

**TOWARDS A CONSENSUS  
BUILDING WITHIN  
CANADA'S AQUACULTURE  
INDUSTRY: DESIGN OF A  
FRAMEWORK FOR  
ADDRESSING CONFLICT,  
INFORMATION  
MANAGEMENT AND  
PUBLIC CONSULTATION**

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**January 2006**



**TECHNICAL REPORT  
NO. 234**

**TOWARDS CONSENSUS BUILDING WITHIN  
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DESIGN OF A FRAMEWORK FOR  
ADDRESSING CONFLICT, INFORMATION  
MANAGEMENT AND PUBLIC  
CONSULTATION**

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January 2006

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## PREFACE

This technical report is a reproduction of a thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Engineering in the Department of Geodesy and Geomatics Engineering, January 2006. The research was supervised by Dr. Sue Nichols, and support was provided by the Natural Sciences and Engineering Research Council of Canada.

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Hutchison, Meredith (2006). *Towards Consensus Building within Canada's Aquaculture Industry: Design of a Framework for Addressing Conflict, Information Management and Public Consultation*. M.Sc.E. thesis, Department of Geodesy and Geomatics Engineering Technical Report No. 234, University of New Brunswick, Fredericton, New Brunswick, Canada, 174 pp.

## **ABSTRACT**

Canada's aquaculture industry has been the focus of considerable conflict among stakeholders, including the federal and provincial government, industry, ENGOs, First Nations, communities, other industries and academia. This research addresses two issues in relation to this conflict: the need for consensus building among stakeholders in the aquaculture industry and the need for dispute prevention in the form of information dissemination and public consultation.

Interviews, questionnaires and conversations with stakeholders were used in combination with existing literature to develop an understanding of the issues and the needs of stakeholders. On the basis of this and the consensus building literature, objectives for a consensus building and dispute prevention framework were developed. Barriers to the creation of this framework, including a lack of trust and political will, and industry concerns regarding privacy were also identified.

The design for the consensus building and dispute prevention framework is comprised of three nodes: consensus building tools, technology solutions and policy and institutional change. Under the first node, a tool set was developed to aid in consensus building, while under the second node a Public Participation Geographic Information System (PPGIS) application was developed to meet information dissemination and public consultation needs. The tool set and the PPGIS application have been implemented through the design of a new authority, known as the Aquaculture Information and Mediation Board, to aid in

mediation and consultation among stakeholders. Upon evaluating the framework design against the previously defined objectives and barriers, the consensus building and dispute prevention framework meets these criteria. It is recommended that a pilot study be conducted in Nova Scotia to further investigate the feasibility of this framework design.

## ACKNOWLEDGEMENTS

I would like to take this opportunity to thank, first and foremost, my supervisor Dr. Sue Nichols who has been a wealth of knowledge and support throughout my research. I would also like to thank my research group, including Michael Sutherland, Sam Ng'ang'a, Boipuso Nkwae, Hazel Onsrud, Silvane Paixao, Jenn Haccoun and Richardo White, for assisting me with research sources and questions throughout this process. Thanks must also be extended to the wonderful GGE office staff, Kim Delorey, Sylvia Whitaker, Tracey Hawco-Winchester, for providing much needed advice and assistance.

I would also like to extend my gratitude to NSERC for assisting with the funding for this research, as well as the Aquaculture Association of Canada and the Alberta Land Surveyors Association for the scholarship opportunities they provided me. Many groups and individuals provided me with their time to discuss issues pertinent to this research, and I would like to extend thanks to a few of these, including the Linking Science and Local Knowledge node of the OMRN, Fred Page, Stewart Lindale, Neil Ross, Rod Beresford, and the respondents of my questionnaire.

My family and friends have also been instrumental in not only providing me with the building blocks upon which I commenced my research, but also in all the support they have given me over the past two years. Many thanks to Mum, Dad, Ben, Brian, Cath, and my wonderful grandparents for all their patience, kind words of encouragement, and endless letters, emails and packages of Australian chocolate that have kept me going.

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## LIST OF ABBREVIATIONS

The following list is a summary of some common acronyms used throughout this research.

AIMB	Aquaculture Information and Mediation Board
CEAA	Canadian Environmental Assessment Authority
DAFA	Department of Agriculture, Fisheries and Aquaculture, New Brunswick
DFO	Department of Fisheries and Oceans, Canada
DR	Dispute Resolution
FAO	Food and Agriculture Organization of the United Nations
EIA	Environmental Impact Assessment
ENGO	Environmental Non-Government Organisation
GIS	Geographic Information Systems
MOU	Memoranda of Understanding
PAA	Positive Aquaculture Awareness (organisation)
PCB	Polychlorinated Biphenyls
PPGIS	Public Participation GIS
RADAC	Regional Aquaculture Development Advisory Committee

# CHAPTER 1

## INTRODUCTION

Aquaculture is a private industry operating in a public space, and during its rapid expansion as a commercial industry over the past twenty-five years it has generated considerable conflict. This research has two goals: improving consensus building among stakeholders and dispute prevention through information dissemination and public consultation.

### **1.1 An Overview of Aquaculture**

According to the FAO, the aquaculture industry is the fastest growing food production sector in the world, increasing annually at over ten percent over the past twenty years [Little and Edwards, 2003]. This growth is attributed to the increasing global population who are dependent upon a source of protein, as well as increasing demand within developed countries, where successful marketing campaigns have promoted fish and seafood as a fashionable and nutritious food [Bastien et al., 2004; FAO, 2000]. It is increasingly acknowledged that the majority of wild stocks are being fully exploited [FAO, 2000], and aquaculture is an industry that is presently growing to meet the increasing demand for seafood (see Figure 1.1). Some sources predict that aquaculture will be the dominant source of fish and seafood by 2030 [Bastien et al., 2004].

Within Canada the aquaculture industry has experienced rapid growth over the past two decades, averaging an annual growth of 19% each year [Bastien et al., 2004]. All ten provinces, as well as the Yukon territory, have investments in the aquaculture industry, while Nunavut and the Northwest Territories are interested in ventures [OCAD, 2004].

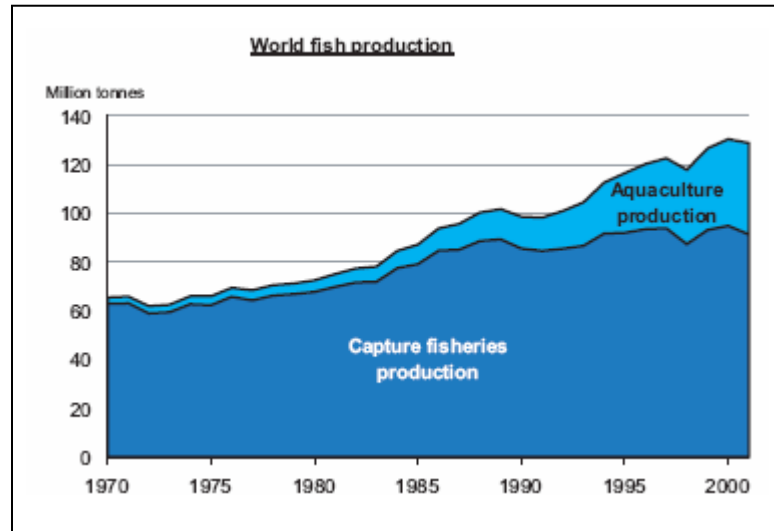


Figure 1.1: A comparison of the role of aquaculture in global seafood outputs over the last 30 years (from Bastien et al. [2004]).

## 1.2 The Research ‘Problem’

Although the industry is economically successful, there are social and environmental issues that have been the catalysts for conflict between stakeholders in the aquaculture industry. Some members of the public have mixed feelings towards aquaculture, seeing it as an industry that is detrimental to the environment and a blight upon the landscape with the potential to affect property values [DeMont, 2002]. There are also fears, held by the

traditional fishery, tourism industry and environmental groups that caged fish could harm wild stocks, both through escapes and also as a result of increased occurrence and severity of disease in the caged populations [Ellis, 1996]. First Nations are another important constituency, particularly on the West Coast. While some First Nations groups are involved in the industry to bring revenue into their communities, other communities are vehemently opposed to the industry and its potential environmental effects and impacts upon their way of life [Kingzett and Norgard, 2004; Environmental Law Centre, 1998].

In response to these issues, advocacy groups have formed in opposition to aquaculture in the marine environment, often headed by well-resourced Environmental Non-Governmental Organisations (ENGOS). These groups have been vocal in expressing their concerns regarding the industry, raising questions and conducting independent research into the environmental impacts of aquaculture. Much of the latter research shows detrimental environmental impacts from the industry, some of which is in conflict with conclusions from government and industry research. A recent report by DFO [Canada, 2005a] revealed that many Canadians do not have a high level of awareness regarding the aquaculture sector, and yet maintain a poor perception about the industry. Part of the reason for this poor perception is that most of the information that community stakeholders are given is through the media, who are more attentive to the controversial information and ‘horror’ stories than they are to the information produced by government and industry regarding improving environmental standards and the economic development in smaller coastal communities [Fraser and Beeson, 2003].



There is a need to address the conflict between stakeholders in the aquaculture industry and engage in consensus building. This research will design a framework to firstly facilitate dialogue between stakeholders in order to build consensus, and secondly to develop an ongoing strategy for information dissemination and public consultation to work towards dispute prevention.

### **1.3 Methodology**

This research was conducted using a broad range of sources. Interviews were undertaken with representatives from government, industry and academia, and questionnaires were sent to ENGOs to gain feedback on their information and public consultation needs (see Appendix I). A number of conferences, targeted at a broad range of stakeholders, including industry, government, First Nations, community, ENGOs and academia, were attended, during which various stakeholders were engaged to understand their concerns and perspectives regarding the aquaculture industry. This information served as background research, and is summarised in Chapter 2.

The basis for the consensus building system design, as outlined in Chapter 3, was developed from the literature and is a streamlined process that can be understood by stakeholders who are not dispute resolution experts. This system is broken down into three categories: conflict assessment, dispute resolution process design and evaluation, which are addressed in Chapters 4, 5 and 6, respectively.

## **1.4 Justification for this Research**

The aquaculture industry is facing a number of challenges and opportunities in the near future. International market pressures are one of the principal challenges, driving down seafood prices, and requiring the industry to increase their economy of scale to remain profitable. Smaller aquaculture operations are struggling to reach viable productivity levels and as a result many aquaculture companies have amalgamated or been sold to large international corporations [Naylor et al, 2003]. There are also opportunities emerging, including the development of offshore aquaculture, and moves to engage in organic aquaculture [Bridger and Neal, 2004; MacFadyen, 2004]. Government, industry and some communities look forward to ongoing, sustainable aquaculture development in Canada, however without overcoming this present conflict this will be difficult.

## **1.5 Scope of this Research**

This research is focused on marine aquaculture (also known as mariculture), and will not deal with the aspects specific to fresh water farms. There are many forms of marine aquaculture operations, including finfish (such as Atlantic or Pacific salmon, Atlantic cod, Steelhead and Tilapia), shellfish (including mussels, geoduck clams and crab) and seaweed. While the majority of the conflict surrounding aquaculture is associated with finfish farms, the conflict impacts upon the shellfish sector as there is a perception that all aquaculture is harmful to the environment [Canada, 2005a]. Thus, while the majority of

this research focuses on finfish aquaculture, the consensus building processes and information management techniques are suitable for all three aquaculture operations.

The provinces considered in this research are British Columbia, New Brunswick, Nova Scotia and Newfoundland. Although marine aquaculture does exist in other provinces, it is not on the same scale and will not be considered. It must be stated, however, that the framework and recommendations developed in this report could be readily adapted to the situation in other provinces.

## **1.6 Definitions**

*Aquaculture:* “The farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants with some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated.” [FAO, 2005].

*Aquaculturalist:* An individual who holds an aquaculture license. [British Columbia, 2005b].

*Aquaculture Lease:* A contract giving the holder rights, restrictions and responsibilities to a specific parcel of land for a specific period of time. Granted by the relevant provincial government.

*Aquaculture License:* A contract giving the holder the right to operate an aquaculture facility in a specific location under conditions specified in the contract. An aquaculture lease must be held in order for a license to be granted. Granted by the relevant provincial government.

*Land tenure:* A collection of rights, restrictions and responsibilities that individuals and/or groups of individuals hold with respect to a portion of land.

*Stakeholder:* Individuals and groups who have an interest or concern in a development or project (in this case aquaculture).

## **CHAPTER 2**

### **AQUACULTURE IN CANADA**

Prior to addressing the issues within the aquaculture industry, an understanding of the industry and the stakeholders involved must be imparted. To this end, the following chapter provides an introduction to the complex jurisdictional issues within the marine space, and the legal framework within which aquaculture operates. The major stakeholders involved in the conflict are introduced, along with some of the major points of contention in the disputes. The current public consultation strategies and information management regimes for the industry are also examined. This chapter concludes that there is a need for constructive dialogue between informed stakeholders, and defines the two issues that this research will address: how can such dialogue be facilitated, and how can stakeholders be kept informed?

#### **2.1 Introduction to Marine Jurisdictions in Canada**

Unlike land, the marine environment is a fairly recent space in which property rights systems have been developed. Modern terrestrial property systems are the result of several thousand years of evolution, from hunter-gatherer societies existing under a communal property regime, to the mosaic of property rights seen today in different regions and cultures. These property rights have molded to the circumstances within these regions. For example in western Europe, private property generally developed from settled agriculture and later from, among other factors, the enclosure of feudal common lands in response to improving technologies that allowed for more efficient agriculture

[Eckert, 1979]. With the industrial revolution land increasingly became recognised as a commodity, and property systems developed to regulate and administer property rights and transfers.

It is important to appreciate the more recent, but rapid development of property rights within the marine space, as this in part explains some of the disputes surrounding the aquaculture industry. This rapid change over the past 40 – 60 years has resulted in developments not anticipated under Canada's *Constitution Act* [1982] as originally drafted in 1867, which to some extent explains the complex jurisdictional issues within Canada's marine space.

### **2.1.1 A History of Property Rights in the Marine Space**

The oceans still largely operate under a hunter-gatherer regime and it is only in recent years, with the formalisation of international jurisdictions under the *United Nations Convention on the Law of the Sea* [1982] (UNCLOS), that nations have significantly extended their jurisdictions seawards. With increasing environmental concerns regarding pollution, overfishing, and multiple uses of the marine space, legislation has been created to define boundaries and regulations have been put in place to manage, monitor and protect some regions. It is within this environment of stronger state rights and traditional private use rights that the aquaculture industry is trying to grow. Based upon the husbandry practices employed in agriculture, aquaculture may be seen as an agricultural venture, however the property rights regimes are very different.

The principle of “freedom of the high seas” governed ocean access from the time that people first became able to build and sail vessels upon the water. A narrow band of water, historically the distance of a cannon shot (ie: the area that could reasonably be defended by a coastal nation), was under customary law considered the nation’s territorial sea for security purposes. However, outside of this narrow region the ocean space was so large and seen as so bountiful that it was treated largely as an area of free access to resources and navigation and was known as the High Seas. Ocean resources were viewed as free goods because no individual would be willing to pay for them since an equivalent area would be available elsewhere without charge [Eckert, 1979]. Essentially, a demand had not been created for specific marine areas, and as such there was no value attached to the rights to use and exploit ocean space.

In 1945, however, US President Harold Truman made the first assertion that the United States of America had exclusive rights to the mineral and hydrocarbon resources on or under its continental shelf [Environmental Health Centre, 1998; *Proclamation No. 2667*, 1945]. There was little initial opposition to this claim, however it prompted other nations, including Mexico and countries in Latin America and the Middle East, to in turn claim exclusive rights to the resources within their continental shelf space, or in some cases out to a distance of 200 miles, both in terms of minerals and the fishery [Thorpe, 1999; *Qatar v. Bahrain*, 2001]. Other nations also extended their territorial seas further seaward. Within 30 years of Truman’s initial proclamation almost all coastal regions – one third of all ocean space – had changed from existing under open access to being subject to national regulations [Eckert, 1979]. In 1982, after three UNCLOS conventions and

extensive drafting the *United Nations Convention on the Law of the Sea* [1982] was adopted and has been ratified by 149 nations [Division for Ocean Affairs and the Law of the Sea, 2005].

### **2.1.2 Federal and Provincial Jurisdictions**

With the afore-mentioned rapid changes to international marine jurisdiction and regulation, it is now pertinent to discuss the way in which Canada's federal and provincial governments manage the marine space. In general, as shown in Figure 2.1, the federal government considers the water and submerged lands located seaward of the low water mark to fall under their jurisdiction by virtue of the *Constitution Act* [s. 91, 1982], previously known as *the British North American Act* [1867], and as a result of previous seabed decisions [Nichols et al., 2000]. However, some Provincial governments dispute the federal government's claim.



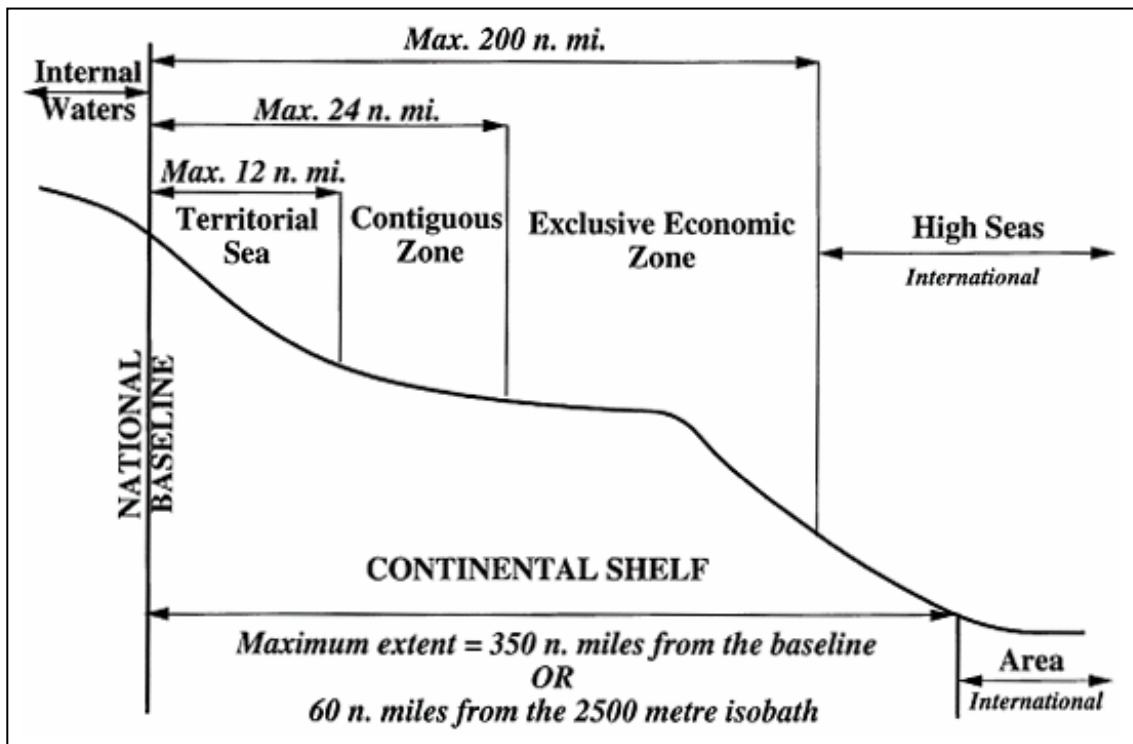


Figure 2.1: Jurisdictional space in the offshore region (from Nichols [1989, p. 210]).

On the east coast, the Atlantic Provinces and Quebec claim at least a territorial sea three nautical miles from the low water mark by virtue of agreements and customs that were in effect prior to the *British North American Act* [1867] and, in the case of Newfoundland, prior to joining Confederation in 1949. These agreements include *An Act relating to the Coast Fisheries, and for the prevention of Illicit Trade* passed in New Brunswick in 1853, which makes reference to a three mile limit from the New Brunswick coast [Nichols et al., 2001].

On the west coast, the government of British Columbia has resolved many of their disputes with the Federal Government. In the Supreme Court case *Re: Offshore Mineral Rights of British Columbia* [1967] it was ruled that because there were no extensions of

provincial jurisdiction prior to the *British North American Act* [1867] (such as a claim for territorial waters as in the Atlantic Provinces) then provincial ownership ends at the low water mark of provincial territory [Harrison, 1979, p. 472]. There remained, however, some conjecture as to the boundaries of British Columbia's territory. In 1984 the ownership of the Strait of Georgia between the British Columbia mainland and Vancouver Island was resolved [*A.G. Can v. A.G.B.C.*, 1984] through reference to an act of the Imperial Parliament in 1863, which defined the western boundary of British Columbia as the "Pacific Ocean" [Giaschi, 2005]. The Supreme Court Decision [Georgia Strait Reference, 1984] stated that the waters defined as the Queen Charlotte Strait, Johnstone Strait, Georgia Strait, and Juan de Fuca Strait (see Figure 2.2) were not within the "Pacific Ocean"; they were thus Provincial territory. A number of jurisdictional issues remain on the west coast, including whether Queen Charlotte Sound and Hecate Strait are within Provincial boundaries by virtue of the same 1863 boundary definition of British Columbia, or whether these are in fact Canadian territorial waters [Williams, 2001].



Figure 2.2: Provincial waters of British Columbia. Basemap from British Columbia [2005a].

The broad federal definition of ocean jurisdiction is further muddled by provincial agreements related to bays and ‘internal waters’. In 1967 the Supreme Court of Canada ruled that seabed resources in British Columbia within harbours, bays and estuaries were provincial, and resources outside were federal [Nichols et al., 2000], although if a bay was a public harbour then its seabed would be under federal jurisdiction. However, there is not necessarily consensus between federal and provincial governments in regard to which authority has legislative jurisdiction. A prime example of this is the Bay of Fundy, which, according to the governments of New Brunswick and Nova Scotia, was divided

by an equidistant line when New Brunswick was distinguished as a province separate from Nova Scotia in 1784. A boundary definition by the first Governor of New Brunswick in 1786 confirms this delineation [La Forest, 1963]. Yet the federal government continues to maintain its jurisdiction beyond the low water mark. Rather than resolve this conflict by declaring the waters under either jurisdiction, the federal government has transferred rights to the provinces of Nova Scotia and New Brunswick for particular activities [Nichols and Monahan, 1999]. This demonstrates that succinct legal definitions are not always necessary for good governance, as will be seen again in the case of aquaculture Memoranda of Understanding in Section 2.1.4.

In addition to these uncertainties about jurisdiction over the seabed, there are complexities regarding specific resources and resource use. Most of the situations described above concerned the seabed and in particular oil and gas. Fisheries, aquaculture, recreation, navigation and other issues may be under a mix of federal and provincial ownership, jurisdiction and administration [Cockburn, 2002].

### **2.1.3 Legal Definition of Aquaculture**

During the formative stages of the aquaculture industry in the late 1970s and early 1980s there was considerable conjecture regarding the appropriate authority by which aquaculture should be governed, as aquaculture was not specifically mentioned in the *British North American Act* [1867]. Wildsmith [1982] argued that there were four ways in which aquaculture could be viewed, resulting in different legislative action:

- a) Under s. 91(12), aquaculture may fall under Sea Coast and Inland Fisheries, and thus be under federal jurisdiction.

*Powers of the Parliament*

*91. It shall be lawful for the Queen, by and with the Advice and Consent of the Senate and House of Commons, to make laws for the Peace, Order, and good Government of Canada, in relation to all Matters not coming within the Classes of Subjects by this Act assigned exclusively to the Legislatures of the Provinces; and for greater Certainty, but not so as to restrict the Generality of the foregoing Terms of this Section, it is hereby declared that (notwithstanding anything in this Act) the exclusive Legislative Authority of the Parliament of Canada extends to all Matters coming within the Classes of Subjects next hereinafter enumerated; that is to say,--*

...

*12. Sea Coast and Inland Fisheries.*

- b) Under s. 92 (13) and (16), aquaculture could be viewed as property or civil rights within the province and / or matters of a local or private nature within the province.

*Exclusive Powers of Provincial Legislatures*

*92. In each Province the Legislature may exclusively make Laws in relation to Matters coming within the Classes of Subject next hereinafter enumerated; that is to say,--*

...

*13. Property and Civil Rights in the Province.*

...

*16. Generally all Matters of a merely local or private Nature in the Province*

- c) Under s. 95, aquaculture could be classified as agriculture, and thus fall largely under provincial authority.

*Agriculture and Immigration*

*95. In each Province the Legislature may make Laws in relation to Agriculture in the Province, and to Immigration into the Province; and it is hereby declared that the Parliament of Canada may from Time to Time Make Laws in relation to Agriculture in all or any of the Provinces, and to Immigration into all or any of the Provinces; and any Law of the Legislature of a Province relative to Agriculture or to Immigration shall have effect in and for the Province as long and as far as it is not repugnant to any Act of the Parliament of Canada.*

- d) Aquaculture may be viewed as a new subject matter not included under the Constitution, and thus the federal government, under residual powers, would be required to enact the necessary new laws and regulations.

Wildsmith [1982] argued that federal jurisdiction over the fishery was limited to the natural fishery, and did not give Parliament the right to deal with the property rights associated with what he termed ‘private aquaculture’, that is the artificial propagation of species that are not to be used for stocking of the wild fishery. He concluded that there was strong evidence for provincial legislation of the industry in the Atlantic Provinces by virtue of no specific federal jurisdiction and the claim of a three-mile territorial sea by the provinces. Nevertheless, Wildsmith [1982] acknowledged that any legislation with respect to aquaculture would require a strong federal-provincial partnership, as many aspects of federal jurisdiction would be affected by the industry.

#### **2.1.4 Memoranda of Understanding (MOUs)**

To overcome the complex issue of jurisdiction, and perhaps with this latter observation of Wildsmith's [1982] in mind, all aquaculture in Canada (with the exception of Prince Edward Island, which is solely under federal authority) is undertaken through Memoranda of Understanding (MOUs) with the federal government. The MOUs detail the specific elements of the aquaculture industry in each province, which may include research, education and training, environmental monitoring, resource planning, and the specific lease and licensing agreements [OCAD, 2003]. In British Columbia, New Brunswick, Nova Scotia and Newfoundland, the provincial government is responsible for regulating site leases and licensing and overseeing the industry's routine operations.

There are moves to abandon the MOUs, however, as the aquaculture industry believes they are becoming obsolete as the market and technology changes. There are presently moves to introduce an Aquaculture Framework Agreement (AFA), which would replace the MOUs and potentially redefine the governance structure of aquaculture [Canada, 2005b].

#### **2.1.5 Incidental Use and Public Rights to the Foreshore**

The rights of the public to the foreshore region are also an important consideration. The public possesses rights to fish in all tidal waters [La Forest, 1973]. This right is restricted to incidental use, however, and does not include fishing by means of weirs and other apparatus that are fixed to the seabed or soil, however. This right also extends to right of way over the foreshore to access the fishery and a location upon the shore to permit a

boat to be drawn. In exercising their rights to the foreshore, the public must also express regard for other users, including other members of the public and adjacent landowners [La Forest, 1973]. However, this does not mean that an aquaculture site is in contravention of these rights if it prevents the public from accessing a former fishing ground [La Forest, 1973]. A lease has been granted to the aquaculturalist for the Crown lands upon which that site is operating and thus the aquaculturalist's operation is similar to other private property that must be respected. However, where an aquaculture operation infringes on the public's use of the foreshore region or waters outside their lease site, for example through the storage of equipment in public space or the mooring of support vessels in locations that prohibit the public from using their own vessels, then it is the aquaculturalist who is preventing the public from exercising their rights [La Forest, 1973].

#### **2.1.6 Rights of Adjacent Upland Owners**

Waterfront property owners possess additional rights to the foreshore, known as riparian rights. These rights generally include access to the water, quality of water, unrestricted flow, ownership of naturally accreted materials and use of the water [British Columbia, 1995]. The Ordinary High Water Mark (OHWM) is typically used as the boundary between private property and Crown lands in Canada [Nichols, 1989]. In many early land grants in Atlantic Canada a strip of coastal land was reserved for the mooring of boats and to ensure public access [Nichols, 1987]. In Eastern Canada, however, many of the early grants of coastal property extended to the low water mark or beyond. The latter are known as water lots, and were allocated to give their owners rights to construct a wharf,



moor their boats or collect seaweed [Nichols and Monahan, 1999]. Where aquaculture operations infringe on these rights, either through a restriction of access or through detrimental environmental effects such as litter and water pollutants, conflict can occur [Nichols et al., 2001].

In regions where First Nations communities have land claims, either approved or pending, they may also have rights to the foreshore and waters. In British Columbia, where no Treaties were made with the First Nations, there are many unresolved and overlapping claims, with 110% of the province being claimed by different groups [Nichols and Monahan, 1999]. Even where land claims are pending, First Nations groups still have rights to be consulted about any activities that may take place within or affect the area of their claim [Gibson, 2003]. The full impact of the Marshall Decision [*R. v. Marshall*, 1999], where it was ruled that Mi'kmaq Indians in eastern Canada could fish at any time without a license, is yet to be felt, however there is potential for conflict to arise between First Nations and the aquaculture industry directly related to this ruling.

## **2.2 Stakeholders in the Aquaculture Industry**

There are many individuals and groups who have a stake in Canada's aquaculture industry. These include the federal and provincial governments, the aquaculture industry, other industries in the region, ENGOs (Environmental Non-Government Organisations), landowners, communities and academia as shown in Figure 2.3. Each stakeholder is

concerned about the elements of the industry that closely affects them, be they economic aspects, environmental concerns or social issues.

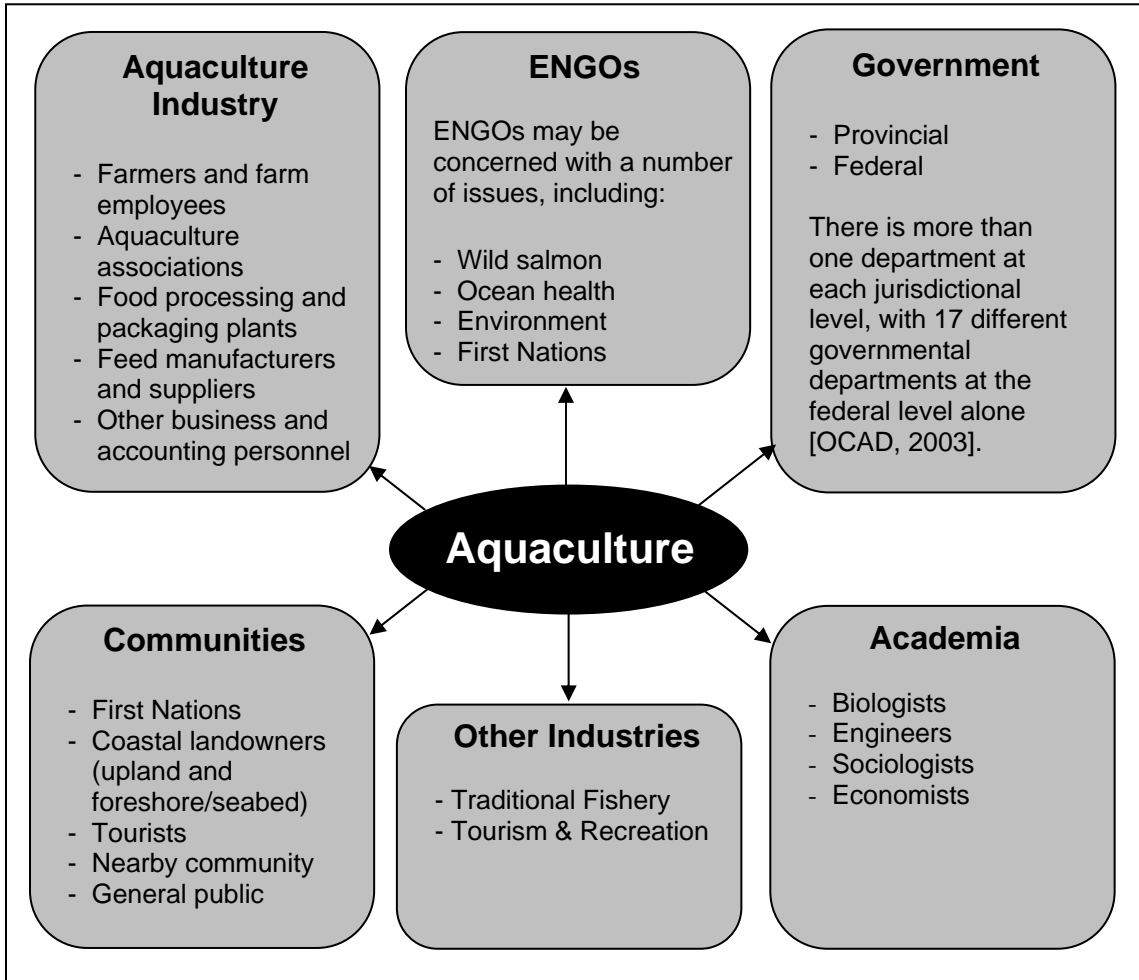


Figure 2.3: Stakeholders in Canada's Aquaculture Industry

### 2.2.1 Federal Government

There are currently 17 different departments at the federal level which have responsibilities related to aquaculture [OCAD, 2003]. Fisheries and Oceans Canada (DFO) is the federal lead agency, a power that is invoked through the *Fisheries Act* [1985] and the *Navigable Waters Act* [1985]. The *Fisheries Act* [1985, s. 35(1)] requires that, “no person shall carry on any work or undertaking that results in the harmful

alteration, disruption or destruction of fish habitat,” (HADD), except where authorised by the Minister. Under the *Navigable Waters Act* [1985, s. 5 and s. 6], “no work shall be built or placed in, on, over, under, through or across any navigable water,” unless approved by the Minister.

Another important authority is the Canadian Environmental Assessment Agency, who conduct screening assessments on all new aquaculture sites. Any work under which either s. 35 of the *Fisheries Act* [1985] or s. 5 of the *Navigable Waters Protection Act* are affected automatically trigger a screening assessment [*Law List Regulations*, 1994]. In general a screening assessment will examine the project in detail and evaluate what the negative environmental effects might be and how these can be eliminated or reduced. Public Participation in the CEAA process is very important and is covered in Section 2.4.2.

### **2.2.2 Provincial Government**

Provincial government authority is derived from the Memoranda of Understanding (MOUs), as outlined in Section 2.1.4. There is generally one lead organisation in each province which is responsible for licensing, routine monitoring and the ongoing management of aquaculture sites once they are approved and in operation.

### **2.2.3 Aquaculture Industry**

The aquaculture industry represents not only the aquaculturalists who farm the sites, but also the spin-off industries, such as hatcheries, processing plants, feed providers and

marketers. Each province has its own industry associations which represent the local industry and their concerns. In some provinces, such as British Columbia, there are two different aquaculture industry associations for finfish and shellfish, to better represent the needs of their respective industries. There is also a national body, the Canadian Aquaculture Industry Alliance, established to coordinate the provincial associations and to address issues that affect aquaculturalists across the country [CAIA, 2005].

#### **2.2.4 Environmental Non-Government Organisations ENGOS**

Environmental Non-Government Organisations (ENGOS) are groups established usually in response to an environmental concern or a conservation need. Many ENGOS are concerned about the marine ecosystem, including the survival of the wild fishery, particularly salmon. ENGOS are generally not supportive of aquaculture, particularly finfish farms, due to concerns for the impact of the industry on the surrounding environment, as illustrated in Figure 2.4. Potential threats include the transferral of diseases to local fish (particularly sea lice), nutrient loading of the water column from excess feed and faecal matter, the presence of drugs and pesticides used to treat farmed fish entering the water column, genetic pollution as a result of escaped fish and the overall loss of habitat for wild fish.

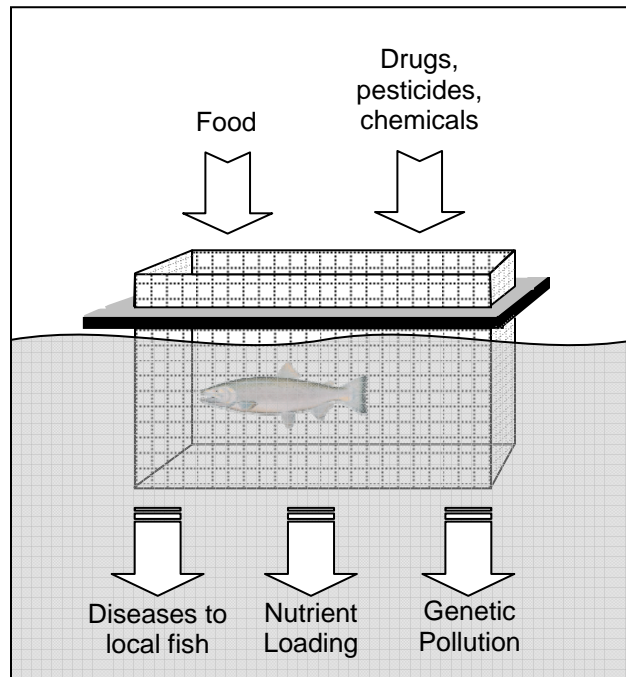


Figure 2.4: Some of the concerns ENGOs have with regard to aquaculture (after Harvey [1998]).

It must be recognised that most of the ENGOs are not opposed to aquaculture in itself, but object to the industry operating in the marine space. The David Suzuki Foundation, for example, is opposed to marine aquaculture, however in closed containment systems on land they feel it represents the potential for “sustainable aquaculture,” which may directly benefit some wild stocks [Ellis, 1996].

ENGO action against aquaculture has been much less severe on Canada’s east coast as compared to the west [Howlett and Rayner, 2004]. There are a number of issues raised in the literature as to why this is the case. Fishing has been a long-established industry on the east coast, and aquaculture may integrate more readily into fishing communities on the east coast rather than on the west coast [Nova Scotia, 2005b]. There are also

economic variations between the two coasts, and the east coast may value the economic potential of aquaculture more highly than the west coast, where environmental interests have a higher value and have been in the public eye for much longer than on the Atlantic Coast [Tindall, 2000].

### **2.2.5 Community and the General Public**

Different communities have different views regarding aquaculture, and may even have different opinions within the same community. Aquaculture may potentially offer economic benefits to community members, which is particularly relevant in rural communities where out migration of youth is an issue [Nova Scotia, 2005b]. However aquaculture may also cause a reduction in coastal property values for a number of reasons. Not all individuals consider the industry to be aesthetically appealing and debris such as rope, plastic containers, feed bags and other rubbish have been attributed to aquaculture sites [Nova Scotia Aquaculture Stakeholders, 2005]. Upland owners concerned about the noise and odour have also made complaints regarding aquaculture sites [Environmental Assessment Office, 1997b]. Secondly, aquaculture operations may be perceived as having the potential for environmental degradation, which may lead to long lasting effects such as reduced water and sediment quality. Tourists, or summer residents in coastal regions may also hold concerns regarding aquaculture where it interferes with their activities or alters their “favourite places” [Howlett and Rayner, 2004].

### **2.2.6 First Nations**

Like other community groups, First Nations communities are divided on their opinions towards aquaculture. Some communities are engaged in the industry and it is providing much needed employment opportunities within the community [Kingzett and Norgard, 2004]. Other First Nations communities are vehemently opposed to the industry and greatly concerned with the potential impacts it may have on the environment [Environmental Law Centre, 1998]. In some cases there are mixed opinions within the same communities regarding the opinions towards aquaculture [Walling, 2005]. There is frequently cooperation between ENGOs and First Nations groups, and an MOU has been signed between a number of these parties to ensure greater cooperation [Watershed Watch Salmon Society, 2001].

First Nations issues are particularly pertinent in British Columbia where, unlike the Maritime Provinces, comprehensive claims based on nonextinguishment of traditional rights are a critical issue and involve extensive coastal regions [Walling, 2005]. Most First Nations communities in British Columbia have yet to prove and gain Aboriginal title to their lands, and in many cases there are overlapping title claims [British Columbia Treaty Commission, 2003]. Furthermore, aboriginal title claims to marine spaces are even more difficult to define and prove, and as yet there have been no treaties signed that incorporate marine space [Gardner, 2001]. The Supreme Court of Canada ruled that the Crown must consult with First Nations groups in regard to any potential infringement of their rights, including aquaculture development, whether or not Aboriginal title has been granted [Gibson, 2003]. According to Walling [2005] one aquaculture operation in

British Columbia must consult with five First Nations communities in regard to their site when it is renewed or altered, because the site is located in an area disputed by the five groups.

### **2.2.7 Other Industries**

Other industries in the vicinity of a proposed or existing aquaculture site may also have an interest in the industry, particularly the commercial fishing and tourism industries. The wild fishery has many concerns regarding aquaculture that centre on similar points to ENGO groups. The incidence of sea lice is particularly pertinent as it may reduce the number of wild stocks and reduce the economic viability of the industry. The wild capture fishery is also concerned about the falling prices of salmon due to increased farmed stocks being available. Prices for fish have fallen considerably, and fishing licenses are also decreasing in value [Naylor et al., 2003]. Some members of the fishing industry are also concerned about hazards to navigation, such as aquaculture sites with facilities that extend beyond the boundaries of the lease and lights used at night that obstruct navigational aids. Some recreational fishermen, however feel that farms help create safe havens for boats [Environmental Assessment Office, 1997b].

In New Brunswick there is also the herring weir industry, which has been in operation since the 1700s [Doucet and Wilbur, 2000] and has become recognised as real property with customary rights, frequently being passed down through generations [Phyne, 1999]. Although there is competition for space between the weir and aquaculture industries, which both require similar site conditions, there is not a great deal of conflict from the



herring weir operators. This is because many herring weir operators converted to aquaculture operations in the early 1980s and still maintain good relationships with the Fundy Weir Fishermen's Association, and many of the current weir operators are directly involved in supplying feed to the aquaculture farmers [Phyne, 1999].

Many representatives of the tourism industry are wary of aquaculture, due to aesthetic concerns that the farming operations detract from the coastal beauty that visitors come to experience, blocking access to tourism resources, such as anchorages, odour and noise, reduced wild life experiences as well as from potential damage to wild stocks, which are essential for the sport fishing industry [Environmental Assessment Office, 1997b; B.C. Wilderness Tourism Association, 2005]. Some attempts have been made by the aquaculture industry to introduce tourists to aquaculture through tours of the farming sites in both Newfoundland and British Columbia, although the latter is more concerned with improving the perception of the industry rather than specifically engaging in a tourism venture [Canadian Experience Travel Network, 2003; Environmental Assessment Office, 1997b].

### **2.2.8 Academia**

Academia is certainly an interest group where aquaculture is concerned and do conduct a large amount of research directly related to aquaculture impacts and development. However most academic research is funded by or completed in collaboration with other stakeholders, such as government, industry, ENGOs and community groups. It is for this

reason that academia is not defined as an individual stakeholder group to include in the dispute resolution strategies developed in Chapters 4 and 5.

## **2.3 Overview of Conflict Between Stakeholder Groups**

To understand the current conflicts a brief overview is required of the two major points of contention between stakeholders that are the catalysts for the dispute resolution and prevention systems designed in this research. The first issue is governance, and the second is the availability of and access to reliable information.

### **2.3.1 Governance Issues**

There are a number of arguments in the literature that question the role of DFO in the aquaculture industry. The principal arguments centre on a conflict of interest in electing DFO the lead aquaculture agency when it is also responsible for the protection of the wild fishery. In one argument, it is suggested that the legislation used by DFO to regulate the aquaculture industry (*Fisheries Act [1985]* and *The Navigable Waters Protection Act [1985]*) is biased toward the protection of the wild fishery and other users of the marine space [Howlett and Rayer, 2003]. In contrast, a recent report from the Standing Committee on Fisheries and Oceans [Cummins, 2003; Canada, 2001a] condemned DFO for their preferential treatment of aquaculture and neglecting their mandate to protect the wild fishery.

These conflicting arguments, though alike in their criticism of the federal department, demonstrate that the group's bias on the issue of aquaculture affects the way in which the activities of DFO are perceived. Although DFO may argue that it is following its mandates clearly, there is either an actual conflict of interest or else a lack of transparency present, which causes the opposing groups to view DFO's activities so suspiciously. This idea is also captured in the following quotation, taken from the opening statement to the Standing Committee on Fisheries and Oceans by representatives from the Auditor General and the Commissioner of Environment and Sustainable Development:

*“... I would like to emphasize that Fisheries and Oceans Canada has not only the job of sustaining the fisheries, but also the fish, the fish habitat, the environment, and, indeed, the livelihood of those that depend on fish. But its track record on timely delivery is not promising. As in so many other areas of my audit work, there is a significant implementation gap that is growing into a credibility gap.”* [Gélinas and Thompson, 2004]

This credibility gap is affecting the way government-produced information is perceived, which leads into the second issue of conflict addressed through this research.

### **2.3.2 Different Information**

As outlined in the previous section, ENGOs have many concerns regarding the aquaculture industry. A number of ENGO groups, particularly the David Suzuki Foundation, conduct their own research to illustrate the problems that they perceive DFO is not addressing. These problems include, principally, the issues of sea lice transference

between farmed fish and wild fish in British Columbia, the impact of escaped farmed Atlantic salmon on the wild Pacific salmon stocks, and the PCB (polychlorinated biphenyl) content of farmed fish.

#### **2.3.2.1 Sea Lice**

Sea lice is a naturally occurring parasite, which is potentially deadly to fish where they carry large amounts of it. In New Brunswick sea lice has been an issue but the province has invested heavily in monthly monitoring and treatment, and in a recent report by the Atlantic Salmon Federation and WWF, scored the highest rating for its efforts in disease and parasite detection and prevention.

In British Columbia, however, there is an increase in sea lice incidence in wild salmon populations in British Columbia, which has led to an ongoing debate between ENGO groups, academics, industry and government as to the role of salmon aquaculture farms in causing this increase. It is theorised that the concentration of fish in the farms could be harbouring the sea lice, which is in turn affecting migrating stocks.

A recent study funded by the David Suzuki Foundation mathematically supports a direct link between sea lice and aquaculture facilities [Krkošek et al., 2005], however as the study was only based on one farm, admits that, “no general conclusions can be made on the transmission dynamics of lice from farm to wild salmon based on this study alone.” The David Suzuki Foundation press release, however, does not mention the latter

concession. “Until now, government and industry have either denied that sea lice are a problem or called for more research. Today’s study shows that the link is undeniable – and that the situation is even worse than we had imagined.” [David Suzuki Foundation, 2005, quoting Foundation marine conservationist, Jay Ritchlin].

Conversely, DFO claims that it does not have conclusive proof of this interaction, however it acknowledges that aquaculture farms may be a contributing factor to the sea lice problem [Canada, 2005c]. The claims of the ENGO groups have been promoted by the media, leading many members of the public to question the commitment of DFO to protecting the wild fish [O’Neil, 2005]. DFO states that it must be more “transparent and available” and “correct misinformation” to resolve this dispute [O’Neil, 2005]. However John Cummins, a British Columbia Member of Parliament and former vice-chair for the Standing Committee on Fisheries and Oceans, who has produced a number of reports strongly condemning aquaculture, disagrees. “The environmental groups are winning the PR [*public relations*] war because they're telling the truth about the dangers fish farms pose to wild stocks” [O’Neil, 2005 quoting Cummings]. This line of reasoning is rejected by Patrick Moore, co-founder of Greenpeace and now a private consultant who believes in the sustainability of marine aquaculture.

*“The fundamental problem in all this sensationalistic “science” is that “correlation” is being equated with “causation.” Correlation occurs when two events or things happen in the same place or time. The classic case is ice cream consumption and shark attacks in Australia. Of course the strong correlation between the two is not because one causes the other, rather it is because warm weather causes both. Otherwise they are not related. The very first line of the Royal Society report [Krkošek et al., 2005] is, “Marine salmon farming has been correlated with parasitic sea lice infestations and concurrent declines of wild salmonids.” This one statement should have disqualified the paper from being printed. Science*

*journals themselves seem to have forgotten the difference between correlation and causation.*” [Moore, 2005]

### **2.3.2.2 Escaped Farmed Fish**

ENGO groups on both the East and West coasts are concerned about the potential for genetic pollution as a result of escaped farmed fish on both coasts. The Atlantic Salmon Federation (ASF), an international ENGO with offices in the Atlantic provinces, is very concerned about the interactions between escaped farmed fish and their impact on the wild salmon. There is the possibility that escaped farmed salmon could interbreed with the wild salmon, and that all escaped species could potentially compete with wild stocks for habitat and food as well as be carriers of disease [Scott, 2005].

On the West coast, Atlantic salmon is also farmed, and as they are not a native species there is concern for the impact of this foreign species on the environment. ENGO groups have produced data that shows a very large number of escaped Atlantic salmon becoming established in regions of British Columbia [Cox, 2004]. DFO has not acknowledged this to be an issue, perhaps because they have not collected the same volume of data as the ENGOs have. However it is argued that this is largely a problem associated with a lack of resources available to DFO, rather than a lack of will [Walling, 2005]. The Positive Aquaculture Awareness group [2005a, p. 11] (PAA) posits that even the ENGO data indicates that the number of escapes from farms is greatly diminished since a peak in 1998, which the PAA attribute to improved technologies.

### 2.3.2.3 Polychlorinated Biphenyl (PCB) Content of Farmed Fish

Another David Suzuki Foundation funded report examined the PCB (polychlorinated biphenyl) content of farmed salmon [Easton et al, 2002]. This report was used as the basis for the Coastal Alliance for Aquaculture Reform (CAAR) to identify farmed fish as being less healthy than the wild alternative, and even potentially harmful to humans, through their 'Farmed and Dangerous' campaign [CAAR, 2005]. The findings from this report were widely publicised by the media. Aquaculture industry organisations have vehemently opposed this report, producing their own science to demonstrate that the PCB levels found were not high compared to safety levels and the levels of the substances found in other commonly consumed meats, and that the statistical validity of the original report was suspect [Moore, 2004]. Indeed, there is a growing trend among industry to completely reject ENGO science.

*"No one in that campaign (to eat more wild salmon and avoid farmed salmon) has the technical expertise to know what fish farming and fishing activities are harmful, or to know how salmon should be protected. None of them has the qualifications to give expert evidence in court on fisheries management or aquaculture technical issues, for example. The staff of the David Suzuki foundation are hired for their media savvy, not for technical expertise. They propose simplistic or impractical 'solutions,' which are crafted to sound logical, but lack scientific merit."* [Hatfield, 2004]

In 2004 a more extensive study was completed that again fanned fears about PCB content in farmed fish [Hites et al., 2004]. The media coverage of the issue was extensive, and resulted in a 50% drop in sales of farmed salmon across the country due to a loss in consumer confidence which, despite extensive advertising, have not returned to previous sales numbers [NBSGA, 2004]. The study has since been described by the American Council on Science and Health as one of the 'Top Ten Unfounded Health Scares of 2004' [Kava et al., 2004].

### **2.3.3 Summary of the Issues**

The aquaculture industry and government has been weathering criticism for many years from ENGOs and other groups in regard to aquaculture, and only recently has there been a movement to address the claims made against the industry. In 2003 the Society for the Positive Awareness of Aquaculture (PAA) announced their campaign to improve public knowledge about the sustainability of the aquaculture industry. The press release was made outside the offices of the David Suzuki Foundation in Vancouver. “We decided to launch this campaign from the Suzuki Foundation offices because this is where the misinformation begins,” [Jensen, 2003]. However thus far the PAA has simply been another viewpoint advertising the aquaculture product, rather than working to build consensus with the ENGOs. The Government is also addressing this issue, most recently through a study into the perceptions of Canadians regarding aquaculture and methods of improving the way the industry is viewed [Canada, 2005a]. Despite the fact that the majority of aquaculture conflict appears to occur on the West coast, the media portrayal of the industry and particularly farmed salmon, has resulted in many Canadians across the country having doubts about the environmental impacts of the industry and fears regarding the safety of all aquaculture products [Canada, 2005a].

Clearly information alone is not helping the stakeholders to reach a consensus over scientific data, but is instead polarizing the interest groups due to a lack of trust in the sources that are providing the information. There is a need for ongoing dialogue and



consensus building, as identified in the literature [Fraser and Beeson, 2003; British Columbia, 2003c]. Questionnaire respondent 101 also agreed with this assessment:

*“Too many times I’ve been told by those who are pro-aquaculture that, ‘people just need to be educated about aquaculture, then they’ll support it.’ There needs to be room for genuine discussion and consultation – not just ‘education’ of the public. The industry and decision-makers need to be prepared to hear what the public has to say. And, moreover, they need to be responsive to what they hear, not to just selectively respond to what they want to hear.” [Questionnaire respondent 101]*

Strategies for building dialogue and trust are examined in more detail in Chapter 3, and are two of the major components addressed in the framework design within Chapter 4. Prior to examining improvements that must be made, however, the following two sections examine the sources of information available, the information dissemination tools used, and opportunities for public participation in the four provinces of interest in this research.

## **2.4 Overview of Current Information Management Tools**

### **2.4.1 Information Sources**

Information regarding aquaculture operations and environmental effects comes from a variety of sources, including environmental impact assessments, industry environmental monitoring, research conducted by government, academics and ENGOs, and local knowledge.

#### **2.4.1.1 Environmental Impact Assessment**

An aquaculture site application is an automatic trigger for an environmental impact assessment (EIA) by the Canadian Environmental Assessment Agency (CEAA), usually through at least one of two mechanisms. Firstly Section 35(2) of the Fisheries Act [1985] may trigger an EIA, when approval is required from the Minister for the alteration, disruption or destruction of fish habitat [*Canadian Environmental Assessment Act Law List Regulations*, 1994, s. 6]. Secondly, an EIA may be triggered by any ‘work’ within navigable waters under the *Navigable Waters Protection Act* [1995, s. 5(1)(a)] [*Canadian Environmental Assessment Act Law List Regulations*, 1994, s. 6]. Finfish aquaculture sites usually trigger an EIA through this latter provision.

When an EIA is triggered a ‘screening’ of the aquaculture proposal will be undertaken, which means that the environmental effects of the proposed operation will be examined to determine whether these are acceptable, or need to be minimised or mitigated [Blue Revolution Consulting Group, 2005]. This examination requires a broad range of

information to be collected [Canada, 2002c; Canada, 2002d; British Columbia 2003d]. Firstly information about the site location is required, including a comprehensive map of surrounding sites, rivers, sensitive habitat, and other rights and uses that exist in the region. Environmental information is required detailing the benthic (substrate) conditions, wild fish counts from stream surveys, water quality data, water circulation models, and climate data. Information regarding current production (species, infrastructure, history of escapes and pharmaceutical use, etc.) is also required, together with a management plan for the new proposed development, which would include environmental management plans for predator control and escape prevention, as well as fish health strategies, feed regimes and harvesting practices etc.

Under the *Canadian Environmental Assessment Act* [1992], public involvement is not required for EIA screenings, but is at the discretion of the responsible authority (DFO). Where public input is solicited, the public must have access to the screening report, usually available by request to the CEAA [Canada, 2005d].

#### **2.4.1.2 Research from Government, Academia and ENGOS**

Currently, there is no central data repository for data produced by government, academia and ENGOS [DeJager, 2005]. These stakeholder groups are largely operating in research silos, which inhibits both the opportunity for new developments and innovation, as well as public understanding and consensus [DeJager, 2005].

The wealth of government information is difficult to consolidate. 'Aquaculture Update' is newsletter available both online and in hardcopy, which is prepared three times a year summarising aquaculture research in the Pacific Region [Pearce, 2005]. With only three issues a year, however, this barely covers the ongoing research that DFO is conducting. While other information sources are available on the DFO website, the size of the government department and the poor design of its website for information provision, make it very difficult to locate relevant information. There is also information in other government departments to consider, such as Environment Canada, CEAA and Transport Canada, as well as provincial government authorities. All these departments must be contacted separately in order to obtain relevant information.

Academic information is even more difficult to consolidate, as there are many journals in which research is published and it is not possible to remain up-to-date with all ongoing research in this manner. Although organisations such as Aquaculture Canada and Aquanet provide annual conferences and publications for academics to meet and present their work, this is not a substitute for an information repository.

Much of the information being conducted by the ENGO groups is available online, as the main focus of these groups is to communicate ideas to decision-makers and the public. However, even then there are many different ENGOs throughout Canada and their information is not collected into a central information repository. Because ENGO information is often viewed as contrary to government data it makes even more sense to

ensure that both information sources are available in the same location so that they can be compared.

To address the lack of data coordination, a knowledge transfer system has been proposed and is currently under development [DeJager, 2005]. This system proposes using a web portal to provide access to a one-stop-shop for aquaculture information needs. Unfortunately no further details regarding the system design or the means by which the quality of data and information will be assessed is available at this time [DeJager, 2005].

#### **2.4.1.3 Industry Environmental Monitoring**

Under the provincial MOUs, most of the provinces are responsible for ensuring that ongoing monitoring of aquaculture sites occurs. However industry is reluctant to release this information to the public because of fears that it will be misconstrued to show detrimental impacts on the environment [Smith, 2005]. In the 2004 Auditor General's Report in New Brunswick [Fraser et al, 2004] it was identified that publicly reported information in 2002/2003 did not include environmental monitoring results. This was amended in the 2003/2004 DELG Annual Report, and it was detailed that annual monitoring revealed 33 hypoxic sites, and 2 anoxic sites [New Brunswick, 2004], however confidentiality requirements prevent individual sites being identified [Fraser et al, 2004]. In British Columbia, however, all annual monitoring results from aquaculture operations are disclosed to the public through the Ministry of Agriculture and Lands website [British Columbia, 2005a].

The accuracy of the environmental monitoring information is of concern to some aquaculture stakeholders, particularly in New Brunswick where the consultants who perform the environmental monitoring are hired directly by industry [Porter, 2003]. Only 20% of the onsite monitoring operations are audited by DFO annually [G3 Consulting, 2000], which further raises public concern that potential adverse effects may not be detected in a timely fashion. However according to Crocker [2005] most New Brunswick environmental monitoring is conducted by one third party company, who are trustworthy only because they have too much to lose by altering the data in any way.

#### **2.4.1.4 Local and Traditional Knowledge**

Local knowledge (LK) is information (usually of a quasi-scientific nature) collected by individuals who are usually not formally trained in information collection. Traditional knowledge (TK) is the result of a much closer and longer lasting relationship to the land, and often refers to knowledge kept by First Nations communities [Ng'ang'a et al., 2004]. This is explained further in Section 3.6.2. Under the *Canadian Environmental Assessment Act* [1992] First Nations TK may be incorporated into the decision making process [CEAA, 2004]. Collection of data and conditions of use, storage, transfer and ownership must be established by the First Nations, and informed consent must be given prior to incorporating TK into the decision-making process [CEAA, 2004]. First Nations communities have also collected compiled LK, through activities such as stream surveys of Atlantic salmon on the Pacific coast, which has been incorporated into research of both DFO and ENGOs [Thomson, 2003].

Little evidence could be found in the literature of other means by which LK and TK are incorporated into the aquaculture decision-making processes. The available channels for communicating aquaculture-related LK or TK information are either contacting a relevant government authority or ENGO group, or by participating in a public consultation meeting relevant to aquaculture and making a presentation in regard to the LK/TK. Public consultation opportunities are discussed in Section 2.5.

## **2.4.2 Information Dissemination Tools**

Each of the four provinces under consideration have different web-GIS tools to enable information dissemination, with the exception of New Brunswick, which is currently developing a system [Page, 2005]. These are discussed in the following sections.

### **2.4.2.1 British Columbia**

The most advanced of these is in British Columbia where a web-based GIS contains the most information and allows for the greatest level of data manipulation [British Columbia, 2005a]. A screen capture of this web-GIS tool is shown in Figure 2.5. There are many data layers that can be turned on, and very few are turned on in Figure 2.5 to ensure clarity.

In addition to basemap data such as cities, roads, rivers and boundaries, there is data specific to aquaculture such as the location of finfish and shellfish sites (shown in Figure 2.5), as well as colour-coded ratings of the water to define how different regions are rated for salmon and shellfish aquaculture (these are listed on the top-left of Figure 2.5). At

high enough resolutions aerial photographs are also available for some aquaculture sites. Each aquaculture site can be queried to display the company name, legal description, tenure information and details about the farmed species. Additional information about the marine ecology and oceanographic conditions is also available.

There are three different levels of tools available for manipulating this GIS, and the most advanced tools are shown on the top tool bar. Tools allow users to measure distances and areas, add their own Java-based SOE points, lines and polygons around which buffers and radii can be created. Information can be downloaded into an Excel file, or external information can be uploaded as shapefiles into the system. Other tools not shown here allow the map to be annotated with basic points, lines, polygons and text. The map can be saved as a link or a PDF document and either printed or mailed.



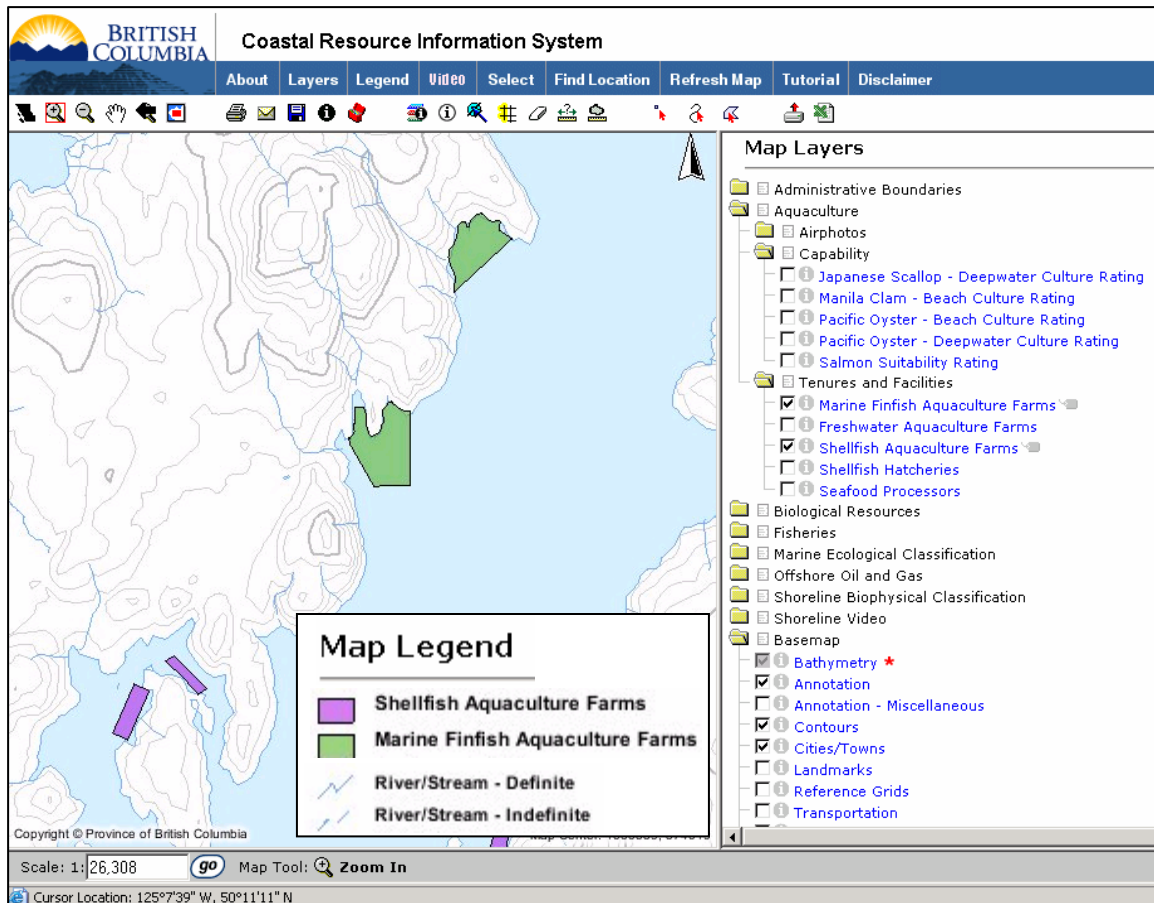


Figure 2.5: British Columbia's Coastal Resource Information System (from British Columbia [2005a]).

#### 2.4.2.2 Nova Scotia

The Nova Scotia web-GIS is much more basic, and provides four different scales on which to zoom in on an aquaculture site (see Figure 2.6). Once zoomed to the maximum scale, an aquaculture site can be selected and queried to display details about that site. Details available include the site license holder and the appropriate contact details, the species farmed, the water body in which it is located, the coordinates of the site and the local government representative to contact in regard to queries about the site. Unlike the British Columbia system, there is no capability provided to enable the map to be saved or emailed.

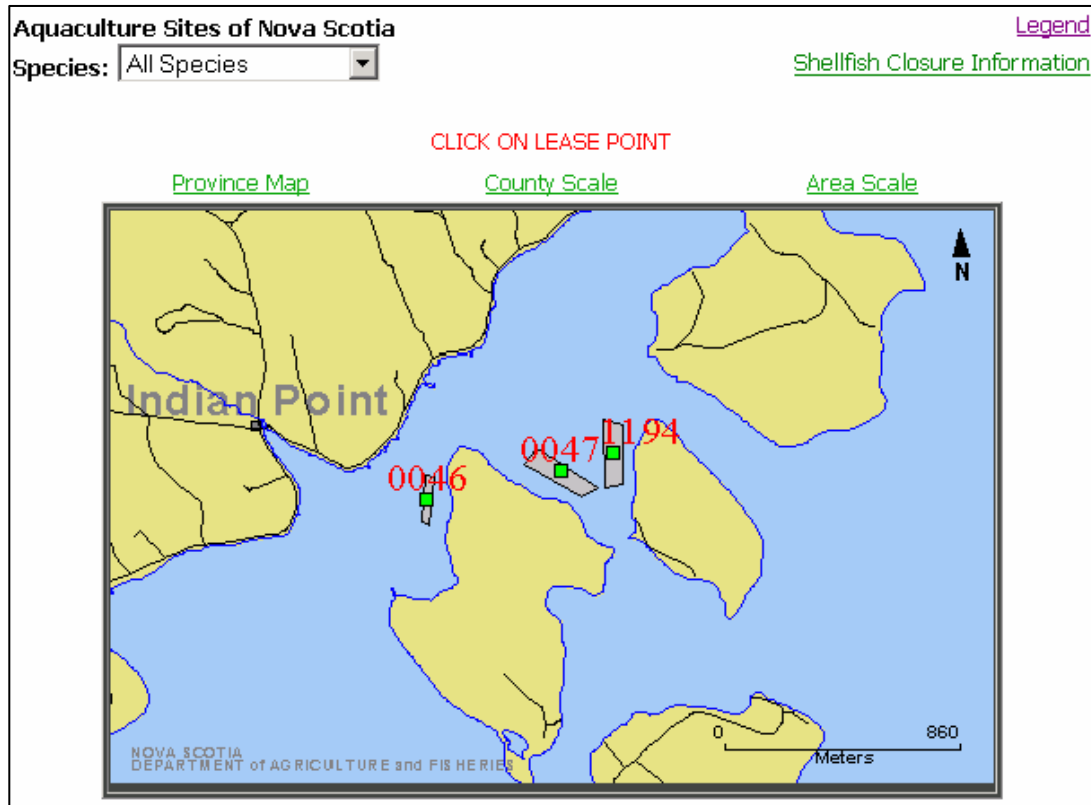


Figure 2.6: Nova Scotia's Aquaculture Site Mapping Application  
(from Nova Scotia [2005d]).

### 2.4.2.3 Newfoundland

The Newfoundland AquaGIS system [Newfoundland, 2005] is slightly more advanced than that available in Nova Scotia and allows the map to be zoomed at arbitrary scales as well as panning, which were not available with the latter. Aquaculture sites can be queried and details relating to the site location and type of species farmed can be identified. The available tools are basic compared to the British Columbia system, but more advanced than the Nova Scotia GIS, and allow measurement to occur. Maps can also be saved as a hyperlink.

## **2.5 Overview of Current Public Participation and Dispute Resolution Practices**

Fisheries and Oceans Canada (DFO) states that it is committed to ensuring transparency within the aquaculture industry and promoting two-way communication between all stakeholders, as identified by Principles 2 and 3 of its Aquaculture Policy Framework [Canada, 2002a].

*Principle 2: “DFO will address issues of public concern in a fair and transparent manner, based on science and risk-management approaches endorsed by the Government of Canada”.*

*Principle 3: “DFO will communicate with Canadians and be informed by their views on issues pertaining to aquaculture development”.*

As noted in Section 2.4.1.1, public consultation under an EIA screening is at the discretion of DFO [Canada, 2005d]. However, within the provinces there are compulsory public consultation requirements as outlined in the following sections.

### **2.5.1 British Columbia**

All applications for aquaculture leases in British Columbia require the applicant to place a notice at the location of the proposed site. This notice must contain the applicant’s name and address, the dimensions of the lease site and the purpose of the application. Further consultation in the form of open houses or local advisory committees may also be required at the discretion of the Crown Land Administration Division [British Columbia, 2005b]. Upland owners of adjacent foreshore may need to be directly consulted regarding the aquaculture site application. New finfish applications automatically require additional

public consultation, most often in the form of a public open house in the area proximate to the application site. Where new or expanding shellfish sites may affect the ability of another shellfish farm to expand, the applicant must consult with neighbouring shellfish farms to ensure that their site will not interfere with any expansion plans of their neighbours [British Columbia, 2005b].

First Nations must also be consulted where appropriate, and provincial staff are responsible for determining whether aboriginal rights or title are affected [British Columbia, 2005b]. As noted in Section 2.2.6, First Nations must be consulted when their rights may potentially be contravened, whether or not they have been granted title [Gibson, 2003].

A new strategy is being implemented in British Columbia to address conflict between stakeholders. Fraser and Beeson [2003] identified the need for a forum on salmon aquaculture, which would work to build dialogue between stakeholders and improve transparency and trust. In response to this need, the Pacific Salmon Forum was launched in April 2005 [Fraser, 2005]. Funded by the province for three years, the Forum's mandate is to enhance both the wild and farmed fishery, while building public confidence in aquaculture and fisheries management [Parker, 2005]. The Forum has most recently been addressing the different information regarding sea lice interactions between wild and farmed fish. For a recent round table on sea lice, researchers prepared papers that were reviewed by ten scientists. The results were encouraging with all researchers present

generally agreeing with the methodologies and research findings within the reviewed papers [Parker, 2005].

### **2.5.2 New Brunswick**

In New Brunswick the public is consulted regarding applications to lease an aquaculture site, but are not consulted regarding applications for aquaculture licenses. The requirements for public consultation are minimal, with the applicant being required to place two advertisements in two local newspapers and provide a list of all upland owners within 100m of the site, who are contacted by the Department of Fisheries and Aquaculture (DAFA) [Environmental Assessment Office, 1997a]. According to Smith [2005] the aquaculture site applicant often engages in further consultation of the public to prevent later disputes, however evidence of such additional consultation could not be found and Crocker [2005] suggests such additional effort is not common. It should be noted that New Brunswick's *Aquaculture Act* [1988] does not provide any means for a public hearing to review aquaculture applications, which reduces the means by which opposition to aquaculture can occur [Phyne, 1999].

New Brunswick also lacks a strong planning scheme for aquaculture sites through which public consultation regarding future development of the industry can occur. According to Lipsett [2005], there are "limited sites" available for development and as such all planning is done on a case-by-case basis using the public consultation channels available for aquaculture site lease applications as noted previously. Major issues of concern when looking at possible new sites is the proximity to existing sites and to wild salmon runs.

There are exclusion zones and controlled growth areas, however these were put in place in consideration of navigation and the traditional fishery. Thus if a coastal property owner wanted to know if an aquaculture site would be built in his view, there would be no way for them to find out.

### **2.5.3 Nova Scotia**

All applications for aquaculture leases and licenses in Nova Scotia must first be approved by the Aquaculture License/Lease Review Network, which encompasses federal and provincial authorities. After initial approval a public hearing is scheduled (in accordance with the Nova Scotia *Aquaculture Act* [1983]) and announced in the local newspapers. The advertisement indicates that unless interest in the public hearing is expressed prior to its scheduled date, the hearing will be cancelled [Phyne, 1999].

Further public consultation and dispute resolution is engaged in through Regional Aquaculture Development Advisory Committees (RADACs), which are established to resolve conflicts among coastal users in Nova Scotia [Nova Scotia, 2005c]. The RADACs are community-based organisations that review aquaculture applications to determine whether they are suitable for the proposed location and then make recommendations to the Minister, who is responsible for the final decision on the issuance of a lease or licence. As a result of this consensus building model, aquaculture has been introduced into new areas on Nova Scotia, as residents have a level of control over aquaculture development in their area [Nova Scotia, 2005c].

#### **2.5.4 Newfoundland**

The aquaculture industry in Newfoundland is relatively new in comparison to the other provinces considered in this research. As a result the policies developed for Newfoundland have had the opportunity to learn from mistakes made in other regions of Canada, such as New Brunswick and British Columbia, where aquaculture expanded very rapidly [McLaughlin, 2005]. The *Aquaculture Regulations* [1996, (5)] of Newfoundland ensure that there is transparency in regard to the industry by allowing confidentiality only to aquaculture information that relates to industry trade practices and unpatented technology, and financial information. This ensures that members of the public have extensive access to a wide range of details regarding industry operations.

No information in the literature could be found regarding public consultation requirements for aquaculture sites, or dispute resolution systems that might be in place. Aquaculture is bringing economic growth to some coastal communities and is frequently welcomed. Many of the operators of the aquaculture sites are current or former fishers, and thus they understand the needs of other fishers in the community who may be sceptical about aquaculture, and know how to consult with them [McLaughlin, 2005].

### **2.6 Summary of the Problem**

The disputes regarding aquaculture are costly when viewed economically, socially and, according to some groups, environmentally. Economic losses are felt by industry, who

must endure a slow regulatory process due to community concerns, as well as lower sales due to poor perception of the industry through the media. The provincial and federal government in turn feel these losses, through reductions in taxes on income, sales and exports. ENGOs and groups opposed to aquaculture, such as some First Nations groups and communities, are also impacted as they must constantly put resources into research and their own campaigns to prevent or limit aquaculture operations. Environmental costs may also occur while the dispute is ongoing and the issues under debate are causing environmental degradation. It is for this reason that many ENGOs and communities in British Columbia are calling for a moratorium on new sites and/or immediate following of all sites until scientific evidence is produced to resolve the informational conflicts as covered in Section 2.3 [CAAR, 2005].

Social tensions between stakeholders who are in conflict may have resulting in social costs. An example of this can be seen in Nova Scotia, where a shellfish aquaculturalist who wanted to expand his operation met with conflict that divided the community, as described by Dwire [1996] (note that names of individuals and places have been changed to ensure anonymity). John Graham had operated his oyster farm in the rural setting of Malpas Cove since the early 1980s and wanted to expand his operations. Graham had always been on good terms with the traditional fishers (fish and lobster) in the community, who had assisted him in starting up his business and in selecting a new site on which to expand his aquaculture operations. However when Graham initiated his expansion plans, he was met with strong resistance from the nearby community of Waldon Bay, a “bedroom” community of Halifax, predominantly composed of more



affluent professionals who did not want their view and property values harmed by aquaculture. The public hearing in regard to the conflict was attended by over 200 people, and as a result of the extreme opposition the application to expand was declined. The public scrutiny of the debate and publications after the fact, however, led to division in the community between the perceived ‘yuppies’, thought to be selfishly denying coastal communities of much needed employment and income, and the longstanding rural community. Moreover, the conflict eroded Grahams relationship with the lobster fishery, who were swayed by environmental arguments that the oyster aquaculture facility posed a threat to their industry. A second example of conflict can be seen in some First Nations communities in British Columbia, where some of the community members are engaging in aquaculture while others are vehemently opposed to the industry [Parker, 2005].

It is clear from the issues discussed within this chapter that there is a need for constructive dialogue between informed stakeholders to build consensus over existing issues and to prevent new issues arising. The problem addressed in the remaining chapters is therefore twofold:

- 1) What techniques can be employed to facilitate dialogue between stakeholders in order to build consensus?
- 2) What ongoing strategies for information and public consultation should be implemented to work towards preventing disputes?

The following chapter will provide an examination of the literature regarding techniques and tools that can be utilised to address this issue. These practices will be drawn on in Chapters 4 and 5, respectively, to define the needs of stakeholders in regard to information provision and communication, and to design a framework to address these needs.

## **CHAPTER 3**

### **A REVIEW OF CONSENSUS BUILDING AND INFORMATION MANAGEMENT TECHNIQUES AND TOOLS**

To address the two questions posed at the conclusion of Chapter 2, this chapter will start by providing a background to consensus building, and will address information dissemination and management in Section 3.6. These techniques form the basis for the consensus building and dispute prevention framework designed in Chapter 5.

#### **3.1 An Introduction to Conflict Management**

Moore [1996] notes that “conflict is not necessarily bad, abnormal, or dysfunctional; it is a fact of life.” The fact is that individuals involved in a dispute may hold opposing views, but each disputant believes that their viewpoint is valid and based on sound reason. For example, the development of Integrated Coastal Zone Management (ICZM) policies is in part due to the conflicts that arise in the coastal zone, where many individuals have different interests and hold different rights. When a new use is introduced into this “mosaic” of rights it is common for some of the existing users to feel that their rights are being threatened [Rijsberman, 1999].

Addressing problems between stakeholders is often called ‘conflict resolution’ or ‘dispute resolution’. This can be a misnomer, however, as many efforts to facilitate dialogue do not immediately achieve a ‘resolution’ to the problem, particularly where problems are deeply entrenched and/or are very complex. Equally, the dispute may not be a conflict per

se, but an inability to negotiate the mosaic of diverse interests and rights. Such is the case with the aquaculture debate, which has a complexity due to the many stakeholders involved and the variety of interests and rights they possess. It is for this reason that the terms ‘consensus building’ and ‘dispute prevention’ are preferred for the overall goals of this research. While tools and techniques for dispute and conflict ‘resolution’ may be discussed in this chapter, the overall goal of this research is to work towards building consensus between the parties.

The field of conflict theory and dispute resolution is very broad and deals with conflicts in the workplace, terrorism, moral conflict, human rights and warfare. The literature review encompassed in this chapter concentrates on the elements of dispute resolution theory and practice that are relevant to the aquaculture debate and the basis for the consensus building framework design in the coming chapters.

### **3.2 Positions, Interests and Needs**

A dispute can be viewed through a number of different frames of reference. In the consensus-building literature, stakeholders may be seen to have positions, interests and/or needs. *Positions* are the basic demands of disputants. For example, in the aquaculture debate some ENGOs have basic demands that all aquaculture cages be removed from the water, while the industry demands the cages remain in the water. When conflict is viewed in this way it commonly appears intractable, as the positions or ‘demands’ may be directly opposed [Maiese, 2004a].

The *interests* of stakeholders may be surprisingly conciliatory, however. For example the ENGOs mentioned above have an interest in ensuring the survival of wild salmon stocks, while the industry wants to remain economically viable. Focusing on the interests that are the basis for the positions can present solutions to the dispute and opportunities for consensus building, which may previously have been obscured by the conflicting positions.

Some academics choose to further define *needs* as being separate from interests. This term is used to define fundamental requirements for human development and survival such as security, identity and a sense of belonging [Maiese, 2004b]. However, the addition of this extra term can introduce confusion between interests and needs. According to Maiese [2004b], when compared to needs, "...interests are tangible things, such as land, money or jobs that can be traded or compromised". For the sake of this research, the term 'needs' will not be used. Even a basic human need for survival is based upon an individual's interest to survive. There are also 'sub-interests' that accompany an interest. For example, an interest of the aquaculture industry is that their business is profitable. A sub-interest of this is that there is healthy stock, which in turn requires clean water and a well-sited aquaculture farm with good hydrological conditions.

### **3.2.1 Rights or Interest-based Consensus Building**

One of the ongoing debates within the consensus building literature is whether a dispute resolution system should be based upon the rights or interests of the individuals and

groups involved. A rights-based mediation system generally refers to a dispute that is evaluated based upon the rights of the parties involved. Rights may refer to legal rights, moral rights, utilitarian rights (where something is a right if it gives the greatest happiness to the greatest number of people [Bentham, 1830]) or basic human 'needs'. According to the dispute resolution literature, a rights-based decision generally results in a winner and a loser as rights inherently result in one party being right and one party being wrong [Morris, 2002]. Silbey and Sarat [1989] argue that the current state of litigiousness in North American society is, in part, a function of an overemphasis on the rights of individuals, which does not take into account social consequences such as increased business costs and a resulting decrease in opportunities.

A more stable system, promoted in much of the dispute resolution literature, is interest-based mediation. Where interests are the basis for addressing disputes, the system is likely more effective and stable (see Figure 3.2) [Brahm and Ouellet, 2003]. Under this system disputes should be addressed mostly based on interests and only occasionally based upon rights. A dispute should be based upon power very infrequently. The reasons for this methodology are twofold:

- a) Interest-based negotiations are less costly, both from a financial perspective and in terms of time, as they do not require adjudication or demonstrations of power.
- b) Interest-based negotiations are win-win, meaning that some measure of success can be attained by all parties. In the case of a rights or power-based system there

will be winners and losers, meaning that not all stakeholders will be satisfied with the outcome. In the case of a power-based decision, the losing side may be angry and seek some sort of retribution, which can further increase costs and, in some situations, may be dangerous.

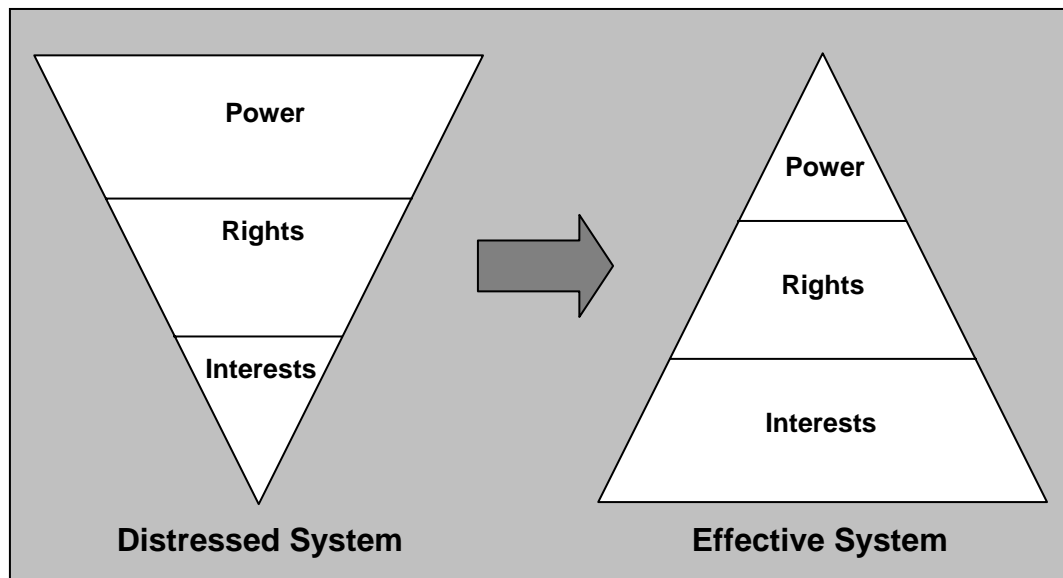


Figure 3.1: A dispute resolution system is only stable and effective when it is based upon interests (after Brahm and Ouellet [2003]).

The following example illustrates the difference between rights and interest-based negotiation in the aquaculture industry. A salmon aquaculturalist may be under pressure to follow their site following ENGO concerns that wild salmon are being adversely affected by sea lice associated with the aquaculture site. The aquaculturalist has a legal provincial lease and license to farm and has passed the annual environmental monitoring requirements. Under a rights-based negotiation, the aquaculturalist would likely ‘win’ on the basis of the legal right they possess, while the ENGO would lose. However, as a result of this loss the ENGO may alert the media to the potential harm the site is causing, which may affect the way the farm is perceived in the community or may lead to

economic harm in the form of lost sales. Conversely, an interest-based negotiation may include a discussion of alternative sites to which the aquaculturalist could relocate the farm stock to allow the existing site to fallow and seek to resolve the issue of whether the site is causing the sea lice in the wild fish. Such a negotiation may also allow an exchange of information so that ENGOs can be aware of the pharmaceuticals used by the aquaculturalist, which may aid in deducing the cause of the sea lice in the wild fish. In this solution both the aquaculturalist and the ENGO would be winners, as the aquaculturalist gets to keep their stocks in another location, and the site is fallowed to the satisfaction of the ENGO.

However one should not completely neglect the consideration of rights, particularly where property is concerned. The following section will examine the importance of rights to the aquaculture debate, and outline three methods for resolving disputes using these rights.

### **3.3 Property Rights and Dispute Resolution**

In this research, the term 'rights' typically refers to property rights, i.e., the rights that an individual or group has with respect to a space, as well as the restrictions and responsibilities associated with those rights. As discussed in Chapter 2, in the case of aquaculture these are not necessarily formal rights, but may also include customary use rights, such as rights to the traditional fishery, herring weirs, and the foreshore.



The nature of aquaculture and the water parcels in which it operates means that pollution and disease from the industry can flow into space in which other individuals and groups have rights. This is an example of an externality.

Externalities are “spillover effects”, either costs or benefits, that result from the economic activities of one group and affect the rights of another [Brooks, 2001]. Beneficial externalities of aquaculture may include direct employment, spin-off industries (e.g., feed supplies and processing) and an improved social structure due to the improved economic opportunities. Negative externalities include effluent in the water, the potential for disease transfer, alteration of traditional ways of life and an aesthetically displeasing appearance. It is also possible that a negative externality for one group, such as an alteration to traditional life, may be of benefit to another group who welcome the changes. Thus, where the aquaculture industry interferes with the rights of these other groups, or devalues their property, is where disputes begin to arise.

Where property rights exist, the framework within which they operate must define how these rights are protected or taken into consideration. This is called internalizing the externality or ensuring that the costs of a negative externality are taken into account by the production costs of the initiator. There are three common methods by which this may be accomplished: property rules, liability rules and inalienable entitlements [Calabresi and Melamed, 1972]. In the following three sub-sections these terms will be explained along with how they would reflect the rights of stakeholders in the aquaculture industry. To illustrate the different methods of addressing these rights a hypothetical example will

be used of a basic dispute involving an aquaculturalist (Owner A) and a group of coastal land owners (Owners B1 – B10). This is similar to the example in Waldon Bay, Nova Scotia, as described in Section 2.6.

The aquaculturalist, owner A, would like to expand his business from the one cage system on the right, as shown in Figure 3.2, to include an additional cage system on the left. However, the coastal landowners do not think that this is an appropriate use of their bay as it will further detract from the aesthetic appearance of the bay (i.e.: viewscapes) and another site may harm their traditional mollusc fishery. Through the property rights approach there are three options for resolving this dispute.

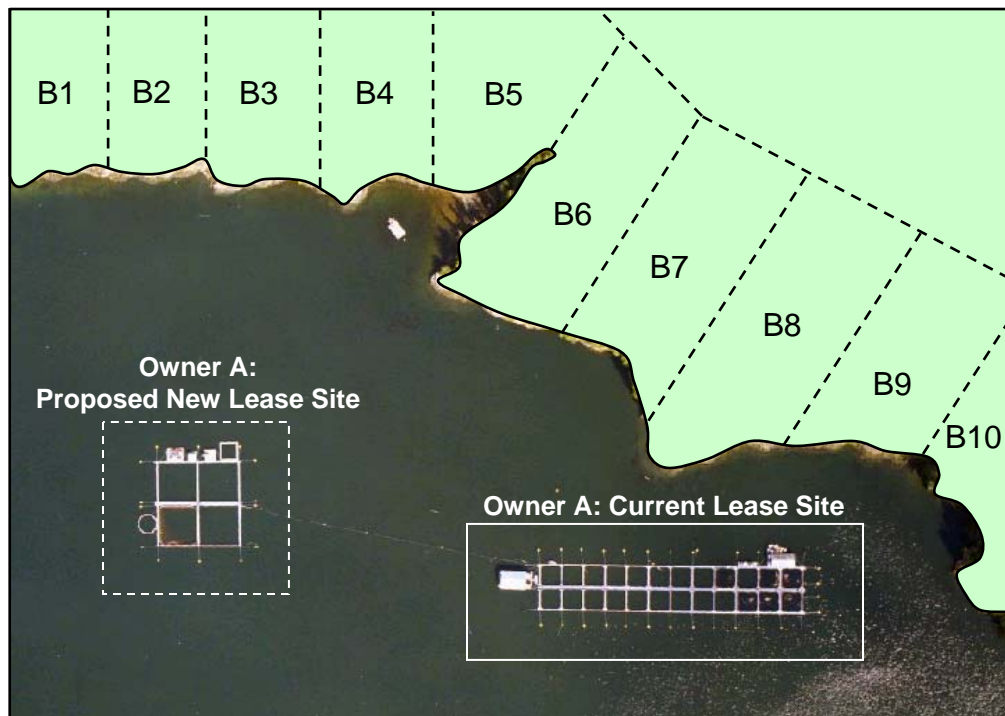


Figure 3.2: The setting for a hypothetical dispute between the aquaculturalist (owner A), and the landowners (owners B1 – B10). Base map from British Columbia [2005a].

### **3.3.1 Property Rules**

Property rules treat rights to resources as private property under a free market economy; the rights that have been vested to the individual are protected under law, unless they choose to sell these rights willingly at a price deemed appropriate by the individual [Calabresi and Melamed, 1972], except in places of expropriation by the state. Property rules assume that each party will act in their own self-interest, thus allocating resources efficiently [Calabresi and Melamed, 1972].

Applying this rule to the hypothetical example, A may have a right to expand the aquaculture site granted from the province and/or B may have rights to the aesthetic appearance or rights to the traditional fishery. Thus, there are two cases to consider under property rules. In the first case the aquaculturalist, A, must purchase any rights held by B in order to expand the site (thus the costs of lost property values are captured in A's production costs) and A will only act if the benefit of the expanded site is greater than the cost of purchasing B's rights. In the second case A has a right to produce the externality unless B purchases this right to expand from A, thus ensuring that any lost productivity of the coast is captured in the cost to the landowners who will only act if this cost is less than the benefits of viewscape or the fishery.

The problem with property rules are three-fold. Firstly, both parties have to have access to the same information in order to make a decision, which is frequently not the case. Secondly, the cost of making collective decisions, as B would need to in the above

example, may be high or difficult to define. Thirdly, it is difficult to define objective values for some externalities, such as viewscape [Calabresi and Melamed, 1972].

### **3.3.2 Liability Rules**

Liability rules are similar to property rules, however rather than the exchange of rights from one rights holder to another, there is a payment of compensation [Calabresi and Melamed, 1972]. In this instance the aquaculturalist, A, may operate the second cage site, but must compensate B for the externality caused. Likewise, B can compensate A for *not* operating the second cage site. In both cases the externality is internalised and decisions will be based on the market values of the rights held. The problems with liability rules are similar problems those affecting property rules, as it is difficult to determine the market value of some rights (such as viewscape, or the long term value of the mollusc industry) and difficult to coordinate collective decision-making. If B were to compensate A it would be necessary for B to arrange that compensation between them. This may prove difficult, particularly where there are ‘freeloaders’ who may dispute the amount of compensation that is their share (for example arguing that their viewscape is less valuable than that of their neighbours) or who hold out, hoping that others will pay their share [Calabresi and Melamed, 1972].

### **3.3.3 Inalienable Rights**

In the third case, it is possible for the transfer of rights (or compensation for the rights) to be prohibited, even when there is a willing buyer and willing seller. That is, the rights are unable to be alienated. This may be due to the impact of such a transfer on a third party,

due to moralisms which prevent a right being valued, or due to paternalism from a higher authority such as the government [Calabresi and Melamed, 1972].

To apply this to the example above, suppose A is willing to purchase the traditional mollusc fishing rights of B. This may cause an impact on other members of the nearby community who also depend on this fishery for their own livelihoods, such as through a processing plant, but were not included in the transfer or compensation. Also, it may not be possible to value the rights of the traditional fishery as it has been a part of the community for generations and they cannot agree on a sale price. Thirdly, the province may decide that the traditional fishery is too important to lose, and may prevent the sale of these rights.

#### **3.3.4 Costs**

There are three main problems with property and liability rules: transaction costs, information costs and enforcement costs. Transaction costs are expenditures, both tangible and non-tangible, that are associated with the transference of property rights or compensation (i.e., not including the money price itself) [Johnson, 2005]. For example, in the case above, this may include the cost of bringing the property owners together to discuss the transaction (travel time, venue costs, lawyer fees) and the cost of delays associated with negotiations and discussion. In the instance where the landowners, B, are purchasing the rights of A, or paying A compensation there may be freeloaders, who seek to benefit from the solution, but pay less than they are required or nothing at all. This greatly increases the time required to collect the financial settlement, and thus the time

taken to resolve the dispute. These transaction costs are particularly high where there are large groups of people involved [Johnson, 2005]. Thus, while the example above is fairly simplistic, the reality of the aquaculture dispute is that there are a very large number of individuals and groups with different rights and viewpoints who must be brought in to negotiate such a settlement. Such costs are likely to be prohibitive.

The second cost that becomes an issue is that of information. All the landowners in the above example must be well informed about the issue through advertising and information sessions, and must be knowledgeable enough to make decisions. Who absorbs these expenses and who provides the information are additional questions that require answers [Kuperan et al., 1998; Johnson, 2005]. It will be seen in the next section regarding interest based dispute resolution that this is a common issue.

Finally, enforcement costs must be addressed to ensure that the decision made is followed through. If A purchases the mollusc fishery rights of B, then enforcement of this action must take place to ensure that B does not accept the money and then continue their fishery. Combating dishonesty such as this is expensive and can result in the need for legal intervention at a later stage [Calabresi and Melamed, 1972].

Overall the major difficulty with this model, with respect to aquaculture, is the number of individuals involved and the difficulty of involving everyone in the compensation or purchasing process. Unlike the simple example used to illustrate the three methods, the reality of the aquaculture dispute involves many more stakeholders who are much more

difficult to consult collectively, and who are far less likely to agree to one particular method. It is for this reason that an interest-based system would be preferable as it concentrates more on the collaborative consultation *process* and the ongoing building of trust and consensus than it does on finalising an explicit solution.

However rights are not irrelevant, and indeed Morris [2002] argues that rights should be viewed as very important interests. It is to this end that the dispute resolution system as defined earlier is modified to include rights as one of the interests considered in the following alternative dispute resolution system (see Figure 3.3).

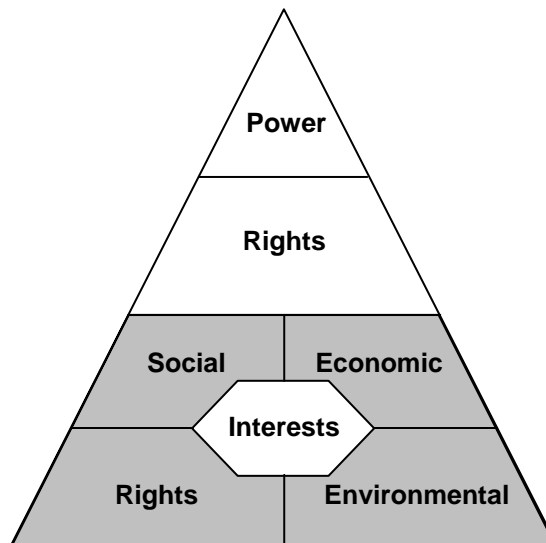


Figure 3.3: Rights may be considered as a type of interest (after Morris [2002]; Brahm and Ouellet [2003]).

### **3.4 Alternative Dispute Resolution**

The previous section examined a rights-based structure for resolving conflicts, and concluded that this is not suitable given the costs involved and the reliance on a set solution. In this section ‘alternative’ dispute resolution systems will be examined, meaning systems that do not rely on legal actions, but instead work towards collaboration and consensus building.

#### **3.4.1 Arbitration and Alternative Dispute Resolution Techniques**

There are three general forms of alternative dispute resolution (ADR) strategies: negotiation, mediation and arbitration. These techniques can be used to help facilitate conciliatory discussions with stakeholders, and are shown in Figure 3.4 on a sliding scale of cooperation.



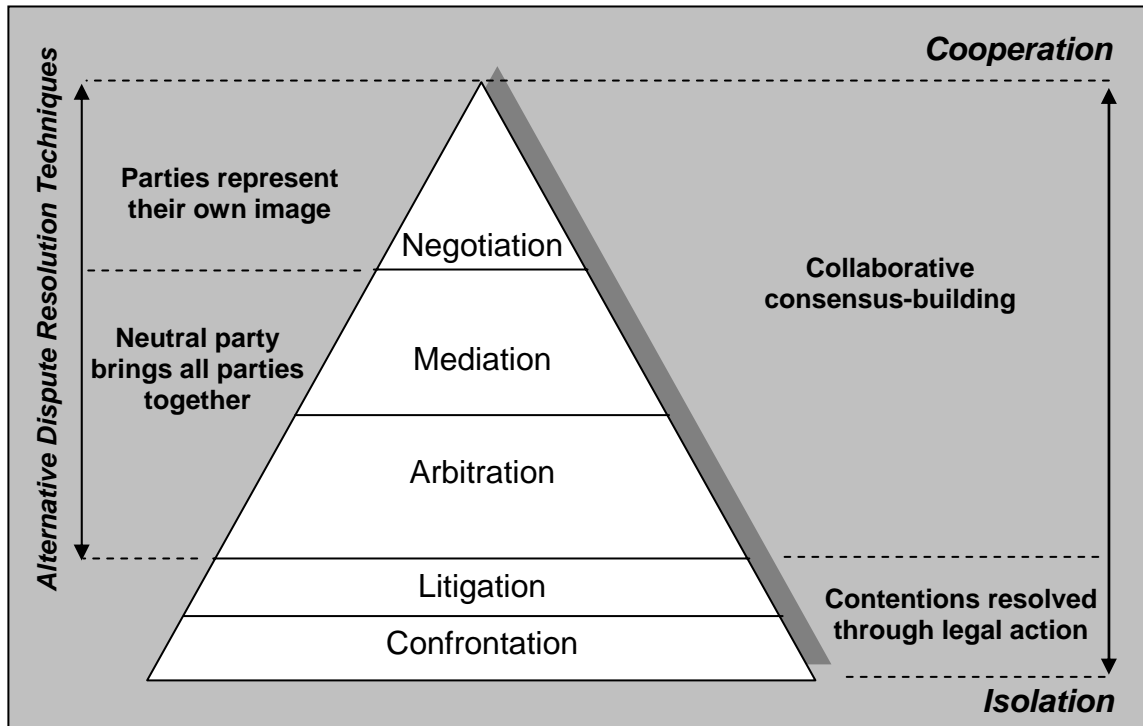


Figure 3.4: Pyramid of cooperation (after Blatch and Cullinen [1998]).

*Negotiation* is the most informal approach and is a voluntary action where individuals with a conflict come together in a temporary relationship to discuss the issues and exchange information. There is no third party to facilitate the resolution process or enforce a resolution [Moore, 1996]. Issues may arise where there are very intense and polarized interests and where the parties involved are unable to effectively communicate. Problems may also arise in the negotiation process where there are disagreements over data and misunderstandings about the interests and rights involved [Moore, 1996]. The intense emotional buy-in of many of the stakeholders regarding the aquaculture industry, as well as the different interpretations of information certainly suggests that negotiation may prove difficult for stakeholders.

*Mediation* is a process that may be employed in these more difficult situations to improve communication and resolve misconceptions with the use of a third party mediator. Participation in the mediation process is voluntary and there is no enforcement of the resolutions that are made, indeed the mediator is designed to facilitate dialogue rather than actually define solutions [Moore, 1996].

In the process of *arbitration* solutions are actually defined, although whether the solutions are enforced depends upon whether binding (enforced) or non-binding arbitration is used. It is these processes of mediation and arbitration that will be utilised in building the framework for aquaculture dispute resolution in this research.

Where a mediator is used within the mediation or arbitration process, they must be perceived as impartial and fair by all parties engaged in the conflict resolution process. Rijsberman [1999] recommends that a local individual who is familiar with the individual case should be assigned as the mediator. However in the case of aquaculture the individuals and groups are often geographically dispersed and made up of many different interest groups. It may not be possible or feasible to employ a local mediator.

### **3.4.2 Collaborative Partnerships**

Another ADR strategy is to encourage collaborative partnerships between different stakeholder groups. Yaffee and Wondolleck [2000] discuss how advocacy coalitions can be built from stakeholders who, on the surface, have nothing in common.

In their example, the Cameron County Agricultural Coexistence Committee was created as a partnership between farmers, environmentalists and government. The United States Environmental Protection Agency (EPA) was conducting research into the effects of pesticides on endangered species, while the Fish and Wildlife Service (FWS) was embarking on a strategy to reintroduce a rare falcon in the region. The FWS and EPA agreed that the farmers needed to significantly reduce pesticide use in the region. The farmers responded angrily, as the level of pesticide reduction called for was tantamount to requesting them to give up farming. After lengthy legal proceedings the three groups and their supporters developed a Coexistence Committee, dedicated to examining how to work together. Their first step was letting each group be their own expert. The environmental groups stopped telling the farmers how to farm, but did explain how the pesticides they used affected the wildlife. They also engaged in constructive communication and discovered that the level of pesticide the FWS had assumed the farmers were using, as was written on the label for the pesticide, was in fact twice the dose that farmers actually used. In the dosage the farmers used, the pesticide was actually safe for the falcons and other endangered species.

This example demonstrates how groups with essentially polar opposite viewpoints on an issue can work together. Such groups are known as advocacy coalitions [Munro, 1993], and work on the assumption that individuals have three levels of beliefs: deep core beliefs, policy core beliefs and secondary policy beliefs, as shown in Figure 3.5. Deep core beliefs cannot be changed, however an advocacy coalition can be formed where

there is an intersection of policy core beliefs or secondary policy beliefs between two stakeholders or stakeholder groups [Munro, 1993].

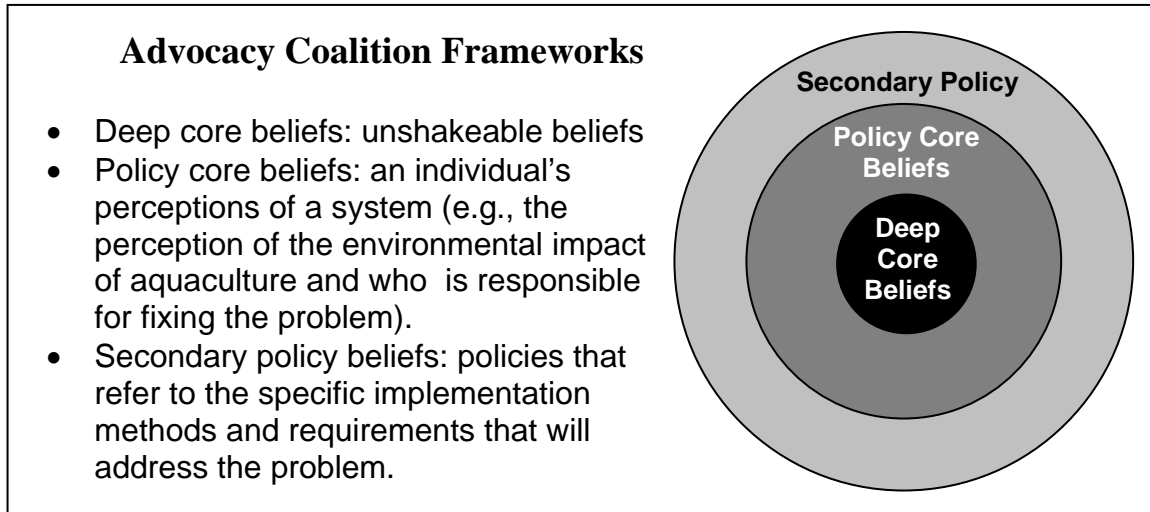


Figure 3.5: Advocacy Coalition Frameworks (text after Collantes [2005]).

### **3.5 A System for Addressing Dispute Resolution**

#### **3.5.1 Considerations for the DR System**

There are many elements identified in the literature as being important within a dispute resolution system. These are outlined in general terms in Table 3.1, and will be framed within the context of the aquaculture dispute in Chapter 4.

Table 3.1: Elements of consideration within a dispute resolution system (from British Columbia [2003b]; Brahm and Ouellet [2003]; Moore [1996]; Pirie [2000]).

	<b>Dispute Resolution (DR) Principles</b>	<b>Description</b>
<b>Communication</b>	Access	<ul style="list-style-type: none"> <li>Stakeholders have access to the DR processes. This may be the mediation forum or the technology through which DR is facilitated.</li> <li>Multiple access points may be required.</li> </ul>
	Awareness	<ul style="list-style-type: none"> <li>Stakeholders are aware of the DR processes and services available (eg: technology solutions).</li> <li>Stakeholders understand how the DR processes are designed to work.</li> </ul>
	Dialogue	<ul style="list-style-type: none"> <li>Communication between stakeholders must be facilitated such that it aids dispute resolution and is accessible to all parties.</li> </ul>
	Education	<ul style="list-style-type: none"> <li>Stakeholders should receive ongoing education in regard to the issues in the dispute, particularly where scientific information is concerned.</li> </ul>
<b>Stakeholder Buy-in</b>	Participation	<ul style="list-style-type: none"> <li>Stakeholders are active in the DR process and are involved in finding solutions. (Steps 3 to 1 on the public participation ladder, Figure 3.7).</li> <li>The DR process should incorporate stakeholder identification procedures to ensure that new stakeholders are not excluded from the process.</li> </ul>
	Trust	<ul style="list-style-type: none"> <li>Trust must be built between stakeholders through the DR process.</li> </ul>
<b>Satisfaction</b>	Fairness	<ul style="list-style-type: none"> <li>The resolutions of disputes are fair and equitable and parties obey them and come away from the resolution process with good faith towards the process and other stakeholders.</li> </ul>
	Equality	<ul style="list-style-type: none"> <li>Power inequalities are balanced.</li> </ul>
<b>Capacity</b>	Cost	<ul style="list-style-type: none"> <li>The DR system is cost-effective</li> </ul>
	Resources	<ul style="list-style-type: none"> <li>Adequate funding, knowledge and human capacity must be in place for the DR process to function at its optimal level.</li> </ul>
<b>DR Tools</b>	Currency	<ul style="list-style-type: none"> <li>The DR process and associated information is up-to-date.</li> </ul>
	Flexibility	<ul style="list-style-type: none"> <li>The system should be able to incorporate a range of stakeholders and their views, and also be able to encompass a variety of scenarios related to the aquaculture industry.</li> </ul>
	Timeliness	<ul style="list-style-type: none"> <li>The DR system reaches resolutions in the quickest possible way.</li> </ul>

<b>Administration</b>	System	<ul style="list-style-type: none"> <li>• An impartial coordinating body must be in place to see to the improvements and evaluation of the system.</li> <li>• The role of the Ombudsman.</li> </ul>
	Evaluation and Improvement	<ul style="list-style-type: none"> <li>• The DR process should be continually evolving and undergoing improvements to maintain its effectiveness and correct ineffective strategies.</li> <li>• The DR process should work towards dispute prevention and early identification; that is, solving the inherent problems rather than addressing issues on a case-by-case basis.</li> </ul>
	Mandate	<ul style="list-style-type: none"> <li>• The goals of the DR process should be clear and transparent.</li> </ul>

### **3.5.2 Consensus Building and Dispute Prevention Framework Design**

There are a number of different methodologies within the literature for designing dispute resolution systems. The system designed in this research draws on a number of examples (eg: British Columbia [2003b]; Brahm and Ouellet [2003]; Blatch and Cullinan [1998]; Rijsberman [1999]; Fraser and Beeson [2003]). The objective of this system is to design an appropriate framework, and it is comprised of three components: conflict assessment, framework design and framework evaluation, as illustrated in Figure 3.6.

The system for designing the framework was developed in this way because it is a streamlined, step-wise process that may easily be understood by non-experts in alternative dispute methodologies. It is essential that individuals who are to engage with the dispute resolution system understand how it works [British Columbia, 2003b]. It incorporates the major concepts of first identifying the status quo and the objectives, which is necessary to highlight the strengths and weaknesses of existing dispute

resolution systems {British Columbia, 2003b}. The system then addresses the two questions that were posed in Chapter 2:

- 1) What techniques can be employed to facilitate dialogue between stakeholders in order to build consensus?
- 2) What ongoing strategies for information and public consultation should be implemented to work towards preventing disputes?

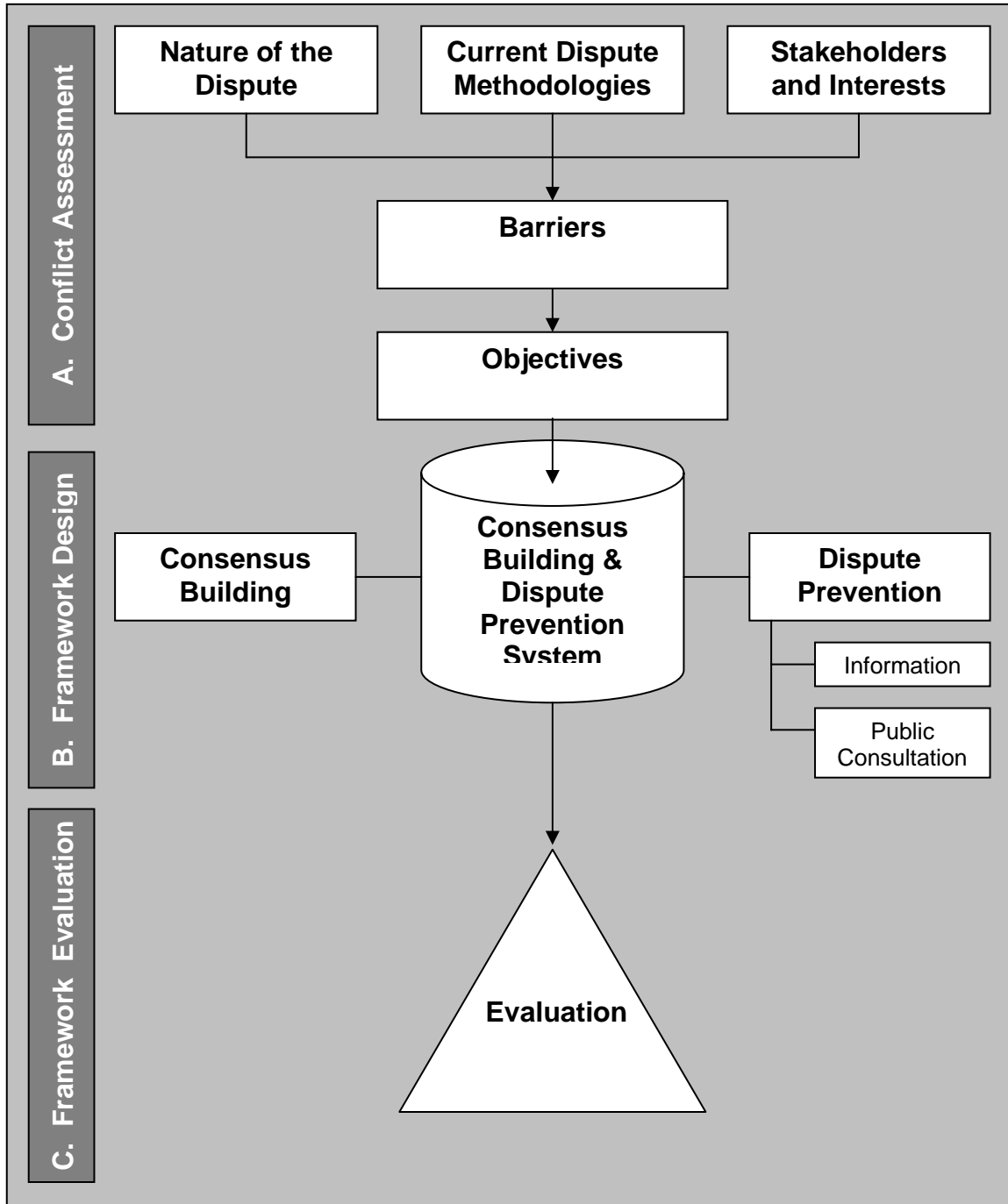


Figure 3.6: The system devised for creating the Consensus Building and Dispute Prevention Framework.



The sections of the system for designing the consensus building and dispute prevention framework are described as follows:

#### A. Conflict Assessment

In the first section of the system the nature of the dispute, the stakeholders involved and existing consensus building techniques are analysed. Barriers to resolving disputes must also be identified, and may include privacy concerns, a fear of the unknown and/or a lack of trust. On the basis of this assessment, objectives of the dispute resolution system will be developed. These will form the basis for evaluating the framework design.

#### B. Framework Design

The framework must address both the barriers and objectives laid out in the conflict assessment component (A), and then establish how this will be accomplished. There are two components to the framework: the first is designed to address consensus building, and the second to address dispute prevention. The system will also address the stakeholder and system management needs outlined in Table 3.1.

#### C. System Evaluation

The evaluation of the system design is the final step before implementation into a pilot study, the latter of which is not within the scope of this research. This evaluation will consider whether the objectives established in the Conflict

Assessment stage were met by the design, and whether the barriers were overcome.

These three components of the system will be addressed in Chapters 4, 5 and 6, respectively.

### **3.6 Dispute Prevention through Public Consultation and Information Dissemination Strategies**

In addition to resolving existing disputes, there is a need to prevent new conflicts arising. Effective consultation and engagement with stakeholders early in the development process can work to prevent conflict by reducing misinformation and creating an ownership in the development process [Rijsberman, 1999]. The concluding remarks from the background study in Chapter 2 identified that there is a need for improved dialogue among stakeholders, and a need to keep stakeholders informed and involved. The previous sections of this chapter have provided a basis for the former, while the latter will be discussed in the following section.

Part of the reason for the disputes surrounding aquaculture is misinformation and a lack of understanding regarding the strengths and limitations of different information and data that is presented. The discussion regarding sea lice is a good example of different information from different sources that is not trusted because there is no admission of the limitations of the data by the stakeholders producing it [O'Neil, 2005]. Other

stakeholders who view the data are aware that there may be problems with the information and inherently distrust the information they are given, scrutinising it for errors, fallacies or statistical flaws. If information were provided and disseminated with increased transparency and with a greater level of public consultation, allowing stakeholders to ask questions and contribute their own local knowledge, this would work towards increasing the knowledge of the public with regard to the aquaculture industry and allow them to question information and practices before a deeply entrenched conflict arises.

### **3.6.1 The Need for Public Consultation**

The purpose of consulting with the public is to incorporate opinions, perspectives and evidence from stakeholders at the earliest stage possible in order to make better decisions and prevent disputes before they arise [Hansen and Prospero, 2005; Rijsberman, 1999]. As discussed in Chapter 2, public consultation strategies already exist within most of the provinces. However the 'level' of public participation varies, as shown in Figure 3.7, from tokenism to active participation in the final solution.

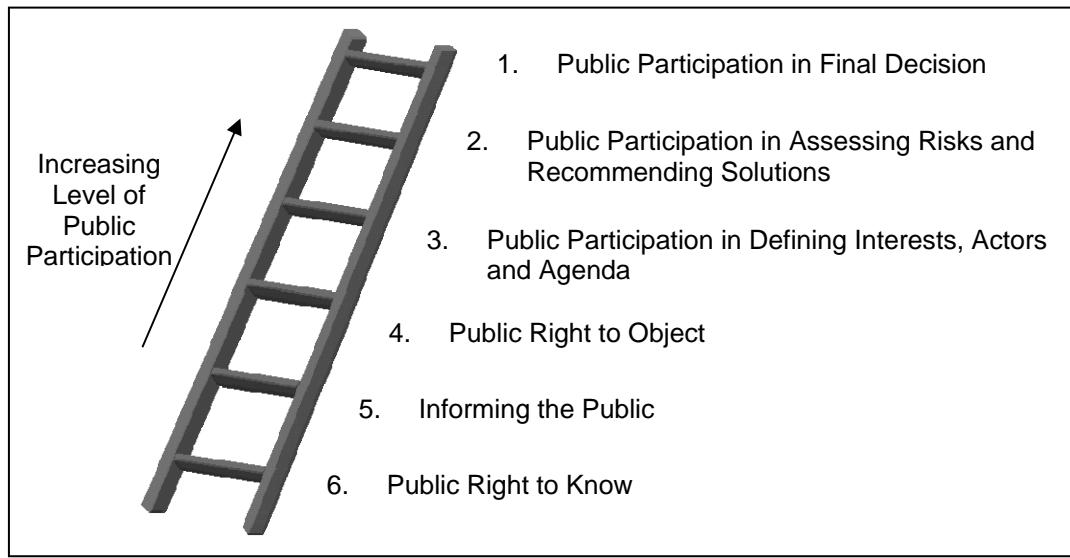


Figure 3.7: The ladder of public participation (after Weiner et al. [2002]).

In the following two examples the contrast between consulting and omitting stakeholders from the decision-making process can be seen.

### **3.6.1.1 Bennet Environmental, New Brunswick**

A recent project which exhibits a lack of public consultation is the development plan by Bennett Environmental to construct and operate a soil oxidiser in Belledune, New Brunswick. An environmental impact assessment (EIA) for this project was never undertaken, and stakeholders were not thoroughly consulted on the project during its provincial review [Lopinto, 2004]. The province undertook various health and environmental reviews, however there was no opportunity for public input into identifying the important components for consideration (as would be required by an EIA). As such, the public perceived that not all the pertinent information had been collected for review [Lopinto, 2004].

Furthermore, the public was misinformed about the development itself. For example the project was misconstrued as a toxic waste incinerator, which would involve the burning of harmful chemicals with the potential to create dangerous emissions. The actual development, however, is a soil oxidiser. The soil is recycled by removing the contaminants, which are mostly destroyed through heating, rather than burning, with the remainder transported to an approved dumpsite that is remote from the proposed facility [Bennett Environmental, 2004; Lopinto, 2004]. The impacts of this misinformation could have been reduced with an informative public consultation process. While there will always be those who distrust a development and speak out against it, most conflict can be avoided by providing stakeholders with accurate information and giving them a forum to voice their concerns and have questions answered. In this instance the level of public consultation was low on the ladder of public participation (Figure 4.2).

### **3.6.1.2 Halifax Landfill, Nova Scotia**

In this example, a higher rung of the public participation ladder was employed. When Halifax was faced with the impending closure of the municipal landfill, the public was asked for their input on the situation through public meetings [Cameron, 2001]. They had already objected to the government's proposals of either new landfill sites or the construction of an incinerator. To the surprise of the government the public chose not to perpetuate the conflict or suggest new landfill sites, instead the public proposed a grassroots recycling program. The government had not considered this option as they believed that the public would not be willing to change their behaviour to solve the problem, and that a technical solution would be more appropriate [Cameron, 2001]. This

example demonstrates how public participation can aid the proponent organisations, as the solutions of the public are sometimes more realistic and sustainable [Weiner et al., 2002] and can offer new and innovative solutions.

### **3.6.2 Incorporating Traditional and Local Knowledge into the Process**

When engaging in public consultation it is important that a two-way flow of information occurs – that is, not only is information disseminated to stakeholders, but stakeholders also have the ability to provide information of their own into the system. Where stakeholders are other organisations, such as ENGOs, information collection usually follows formal channels and can be verified through supporting documentation as well as the credentials and reputation of the information collectors. In the case of local communities and the general public, however, information can take many different forms and can be more difficult to compile. How does one incorporate anecdotal evidence, sketch plans, historical observations and other local knowledge into the decision making process?

Although these stakeholders may not be recognised as professionals in their information collection, it is nonetheless valuable to recognise their contributions. Such contributions may take one of two forms: traditional knowledge or local knowledge [Ng'ang'a et al., 2004]. Traditional knowledge (TK) is a term used for information gained through close contact with a region, often over many generations. It is commonly used to refer to information from First Nations peoples, however can also be used for other members of

the public who have resided in an area for a long time and are familiar with the natural processes. This knowledge may exist in many formats, including oral histories, paintings, photographs and wildlife records.

Local knowledge encompasses more ‘scientific information’ collected by local communities and ENGOs, for example stream samples, fish counts and water quality data [Ng’ang’a et al., 2004]. This data collection is often coordinated by ENGOs for specific reasons, such as environmental monitoring, and although the collectors may not be ‘professionals’, their data may still be very valid and may compliment other information collected by more conventional organisations. An example of this would be data collected by First Nations regarding wild salmon returns in the Broughton archipelago in British Columbia [Thomson, 2003].

### **3.6.3 Public Participation Geographic Information Systems (PPGIS)**

The use of geographic information systems (GIS) has increased rapidly over the last decade, and its ability to deal with spatial problems is well recognised among decision-makers. However using GIS for collaborative decision-making is an area that is still very much in development. It is a technology that will be employed in the framework within Chapter 5, and therefore some background is provided here.

The value of combining or overlaying datasets has long been recognised. One of the earliest example of this was in 1854 during the cholera epidemic in London. A London




doctor, John Snow, demonstrated a correlation between the locations of homes of cholera victims and a particular water pump on Broad Street [Gilbert, 1958]. The development of computerised GIS in the 1980s improved the ability to link geographic datasets [Masser, 1998]. However it wasn't until the 1990s, with the introduction and increased usage of the Internet, that the general public, who did not possess specialised skills or GIS software, were able to access and utilise such technologies [Ammouri, 2002]. An increased awareness of the need for public participation in decision-making has also arisen, and the Internet has added a new dimension to the stakeholder consultation process.

The Internet is increasingly being used as a method of public consultation. Gudes et al. [2004] suggest that using web consultation methods are ideal where there is potential for conflict between contributing members of the public as it allows participants to maintain their anonymity. In their case study in Israel, Gudes et al. [2004] argue that by replacing traditional public consultation methods (i.e., meetings) with web-based consultation, one can remove the conflict that often arises from face-to-face meetings. The case study revolves around devising an area plan for a neighbourhood in Tel-Aviv. However the authors do not consider the ability for all occupants of this area to access, let alone have the required training to use, the web based system suggested. This is particularly pertinent given the occupants of the area, who include “veterans, new immigrants and foreign workers” [Gudes et al., 2004]. The older members of the community, in particular, may not be familiar with the technologies involved, while the latter two occupants may not have access to the technologies even if they are familiar with them.



Although web based consultation systems have potential, they must be implemented with caution so as not to alienate non-users of this relatively new technology.

Table 3.2: The benefits of incorporating public participation into an information system (from Meredith [2000]).

	<b>Interactive Communication</b>	<b>Value to Public</b>	<b>Technical Complexity</b>
	One to One	Low	Low
	One to Many	Higher	Higher
	Many to Many	Highest	Highest

Public Participation GIS (PPGIS) cannot be defined by one application, but should be viewed as a system or concept involving stakeholders in a decision making process through the use of Geographic Information Systems. It is a tool that not only communicates information to participants, but also incorporates user feedback and information, thus ensuring two-way communication between the GIS primary data provider and participants, improving both the value of the information and the value of the decision making (see Table 5.1). This GIS may or may not be remotely accessed;

however this capability is likely to raise involvement and increase the flexibility of the tool [Ammouri, 2002].

The proponent of the PPGIS must be a trusted in order for the information they are presenting to be accepted and the PPGIS to be adopted as a tool. As Kwaku Kyem [1998] noted, individuals must trust the messenger in order to trust the messages they bring. One of the major problems in establishing a PPGIS is the high costs both financially and in terms of capacity of establishing the system, as well as ensuring ongoing support, updates and maintenance. Currently in Canada, the provinces with web-GIS applications are established and maintained by the provincial governments, who have the necessary capacity and upfront finances to establish the system. The provinces may also reduce costs because they already have much of the data, which is often the most expensive component on an information system. However, the government may not be the best proponent for a PPGIS where aquaculture is concerned due to the distrust of government as discussed in Chapter 2.

Figure 3.8 (after Ammouri [2002]) demonstrates that improved decision-making will come from a consultation methodology that is flexible in both time and the process used. It will reflect the needs and desires of individuals as well as their interpretation of the problem, while being considerate of social and political priorities. The Internet provides a flexible medium as it is accessible at any time, and individuals may maintain their anonymity. This aids in reducing the potential for a decision making process to be dominated by a minority of the group, as can occur in a face-to-face meeting [Ammouri,

2002]. As noted in Section 3.5.1, removing power inequalities from the dispute resolution system is very important.

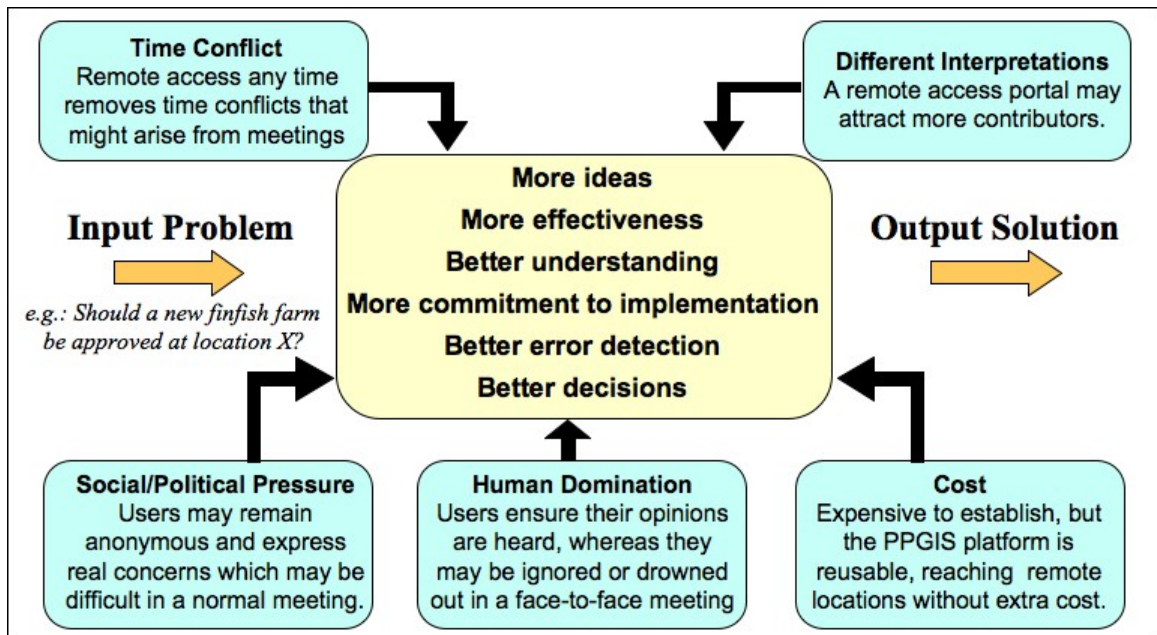


Figure 3.8: The decision making process can be improved by a number of factors in the consultation process, (after Ammouri [2002]).

## **CHAPTER 4**

### **INTERESTS AND OBJECTIVES FOR AN AQUACULTURE CONSENSUS BUILDING AND DISPUTE PREVENTION SYSTEM**

At the conclusion of Chapter 2, two questions were raised that are the core problems being addressed through this research:

- 1) What techniques can be employed to facilitate dialogue between stakeholders in order to build consensus?
- 2) What ongoing strategies for information and public consultation should be implemented to work towards preventing disputes?

To meet these needs, a consensus building and dispute prevention framework for aquaculture will be designed, drawing on knowledge of the stakeholders and the disputes as well as the existing literature, as covered in Chapters 2 and 3 respectively. This will be done using the Consensus Building and Dispute Prevention System Design from Chapter 3 (see also Figure 4.1). The nature of the dispute and current dispute resolution strategies (including information management and public consultation strategies), as covered in Chapter 2, will be summarised and an examination of stakeholder interests will be undertaken. This examination will reveal that there is already some common ground among stakeholders, although there are also many barriers to consensus building, which must be explored and resolved. These barriers along with a summary of the issues that

must be addressed through the dispute resolution system will be delivered through six objectives, against which the framework design will be evaluated in Chapter 6.

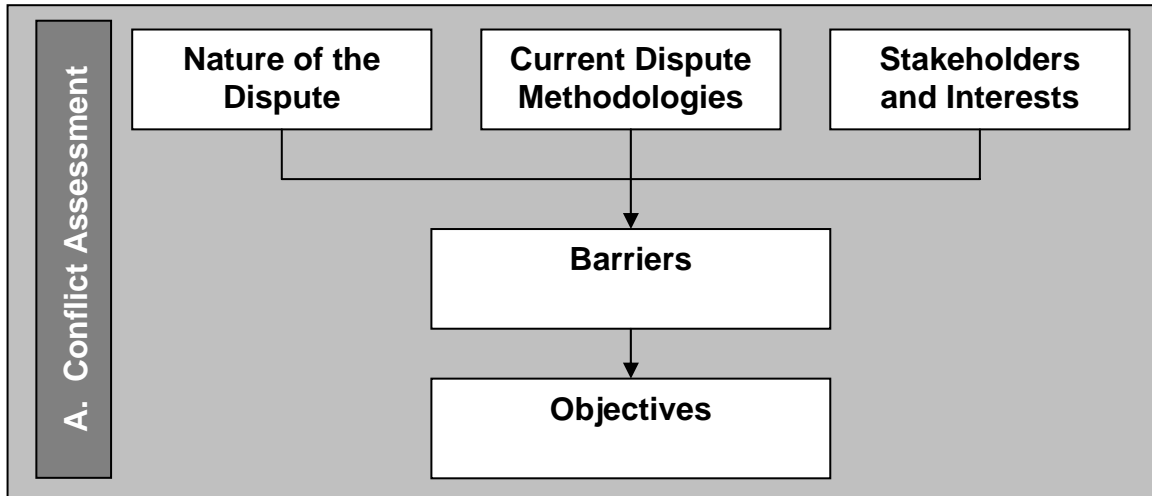


Figure 4.1: Part A of the Conflict Resolution System

## 4.1 Framing the Dispute

The aquaculture dispute is framed by giving an overview of both the nature of the dispute and the current DR systems, (see Chapter 2). The interests of stakeholders must then be identified, separate from stakeholders' positions. Then the manner in which these interests are connected will be explored to identify common ground that already exists among stakeholders.

#### 4.1.1 Nature of the Dispute

To summarise the types of disputes from Chapter 2, Table 4.1 highlights the main stakeholders and their dominant *positions* and, in the case of Government, responsibilities regarding aquaculture.

Table 4.1: Stakeholders and their positions regarding the dispute

<b>Stakeholders</b>	<b>Positions</b>
<b>Federal Government</b>	<ul style="list-style-type: none"> <li>- Promoting aquaculture as required under the DFO mandate.</li> <li>- Responsible for protection of the wild fishery under the <i>Fisheries Act</i> [1985].</li> <li>- Responsible for conducting environmental impact assessments under the <i>Canadian Environmental Assessment Act</i> [1992].</li> <li>- Responsible for safety of navigation under the <i>Navigable Waters Protection Act</i> [1985].</li> </ul>
<b>Provincial Government</b>	<ul style="list-style-type: none"> <li>- Responsibilities depend on the MOU, but generally include aquaculture site leases, licensing and monitoring.</li> </ul>
<b>Aquaculture Industry</b>	<ul style="list-style-type: none"> <li>- ENGOs are promoting information based on poor science and questionable sampling.</li> <li>- ENGOs are operating under hidden agendas from the commercial fishery to defame the aquaculture industry and its products.</li> </ul>
<b>ENGOs</b>	<ul style="list-style-type: none"> <li>- Aquaculture is harming the wild fishery through transferral of sea lice and disease.</li> <li>- Farmed fish is higher in PCBs than wild fish</li> <li>- The Federal Government has a conflict of interest through its mandate to both protect the wild fishery and promote the aquaculture industry.</li> </ul>
<b>First Nations</b>	<ul style="list-style-type: none"> <li>- Some First Nations groups are opposed to aquaculture as they feel it threatens wild fish stocks which they use for employment in the commercial fishery, for food and as part of their traditional way of life.</li> </ul>

	<ul style="list-style-type: none"> <li>- Other First Nations communities have become involved with the industry, through creation of their own facilities or by becoming employed at an aquaculture site or in one of the support industries.</li> </ul>
<b>Community and General Public</b>	<ul style="list-style-type: none"> <li>- Some communities welcome the aquaculture industry as it generates employment in some areas and creates 'smart jobs', which works to reduce out-migration..</li> <li>- Other communities do not view aquaculture favourably as it may impact upon their property values and the aesthetic value of their area. This concern is heightened by a lack of planning (particularly in New Brunswick [Lipsett, 2005]) as to where aquaculture sites may be located.</li> </ul>
<b>Other Industries</b>	<ul style="list-style-type: none"> <li>- Other industries, including tourism and the wild fishery are concerned that aquaculture industries will harm their businesses.</li> </ul>

#### 4.1.2 Current Dispute Methodologies

The current methodologies for addressing disputes regarding aquaculture were outlined in Section 2.5. Table 4.2 summarises the dispute prevention systems.

Table 4.2: The current dispute prevention systems in the provinces of interest.

	<b>British Columbia</b>	<b>New Brunswick</b>	Nova Scotia	<b>Newfoundland</b>
<b>Publicly Accessible Web-based Information System</b>	Most advanced system for aquaculture information in Canada. Extensive tools and data available.	No system	Basic system with minimal navigation tools and no query tools. Limited site information available.	This system has basic navigation and query tools and provides limited information about the site.
<b>Public Consultation Requirements</b>	A notice is placed at the location of the proposed site and public open houses are common. Upland owners and First Nations must be consulted	Two advertisements must be placed in two local newspapers, and a list of upland owners within 100m of the proposed site must be compiled to be notified by DAFA.	Public hearings are mandatory unless there is no opposition to a site. RADACs allow communities to be directly involved in assessing the suitability of new site applications.	No formal consultation requirements.
<b>Dispute Resolution Systems</b>	The Pacific Salmon Forum is a new venture to address conflict among stakeholders	There are no dispute resolution systems in place	RADACs are a form of consensus building to prevent disputes	No formal dispute resolution systems.



### **4.1.3 Stakeholders and Interests**

As outlined in Section 3.2, stakeholder positions are the demands stakeholders make, and are not necessarily directly related to their interests. The interests of stakeholders already share many commonalities, where different stakeholders hold interests in the same thing.

The interests held by stakeholders are listed below in three cognitive groups: economic interests, environmental interests, and social interests.

#### **4.1.3.1 Economic Interests**

##### **(a) Profitable aquaculture industry**

- **Federal Government:** The federal government directly benefits from tax revenues associated with aquaculture profits. This includes income tax, sales tax as well as taxes upon exports to other countries.
- **Provincial Government:** Aquaculture provides direct and indirect benefits to the provinces through its continued profitability. This includes employment and associated industries (hatcheries, processing, veterinary services, etc.) as well as provincial taxes.
- **Aquaculture Industry:** The aquaculture industry is primarily concerned with making a profit. In some instances this profit may replace alternative income.
- **First Nations Groups:** Some First Nations groups in British Columbia are employed in aquaculture operations. The introduction of these aquaculture

facilities has allowed communities to increase their employment levels. The continued profitability of the industry ensures their employment.

- Community: Some community members in coastal regions are directly employed by the aquaculture industry and thus its profitability ensures their continued employment. Other community members benefit indirectly through sales, construction, etc.

(b) Profitable wild fishery

- Federal Government: The federal government directly benefits from tax revenues associated with profits from the wild fishery and fisheries licences.
- Provincial Government: A profitable wild fishery greatly benefits the province through the provision of employment, and indirectly through other resulting expenditure on associated services, manufacturing and injection of money into coastal communities. The loss of the wild cod fishery in Newfoundland is a good example of the province's interest in maintaining a profitable wild fishery.
- Other Industries - commercial fishery: Obviously the commercial fishery is interested in maintaining profitability, along with other associated industries such as processing plants, boat builders, equipment suppliers, private wharves, etc.

- Other Industries – tourism: Some aspects of the tourism industry depend on the wild fishery, particularly in British Columbia where there is a large sport fishing industry.

(c) Profitable tourism industry

- Provincial Government: Profitable tourism leads to tax revenues to the provincial government and also results in employment within the province.
- Community: Tourism profitability means that tourism is popular and thus injects money into communities through tourist expenditure on accommodation, food, beverages, incidental purchases and services.
- Other industries – tourism: Obviously the tourism industry is interested in maintaining profitability.

(d) Property Values

- Provincial Government: Increased property values increases the provincial land tax revenue, as well as revenue from land sales.
- Community: It is very important to communities that property values are maintained in the event that community members want to sell their land.

(e) Employment

- Federal Government: The federal government has an interest in ensuring that Canadians are employed. This not only decreases welfare payments, but increases income tax revenues.
- Provincial Government: Individuals with a higher income will spend more, meaning greater tax revenues through provincial sales taxes.
- First Nations: Employment is an important concern in many First Nations communities. Some communities in British Columbia are located in very remote areas where employment levels may be low.
- Community: The availability of employment and business opportunities is a great concern to coastal communities, particularly the availability of ‘Smart Jobs’, which will draw new generations back into the community and work to reverse the current trends in out migration [Nova Scotia, 2005b].

**4.1.3.2 Environmental Interests**

(a) Clean Water

- Federal Government: The federal government has an interest in maintaining clean water quality, as any activity to the contrary may constitute a HADD (Harmful Alteration, Disruption or Destruction) of fish habitat.

- ENGOs: ENGOs typically have a great interest in the water quality of marine areas, which is essential for biodiversity.
- First Nations: As many First Nation communities, particularly in British Columbia, rely heavily on the marine space for their food source, they have a great interest in ensuring that water is clean.
- Communities: Many recreational activities that communities have an interest rely on clean water, including swimming, boating and recreational fishing.
- Other industries – tourism: Aspects of the tourism industry, such as beaches, fishing and kayaking rely on clean water.

(b) Healthy marine ecosystem

- Federal Government: The federal government has a responsibility for the protection of the marine environment through the Canadian Environmental Assessment Act (CEAA) and through DFO.
- ENGOs: The promotion of healthy marine ecosystems is a high priority for many ENGO campaigns.
- First Nations: Healthy ecosystems maintain a balance and will thus continue to provide a sustainable food source for First Nations communities. The marine space is also of great cultural value and as such it is important that it is respected and cared for.
- Communities: Communities in proximity to the marine space usually value it and its health highly, and thus have an interest in it.

- Other industries – tourism: Many tourism ventures take advantage of the healthy marine ecosystem, including whale watching tours, fishing and recreational swimming and boating.

(c) Protection of the wild fishery

- Federal Government: Under the Fisheries Act [1985, s. 35 and s. 35] the federal government has a responsibility to protect the wild fishery.
- ENGOs: The continuing health of wild fish stocks is very important to many ENGOs.
- First Nations: The wild fishery provides employment and food to First Nation communities.
- Other industries – commercial fishery: Obviously the viability of the commercial fishery depends on wild stocks and this is thus an important interest.
- Other industries – tourism: Some aspects of the tourism industry depend on a viable wild fishery.

#### **4.1.3.3 Social Interests**

(a) Thriving coastal communities

- Provincial Industry: The provinces are very interested in increasing the economic and social opportunities of coastal communities. This ensures

that out migration is reduced, employment is maintained and the tax base in coastal communities continues to be secure.

- Aquaculture Industry: Smaller operators of aquaculture operations, as well as many employees within the industry as a whole have an interest in being able to continue living in coastal communities.
- Communities: Members of coastal communities have an interest in remaining in these locations.

(b) Protection of the traditional way of life

- First Nations: Many First Nations communities are still strongly based on traditions, which is highly valued.
- Communities: Members of coastal communities are often long entrenched within the social structure of coastal communities and highly value their way of life.
- Other industries – commercial fishery: Many members of the commercial fishery have an interest in remaining fishers and passing the trade down through the generations. The collapse of the wild cod fishery in Newfoundland highlights this interest, as some fishers can no longer continue their trade.

(c) Well planned aquaculture sites

- Federal Government: Aquaculture is subject to the Navigable Waters Protection Act under the authority of Transport Canada. As such, they

require well planned aquaculture siting to ensure that ongoing navigational planning can occur.

- Provincial Government: The provinces *should* have an interest in planning, as they are the authority partially responsible for site assessments and approvals. Unfortunately, in the case of New Brunswick there is little planning to endorse this interest.
- Communities: Community members have an interest in being aware of the developments in their vicinity, particularly coastal property owners. The latter are likely very interested in where aquaculture may potentially be sited, particularly where it may affect property values.

(d) Aesthetics

- Communities: Members of the community are usually concerned with the physical appearance of their area, particularly property owners where less visually pleasing elements may devalue their assets.
- Other Industries – tourism: The visual appearance of the marine space is very important for tourism.

(e) Access to the Foreshore

- Communities: The public has a right of access to the foreshore.
- Upland Owners: Upland owners may have riparian rights to the water and foreshore regions.



- Other Industries – tourism: In addition to the public right to the foreshore the tourism industry may have special interests in particular regions of the foreshore where recreation occurs, including popular beaches and fishing locations, as well as wharves for boat mooring.

It can be already seen from this summary of stakeholder interests that there is considerable overlap in the issues stakeholder have, with many compatible interests between stakeholders who appear, at face value, to be in direct opposition to each other. There are also *sub-interests* for each of these interests. For example, the interest of having a profitable aquaculture farm has certain sub-interests. In order to be profitable there must be an economy of scale, which requires a large stock. A large stock in turn requires a low level of fatalities and, preferably, no escaped fish. Another sub-interest for profitability is a healthy stock to ensure that the fish is suitable for passing Canadian Food Inspection Agency criteria, in addition to being aesthetically appealing to consumers. Healthy stocks require low-levels of disease incidence, clean water and environment and a well-suited aquaculture site. These sub-interests are illustrated graphically in Figure 4.2. The five sub-interests at the lowest level directly correspond to interests that ENGOs also have, meaning that advocacy coalitions, as discussed in Chapter 3, are possible to encourage.

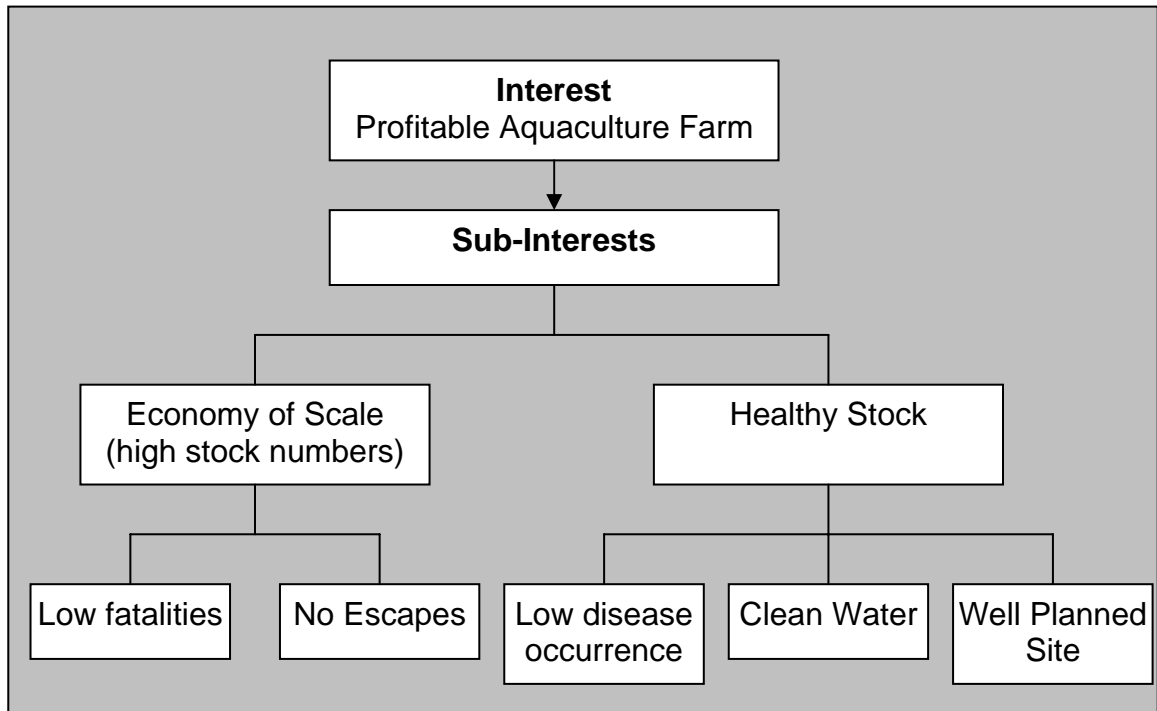


Figure 4.2: Illustration of interests and sub-interests

This is just one example of how common ground can be found for stakeholder conflict. Dialogue must be established between stakeholders so that they can discover for themselves what common ground they have.

## 4.2 Barriers

There are a number of barriers that may prevent the successful development of a response to meet the needs identified in the previous section. The dominant barriers are a lack of trust, power imbalances, privacy, political will, and costs.

#### **4.2.1 Barrier: Lack of Trust**

The issue of trust is one of the biggest issues to overcome, as there are long held perceptions regarding government practices, particularly DFO practices, and an entrenched view held by some individuals that aquaculture is fundamentally environmentally unsound. According to McLaughlin [2005] it may not be possible to alter the perceptions of some individuals regarding DFO and the aquaculture industry within the older generation of fishers in the Bay of Fundy, such is the deep sense of distrust. Without some measure of trust in the information provider and the available information it will be very difficult to build consensus regarding the many issues surrounding aquaculture.

#### **4.2.2 Barrier: Power Imbalance**

It is common for coastal conflicts to involve a power imbalance, and aquaculture is no exception. The federal government acts as the 'owner' of the land upon which many coastal activities occur. Meanwhile, the users of this space, usually local communities, often have rights that may or may not be formal, as outlined in Section 2.1. The community groups affected may have no means or experience by which to organise themselves, and thus feel powerless. Equally, ENGOs are very powerful influences over communities as many of them have considerable exposure in the media, which offers an imbalanced view of the dispute [Simpson, 2005]. Other causes of a power imbalance include money, access to information and the ability to organise.

### **4.2.3 Barrier: Privacy**

The discussion regarding what information is relevant for stakeholders to know and what information should be kept confidential is difficult to resolve. Increasing the available information is a topic of great sensitivity, particularly as many industry representatives feel that they have been the victims of disclosing too much information in the past [Smith, 2005]. One of the key problems with providing information is the danger of misinterpretation or extrapolation. This is particularly problematic where scientific information is concerned, as many members of the general public are not well versed in scientific methodologies and may not understand the provided information, to the detriment of the industry. Page [2005] notes that, “there is a certain legal responsibility associated with disseminating information, particularly when it concerns the livelihood of industries and people.

### **4.2.4 Barrier: Political Will**

There must be political will at both the federal and provincial levels to engage in proactively pursuing consensus building in the aquaculture industry. Provincial governments are responsible for most of the development needs of the aquaculture industry and need to be willing to introduce and promote increased levels of public participation and information dissemination from the aquaculture industry.

Particularly in New Brunswick, there appears to be a lack of provincial effort to address the low level of public consultation and information provision required through the Aquaculture Act [1988] and accompanying regulations. Without proactive effort by the

province to improve these policies, as well as industry buy-in to advise the province on their needs and cooperate with changes, consensus building will remain difficult. British Columbia's initiation of the Pacific Salmon Forum is a good demonstration of political will at the provincial level to address the ongoing conflict. Equally, the implementation of the community-based RADAC groups in Nova Scotia demonstrates political will to address conflict.

ENGOs must also engage with decision makers. There is currently reluctance within ENGOs, particularly on the west coast, to engage with DFO in constructive dialogue, as they have been very disappointed with DFO's practices and science, particularly with regard to the sea lice issue [Orr, 2005]. It is for this reason the DFO is not involved with the Pacific Salmon Forum initiative in British Columbia [Gallaugher, 2005].

#### **4.2.5 Barrier: Cost**

If the framework developed here results in increased costs levelled for the industry then it may be doomed to failure before it even starts. Smaller aquaculture operators in many locations are already struggling to meet the rising costs of regulatory demands such as environmental monitoring, and additional financial burden will not ensure the buy-in of industry, which was noted as a crucial step in Table 3.1, Section 3.5.1. Costs must be either shared between stakeholders, avoided or borne by one authority.

Sharing costs would meet similar issues to those seen in the property and liability rules methods of internalising the externality, as described in Section 3.3. It may be difficult to

divide the costs equally and there is always the concern that there will be freeloaders [Calabresi and Melamed, 1972]. Avoiding costs appears highly unlikely where any data and information are concerned, as there is the need for ongoing maintenance and updating, as well as specialist interpretation. In addition to this there is the need for infrastructure to support this data, such as a GIS and data storage requirements, and infrastructure for any consultation methods employed, such as office space, travel costs and supporting staff.

If costs are to be borne by a single organisation, the logical authority would be the provincial or federal government. This may also be seen as a form of cost sharing, as government funds are sourced from all members of the public. The Pacific Salmon Forum is funded by the provincial government, as there remains trust between ENGOS and the province [Gallaughar, 2005].

### **4.3 Objectives of the Dispute Resolution System**

The consensus building and dispute prevention framework must accomplish two things:

- Goal 1: Facilitate the consensus building process between stakeholders in current aquaculture disputes, and,
- Goal 2: Provide stakeholders with information and a forum for public consultation to assist in preventing further conflict.

Table 3.1 in Section 3.5.1 outlines six different issues regarding conflict resolution that must be addressed: communication, stakeholder buy-in, satisfaction, capacity, tools, and administration. These six elements form the basis for the six objectives of the framework, and are outlined in detail as follows, relative to the two framework goals.

#### **4.3.1 Communication**

Communication depends on awareness, access, dialogue and education.

##### **1) Consensus Building:**

- All stakeholders must be *aware* of the dispute resolution processes that are being conducted and the reasons for these processes.
- Dispute resolution tools should be *accessible* to all stakeholders.
- *Dialogue* between stakeholders should be encouraged and facilitated by a mediator to ensure that discussions facilitate consensus, rather than encouraging further discord.
- Ongoing *education* should be provided to stakeholders on the issues of the dispute, particularly where scientific information with a degree of uncertainty is concerned.

##### **2) Dispute Prevention:**

- Stakeholders should be *aware* of the information that is available, and of opportunities to participate in decision-making processes.

- Information should be *accessible* to all stakeholders, both geographically and intellectually. Public consultation opportunities should be accessible to all stakeholders in some way.
- *Dialogue* between stakeholders should be facilitated in regard to the information even when a formal consultation session is not available.
- Stakeholders should receive ongoing *education* regarding the information and the data it is based on, particularly where conclusions are uncertain.

Objective 1: The framework should facilitate communication between all stakeholders.

#### **4.3.2 Stakeholder Buy-in**

To gain the buy in of stakeholders, participation must be encouraged and trust promoted.

##### **1) Consensus Building:**

- Stakeholders must be encouraged to *participate* and be actively involved in the development and use of consensus building tools. Stakeholder identification methodologies should be employed to ensure that the widest range of stakeholders are included.
- The tools used should work to build *trust* at the earliest stage of the consensus building process.

##### **2) Dispute Prevention:**

- Stakeholders should be encouraged to *participate* in public consultation sessions and to read and listen to information in regard to the sites and their operations.



- The information system utilised should engender *trust* between stakeholders.

Objective 2: The framework should promote participation and work to engender trust between stakeholders.

#### 4.3.3 Satisfaction

Stakeholders should have a sense of fairness and equality about the processes.

##### 1) Consensus Building

- The consensus building process should exhibit *fairness* in its approach to dispute resolution.
- The process should work to promote equality by reducing power struggles.

##### 2) Dispute Prevention

- The information provided to stakeholders should promote *fairness* through a balanced view of the information from all stakeholders, including local knowledge.
- Information sharing and public consultation opportunities should not be dominated by more powerful stakeholders to ensure *equality*.

Objective 3: The framework should promote fairness and equity.

#### 4.3.4 Capacity

Adequate resources (financial and knowledge) should be available to ensure the success of the system.

##### 1) Consensus Building

- The system should have sufficient funding to cover *costs*, however it should not absorb these costs from the disputants (refer to section 4.2.5).
- Facilitators involved in the consensus building strategies should have appropriate *knowledge* with regard to dispute resolution strategies to ensure that the system functions at its most beneficial level.

##### 2) Dispute Prevention

- The *cost* of public consultation, particularly to smaller communities, should be minimised through remote access technologies.
- Facilitators at public consultation sessions should have adequate *knowledge* to be able to address stakeholder concerns.

Objective 4: The framework should have appropriate capacity to provide quality consensus building and dispute prevention strategies.

#### 4.3.5 Tools

Tools available through the framework should be current, flexible and timely.

### 1) Consensus Building

- The consensus building techniques should be up-to-date based upon *current* issues, stakeholder needs and research.
- The system should be *flexible* in order to meet changing circumstances.
- The tools employed in the system should be able to address new or enflamed disputes in a *timely* way.

### 2) Dispute Prevention

- Information provided to stakeholders should be *current*. Public consultation techniques and sessions should also reflect *current* changes within the industry.
- Tools employed in the information systems should be *flexible* to allow users with different knowledge and abilities to utilise them appropriately.
- Information should be provided to stakeholders in a *timely* way, as should public consultation sessions where necessary.

Objective 5: The framework should provide appropriate tools.

#### 4.3.6 Administration

The system requires an administrative body to make improvements and ensure transparent processes.

### 1) Consensus Building

- The system should have adequate administration to ensure that evaluation and *improvements* to the system will occur.

- The administrative body should ensure that their processes are *transparent*.

## 2) **Dispute Prevention**

- An administrative body is required to provide maintenance for the information system.
- The administrative body should ensure that all information within the system includes appropriate metadata to ensure transparency, and that a methodology for developing metadata related to local knowledge is developed.

Objective 6: The framework should provide guidelines for appropriate administration of the consensus building and dispute prevention system.

## CHAPTER 5

### DESIGN OF A CONSENSUS BUILDING AND DISPUTE PREVENTION FRAMEWORK TO ADDRESS STAKEHOLDER NEEDS

The objectives established in Chapter 4 will be addressed in three ways, as illustrated in Figure 5.1. Conflict resolution tools will be developed to address the consensus building needs, while technology solutions will address information provision and public consultation. These will both be enacted by an authority created through policy and institutional change. These three nodes form the basis for the consensus building and dispute prevention framework.

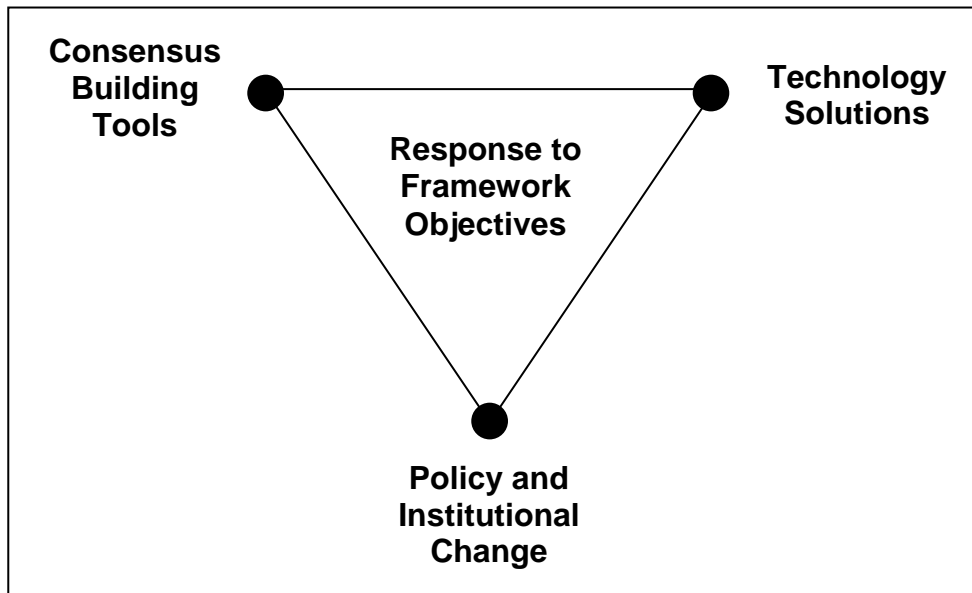


Figure 5.1: The three nodes by which the user requirements will be addressed.

## 5.1 Consensus Building Tools

The overall goal of this research is to develop a framework that will contribute to consensus building between stakeholders in the aquaculture industry. However steps towards resolving the issues of distrust must begin within the framework if the subsequent steps are to be successful. To this end, the first node of the framework outlines a tool set for addressing and working towards consensus building.

### 5.1.1 Development of a Tool Set to Address Consensus Building

The following discussion outlines a ‘tool set’ which should be further developed to provide these tools to decision makers in order to initiate consensus building in the aquaculture industry.

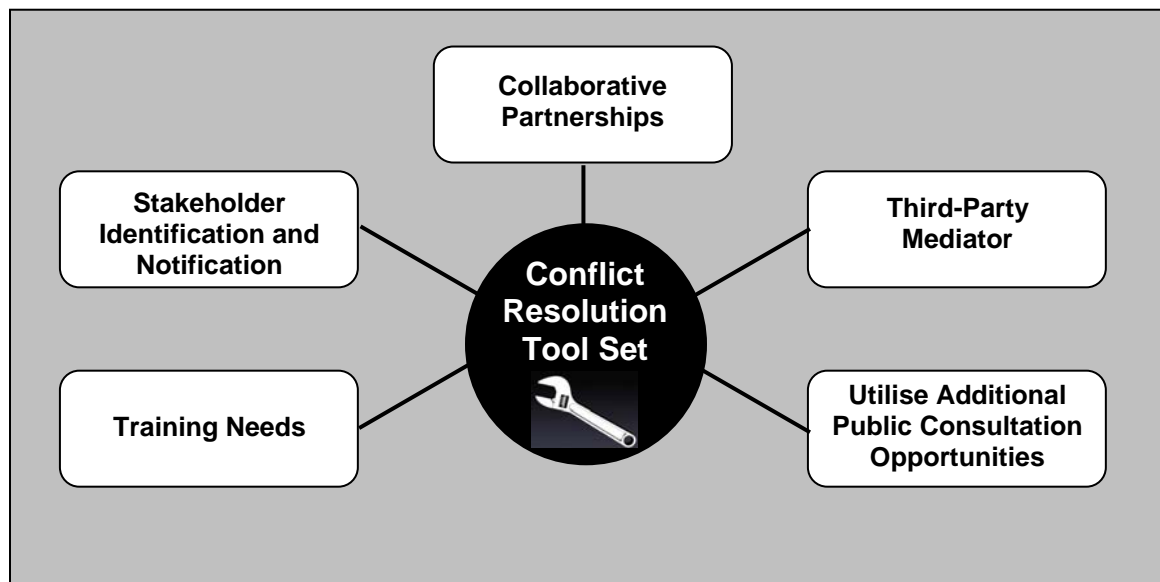


Figure 5.2: The conflict resolution tool set

### **5.1.1.1 Training Needs for Decision Makers**

One of the key issues identified by Rijsberman [1999] is that coastal decision makers generally do not have the appropriate training to address the conflicts that arise in this space. There must be a concerted effort on the part of governments to facilitate more constructive dialogue based on consensus building, rather than on simply gathering comments and objections. The development of a training course would greatly benefit Government employees who work in coastal policy and integrated coastal management. Implementation of this tool is discussed further in Section 5.3.

### **5.1.1.2 Stakeholder Identification and Notification**

The overarching rationale behind conflict management is that the stakeholders who are engaged in conflict should be the individuals and groups involved in the resolution of that conflict. Hence, there is a need for improved methods of identifying and notifying potentially interested individuals of the issues at hand. This need should be addressed by the authority overseeing the conflict resolution system, which is ideally based on a partnership between the stakeholders, as discussed later in Section 5.3.

### **5.1.1.3 Collaborative Partnerships**

Partnerships between stakeholders need to be developed by drawing on common interests as outlined in Chapter 4. Such partnerships can be used to develop communication lines and build trust between different stakeholders. In Figure 5.2, the potential common ground between a wild salmon advocate and an aquaculture farmer is shown. This builds on the model shown in Figure 3.5.

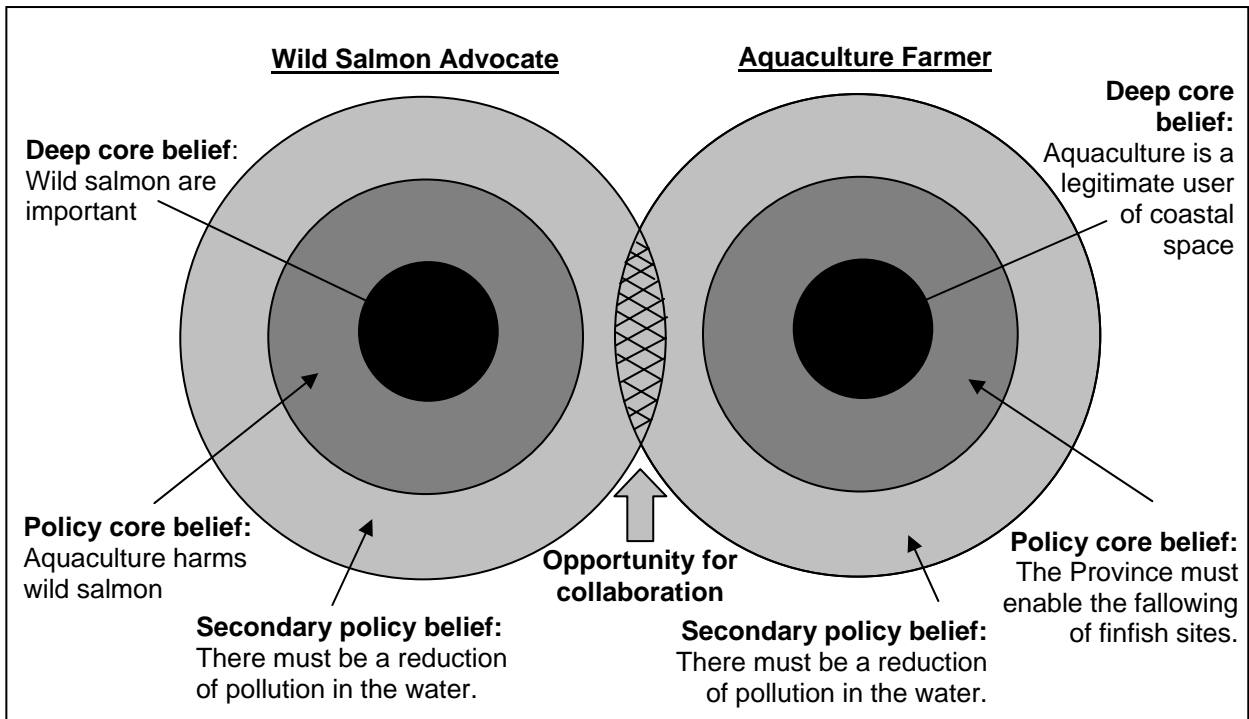


Figure 5.3: Potential for advocacy coalitions

#### 5.1.1.4 Third Party Mediator

Given the level of conflict in British Columbia, it is recommended that mediation, rather than negotiation, is employed (refer to Section 3.4.1). The mediator must be perceived as impartial and fair by all parties engaging in the conflict resolution process. Thus, a government representative would not be a suitable mediator as there is too much perceived bias. Rijsberman [1999] recommends that a local individual who is familiar with the individual case should be assigned as the mediator, however, in the case of aquaculture stakeholders, the individuals and groups are geographically dispersed and made up of many different stakeholder groups. Thus it is recommended that an alternative mediator is found. Suggestions for such a mediator are made in Section 5.3.



#### **5.1.1.5 Create and Utilise Additional Public Consultation Opportunities**

Part of the trust-building exercise is the effective involvement of stakeholders. There needs to be a concerted effort to engage stakeholders in new and innovative ways. McLaughlin [2005] suggests that aquaculture fairs targeted towards the community as well as industry should be held on a regular basis in areas near aquaculture facilities.

In a DFO report into public perception of the industry [Canada, 2005a], the users revealed that they wanted to receive information from a variety of sources, including pamphlets at the point of sale, information and the use of multiple media sources (newspaper, radio, television, internet), town hall meetings, independent studies. By communicating with the public through a variety of means it provides opportunities for additional dialogue.

## **5.2 Technology Solutions**

As outlined in Chapter 4, dispute prevention requires ongoing information provision and public participation in decision-making [Rijsberman, 1999]. In this section the use of technology for facilitating that need is addressed.

### **5.2.1 Improving Information Tools**

Although the need for public participation in decision-making is rarely questioned, the methodology behind consulting stakeholders is a matter of some debate. A decisive

framework for such discussions is difficult to determine as every issue has a variety of stakeholders who relate differently to each other and have unique needs.

The geographic dispersion of the public may also vary. For example, an issue that affects farmed Atlantic salmon near Deer Island on the Bay of Fundy may be of concern only to those in the immediate vicinity, or may concern all individuals near the Bay of Fundy, or the East Coast, or on both the East and West coast, or worldwide. Other issues, particularly those that have a much broader interest area such as potential environmental degradation or disruption to migrating fish and mammals, may affect a much larger population of concerned individuals. For example many of the ENGOs are funded by large foreign corporations [Positive Aquaculture Awareness, 2005b]. It must be recognised that communities can be defined in many different ways, including proximity to aquaculture operations, occupation (being a direct or indirect employee of the industry), and spiritual relationships, such as the connection that exists between some First Nations communities and the coastal regions [Weiner et al., 2002].

There are many methods of consulting the public. Traditional consultation methodology incorporates well-advertised public meetings for concerned citizens to meet with other stakeholders and discuss a particular issue. Other methods of public consultation may include advertisement of development plans that may be viewed at a municipal office, or letters sent out to those who are believed to be stakeholders. These two methods do not incorporate public feedback as readily, and in the case of the latter may even overlook members of the public who have concerns. A combination of consultation methods

usually offers the best method of ensuring the public is well informed and have the opportunity to have their say.

### **5.2.2 Existing Systems and Needs for Improvement**

In British Columbia, Nova Scotia and Newfoundland there are online web-GIS applications that facilitate the communication of information between decision-makers and interested stakeholders. As discussed in Chapter 2, the British Columbia Coastal Resources Information System [British Columbia, 2005a] is currently setting the standard for coastal information provision in Canada. However there are still areas for improvement, particularly in enhancing participatory capabilities and the incorporation of local knowledge.

### **5.2.3 Incorporating Local Knowledge**

One of the user requirements was the capability for users, such as community groups, to upload their own locally collected information. As discussed in Section 3.6.2 local knowledge can greatly benefit decision makers. A convenient method for collecting local knowledge is through a participatory GIS, as is discussed in the following section.

### **5.2.4 Design of a System for Improved Information Dissemination**

Providing information through a web-GIS application is convenient for many users, however the communication method is only one-way: from system maintainer to user. To facilitate the desired two-way flow of information a system such as Public Participation can be utilised. In Figure 5.7 a screen capture of the B.C. Coastal Resource Information

System is shown and will be used as the basis for a hypothetical case study in use of a PPGIS application.

Suppose a sport fishing tourism company frequently uses the water in the region marked with an X. The company thinks that the number and quality of the fish caught has declined over the last few years and they believe it is associated with the fish farm shown circled in the diagram. This fish farm is located on waters with a poor salmon suitability rating, which is an index based on DFO studies that indicates that these waters are not suited for finfish farming.

Without the Public Participation component of the information system (as the system currently is in British Columbia), the sport fishing company have a few options to email the map and their comments to a representative that they must choose, or to print the map out and wait for a local consultation meeting regarding that particular finfish site.

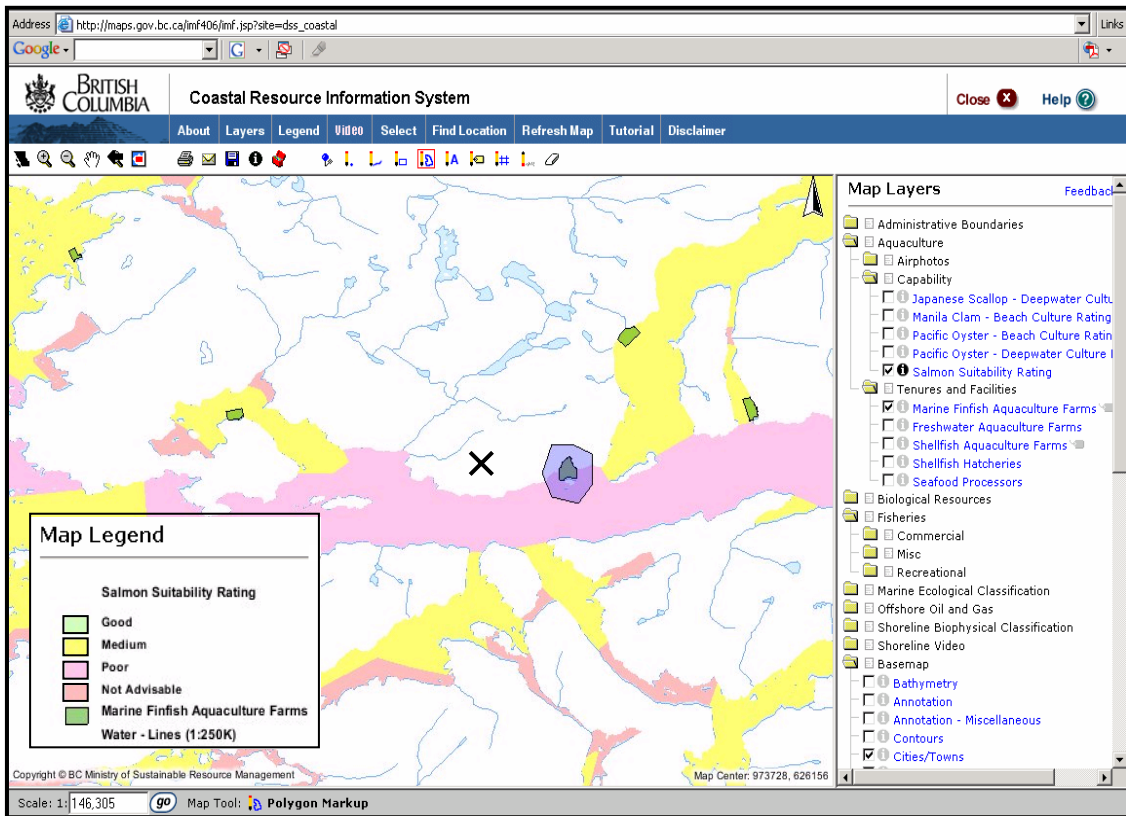


Figure 5.4: British Columbia’s Coastal Resource Information System. This system is a good starting point from which to develop a PPGIS.

If public participation components are included within the system, however, the company could add comments, geo-referenced to the location of concern, which could be viewed by other individuals. The company could choose to make the comments anonymously or leave their contact details for interested individuals, or the finfish farm operator, to contact them in regard to their concerns. These comments could also automatically be directed to the appropriate government representative, complete with the relevant coordinates for the area of concern and the appropriate reference numbers for the aquaculture site already embedded in the map to help decision makers identify it quickly.

## **5.2.5 Constraints and Challenges for PPGIS**

### **5.2.5.1 Industry Privacy**

There are certain forms of information that industry is not comfortable providing to user groups, as noted in Section 4.2.4. Discussion must be initiated between industry and other stakeholders as to the concerns that industry holds regarding misuse of particular information sources. Such a discussion could be initiated under the consensus building strategy described in Section 5.3.

### **5.2.5.2 Accuracy of Local Information**

Processes behind local information capture need to be examined, particularly in terms of accuracy. The very nature of GIS forces accuracy requirements to become a concern and given the wide use of sketch maps for local information collection, this could become an issue. One method of improving the accuracy of local information is through community training programs for information capture. Government or industry associations could partner with ENGOs and communities in advocacy coalitions [Collantes, 2005] to work towards training communities to capture information that is both relevant to community concerns and of an accuracy and quality that it can be incorporated into government and industry decision-making.

### **5.2.5.3 Data reliability and inconsistencies**

Coastal disputes, particularly those involving sustainable development, include high levels of scientific uncertainty [Rijsberman, 1999]. As such considerable information is

required to impart a balanced view of the issues and ensure that stakeholders understand that there is uncertainty in the information. One method of addressing inconsistent data or information of questionable reliability is through a forum such as the Pacific Salmon Forum, as discussed in Section 2.5.1. The ongoing conflict regarding the correlation of sea lice to farmed fish is being addressed through targeted, peer-reviewed research, which is discussed among a round table of all stakeholders. Such an initiative will also be employed in the strategy outlined in Section 5.3.

#### **5.2.5.4 Access to Information**

The ability for the public to access and utilise GIS is another important factor. An example of a PPGIS project in Israel was raised earlier in Section 3.2.2 [Gudes et al., 2004] and highlighted the difficulty of ensuring that all stakeholders have the ability to access and utilise the technology. If particular individuals cannot access the technology and thus are not able to voice their opinion, the decision making process could be biased against their opinions. In questionnaires conducted as part of this research, many stakeholders identified that they liked to be informed through web-GIS and would like to see more of it. While this is encouraging there would still be the need to ensure that stakeholders who are not able to access the online information repository. One possible solution would be to make the PPGIS available at all municipal offices together with at least one trained member of staff who can guide interested users through the process.

Another concern raised by Jordan [1999] is that PPGIS may result in division of the public into those ‘in the know’, and those who are not. A PPGIS project in Minneapolis

was designed to ensure that the public was well informed about efforts in neighbourhood improvement [Elwood, 2002]. Much of the community has embraced the project and are now far better informed about the municipal plan and the neighbourhood itself. However this additional information has led members of the community to use bureaucratic terms, such using as code numbers for vacant houses. While this aids in communicating with the government, it alienates other members of the community who are not familiar with such 'expert' terminology and as such are pushed out of the consultation process as they can no longer effectively communicate with other members of their community [Elwood, 2002]. Thus it is important that all interested stakeholders have access to this information either through the PPGIS, or through contact with the PPGIS facilitating organisation (see Section 5.3.2).

#### **5.2.5.5 Complexity of Information**

One of the user requirements was to ensure that information is accessible to all users. However, the PPGIS is to be utilised by many different stakeholder groups of different knowledge bases and needs, from academia to members of the general community. To ensure that the information is accessible to all users, different levels of operation should be available to users of the PPGIS. Users should select a operation level when they when they first start the PPGIS application.

- Level 1: Level 1 would facilitate basic enquiries related to aquaculture farm locations, size, species types, salmon runs, topography and other coastal users and their rights. This is essentially an extension of the available information in



the Newfoundland and Nova Scotia GIS applications, and a slight reduction on the information available in the British Columbia system. Available tools will be limited to basic query functions and distance measurement. Participatory functions will also be limited to allowing users to add comments regarding specific locations to an online web forum, or providing private comments to a relevant authority in response to particular issues.

- Level 2: Both the information and tools available in the Level 1 system would be extended to meet the needs of more detailed questions. Information would include hydrological information, historical data, fish escapes, pharmaceutical use and environmental monitoring information. Tool sets are expanded to include annotation tools with which users may mark the maps they create, similar to the tools currently available through the British Columbia GIS. Participatory functions will be expanded to allow users the opportunity to engage in real-time discussions regarding specific issues relevant to them.
- Level 3: This level of information is designed for scientists and researchers, as the available information is extended to include information of a scientific and technical nature that may require special knowledge to understand. Tool sets would also be at a higher level, providing users with the ability to run basic computations on the data sets. Participatory functions will remain the same as Level 2.

By using multiple platforms it is anticipated that users can access data that is appropriate for their information needs and knowledge base. The PPGIS proponent, as detailed in Section 5.3, will also provide further assistance.

#### **5.2.5.6 Proponent of the Information System**

The establishment of a PPGIS as described here would have considerable ongoing and upfront costs. As discussed in Section 4.2.6, a single authority is the most likely source of such funds. Although government or industry is the most likely source of such funds, distrust between stakeholders would make it difficult for either of these authorities to be seen as a trusted sponsor for the system. If Government or industry were the proponents of such a PPGIS initiative the application may be met with suspicion from the community. Equally, if the project were community or NGO driven it would be unlikely to gain the respect of industry, and may also lack the necessary ongoing financing, expertise and coordination to be a long term solution.

A suggestion to overcome government suspicion would be to utilise a third party to establish and maintain the PPGIS, for example a university institution, which is more likely to be perceived as impartial (though not by all aquaculture stakeholders). As many university departments already have a rapport with nearby communities this may work very well. A pilot project would be necessary to demonstrate the use and effectiveness of such a system to other communities.

The third party may also be a specifically established authority designed to facilitate information exchange. This third party could also offer mediation between stakeholders, and promote public consultation, as was recommended in the conflict resolution tool set in Section 5.1. The policy needs of such a concept are discussed in the following section.

### **5.3 Policy and Institutional Change**

As can be seen from the user requirements, the greatest issues to address are that of trust and communication between stakeholders. These are addressed through the following policy design factors.

#### **5.3.1 Addressing DFO's Conflict of Interest**

As discussed in Chapter 2, there is considerable conflict regarding the role of DFO in its dual mandate to both promote the aquaculture industry and protect the wild fishery and fish habitat. Some observers believe that DFO and the legislation used to instil the Department as the lead agency in aquaculture development is biased towards the protection of the wild fishery and other coastal users [Howlett and Rayner, 2003]. However other stakeholders, including the Standing Committee on Fisheries and Oceans, have stated that DFO treats aquaculture development preferentially to the detriment of the wild fishery [Cummins, 2003; Canada, 2001a] and have condemned DFO for their preferential treatment of aquaculture and neglecting their mandate to protect the wild fishery. Clearly there is a perception of conflict of interest that is being viewed by

stakeholders on both sides of the aquaculture debate. This conflict must be addressed in order for trust in the government to be promoted.

A similar situation faced the oil and gas industry in Nova Scotia. There was a perception that the Canada-Nova Scotia Offshore Petroleum Board had a conflict of interest in its mandate to both conduct the environmental assessment for oil and gas applications, and to issue the licenses for successful applicants [Strong et al., 2002]. As a response to this issue, legislation was introduced which separated the Board's responsibilities for industrial promotion and environmental assessment. A similar process should also be employed either within DFO, or alternatively the responsibilities for the aquaculture industry should be transferred to a different authority.

There are two scenarios proposed for further examination:

1. *Separate DFO responsibilities more succinctly into wild fisheries and habitat protection, and aquaculture promotion.* This would likely require aquaculture to be regulated under a federal Aquaculture Act, as opposed to the *Fisheries Act* [1985] and *Navigable Waters Protection Act* [1985] as it presently is. This method is unlikely to succeed, however, due to distrust towards DFO as a whole, with many stakeholders holding the perception that DFO has failed the wild fishery as well [Canada, 2005a]. While this would mostly address the conflict of interest concerns it is not necessarily an appropriate solution.

2. *Federal regulation of aquaculture could be coordinated under Agriculture and Agri-Food Canada.* This may also be a step towards including aquaculture under federal agricultural subsidies programs, which would greatly aid industry. However this would also introduce yet another department into the regulatory framework for aquaculture governance, as DFO would still be a regulatory authority under the Fisheries Act and Safety of Navigation Act.
3. *Innovate to create a new authority to oversee the aquaculture industry.* This may involve a new authority at the provincial or federal level, or an authority draws on both provincial and federal representation.

### **5.3.2 The Concept of a Federal-Provincial Aquaculture Development Board**

The idea of innovating to create a new authority is the option that is explored through the remainder of this research. This option offers the greatest potential to incorporate stakeholders into the decision making process, rather than solely shuffling government responsibilities, as options one and two of the previous section allow.

In line with the Canada-Nova Scotia and Canada-Newfoundland Offshore Petroleum Boards, a Board could be created to manage aquaculture dually at a federal and provincial level. While this method would involve the creation of an additional authority and thus additional regulations, it would also facilitate greater communication between provincial and federal levels of governance. Responsibility for environment and fish habitat protection would still rest with the Canadian Environmental Assessment Agency

(CEAA) and DFO, however the promotion of aquaculture and provision of leases and licenses would be facilitated by a Board within each province.

A province-based board system would be necessary as an over-arching Canada-wide Board would not be able to take into account the differences that are present in different regions. British Columbia's regulatory environment and stakeholder conflict is very different to the Newfoundland experience, for example. Also, each province's aquaculture strategy is set up through an MOU with the province, meaning that to have an Atlantic Board, for example, would require a greater amount of regulatory change. Boards would require a committee of representatives nominated by a combination of industry, provincial government, federal government and relevant stakeholders.

The exact construct of such an endeavour is beyond the scope of this research, however one of the main barriers to such a system would be cost, as an aquaculture Board for each province would require considerable ongoing financial support. For example the Canada-Nova Scotia Offshore Petroleum Board has 32 technical and support personnel. Unlike offshore resources, which are immensely profitable and have a tax-base that can support such an endeavour, aquaculture is simply not in the same economic situation. Some economies of scale could be gained by collaboration between the provincial Boards, such as sharing best practices and software, and conducting one pilot study upon which the policy and regulations of the Board could be based.

This concept of a combined authority is elaborated on in the following section to incorporate other stakeholders into the Board in order to facilitate consensus-building and mediation.

### **5.3.3 Aquaculture Information and Mediation Board (AIMB)**

As outlined in the capacity building tool set in Section 5.1 there is a need to build conflict resolution capacity by training government and industry personnel in alternative dispute resolution strategies, and by introducing a mediation process to initiate trust-building. To this end, the following Aquaculture Information and Mediation Board (AIMB) is recommended, loosely based on the structure of the Offshore Petroleum Boards.

The concept diagram for the AIMB is outlined below. Essentially the Board acts as a contact point and third party for aquaculture information exchange (two-way communication) and dispute resolution.

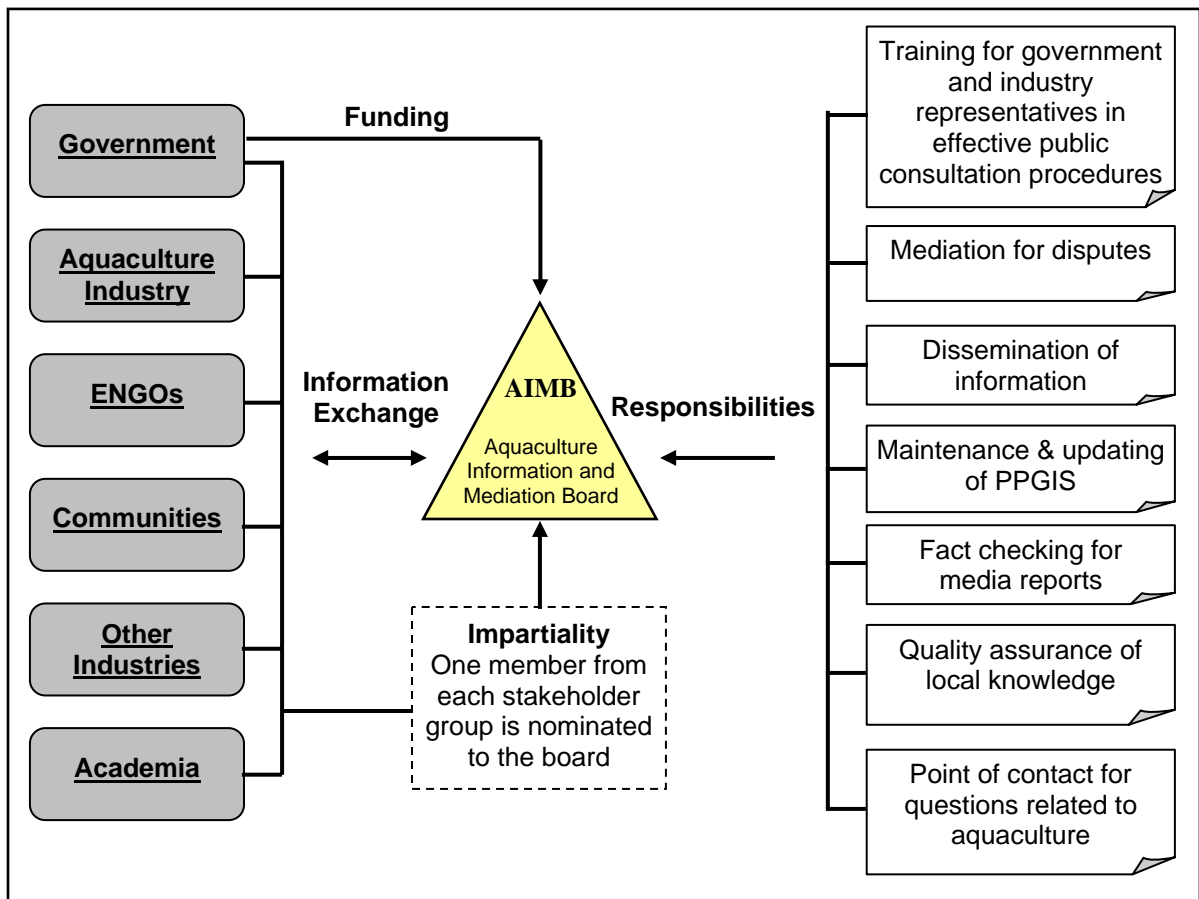


Figure 5.5: System diagram for the establishment of an Aquaculture Information and Mediation Board

### 5.3.3.1 Responsibilities of the Board

The proposed responsibilities of the Board are outlined on the right hand side of Figure 5.8.

#### a. Training Facilitation

The Board would provide the training needs for government and industry personnel in effective consultation methodologies as stipulated under Section 5.1.1.1 of the conflict resolution toolset.



b. Mediation for Disputes

The Board would operate as a third party for mediation of disputes, as required under Section 5.1.1.4 of the conflict resolution toolset.

c. Information Management Responsibilities

The remaining responsibilities of the Board related to information management. The Board would act as an impartial third party responsible for maintaining and updating the PPGIS, as recommended in Section 5.2. The Board would also be responsible for disseminating this information through the PPGIS and in other forms. Recommendations for alternative information dissemination practices were made in Section 5.1.2 and included providing pamphlets at points of sale, and developing innovative ways of engaging the public in other forums. The Board would also form a fact-checking role for the purposes of media releases by stakeholders (ENGOs and government), as well as providing quality assurance for local knowledge provided by stakeholders. Finally the Board would act as a one-window point of contact for interested stakeholders to gain information or learn about other sources of information.

**5.3.3.2 Ensuring Impartiality of the Board**

The Board would work towards maintaining an ethic of impartiality by having a member from each stakeholder group nominated to the Board. The Board members would be responsible for hiring relevant personnel and services to meet the responsibilities as

described above. Due to the scientific nature of some of the Board's responsibilities, such as fact checking and information system maintenance, it would be necessary to employ professionals to meet these needs.

The issues relevant to the aquaculture industry vary geographically, and as such the establishment of an AIMB is recommended within each province, commencing with a pilot study in Nova Scotia as described below.

#### **5.3.3.3 Pilot Study – Nova Scotia**

In order to test the viability of this concept a pilot study is recommended in the province of Nova Scotia. This province is selected for a two reasons:

- 1) Nova Scotia has a good record of public consultation [Nova Scotia, 2005b; Nova Scotia Aquaculture Stakeholders, 2005] and thus likely has the political will to invest the necessary time and funding into the project. As discussed in Section 2.5.3, Nova Scotia has already implemented a community-based organisation to assist in reviewing aquaculture lease and licence applications, which has been successful in overcoming public distrust of the industry in many regions [Nova Scotia, 2005c].
- 2) The aquaculture industry is much smaller in Nova Scotia than in other provinces, and there is a good representation of stakeholder groups with important concerns, including First Nations, community groups and ENGOS. However, based on the

literature and feedback from stakeholders at the Nova Scotia ‘Growing Our Future’ stakeholder meeting [Nova Scotia Aquaculture Stakeholders, 2005] the level of conflict between these groups is lower than in British Columbia or New Brunswick, meaning there is more room to make errors and adjustments to this system than in other provinces.

#### **5.3.3.4 Funding**

The Nova Scotia pilot project would have considerable costs associated with it, and these would be met through a collaboration between the provincial and federal government. Costs would include the establishment of a new PPGIS, additional data, and training for the personnel who are to maintain, update and utilise the system. In order to ensure that the source of this funding does not appear to influence the Board’s decision making processes the Board’s financial records would be publicly available.

#### **5.3.4 Utilising Local Knowledge**

In Section 5.2.1.2 the concept of collecting local knowledge as a means of understanding user needs and building trust was introduced. However, the collection of local knowledge is all but useless without the incorporation of this information into the decision-making process. There is a stigma attached to local knowledge; it is sometimes perceived as being less valid than information collected by official sources. The AIMB quality assurance process for local knowledge as well as the science panel proposed in section 5.3.6 should work towards improving the perception of this information and lead

decision-makers to utilise it more in aquaculture development, decision-making and monitoring.

### **5.3.5 Privacy Concerns**

As noted previously, there is some information that industry is not comfortable releasing to the general public. Privacy policies at the provincial level should be examined to ensure that they protect industry from disclosure of sensitive information. By protecting industry in this way there is a greater likelihood of industry buy-in in the PPGIS system, as they would be assured that sensitive information related to their specific facilities is protected.

### **5.3.6 Addressing Scientific Uncertainty**

Based upon the success of the recent sea lice round table under the Pacific Salmon Forum initiative, it is recommended that a similar Science Panel be regularly convened by the AIMB. This would allow conflicting information to be addressed, and provide a forum for examining information of questionable reliability. Unlike the Pacific Salmon Forum, which has a mandate of only three years [Parker, 2005], it is recommended that the Science Panel meet regularly as long as there is conflicting information to address.

## **5.4 Summary of the Framework Design**

The framework for dispute resolution designed within this chapter is composed of three nodes, which respond to the six objectives developed in Chapter 4. The first node developed a tool set for consensus building, while the second node developed a PPGIS strategy to address dispute prevention through information provision and public participation. Both nodes were then put into action through the third node, policy and institutional change, whereby a new authority was developed to enact the consensus building tool set and PPGIS. This new authority, known as the Aquaculture Information and Mediation Board (AIMB) was designed to operate as a third party mediator comprised of six individuals from each of the major stakeholder groups. A pilot study in Nova Scotia is recommended to assess the feasibility of this design.

## CHAPTER 6

### EVALUATING THE FRAMEWORK

In this chapter, the consensus building and dispute prevention framework, as designed in Chapter 5, will be evaluated based on the objectives and barriers that were identified in Chapter 4.

#### 6.1 Evaluating the Framework Based on the Objectives

The Consensus Building and Dispute Prevention Framework, as developed in Chapter 5, will be evaluated against the six objectives developed in Chapter 4:

**Objective 1:** The framework should facilitate communication between all stakeholders

**Objective 2:** The framework should promote participation and work to engender trust between stakeholders.

**Objective 3:** The framework should promote fairness and equity.

**Objective 4:** The framework should have appropriate capacity to provide quality consensus building and dispute prevention strategies.

**Objective 5:** The framework should provide appropriate tools.

**Objective 6:** The framework should provide guidelines for appropriate administration of the consensus building and dispute prevention system.

### **6.1.1 Objective 1: The framework should facilitate communication between all stakeholders**

As outlined in Chapter 4, there are four key elements for communication: awareness, access, dialogue and education.

- a) *Awareness*: Increased awareness of consensus building strategies is facilitated through the conflict resolution toolset, which advise creating additional public consultation opportunities (Section 5.1.1(e)). Through more extensive public contact regarding aquaculture, stakeholders will be more aware of the issues and have opportunities to discuss them in a variety of forums.
- b) *Access*: The AIMB meets this criterion by providing a one-stop-shop for information. Appropriate advertising of the AIMB services by industry, government and NGOs should notify interested stakeholders of this information source. Users who do not have access to Internet facilities or do not have knowledge in their use have two options. Firstly they can seek their local municipal office to view the system guided by a trained operator. Alternatively they can contact the AIMB directly to seek out the answers to their questions. In this latter case, the speed of access may be inhibited, however in comparison to existing methods where stakeholders have to seek out information of questionable reliability from multiple sources, the process would be considerably faster.
- c) *Dialogue*: The AIMB will facilitate dialogue by either being the mediator, or selecting a third party mediator to attend relevant public consultation meetings. The PPGIS system operated by the AIMB will also facilitate dialogue between

stakeholders who are able to comment on information in real time on a public forum, and also communicate their own local knowledge in this way.

- d) *Education*: Training needs are addressed in the framework both for coastal decision-makers to be more knowledgeable in conflict management (Section 5.1.1(a)), as well as for the public to receive education on matters relating to aquaculture. The AIMB will be a contact point for both needs, with government training provided by the Board, and public education facilitated through increased public consultation opportunities.

#### **6.1.2 Objective 2: The framework should promote participation and work to engender trust between stakeholders.**

Objective 2 is related to the buy-in of stakeholders through participation and trust

- a) *Participation*: Improved methods of stakeholder identification and subsequent improvements in stakeholder consultation opportunities should involve more individuals in communication regarding aquaculture. The ability for stakeholders to add input and local knowledge to the PPGIS should also empower individuals to feel more ownership in the solutions and thus encourage further participation.
- b) *Trust*: The impartial nature of the AIMB, which is composed of one member from each of the seven predominant stakeholder groups, should aid in building trust in the information provider. Trust between stakeholders may be built through improved access to information and the promotion of collaborative partnerships.



### **6.1.3 Objective 3: The framework should promote fairness and equity.**

The requirement for fairness and equity is related to the overall satisfaction of stakeholders in the consensus building and dispute prevention process.

- a) *Fairness*: The use of an impartial body, the AIMB, to mediate between stakeholders should promote a sense of fairness with respect to the way in which individual stakeholder concerns are addressed.
- b) *Equality*: One of the main benefits of PPGIS is that its remote access largely removes the issue of power between stakeholder groups from the participatory process. The use of the AIMB to act as an impartial third party to the process should further enable reduce the impact of power inequalities.

### **6.1.4 Objective 4: The framework should have appropriate capacity to provide quality consensus building and dispute prevention strategies.**

In objective 4, capacity was defined by the availability of adequate resources, both finances and knowledge.

- a) *Costs*: The AIMB is funded through a joint effort of the federal and provincial government, rather than tapping into non-governmental disputants for funds. Costs for disputants are further reduced by providing the remote access PPGIS, which will reduce the costs of transportation for stakeholders, particularly those in remote areas, to attend public meetings and acquire information.

- b) *Knowledge*: The framework increases the knowledge capacity through training of decision-makers facilitated by the AIMB.

#### **6.1.5 Objective 5: The framework should provide appropriate tools.**

The appropriateness of tools was defined by currency, flexibility and timeliness.

- a) *Currency*: The currency of information is ensured by the creation of the AIMB to maintain and update the PPGIS. By increasing engagement with the public stakeholder issues and needs will also be more up-to-date. With improved communication between stakeholders, and particularly the real-time ability of the PPGIS to facilitate this communication, the issues that are important to them should become apparent much more quickly.
- b) *Flexibility*: Through a dedicated third party such as the AIMB, the PPGIS and conflict resolution tools can be modified where necessary to adapt to changes in the conflict or developments in the capabilities of the systems themselves (i.e., incorporate new software or additional data).
- c) *Timeliness*: The PPGIS allows stakeholders to voice their concerns much more quickly than they otherwise would be able to if they needed to wait for a public consultation meeting. The AIMB is also able to respond to stakeholder needs and new conflicts quickly, as it is dedicated to aquaculture conflict management and stakeholder support.

**6.1.6 Objective 6: The framework should provide guidelines for appropriate administration of the consensus building and dispute prevention system.**

Appropriate administration was required to allow improvements to be made to the system, and also to ensure that there is an authority that can be monitored and evaluated and can be seen as transparent. This administrative body is the AIMB, an impartial third party designed to increase public involvement and education regarding aquaculture and the issues involved, facilitate the two-way exchange of information between stakeholders through a web-based PPGIS and engage in consensus building using a tool set of conflict resolution techniques.

**6.2 Addressing Barriers**

**6.2.1 Lack of Trust**

The conflict resolution tool set developed in the framework should aid in increasing trust between stakeholder groups if it is implemented through the impartial AIMB. It is anticipated that an increased level of information exchange and communication between stakeholders through the PPGIS will also work to build trust. The AIMB should also work to build collaborative partnerships or advocacy coalitions based on common interests, which should work to build trust between what may otherwise be combative stakeholders.

### **6.2.2 Power Imbalance**

The imbalance in power is addressed in two ways. Firstly the PPGIS assists in removing the confrontation of a face-to-face meeting, which can be the cause of difficulties where one party feels intimidated by another. Secondly, the use of a third party instead of a government organisation removes the stigma of a potential conflict of interest which is presently an issue where DFO is trying to act as information provider.

### **6.2.3 Privacy**

The framework includes a review of federal and provincial policies to ensure that sensitive industry information, such as that relating to financial information and competitive advantage, is kept confidential. This should encourage industry to be more confident about the AIMB system knowing that their privacy is protected.

### **6.2.4 Political Will**

Conducting a pilot project of the AIMB in Nova Scotia will prove whether the AIMB model is appropriate to facilitate stakeholder information provision and mediation. If the project is a success this may encourage government and industry to support the project and implement it on a wider scale. The formation of advocacy coalitions lobbying for such a system would also aid in increasing the political will towards implementation of the system.

### **6.2.5 Cost**

The framework requires very little cost on the part of industry, beyond having a presence on the AIMB. The majority of the cost should fall on the federal and provincial governments. This cost is justified as the government stands to gain considerably from consensus building and reduced conflict surrounding aquaculture. The AIMB, if successful, would take the place of a number of tasks currently fulfilled by the government, including web-GIS maintenance, public consultation facilitation for new aquaculture sites and ongoing media releases to combat the anti-aquaculture sentiment put forward by ENGOs. The Government has also committed to consensus building under their Aquaculture Framework [2002a], and the AIMB would help facilitate this policy.

## **CHAPTER 7**

### **CONCLUSIONS AND RECOMMENDATIONS**

This research was undertaken to address two issues: the need for consensus building among stakeholders in the aquaculture industry and the need for dispute prevention in the form of information dissemination and public consultation. A system was developed through which a consensus building and dispute prevention framework would be designed. Firstly six objectives were developed to guide the design of the framework, focussing on communication, stakeholder buy-in, satisfaction, capacity, tools, and administration. Barriers to the success of the framework were also defined, which included a lack of trust between stakeholders, power imbalance and privacy.

The consensus building and dispute prevention framework was designed around three nodes: consensus building tools, technology solutions and policy and institutional change. Under the first node, a tool set was developed to aid in consensus building, while under the second node a PPGIS application was developed to meet information dissemination and public consultation needs. Implementation of the toolset and the PPGIS application was undertaken through the third node, through the development of a new authority to aid in mediation and consultation between stakeholders. Finally, the framework was successfully evaluated to verify that it had met previously defined objectives and overcome the established barriers.

## 7.1 Conclusions

This research identified information management as a key issue behind the conflict surrounding aquaculture. Two fundamental problems are, firstly, the different sources of information that have been produced, and secondly, a lack of discussion and consensus regarding this information. These deficiencies need to be addressed in order to resolve the ongoing debates and address the environmental, social and economic concerns of the stakeholders.

This research also revealed that there is willingness for consensus building among stakeholders. The aquaculture policy framework is an instrument that demonstrates the commitment of DFO to being transparent and engaging in communication with stakeholders. Industry has also indicated that it is concerned with the poor perception of aquaculture and its products and would like to improve this. Some ENGOs have published a significant amount of information and are frustrated by the lack of attention that has been paid to the information. Thus, they are likely to be very interested in discussing these issues.

The literature review and further interviews that were undertaken for this study demonstrated that consensus building requires collaboration, and cannot be resolved by the actions of one stakeholder. Such actions have been tried before, for example the ENGO efforts to disseminate their information have suffered from a lack of trust, while the government-driven efforts to facilitate communication have also had limited success.

The framework developed within this research developed a technical solution for addressing information management and public consultation. However the institutional changes required to enact this tool are equally important. Without the necessary structures to implement and maintain the technology it will not be successful. It is also important that the AIMB authority that was created to deliver the technology be perceived as impartial. Without trust in the information system proponent it is unlikely that the information within the system would be trusted, thus defeating the purpose of information provision.

## **7.2 Recommendations**

A number of recommendations were developed from this research. Firstly a pilot study is recommended to test the viability of the AIMB strategy. Further research is also recommended into methodologies that can be used to evaluate the operations of the AIMB. Privacy remains an issue in which further research should be carried out, as well as an examination of other options for resolving the perceived conflict of interest within DFO.

### **7.2.1 AIMB Pilot Study**

In addition to the evaluation of the consensus building and dispute prevention framework within this research, a practical feasibility study of the framework is required. As outlined in the User Needs Framework, a pilot study for the AIMB and the consensus building



framework is recommended to be undertaken in Nova Scotia. This location was selected because it has a good record of positive political will where public consultation is concerned, and any obvious problems with the framework design should become apparent. The size of the aquaculture industry in Nova Scotia would also reduce the costs required for the pilot study, allowing more funds to be available for necessary revisions to the framework if required.

### **7.2.2 Evaluation of AIMB Operations**

It is recommended that a strategy for evaluating the operations of the AIMB be developed. The successes of the Board must be identified to ensure that the benefits of this authority is recognised. Functions of the Board that require improvement must be also be established so that changes can be made and the Board continues to function at an optimum level. Such an evaluation could not be accomplished by one stakeholder, as bias may be perceived, and the creation of another committee to perform the evaluation would be superfluous. It is possible that regular (e.g.: annual or biennial) collaborative meetings could be held to evaluate the Board's performance, with input from a variety of stakeholder groups.

### **7.2.3 Further Research into Privacy**

One of the barriers identified for the framework was privacy. It is recommended that further research be undertaken to establish what the privacy needs of stakeholders are. This could be conducted by the AIMB to establish what the information needs of the system are, and whether or not this information is sensitive. It is also recommended that a

regulatory review of federal and provincial policy be undertaken to assess the privacy protections that are available, and whether these are appropriate, insufficient, or overly secretive.

#### **7.2.4 Examination of Other Options to Address DFO Conflict of Interest**

In Section 5.3.1, three scenarios were outlined for addressing DFO's conflict of interest, and one of these scenarios, the option to innovate, was investigated through this research. It would be worthwhile investigating the feasibility of the other two options. Firstly, the possibility that DFO responsibilities might be separated, and aquaculture regulated under a federal Aquaculture Act, rather than using fisheries legislation. Secondly, there is the possibility of removing aquaculture from the authority of DFO and having it coordinated by another authority, such as Agriculture and Agri-Food Canada.

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## **APPENDIX I**

### **QUESTIONNAIRES MAILED TO ENVIRONMENTAL NON- GOVERNMENTAL ORGANISATIONS (ENGOS)**

## **ABOUT THIS QUESTIONNAIRE**

This questionnaire was prepared to engage environmental non-government organisations (ENGOS) confidentially in order to ascertain the nature of their information needs and public consultation requirements. The targeted ENGOS were located in British Columbia, New Brunswick and Nova Scotia. Of the twelve surveys sent out, seven were returned. Although the questionnaires do not provide any statistical information related to ENGO perspectives, some of the comments that were provided in the received surveys proved to be relevant and interesting, and were included in this research. As such, the questionnaire is provided here as a reference.

## Stakeholder Questionnaire Aquaculture Information Requirements

The attached questionnaire is being distributed as part of a Master's of Science in Engineering thesis in the Department of Geodesy and Geomatics Engineering at the University of New Brunswick. I am interested in knowing what aquaculture-related information you need or are interested in, and how you would like to obtain it. This information will be used for a study on the way information related to aquaculture is managed and how these management processes can be improved.

I would greatly value your input in this research. The identity of all contributors will remain confidential, and as you can see no names are required on this questionnaire.

Should you wish to obtain more information in regard to this study please contact me using the details below.

Kind regards,

Meredith Hutchison

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# Stakeholder Questionnaire Aquaculture Information Requirements

Please complete as many questions as you are able, and feel free to add further information as you see fit.

This survey is to be filled out by hand. To answer the survey, please select the appropriate check boxes and/or write in the available space.

## A. About the Participant

1. What is your interest in the aquaculture industry? Please check as many as applicable.

- Involved in the aquaculture industry
- Property owner near an aquaculture facility
- Traditional fisherman
- Recreational fisherman
- First Nations
- Tourism operator
- Local business owner
- Interested member of local community
- Other (please specify): \_\_\_\_\_

## B. Your Experience with Aquaculture Information

	Not at all	Somewhat	Adequate	Very well informed
2. Do you feel well informed about the aquaculture industry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Never	Occasionally	Often	Frequently
<p><b>3.</b> During the last two years, how often have you <b>wanted</b> information regarding aquaculture? (If you have not wanted information, skip to Question 5).</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>What information did you want?</p> <hr/> <hr/> <hr/> <hr/>				
<p><b>4.</b> Did you <b>find</b> this information?</p> <p><input type="checkbox"/> Yes, I found all the information I looked for.</p> <p><input type="checkbox"/> No, I wasn't interested enough to look.</p> <p><input type="checkbox"/> No, I was interested but did not have the time.</p> <p><input type="checkbox"/> No, I could not locate all the information I wanted. (Go to question 4a).</p> <p>    → a. Why did you have difficulties locating the information?</p> <p>        <input type="checkbox"/> I did not know who to talk to.</p> <p>        <input type="checkbox"/> The information I sought is/was not publicly available.</p> <p>        <input type="checkbox"/> The information is located far from where I live.</p> <p>        <input type="checkbox"/> The information is online and I do not have internet access.</p> <p>        <input type="checkbox"/> Other (please specify):</p> <hr/> <hr/>				

**C. Additional Information About Aquaculture**

5. What areas of the aquaculture industry and its operations would you like to know more about?

	Not Interested	Somewhat Interested	Quite Interested	Very Interested
<i>Site Licenses</i>				
New lease/license applications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Renewal of lease/licence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Environmental information</i>				
Initial environmental assessment results	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental monitoring results	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydrological information (tidal flushing, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Biological Information</i>				
Growing processes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stock numbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Species type and stock origins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pharmaceutical use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feed processes and volume	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Escapes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Governance</i>				
The aquaculture lease and licensing process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The aquaculture planning process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Other (please list below):</i> _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<hr/> <hr/> <hr/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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**D. Method of Acquiring Information**

6. By what method would you like to acquire aquaculture-related information? Please **rank** the following in order of preference (1 – 4).

Preference (1 – 4)	Information Acquisition Method
	Information available for viewing at nearby government office Regular <b>public</b> meetings with other industry and government representatives An annual report mailed to interested residents An internet website containing relevant information Other (please specify): <hr/> <hr/> <hr/> <hr/>



**E. Public Participation**

	None	Needs Improvement	Adequate	Excellent
<p><b>7. New Aquaculture Site Applications</b>            How would you rate the public consultation opportunities you are offered for new aquaculture site applications?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>8. Ongoing Aquaculture Site Health</b>            How would you rate the public consultation opportunities you are offered regarding the health of existing aquaculture sites?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>9. Aquaculture Lease/Licence Renewals</b>            How would you rate the public consultation opportunities you are offered regarding the renewal of leases and licences for existing aquaculture sites?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. How would you like to be consulted in the following 3 circumstances:

Consultation Method	Circumstances		
	New Site Applications	Ongoing Aqu. Site Health	Lease & Licence Renewal
• Mailed letter to community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Newspaper advertisement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Public Open House/Public Meeting for every application	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Public Open House/Public Meeting for controversial site applications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Website notification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Other (please provide details): _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**F. Local Knowledge**

	Yes	No
11. Do you have information or compile data that may be relevant to decision-makers in Government, other members of the aquaculture industry or the community?	<input type="checkbox"/>	<input type="checkbox"/>
a. If Yes, please provide details of the information you collect: _____ _____ _____ _____		

b. Have you provided this information to decision-makers? If so, please provide details of who you provided it to and how it was received/used:

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**G. Further Information**

12. Please provide any further information regarding your views on information provision and public involvement in the aquaculture decision-making process.

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## CURRICULUM VITAE

**Candidate's full name:** Meredith Anne Hutchison

**Universities attended (with dates and degrees obtained):**

Bachelor of Geomatics Engineering, University of Melbourne, Australia, 2003  
Bachelor of Science (Geology), University of Melbourne, Australia, 2003

**Publications:**

Hutchison, M. and S. Nichols (2005). "The Potential for Public Participation GIS as a 'Push' Technology for Disseminating Aquaculture Information to Stakeholders." Accepted for publication in *Contributed Papers from Aquaculture Canada 2005*. Aquaculture Association of Canada, St. Andrews, N.B.

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**Conference Presentations:**

Hutchison, M. and S. Nichols (2005). "Putting the Pieces Together: Towards Sustainable Aquaculture through Stakeholder Collaboration." Presented at the OMRN National Conference, Ottawa, O. N. September 29<sup>th</sup> – October 1<sup>st</sup>, 2005.

Hutchison, M. and S. Nichols (2005). "The Potential for Public Participation GIS as a 'Push' Technology for Disseminating Aquaculture Information to Stakeholders." Poster presented at Aquaculture Canada conference, St. Johns, N. F., July 3 – 6, 2005.