and Rein 1994, 33). Frames can take on two forms: rhetoric or action. Rhetorical frames are "frames that underlie the persuasive use of story and argument in policy debate" (Schon and Rein 1994, 32). Action frames are "frames that inform policy practice" (Schon and Rein 1994, 32). In the analysis of the Great Lakes picture, both of these levels of policy framing exist. In fact, it is possible to identify frames within the policy process through an understanding of factors that re-frame and reflect on the present process.

Figure 3.5.3 depicts the connection between narratives (the story as manifested in the reports), frames (the exposed values and assumptions for action -

Figure 3.5.3 Fitting Frames Within the Policy Process
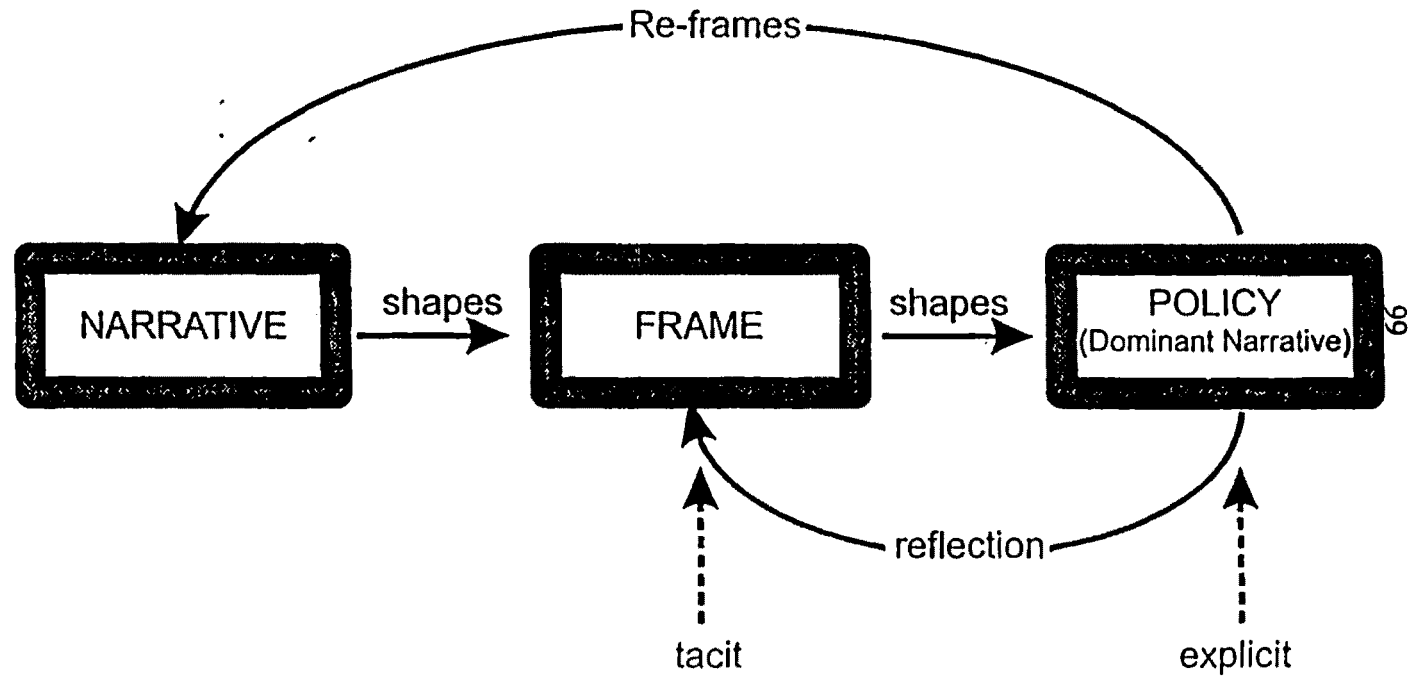
a tacit commitment) and the policy (the actions to support particular beliefs -an

explicit commitment). These two levels of policy framing resonate with Sabatier's

(1997) discussion of deep core beliefs and secondary aspect of belief systems;

wherein he asserts that deep core beliefs are resistant to change and that secondary

aspects "are assumed to be more readily adjusted in light of new data, experience,

or changing strategic considerations" (1997, 8) (see Chapter 2) From the frame

analysis of the biennial reports it can be seen that the rhetorical frame (of

ecosystem health) is established early in the policy making process with the

revision of the GLWQA in 1978. A rhetorical frame of ecosystem approach

provides the consistent unifying backdrop for decision-making in the Great Lakes

through shared metaphors and discourse. This backdrop suggests that there is an

underlying philosophy to how decisions are made. Moreover there are two action

frames that encompass all the biennials: first, managing ecosystems; and second,

changing human behaviour. These two action frames depict the two styles in

which the ecosystem approach are interpreted in praxis. For example, the early

biennials recommend action on the basis of managing levels of toxins entering the

water system as opposed to a recommendation of changing our use of the water

system due to its contamination.

Action frames change in response to the gradual accumulation of evidence

and highlight the trend for recommendations developed throughout each biennial.

Commitment to action frames is more strategic than to rhetorical ones, which

represent many value positions. Yet frames do change -- a situation of "re-framing" (Schon and Rein, 1994). This notion concurs with Roe's assertion that policy reaches an "analytic tip" which can be conceived metaphorically as the gradual accretion of negative feelings toward conventional categories of analysis until a critical moment or period arrives when analysts seem to abruptly abandon their conventional terms and switch over to newer ones" (Roe 1994, 120). This tip or reframing results in the formation or creation of a new policy frame to deal with a new conceptualization of an issue. The tip does not occur suddenly in the policy world -- it may take years or even decades (Sabatier 1987). Further a "policy may be re-framed as a result of cumulative, incremental adaptations to a changing situation" (Schon and Rein 1994, 35). The tips or reframings will be explored in the Great Lakes policy process in Chapter 5.

3.6 Conclusion

This research involves 27 in-depth interviews and the formal analysis of 627 pages of text. The thematic analysis of these data are used as the foundation for both the text, intertext, and policy analysis. The analysis is thus based on an interconnection of three methodologies all investigating the process of policy making in the Great Lakes. This chapter put forth a unique research design that incorporates frame analysis, semiotic analysis and interpretive policy analysis. Together these three analyses tell a rich story of the policy making process in the

Great Lakes. The advantage of this combination is the merit it brings to the inclusion of language (and meaning) into policy endeavors.

In accordance with the conceptual framework and research design the following three chapters will investigate the respective strategies, frames and science of decision making in the Great Lakes.

CHAPTER FOUR: STRATEGIES FOR DECISION MAKING
Great Lakes Interests

4.1 Introduction

Chapter Four is the first of three empirical chapters in this thesis. This chapter presents the findings of the interview data around strategies for decision making. The Great Lakes policy system is structured around an 'ecosystem health' framework for addressing problems and issues. This chapter develops an explanatory policy analysis to explain why the policy process takes the form it does, not merely how it does this. Determining "why", this chapter uses the advocacy coalition framework, set forth by Paul Sabatier (1987, 1993) and Jonathan Lomas (1988, 1993), to construct a useful and powerful explanatory environmental health policy analysis. This framework allows the institutional structure for decision-making and the values of Great Lakes stakeholders to emerge to explain why human health has been given a high priority within the Great Lakes ecosystem.

Section 4.2 highlights the stakeholder's viewpoints on working together across political boundaries. Views of the Great Lakes Water Quality Agreement (GLWQA), binational co-operation, and the role of the IJC are presented. Section 4.3 delves into the values that underlie the Great Lakes decision making

process. It presents the dominant themes that emerged from the interviews with Great Lakes stakeholders. An advocacy coalition framework is used to lay out the stakeholder positions within an ecosystem approach to policy. This chapter concludes by unpacking our understanding of the strategies of decision making in the Great Lakes.

4.2 Canada and the United States Working Together

Managing the Great Lakes ecosystem involves more than a willingness on the part of Canada and the United States to work together. It involves an understanding of the challenges of working with two different political structures and value systems about environmental health issues. The purpose of this section is to present the viewpoints of the key players in the Great Lakes about 'working together' within an international context. This section will present the stakeholders' views on the GLWQA, bi-national co-operation, and the role of the IJC. Most interesting is the viewpoint of each stakeholder about this bi-national co-operation. They speak with pride about this collaboration between countries. However in practice they are frustrated by the differences in approaches to science, politics, and economics.

From a Canadian perspective, the dominant image is the dedication to environmental integrity. For Canada, working together means showing the

U.S. what it can do in this regard and hoping to inspire change. The following

quotes reflect this philosophy of what 'working together' means.

"Well I think the contribution that I see that we make is that it's bringing a
concerted Canadian position to the Canadian government position, and then
allowing us to take that concerted Canadian position to deal with the Americans.
...the whole objective of this is really to ensure that Americans continue to
work because that's where the majority of the problems are. For us to do that
we have to have clean hands. We have to be seen doing what we can do. And
to a certain degree we tend to be leaders in that regard because of that. The
concepts of looking at results, defining targets and schedules. Those kinds of
things have come out on the Canadian side of how we deal with issues."
(Director General, EC Ontario)

From the American perspective this inspiration is noted:

"I was struck more by the parallel from the differences [between countries]. I
think the Canadians may have invested more heavily. For example, according
to some of the wildlife studies, I think they've invested more systematically in
developing some of the cancer registries that they have in place. I think they've
been at the forefront of putting money forward to address the concerns. I think
they've got a very admirable track record there" (ATSDR).

In the words of an informant at the US EPA "it's a zoo. It's very different than

the Canadian system. ... Canada's system is in some ways a lot saner. And part

of it is because our process is so driven by litigation." So it is evident that at

the policy level 'working together' is perceived as difficult. However, scientists

in both countries perceive a collaboration on a scientific level.

Formal Agreement

The International Joint Commission is the binational body established to

settle disputes regarding Great Lakes waters whether the basis of the debate

focuses on use of the lakes or pollution. The IJC is headed by 6 appointees, 3

appointed by the American President and 3 appointed upon the recommendation

of the Canadian Governor-in-Council. There are three offices: one in

Washington D.C., another in Ottawa, and a third regional office in Windsor.

The Commission is responsible for making recommendations to both

governments regarding their commitment to the GLWQA. They do this through

conferring with three advisory bodies organized by the IJC; the Science

Advisory Board, Water Quality Board and Great Lakes Managers. In theory,

GLWQA is a model of international co-operation; in practice it is a challenge to

work within its parameters.

"Is it a good enough document to essentially give governments all they need to know about how they are doing at any given time? No ..." (IJC Ottawa)

"The GLWQA is a marvelous document on paper, but I have yet to feel either country really takes it seriously There seems to be a lot of "lip service" but limited willpower to achieve its goals and purposes" (IJC Washington)

"I think it's (the GLWQA) a watershed in terms of an international or bi-national agreement. It's very unique. I think the starting with the whole series of agreements around the IJC starting with the 1909 Boundary Waters Treaty. A very forward-looking kind of treaty when you think about it. In 1909 the set up of two countries recognize that they had to share a natural resource. That they had to co-manage and set up a mechanism to do that and it served well for almost 90 years now. The GLWQA was an extension of that. It's moving beyond simply the management of the qualities of water, water flows to looking at the quality of the water and ensuring the quality and recognizing whether the IJC can help us in doing that. So I think that is again it is seen as a model around the world, of international co-operation, to manage a watershed in a

holistic fashion." (Director General, EC Ontario)

The stakeholders (including decision-makers) are riding on a political merry-go-round because they have to work between the two governments which have different politics and different ways of collecting information. It is for this reason that the IJC is pivotal in ensuring the two countries work together. The IJC is unique in its mandate of binational co-operation. Its most important role is to present Canada and the United States on equal footing with respect to Great Lakes issues. The Federal Canadian government considers this role of the IJC paramount in 'working together'. The Canadian section of the IJC concurs.

"It is the only forum where we hold an equal voice with the United States. And we should never underestimate that as a significant vehicle for a Canadian policy." (Director General, EC Ontario)

"Sometimes the IJC can be used as a vehicle for to actually get binational cooperation out there. I'm not saying bi-national cooperation isn't happening all the time and that if we didn't have the IJC it wouldn't happen, but it brings it to a more coordinated, more transparent level than individual scientists talking to individual scientists in the two countries" (IJC Ottawa)

"The one advantage the Commission gives is it gives a certain equality between the weight of those views in the discussion because Canada and the US can function equally good in the Commission. Whereas in the global political scene, of course, the US carries much more weight. It even carries more weight than every other country in the world combined." (IJC Ottawa)

"The beauty of it for Canada is the fact that even though we're one tenth the size of the United States we basically share 50% of the power in terms of setting directions for that clean up. Otherwise, you can well imagine, if it was an 90-10 kind of weight toward the Americans based on population or economic clout or whatever, you really wouldn't have much of a voice in how the Great Lakes

gets protected." (Director General, ECl)

"...in the United States the Great Lakes is kind of just like any other region or part of the country, and if there is a squeaky wheel there it will get some grease otherwise some other part of the country gets grease. And so having the Commission that can report into the State Department the and President's Office is fairly significant in terms of raising profile and clout." (Director General, EC)

Therefore from a Canadian perspective the IJC holds a critical role in leveling the playing field between Canada and the US. Canada's approach to Great Lakes issues is fundamentally about changing American processes and this is being done by setting an example that will inspire environmental action.

"If we can't look after our own backyard, how do you go to somebody else's backyard and say, Hey, come on now, clean up! " (IJC Ottawa)

"... Canadians are really lovely people and the thing they cannot stand is the prospect of having to confront the Americans about the appalling mess that the Americans have made..." (IJC Windsor)

From an American perspective, the Great Lakes issue is larger than efforts between two countries; it speaks of a global collaboration. This is reflected in the ATSDR's comment on international co-operation:

"...about the international aspect, always look outside the box as much as possible because if we look at the levels of pollutants in te Great Lakes Basin we say that there were some dramatic decline in the late 70s and on into the early 80s, but then in about the mid 80s or so we see a pulling of things such as PCBs and DDTs and maybe even at the beginning of uptake of these chemicals. And we know 90% of the atmosphere of the inputs of PCBs to Lake Superior comes through the atmosphere and the transport of PCBs into the great Lakes basin. And similarly in the case of DDT, we see there are significant levels of DDT coming into the basin from off-shore uses in the Carribean. And the fact that we recognize that pollution does not recognize geographic boundaries, just

underscored by those trends and recognition that we need to be looking at things globally" (ATSDR).

In addition when the members of the American IJC were asked about working together with Canadians it was stated: "it is the Commissioners who have the most say in what happens. ... but I suspect it is an aroused public [who really has the say]" (IJC Washington).

Working together for industry is equally different on both sides of the Great Lakes.

"My perception is that Canadian industry is heavily engaged in co-operative work with governments and with certain environmental communities to bring about real change. I don't see the same level of cooperation and effort on the US side" (Industry).

Therefore working together depends on who you are in the process and which side of the political border you sit. This is even reflected in the IJC that is set up to bridge the gap between all the 'seatings'.

Political Structure

The political structures of Canada and the United States are inherently different from a Canadian perspective and not so different from an American one. To summarize the interview data, key players on the American side of the Great Lakes appear to downplay the differences in political structures. For example, "I do not see them as significantly dissimilar. Both seem concerned

about satisfying an aroused and concerned public" (IJC Washington), "they

appear to be relatively similar" (IJC Washington), and the systems are "parallel"

(ATSDR). In contrast, Canadian interviews emphasize difference. The

following quote tells the story of Canadian and American political systems not

only being different in theory but also in practice.

"They're (the differences between Canada and the US) fairly important because
we work from a much less regulated law type regulation system than they do.
And so when you try to tackle a problem it's like when you bring your
perspective to the table unless you can explain your perspective very well to the
other group and they understand yours, sometimes it's very difficult for the two
countries to sit down and do it because either are sitting back and saying, 'well
our regulations are much stronger'. We do this to relate regulation and
therefore we're effective and if anybody breaks the law they go to jail. And we
say, that's fine and dandy, except who is enforcing it. ... As far as getting
cooperation and timeliness, Canadians believe that we're much more effective at
that. Getting cooperation and timeliness for people to do their job" (IJC
Ottawa).

        Specifically the wide ranging jurisdictional differences make co-

operation between countries a challenge with respect to implementation of

policies.

"There is certainly difference between Canada and the US, very definitely. The
differences start with their jurisdictional structures are very different. Largely,
the federal level has pre-eminence in the US and, in effect, it is those federal
laws that drive everything. They devolve or delegate to the States and
implementation of some of those, along with resources to address that. So EPA
becomes a very major player in Great Lakes' issues on the US side".
(Environment Canada)

"... and then each state has its own EPA and the states can set their own
regulations. And as long as they don't run counter to the federal regulations,

that's fine. So state for example can easily set more stringent regulations say then the federal government does" (US EPA).

In contrast, Canada has two primary levels of government involved in trying to address the Great Lakes issues. Canada has tried to overcome this challenge with the creation of a unifying 1994 Canada-Ontario Agreement (COA) Respecting the Great Lakes Basin Ecosystem. COA is a framework for uniting federal and provincial responsibilities for environmental management in the Basin. Its purpose is to aid Canada in fulfilling its obligation under the GLWQA and is currently being re-negotiated. COA combines the efforts of Environment Canada, Health Canada, Department of Fisheries and Oceans, and Department of Agriculture, the Ontario Ministry of Environment, Ontario Ministry of Natural Resources and the Ontario Ministry of Agriculture, Food and Rural Affairs.

"It's a very different game on the Canadian side because of our Constitution. Largely, environment doesn't exist in our Constitution. But it's a very much assured jurisdiction, with a very significant portion of it resting with the provinces. So the balance of who has the jurisdictional responsibility is very different. And that's one of the issues we have to deal with in dealing with across-the-border between Canada and the United States. It is why we have on the Canadian side a Canada-Ontario Agreement. It's recognizing that there is assured jurisdiction there that both have roles to play, that we try to identify a program that would try to meet the objectives of the GLWQA..." (Environment Canada)

In addition, Canada and the United States developed the Great Lakes Binational Toxics Strategy in 1995. This is a strategy for the virtual elimination

of toxic substances in the Great Lakes, so as to "protect and ensure the health and integrity of the Great Lakes ecosystem". Its framework is fundamentally a co-operation between Environment Canada and the United States Environmental Protection Agency. "This strategy reflects the firm commitment of Canada and the U.S. to better focus and coordinate existing programs toward the goal of virtual elimination of toxics" (1995 Binational Toxics Strategy). Target dates for elimination of toxins, such as DDT, PCBs, and mercury, have been set for the year 2006.

However the challenges of working within two systems is still reflected in the views of the policy makers at the provincial level. For example,

"They don't have the same approach. Their approach is different. The EPA tend to try to set the standards... kind of national standards. ... I see a movement happening in the US to have the EPA a bit more aggressively involved in trying to coordinate at the State level. To be a bit more... to follow the.. Canadian model." (Environment Canada)

This theme of the American model becoming more Canadian is common throughout the interview data. It reflects what both sides consider to be one of the largest obstacles in dealing with Great Lakes issues, the need to have a similar system within which to work.

The framework of approaching problems and solutions in this international context stems from a fundamental difference in the motivations behind each country for wanting to address Great Lakes issues.

"Another aspect is that in the United States, particularly, the way they are structured and the way their political process works, is that human health concerns play a much more dominant role in deciding on government policy direction and laws and regulation and enforcement and all of that stuff, than it does Canada.... I think the Canadian kind of social setting or the Canadian ethic or something says that yes we've got to be concerned about human health but we've also got to be concerned about our environment. So I think we tend to mobilize more quickly. We don't need a human health issue at the forefront in order to mobilize ourselves, whereas the US might more so. ... We had a heck of a time trying to mobilize the American public opinion and concern around the Great Lakes when we pitched it as, and it was a true pitch, that our lakes were dying. But when the Americans got concerned about it, they got concerned because they recognized that there were human health impacts associated with acid rain and acid mist and sulphur dioxide emissions and that sort of thing. Two different countries, two different cultures, and slightly different orientation when it comes to human health concerns. " (EC)

"... the US tends to take decisive action upon environmental issues when there's a human health trigger. And you see a slowness or reticence to take action unless that trigger is apparent, whereas in Canada we would tend to be just as concerned if we say signs of environmental degradation as we would of human health concerns." (EC)

Human health continues to be a major driver in the Great Lakes debates. From a motivating factor to an outcome predictor it holds a great deal of power within the decision making process for environmental issues. It can be argued that Canada's realization that American policy making is centred so strongly on human health for environmental issues has instigated the shift in framing Great Lakes issues to mobilize action.

'Working together' presents numerous challenges in environmental health issues. Pollution does not recognize political boundaries but policies

must. The increasing need to consider the international context for policy making has led to exercises in comparing political systems and decision making structures. "It's hard to argue which is a better system, which is a worse system because I don't know if they're really that comparable. They may all have the same end goal, but I don't know if the two approaches are really that comparable" (IJC Ottawa). Perhaps working together means trying, as Canada and the US are, to create a binational policy space where there is a clear transfer of information and co-operation on working strategies, such as the IJC, GLWQA, and Air Quality Agreement.

A common theme with respect to political structure is that of working within different modes and methods of domestic science. Science has a significant role in the decision making process in environmental health issues.

"The reality is that the domestic science in the US is very different thing than the domestic science in Canada. So we have to recognize that. But then try to coordinate our programs, our domestic programs, so that they are much aligned as possible to deliver on those common objectives. That does take some bit of effort." (Environment Canada)

"The US has more information about what's going in the lakes than Canadians do" (GLRC)

From both sides of the Great Lakes it is clear that science, particularly on evidence of toxins and human health evidence, plays a major role in setting the stage of any alliance of decision making (see Chapter 6 for elaboration).

In bringing science and policy together, the IJC plays a pivotal role in enabling Canada and the United States opportunities to work together. The IJC considers its role as one of providing networks for both sides. The IJC also understands the power of such a role beyond a self proclaimed apolitical position.

"...you're (as part of the IJC) such an influence on things but really in fact you're a major influence on the people who work together, how they work together, and the conclusions that they come up with, and how the conclusions are expressed in terms of the reports and recommendations that later go forward to the commission" (IJC Windsor).

"...it's a body that sets dimensions as opposed to actually having to implement policy. So in advising on policies and on directions it can very much set long term goals, can set conceptual frameworks" (IJC Ottawa).

"So part of the strength of the Commission is through its Boards and its ability to bring people together" (IJC Windsor).

The International Joint Commission is the single unifying component of 'working together' for policy making in the Great Lakes. It sets the stage for communication and dialogue between nations. As such its role is pivotal to fulfilling the GLWQA. The IJC sits in a powerful position between government Parties to influence the facts that matter and how they are connected to values. Values represent a fundamental element of decision making and implementation of action in the Great Lakes.

In conclusion, Canada and the United states are formally and informally

committed to 'working together' on Great Lakes issues. The IJC is critical in establishing and maintaining this commitment. Specifically the GLWQA and the Biennial Reports form a consistent collaboration between countries. However, their differences in process and perspective impact on the outcome of any collaboration.

✦

4.3 Key Stakeholders, Values, and Ecosystem Health

Ultimately, decisions regarding Great Lakes issues are shaped by those in positions of political and economic power. However, the stakeholders that contribute to the process of making those decisions are numerous. They include: Government (Ministries of Environment/Health/ Agriculture/Fisheries); Industry; International Joint Commission; Non-Government Organizations (Environmental Organizations, Interest Groups, Research Facilities); Scientists (Academic, Non-Academic); and Public (citizens of the Great Lakes region); and Native Communities.

Many stakeholders agree that the decision making process follows as much or even more informal processes as formal ones. This perception of informal decision making is held through the belief that the gatekeepers in bureaucracy (those with the decision-making power to implement policy) appear nameless and faceless to many stakeholders, invariably leading to the 'mystery' surrounding decision-making (Boardman, 1992, 116). In the Great Lakes the institutions for

decision making are many and include a large informal structure that changes the

power of the formal structures.

"The commission really can't be that ambitious in a sense. It's limited. It's like all
of the institutional mechanisms on the Lakes really. There's a whole variety of
piece-meal institutions out there,..., and a plethora of institutional arrangements
out there. And in a sense we're all kind of limited because of the Boundary Waters
Treaty and the GLWQA, all have defined the institutional response in a sense
[that] is wildly out of date. The institutional thinking kind of stumbles along.
Nobody puts much effort into it" (IJC Windsor).

Although the SAB is not a decision-making body, the advice it provides to

the IJC is an invaluable component of its recommendations to the Canadian and

American governments. Since the IJC seriously considers SAB advice when

making its recommendations, an account of the SAB activities and processes is

important. The SAB is a multi-disciplinary group of individuals serving in personal

and professional capacities to objectively consider scientific evidence surrounding

Great Lakes issues and priorities. Advice from the SAB is established by

workgroups that filter the evidence through the experiences and expertise of

members to form a consensus on their best advice to the IJC Commissioners. The

consensus is a formal structure of decision making however there are many

informal structures that branch off from this particular relationship. The IJC has

contact with its SAB members outside of the Board meetings that can impact on

the interpretation of scientific evidence. "With the infinite interpretations of what

constitutes ecosystem health by an interdisciplinary group of individuals it is

difficult to see how a consensus forms" (Canadian SAB co-chair).

Inherent to decision-making is the consideration by the stakeholders regarding what "ought" to happen under particular circumstances. Since science can only address what "is", tt alone can not answer what "ought" to happen and is therefore important for the IJC and SAB to consider a multi-disciplinary perspective in making decisions. "I think you are basically saying that scientists cannot make the decisions, the decisions involve the community" (SAB member). "Greater public awareness brings with it a call for meaningful public participation in decisions affecting the quality of the environment" (Boardman, 1992, 51). This public process grants the Great Lakes' citizens a clear voice in those IJC decisions that can affect their lives on an economic, social, political, and biological/physiological level, shown particularly at biennial meetings and in Biennial Reports.

Community involvement is considered a relatively recent learned lesson for the Great Lakes management system. It is ambiguous whether there is a direct or indirect role for the public. One major problem stems from a lack of definition around who the public is, whether it is only those interested publics involved in environmental groups, all lay persons, all citizens expert and lay, etc. It is however indisputable that there is some role to be played by the public.

"I think the circle needs to be completed. The public ultimately is the will. I think it provides the political will to accomplish. Science tells us there's a problem and maybe some of the solutions. The regulatory group and industry can tell us what is

practical that we can do, and then the public along with the politicians provide that will to have it done." (IJC Windsor).

The lens through which we view decision-making or policy-making is critical when a diversity of individuals and groups are to be assembled (Hogwood & Gunn, 1984, 20).

The interviews with stakeholders covered seven components of the Great Lakes policy process. These components are; role, main issues, policy contribution, GLWQA, human health, evidence, and international co-operation. Table 4.3.1 illustrates the different themes that emerged in these seven components for each stakeholder group interviewed. The findings help to construct a coalition framework around beliefs. interests, and ideologies. A summary of the identification of these interests, ideologies and beliefs are compiled in Table 4.3.2. Together this information forms the basis for determining the coalitions that take part in the Great Lakes policy process. These coalitions form the basis of understanding the positions and strategies taken on environmental health issues around the Lakes.

Interviews with Canadian government stakeholders show that their role in the Great Lakes policy process is one of maintaining cross-border communication, particularly in translating the science, linking the environment to human health, and maintaining an equal partnership through the GLWQA. The most important theme that emerged through these discussions was that scientific evidence is only critical

to a point in policy making and further that politics is an art. The dichotomy

between healthy economy and healthy environment is distinct in conversations with

government stakeholders as a whole. It is for this reason that government interests

can be depicted as economic and public support, and beliefs about science center

on there not being enough evidence for action.

Table 4.3.1:Themes that Emerged from the Interview Data of Great Lakes Stakeholders

	Government		IJC		Environmental Groups		Industry	Academia	Native Community
	Canada (n=4)	U.S. (n=2)	Canada (n=6)	U.S. (n=3)	Canada (n=4)	U.S. (n=2)	(n=2)	(n=2)	(n=2)
Role	cross border	reduce exposure to PTS*	epistemological concerns	timely exchange of info	protect and restore the lakes	act on the Lakes' behalf	reactive role	establish risk and benefit analysis	awareness to aboriginal people
Main Issue	sustainable development	PTS and air pollution	money	catalytic, translate science to lay public	air health, fish consumption	unstable biological system	sediments	cancer	air pollution
Policy Contribution	deal with U.S. problem, translate the science	communication of science, weight of evidence	pushing socio-economic issues	no political will, not taken seriously	socio-political process of defining policy	co-ordinate research team, multi-disciplinary institution	include industry in the consensus	health effects knowledge	policy needs to reflect the grass roots objectives
GLWQA	model	model	crucial for practical success	no human health	model	model	good, but IJC is the real model	commitment	macro picture ok, micro not

PTS = persistent toxic substances

Table 4.3.1 Continued:Themes that Emerged from the Interview Data of Great Lakes Stakeholders

	Government		IJC		Environmental Groups		Industry	Academia	Native Community
	Canada (n=4)	U.S. (n=2)	Canada (n=6)	U.S. (n=3)	Canada (n=4)	U.S. (n=2)	(n=2)	(n=2)	(n=2)
Human health	link to environment explicit now	the hook, driver for regulation	context more important than science, human health is driver	driving focus and public momentum	not directly related to Lakes alone	critical end point, more news-worthy than others	quality of life	driver of the policy process, most likely to affect change in Lakes	important for getting things done
Evidence	critical to a point, politics is an art	not important, not everything	para-mount, together common sense and evidence are the basis of policy	important to get the truth/fact about what is happening and what to do	depends on who the policy maker is	direct role in setting policy agendas through public concern	important because it is about change and change is about money	gets things done, builds a strong weight of evidence	may never see it and cannot wait
International Cooperation	equal partners for Great Lakes	both concerned with aroused public	more talking and sharing of info	no difference	Canadian piggy-backing American	bureau-cratic culture too different	industry co-op in Canada not US, money	back scratching attitude between countries	like sitting in a mud puddle and comparing mud

Interviews with American government stakeholders show similarly that weight of evidence is key to policy and scientific evidence is not the only critical factor for environmental health decision making. As human health was clearly shown to be a driver for regulation their beliefs around science are consistent with their Canadian counterparts.

Interviews with Canadian members of the IJC show that epistemological concerns are central to their perceived role in the Great Lakes policy process. Meaning they are most concerned with ways of knowing what is going on with the Lakes given the cross-border co-operation that is needed The interviews also show that they consider money to be the main issue in dealing effectively with problems in the Lakes. In fact, they say that a weight of scientific approach evidence must include common sense and a socio-political context for policy. The questions of international cooperation brought out themes of the need for more consistent talking and sharing of information between countries since the GLWQA that formally binds the two nations is crucial for operational success.

The American members of the IJC agree with their Canadian counterparts that human health is important to driving the policy process. However, there were differences in how both groups saw their contributions to policy. The American IJC identified the translation of science to the public as a main issue in the Great Lakes. The perspective that if the public is "on board" with what is happening that the Great Lakes will be taken seriously by the American bureaucrats.

The IJC as a whole hold to an ideology about what the ecosystem 'ought' to be, specifically that the ecosystem ought to be protected and maintained. This was in line with responses from the academic stakeholder groups. The IJC's responses to questions of scientific evidence and the role of human health in the policy process show that their beliefs about science in the Great Lakes are that there is not enough evidence of human health effects from environmental exposure at the present time for action. Although some members of the IJC express clear reservations about the weight of evidence around human health, collectively the themes express a need for more collaboration in research and more science.

Interviews with Canadian environmental groups show that the protection of the Lakes is at the center of all endeavors in Great Lakes policy making. Interesting are the messages that human health is not directly related to the Lakes alone and that relevant scientific evidence depends on who the policy maker of the day is. These two dominant themes that emerged through the interviews show clearly that environmental groups in Canada consider the Great Lakes only one piece of a larger battle on environmental protection. Certainly there is an understanding of the environment and human health connection, including a clear ideology that people ought to live in a pollution-free environment. This ideology holds true for all environmental groups interviewed.

Interviews with American environmental groups show similarly that they feel that there is enough evidence for action. This stakeholder group noted the

newsworthy aspect of human health in the Great Lakes policy arena. Specifically

the data show that American environmental groups feel public concern is

paramount to setting policy agendas through their awareness of scientific human

health evidence. Thus their interest in public support is clear, as well as protecting

the environment in the process of acting on behalf of the Great Lakes.

The interview with the president of the Council of Great Lakes Industries,

that represents over thirty industries in the Great Lakes Basin, showed that

industry's role in the Great Lakes policy process is largely reactive. Presently they

are not included on scientific boards or fully in the decision making processes of

the Lakes. As a result their positions come as a reaction to IJC and other

stakeholder inputs. Industry considers the main issue to be one of contaminants in

sediments and the legacy left by past industries. Currently industry is included in

some of the consensus building exercises in Canada but not in the United States.

A dominant theme from this interview was the notion of 'change': scientific

evidence is crucial for industrial change; for industry or society to change it would

involve a great deal of money. Furthermore, it was suggested that the IJC needs

to change its consensus process to include industry. From this interview it was

clear that the ideology held dear is that people ought to live in a modern society,

and thus enjoy the benefits of modern industry and technological innovation with a

balanced cost to the environment. Beliefs about science from industry hold that

there is not enough evidence for action because the action at present would involve

too much money and change to society.

The interviews with members of Canadian and American academic institutions were with persons that sit on the IJC science advisory board (SAB). The interviews show that most strongly that human health is a driver in the policy process and the most likely factor to effect change in the Lakes. Although there appears to be a 'back scratching attitude' between countries there is still a challenge of building a strong weight of evidence across borders with different methods of science and process on each side. In terms of role of academia in the Great lakes process the interviews show that academics' role on Boards is primarily about establishing risk-benefit analyses for the IJC. This type of analysis as will be seen in chapter 6 is a socio-political process that can make it difficult to get things done. Yet academic respondents argue that the science on human health evidence is limited by methodological design, specifically, in epidemiology and risk assessment. The ideologies that emerged resonate with those of the IJC that the ecosystem ought to be protected from harmful effects. Their ideology is more broadly based than protection of human society and health.

Lastly, the interviews with Native Communities representatives show the Great Lakes policy process needs to reflect grass-roots objectives. Natives' ability to consider micro and macro levels of impact on the Lakes supports their ideology that people and the ecosystem ought to live in harmony. Human health emerged as important for getting things done. However evidence of this nature may never be

seen. A sense of urgency as a theme emerged when discussing the importance of scientific evidence for building up a weight of evidence. The native community feels that comparing Canadian and American processes is like "sitting in a mud puddle and comparing mud", meaning both countries are contributing to the problem and both need to come together in practice to fix it. For the native community there is a belief that there is enough evidence for action and most certainly as an at-risk community through fish consumption, their health is being affected by Great lake contamination.

Table 4.3.2 compares the values, consisting of interests, ideologies, and beliefs, of the stakeholders in the Great Lakes policy system. These values were determined by interpreting the statements and themes that emerged from all the interview data. For example, statements by members of government that the dichotomy between environment and economy is a strong factor in influencing the policy system, tells the researcher that economy is an identifiable interest of government. The thematic interpretation of the interview data resulted in a matrix that reveals a set of values held by the respective key players. To summarize, the respective interests of the stakeholders are as follows: **Government-** public support (votes), reputation, economy; **Industry-** money; **IJC-** further research (money), jobs; **Environmental Groups-** environment, public support (donations); **Public-** health, money, jobs; **Scientists/Academia-** further research (money); **Native Communities-** health. Interests reveal moral stances towards the decision-

making process. 'Public' is added in this identification of values because each participant offered their personal perspectives on the policy process separate from their professional position. Although the public was not interviewed for this study, they appear to play a central role in the concerns of all stakeholders in the policy process. It is important to consider that "...individuals act on more than just self-interest or preference, they act on beliefs too" (Schlager, 1995, 255).

Beliefs consist of our perceptions of important causal relationships, value priorities, and perception of the way the world works (Sabatier & Jenkins-Smith, 1993, 17). Beliefs are based on causal models of what "is" filtered by values. As seen in Table 4.3.2 the key players hold differing beliefs about whether there is sufficient evidence for action by policy makers. Some are convinced and others are immobilized by the evidence. Two distinct advocacy coalitions divide Great Lakes policy issues according to beliefs.

Table 4.3.2: Identification of Key Players' Interests, Ideologies and Beliefs in the Great Lakes Policy System

Key Players	Interests	Ideology	Beliefs about Science
Government	public support reputation economy	People ought to live a modern healthy life.	not enough evidence for action
Industry	money profit	People ought to live in a modern society.	Not enough evidence for action
IJC	further research jobs	Ecosystem ought to be protected and maintained.	Not enough human health evidence for action
Environmental Groups	health, environment, public support	People ought to live in a pollution-free environment.	Enough evidence for action -- human health at risk
Public	health, money, jobs/environme nt	People ought to live a modern healthy life.	Questionable action based on evidence
Academia /Scientists	Further research	Ecosystem ought to be protected from harmful effects.	Human health evidence limited by design.
Native Communities	health	People and ecosystem ought to live in harmony.	Enough evidence for action -- human health at risk

The Environmental Coalition, consisting of environmental organizations, citizen groups, Native Communities and the like, believe that: (1) human health is more important than economic development; (2) water pollution is a serious health problem; (3) government is driven primarily by economic incentives; (4) government officials are not trustworthy; (5) and there is sufficient human health evidence from Great Lakes research to warrant policy action. In contrast, a competing Business Coalition exists that believes: (1) human health issues are in balance with economic issues; (2) human health risks from Great Lakes water quality are not serious; (3) technological innovation is important to our future; (4) government can be trusted to act appropriately; (5) the evidence on human health effects from Great Lakes water quality is not sufficient to warrant policy action. This second coalition consists of Government, Industry, Science, Public (non-native), and IJC stakeholders. It is important to note that not everyone or every group fit perfectly into one coalition or the other. For example, scientists may offer their expertise to industry yet may still have beliefs coinciding with the Environmental Coalition. The ethos that couches the second coalition's beliefs focussing on evidence of human health effects is that truth is found in science. This is significant to note because it helps to explain the strong emphasis on science in the environmental health policy arena. The concept of truth will be discussed in chapter 6 along with the understanding of prudent decision making.

Many stakeholders identified that the challenge of decision making and

policy making in the Great Lakes lies in the value system of our society. Changing

beliefs are considered the corner stone of action (changing behaviours). The IJC is

cognizant of this fact, exemplified by the IJC Commissioner:

"I think that the major hurdle is not the process but the willingness to do things. I
think this is a very materialistic and money-based society, Canada and the US and
Europe and all that. And that people judge things in terms of how much it will
cost and whether or not you will make profit out of the operation and whether or
not you will be competitive on the world market which to me is totally nonsense.
And that is the major hurdle facing us. Not the tool that we have, not the
structures and all that, but where is it that we want to go as human beings, as a
society, whether we really believe that money and growth and economic growth
and return on your investment is good or drives us, or whether there is other
values. I think that's where the problem is more than in the structure and the policy
making, decision process. I think we have collectively to change our attitudes
regarding all that. ... These are things that people don't want to look at. It's not
the decision making process that's wrong, it's who we think we are, where we
think we're going as a society".

This view is shared by Council of Great Lakes Industries and Native Communities:

human behaviour is the problem and the nation's attitudes need to be changed.

The beliefs shared by both advocacy coalitions reflect the position, that

"...to really do what it's going to take to restore and protect the lakes is really
about re-designing industrial way of life. And that becomes a much bigger issue
than just clamping down on the polluters at the end of the pipe. There are most of
these, sort of end of the pipe work that's been done, and there's going to be a
whole lot more and the sources of pollutants now are atmospheric... and to address
those it's going to require major changes in the way things are done. And they are
going to take a lot of time and a lot of money and commitment, political will"
(GLRC).

The assumptions that underlie our beliefs reflect our fundamental value of

how things "ought" to be. In contrast to beliefs, our ideologies or core values are

difficult to change and may be non-testable. The ideology that are being defended

by the Environmental Coalition is that ecosystems ought to be protected from

harmful elements. The Business Coalition follows the ideology that people ought

to live a modern healthy life. Since core values are near impossible to change a

challenge is always present in bringing together these two coalitions for decision

making. Therefore reaching a consensus will have to depend upon changing

interests or presenting information persuasive enough to change beliefs about

science.

4.4 Power to Change Values

"The distribution of power determines WHOSE ideology, interests, and

information will be dominant" (Weiss, 1983, 239). Power refers to the position or

level of consideration a stakeholder is given within a Great Lakes issue or debate.

Shifts in power (through elections, economic change, etc) bring changes in policy

more significant than information shifts. In fact, the influence of particular

stakeholders can cause significant reverberations within the policy arena. Since

IJC and its Boards' positions are dependent upon Government appointment, the

pendulum of power is synchronized with federal elections, making policy-making

and decision-making time conscious.

For the Great Lakes, governments and bureaucrats tend to be issue-driven;

and the environmental groups and public tend to be outrage-driven (Sandman,

1987) . The problem with outrage driven action is that having unjustified outrage

may do more harm to society than good. "Governments are just too worried about

being held accountable for what they say and that's what people are looking for"

(GLU). The outrage debate can be expressed best by IJC, Windsor:

"I mean bureaucrats generally, governments generally, take the viewpoint that a responsible bureaucrat does not make the public anxious about something. It is not your responsibility to generate outrage amongst the public even about outrageous things. This is one of the big dilemmas. When some kind of outrageous thing has happened, you are not supposed to make the public outraged but if you don't make the public outraged then nothing will happen. ... Very successfully the bureaucracy has kept the public from being outraged by outrageous situations. I suppose in terms of how do you make democracy work ... particularly when the outrage has in fact been caused by industry who are the ones we are so dependent on for our economic well being, ... the enormous dilemma which arises from that situation .....quite frankly I don't at this point in time know how when something outrageous happens to get something efficiently done about that outrageous situation without covertly going to the public ... through a process of communication this outrage can be transmitted to the politicians and thereby to the bureaucrats to do something about it. But, it's an incredibly inefficient way of running a country...".

Government and industry make some of the most important decisions by

their economic and public significance in society. The interviews showed that

industry may be in the best position to influence the type of decisions that are

made. It was also suggested by some stakeholders that industry may have the

strongest power to change the direction of environmental action in the Great

Lakes. The perception that came through in the interviews was that industry sits in

a position to change its methods of doing business. The additional perception is

that Government has the power to instigate and enforce that change. But what is

overlooked is that the public collectively puts power in the hands of both these players by electing politicians and buying consumer goods. An environmental organization executive points out that "I think economics plays a major part in the mentality that people have in working toward improving the environment" (Great Lakes United).

Environmental organizations "...have become very powerful and have extraordinarily high credibility in the minds of the public and even better than government, better than I think the science" (National Institute of Water Research). Pivotal in the discussion of power distribution within the policy subsystem is public perception. The "alarmist mindset" that has been prevailing behind much of the action over the last 25 years continues to drive many of the issues. It emerged from the data that the public's role in decision-making is implicit to the process. However, the public emerged as a powerful force in the process. NGOs, like Great Lakes United, have become effective (by their standards) in organizing the public to obtain responses from decision-makers (GLU). The power of the public will continue to be strong because of its direct appeal to Government interests (namely public support).

Underlying the issue of public participation in decision-making, regardless of the type of decision to be made, is the re-distribution of power. To involve the public in decision-making requires that the present decision-makers relinquish at least some of their power. It has been hypothesized that "no one gives power

away -- it must be taken" (Checkoway, 1981). This cynical perspective of power transfer is commonly argued in the literature, particularly in instances where the role of the public in a decision-making process is not made explicit. The transfer of power (Checkoway, 1981; Arnstein, 1969), or "power sharing" (Eyles, 1993), is a fundamental struggle in establishing a role for the public and others in a decision making process. Recent trends or 'recipes' of public participation in environmental health decision making have tried to move beyond the common perception that the public is to be manipulated for their own good and towards an enlightened public involvement to best address the needs of our communities. In the Great Lakes, public participation is considered the backbone of the Biennial meetings and their subsequent reports. However, the Biennial Reports do not always reflect this. In fact, aside from the invitation to interested publics to the Biennial meetings, there seems to be little inclusion of lay voices and values in the process.

The media plays a powerful role in contextualizing issues. "In addition to mobilizing concern, media coverage influences public perceptions and the responses of politicians by framing issues as economic or social, personal or political" (Boardman, 1992, 179). The media is faced with issues of objectivity, balance and fairness to the citizens of the Great Lakes community. It provides a forum for debate that can cause immense reverberations throughout the policy subsystem by changing courses of action, focussing on irrelevant information,

and/or interpreting scientific research incorrectly or without proper context and knowledge. As a consequence, the media plays an influential role in setting the stage for instigating decision-making processes through its outrage-driven tone and demand for action. The role of the media deserves a separate investigation than can be provided through this research time frame.

Ecosystem Health and Strategies for Decision Making

Values, specifically interests, can be re-framed through shifts in information. In the Great Lakes the concept of ecosystem health holds the power to re-frame interests of many dominant stakeholders. For example, leading up to the 1994 IJC Seventh Biennial Report, there was a restructuring of the IJC's information channel. This change reflected the need to optimize SAB contributions to the IJC in the policy process. As part of this restructuring, the SAB articulated a new set of operating principles: (1) People are part of, not separate from, the rest of the ecosystem; (2) Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO); and (3) The "weight of evidence" approach is a sufficient basis for policy development (IJC 1993). These three fundamental principles represent the backbone that supports ecosystem health endeavours. The SAB was given the lead (over other advisory boards) on ecosystem health priorities and developed these principles seriously in its attempt to "further develop, explore and identify the concept of ecosystem health as it

pertains to the Great Lakes Basin" (IJC 1993). This role was given to the SAB because the Commission of the day wanted an evidence-based decision making approach.

It is the responsibility of the SAB to advise and assist the IJC in making recommendations to the Canadian and American governments regarding their commitment to the 1972 Great Lakes Water Quality Agreement (GLWQA). "Ecosystem health" has predominantly been the lens set forth by the SAB to consider scientific evidence. Further, the "SAB and IJC are out front in the public and private sector in terms of bringing human health to the forefront of ecosystem management" (SAB co-chair). It appears at the onset that this focus on human health is a strategic 'tool' used to provoke interest and concern from decision-makers. "It's gotten into the language, into the way the governments actually think and frame their issues." (SAB member). Since human health tends to dominate most of the Great Lakes agendas, particularly the IJC Priorities document after 1995, this broad "ecosystem" framework through the use of human health has effectively permeated the decision-making process.

Ecosystem health has enabled human health to surface more freely into the Great Lakes policy language. Human health is now an explicit conceptual element of Great Lakes issues. This is a significant shift from the first 20 years after the signing of the Great Lakes Water Quality Agreement of 1972. It became clear to many stakeholders and those in positions of power that human health was more

meaningful than ecosystem health as a conceptual and communication tool. It

drove the messages of toxic contamination home in a convincing and emotional

way. It was a powerful tool in motivating political will and hence setting priorities

for regulation. As stated by a member of the US EPA, "Very honestly I think that

human health frequently becomes the driver. There has been little regulation at

least in the US that have been based on damage to the ecosystem or fish and the

wildlife" (US EPA). Therefore, for those stakeholders who considered their voices

were not being heard, human health provided an opportunity to re-frame the issue

and give direct personal meaning to an environmental issue.

The ecosystem health approach has changed the face of environmental

management in the Great Lakes. In practice it has enabled the IJC to bring

together multi-disciplinary groups in addressing issues. It is certainly a vehicle for

communication in bringing together scientists and policy makers though various

workshops and meetings. Ecosystem health plays a significant role in enabling

coalitions to form around particular agendas such as the degradation caused by the

introduction of exotic species into the Great Lakes. Unfortunately,

"...there are a whole group of people within a variety of different organizations
who frankly tried to hijack the agreement and superimpose their agendas such as
exotic species, wetland, habitat protection - all those other kinds of issues
biodiversity- and tried to make those part of the working agenda of the GLWQA
using "ecosystem approach". That's really a perverse re-interpretation of the
ecosystem approach which was originally focussed on pollutants" (IJC Windsor).

The reframing of the debate in the Great Lakes policy process has solidified the

Coalitions that have formed. The Coalitions emerge out of similar beliefs about science. Interests are only one component of values. Recall from section 2.4.2 that values are often seen as distinct in policy: they take the form of 1) interests, 2) beliefs and 3)ideologies (Lomas 1990). For ecosystem health to shift more than just stakeholder thinking it would need a long term shift in beliefs about science.

In keeping with the idea that human health is a vehicle for advancing our concern about the Great Lakes ecosystem, there are some inherent limitations to this line of thought. If what is done to fish and the aquatic ecosystems is invariably done to ourselves and our children, then how do we address the problem? The limitation with this individual health effects perception of the Great Lakes is that; "[a]s long as the public discussion about toxins is in terms of individual risks, the passage of strong regulation is unlikely" (Tesh, 1988, 164). Regulation or policy action, the ultimate goal of decision-making, is dependent upon action for the collective good. Acting on behalf of a larger public is a difficult motivating factor because of personal differences in self-interests and beliefs in what is causing the problem (Stone, 1988).

Consideration of a basin-wide ecosystem approach to decision-making certainly lends itself well to the "broad" political way of looking at issues. Accordingly, the logic supporting the introduction of human health into the policy subsystem is presented by the inherent limitations of considering no single component of the Great Lakes in isolation from other components. Experience

tells us that the public doesn't respond well to "collective good" actions, and reacts more effectively to the concept of individual gains and/or losses (Stone, 1988). Ecosystem health leaves too much room to contemplate inaction based on perceptions of non-tangible collective impact. Consequently, focussing on human health risks prompts reactions by appealing to human interest for personal well-being.

The IJC has provided a vehicle for these different organizations and interests to meet and discuss the many interpretations of the ecosystem approach. According to Sabatier, this is the position of a "policy-broker" in the ACF. This is a role valued by many. For example:

"Pollution prevention was one workshop that we had a lot of work done on and involved our Science Advisory Board and our Water Quality Board. In other words, it involved the scientist and the regulator or the policy maker. Some of them had never met. Some of the scientists had never met the people in the regulatory agency. Had never discussed with them before. They didn't get an opportunity to do it in their own jobs, whereas the commission provided the vehicle for there to be that sort of communication" (IJC Windsor).

Again, the position of the IJC between science and policy and between countries is crucial to effectively deal with Great lakes issues.

Personal and professional interests (motivations, incentives, opportunities and constraints) are reflected in the decision-making process. It is no different when considering Great Lakes issues, particularly under the framework of ecosystem health. As mentioned previously, efforts for an improved ecosystem provide little in the way of immediate individual gain. It is understandably hard

for people to undertake private costs for the collective good (Stone, 1988, 16).

For this reason, human health is a more effective means of provoking reaction

through its appeal to self-interest, rather than the health of the entire ecosystem.

Realistically, human health is of utmost concern to humans, and humans are the

ones making the decisions. In terms of industry and government, human health is

something they don't want to deal with because it seems to involve remediation

and money and compensation (Canadian Chlorine Co-ordinating Committee

member). Therefore, it is effective as a tool for players in the policy subsystem to

attack interests and provoke reaction (change the way things are being addressed).

Unfortunately, multiple interpretations and operationalizations of the term

'ecosystem health' have surfaced as a result of its inclusion into the GLWQA. For

example:

"I think we have a sufficiently flexible understanding of what it is to allow us to do
our work"
"...it is a subjective assessment"
"We [the SAB] slowly progress with whatever definitions we feel comfortable
with"
"It is an umbrella, so broad it can be used in and called forth as rationale for any
interest group to make any wishes about any issue"

Ecosystem health has been instrumental in changing the nature of Great

Lakes decision making. Allowing for a clear conceptual link between the Great

Lakes and human health, the ecosystem health approach also opened the doors to

multiple uses and interpretations of how decisions should be made. Yet it also

adds to the complexity and confusion around environmental health policy making.

By promoting multiple interpretations of problems, ecosystem health has perhaps

made solutions or action intractable.

4.5 Conclusion

The ecosystem health framework sets the stage for the decision-making

processes in the Great Lakes. It considers an interconnected environment and a

multi stakeholder community. This complexity is only heightened by the values,

knowledge and institutional structures that comprise the policy subsystems. The

advocacy coalitions reflect the power within the system and give insight to the

policy implementation challenges.

The Great Lakes policy making process is complex. The complexity is

such that "inside the black box of decision making.. It is a highly political process

in which power and entrenched interest are the main driving force" (Ham, 1990,

46). The stakeholders' powers and interests that drive the policy process are

reflected in the political bargaining lens whereby policy is seen as an outcome of

compromise between competing interests. The process is rhetorical and

negotiable, competitive, and pragmatically driven by stakeholder values.

Figure 4.5 illustrates how the values form the foundation for the structures

of decision making in the Great Lakes. The values that are easier to change

connect with the informal structures, meaning that change or action is

Figure 4.5: Unpacking Our Understanding of the Strategies of Decision Making in the Great Lakes

STRUCTURE

FORMAL

IJC
EC
EPA

INFORMAL

Coalitions
Stakeholders
Citizens
Workshop/Conference Interactions
Cross Border Conversations

Hard to Change

Easier to Change

VALUES

Ideology

Beliefs ←——→ Interests

143
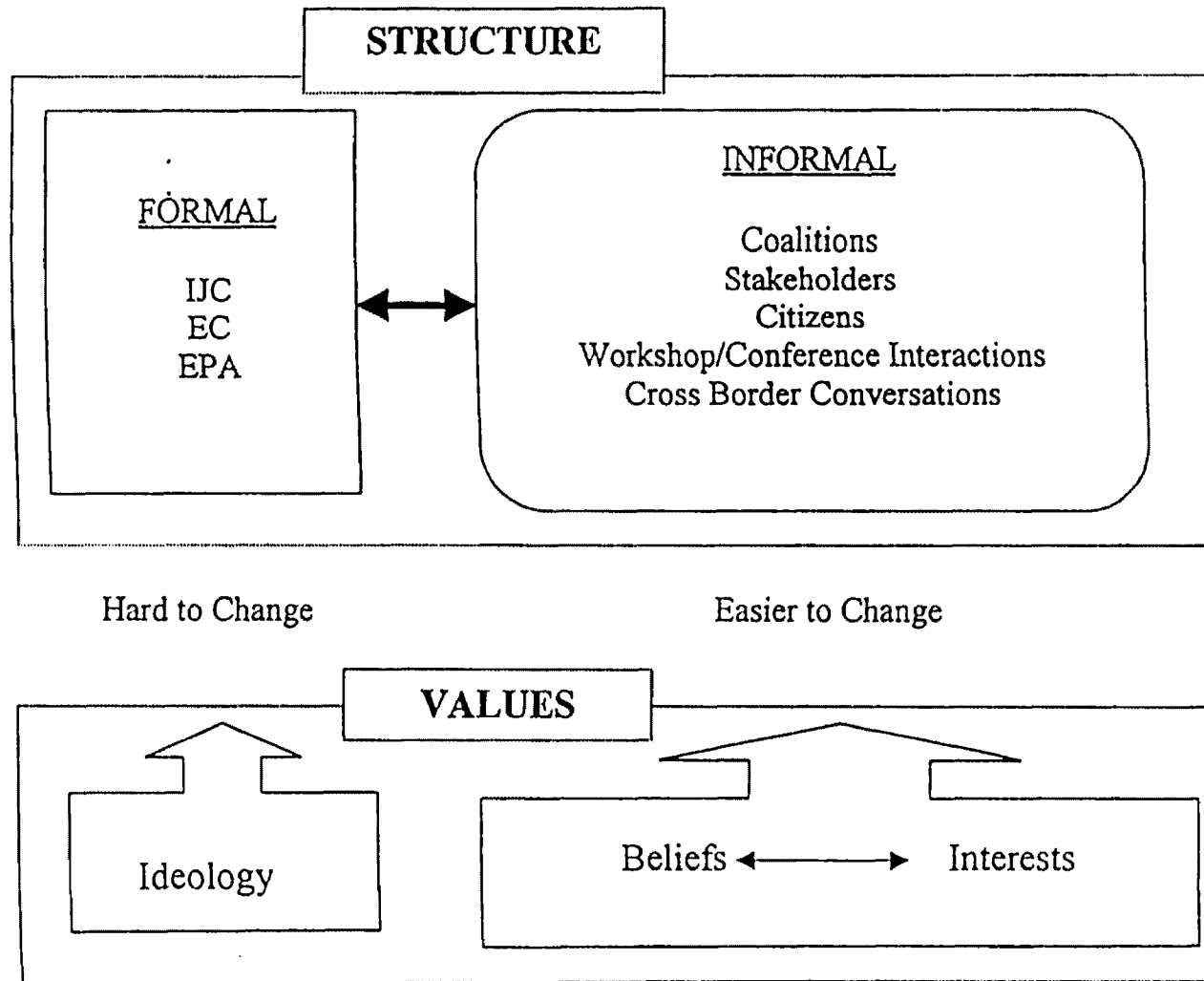
fundamentally only going to happen through a shift in beliefs or interests. Since

ideologies form the basis of the formal structures of decision making these aspects

of the policy system will be difficult to change. Unpacking our understanding of

the strategies of decision making in the Great Lakes results in the division of

values from the formal and informal structures, in addition to the power of

ecosystem health as a conceptual framework that effectively impacts on beliefs and

interests. The next chapter will bring together the frames of decision making by

analysing IJC language.

CHAPTER FIVE: FRAMES OF DECISION MAKING[1]
Great Lakes Ideas

5.1 Introduction

Chapter five is the second of three empirical chapters in this thesis. This

chapter provides a picture of the frames of decision making in the Great Lakes.

Semiotic analysis and frame analysis (Chapter 3) are applied to the Great Lakes

policy context in an attempt to examine the underlying assumptions and values in

the environmental health policy language. Combining these two analysis will tell a

rich story of the importance of policy meaning to the dynamic of a policy system.

The previous chapter served to explain the key concepts, key players and dominant

coalitions at play in the system. This chapter serves to explain the communication

within this system as presented in the consensus documents of the IJC Biennial

Reports.

5.2 Human Health

The International Joint Commission (IJC) has overseen the implementation

of the Great Lakes Water Quality Agreement between Canada and the United

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[1]

Portions of this chapter (5.2) are revised from Iannantuono, A. and Eyles, J.D. 1997. Meanings in Policy: A textual Analysis of Canada's 'Achieving Health for All' Document, *Social Science and Medicine*, Vol 44, No. 11, pp. 1611-1621. Also Portions of this chapter (5.3) are taken from Iannantuono, A. and Eyles, J.D. 2000. Environmental Health Policy: Analytic "Framing" of the Great Lakes Picture. *Environmental Management*. Vol. 26, No. 4, October Issue.

States for almost thirty years. Part of its mandate has been to facilitate international co-operation among a diversity of stakeholders focusing on the "waters" and the "ecosystem". In the 1970s policy focused on ecosystems (ecological perspectives), wildlife, biota and fish. In the last 15 years human health effects associated with environmental exposures have received considerable recognition. By contrast, less concern has been expressed for what is traditionally considered "environment" issues (such as protecting fish species). This shift at the policy level is well illustrated in the manner in which human health is increasingly used as a way for mobilizing environmental agendas.

"... there is much more of a focus on the human health dimension to the point that some people think that if you highlight human health impacts and health effects, good and bad, that you almost need to do that to get the other parts of the Great Lakes agenda on the public agenda again. So it's being used as a tool to get people to focus back on the environmental aspects of the Great Lakes" (GLHEP)

This section presents an analysis ten IJC biennial reports and interviews with various Great Lakes stakeholders to track how the framing of Great Lakes issues has shifted from concern for its waters to concern for human neuro-behaviour and reproductive systems. Frame analysis is used to reveal the controversies that are expressed through the Great Lakes policy documents. The analysis of the reports also shows a shift in operational frames, used by the IJC to mobilize decision-makers to action. To follow in section 5.2.2. is the semiotic analysis of the Biennial Reports which will provide a rich account of the policy

frames by interpreting the meaning of the text used by the IJC to address Great Lakes issues.

The interviews with various key players in the Great Lakes add to the narrative of the Biennial Reports. From the interview data it is clear that the Biennial Reports do the following: engage issues, precipitate political debate, move environmental policy, enhance awareness, influence government, popularize certain types of health evidence and develop metaphor as symbols. These themes thread through all stakeholder groups and create an intertext of credibility and belief in the use of the Biennials in the Great Lakes policy arena. The policy space is thus reconstructed through the frame analysis (5.2.1), semiotic analysis (5.3) and the interview data.

5.2.1. Frame Analysis of the Analytic "tip"

Since the signing of the Great Lakes Water Quality Agreement (GLWQA) in 1972 by Canada and the United States there have been changes in the 'framing' of Great Lakes problems by the International Joint Commission (IJC). The IJC sits in an influential position, making recommendations to the Canadian and American Parties (or governments) about the nature and direction of policy. How the IJC defines and articulates the problems and posits improvements through its recommendations to government has impacted upon the action (and inaction) on the part of decision-makers. How environmental issues (Great Lakes issues) are

"framed" as problems affects what solutions are suggested and agendas set. "On

the one hand, the way the problem is framed influences the way that problem is

dealt with. But the opposite is also true: the feasibility of certain actions influences

the way a problem is framed" (Liberator 1995, 65). The purpose of this section is

to illustrate the analytic 'tip' of the Great Lakes environmental policy process as a

human health issue to reveal its strategic or political value.

The Great Lakes is a case fraught with predicament over the human

condition. Human populations living in the Great Lakes basin are faced with

uncertainty, as much scientific evidence on health effects from the environment in

which they live remains equivocal. Yet ill-health effects, such as neuro-

behavioural disorders and human reproductive health problems, from persistent

toxic substances found in the waters have pervaded recent policy literature in the

Great Lakes area (Colburn et al. 1990, Health Canada 1997). While human health

concerns have always been a part of what the IJC does in upholding the GLWQA,

it will be seen through this analysis that the role of human health has changed over

the last 25 years since the signing of the original Agreement in 1972. At present

human health is the fundamental policy frame for Great Lakes issues despite the

considerable scientific uncertainty surrounding the linkages between the physical

environment or its contamination on human health (Tremblay and Gilman, 1996).

In this case, human health acts as a proxy for environmental concern (Burger

1990) potentially engendering concern for ecosystem changes and impacts shaped

by human activity.

To ensure long term commitment to environmental issues in the Great

Lakes Basin the Commission's original Agreement is under biennial reassessment.

The 1978 Great Lakes Water Quality Agreement requires the Commission to make

a full report to the Parties and to state and provincial governments no less

frequently than biennially concerning progress toward the achievement of the

general and specific objectives of the Agreement and an assessment of the

programs and measures undertaken pursuant to the Agreement. The Biennial

Reports overview the progress and recommendations of the Commission in

upholding its commitment to oversee Great Lakes environmental issues. An

assessment of these reports provides the basis for an investigation into the frames

used to guide Great Lakes decision making.

"But the Ecosystem Genie had been let out of the bottle and into the Agreement, and had brought with it all the attendant ambiguities and action uncertainties that have been an agreed characteristic of this concept and approach since its introduction by Tansley in 1935 (Golley 1993)" (cited by Gilbertson, 1998).

In 1968, Jaro Maydo coined the term "ecomanagement" to highlight

control over the ecological degradation that was becoming evident to ecologists

and biologists. It set the stage for the signing of the National Environmental

Protection Agency (NEPA) in the U.S. in 1969, the purpose of which is to

encourage harmony between humans and the environment. Eco-management

framed the early years of implementing the GLWQA. It set standards and

protocols for dealing with environmental degradation through the management of pollution. The ecosystem approach came to the forefront of natural resource management systems in 1969. It became a pivotal concept in the IJC with the revision of the IJC GLWQA in 1978. It provided both Parties with a clearer understanding of the role of humans in the Great Lakes and it made explicit the involvement of ecosystems in the management strategies of the Lakes. The environment was no longer an entity separate from humans: both were connected because they were both formally a part of a biological ecosystem. The notions of balance and harmony were also pivotal throughout this changing policy conceptualization of the Great Lakes ecosystem. The health of the Great Lakes was now connected to the wider Basin with its watershed, tributaries and larger population.

From these early years, we can see that a broad based rhetorical frame has dominated much of the policy work in Great Lakes issues, i.e. the ecosystem approach. To recall, rhetorical frames are philosophies that address the way a policy system ought to function. In essence the ecosystem approach was created to mobilize the political will of decision-makers through pressure from an interested public made up of concerned fishers, scientists, homeowners, parents, environmentalists, and others (Allen et al. 1992). In 1978 the Great Lakes Science Advisory Board requested a clarification of the ecosystem concept. This was produced in the revised Agreement and published a report titled "The Ecosystem

Approach". This report acted as a catalyst for shifting "from a narrow perspective of water in a political context to a wider perspective and significantly different approach of policy development in an ecosystem context" (Allen et al. 1992). This report was later revised and extended in 1993 by Allen et al. in a document entitled "The Ecosystem Approach: Theory and Ecosystem Integrity". The ecosystem approach has remained the dominant philosophy of decision making in the Great Lakes. It has fundamentally changed the way problems and solutions are conceptualized around the Lakes. As a rhetorical frame it reflects the beliefs of the majority of stakeholders including government, non-government agencies, industry, public, academia. Little, at present, seems to threaten the hegemony of this frame.

Gilbertson (1998) argues that since the signing of the Great Lakes Water Quality Agreement in 1972 there have been three dominant approaches that shape the way the quality of the Great Lakes are interpreted: those of water quality, eco-management, and forensic eco-toxicology. These approaches may be seen as action frames and are documented throughout our discussion of the biennial reports. Although these approaches are not sequential or hierarchical they do represent the common conceptualizations of problems and solutions. Water Quality Approach frames Great Lakes issues in the context of "potential" effects that might occur if concentrations of toxins reach particular levels. Eco-management Approach emphasizes managing the ecosystem through skillful

application of principles and techniques. Forensic eco-toxicology Approach makes

reference to "actual" chemically-induced 'injury' to health or resources.

According to Gilbertson (1998) each approach brings with it contrasting

conceptualizations of how problems in the Great Lakes are to be defined and

solved, partially in response to the vague nature of the Great Lakes Water Quality

Agreement under the 'ecosystem' umbrella erected in 1978.

Identifying the Problems: Shifts in Themes and Frames

The IJC biennial reporting began in 1982. All of the ten biennial reports to

date have noted the limitations of science and research to address problems in the

Great Lakes ecosystem, the synergistic effects of chemical contaminants on the

aquatic life and more recently on the human populations living in the Basin.

Science has been unable to provide policy makers with definitive answers to their

questions. However each biennial report has attempted to convey the importance

of further research to decision makers on both sides of the border.

Table 5.2.1 illustrates how each report is connected to "frames" used to convey

the Great Lakes issues. The reports all identify the predominant problems,

beginning with institutional framework problems (1982). The IJC felt that the

structures of decision-making set up to deal with Great Lakes issues were not

effective. This was addressed by an eco-management approach to Great Lakes

issues whereby institutional structure is seen as critical to manage the ecosystem

properly. The problems became less focussed on institutions and more on the nature of identifying problems themselves through intricate person-environment relations.

TABLE 5.2.1: FRAMES OF THE IJC BIENNIAL REPORTS

Rhetorical Frame	ECOSYSTEM APPROACH — ECOSYSTEM HEALTH									
Action Frame	'MANAGING ECOSYSTEMS' (Ecosystem)			'CHANGING HUMAN BEHAVIOR' ('Forensic Eco-toxicology')						
Sub-frame		PTS* control		future generations	cancer	PTS* prevention	reproductive health	child health	global context	assess efforts
Dominant Themes	commitment to person-environment relation	interim assessment document	setting benchmarks	virtual elimination of PTS	cancer	weight of evidence	threats to human health	children	moving forward from PTS	sustained effort
Problem	weak institutional structure	involve public	no epi-demiology	assessing health	"translating" the agreement	dealing with PTS effectively	strategic decision-making	awareness of health practi-tioners	PTS legacy	resourc allocation
Biennial Report	1st, 1982	2nd, 1984	3rd, 1986	4th, 1989	5th, 1990	6th, 1992	7th, 1994	8th, 1996	9th, 1998	10th, 2000

Note: 1972 to 1978, when the revised GLWQA was written, was the era of a water quality approach.
*PTS stands for persistent toxic substances.

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Assessments (as seen in the second report, 1984) and benchmarks (as seen

in the third report, 1986) were the predominant style of attacking the identified

environmental problems. It soon became apparent scientifically and politically that

restricting the identification of problems to one pollutant at a time and

management approaches to a broad "ecosystem" approach was extremely limiting.

The dynamics of environmental degradation were much more complex than

anticipated because of the diversity of pollutants and the synergistic effects of

contaminants acting together to cause harm (Canada, 1991). Management

techniques simplified the problem which aided public understanding (Biennial

1984) but did not suggest meaningful solutions. The water quality approach of the

1970s demanded management on the basis of single chemical compounds such as

banning phosphorus. It became increasingly evident that no single chemical agent

was responsible for the degradation of the Lakes and in order to find solutions to

synergistic effects research needed to follow this approach as well. Thus, the first

report recommended a significant shift in how the problems were going to be

tackled in the Great Lakes and specifically how the science needed to be

understood and practised. Advances in understanding synergistic effects of

chemicals in such vast ecosystems as the Great Lakes have only slowly been

addressed in the fields of biology and biochemistry. Yet eco-management failed as

a policy frame because it placed exclusive emphasis on ecosystem rather than putting humans as the central focus. Thus if humans were the impetus behind environmental degradation and would benefit most from its clean up then their activities should be the central focus for decision makers and policy formulation. Risks to human health and around potential destruction of life forms necessary for human existence were key to policy development in the Great Lakes Basin. Indeed, the third Biennial (1986) notes the lack of epidemiological evidence to further these arguments. The forensic approach is better able to grapple with the synergistic effects and human health assessment is seen as key for understanding problems in the Basin (4th Report, 1989) which led eventually to an increasing awareness of the role health practitioners could play dealing with the environmental health concerns (8th Report, 1996). Human health evidence has the power to change the political process in the Great Lakes.

"You can do your work with the birds and show the appalling things that are happening with the birds. You can try and help the scientists tell the story around the fish and around the mink. But within the value system of this society, none of that counts. None. What we are waiting for is to see as to whether the new health evidence actually counts for anything. Does it count for anything with the health authorities to the extent which they are prepared to mobilize the political process in a way that they haven't done in the last 25 years?" (IJC Windsor).

This shift towards a forensic eco-toxicological approach is perhaps the

most significant change in Great Lakes policy making since the signing of the

original GLWQA in 1972. It brought with it a plethora of explicitly value laden

frames connecting the environment explicitly to the health of human populations

around the Lakes. In this change in action frame, we can identify a reframing -- an

analytic tip in the late 1980s. "It's like anything, as you increase your awareness

and become more enlightened, you begin to understand how these different things

are working. It has been a revelation, a real revelation" (IJC Windsor).

A reframing that was brought about with the realization of power of human

health as a conceptual tool, more so than the concept of ecosystem health. As is

articulated by a member of the WWF "...human health is more resonant for people

than ecosystem health. Human health can be an important driving force in moving

backwards and forwards, and organizing pressures on governments to take both

remedial and preventive actions" (US WWF). In fact, the reality may lie in the

perception that Director of IJC Windsor, describes.

"I think many people, including myself, believe if there is a human health threat in
the Great Lakes that there will be a greater political will to solve it, than if the
problem is just quotations "sort of an environmental health". That the urgency and
pressure from society is a lot greater if there is a human health risk. I think you'll
get more action, more energy, more resources directed to solving the problem
then."

Therefore the reframing of Great Lakes issues towards a human health

focus rather than ecosystem health and environment focus serves many purposes

within a political process. A shift that can be followed through the biennials.

Tipping the Action Frame: Eco-management to Human Health Assessment

A shift or tip represents "a pivotal turn within the struggle of ideas in that the conceptualization of what constitutes a public problem is framed within new targeted boundaries for action " (Iannantuono and Eyles, 1999). Concern about the Great Lakes moves beyond management of a biophysical system towards explicit concern for the health of human populations. Actions target neuro-behavioural disorders and reproductive and developmental complications thereby examining and confronting biota and water issues indirectly through their eco-systemic link to humans. Indeed, the fourth biennial report (1989) presents a major shift in the approach to IJC reporting. The health of humans moves to the center of Great Lakes research with recognition of citizens' exposure to low level toxins for long periods of time. Eighteen years of biological evidence of degradation from wildlife and aquatic biota sets the backdrop for the defining moment for a shift in action frames from an eco-management to a forensic eco-toxicology. "There isn't a smoking gun there that we can sort of point at, but there's certainly growing evidence that we better do something about this" (Environment Canada). Conceptualizations of Great Lakes issues takes a distinct human perspective

although still embedded in a predominantly ecosystem view, ie. ecosystems with humans.

In addition, the signing of the IJC Protocol in 1987 amending the 1978 Great Lakes Water Quality Agreement "reflect[ing] advances in technology and aim[ing] to strengthen the programs and practices laid out in the 1978 Agreement and to increase accountability for their implementation" (IJC 1987, 19). Furthermore, this period marked the Science Advisory Boards shift in committee membership to enhance the use of integrative science in exploring ecosystem approaches to managing human uses of the Great Lakes Basin Ecosystem (IJC Annual Report 1985). At this time a Committee on Health was added to its three standing committees: Societal, Technological, and Ecological. The Health Committee's focus is human health in the ecosystem context, as human health is linked to the health of other species. This Health Committee was previously a joint responsibility of the Great Lakes Science Advisory Board and the Great Lakes Water Quality Board.

Also in 1987 the Workshop on Cumulative Environmental Effects: A Binational Perspective did much to aid in this advance. Two years later, in 1989, a Workshop was held on Cause-Effect Linkages. The IJC was clearly now interested in documenting and integrating research on human health effects into

what was predominantly only a database of knowledge on animals. Further Cause-Effect Linkages Workshops were held in 1991 and 1995 and resulted "in a series of seventeen case studies ranging from effects at the population level of biological organization down to the sub-cellular" (Gilbertson 1998, 17). What had been traditionally water quality and eco-managment approaches to the Great Lakes was clearly being taken on differently after these sets of workshops. Conflicting values and interests were certainly competing among stakeholders at this period of time. However the IJC made a concerted effort to shift the way the GLWQA was framed to set the stage for something more dramatic to happen -- perhaps the attention of policy makers to act.

It appears the link between evidence from animal data and human data set the stage for a shift in action within the IJC.

"... [I]n the mid 80s when it was clear that in terms of pollution prevention we kind of hit a plateau in terms of the regulatory system, controlling pollution. It was clear from looking at the levels in the fish and wildlife for certain persistent toxic substances like PCBs that we were on a plateau and we weren't coming down. We got the levels down to a certain point in the early 80s–they're still there. They haven't moved much. I think that in around '86, '87 certainly the Science Advisory Board in response originally to Bob Welch when he was commissioner, he's one of those people who had vision. Sort of inspiration and vision. I think it was in '86, he started asking, as a commissioner started asking, human health questions, whether there was any human health impact in persistent toxic substances. And that's what caused the Science Advisory Board to decide that it needed to invigorate its efforts on the human health side. Up until that point in time human health had been dealt with as a kind of an unimportant joint committee between the two boards, between the Water Quality Board and the Science

Advisory Board" (IJC Windsor).

In addition, another shift from persistent toxic substances (exposures) to

reproductive health issues (outcomes) within the Biennial Reports may be noted.

This reframing stems from an intuitive human-environment connection that

pervades all evidence in this area.

"It's only more recently that looking at wildlife, bird population drops, thinning of
egg shells, that kind of stuff, fish with tumors, where people have looked at it and
said, well using the miner and the canary analogy that gee if we've got all these
fish with tumors or we've got these herring gull population that are dropping, this
cannot be a good omen for human health. So the Great Lakes have been evolving
for a number of years and the latest evolution I would say moves from sort of the
general toxic chemical contamination issue because those levels of toxics are
declining in the environment to one of endocrine disruption and that sort of thing.
(EC).

The policy shift or "tip" recognizes the salience of human health within an

environmental policy context. Human health becomes a proxy for ecosystem

monitoring and improvement. The new action frame emphasises ecotoxicology and

over time the need to change presented by the environmental insults of persistent

toxic substances (PTS) (Biennials 1989, 1992), cancer (Biennial 1992),

reproductive and child health (Biennials 1989, 1994, 1996). Without this shift

towards change and changing human behavior and activity in particular, the Great

Lakes debate may have ended without action. By adopting a human health frame,

strategies were put in place that might advance action in the form of research and

political attention through institutional linkages and utilizing health professionals to
advocate for change. Change in human behaviour is tangible and conceivable
when the effects hits so close to home on an emotional level.

"I think because human health really represents the hook. People will say, gee it's
too bad the eagles aren't doing well. Gee it's too bad that fishing is not so great.
But they are much less sanguine when it's the intellects of their children that may
be questioned or their ability to have children that's in question." (ATSDR)

Action however remains limited. There is little institutional structure for
decision making with respect to the Great Lakes. The International Joint
Commission remains advisory to Parties. Further, the focus on health has some
ambiguity. Health is not clearly defined throughout the reports although there is a
definition for ecological health. Ecological health is defined as something more
than the absence of disease (4th Biennial, 1989). In framing health, discussions
centre on defining acceptable levels of pollution for a lake to maintain its
ecosystem resilience. With a ratcheting down from "healthy" levels of pollution
(toxin levels in the lakes) to no tolerable levels (virtual elimination, zero
discharge). The ambiguity has led to multiple targets for change and some
confusion about the 'real' impact on humans. Much work remains to be done on
the environmental burden of illness (see Health Canada 1997). Yet through this
vital catalytic period, 'health' became pivotal. Its lack of frame definition aids in
its broad acceptance as all could 'buy in' to a notion as acceptable as community

(as in community care) especially when linked to children or the survival of the species. Being against health is like being against motherhood. Knowledge is gained through "...human health as a grabber. That if you could demonstrate there was a human health effect that people would have to be concerned about these substances. So it is as if it was almost seen as a marketing dimension to the thing or at least here are the things that are really going to bother people" (IJC Ottawa). Some stakeholders even attest to using human health in this explicit manner. "So I guess we intuitively knew that human health aspect of our story would be significantly more newsworthy than the other elements of our story" (US WWF).

In fact, the last decade of the 20th century, from the fifth biennial report on brings the threat to health of future generations to the forefront of political discourse for environmental issues, with "cancers" pointing the way into public perceptions of risk. As an uncertain and not fully understood etiology, cancer captures the public's imagination and focus. Sontag (1978) denotes a cancer "frame" or image as the ultimate attack on the natural and moral order. 'Cancer' sparked the urgency to act which rose with each biennial report. The sixth and seventh biennial reports reflected this mounting evidence of human health effects from Great Lakes contamination. Thus in 1997 the Quebec Ministry of Health and Social Services and the Agency for Toxic Substances and Disease Registry held a

Health Conference to endorse the notion that human health is being adversely

affected by contamination to the Great Lakes environment. It brought together

epidemiological, toxicological and wildlife biological science and helped

substantiate the salience of health in Great Lakes framing (ATSDR, 1997).

Let us note that the biennials tell a rich story. Things change at the biennial

scale as new evidence or interests jostle for attention. Emphasis on survival of the

species through reproductive problems (7th) and child health (8th) operationalized

the forensic frame in terms of scientific and political agendas. Explicit linkage to

the development and nurturing of children relates to the emotions of decisions

makers whom the reports are intended to convince. Wildlife, biota, and aquatic

ecosystem data fail to resonate so well. Compelling evidence to act presents itself

in 1996 as the need to consider the damage to our children (our future) from the

Great Lakes environment (ecosystem). The action framing of the last three biennial

reports has shifted from Great Lakes issues as reproductive health issues to child

health issues to species survival issues (9th Report) (see also Colburn 1996). This

shifting of how environmental health issues are framed in different biennials speaks

to the strategic nature of the IJC to make recommendations to both governments

that resonate with their existing conceptualizations of how the world "ought" to

be. The themes in frames point to threats to health, children and ability to

reproduce, convincing arguments for many individuals in North America society

(Health Canada, 1993).

5.3 Ecosystem Health

The Biennial Reports have their own history, context and culture; with the

signing of the Boundary Waters Treaty in 1909, the signing of the Great Lakes

Water Quality Agreement in 1972 and the subsequent Revisions in 1983 and 1987,

as well as, the ten Biennial Reports. The Revised GLWQA set a new agenda for

environmental health in the Great Lakes and hence both Canada and the United

States Parties frame and meaning of problems shifted. This new agenda was

founded in the context of an ecosystem approach to environmental management.

Policy ideas were to be set in this new context with significant attention to be paid

to humans within the Great Lakes ecosystem. The frame analysis in the previous

section demonstrated how human health frames acted as a 'hook' for

environmental policy in the Great Lakes. This section aims to expand on the frame

analysis with a formal analytic strategy using a semiotic schemata (detailed in

section 3.4.2). In order for semiotic signs and codes to be understood they need to

be set in the context of the frame analysis which will therefore serve as the

"intertext" for this interpretive analysis of text. An analysis of the Biennial

language can help reveal the nature of the framing of environmental health policy

discourse in Canada and the United States.

While all of the 627 pages of text cannot be reproduced to illustrate the

process of analysis, sections have been extracted for each component and analyzed

to show the procedure through which Table 5.3, the analytic framework, was

created. The selected sections represent the dominant theme within each

component. This table is based on a close reading of the text and assessment of

text and intertext to point to signs and codes acting in policy language.

Table 5.3.1: Signs and Codes in the text of the IJC Biennial Reports

SUB-COMPONENTS	SIGN, CODES, AND SIGNIFICATION
Affective Symbolism	integrity, responsibility
Shared values	vision, pride, honesty
System of Contact	ecosystem, prevention, integration, enforcement, long term public health, consensus
Metalinguistics	reason, co-operation, tolerance
Shared understanding of codes	social unacceptance, weight of evidence
Codes	collective strength, political will, power of the law, human health issues
Mode of syntagms	virtual elimination, zero tolerance, reverse onus, environmentally benign, multilateral intergovernmental framework, persistent toxic substances
paradigms	legacy of toxins, future generations, synergistic effects, interdependence
rules and generalizations	definition of 'healthy' and 'state', environment as linked to humans
constitutive conventions	to have integrity you must understand environmental health
themes	prevention, change, integration, social context, important
cognitive clusters	complex, new approach, interdependence, long term
link to assumptions	public voice/input needs to be heard
signifier and signified	modern economics signifies ecosystem, solution signifies no more pts, toxins signify danger, prudent action signifies prevention, urgent action signifies moral responsibility
surface vs underlying	health of Great Lakes means human health
semiosis in meaning	rhetoric to action, change means lifestyle change and no lifestyle change, jobs versus environment now jobs equals environment, no acceptable risk
shared rules, culture	pollution doesn't respect boundaries, Great Lakes issues larger than this one system
action implementation	government responsibility
context	change

Two words permeate through every biennial: 'integrity' and 'responsibility'.

In fact there is an evolution of the use of the term integrity throughout the

Biennials. This evolution is as follows:

> "To restore and maintain the chemical, physical, and biological integrity
> of the waters of the Great Lakes Ecosystem" (Article II, GLWQA 1972)
> Integrity of waters (1st Biennial)
> State of the lakes (2nd Biennial)
> Integrity of the environment (3rd Biennial)
> Integrity of the ecosystem (4th Biennial)
> Environmental integrity (5th Biennial)
> Environmental integrity of the ecosystem (6th Biennial)
> Integrity of the Great Lakes (7th Biennial)
> Integrity of the ecosystem and public health (8th Biennial)
> Integrity of natural environment (9th Biennial)
> Ecosystem integrity (10th Biennial)

The term "integrity" remains a steadfast theme throughout the biennials.

'Integrity' is used as a sign of *affective symbolism* shaping the emotion of

environmental health communication. Through this affective symbolism the

Biennials play upon the honesty, morality and pride of decision makers and the

wider audience. It inputs a sense of obligation and a moral judgement upon

decisions about the Great Lakes so as to assume a national treasure. This

resonates with the *shared values* by the public about the manner in which

environmental health issues are communicated. Implied are the Great Lakes as a

focus of 'pride' and a much needed 'vision' about how we need to proceed with

respect to environmental health connections. This vision sets out our

'responsibility' to prevent further degradation of the Lakes and therefore protect

our own human health. The values portrayed in the Biennial Reports are depicted

clearly in this quote from the Seventh Biennial Report.

"All sectors of society must accept their part of the responsibility to protect the
integrity of ecological systems, ..., all must have a shared vision and work together
to achieve the strategy's objectives instead of denying the need for action, even
when that action means fundamental change" (7th Biennial Report, 15-20).

In addition, the notion of integrity resonates strongly with Native Community

members, who consider the term one that is more resonant with their lifestyle than

non-Native peoples. The IJC acknowledged this fact in the following statement,

"...they (native peoples) still rely on the integrity of the ecosystem to a greater
degree than the non-Indian population, they are more directly and adversely
affected by disruptions of that system" (5th Biennial, 15).

The *system of contact* used in the Biennials is that of the 'ecosystem

approach'. Other approaches to decision making in the Great Lakes centre on

prevention, integration, enforcement, long term public health and consensus. All

of these terms are encompassed within the ecosystem philosophy. In fact this

approach is so dominant throughout the reports that in 1992 a 67 page document

by Allen, Bandurski and King was released titled The Ecosystem Approach:

Theory and Ecosystem Integrity. This document set the stage for much ecosystem

debate within the network of Great Lakes stakeholders.

"In a participative, technetronic democracy where success depends on getting
everyone into the action of planning for the future, there seems to be little basis for
hope in the outcome unless there is a common language and a common orientation

to the problem" (Allen, Bandurski and King, 1992, 41).

One of the biggest problems of language in recent Great Lakes documentation on decision making is that all the environmental terms "carry the baggage of their varied histories" (Allen, Bandurski and King, 1992,3). The terms have evolved from terms such as "sustainable development" to recent "ecosystem approach". Although, 'ecosystem approach' has been around for almost 20 years, its definition has changed and according to IJC Windsor is now a "vehicle being used to satisfy everyone's personal agenda". Terminologies associated with environment have changed with varying perspectives of interest to include environmental "integrity", environmental "vitality" and environmental "security". As seen in the frame analysis the rhetorical framework has remained the ecosystem approach since the beginning of the biennial reporting. However, within that frame the sub-frames have taken on varying interpretations of an ecosystem such as management control measures to reproductive health effects. The human health link to an ecosystem approach has changed the Biennials more than any other aspect of this approach (as concluded in the frame analysis). The ecosystemic language has provided an opportunity to drive agendas in the Great Lakes policy arena that otherwise would have remained in public health spaces. The Biennials are explicit in acknowledging this fact when a shift of policy frames happened in the Fourth Report with recommendation number twenty-four.

"The revised Agreement explicitly recognizes that humans are an important component of the ecosystem and the protection of their health is a worthy goal in its own right" (4th Biennial, 37).

"The increased importance given to human health in the Agreement and the high level of general concern have led the Commission to instruct its boards to give high priority to human health issue" (4th Biennial, 38).

"The Commission will be devoting more attention to programs related to human health in future reports and recommends that: 24. *The Parties give high priority to human health considerations and support research to understand the impact on human health of chronic exposure to small amounts of toxic contamination*" (4th Biennial, 38).

The communication of environmental health issues is also disclosed in the

Biennials through the social aspects of the text, *metalinguistics*. The Reports use

notions of reason, co-operation and tolerance in communicating to its audience

that a *code* must be shared by all in accepting responsibility for the integrity of the

Lakes. The codes are collective strength, political will, power of the law and link

to human health issues. These codes can only be understood if it is 'socially

unacceptable' to pollute the waters and there is an allowable 'weight of evidence'

to scientifically justify damage to the ecosystem. For example,

"... to build the mutual respect, mutual trust and a willingness to compromise that are also essential to meaningful consultation on such highly complex issues. A sense of shared responsibility and shared interest also increases the likelihood that differences will be resolved in an amicable manner" (1st Biennial Report, 2).

"...it is important to help create a climate where thoughtful, concerned individuals and groups will be encouraged to help find innovative, constructive solutions" (1st Biennial, 6).

"...there must be strict application and enforcement of zero discharge and other restrictions as appropriate, and meaningful penalties for violations. The theme that the time has come when the principle of the Agreement must be given the force of law, providing for prohibition of the creation and/or discharge of dangerous substances and for appropriate penalties for breach, and that attention to this requirement should be given top priority, ... thus bring together legalities and ethics with respect to our responsibility to preserve the environment" (5th Biennial, 12).

"Unfortunately, the global picture is overwhelming for the majority of citizens, and has led to some sense of hopelessness or disengagement. This trend needs to be reversed, and that can be achieved by showing that further progress can be made. But further progress can be made only if action is dedicated, collective and focused" (9th Biennial, 5).

Often new texts, *syntagms*, are used when language does not provide already identifiable text to explain a situation. The Great Lakes policy text is rich with syntagms adhering to the paradigms of the legacy of toxins, synergistic effects of chemicals, interdependencies of all living species and complexity of having to consider future generations. The following quotes are examples of the new text considered a mainstay of discussions around Great Lakes issues. Namely, virtual elimination, reverse onus, zero tolerance, environmentally benign, multilateral intergovernmental framework, and persistent toxic substances.

"The Agreement calls for the virtual elimination of the input of persistent toxic substances into the Great Lakes basin to protect human and environmental health. We have not yet virtually eliminated, nor achieved zero discharge of any persistent toxic substance" (6th Biennial, 2).

"The mounting evidence of the global nature of many persistent toxic substance problems suggests the need for a global strategy for some substances, within this multilateral intergovernmental framework. Such a strategy should recognize that all persistent toxic substances are dangerous to the environment, deleterious to the

human condition and can no longer be tolerated in the ecosystem, whether or not unassailable scientific proof of acute or chronic damage is universally accepted" (6th Biennial, 5).

"Transition to a cleaner and more environmentally benign society entails costs and risks and will involve an orderly process along a designed path to move toward sustainable development (9th Biennial, 2).

There is a cultural context forming around the new text and new conceptualization of problems and solutions. As part of the formal semiotic analysis two dominant themes of *rules and generalizations* emerge from the Biennials; first, that there is a clear understanding of the definition of "healthy" within the Great Lakes ecosystem and second, that the environment is an entity linked inextricably with humans. These two rules underlie the meaning of each Biennial Report and therefore build a cultural context for understanding environmental health issues. This context holds that everything is connected to everything else. To address issues of environment all other issues, social, economic, political, biological and otherwise, need to be included. By stabilizing this assumption of interconnection, a clear definition of "healthy" for the Great Lakes can be explored. In addition the meaning of "integrity" needs to be explored as it comes forth as a *constitutive convention* whereby the meaning of one term rests on another. Integrity of the Great Lakes is somehow linked to a healthy ecosystem and therefore linked to environmental health and human health.

This leads to patterns or *cognitive clusters* in the ways of thinking about

environmental health policy problems. The Biennial Reports want their readers to

think of the Great Lakes as complex and interdependent problems with solutions

that require long term commitment and a new approach. For example the Seventh

Biennial Report title "Everything has changed, but for our way of thinking"

summarizes the frustration within the IJC. After years of making clear the

connection between environment and human health in the Fifth and Sixth

Biennials, ways of thinking and conceptualizing problems and solutions has not

changed. The following are quotes depicting the cognitive clusters formed in two

Biennial Reports.

"...from an ecosystem perspective, all elements of the environment — human,
animal, vegetable and other— are interdependent and that what is a detriment in
the long term for one element will inevitably be a long-term detriment to others"
(5th Biennial, 13).

"All parts of the system are now recognized as interdependent ... society faces a
daunting, unresolved challenge: dealing effectively with persistent toxic substances
in the Great Lakes Ecosystem" (6th Biennial, 1).

It is clear from the Biennials that the role of the public is critical to any

change. It is paramount that the public be "engaged" in the issues. "As

technological and scientific limitation on progress become more apparent, the

challenge becomes increasingly one of engaging public support for the new

approaches and programs that are needed" (2nd Biennial, 2). As well the public

input is not only necessary but valued and labeled in the Fifth Biennial as "practical

public input"(5th Biennial, 14). The role of Great Lakes decision makers is not

only to deal with existing problems but also to impact on the prevention of future problems. Stakeholders are told they "...must empower citizens to act responsibly towards the environment" (6th Biennial, 3). Public input is a powerful assumption that flies in the face of the action implementation signs that emerge through this semiotic analysis. It is government responsibility to alter attitudes, perceptions and values of the public. This presents an interesting direction for political power in knowing what is best. What is particularly challenging in this finding is the filter of science (that will be discussed in the following section) to government and the role and interpretation of science in setting environmental perceptions and realities.

Interdependence of values and facts is clear when identifying the *signifier and signified* in the Biennials. The semiotic analysis reveals that urgent action on environmental health issues signifies a moral responsibility, prudent action signifies prevention, toxins signify danger, a solution signifies no more toxins, and 'modern' economics signifies an eco-systemic approach to economy. The following quote is an example of the paradox of economy and environment.

"...overall policy response to the environmental health studies and public concern to date must be characterized as limited and disappointing... just as human health is dependent on the absence of environmental degradation, however, ecosystem integrity is dependent on more than environmental quality. It also must include economic, social, cultural, and political dimensions, not the least of which is a healthy population and healthy communities. ... Paradoxically, a healthy environment depends on the existence of vibrant local and regional economies" (7th Biennial, 14).

This paradox underscores the meaning of health within the context of the

Great Lakes. Health of the Great Lakes means human health. To speak of change

is therefore to speak of lifestyle change however it is unclear whether such drastic

measures are needed. For example,

"Society — governments, entrepreneurs, labour, scientists and educators — can
deal with this problem [of persistent toxic substances] without destroying the
lifestyles we enjoy. Society does not want to destroy its economic or social
vitality, nor is this necessary. A carefully planned and deliberate process of
transition away from the persistent toxic substances we now produce and use to
more environmentally and humanly sustainable patterns of production and
consumption is needed. This transition should protect the vitality of business, the
earning capacity of labour, the integrity of the natural environment, and the
potential for our current and future health" (8th Biennial, 13).

It is precisely this *semiosis* in meaning that can shift the entire process of

implementation for change. It was presented in other Biennials as follows:

"Surely it is time to ask whether we really want to continue attempts to *manage*
persistent toxic substances after they have been produced or used, or whether we
want to begin to *eliminate* and *prevent* their existence in the ecosystem in the first
place" (6th Biennial, 3).

" Yet, Great Lakes basin inhabitants continue to be the recipients of persistent
toxic substances produced and justified as the basis for jobs and our way of life. ...
The changes in personal responses must be so fundamental that the old mindset of
"jobs vs environment" is replaced with a recognition that "environment = jobs" (7th
Biennial, 20).

The rules which make the issue of environmental health universal across

cultures is the reality of the scientific fact, meaning that science tells the truth of a

problem. The original GLWQA and its revision in 1978 that adopted an

ecosystem approach did not fathom the true complexity and severity of the

problem within the Great Lakes. It was in the Third Biennial of 1986 that

explicitly stated the pieces of the puzzles are more "scattered and invisible" than

ever thought before. Implementation would therefore have to target deeper

changes within the society than previously thought.

For example the *action implementation* revealed that,

"Unless the attitudes, perceptions and values of government officials and all the
citizens of the Great Lakes Basin are reasonably consistent with an ecosystem
approach, implementation of the general and Specific Objectives of the Agreement
will be difficult if not impossible to achieve. The Commission believes that new
initiatives on the part of the Parties are required to give a continuing sense of
purpose, direction and commitment to Agreement activities. A clear sense of unity
and direction on issues central to the Agreement is required. (1st Biennial, 5).

"People are becoming more aware of the problems related to Great Lake water,
and their perceptions and attitudes are increasingly important" (2nd Biennial, 1).

The government players are "praised" for their "wisdom and foresight" in adapting

an ecosystem approach to the problems and solutions of the Great Lakes.

However their role is limited by the other players involvement and co-ordination.

And "much work remains to be done" (IJC Biennials). The following are

examples of these themes as stated by the IJC.

"While governments deserve praise for support of the ecosystem concept, there are
mixed results in its actual implementation under the Agreement" (3rd Biennial, 3).

"At the time the 1978 GLWQA was negotiated, the principal impetus for an ecosystem approach come from scientists, who were increasingly describing and explaining phenomena in terms of ecological systems. Despite its novelty in that context, the Governments' negotiators had the wisdom and foresight to incorporate an ecosystem perspective into the new Agreement" (3rd Biennial, 2).

"Governments have implemented programs to alleviate much of the highly visible pollution from municipal and industrial sources, and to prevent pollution from shipping sources, although much remains to be done in implementing these programs. ... the goal of "virtual elimination" of inputs of persistent toxic substances to the Great Lakes remains an unmet challenge" (4th Biennial, 5).

"Governments at all levels have allocated billions of dollars toward achieving the Purpose and Objectives of the 1972 and 1978 Agreements. Progress has been achieved, but much remains to be done" (6th Biennial, 5).

There seems to be some confusion assessing the implementation strategy and institutional structures around implementation. From the IJC perspective the government lacks effective implementation strategy.

"...the problem lies not with the basic legislation, but with significant barriers to the effective implementation of this authority" (7th Biennial, 10).
"...focus of attention should be on implementation of what the Governments of Canada and the United States have already agreed on, rather than on new undertakings" (7th Biennial, 17).
    Throughout the Biennials the level of understanding assumed by the language is bound by its *context*. This context is different from the cultural context that emerged through the rules and paradigms of the formal semiotic analysis. The language of the Biennials asserts and proposes a context of "change". The type of change necessary are; 'fundamental', deliberate 'transitions', and 'inevitable'.

"All sectors of society must accept their part of the responsibility to protect the integrity of ecological systems, ..., all must have a shared vision and work together

to achieve the strategy's objectives instead of denying the need for action, even when that action means fundamental change" (7th Biennial, 15-20).

"Governments must lead this deliberate transition towards environmentally and humanly sustainable production and consumption to ensure that future generations have a sustainable future" (8th Biennial, v).

"Change is inevitable. Our understanding of Great Lakes issues continues to evolve; the concept of governance continues to change. So must institutional structures and society's way of thinking. To ensure that the product of change is what society desires and seeks, people must fully participate in the transition process. The challenge is how to proceed. (9th Biennial, 27).

Table 5.3.2 attempts to show the overall "atmosphere" of the Biennial

Reports. This table is a summary of findings from the schema presented in 5.3.1.

It reflects a thematic interpretation of the signs and codes for each component and

sub-component of the textual analysis. It presents one interpretation of the

dominant meaning as carried out in the semiotic approach. The overall

interpretation for *communication* of environmental health is image or reputation,

that results from considering the commonality between integrity, legacy,

ecosystem, discipline and power. An aura of reputable status is communicated.

The *units of analysis* consider the power of many and need for drastic change that

together address the elements of a coalition working united on an issue. In the

formal analysis component of the schemata the commonality linking long term,

healthy, environmentally healthy, and change is their reference to persistence. For

comparisons, the overall theme is humanization resulting from the link drawn

between thinking, inclusion of the public and morality. In *penetration of the text*

the commonality between health of the Great Lakes, individual health, and lifestyle change is the element of personal health. Considering the *perspectives* component, public results from an interpretation of themes that are carried through global, government, and change.

This semiotic analysis concludes that policy language influences the focus and understanding of environmental health. A dominant meaning emerges from a close look at the Biennial Reports. Overall environmental health is communicated by image and reputation. It uses coalition as its power and persistence in humanizing evidence linking environment to health as the key to effective action implementation. The Great Lakes are bound to a public context and therefore the IJC has approached its policy making in a public domain. The penetration of text reveals a strong root of future change in the hands of personal health of the Great Lakes ecosystem, namely human systems.

Table 5.3.2 Interpretive analysis of signs and codes

Communication of "environmental health" system

Affective symbolism	integrity
Shared values	Legacy
System of contact	ecosystem
Metalinguistics	disciplined
Shared understanding	power
Overall	*Image, reputation*

Units of Analysis

code	Power of many
mode of syntagm	drastic change
overall	*Coalition*

Formal Analysis

Paradigms	Long term
Rules and generalizations	healthy
Constitutive conventions	environmentally healthy
Themes	Change
Overall	*Persistence*

Comparisons

cognitive clusters	thinking
link to assumptions	including public
signifier and signified	morality
Overall	*Humanize*

Penetration of Text

surface	Health of Great Lakes
underneath	Individual health
semiosis	Lifestyle change
overall	*Personal health*

Perspectives

|	
shared rules, culture	global
action implementation	government
context	Change
overall	*Public*

The interviews with various key players in the Great Lakes add 'intertext' to this discussion and analysis of the biennial reports. From the interview data it is clear that the Biennial Reports do the following: "engage issues", "precipitate political debate", "move environmental policy", "enhance awareness", "influence government", "popularize evidence" and "develop cliches". These themes thread through all stakeholder groups and create an intertext of credibility and belief in the use of the Biennials in the Great Lakes policy arena. The policy space is thus reconstructed through the frame analysis, interview data and semiotic analysis.

5.4 Conclusion

Ecosystem health is an umbrella term and approach under which any agenda can be legitimately pursued under the GLWQA. It has allowed policies and the language of policy debates to frame their arguments around human health issues. The frame analysis showed a clear evolution and shift in frames over the past 30 years. This concurs with Sabatier's view of the time needed for evidence-based policy shifts to occur. Over 30 years and specifically under the umbrella of ecosystem health, human health frames have dominated Great Lakes policy discussions. It has filtered out of all other frames to be the most important construct of policy making in issues of environmental health (see Figure 5.4).

The semiotic analysis of the Biennial reports exemplifies the importance of policy

**Figure 5.4 Unpacking Our Understanding of the Frames of
Decision Making in the Great Lakes**

ECOSYSTEM HEALTH

Water Quality

Aquatic Biota

Wildlife Species

Environmental
Health

Human Health

Policy Making Frame
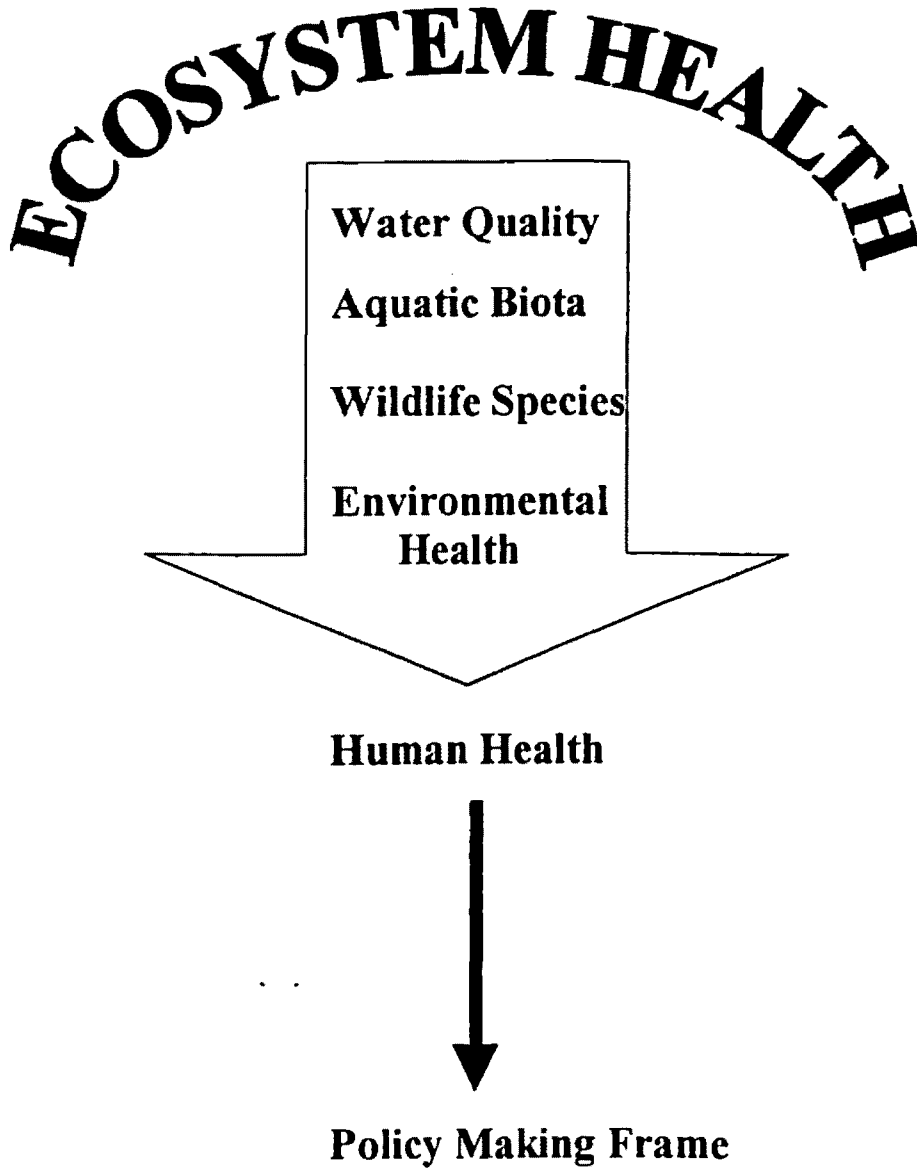
language in understanding environmental health issues. A language system is a part of the policy context for the Great Lakes. Particularly adding meaning to a strategy for using human health as a 'hook'. Human health surfaces through several components of the semiotic analysis as an assumption linked to strong societal values of integrity and self-respect. Through its policy frames and semiotic constructs the Biennial reports create a vision of the Great Lakes as a part of ourselves physically, emotionally, and spiritually. How then does policy change happen? The next chapter explains the role of science in this complex process.

CHAPTER SIX: ROLE OF SCIENCE IN DECISION MAKING
Great Lakes Information

6.1 Introduction

Chapter Six is the last of three empirical chapters in this thesis. This

chapter addresses the critical role of science in Great Lakes decision making. As

stated in the previous section, policy making involves more than evidence, it

involves values and a policy subsystem of key players and international political

structures. For policy, science speaks to a truth or reality about what is going on

or facts provides in a given situation. Science is often perceived as proof, yet

policy must often consider a weight of evidence approach to decision making

based on an acceptable level of risk. The complexity of this relationship lies in the

quest to find a particular "truth" by policy makers and the communication between

science and policy in making decisions about environmental health issues. This

chapter presents the views of the key informants and stakeholders in dealing with

these complexities. Thus a third layer is added to the exploration of the Great

Lakes policy process.

This chapter uses the stakeholder's perspectives of the role of science in

Great Lakes decision making as stated in the key informant interviews. In

addition, the role of science is investigated in reports of a number of IJC

Workshops around this issue; namely, 1988 Workshop on the Role of

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Epidemiology in Assessing the Effects of Great Lakes Water Quality on Human

Health, 1989 Workshop on Cause-Effect Linkages, 1992 Workshop on Scientific

Challenges for Regulatory Decision Making, 1992 Virtual Elimination of Persistent

Toxic Substances, 1993 Workshop Applying Weight of Evidence, 1993 Workshop

on Risk Assessment, Communication and Management in the Great Lakes Basin,

and 1994 Workshop on Dialogue Between Science and Community. These

Workshops were chosen because they all address explicit efforts by the IJC to

understand the role of science in Great Lakes decision making. These seven

Workshops deal with a cross section of issues of importance around science and

policy, namely: weight of evidence approach, risk communication, and science as a

'truth' of cause and effect relationships.

According to the stakeholders in their interviews, the IJC consistently

surfaced as pivotal in bringing science and policy together in the Great Lakes. The

IJC relies on its two joint institutions established under the GLWQA — the Great

Lakes Water Quality Board (WQB) and the Great Lakes Science Advisory Board

(SAB). As principal advisor to the IJC, the WQB is composed of 20 program

managers and administrators drawn from the two federal governments, the eight

states and two provinces in the Great Lakes basin. SAB, whose 18 members

represent a broad range of disciplines, provides science advice to both IJC and

WQB. In 1984 the IJC established a Council of Great Lakes Managers, whose 22

members are responsible for research programs related to implementation of the

Agreement. Membership in these institutions is determined by the IJC. These three groups are the predominant pathways of science reaching the Great Lakes policy arena. Through workshops and meetings organized by the IJC these members collaborate on the future of the Lakes.

6.2 The Truth?

Historically the truth has only been about the physical science of the water in the Lakes. However since the introduction of the ecosystem approach and the subsequent focus on human health, the truth is now more broadly defined. For the Great Lakes, the 'truth' refers to all of what is happening chemically, biologically, socially, economically, politically, and physically in the Basin.

It has been said by some in the Great Lakes community that science is a big part of the truth (IJC Windsor). It has been stated by many in government positions that it is "absolutely critical" to "make sure we're doing the right thing and that we're addressing the right problem" (Environment Canada). In fact, for policy making science is the "rational approach" for implementing policy. However the "truth" may be subjective. In the Great Lakes the truth depends on who you are.

"What I would say is that everyone can live in a democracy and everybody is allowed to interpret things the way that they want to see it. Some people are wearing rose coloured glasses, and others are not, or we're all wearing different shades and we may see different things depending what we want to or choose to see" (IJC Ottawa).

"...industry scientists will say a chemical is safe; academics will say, gee we've got evidence that maybe it isn't so safe; and government scientists, if you're in the environment department you might say, gee this is pretty terrible; and if you're a scientist in an industry department you might say, well you got to sort of weigh the risks and benefits of jobs and employment and export markets and that kind of stuff. A lot of things go into scientific debate and somebody has got to still do something out of it at a given point in time and make a decision and go in a certain direction" (Environment Canada).

"I mean if you are industry policy, industry will pick and choose the science. If you're looking government policy, they may pick and choose the sciences. If you're looking at public policy at the community level, you know the municipal, I think the kind of science might vary to what federal governments look at. So it really depends on... and it gets done as to how you interpret the issues. And I think community knowledge is very important. Now to me that's part of a science, but some people wouldn't even consider it a science. So it depends on your vision. I see it as a science and I see it in certain levels of policy making not even considered and I think at other levels it drives the policy making. So it really depends on who the policy makers are." (GLHEP).

"I think if it's ignored or denied it's interpreted according to what they know or perceive. You'll have the whole gamut, the whole spectrum. From industry to environmental groups who will have diametrically opposed views of the same piece of science, and it depends on what their ends are. Obviously the governments are planted in the middle, right? Environmental groups will use the science to push the science to limit, to state whatever it is that they want to state and to make a point. The industry group, from their point of view, also look at the science and address the weaknesses of the science., and be far more conservative as to what the science is telling the environmental group. We assess the science and based on what we know, this is what we will come up with. It could be somewhere in the middle. It could even be at one end with the others, depends on what the science is telling us" (GLHEP).

Science for policy is complex. It is complicated by how the different judgements

about evidence are weighed in light of the uncertainties and necessity to make

decisions. Pierre Beland, before he became an IJC Commissioner highlights this

fact at the 1992 Workshop on Scientific Challenges for Regulatory Decision

Making,

"In the sociopolitical arena, decision making is based as much on experience as knowledge. Scientists have a lot of experience, but generally they refrain from using it" (Pierre Beland, presentation 1992 Workshop).

Another complexity comes from the nature of science to provide proof that

a cause-effect linkage exists in an environmental health situation. For science to be

persuasive to policy makers, this proof is essential.

"...[I]f you want to go and be persuasive you have to have what I call this forensic evidence, which is the evidence of the actual damage which has been done together with the experimental evidence which corroborates that what you believe has actually did cause it. And that really should be the powerful incentive for actually implementing policy or in developing a new policy" (IJC Windsor).

"In the way of government policy development or legislation or regulation without a good scientific basis on which to build. It would be a house of cards otherwise. You develop a regulation to control something and you couldn't prove the cause-effect relationships, clearly someone would take you to court and the whatever thing you tried to do would be thrown out of court" (Environment Canada).

"Well I think you need to have enough evidence to alert you to a substantial probability of a problem. But I don't think we can, in many cases, afford to wait until absolute proof, if you want to call it that or very high standard of evidence that's demanded to have proof without a shadow of a doubt, in kind of criminal sense. I don't think we can afford to wait that long for most of these substances. But obviously you don't want to start doing things without any obviously don't want to start doing things without any evidence either. And then it becomes a policy judgement as to when is enough enough, or a scientific one." (IJC Ottawa).

"What I'm saying is science is important but I think governments as decision-making bodies are getting fairly adept at taking some scientific information, extrapolating it, making a decision that is prudent, and then racheting down if the scientific evidence indicates there is more severe problem than we thought." (Environment Canada).

Therefore, truth is determined by who you are (the speaker or author) and how

persuasive the body of evidence is in demonstrating a plausible cause-effect

relationship.

The IJC's Council of Great Lakes Research Managers held a workshop on Cause-Effect Linkages in March 1989. This workshop explored the use of five causality criteria in relation to outbreaks of diseases in biota in the Great Lakes basin that are suspected to have been caused by chemicals. The five criteria are; time order, strength of association, specificity, consistency, and coherence. These criteria are from a traditional epidemiological tool in determining biological plausibility of a suspected cause resulting in a specific human disease (Susser, 1986). The next section 6.3 will explain this further through an illustration of epidemiological research methodology. These criteria are used by the IJC precisely to determine the 'truth' and 'proof' of a cause-effect linkage between persistent toxic substances found in the Great Lakes and health, specifically human health. At this workshop case studies were presented to a multidisciplinary group of scientists and regulators for the following: liver tumors in brown bullhead fish (Bauman), reproductive impairment in trout fish (Mac and Edsall), decline in bald eagles (Colborn), outbreaks of chick-edema disease in fish eating birds (Gilbertson, Kubiak, Ludwig, and Fox), embryonic mortality and deformities in snapping turtle eggs (Bishop, Carey, and Brooks), decline in mink and otter populations (Wren), cognitive behaviour impairment of human infants of mothers who ate Great Lakes fish while pregnant (Jacobson). After the presentation of such case studies it was only too clear to some participants that this body of evidence provided a strong

cause and effect relationship between persistent toxic substances in the Great

Lakes and health effects. Therefore a 'truth' had emerged. The next step is more

complicated and difficult.

The next step is then to design a strategy for implementing virtual

elimination of persistent toxic substances in the Great Lakes. The discussion at the

1992 IJC Workshop sponsored by the workgroup on Ecosystem Health centered

on this very challenge. At the core is new language around virtual elimination in

that a 'functionally healthy ecosystem' is the true measure of success.

"The ultimate measure of our success in achieving the IJC's goal of the virtual
elimination of persistent toxic contaminants will not be our attainment of some
measured concentration calculated by a regulatory agency, but rather the absence
of gross and subtle manifestations of toxicity and the restoration of a functionally
healthy ecosystem" (Glen Fox, Canadian Wildlife Service, presentation at the 1992
Workshop).

Further it became clear through this workshop that values were a

significant component of scientific interpretation and in discerning what science is

'saying' all components must be investigated.

"There is particular concern that expert scientists called to give testimony tend to
synthesize evidence in ways that they may not make explicit. They, as all of us, are
driven by their own values. We need to get those values laid out, get the
assumptions and values up front, because they are always there, and they are
critical in the way one synthesizes conflicting evidence" (Presenter at the
Ecosystem Health Workgroup workshop 1992).

The implication in this quote is that only certain values are wanted when weighing

the evidence. Weight of evidence therefore includes "getting assumptions and

values up front". This led to the 1993 Workshop on Weight of Evidence whereby

'weight of evidence' is now used as a surrogate for 'causality'. How one sees the

evidence, through their values, impacts on whether a strong cause-effect linkage

exists. With the understanding by scientists and policy makers that science does

not exclude values then putting a weight of evidence approach into practice is

significant.

"Weighing evidence in order to decide upon a course of action under
circumstances of uncertainty is not a value-neutral exercise. ...The goal, rather, is
to make inferences that can inform a course of action that will minimize the
likelihood of significant harm. When the harm is large, the uncertainty is great,
and our ability to predict the future is limited, we adopt a precautionary standard
to judgment and inference." (Weinberg and Thornton, 1993 IJC Workshop on
Weight of Evidence).

Subsequently in 1997, the Agency for Toxic Substances and Disease Registry

(ATSDR) and Health Canada sponsored a health conference to combine the body

of evidence from wildlife biologists, epidemiologists, and toxicologists of the

health consequences associated with exposures to persistent toxic substances. The

weight of evidence was·gathered around exposures to PCB's, dioxins, chlorinated

pesticides and mercury. Particularly the effects on susceptible populations such as

certain ethnic groups, sport anglers, the elderly, pregnant women, children, fetuses

and nursing infants. Together the evidence made a convincing 'case' to the IJC for

linking environment to health in Great Lakes. However, knowing the science is

only one piece of the decision making process in the Lakes.

In the Great Lakes decision making process the interpretation of science or

weight of evidence explicitly involves values. Values underlie the perception that

science is the truth. However, it is those same values that change the truth

through their strong connection to socio-economic structures of society. In 1993

this tension and connection between science and policy is proposed.

"A large part of society believes that if we can get enough science and technology
we can solve the problem. Science is a system of inquiry. It is not a system of
answers or of decision-making. No matter how much science we have, there is
always more science we will want and need and we will never have all the answer,
but decision making comes through judgment, wisdom and ethics. Science is a
tool, not a solution. And so we need to use the best science we can, but we've got
to go beyond that and be guided by ethics.

...

It seems that there are no easy answers in these complex issues, since it is difficult
to make policy decisions to protect an ecosystem or a sensitive species when there
will be effects on the socioeconomic structure of our society." (IJC 1993
Workshop on Weight of Evidence)

Central and pivotal to overcoming this tension is how science is communicated to

non-scientists. This role of "policy broker" (Sabatier, 1987) for science is held

predominantly by the IJC.

"The IJC's *formal* mandate is to pass on messages such as this to the Governments
of the United States and Canada. But recently [1992], the Commission recognized
that it also carries an informal mandate: to act as a locus for interventions from the
public and activist groups who are concerned about health issues, particularly in
the Great Lakes basin." (IJC 1992, 1).

In this position the IJC holds the power to persuade policy makers through a

recognition of what values and what science are to be brought together. The

communication of acceptable risk (see section 6.3) is inextricably linked to the

societal values which weigh the evidence differently than scientists themselves.

After the 1992 Workshop a report was released titled Our Community, Our

Health: Dialogue Between Science and Community. The following description of

the process and players of communication of science was made:

"Once a valid scientific case has been made it must be transmitted from the
scientific community to the regulatory community. These communities have
traditionally been two solitudes with unsatisfactory communication between them.
The science has, at times, lain dormant in the scientific literature for more than a
decade until a non government organization or the media have prepared a polemic
story and politicized the issue. As a public constituency is built for the case, the
issue may come to the attention of the politicians and regulatory community. Thus
science has been used to influence public perception and thereby used to leverage
public policy and risk perception." (IJC 1992, 7).

According to the interviews this process still holds true. In fact, the 'truth' rests

on who you are because your perspective in the weight of evidence rests partly on

values. As seen in Chapter 4 the values are different across stakeholder groups

and the coalitions that form interpret science differently. For example, how

environmental groups weigh the evidence of human health effects from toxins is

different from the way industry weighs that same evidence. The difference in

weights is due to differing values that frame the science in a particular manner.

In conclusion, this section on truth has presented the empirical findings

from the interviews and various workshop documents around the role of science in

decision making. Since participants were only asked about the role of science as

one piece of the policy making pie, their messages were not focused on the detail

of the science but rather the nature of science in this policy role. To further make

sense of these findings the following section will couch the "truth" in light of the

reality of working in the area of risk estimates and acceptable risk. The following

section also serves to highlight the nature of science in policy.

6.3 Risk Estimates

"The [IJC] Commission has tended to endorse the use of risk assessment

for priority setting and in deciding what problems are worth pursuing and which

are not" (IJC 1993, 29). These priorities are shared with the stakeholders at large

through Priority Reports published biennially opposite to the IJC Biennial

Reporting Cycle. The Priority Reports present all the considerations of each IJC

Board in making recommendations to the Parties. The prioritization process is

based on science and values, predominantly through a weighing of risk estimates.

Environmental health policy responds primarily to public concern about

human health effects from exposure to environmental contaminants. Since science

(specifically epidemiology and toxicology) is limited in its ability to determine the

definitive cause and effect of such concerns, policy is often bound to estimates of

risk for prudent action. Environmental health policy relies on risk assessment and

management, in that it has a responsibility to determine what society feels are

acceptable risks. Risk management is a socio-political process (Chu and Simpson

1994). It involves weighing the benefits to society against the risks on a subjective

scale that imputes moral responsibility, values and assumptions about what defines

a risk or benefit.

"The two countries that share the Great Lakes have the luxury of making the
environment an issue of moral relevance. In many developing countries,
environment is not treated as morally relevant. But in much of North America, the
environment has become a moral issue in the same way that our children, the
elderly, and the sick are treated as moral concerns" (IJC 1993, 30).

Since exposure to risk is not always voluntary, the management of risk also

involves the allocation of responsibility to those involved in putting a population at

risk. Leiss and Chociolko (1994) state that risk management is "an institutional

decision on how best to control the assessed risk" (28). By asking the question

'what is acceptable by society?' in essence the population is being asked to

consider what is both socially and financially tolerable. This brings to light the

significance of the socio-political context of a risk, hence the values of a society

(Harrison and Hoberg 1995). In Canada, risk management procedures build on

cost-effectiveness, risk benefit, benefit cost, and socio-economic impact analyses

(Leiss and Chociolko 1994). Each of these procedures is bound to subjective

interpretation of benefits and costs based on societal values (namely interests,

motivations, incentives). In contrast, American risk management is made on the

basis of mathematical models that also do not escape value judgements in setting

acceptable levels of risk.

"The Water Quality Board concludes that both Canada and the United States have developed formal frameworks for health risk assessment and risk management. These frameworks are generally similar and take into account hazard identification and risk estimation, as well as strategies for risk management" (IJC 1993, 31).

In policy, managers tend to err on the side of safety. However, risk averse behaviour is criticized for its emphasis on overprotection. Depending on one's interests the definition of 'overprotection' changes. In fact, risk management results in disagreements among social interests because they all have interest in underestimating the risk and maximize their benefits. Note that benefits are sometimes not defined in terms of improved health (Prager 1983) but can be defined as economic gains or social status. The political nature of managing risk in society results in often subjective determination of what levels of risk are acceptable. Of significant importance to this socio-political system are the consideration of the needs of high risk groups and the cumulative risks for a population.

In the Great Lakes policy process, acceptable levels of risk are often in question. Levels of persistent toxic substances and the impact on human health of those living in the Basin are examples that specifically put into question, the nature of the environment and health relationship. For the purpose of decision making, the IJC Advisory Boards are put in a position to weigh the evidence and use that to make recommendations to the Parties. In particular the weight of evidence is about assessing the risk to human health. From the IJC's perspective this process is more political than scientific and this is exemplified in the following quote: "I

guess your own internal instincts help you gauge whether something is strong or not strong" (IJC Ottawa).

Who decides on acceptable risk (Prager 1983)? If the benefit is not improved health then what risk is acceptable? Is it to be determined by the public, all stakeholders, politicians, scientists? If a role is for the public then they will need to be educated and informed. Ideally a consensus of all stakeholders would best address society's values concerning what they consider to be the benefits, costs, and risks (Leiss and Chociolko 1994). The answer to the question is a multi-stakeholder consultation in determining acceptable risk. This is precisely what the IJC has done through its Boards and subsequent Workshops. Bargaining and negotiation are necessary to determine the risk benefit decisions that suit the population at risk. Understanding the elements that constitute risk uncertainty may help to clarify the development of policy making in the Great Lakes.

Acceptable risk levels for cancer causing agents are particularly contentious. There is apparently no safe level for such exposure. In fact, negative studies are not accepted as proof that the substance is not carcinogenic on the grounds that lives are more important than money (Harrison and Hoberg 1995). In these instances where there is question of cancer as the attributed risk to a population, public health practice almost always errs on the side of safety. Cancer has become a political term in environmental health policy motivating action by policy makers in a light of moral responsibility to protecting humans from its threat

(Burger 1990). For example, the early 1970s saw much interest in PCBs. Extensive research was carried out to determine their biological properties. Uncertainties were diminished significantly with no conclusive evidence linking exposure to PCBs and cancer in humans. However like all science, questions were generated and new hypotheses considered. A scientific outcome of inconclusive evidence instills fear in public. An agenda of national concern still exists with respect to PCBs and human health despite the plethora of scientific evidence that states there is no relationship. There are still expectations of scientific certainty by the public and government. In fact, despite the science it is seen as a moral responsibility to ban PCBs (Burger 1990).

The problem with water pollution policy it that it is often difficult to assess the route of human exposure. Of the 66,000 chemicals in the environment, only 105 have been regulated in the American Water Act. The EPA explains that this is because there is not adequate toxicological data. Yet there are instances when the harmful health risks are known and nothing is done. For example, TCE (trichloroethylene), an industrial solvent, is known to cause kidney damage when ingested by humans. The EPA believes there is no safe level of exposure to TCE. But, there are no rules prohibiting consumption of water with the solvent in it. In fact, waters in southern California have tested in excess of what the EPA suggests should be a maximum concentration. This example illustrates the uncertainty, in the form of lack of political will, and values, that still surrounds how acceptable

levels of risk are determined and implemented through policy into regulation standards. The process is fraught with subjective judgements right through to the end (enforcing regulations).

Risk analysis to determine an acceptable level of risk for society is as political as it is scientific (Smith 1992). The science of environmental health problems is based on epidemiological studies and extrapolation from toxicological studies. Methodological limitations of the studies may result in questionable degrees of confidence in the data for a risk assessment. Risk assessment depends on choice and interpretation of data, extrapolation modes and choice of exposure assumptions and models (Bates 1994). It can be manipulated on each criteria. Therefore the range of risk estimated for one exposure case can be wide. In fact, the process has become political in the sense that the choices of interpretation and models are based on value judgements.

Communicating Risk in the Great Lakes

Science is not usually communicated to policy makers by scientists. It filters through other channels such as media, public outrage, non-government organizations, and in the case of the Great Lakes through the IJC. Academic scientists working on the Science Advisory Board of the IJC say "it is nobody's job to communicate science to policy makers but someone should do it" (Academia -United States). An IJC Commissioner states "but we have to find a

way for scientists to be closer to the public arena, closer to the policy making and

decision making process". It appears critical that the element that is most

important for effective policy making in the eyes of all stakeholders must be

communicated by someone that has knowledge of both the politics and science.

"There are a few of us who are at that strange interface between the science. We understand the science and the regulatory community. The real problem is that those people at the interface tend not to be regarded with any esteem by the group, but they are essential conduit between them. But because they haven't got the white lab coat on and because they're not writing regulations, they're not doing the real job. And they don't understand in fact that whole sort of communication process through the interface is really critical to anything getting done." (IJC Windsor).

A major issue that surfaced through the interviews is that the regulatory

community and the scientific community "don't know even who the other people

are. They don't know who they ought to be talking to" (IJC Windsor). It appears

the process of decision making in the Great Lakes relies heavily on the IJC to bring

together these communities. The power of the IJC then lies in their ability to

determine who to bring together and how to interpret the science once an

exchange of information is established. However regulators still rely on factors

outside of evidence.

Policy makers in Canada admit that "There is an art to politics. And that's

one of the arts in terms of kind of reading the tea leaves and making some political

judgements about which direction to go in" (Environment Canada). The

implication of communicating the "truth" is that it depends on who determines

what the truth is and foremost there is no guarantee it will be received as a truth
(this depends on what the values are that couch it). Communication of science is
dependent upon the filtering of information from science to policy by the IJC and
the values held by the decision makers.

6.4 Conclusion

As Figure 6.4 shows the perception of scientific knowledge for decision
making is delineated between some idealistic truth and arbitrary propaganda or
non-scientific truth. The role of science in Great Lakes decision making lies in the
determination of a 'good' estimate of risk. Environmental health evidence and
science are limited by the inherent complexity of the issue and the limitation of its
methodology. Hence if science is partial so too are the "truth" and "proof". Such
relativity is at the core of many policy debates, particularly in the Great Lakes
where the costs to society are immense if the prudent action or inaction is wrong.
The relative risks are different between economic health and environmental health
in society. This chapter has brought together the importance of the interpretation
of science in a political process, the significance of human health evidence in
connecting science and policy, and finally the challenging role of the IJC in
speaking all languages to each stakeholder.

In conclusion, the interview data reflect the problems and responsibilities of
science and policy to connect in a meaningful way in order to fulfill a commitment

Figure 6.5: Unpacking our Understanding of the Role of Science
in Great Lakes Decision Making

Perception of Scientific Knowledge for Decision Making
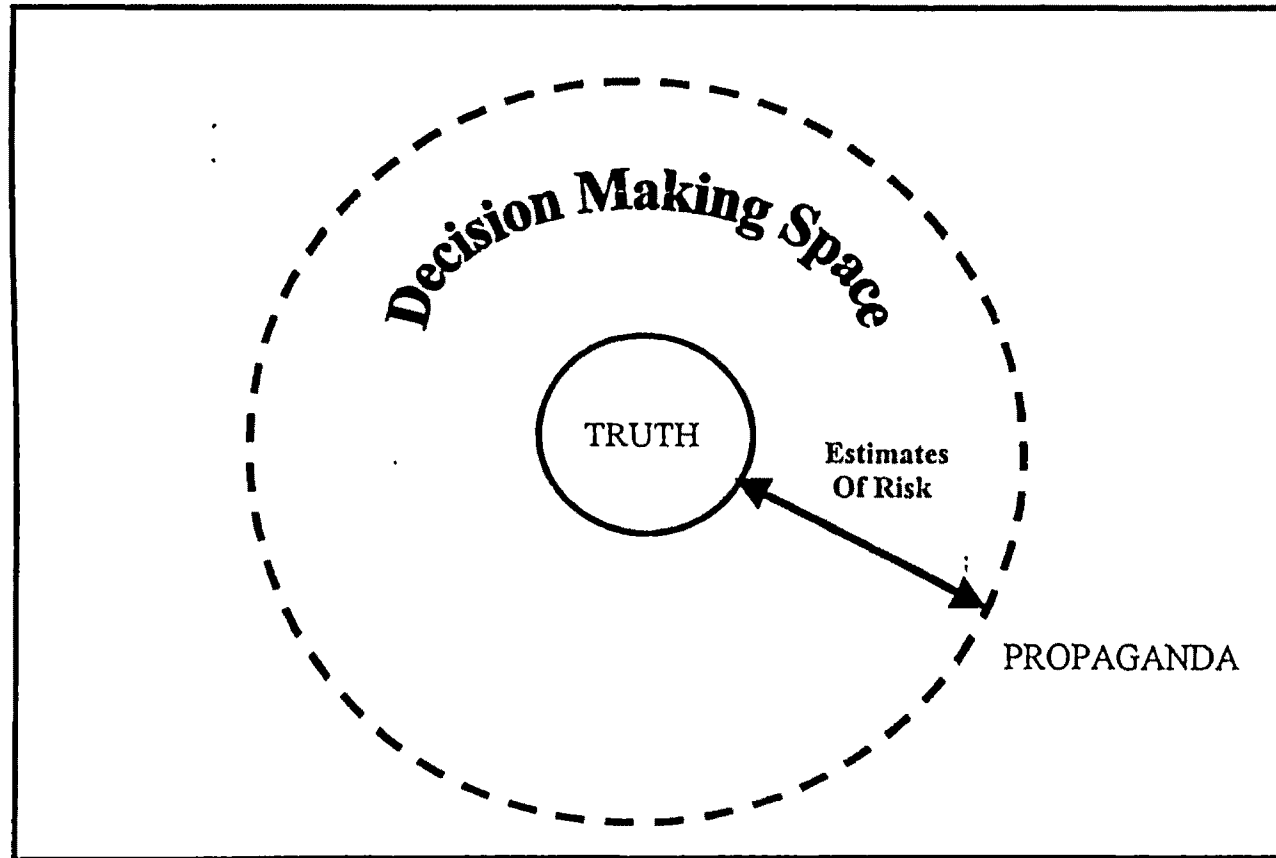
to ecosystem integrity in the Great Lakes. Without an understanding of the

limitations of science to carry the burden of this responsibility, policy and decision

making among multiple stakeholders will remain difficult. The Great Lakes policy

system is fraught with multiple interpretations of a problem or issue coupled with

the complexity of depending upon science to provide answers.

CHAPTER SEVEN: FACTORS AFFECTING POLICY CHANGE

7.1 Introduction

The previous three chapters provide a thick description of the Great Lakes policy process. The purpose of this chapter is to provide the first steps in gathering evidence about the factors affecting the 1989 policy change that occurred, with human health becoming a primary mechanism for change in the policy arena. The layers of complexity were peeled back through the three methods of analysis, interpretive policy analysis, frame analysis, and semiotic analysis.

This chapter presents an explanation of policy change according to the framework of Sabatier and Jenkins-Smith 1997 (as seen in section 2.4). Part of the rationale of the advocacy coalition framework (ACF) is to help understand the process of policy change, defined as the policy-oriented learning that occurs over a decade or more by policy subsystem interactions. In the Great Lakes policy process, policy-oriented learning has resulted in one significant change over the last 30 years: this change is the way in which stakeholders, the IJC in particular, have framed the policy debate. Sabatier (1993) tells us that policy change is best understood through a focus on "policy subsystems". Initial application of the ACF, as the first layer of analysis in this thesis, identified and structured the values

within the Great Lakes policy subsystem. The second layer involved

understanding how these values played out in the policies, as represented by the

IJC Biennial Reports. The third layer explored the context of values with respect

to the role of science and its communication, thereby exposing the specific learning

process required to deal with the element of uncertainty in this policy subsystem.

Therefore it is now necessary to build a framework for understanding the policy

change that has occurred by bringing together these three layers of exploration.

Most changes in the policy subsystem occur because of 'external shocks'

(Pal 1996). "The basic argument of the ACF is that, while policy-oriented learning

is an important aspect of policy change and can often alter secondary aspects of a

coalition's belief system, changes in the *policy core* aspects of a governmental

program require a perturbation in non-cognitive factors external to the subsystem"

(Sabatier and Jenkin's Smith, 1997, 12). External non-cognitive factors, also

referred to as dynamic factors, can be categorized as changes in personnel, changes

in socio-economic conditions, and changes in system-wide governing coalitions.

In the Great Lakes policy system it is precisely these non-cognitive factors external

to the subsystem that can explain the changes that were seen in the analysis. The

changes in personnel for the Great Lakes means changes in the IJC Commissioners

as well as changes in membership on the IJC Boards specifically the Science

Advisory Board. Changes in socio-economic conditions means changes in the

economic resources available to governments and scientists in the Great Lakes.

This change also reflects the issue of political and economic timing with respect to decision making, policy making, and connections to societal mind-sets about environmental issues. The last form of change, coalition changes, refers to the shifts in the values (in the form of beliefs and interests) of Great Lakes stakeholders. These coalition changes are secondary to personnel and socio-economic changes that take place in the policy system.

In light of these forms of change, this chapter will examine the following factors in the Great Lakes policy subsystem that may have influenced change: 1) a new Commissioner, 2) a different SAB member, 3) Hamilton 1989, and 4) the socio-political context.

7.2 A New Commissioner

In 1989 the President of the United States nominated Gordon K. Durnil to be an IJC Commissioner. As one of six Commissioners, Durnil considered his job to "bring together various people on an international basis to find solutions to binational environmental problems" (Durnil 1995, 30). His greatest strength for this position was his ability to listen to all stakeholder groups and make decisions. In listening, specifically to the public, the issues and scientific evidence became real and personal for Durnil (Durnil 1995). He saw it as an honour to be a Commissioner and used his skills to have an influence on the Great Lakes decision making and policy making process like no other Commissioner before him. The

difference with Durnil was that he fundamentally believed that environmental

protection could not be divorced from morality and as such required a willingness

to acknowledge and change our values as a society. He was met with great

resistance by others in the IJC and his counterparts in politics because of his ability

to form conclusions based on a weight of evidence approach.

Gordon Durnil listened to all the evidence and public outrage concerning

the injury to human health and was profoundly affected by it (Durnil 1995). He

gathered information and evidence after the 1989 Biennial meeting that enabled

him to be "influential in writing a very hard hitting report which came out I think

in 1990, fifth Biennial Report to the government" (1994 Conversation with

Michael Gilbertson, IJC Windsor). This report said among other things that 'you

must live up to your policy of declaration' namely that persistent toxic substances

are going to be virtually eliminated. In this he was drawing a direct link to the

policy of the Parties which is contained in the Agreement.

Durnil considered the involvement of the public paramount to change. "I

came on the Commission as a person who believed deeply that the solutions to

societal problems required public knowledge and public action" (Durnil 1995, 36).

He put in motion changes to the structure of Biennial meetings that still exist

today.

Yet Durnil (1995) reflects on his frustration with working within the

system in the late 1980s and early 1990s as follows:

"It seems to me that the logical thing a good conservative should do in considering environmental matters is to gather the facts, weight those facts, then make his or her own decision about what to believe and what not to believe , what to do and what not to do, what to be primarily concerned about, or not concerned about at all. The crucial element in all of this is an honest exposure to facts. For some reason, too many people turn off their ears to an absorption of existing facts as soon as the word *environment* is mentioned. I wonder why that is. Perhaps it is because the thought that we might be doing something that could adversely effect our ability to reproduce as a species is beyond comprehension for most of us. Perhaps it is because we are so surrounded by bad news and prediction of doom that we can't separate the wheat from the chaff" (44).

Durnil was explicit about the need to attract the attention of policy makers and

decision makers in both countries to take action. He was consistent in his belief

that humans do not sit on the sidelines of the environment. He knew very well that

"adverse effects on humans will attract attention anywhere in the United States and

just might be the catalyst for obtaining the funds needed to see what's going on

with the otter [or any other wildlife, aquatic life or traditional environmental

concern]" (74). He saw that the absence of human health studies was being used

repeatedly as a barrier to progress for virtual elimination policies. And as a

former government official he was first to admit the denial of government in

acknowledging that the science exists, that injury to human health exists. He was

dedicated to ending this denial and began to put a weight of evidence approach

into practice. He took the opportunity of leadership through his position as IJC

Commissioner to inform the public and government that there is a serious problem

in the Great Lakes and that all stakeholders are responsible to do something about

it.

This position is reflected in the findings of the semiotic and frame analysis of this thesis. The singling out of human health from all other ecosystem elements was deliberately set out by the Commissioner's belief in the role human health could play in instigating change. With the purpose of implementing a virtual elimination of toxics in the Great Lakes in the forefront of his mind, Gordon Durnil strategically set out to use human health effects to capture the attention of the public in both nations. He was not alone in this strategy. There were others thinking along the same lines who saw the same opportunity in the late 1980s to change the framework.

7.3 A Different SAB Member

In Theo Colborn's capacity as scientist working for the Conservation Foundation in Washington D.C. she was asked in 1988 to embark on a two year study of the Great Lakes basin to assess environmental conditions and trends and the adequacy of government programs. The study was a collaboration of the Conservation Foundation and the Institute for Research on Public Policy. Specifically a report <u>Great Lakes, Great Legacy</u> was produced by a six member project team. This report was read by a wide audience of policy makers, scientists, activists, non-government organizations, environmental groups and lay public. It planted a seed of doubt in the minds of Great Lakes stakeholders that the way

policies and decisions had been made to date may not be enough and that clean-up

efforts were far from completed in the basin. Specifically, this report pointed out

the subtle effects on human health that have largely gone undetected. It argued

that these effects stem from the bio-accumulation of persistent toxic substances in

the Lakes. The report provided the public with an account of what was going on

in the Lakes in an easy to understand way. This contributed to setting the stage

for the organized citizen involvement at the 1989 Biennial meeting in Hamilton,

Ontario.

In 1991 Theo Colborn brought scientists, that had never met before

because of disciplinary boundaries, together at the Wingspread Conference Center,

Racine, WI. They shared ideas and theories on what was really happening in the

Basin. This meeting spawned the collaboration of much research in the area of

injury to human health and has since provided the IJC with understandings of the

science much richer than before.

Theo Colborn later became a senior scientist with the World Wildlife Fund

and a recognized expert on endocrine-disrupting chemicals. In the mid 1990s,

Colborn wrote an influential book accounting for the discoveries of the link

between persistent toxic substances found in the Great Lakes and human health

effects. The book was titled, Our Stolen Future: Are we threatening our fertility,

intelligence, and survival? A Scientific Detective Story and it argued that toxics

were causing endocrine disruption and hormone mimicking among many species

around the Lakes. Prefaced with a forward by then Vice President Al Gore, this book has made a significant impact on the public debate about whether human impact on the environment is affecting the well-being of our children and the survival of the species. This same tone is reflected in the 7th Biennial Report and onwards. Theo Colborn's conviction and belief that synthetic chemicals cause hormone disruption of wildlife and human species resulted in her membership on the IJC SAB and hence impacted on the IJC's depiction of the Great Lakes debates. IJC members were persuaded by her thorough account of over 2000 scientific studies and her interactions with scientists to put together the book.

What is important about the influence of Theo Colborn is her ability to present a synthesized view of scientific evidence in convincing the IJC that the subtle human health effects were significant and serious. Certainly all members of the SAB affect on the IJC's understanding of what is going on in the Basin. However there are key individuals, like Theo Colborn, whose views have filtered through to IJC recommendations in a profound way. Growing evidence of harm to human health from toxics was mounting for many decades before Colborn started putting the larger picture together. But her contribution to the chain of events was such that her synthesis of evidence persuaded the IJC to move in a new policy direction, towards a human health focus.

Furthermore, Jack Valentine was co-chair of the SAB during the time when Durnil was a Commissioner and Colborn was sitting on the Board. He put forward

a recommendation that was incorporated into the Fifth Biennial Report about a ban on the use of all halogen compounds, not just chlorine. This was later adopted into the Sixth Biennial Report in the form of "sunsetting" the use of chlorines in the manufacturing processes. It was one of the most controversial IJC recommendation to date, stating "the parties develop timetables to sunset the use of chlorine and chlorine-containing compounds as industrial feedstocks and that the means of reducing or eliminating other uses be examined" (1992 Sixth IJC Biennial Report). This precipitated the entry of industry into the Great Lakes debate. Until this time industry had been a sideline player in the policy subsystem and as a result of Jack Valentine and his attack on halogen compounds, industry became engaged in a 'war'. Valentine shared his belief with the IJC that winning wars was done with an element of surprise, and this recommendation to ban halogen compounds was a surprise to industry and caused immense reverberations throughout the polity.

Jack Valentine also contributed to the policy process by broadening the definition of science for the SAB. As SAB co-chair he opened the doors to the introduction of social science evidence in the debate of causation around human health. Now for the first time scientists were hearing evidence from psychologists and behaviourists about the subtle effects of contamination on human behaviour. It also meant that non-physical/natural scientists but experts nonetheless were being allowed the opportunity to participate on the SAB.

With the public and industry now involved and scientists across disciplines

talking and collaborating, the policy subsystem grew. This growth provided the

momentum needed to carry forward on a path of human health effects and a

change in the policy learning process.

7.4 Socio-Political Context

The socio-political context of the late 1980s did much to build a

momentum for change and bring forth the values of key stakeholders in the Great

Lakes policy process. This context presented an opportunity for Durnil, Colborn

and the Hamilton IJC meeting to have the impact they did on the process. Policy

analysis is an interpretive inquiry and as such it is important to highlight the

context (Brunner 1982). The social and political context of how policy 'meaning'

changed gives validation to the values, specifically beliefs, that emerged at that

time (Yanow 1993).

In 1986, the Sierra Club began organizing an annual "Great Lakes Week"

in Washington, D.C. This week was organized to bring together members of

Congress, the states represented by the Great Lakes Commission, labor unions and

environmental organizations to lobby for Great Lakes interests. Growth of a Great

Lakes community was building at this time. This community saw to the signing of

the Great Lakes Toxic Substances Control Agreement (GLTSCA) and the Great

Lakes Charter in 1986. Both were voluntary arrangements to share information

and to take a unified stance in protection of the Lake's resources (Colborn, 1990).

Similarly in Canada in 1986, these Agreements were complimented by the

Memorandum of Understanding on the Control of Toxic Substances in the Great

Lakes Environment and the re-negotiation of the Canada-Ontario Agreement. In

addition, Ontario established a new water quality regulatory program called the

Municipal-Industrial Strategy for Abatement (MISA).

Soon after the signing of the 1987 Protocol amending the GLWQA, the

U.S. Clean Water Act was amended in 1987 to recognize the objectives of the

Agreement in national water policies and programs. Through the Protocol, the

governments made a commitment to clean up 43 areas of concern around the

Great Lakes through Remedial Action Plans (RAPs). Also in 1987 the

governments agreed to develop Lakewide Management Plans (LAMP) for each of

the Great Lakes to eliminate critical pollutants.

In 1988 the Canadian federal government combined five statues into a new

Canadian Environmental Protection Agency. This year also saw the signing of the

Canada-US Free Trade Agreement. As well the GLWQA received more

acceptance in the U.S. EPA than ever before, because the head of the U.S. EPA

proclaimed that the Great Lakes was a model for policy on ecological integrity.

This context laid the backdrop to the 1989 IJC Biennial meeting in

Hamilton. The influential forces of this socio-political climate together with the

specific contributions of key individuals resulted in the policy change that remains

implemented to this day in the Great Lakes.

7.5 Hamilton 1989

A working coalition of environmental groups decided to increase the

public's presence at the 1989 IJC Biennial meeting. This decision was a result of

the limited public role in earlier meetings. The organizations included Greenpeace,

Sierra Club, The Lake Michigan Federation, Canadian Institute for Environmental

Law and Policy, the National Wildlife Federation, and Great Lakes United.

Together these organization encouraged over 1000 citizens to attend this meeting

and make known their concerns about the state of the Great Lakes to the IJC.

This was over twice the usual attendance of a previous Biennial meeting.

Concerned that the new government programs would not achieve virtual

elimination or zero discharge, the environmental coalition joined together, loudly,

to voice their disapproval. Their message was clear that governments and the IJC

act urgently to eliminate toxic contamination from the Great Lakes.

The Hamilton meeting changed the way that Biennial meetings were

conducted. After 1989, Biennial meetings have seen more participation and

interaction of a larger and broader audience. The meetings prior to 1989 had

involved little participation from environmental organizations or citizen groups.

This inclusion of the public was explicitly the result of a 1987 Protocol amending

the Agreement that recommended the inclusion of environmental leaders in the

negotiations.

A whole series of things came together at the 1989 Hamilton meeting.

First the non-governmental organizations organized. They held townhall meetings

right around the entire Great Lakes basin to inform the public of the scientific

evidence. In response to these meetings there was massive public interest and a

large number of public participants came to Hamilton and made presentations to

the Commission. The second thing was Theo Colborn and her book on Great

Lakes, Great Legacy that described in understandable terms what was going on in

the lakes. Third there were workshops held for scientists to enable them to make

causal statements about injury to human health rather than just statements about

'potential' effects.

Michael Gilbertson, senior scientist for the IJC, held workshops around the

whole question of how scientists show causal relationships. Scientists were

beginning to feel more confident about making statements about injury rather than

the potential effects. The first cause-effect workshop was held in Chicago in 1989.

Gilbertson's contributions rest firmly with changing the type of statements received

by regulatory officials. "They are impotent statements. They are not going to

make regulatory officials do anything". In a 1994 conversation with Gilbertson he

stated;

"What I am hoping to do in the Commission is to get a study going on human
health, really to answer the question, a very pointed different kind of questions, the
question being "how persistent toxic substances in the Great Lakes caused injury

to human health?." Now that is the questions that I am hoping the commissioners will want me to answer. Now that is a different exercise from the ones these guys have been through."

This type of questioning from within the IJC coupled with 'answers' from Colborn and the receptive climate at the Commission level enabled policy learning to occur.

7.6 Conclusion

Policy change is about policy-oriented learning. In the case of the Great Lakes, the learning came on a number of fronts: first Commissioners assigned to listen and lead the investigation; second front the members of the IJC Boards and staff that play a significant role in setting the tone for the Biennial Reports which make recommendations to the Parties; and third the socio-political context at large that result in financial and social interests in environmental issues in the late 1980s and early 1990s.

The tone and frame of the policy system has been attributed to the influence of key 'personnel'. Shifts in the policy frame around 1989 can be explained by the presence of Gordon Durnil as Commissioner, the work of Theo Colborn on human health effects, the strategies of Jack Valentine, and the timing of certain reports and workshops around causation. The constellations were aligned in a way that shifted the focus of the policy subsystem towards human

health and away from traditional environmental debates. The Great Lakes Water

Quality Agreement has since become a forum to debate injury to human health and

less so injury or harm to wildlife or other environmental elements.

CHAPTER EIGHT: CONCLUSION
Making Environmental Policy: Values, the IJC and the Great Lakes Case

8.1 Overview

This thesis set out to investigate how policies are made in the Great Lakes.

It discovered that values play a critical role, in structuring the policy subsystem,

stabilizing the multiple meanings and interpretations of policy text, and

contextualizing the role of science in the process. As an interpretive policy

analysis, this thesis illustrated the need for analysts to consider the 'framing'

process of policy (Roe 1994). Specifically, a "validation of values" has surfaced in

understanding how the Great Lakes policy process "means" (Yanow 1993).

This study used a triangulation of three methods of analysis: interpretive

policy analysis (Advocacy Coalition Framework), frame analysis and semiotic

analysis. By building on each other, each method involved a multifaceted

understanding the level of complexity in the Great Lakes policy making process.

This layering of analysis was done to build, in an inductive manner, the world of

environmental policy making for the Great Lakes.

Chapter four, as the first layer, identified and structured the values within

the policy subsystem. This was necessary to assess the ideologies, interests and

beliefs held by the various stakeholders. Chapter five, as the second layer, built on

the understanding of values in determining how they were represented in policy, as found in the IJC Biennial Reports. The semiotic analysis was used to investigate the policy text at a more detailed. The advantage of this detailed analysis was in bringing 'meaning' and 'validation of values' to the policy process. Thus within chapter five, the semiotic analysis was layered upon the frame analysis, for the purpose of building an inductive interpretation. Chapters six and seven make up the third layer of the complexity in understanding this policy process by contextualizing the values that emerge out of the previous chapters. Chapter six exposed the policy learning in the context of the role of science. Chapter seven suggested factors to explain these findings in light of the ACF policy-oriented learning approach. By organizing the research in this way the richness of the findings is brought out and the complexity of policy making revealed. Moreover, the order of the layering allowed for an inductive sequential emergence of the findings.

This research has three main findings. First, values play a critical role in the nature of environmental policy making. Values were revealed through an interpretation of text, intertext, and interview data. Values took the form of assumptions, interests, beliefs, ideologies, uncertainties, attitudes, polarizations and perceptions. Second, this research identified the IJC as pivotal to Great Lakes policy making. And third, this study showed that environmental policy change is instigated through human health frames and the linkage between human health and

the Great Lakes environment. A summary of each of these three findings will follow.

8.2 Values are Important

Values are at the center of policy making in the Great Lakes. Values are comprised of beliefs, ideologies and interests: some values are easier than others to change and as such have different impacts on the policy subsystem. The stakeholders hold differing beliefs about whether there is sufficient scientific evidence for action by policy makers. In Chapter 4 two advocacy coalitions were thus identified; the environmental coalition and the business coalition. Although beliefs can be changed and a stakeholder can move from one coalition to another depending on the issue on the table, there are values that are more difficult to change.

In contrast to beliefs, ideologies or core values are difficult to change and are non-testable. The Environmental Coalition ideology is that ecosystems ought to be protected from harmful elements. The Business Coalition holds that people ought to live a modern healthy life. Since core values are nearly impossible to change there is always a tension present in bringing together these two coalitions in decision making. Therefore reaching a consensus will have to depend upon changing interests or presenting information persuasive enough to change beliefs about science, the evidence for action.

Personal and professional interests (motivations, incentives, opportunities and constraints) are reflected in the decision-making process. Interests can be re-framed through shifts in information. In the Great Lakes the concept of ecosystem health holds the power to re-frame the interests of many dominant stakeholders. The ecosystem approach has remained the dominant philosophy of decision making in the Great Lakes for twenty three years. It has fundamentally changed the way problems and solutions are conceptualized around the Lakes. As a rhetorical frame it reflects the beliefs of the majority of stakeholders including government, non-government agencies, industry, public, academia. Little, at present, seems to threaten the hegemony of this frame.

This shift towards an ecosystem approach, specifically the forensic eco-toxicological approach, is perhaps the most significant change in Great Lakes policy making since the signing of the original GLWQA in 1972. It brought with it a plethora of value laden frames connecting the environment to the health of human populations around the Lakes. Reframing was identified by this analytic 'tip' in the late 1980s.

A dominant 'meaning' emerges from a close, semiotic, look at the IJC Biennial Reports by validating the values that surface in the policy text. Overall, environmental health is communicated by image and reputation. It uses coalition as its power and persistence in humanizing evidence linking environment to health as the key to effective action implementation. The Great Lakes are a public

context and therefore the IJC has approached its policy making in a public domain. The penetration of text reveals strong impetus for future change in the personal health of the Great Lakes ecosystem, especially human beings.

Through a re-framing, and different attack on personal interests of stakeholders, there was a realization of the power of human health as a conceptual tool, more so than ecosystem health.

As an international policy case study, the Great Lakes has illustrated clearly the significance of policy frames in changing the shape of policy debate and subsequently policy output. Meaning is brought to policy through an understanding of values and assumptions that lie within the apparent consensus among stakeholders. In this case the link between environment and health was strengthened by an ecosystem approach that enabled human health to take the place of environmental health in policy space, allowing a whole new set of parameters and constructs to build decision making around. Specifically it has enabled individual human behaviour to take center stage in the ecosystem and thus see all action is dependent on individual change. It is at his level that policy implementation remains difficult, sufficiently so to allow the two coalitions to apparently agree on all but the fundamentals.

Human health is a major driver in the Great Lakes debates. From a motivating factor to an outcome predictor it holds a great deal of power within the decision making process for environmental issues. Therefore, for those

stakeholders who considered their voices were not being heard, human health

provided an opportunity to re-frame the issue and give more personal meaning to
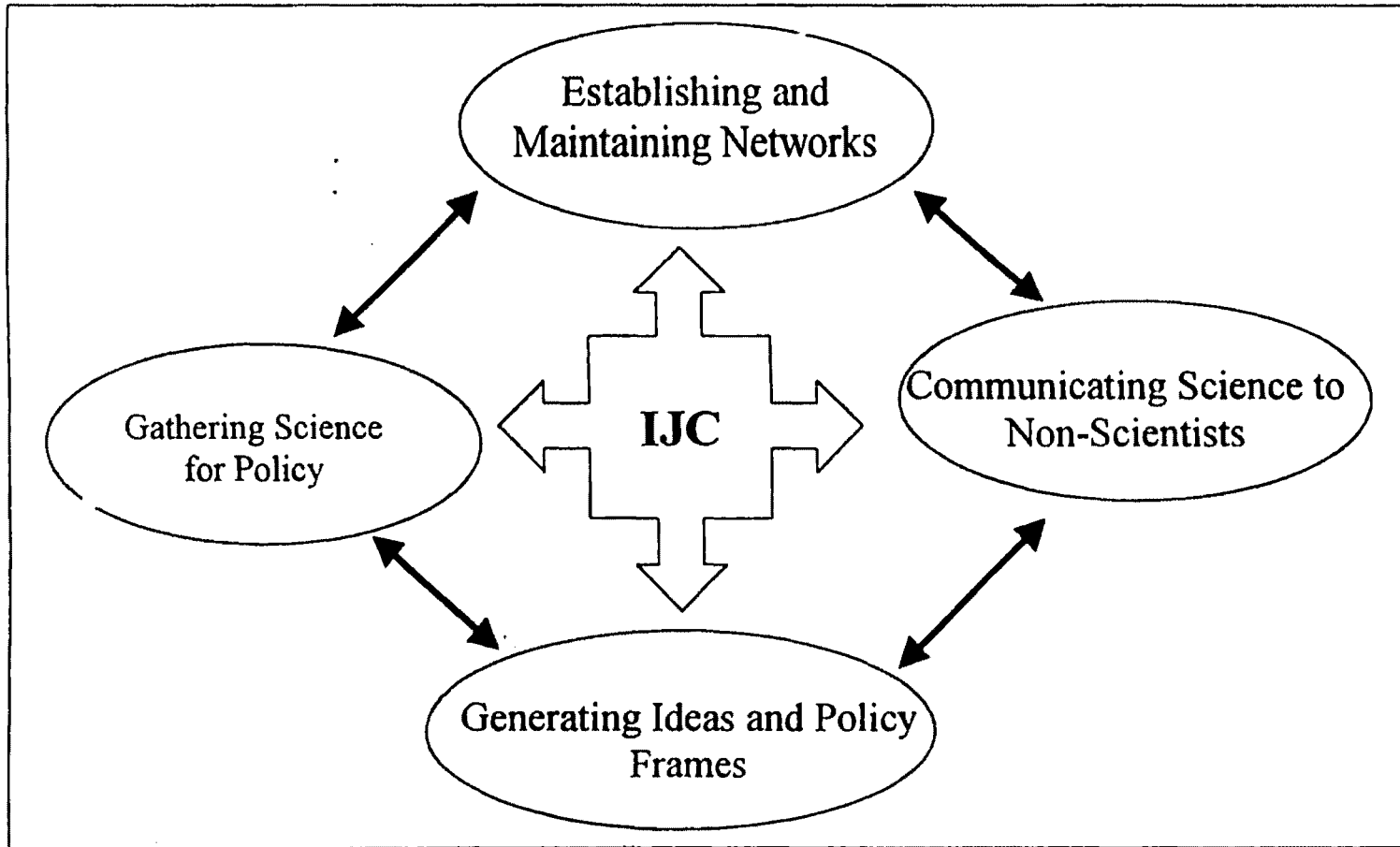
an environmental issue.

8.3 The IJC is Important to the Great Lakes Policy Process

Figure 8.3 illustrates the central role that the IJC plays in the Great Lakes

policy world. The research has shown the IJC to be critical in four areas of the

policy process: in establishing and maintaining networks among all stakeholders

(Chapter Four); in communicating science to non-scientists (Chapters Four and

Six); in gathering science for policy (Chapter Six); and finally in generating ideas

and policy frames (Chapter Five). According to Sabatier each of these areas

impact on each other over time and are part of the dynamic factors of the policy

subsystem.

The International Joint Commission is the single unifying component of

'working together' between Canada and the United States for policy making in

the Great Lakes. It sets the stage for communication and dialogue between

nations. As such its role is pivotal to fulfilling the GLWQA. The IJC sits in a

powerful position between government Parties to influence the 'facts' or

evidence that matter and how they are connected to values.

The IJC makes recommendations to the Canadian and American Parties (or

governments) about the nature and direction of policy. How the IJC defines and

Figure 8.3 The IJC's Impact on the Great Lakes Policy Process

Establishing and Maintaining Networks

Gathering Science for Policy

IJC

Communicating Science to Non-Scientists

Generating Ideas and Policy Frames

articulates the problems and posits improvements through its recommendations to government has impacted upon the action (and inaction) on the part of decision-makers.

8.4 Environmental Policy Change

This research has found that the Great Lakes policy process is complicated by: the nature of the binational relationship between Canada and the United States; the distribution of power within the policy subsystem; the differences and similarities in stakeholder values (ideologies, interest and beliefs); working within an ecosystem framework; the way in which values play out in the policies; the 'tipping' of policy framing toward human health because of changing values; the nature of the policy 'intertext' to reveal value changes; the context of values with respect to the role of science; context of non-cognitive external factors; and the socio-political context.

Many stakeholders identified that the challenge of decision making and policy making in the Great Lakes lies in the value system of our society. Changing beliefs is considered the corner stone of action (changing behaviours). Although progress has been made in cleaning up the lake, the viewpoints of many stakeholders in this study is that further change, 'real' change, needs an alteration to our way of life as we know it today.

How environmental issues (Great Lakes issues) are "framed" as problems

affects what solutions are suggested and agendas set. Further, who you are in the policy process determines the values you hold and your policy frame. Policy making is certainly more art than science and as such the policy framing that goes on in the Great Lakes is carried out informally. For example, the Canadian government's claim that scientific evidence is only critical to a point then the art of politics takes over. Together Canada and the United States have made a formal commitment to protecting the Great Lakes from environmental degradation. Informally coalitions have been formed that reinforce this institutional structure for decision making.

Environmental policy change has occurred through a re-framing of Great Lakes issues towards a human health focus rather than ecosystem health and environment focus. This serves many purposes within a political process. Terminologies associated with environment have changed its meaning throughout the IJC Biennial Reports: environment has become environmental "integrity", environmental "vitality" and environmental "security". As seen in the frame analysis the rhetorical framework has retained 'ecosystem' since the beginning of the biennial reporting. However, within that frame the sub-frames have taken on varying interpretations of an ecosystem such as management control measures to reproductive health effects. The human health link to an ecosystem approach has changed the Biennials more than any other aspect of this approach (as concluded in the frame analysis). The ecosystemic language has provided an opportunity to

drive agendas into the Great Lakes policy arena that otherwise would have remained in public health space.

Environmental policy change is also dependent upon the role of industry in the policy process. This role is largely reactive and there is presently no industry representation on IJC scientific boards. As a result their positions come as a reaction to IJC and other stakeholder inputs. Industry considers the main issue to be one of contaminants in sediments and the legacy left by past industries. Currently industry is included in some of the consensus building exercises in Canada but not in the United States. For change to be successful and effective industry must be in a central position in the process.

8.5 Contributions of the Work

The work presented in this thesis makes substantive, methodological and theoretical contributions. The substantive contributions come from the thick description of the Great Lakes policy making process. As environmental issues are increasingly framed using 'ecosystem' language and draw on the linkage between human health and the environment there is a need to understand how and why policy making processes changes as a result. This study, therefore, provides an example of how human health acts as a catalyst for environmental policy change. In practice, this study provides Great Lakes policy makers and researchers with an understanding of the parameters of environmental policy within an international

context.

Methodological contributions come from undertaking an interpretive policy analysis. This adds to contemporary policy analysis by focusing on the meaning of policy; such as policy literature addressing policy discourse, communication, and policy paradoxes (Roe, 1994; Stone, 1988; Throgmorton, 1991; Yanow, 1992, 1993, and 1996). By building a bridge between policy and language, this study unravels the uncertainty, complexity, and polarization of policy decisions. It shows how complex problems call for a variety of modes of inquiry — interpretive, frame and semiotic — and shows that the triangulation of these inquiries provides an inductive layering of the complexity of the world of policy making in the Great Lakes.

Methodologically this thesis brought to light the strengths and limitations of using each of three methods of analysis. First, the Advocacy Coalition Framework (ACF) (chapter 4) was useful in helping to identify and structure the values within the policy subsystem as well as in understanding the factors affecting policy change in chapter 7. ACF was limited by its primary focus on values as interests, beliefs and ideologies. It was recognized by the other forms of analysis that values took the form of assumptions, perceptions, frames, uncertainties, and attitudes. In addition interests perhaps remain relatively unexplored in ACF. Second, the frame analysis and semiotic analysis of chapter 5 were useful particularly in uncovering the role of values in the policy process rigorously and

systematically. These methods were limited in terms of providing detail concerning institutional structures for decision making change. These strengths and limitations are a significant contribution to future use of these methods.

Theory contributions come from conceptualizing language as a social system and subsequently policy text as a space to understand this system. Theoretically the argument throughout this thesis is that policies can be seen as a 'space' through which we gain insight into the complex world of policy making processes, science and policy, and the contentious dynamics of multi-stakeholder involvement in environmental issues. Space refers to the conceptual place where decision making happens. This 'space' is also a theoretical distance between stakeholders in their efforts to make a collective decision.

Theory contributions also come from the inclusion of social science concepts such as 'power', 'values', and 'context' into the literature on environmental policy change. Environmental change occurs in places and spaces and therefore must be situated in a broader societal context. This work shows how such concepts can add to the environmental literature through a rich understanding of how problems are framed and re-framed in place over time. Specifically, this study extended the understanding of values to the 'validation of values' in a policy process.

8.6 Directions for Future Work

Future work could include research within the Great Lakes case study itself

by extending the examination to include the role of media and both lay and

interested publics in the policy making process. This investigation would clarify

the dynamic of the policy subsystem and also would add another layer of

'meaning' within the context of the IJC policy frames.

Also, within this case study, an extension of the role of science could be

pursued. Specifically the meaning and parameters of what constitutes a "strong"

weight of evidence and a "good" risk estimate for different stakeholders. The

criteria are for these characterizations are not clearly defined in the literature.

Future work could also reach beyond this research to other environmental

issues such as global warming or acid rain, and in particular issues that have

resulted in a formal commitment or agreement by one or more countries. It would

be interesting to apply this type of analysis to other complex and international

problems with different socio-political contexts. For example, work in the African

Great Lakes is presently being organized to form a similar Commission to the IJC

to deal with their common resource issues, including over-fishing and depleted fish

stocks. This would be an example where knowledge of the pivotal position of the

IJC would be a valuable backdrop for pursuing an interpretive policy analysis

prospectively.

Lastly, future work could include a more refined development of a

qualitative methodology that combines policy and language analysis. Using

different contexts and issues this methodology could be extended to other

environmental and non-environmental issues to see the strength and power of

analysis for policy makers and decision makers.

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Appendix A: Key Informant Contact List

Key Players	CANADA	UNITED STATES
International Joint Commission	Windsor: *Michael Gilbertson Peter Boyer Douglas McTavish Ottawa: Jim Houston Geoff Thornburn	Washington: Bruce Bandurski Joel Fisher Ann Arbor (GLC): *Michael Donahue
Commissioners	Pierre Beland (Cnd)	Thomas Baldini (refused)
Environmental Groups	*Tony Wagner, Waterfront Regeneration Project *Rosalie Bertell Mary Hegan, GLHEP *Mary Ginnebaugh, GLU	Rick Leiroff, WWF Jack Manno, GLRC
Government	Doug Haines, HC, GLHEP Vic Shantora, EC John Mills, EC *Ralph Daley, NIWR	Linda Birnbaum, EPA Chris DeRosa, ATSDR
Industry	*Hugh Eisler, Canadian Chlorine Co-ordinating Committee	George Kuyper, CGLI
Native Community	Maxine Cole, EAGLE Henry Lickers, Akwesasne	Henry Lickers, Akwesasne
Academia	*Brian Gibson, Toronto	Diane Henshel, Indiana

* initial contacts/interviews

Appendix B: List of 58 Potential Key Informants
by Stakeholder Group and Country

International Joint Commission

CANADA
Michael Gilbertson	senior scientist, biologist
Peter Boyer	SAB secretary
Douglas McTavish	director of IJC Windsor office
Geoff Thornburn	economics advisor
Jim Houston	environmental advisor
Pierre Beland	Commissioner
Leonard Legault	Commissioner
Francis Murphy	Commissioner

UNITED STATES
Bruce Bandurski	environmental advisor
Joel Fisher	environmental advisor
Michael Donahue	SAB Chair
Gordon Durnil	past Commissioner
Thomas Baldini	Commissioner
Susan Bayh	Commissioner
Alice Chamberlin	Commissioner

Environmental Groups/Consultants

CANADA
Tony Wagner	Waterfront Regeneration project
Rosalie Bertell	
Susan Sang	World Wildlife Fund
Mark T. Goldberg	Global tox international consultants
Joseph MacInnis	Friends of the Environment Foundation
Mary Hegan	GLHEP, public participation co-ordinator
Mary Ginnebaugh	Great Lakes United
John Jackson	Great Lakes United

UNITED STATES

Theo Colborn	World Wildlife Fund
Joanne Goodwin	National Wildlife Fund
Rick Lieroff	World Wildlife Fund
Jack Manno	Great Lakes Research Council
Jean McGraw	Sierra Club

Government

CANADA

Warren Foster	Health Canada, reproductive toxicology section
Kayla Estrin	Environment Canada, senior analyst
Andy Gilman	Health Canada, Bio-Regional Health Effects Program
Doug Haines	Health Canada, Great Lakes Health Effects Program
Victor Shantora	Canadian Environmental Protection Agency, Director General
James Ashman	Ministry of Agriculture
John Cooley	Fisheries and Oceans
Douglas Dodge	Ministry of Natural Resources
John Mills	Environment Canada, Ontario Director
Ralph Daley	National Institute of Water Resources

UNITED STATES

Linda Birnbaum	US Environmental Protection Agency
Paul Bertram	US EPA, Great Lakes National Program Office
Chris DeRosa	Agency for Toxic Substances and Disease Registry
Renata Kimbrough	US EPA
Suzanne McMaster	US EPA
Val Adamkus	US EPA
Paul Johnson	Agriculture
Bob Burris	Natural Resources

Industry

CANADA

Hugh Eisler	Chlorine
Ann Mason	Chlorine Chemistry Council, Policy Director

UNITED STATES

Werner Braun	DOW Chemical
George Kuyper	Council of Great Lakes Industries, Chair

Native Community

Maxine Cole	E.A.G.L.E.
Henry Lickers	Akwesasne

Academia

CANADA

David Rapport	University of Guelph
Brian Gibson	University of Toronto
Henry Reiger	University of Toronto
George Francis	University of Waterloo
John Frank	University of Toronto

UNITED STATES

Louis Gillette	University of Florida
Diane Henshel	University of Indiana

APPENDIX C: Checklist Questions:

1. Could you tell me a bit about your job here at .....? What is it that you do? What is your official title?

2. How long have you worked as a ....?

3. When did you first begin to be involved in Great Lakes issues?

4. How do you think your work helps in dealing with Great Lakes issues?

5. What do you think are the main concerns and issues surrounding the great lakes? Why or why not? What is the most pressing concern? Do you think that is what the public is concerned about?

6. What do you think you have contributed to the Great Lakes policy process? What is your role? How do you see your role as compared to the IJC?

7. What are your thoughts on the GLWQA? What about the biennial reports? Are they the most important documents when it comes to making policy or decisions in the Great Lakes? If not, what is? Why?
How about the biennial meetings? What do you think of them? Why do you think that?

I would now like to ask you a few questions specifically about the environmental health aspect of the great Lakes?

8. What do you feel is the role of human health in the Great Lakes? Has it always been that way? What has changed? When did human health become important as an issue? What other issues were/are dominant?

9. What do you think is the relationship between the Great Lakes environment and our health?

10. How important is (a) evidence and (b) science? What type of evidence and science? Is ignored if so by whom? What role does science-evidence play in policy agendas?

11. How and who determines what gets on the agenda (scientific, political, biennial) for the Great Lakes? Is it a consensus process? Who do you think has the most say in what happens? Does the public have a role?

I would now like to ask you a few questions about the international aspect of dealing with the Great Lakes.

12. Are there differences between Canada and the United States in dealing with environmental health problems around the Lakes? How important are the difference between Canada and the United States when dealing with environmental health problems around the Lakes?

13. How do you think the decision-making or policy-making process should work? Why doesn't it work that way?

14. Do you think the IJC is pivotal in its role as advisor to both governments?

Appendix D: Letter to participants

Dear participant:

During the time period from October 1994 and February 1996 I interviewed you for my doctoral dissertation work on the Great Lakes policy making processes. I am presently in the final draft stages of my thesis and request your permission to proceed by accepting one of the following statements:

1. I agree to the anonymous use of quotes from my conversation with Adele.

2. I agree to the anonymous use of interview data as part of Adele's thesis only if I can read the sections that include my quotes.

3. I agree to the anonymous use of quotes from my conversation with Adele only if I can read the entire original transcript from the interview.

Please note that all quotations will be anonymous as per our discussion after the interview however due to the key role that you play in the Great Lakes it cannot be guaranteed that your identity will not be known.

A response is requested by Mar 31, 2001. No response will be received as an acceptance of the interview conversation material.

Thank you for your co-operation,
Sincerely,

APPENDIX E: Nudist Codes

Q.S.R. NUD.IST Power version, revision 4.0.

(1)	/Institutional Structure
(1 1)	/Institutional Structure/GLWQA
(1 1 1)	/Institutional Structure/GLWQA/revisions
(1 1 2)	/Institutional Structure/GLWQA/comments
(1 1 3)	/Institutional Structure/GLWQA/ecosystem approach
(1 1 4)	/Institutional Structure/GLWQA/eco-management
(1 1 5)	/Institutional Structure/GLWQA/hijacking - vehicle
(1 1 6)	/Institutional Structure/GLWQA/time line
(1 1 6 1)	/Institutional Structure/GLWQA/time line/outdates
(1 1 7)	/Institutional Structure/GLWQA/model
(1 1 7 1)	/Institutional Structure/GLWQA/model/international power
(1 2)	/Institutional Structure/Great Lakes Perspective
(1 2 1)	/Institutional Structure/Great Lakes Perspective/orientation
(1 2 2)	/Institutional Structure/Great Lakes Perspective/main concern
(1 2 3)	/Institutional Structure/Great Lakes Perspective/values
(1 2 3 1)	/Institutional Structure/Great Lakes Perspective/values/ changing attitudes
(1 2 3 2)	/Institutional Structure/Great Lakes Perspective/values/society
(1 2 4) issues	/Institutional Structure/Great Lakes Perspective/governance
(1 3)	/Institutional Structure/Powers at Play
(1 3 1)	/Institutional Structure/Powers at Play/experiences
(1 3 1 1) control or formality	/Institutional Structure/Powers at Play/experiences/lack of
(1 3 1 2) down play	/Institutional Structure/Powers at Play/experiences/government
(1 3 1 3) organizations	/Institutional Structure/Powers at Play/experiences/frontline
(1 3 1 4) making	/Institutional Structure/Powers at Play/experiences/decision
(1 3 1 5) recommendations	/Institutional Structure/Powers at Play/experiences/biennial
(1 3 2)	/Institutional Structure/Powers at Play/groups
(1 3 2 1)	/Institutional Structure/Powers at Play/groups/industry response
(1 3 2 2)	/Institutional Structure/Powers at Play/groups/native group
(1 3 2 3)	/Institutional Structure/Powers at Play/groups/commissioners
(1 3 2 4)	/Institutional Structure/Powers at Play/groups/role of public

(1 3 2 5)   /Institutional Structure/Powers at Play/groups/ijc
(1 3 2 5 1)   /Institutional Structure/Powers at Play/groups/ijc/networking
(1 3 2 5 2)   /Institutional Structure/Powers at Play/groups/ijc/power
(1 3 2 5 2 1)   /Institutional Structure/Powers at
Play/groups/ijc/power/dispute resolution
(1 3 2 5 2 2)   /Institutional Structure/Powers at
Play/groups/ijc/power/concepts
(1 3 2 5 3)   /Institutional Structure/Powers at Play/groups/ijc/limited
(1 3 2 5 3 1)   /Institutional Structure/Powers at Play/groups/ijc/limited/will
(1 3 2 5 3 2)   /Institutional Structure/Powers at
Play/groups/ijc/limited/network
(1 3 3)   /Institutional Structure/Powers at Play/consensus
(1 3 4)   /Institutional Structure/Powers at Play/vision
(1 3 5)   /Institutional Structure/Powers at Play/agenda
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(1 4 2 1)   /Institutional Structure/Policy/contribution/community
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(1 5)   /Institutional Structure/Inaction towards action
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(1 5 1 1)   /Institutional Structure/Inaction towards
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(1 5 2)   /Institutional Structure/Inaction towards action/regulation on
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(1 5 4)   /Institutional Structure/Inaction towards action/collaboration
(1 5 5)   /Institutional Structure/Inaction towards action/science
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(1 6 3 1)   /Institutional Structure/Biennials/vehicle/example
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(1 7 2)	/Institutional Structure/Canada and United States/binational

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(1 7 3)	/Institutional Structure/Canada and United States/collaboration

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(1 7 3 1)	/Institutional Structure/Canada and United States/collaboration

of science/no mechanism

(1 7 4)	/Institutional Structure/Canada and United States/comparisons
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(2 2 1)	/Science and Policy/communication/problem
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(2 3 1)	/Science and Policy/responsibilities/issue driven science
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(2 4 1)	/Science and Policy/mediation/limitation
(2 4 2)	/Science and Policy/mediation/translation of science into policy
(2 5)	/Science and Policy/integration
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(3 2 1)	/Role of Science/persuasive science/storytelling
(3 3)	/Role of Science/political power
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(4 1 1)	/Human health/health authorities/political mobilization
(4 1 2)	/Human health/health authorities/real evidence
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(4 4 2)	/Human health/driver/political mechanism
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