Dissecting Co-management – An Examination of Fishermen Involvement in Fisheries Management in Nova Scotia, Canada

by

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Abstract

This research provides a systematic assessment of fishermen involvement, by first disaggregating fisheries management into its various components, allowing for a more nuanced understanding of the realities of co-management, from the perspectives of organized fishermen associations in Nova Scotia (NS), Canada. Fishermen association representatives were interviewed to: 1) Examine the perceived nature and extent of fishermen involvement, both current and desired, in fisheries management overall and across six management categories; and 2) Determine what factors and conditions are perceived to constrain the achievement of their desired involvement.

Results show that perceived levels of both current and desired involvement vary across fisheries management components. A range of barriers are identified that are felt to be preventing the achievement of desired involvement. This research offers insight into the realities of co-management as well as the willingness and capacity on the part of fishermen associations to take on various management tasks.

List of Abbreviations Used

CHP – Conservation Harvesting Plan

CMB – Community Management Board

CPR – Common Pool Resource

DFO – Department of Fisheries and Oceans Canada

FAO – Food and Agriculture Organization of the United Nations

FHOSA – Fish Harvester Organization Support Act

IFMP – Integrated Fisheries Management Plan

ITQ – Individual Transferable Quota

JPA – Joint Project Agreement

LFA – Lobster Fishing Area

MFU – Maritime Fishermen's Union

NS – Nova Scotia

SES – Social Ecological System

TAC –Total Allowable Catch

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Chapter 1: Introduction

1. Background and Rationale for Thesis

1.1. The Changing Paradigms of Fisheries Management

It is now widely accepted that the world's oceans are of fundamental importance to human wellbeing, but that global fisheries are in crisis, so urgent attention is needed to address the underlying problems (Allison & Ellis, 2001; Andrew et al., 2007; Bene, 2006; Berkes, Mahon, McConney, Pollnac, & Pomeroy, 2001). Fishery exploitation, habitat degradation and environmental change have resulted in changes in the presence and distribution of coastal and marine species worldwide, with significant implications for both ecosystem health and the livelihoods of those who depend on them for survival (Andrew et al., 2007). Environmental pressures further compounded by social, cultural, economic and political transformations and government policies that tend to favour large-scale, commodity oriented fisheries have left fishing communities increasingly marginalized (Berkes, 2003; Hutchings, 2000; Kearney, Berkes, Charles, Pinkerton & Wiber, 2007).

The conventional approach to fisheries science and management, as practiced since the early 1940s, has focused heavily on biophysical aspects of productivity such as maximization of yields and increasing the efficiency of fishing effort, resulting in the intensive utilization of ocean resources (Andrew et al., 2007; Berkes, 2003; Holm, 1996). With a focus on biology and economics and devoted, by and large, to single species management, the conventional fisheries management regime has been based on "a tradition of positivistic science, which assumes that the world is predictable and controllable" (Holm, 1996, p.178). This radical simplification has ignored most interactions among species within marine ecosystems and has regarded humans as external to the system being managed (Andrew et al., 2007; Holm, 1996). Further, conventional approaches to conservation and ecosystem management relied exclusively on scientific and top-down methods, largely failed to incorporate local knowledge or

management systems formally adopted by the resources' users (Riedlinger & Berkes, 2001; Berkes et al**.,** 2001), and have tended to be out of touch with local realities, with resource users often given no part in the decision-making process (Garcia, 2005; Varjopuro, Gray, Hatchard, Rauschmayer, & Wittmer, 2008).

The failure of conventional fisheries management practices to deliver ecologically sustainable or socially equitable fisheries (Charles, 2001; Garcia, 2005; Varjopuro et al., 2008; Worm et al., 2009) was already becoming evident by the early 1980s and has been deeply felt in many Canadian fishing communities [e.g., after the dramatic collapse of the Canadian Atlantic cod fishery in the early 1990s (Charles, 1997; Charles, Burbidge, Boyd, & Lavers, 2009), which "spread alarm amongst fishery scientists, managers and environmental groups around the world" (Caddy & Cochrane, 2001, p.660)]. This resulted in a reexamination of conventional management theory and the development of new concepts and approaches in fisheries research and management in the search for better ways to sustainably manage fisheries in terms of both ecological and social objectives (Berkes, 2003).

One of the shifts in resource management discourse has been a move away from top-down, 'command and control' resource management and lack of coordination among resource users and governmental resource management, towards a greater emphasis on "decentralization, devolution, regionalization and more collaborative decision-making" (Suarez de Vivero, Mateos, & del Corral, 2008, p.319) through various forms of co-management or 'shared stewardship.'

1.2. Defining Co-management

Broadly defined as "the sharing of power and responsibility between government and resource users" (Berkes, George, & Preston, 1991, p.12), the concept of cooperative management, or 'co-management', is rooted in common property theory (Carlsson & Berkes, 2005; Pomeroy & Berkes, 1997; Pomeroy & Rivera-Guieb, 2006) and can be analyzed in terms of the roles, responsibilities and rights surrounding the use and

management of a given common pool resource (CPR) (Pomeroy & Rivera-Guieb, 2006; Pinkerton, 1989).

Whereas natural resource management involves looking at the physical, biological, economic and social aspects of managing a given resource, so as to guide its sustainable use and conservation (Fisheries and Oceans Canada (DFO), 2013), co-management "is less about the management of resources and more about managing relationships between people; more specifically, it is about redefining or renegotiating new relationships between people with varying interests in, and varying degrees of authority over, the resource" (Goetze, 2004, p.5).

Osherenko (1988) offers the following early definition of co-management often cited in the literature:

> A co-management regime is an "institutional arrangement in which government agencies with jurisdiction over resources and user groups enter into an agreement covering a specific geographic region and spelling out: 1) a system of rights and obligations for those interested in the resource; 2) a collection of rules indicating actions that subjects are expected to take under various circumstances; 3) procedures for making collective decisions affecting the interests of government actors, user organizations and individual users (Osherenko, 1988, p.13).

Carlsson and Berkes (2005) cite subsequent definitions of co-management to include:

> The term given to governance systems that combine state control with local, decentralized decision making and accountability and which, ideally, combine the strengths and mitigate the weaknesses of each (Singleton, 1998, p.7).
>
> A partnership in which government agencies, local communities and resource users, non-governmental organizations and other stakeholders negotiate, as appropriate to each context, the authority and responsibility for the management of a specific area or set of resources (IUCN, 1997, p.76).
>
> A situation in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements and responsibilities for a given territory, area or set of natural resources (Borrini-Feyerabend, Farvar, Nguinguiri, & Ndangang, 2000, p.1).

These, and the many other, definitions of co-management exhibit a number of common underpinnings. Carlsson and Berkes (2005) identify that they all: (1) associate the concept of co-management with natural resource management; (2) regard co-management as some kind of partnership between public and private actors; and (3) identify co-management as a process, as opposed to a fixed state, that takes place along a continuum (Carlsson & Berkes, 2005). Despite these commonalities, Carlsson and Berkes (2005) argue, definitions of co-management often fail to capture "the complexity, variation and dynamic nature of contemporary systems of governance" (Carlsson, 2000; Berkes, 2002; Plummer & FitzGibbon, 2004, as cited in Carlsson & Berkes, 2005, p.67). The nature of a given co-management arrangement will depend on "the roles of government and other stakeholders in the decision making process, the types of management tasks which can and/or should be co-managed, and/or the stage in the management process when co-management is introduced" (Mazur, 2010, p.4). Furthermore, co-management is, by nature, a dynamic and iterative system and therefore, Carlsson and Berkes (2005) argue, "should be understood as a process in which the parties and their relative influence, positions and activities are continuously re-adjusted" (p.67). The nature of a co-management system also highly depends on "whether external circumstances are conducive for developing such systems" (Carlsson & Berkes, 2005, p.67), and therefore vary depending on the socio-economic and political context within which they arise.

As co-management is a term that has been used "to designate a wide array of arrangements for shared decision-making between government resource management agencies and community based parties" (Pinkerton, 1996, p.54) and does not describe a single management model (Armitage, Berkes, & Doubleday, 2007), definitions of co-management remain very broad, resulting in the concept having been interpreted differently by various academic, government, non-government and international organizations, as well as resource managers and local stakeholders. Given the variations in both co-management theory and practice, a number of typologies of participation have been developed to characterize the differences in the nature and extent of local involvement in the management of natural environments. A useful conception of a continuum of co-management arrangements – comparable to Arnstein's (1969) idea of a

ladder of participation – has been described by several authors (Pinkerton, 1989; Pinkerton, 1994; Sen & Nielsen, 1996; Berkes et al., 1991; Pomeroy & Berkes, 1997; Carlsson & Berkes, 2005; Pomeroy & Williams, 1994, etc.), who argue that co-management does not describe a single management model, but rather represents a continuum of arrangements in which partners participate to varying degrees. This spectrum of management arrangements is often seen as lying between two management extremes - fully centralized control, where the resource users are instructed about decisions that the government has already made, and self- or community-based management, where power is held by or delegated to resource users to make decisions and the government is merely informed of these decisions. It is this conceptualization of co-management - where distinct parties (i.e., government and local resource users) share, to varying extents, in "making decisions about practical outcomes related to a particular resource or area" (Pinkerton, 1989, p.4) that is used in this thesis.

Unpacking the concept of co-management is further complicated by the question of who is included as co-management partners. As Syenseke (2009) writes: "In co-operations between authorities and the local level, one critical aspect to consider is how the local society is represented" (p.220). Whether a community is place-based (i.e., groups of people who live in a shared geographical space), or one of shared interest (e.g., fishermen in a fishermen's association) (Selman, 2004), "communities themselves are rarely coherent and homogeneous units" (Brosius, Tsing, & Zerner, 1998; Agrawal & Gibson, 1999, as cited in Carlsson & Berkes, 2005, p.67), but generally consist of "several subgroups with different and often contradictory interests" (Natcher & Hickey, 2002, p.351), depending on a host of within-community differences, including gender, ethnicity, socioeconomic status, rights of access to resources, etc. (Carlsson & Berkes, 2005). As Natcher and Hickey (2002) write: "Resource management remains a social process in which cultural, economic, and political variables inevitably come into play. Even within a community-based context, the inclusion of some interests has generally meant the exclusion of others" (p.351). Not all interests within the community are equally represented, or voices heard. Assessing the extent of 'community' involvement in co-

management therefore necessitates a clear definition of what we mean by 'community' (i.e., which groups within the community are being considered).

1.3. Rationales for Greater Involvement

The resource management literature increasingly recognizes fisheries as linked social-ecological systems (SES) that need to be managed using an integrated approach (Stringer et al., 2006; Berkes & Folke, 1998; Folke, 2006; Pinkerton, 2009). It furthermore reflects a growing recognition of the value of locally grounded, context sensitive and community-based assessments as a necessary step to formulating effective strategies to address social-ecological challenges (Jentoft, 2000; Olsson, Folke, & Berkes, 2004; Smit & Wandel, 2006). It is increasingly accepted that, to be effective, institutional policies and programs must reflect and resonate with local realities and ecological knowledge, comprising not only local observational **knowledge** of species or other environmental phenomena, **practice**, with regard to the way people carry out their resource-use activities, but also **values**, in terms of how people relate to resources and the ecosystems of which they are a part (Berkes & Folke, 1998).

There are three fundamental rationales used to justify incorporating local involvement in resource management decision-making (Fiorino, 1990): 1) the first, normative rationale, stresses the principle that policy-makers need to obtain the consent of citizens (resource users), who have the right to meaningfully participate in the decision-making process (i.e., **community involvement is ethically justified)** (Carlsson & Berkes, 2005). Concepts such as equity (Hanna, 1995), fairness (McCay & Jentoft, 1996), and community empowerment (Jentoft, 2005) are often raised in argument for the democratic "involvement of citizens in decisions concerning their own livelihood" and the "delegation of decisions to be taken as close to the users as possible" (Nielsen et al., 2004, p.154).

2) The substantive rationale argues that knowledge relevant to decision-making is not limited to scientists. (i.e., **local knowledge is valuable and can contribute to not only**

sound, but also better, management) (Jentoft, 2000; McCay & Jentoft, 1996; Jentoft, McCay, & Wilson, 1998; Nielsen et al., 2004).

3) Finally, the instrumental rationale for local involvement considers the increased efficacy of policy when it involves broad understanding and support by stakeholders - **local engagement and support for management policies increases legitimacy and therefore acceptance of, and compliance with, management measures, and is consequently critical to their success** (Felt, 1990; McCay & Jentoft, 1996; Jentoft et al., 1998; Singleton, 2000, Pinkerton & John, 2008). Related to this rationale is the idea that co-management also allows for greater efficiency (Hanna, 1995; Singleton, 2000) - due to reduced implementation and enforcement costs, as a combined result of greater compliance as well as an increased allocation of management responsibilities to resource users (Jentoft et al., 1998; Carlsson & Berkes, 2005).

Thus, the emergence of co-management can be seen to be based on the promise for a "more appropriate, more efficient and more equitable management" of resources (Pinkerton, 1989, p.5), or, as Nielsen et al. (2004) puts it, on "considerations of both democracy and efficacy" (p.154).

1.4. Factors Affecting Involvement

Despite the increasing acceptance of the above mentioned rationales for incorporating local involvement in resource management decision-making (Berkes et al., 2001; Gray, 2006), studies have demonstrated that co-management is not a panacea for solving all the challenges of, or realizing the opportunity for greater community empowerment in, fisheries management (Chuenpagdee & Jentoft, 2007; Jentoft, 1989; Nielsen & Vedsmand, 1999; Jentoft, 2000; Symes, 2006; Armitage et al., 2009; Berkes, 2009). Just as the term co-management has been variously defined, and finds different expression depending on how it is conceptualized, fishermen involvement is also constrained by, and emergent from, a range of cross-cutting factors and conditions.

There is a growing body of literature exploring factors that affect the ability of resource users to manage their resource, as well as looking at general preconditions for 'successful' co-management of fisheries, or other local resources (Armitage et al., 2009; Berkes et al., 2001; Felt, 1990; McConney, Mahon, & Pomeroy, 2007; Napier, Branch, & Harris, 2005; Nielsen & Vedsmand, 1999; Ostrom, 1990; Pinkerton, 2003; Pinkerton, 2009; Pomeroy, 2007; Pomeroy, Katon, & Harkes, 2001; Singleton, 2000; etc.). While most authors agree that 'conditions for success' are context-specific (Pinkerton, 2009), a number of these conditions are nevertheless recurrent in the literature. Plummer (2009) offers a useful synthesis of this research, whereby he identifies and classifies these 'conditions for co-management success' as either exogenous or endogenous variables.

Exogenous variables include: 1) "ecosystem changes or resource alterations that precipitate (real or perceived) crisis" (Sen & Nielsen, 1996; Pomeroy & Berkes, 1997; Plummer & FitzGibbon, 2004; Pinkerton, 1989; Olsson et al., 2004; McConney et al., 2007; Armitage et al., 2009); 2) "legal mandates, policy prescriptions, and/or resources support (or reductions) by government"; 3) "the social and political context within which co-management is embedded; and 4) "meso-scale" social and economic drivers" (Folke, Colding, & Berkes, 2003, as cited in Plummer, 2009, p.7).

Endogenous variables influencing co-management, on the other hand, were cited as including the human, social, physical, and financial capital employed by organizations and individuals (Plummer & Armitage, 2007, as cited in Plummer, 2009); attributes of organizations and individuals such as leadership, financial stability, and the strength of social networks in relation to their ability to generating knowledge, bridge organizations, and contribute towards social learning (Berkes, 2009, as cited in Plummer, 2009; Kearney et al., 2007).

A number of authors have similarly outlined conditions affecting the success of co-management as occurring on one of three levels (cited by Pomeroy et al**.,** 2001, as having initially been identified by Pollnac, 1998): 1) the supra-community level (i.e., including enabling legislation and supportive government administrative structures at the national level (Pomeroy et al**.,** 2001, p.199), and other external factors; 2) the community level

(i.e., including the existence and strength of legitimate community organizations that can "represent resource users and stakeholders and influence the direction of policies and decision-making" (p.202), local leadership, participation by those affected, capacity building and social preparation, etc.); and 3) the individual level, namely the social, economic and political incentive structures that "induces individuals to participate in the process" (p.204).

Successful co-management is clearly dependent on many factors. Pinkerton et al. (2014) classifies critical conditions for successful co-management as relating either to: (1) conditions in communities and regions; (2) external political conditions; or (3) conditions in government agencies. These can be seen to encompass many of the elements raised by other authors, such as the importance of effective communication and conflict resolution processes, and social capital (i.e., social networks, trust and legitimate and effective leadership), institution building, supportive policies, community and governmental commitment and capacity, among others (Berkes, 2009; Berkes, 2002; McCay & Jentoft, 1996; Sen & Nielsen, 1996; Folke, Hahn, Olsson, & Norberg, 2005; Napier et al., 2005; Armitage et al., 2009; Pinkerton, 1989; Pinkerton, 1993; Pinkerton, 2009). The discussion of barriers to co-management in the literature tends to emphasize the absence of these 'conditions for success.'

1.5. Local Involvement: Rhetoric or Reality

That co-management holds promise for a "more appropriate, more efficient and more equitable management" of fisheries resources (Pinkerton, 1989, p.5) has been gaining increasing consensus in the literature and acceptance among many governments (Charles, 2008; Nielsen et al., 2004). In fact, the increased use of the terms 'participation' or 'involvement' in fisheries management discourse has come to reflect an almost statutory requirement to consider the voice of resource users in developing and carrying out resource management policy (Campbell & Salagrama, 2001), as a growing number of governments have come to emphasize increased collaboration as an important part of their natural resource management strategies.

The concept of co-management has, however, as mentioned, been adapted differently in different situations and thus has been used to describe a multitude of, at times quite dissimilar, institutional arrangements (Nielsen et al., 2004). While looking at the spectrum of co-management arrangements is a useful analytical tool, it has tended to, by and large, be applied in a manner that does not recognize the complexity of fisheries management, notably the multitude of management tasks involved. The extent to which fishermen are currently, or wish to be, involved across the different aspects of fisheries management (i.e., defining the management structure, data collection, operational decision-making, enforcement, etc.), is not likely to be uniform. The importance of assessing how fishermen involvement operates in practice **across specific management categories**, has been noted by a number of authors in the co-management literature (Jentoft et al., 1998; Charles, 2001; Nielsen et al., 2004; Pinkerton & Weinstein, 1995; Pinkteron, 2009, among others), and some important work has been done in assessing **which specific management tasks are performed by whom**, including work done by Pinkerton and Weinsten (1995) and Pinkerton (2009), which evaluated involvement in various fisheries management categories as either de jure (i.e., formally or legally established), de facto (i.e., informally established), or non-existent.

2. Purpose and Objectives of the Study

This research adds to these studies in addressing this need, by providing an integrated understanding of the nature and the extent of fishermen involvement in fisheries management across management categories, both current and desired, as well as factors affecting involvement. This is done by applying a 'ladder of participation' or co-management spectrum to each management category in order to better see how the rhetoric of participation meets reality, as perceived and experienced by a subset of the fishing community: fishermen's association representatives, and within a particular region: the Canadian Atlantic Coast province of Nova Scotia (NS).

Specifically, the objectives of this study are:

1) To describe the current nature and extent of fishermen involvement in fisheries management in NS (overall and by management category), as perceived by fishermen's association representatives;
2) To provide insight into aspirations for involvement (overall and by management category);
3) To explore levels of dissatisfaction with the nature and extent of current involvement, and the consequent engagement gap;
4) To determine what factors and conditions are seen to be constraining the achievement of desired fishermen involvement in the management process in the province;
5) To explore who experiences greater involvement and why, with a focus on the differences in experience between groundfish and lobster fishermen's associations.

3. Overview of Methods – Research Approach

In order to achieve this project's stated objectives, this research consisted of two primary components.

Literature Review Component

An initial comprehensive literature review was conducted on the fisheries management process and co-management theory. This research provided the theoretical understanding necessary to develop a draft survey for assessing the nature and extent of fishermen involvement in fisheries management across Nova Scotia in the regional review component of this research.

Regional Review Component

To address the above stated research objectives, a regional component of this research involved a combination of document review and telephone interviews of representatives of fishermen's associations in Nova Scotia. This research explored fishermen

involvement (current and desired) in various aspects of fisheries management in Nova Scotia, as perceived by association representatives, and explored their perspectives on factors affecting this involvement.

The methodology selected for this research was a mixed methods approach, whereby qualitative and quantitative data collected through interviews, incorporating both (1) a tested survey instrument to assess fishermen involvement in various aspects of fisheries management across a 'co-management spectrum' as well as (2) semi-structured interviews addressing factors affecting this involvement.

The data were analyzed through both qualitative and quantitative procedures. The survey data from the regional survey was tabulated and analyzed using Microsoft Excel. Mean involvement ratings for six fisheries management categories and in fisheries management overall were calculated and summary tables and graphs were constructed, to provide a numerical picture of:

1) The respondents' perception of the extent of fishermen's current involvement in fisheries management;
2) The respondents' perception of the desired levels of fishermen involvement in management;
3) The respondents' general levels of dissatisfaction with their involvement, as calculated by the difference between the scores for current and desired involvement, and the consequent unrealized potential for greater engagement.

Descriptive, or narrative, qualitative interview data was inventoried, categorized, and coded for emerging themes and patterns using the open, axial, and selective coding method outlined by Strauss and Corbin (1990), resulting in a descriptive assessment of the critical factors and conditions felt to constrain the achievement of desired levels of involvement in fisheries management.

A more detailed description of the full methodology used in this research is available in Appendix 1.

4. Geographical Context and Focus

4.1. Situating the Project: Co-management in Canadian Fisheries

The involvement of fishermen in the management of Canada's fisheries resources has become increasingly recognized as essential to the development of responsive management strategies that are more adaptive, sustainable, and both culturally and economically appropriate (Berkes, 2003; DFO, 2004a; DFO, 2004b). As a result, the Canadian government has articulated the need for collaboration in commercial fisheries management and "decisions based on shared information, on consultation with stakeholders, and on their advisory or management participation in the planning process" (DFO, 2002, p.11), as outlined by Canada's **Ocean Strategy**. This is meant to take place through formal consultation processes meant to "allow for enhanced input from resource users and other stakeholders into the management and conservation measures affecting a fishery" (DFO, 1999b, p.3), while maintaining Ministerial discretionary powers set out in the **Fisheries Act** (Fisheries Act, 1985; Wilson, 2008).

In Canada, fisheries management, defined by the Food and Agriculture Organization of the United Nations (FAO) as "the integrated process of information gathering, analysis, planning, consultation, decision-making, allocation of resources and formulation and implementation, with enforcement as necessary, of regulations or rules which govern fisheries activities in order to ensure the continued productivity of the resources and the accomplishment of other fisheries objectives" (FAO, 1997), is the responsibility of the federal Department of Fisheries and Oceans (DFO) (Constitution Act, 1867; Wilson, 2008). Commercial fisheries are managed through Integrated Fisheries Management Plans (IFMP) - species and region specific multi-year planning frameworks, which provide a summary of a given fishery resource, management objectives, measures to be used to achieve these objectives and assessment of their success, as well as allocation and license conditions (DFO, 1999b). Though not legally binding, IFMPs are required for all commercial fisheries and are the cornerstone of Canada's fisheries management process. IFMPs are one (and the most commonly used) of two forms of fisheries 'co-management' pursued by the Canadian government (DFO, 1999a;1999b). Joint Project Agreements

(JPAs), which establish more formal/legally binding conditions for collaboration between DFO and industry partners, are considered the second level of co-management (DFO, 1999a), though not all fisheries will develop JPAs. Through these, and various other more formalized or informal arrangements with government, Canadian fishermen, through their associations, have arguably been able to achieve more direct involvement in various aspects of fisheries management (Gough, 2007). However, studies have shown IFMPs in parts of the country (e.g., the west coast) to be dominated by large industry, at the expense of community voices, which are much weaker (Jones, Rigg, & Pinkerton, 2017).

Over the last several decades, Nova Scotian fishermen's associations, generally formed around geographically-based communities of interest (i.e., local fishing fleets) (Graham, Charles, & Bull, 2006), have provided local fishermen with the means to come together on important issues and to promote their interests with government agencies such as the Department of Fisheries and Oceans (DFO) (Boudreau, Wallace, & Wagner, 2002). Not all fishermen in Nova Scotia are represented by a local fishermen's association – determined by their region, the fishery in which they participate, and their role or status (i.e., license holders vs. crew). However, in the face of increasing government devolution of certain fisheries management functions onto industry, these associations have come to provide an increasingly broad range of services and to play a growing role in the management of fisheries resources (Wilson, 2008).

The Canadian government has long referenced the importance of involving fishermen in management decisions through their professional organizations. Early fishermen cooperatives began to take form in the late 1920s. However, it was not until Canada's Minister of Fisheries and Oceans in the early 1970s, Roméo Leblanc, emphasized the need for fishermen to organize, so as to effectively represent their views to government and contribute to management decisions, that fishermen's associations began to play larger role in fisheries co-management (Hanlon, 2012). It is now primarily through fishermen's associations that the Canadian government seeks to incorporate the interests of the fishing community into fisheries co-management. This emphasis on the role of fishermen's associations in the management of Canada's fisheries resources makes the

experience and perspective of those representing these associations of particular relevance when assessing the rhetoric and the reality of fisheries co-management in Canada.

As discussed earlier, the fishing community is not homogeneous, but, rather, consists of numerous, often opposing, interests (Brosius et al., 1998; Agrawal & Gibson, 1999, Carlsson & Berkes, 2005; Natcher & Hickey, 2002), not all of which are represented by fishermen's associations. As a result, it is important to acknowledge that a number of community voices are left out. Fishermen's associations represent the interests of a subset of the fishing community – fishing license holders. In assessing fishermen involvement through the experience and perspective of those representing these associations, this research looks at the nature and extent of involvement of those within the fishing community who are already most involved and does not address the important question of who else, beyond the members of associations, ***should*** be involved in the co-management process (See Chapter 4 for study limitations to the research and avenues for future study).

4.2. Geographical Focus: Fisheries in Nova Scotia, Canada

Nova Scotia is a Canadian province with 7,600 kilometres of coastline, with no point further than 65 kilometres from the sea, and with approximately 70% of Nova Scotia's population residing in coastal communities (Huston, 2007). The Nova Scotia commercial fishing industry provides an important economic base for many coastal communities, with many relying directly (or indirectly) on participation in the fishery for their livelihood (Charles, 1997; Pinfold, 2007). With its socio-cultural, economic and ecological wellbeing so intimately tied to the state of the oceans, this Atlantic Canadian province provides an invaluable setting for this research.

Nova Scotia's commercial fisheries target a multitude of species. Groundfish stocks [bottom-dwelling (benthic) fish, specifically cod (***Gadus morhua***), haddock (***Melanogrammus aeglefinus***), halibut (***Hippoglossus hippoglossus***), and pollock (***Pollachius virens***)] were once the mainstay of the fishery, but many have yet to recover from their dramatic collapse in the 1990s. While still significant, they are greatly

diminished from the about 50% of landed value they accounted for in the 1980s (Pinfold, 2007). Meanwhile, lobster (**Homarus americanus** – a highly valuable benthic shellfish) populations have since surged, resulting in lobstering having become "the backbone" of many Nova Scotian fishing communities (Charles, 1997; Pinfold, 2007). Shellfish, including lobster, scallop (**Placopecten magellanicus Group**), snow crab (**Chionoecetes opilio**), and shrimp (**Pandalus borealis**) as primary species, account for a significant majority of the province's landed value (DFO, 2015). Many other species are also caught, but are of much less overall importance.

Though "fishing licenses and quota (and consequently profit) is increasingly becoming concentrated in the hands of a few" (Grant, 2015, para.2), Nova Scotia's fisheries remain characterized by a relatively large number of primarily small-scale 'owner operated' fleets – "ones in which each fishing enterprise is owned and operated by an individual fish harvester" (Graham et al., 2006, p.21). Unlike some other provinces, such as Prince Edward Island and Newfoundland, which are characterized by having most fishermen represented by a single fishermen's association, Nova Scotia hosts a significant number of fishermen's associations, of various size and organizational structure, spread across the province. This multitude and diversity of associations offers a wide range of perspectives and experience regarding fishermen involvement in fisheries management and furthers the province's value as a geographical focus for this study. This study pays particular attention to associations representing fishermen in the two most important and widespread fishery sectors in the province, those for groundfish and lobster.

5. Contribution to Knowledge

This project is distinctive and important in several respects. The research contributes to a wider understanding of the nature and extent of fishermen involvement (both current and desired) in fisheries management, as experienced by fishermen's association representatives in Nova Scotia. Whereas theories of co-management tend to, by and large, look at involvement overall along one ladder, or scale, of participation (e.g., Arnstein, 1969; Pinkerton, 1994; Sen & Nielsen, 1996; Pomeroy & Berkes, 1997, etc.), fisheries

management is, in fact, complex, involving a multitude of varying management tasks (Jentoft et al., 1998; Charles, 2001; Nielsen et al**.,** 2004; Pinkerton & Weinstein, 1995; Pinkerton, 2009). There is no reason to expect that the extent to which fishermen are currently, and wish to be, involved across the different aspect of fisheries management is uniform. This research adds emphasis to the growing recognition of the value of assessing involvement by first disaggregating fisheries management into its various components, so as to better understand how co-management is played out on the ground, by comprehensively and systematically assessing involvement in various components of fisheries management against a 'ladder of participation' or co-management spectrum. Looking at the extent to which fishermen are, and wish to be, involved in each aspect of fisheries management not only allows for a more nuanced understanding of the realities of 'co-management,' but also better permits the formulation of effective strategy for achieving more meaningful involvement in the management of fisheries resources.

Furthermore, this study adds to the growing body of research on factors and conditions that enhance or constrain fishermen involvement in resource management, by providing insight into the barriers fishermen's association representatives feel to be constraining their desired involvement in the co-management of the resources on which fishermen depend. Identifying commonalities and differences in industry experiences and perspectives on involvement (i.e., which factors and conditions are seen to constrain fishermen involvement from both the supra-industry/association, and intra-industry level, and determining which factors and conditions are widely relevant across associations, or alternatively context-specific) facilitates an exchange of knowledge and perspectives. This, in turn, will hopefully result in the development of strategies to better support enhanced fishermen involvement in the co-management of fisheries resources. A thorough understanding of current and desired fishermen involvement in fisheries management and the barriers felt to be constraining its meaningful achievement is an important first step toward helping ensure a more coherent and effective framework for future stakeholder engagement in support of improved governance.

6. Thesis Overview and Organization

This thesis is organized into four chapters and supplemental appendices. This first, introductory chapter, has presented the background, the rationale and the objectives of the thesis, the significance of this research, the geographical context, and a pertinent literature review.

The key results are then presented in Chapters 2 and 3, written in the format of two distinct but complementary manuscripts that are to be submitted to the primary literature. Chapter 2 explores the nature and extent of fishermen involvement in fisheries management, as perceived by fishermen's association representatives in Nova Scotia. It disaggregates fisheries management into six categories, with the fishermen representatives evaluating their association's and membership's current and desired involvement in each. Areas of priority for fishermen involvement are also assessed. Finally, differences in perspectives and experience on fishermen involvement in fisheries management between associations representing fishermen participating in Nova Scotia's two primary fisheries – lobster and groundfish – is explored.

Chapter 3 adds to the situational analysis of fishermen involvement of Chapter 2 by exploring the factors and conditions that have shaped the nature and extent of fishermen involvement in the province, again as perceived by association representatives. Barriers felt to be constraining fishermen's desired involvement in fisheries management overall and within each of the six management categories presented in Chapter 2 are identified, and analyzed for significance, as determined by the frequency with which each barrier is raised in the interviews. Comparative analysis between lobster and groundfish associations is again conducted to determine commonality and differences in barriers felt.

The fourth chapter concludes the main body of the thesis with a summary of key findings, lessons learned and potential application. It also outlines limitations of the study, and, finally, proposes possible directions for future research.

Multiple Appendices have been included to provide a fuller picture of the interview instrument and methodology used, expanding on that presented in the main chapters. Appendix 1 provides an in-depth description of the methodology used for the study. Appendices 2 and 3 present the interview guide and consent form used in this research, respectively, and Appendix 4 lists the Nova Scotia fishermen's associations that took part in this research.

Chapter 2: Dissecting Co-management – Exploring the Nature and Extent of Fishermen Involvement in Fisheries Management

1. Introduction

1.1. Co-management

The conventional approach to fisheries science and management, as practiced since the early 1940s, focused heavily on biophysical aspects of productivity such as maximization of yields and increasing the efficiency of fishing effort (Andrew et al., 2007; Berkes, 2003; Holm, 1996). This ignored most interactions among species within marine ecosystems and regarded humans as external to the system being managed (Andrew et al., 2007; Holm, 1996). Further, conventional approaches to fisheries management relied exclusively on scientific and top-down methods, largely failed to incorporate local knowledge or management systems adopted by the resources' users (Riedlinger & Berkes, 2001; Berkes et al**.,** 2001), and have tended to be out of touch with local realities, with resource users often given no part in the decision-making process (Garcia, 2005; Varjopuro et al**.,** 2008).

The failure of such management practices to deliver ecologically sustainable or socially equitable fisheries (Charles, 2001; Garcia, 2005; Varjopuro et al., 2008; Worm et al., 2009) was already becoming evident by the early 1980s and has been deeply felt in many fishing communities (e.g., after the dramatic collapse of the Canadian Atlantic cod fishery in the early 1990s) (Charles, 1997; Charles et al**.,** 2009). This resulted in a reexamination of conventional management theory and the development of new concepts and approaches in fisheries research and management in the search for better ways to sustainably manage fisheries in terms of both ecological and social objectives (Berkes, 2003).

One of the shifts in resource management discourse has been a move away from top-down, 'command and control' resource management and lack of coordination among

resource users and governmental resource management, towards a greater emphasis on "decentralization, devolution, regionalization and more collaborative decision-making" (Suarez de Vivero et al**.**, 2008, p.319) through various forms of co-management or 'shared stewardship'. That co-management holds promise for a "more appropriate, more efficient and more equitable management" of fisheries resources (Pinkerton, 1989, p.5) has been gaining increasing consensus in the literature and acceptance among many governments (Charles, 2008; Nielsen et al., 2004). In fact, the increased use of the term 'participation' or 'involvement' in fisheries management discourse has come to reflect an almost statutory requirement to consider the voice of resource users in developing and carrying out fisheries management policy (Campbell & Salagrama, 2001), as a growing number of governments have come to emphasize increased collaboration as an important part of their natural resource management strategies.

The concept 'co-management' has been interpreted differently by various academic, government, non-government and international organizations. "Definitions vary in their focus on the roles of government and other stakeholders in the decision-making process, the types of management tasks which (are felt) can and/or should be co-managed, and/or the stage in the management process when co-management is introduced" (Mazur, 2010, p.4). To make sense of the variations in co-management theory and practice, a useful conception of a continuum of co-management arrangements has been described by Berkes et al. (1991), who argue that there are various levels of co-management corresponding to the extent of local-level involvement and shared decision-making in resource management, as well as the degree of integration of local and state level management systems. Co-management, when broadly defined as "the sharing of power and responsibility between government and resource users" (Berkes et al**.,** 1991, p.6), does not describe a single management model, but rather represents a broad spectrum of arrangements – comparable to Arnstein's (1969) idea of a ladder of participation – that involves different levels of power-sharing, lying between two management extremes – fully centralized control, where the resource users are instructed about decisions that the government has already made, and self or community-based management, where power is

delegated to resource users to make decisions and the government is merely informed of these decisions. It is this conceptualization of co-management that is used in this thesis.

While the above spectrum of co-management options is a useful analytical tool, it has tended to, by and large, be applied in a manner that does not recognize the complexity of fisheries management, notably the multitude of management tasks involved. The extent to which fishermen are currently, or wish to be, involved across the different aspects of fisheries management is not likely to be uniform. The importance of assessing how fishermen involvement operates in practice **across specific management categories**, has been noted by a number of authors in the co-management literature (Jentoft et al., 1998; Charles, 2001; Nielsen et al., 2004; Pinkerton & Weinstein, 1995; Pinkerton, 1989; Pinkteron, 2009, among others), and some important work has been done in assessing **which specific management tasks are performed bywhom**, including work done by Pinkerton and Weinsten (1995) and Pinkerton (2009), which evaluated involvement in various fisheries management categories as either de jure (i.e., formally or legally established), de facto (i.e., informally established), or non-existent.

This research adds to these studies in addressing this need, by assessing how fishermen involvement differs **across specific management categories** by applying a 'ladder of participation' or co-management spectrum to each category. Disaggregating fisheries co-management into management categories permits greater insight regarding the extent to which, within each aspect of fisheries management, fishermen are, and wish to be, involved. This, in turn, can help evaluate the realities of co-management against its rhetoric. Importantly, a more nuanced understanding of the realities of 'co-management' also better permits the formulation of effective strategies for achieving more meaningful fishermen involvement in the management of fisheries resources.

The specific objectives of this paper are to:

1) Provide a more detailed understanding of the nature and the extent of fishermen involvement in management overall and by fisheries management category, as perceived by fishermen's association representatives in a particular region.

2) Provide insight into aspirations for involvement, the levels of dissatisfaction with current involvement and the consequent engagement gap (i.e., unrealized potential for greater engagement);
3) Explore who experiences greater involvement and why.

There are many factors that might affect the current or desired levels of involvement of a given association in fisheries management, including which fishery they participate in and their region, as well as numerous others, such as the health of the stocks, license type, association history and various association statistics including accreditation status, size, staffing, corporate connection, etc. This paper, however, focuses the exploration of commonalities and differences in perspective and experience among fishermen's associations to (1) an overall assessment across all respondents, and (2) a comparison between the two most important and widespread fisheries sectors in the province, those for groundfish and lobster.

1.2. The Nova Scotia Fishery

The region examined in this study is the Eastern Canadian province of Nova Scotia (NS). The Canadian government has articulated the need for collaboration in commercial fisheries management via "management decisions based on shared information, on consultation with stakeholders, and on their advisory or management participation in the planning process" (DFO, 2002, p.11). This is meant to take place through formal consultation processes meant to "allow for enhanced input from resource users and other stakeholders into the management and conservation measures affecting a fishery" (DFO, 1999b, p.3), while maintaining Ministerial discretionary powers set out in the **Fisheries Act**(Fisheries Act, 1985; Wilson, 2008)**.** While these, and various other formalized or informal arrangements with government, have arguably allowed Canadian fishermen, through their associations, to achieve more direct involvement in aspects of fisheries management (Gough, 2007), there has been little critical evaluation of the nature and extent of how fishermen involvement is being evidenced on the ground (i.e., through an

integrated assessment of involvement across management categories), resulting in a challenge in separating the rhetoric of co-management from the reality.

Nova Scotia is a Canadian province with 7,600 kilometres of coastline, with no point further than 65 kilometres from the sea, and with approximately 70% of Nova Scotia's population residing in coastal communities (Huston, 2007). The Nova Scotia commercial fishing industry provides an important economic base for many coastal communities, with many relying directly (or indirectly) on participation in the fishery for their livelihood (Charles, 1997; Pinfold, 2007). With its socio-cultural, economic and ecological wellbeing so intimately tied to the state of the oceans, Nova Scotia is a suitable setting for this research.

Over the last several decades, Nova Scotian fishermen's associations, generally formed around geographically-based communities of interest (i.e., local fishing fleets) (Graham et al., 2006), have provided local fishermen with the means to come together on important issues and to promote the community's interests with government agencies such as the Department of Fisheries and Oceans (DFO) (Boudreau et al**.,** 2002). In the face of increasing government devolution of certain fisheries management functions onto industry, these associations have come to provide an increasingly broad range of services and to play a growing role in the management of their fisheries resources (Wilson, 2008).

While not all fishermen in Nova Scotia are represented by a local fishermen's association – membership in which is determined by their region, the fishery in which they participate, and their role or status (i.e., license holder vs. crew) – it is primarily through these associations that the Canadian government seeks to incorporate the interests of the fishing community into fisheries co-management. Thus, the experience and perspective of those representing these associations is of particular relevance when assessing the rhetoric and the reality of fisheries co-management in Canada.

Nova Scotia's fisheries remain characterized by a relatively large number of primarily small-scale 'owner operated' fleets – "ones in which each fishing enterprise is owned and

operated by an individual fish harvester" (Graham et al., 2006, p.21). Unlike some other provinces, which are characterized by having most fishermen represented by a single fishermen's association, Nova Scotia hosts a significant number of fishermen's associations, of various size and organizational structure, spread across the province. This multitude and diversity of associations offers a wide range of perspectives and experience regarding fishermen involvement in fisheries management and furthers the province's value as geographical focus for this study. This study pays particular attention to associations representing fishermen in the two most important and widespread fishery sectors in the province, those for groundfish and lobster.

2. Methodology

2.1. Interview Design and Development

An initial comprehensive literature review was conducted on the fisheries management process and co-management theory. This research provided the theoretical understanding necessary to develop a survey for assessing the nature and extent of fishermen involvement in fisheries management across Nova Scotia.

The interview instrument consisted of three components (See Appendix 2: Interview Guide). The first section explored contextual information pertaining to the role of the respondent, the association they represent, and the fishery they identified as most important to their membership, as some associations were multi-species associations, representing fishermen in more than one fishery. The second section surveys respondents on their current involvement overall and in six fisheries management categories, their aspirations for co-management and factors affecting their involvement. (See Chapter 3 for analysis of barriers felt).

In order to assess the nature of fishermen involvement in fisheries management in the second section of the interview, six management categories were developed, each of which encompass several key functions (Table 1).

Table 1: Management categories within fisheries management

Fisheries Management Categories	Management Functions
1: Direction-Setting, Planning & Policy Development	a. Problem identification b. Setting policy objectives – defining what should be achieved c. Developing policy d. Evaluating the effectiveness of the plan & related policies e. Assessing actual and potential impacts of policies f. Creating long-term fisheries management plan (i.e., goal and objective setting, identifying indicators of success, etc.) g. Monitoring the implementation of the management plan
2: Harvest Management	a. Monitoring and assessing status of stock to determine harvest levels (e.g., tracking and documenting catches and landings) b. Setting level of catch (i.e., TAC, quota) c. Managing/authorizing harvesting seasons (i.e., setting openings & closings) d. Managing/authorizing areas for harvesting (i.e., fishing zones) e. Managing/authorizing fishery access – determining membership criteria (regulation for licensing, etc.) f. Assigning allocation and distribution of catch (arranging internal distribution of catch)
3: Compliance & Enforcement	a. Developing fishing rules to support management objectives b. Educating members/building awareness about the rules to improve compliance c. By-law and regulation enforcement (e.g., patrolling for violators, monitoring/verifying harvest or other resource use activities and compliance) d. Imposing penalties and sanctions for non-compliance/penalizing violators
4: Ecosystem Stewardship, Conservation & Rehabilitation	a. Planning for habitat rehabilitation, enhancement or stewardship (setting strategies) b. Conducting habitat rehabilitation/ enhancement c. Planning for stock rehabilitation, enhancement or stewardship (setting strategies) d. Conducting stock rehabilitation/ enhancement (e.g., running hatcheries) e. Conducting habitat or ecosystem assessment/ monitoring

Fisheries Management Categories	Management Functions
5: Research	a. Developing a research plan/setting research scope b. Conducting data collection c. Conducting analysis of data collected d. Managing access and ownership over data and research results e. Applying findings to support fisheries management
6: Organizational Management & Development	a. Building capacity – creating new mechanisms to support fisher involvement in fisheries management (e.g., professional development for members, etc.) b. Managing interpersonal conflict within fishery c. Managing conflict with outside interests

This division of fisheries management into subcategories was adapted from Pinkerton and Weinstein's (1995) approach and the table of management functions that commonly occur within community-based fisheries management, as outlined by Graham et al. (2006).

To assess the extent of fishermen involvement, as perceived by representatives of fishermen's associations, respondents were asked to rate their **predominant level** of current and desired involvement in fisheries management overall and in each fisheries management category – since involvement within the different functions of a given management category might not be equal - against a scale of one to ten, representing a spectrum of management arrangements, power-sharing and fishermen involvement, lying between two extremes: 1 representing 'no fishermen involvement,' and 10 representing 'full involvement or exclusive fishermen responsibility.' This rating framework for assessing involvement by management category allowed for data on respondents' experience and perspective to be collected in a standardized format and easily compared.

The use of a continuous one to ten rating scale, with only endpoints defined, permitted results to be analyzed as interval scaled data, "making it possible to interpret not only the order of scale scores but also the distance between them" (Crawford, 1997, para.11), thereby justifying the use of statistical techniques that rely on "the calculation of the

arithmetic mean as the measure of average" (Treiblmaier & Filzmoser, 2009, p.3). This means of measurement, often termed a semantic differential scale, since "each end of the scale is labelled with a word/phrase (or semantic) that is opposite in meaning to the other" (Crawford, 1997, para.25), is often used in evaluating social attitudes (Al-Hindawe, 1996), and is recognized in the literature as being a valid and reliable alternative to Likert style scales (Al-Hindawe, 1996; Treiblmaier & Filzmoser, 2009), which generally present fewer and well defined categories. This one to ten rating scale provides greater resolution than scales with fewer points and makes "the semantic understanding of the various categories less important (as long as the anchor points are clearly defined)" (Treiblmaier & Filzmoser, 2009, p.6).

Respondents also provided verbal explanation of their ratings and were asked to reflect on enablers or constraints to achieving their desired levels of involvement in each management category (See Chapter 3). This served to substantiate and contextualize their numerical responses and, also, allowed differences in interpretations of the rating scale to be more easily identified.

The third section of the interview explores participants' reflections on co-management overall as well as key enablers or constraints to having been able to achieve their desired involvement (See Chapter 3). Further, respondents were asked to rank the six fisheries management categories in order of their perceived priority for fishermen involvement. Recognizing that "involvement in fisheries management does not always happen in any particular order, nor are (management) activities always easily separated from one another" but rather "reinforce each other" and should consequently be "integrated, complementary, ongoing, and simultaneous" (Graham et al., 2006, p.27), ranking the fisheries management categories in order of perceived priority for fishermen involvement provided information on the perceived importance of involvement in each management category with respect to one another and offered a means of triangulation with data from the ten-point scale on desired involvement in fisheries management.

The interview was pilot tested in November 2012 with two Nova Scotia fishermen's association representatives, selected as a result of their collaborative relationship with the thesis supervisor and/or mutual affiliation with a community-university research alliance, to obtain feedback on the interview questions, wording, and length. Slight modifications to some of the interview questions were made, based on suggestions and comments from pilot results, and a few items removed or added, before the remainder of the interviews were conducted between January and June 2013. Ethics approval, from the Dalhousie University Research Ethics Board was received before commencing the interview process and participant consent obtained prior to each interview (See Appendix 3: Consent form).

2.2. Participant Criteria and Selection & Data Collection and Rationale

Fishermen's associations across Nova Scotia were selected randomly from a compiled list of Nova Scotia associations obtained from **the Nova Scotia Department of Fisheries and Aquaculture** and the **Nova Scotia Fisheries Sector Council.** Initial contact was made with the primary contact person for each association. However, interviewees for each fishermen's association were determined by the associations themselves. A total of 31 interviews were conducted, each directed to a representative of a fishermen's association within Nova Scotia.

Respondents were asked to speak on behalf of the fishermen's association and membership they represent. While it is important to acknowledge that responses are individual opinions inherently framed by the respondent's own background and experiences, and may not represent the perspectives of all local fishermen, the fact that interviews were conducted with association representatives ensured that selected respondents were most likely to be active and knowledgeable in fisheries 'co-management' and best able to reflect on the experience of the fishermen they represent. The position of each respondent within their fishermen's association is cited as held at the time of interview (2013).

Surveys were administered through predominantly in-depth semi-structured telephone interviews. All respondents were offered the opportunity to review the interview questions before the interview date and encouraged to have the interview questions on hand during the call to help facilitate the interview process. Interviews took an average of 1.5 hours to complete.

2.3. Data Analysis

All interviews were audio-recorded and transcribed. Survey data (i.e., numerical rating of current and desired involvement and prioritization of involvement by management category rankings) were entered into a Microsoft Excel® spreadsheet where mean involvement ratings, summary tables, and graphs were constructed. Contextual variables pertaining to each association were also tabulated to allow for analysis of commonalities and difference in perspectives and experience between associations and, combined with respondents' qualitative data, used to help explain any observable trends. The mixed methods approach to this research, combining quantitative survey with qualitative interview data, thus allowed for a greater understanding of and validation of research results.

Involvement ratings for each of the six fisheries management categories, and in fisheries management overall, provided a numerical picture of the perceived nature and extent of current and desired involvement in the management of the fishery identified as most important to the membership of each fishermen's association interviewed, and allowed for analysis of: (1) the extent of fishermen involvement in fisheries management overall and within each of the six management categories; (2) respondents' desired levels of involvement overall and in each of these categories; as well as (3) respondents' levels of dissatisfaction with their involvement, as calculated by the difference between current and desired involvement ratings. Looking at the mean difference between current and desired involvement ratings offered insight into the unrealized engagement potential, or 'engagement gap'. Mean current and desired involvement, and the consequent engagement gaps, were calculated for each fisheries management category and for two

measures of involvement in fisheries management overall: (1) the overall rating of the association and membership's involvement, as given by the respondent; and (2) the aggregate overall rating, as determined by averaging the scores (each out of 10) given for each of the six fisheries management categories. The second of these measures of overall involvement, where the rating of involvement for each management category is given equal weighting in the assessment of fishermen involvement overall, offered a means of triangulating the overall involvement rating given by the respondent, which may have been weighted towards certain management categories due to particular satisfaction or dissatisfaction in a given area.

Despite attempts at consistency in questioning and clarity in wording, some differences in interpretation of the rating scale were evident. Most respondents seem to have interpreted the rating scale as reflecting a co-management spectrum, or 'ladder of involvement' in line with the theoretical scales of involvement presented in the co-management literature (e.g., Pinkerton, 1989; Pinkerton, 1994; Sen & Nielsen, 1996; Berkes et al., 1991; Pomeroy & Berkes, 1997; Carlsson & Berkes, 2005; Pomeroy & Williams, 1994, etc.), as intended, with management arrangements lying between two hypothetical management extremes – fully centralized control, and 'true' self or community-based management.

However, some respondents seemingly rated their involvement on a scale where the highest involvement rating ("full involvement or exclusive fishermen responsibility") was interpreted as limited by what the respondent thought was possible – i.e., as involved as possible within the current management framework. This was not the intended interpretation, and use of this data would therefore confuse the results. Osborne and Overbay (2004) argue that when dealing with data issues, such as those arising from the misunderstanding of a question, re-calculation or re-estimation of the correct answer is recommended, so long as sufficient information is available to do so. If such responses cannot be 'corrected,' they should, they argue, "be eliminated as they do not represent valid population data points" (Osborne & Overbay, 2004, p.2). In line with this thinking, and in order to effectively analyze responses, certain scores were removed when they were very obvious outliers to the co-management scale interpretation, (i.e., where the

interpretation was very clearly and significantly at odds with that of the other respondents) or where the verbal explanation of a given respondent clearly contradicted their rating response, indicating that they did not understand the question as intended and making the rating response meaningless and confusing the analysis. Where possible to do so consistently across management categories, a few ratings were also modified to make one particular respondent's responses internally consistent. The remaining responses were included in analysis as answered.

The study's mixed method design (i.e., looking at involvement quantitatively, with use of a numerical rating scale, as well as through qualitative interview) allowed for comparison and corroboration between qualitative and quantitative assessments of current and desired involvement and helped identify contradictions between, and to some degree correct for, differences of interpretation common in survey style interviews (Denzin, 1978; Creswell & Plano Clark, 2007; Greene, Caracelli, & Graham, 1989; Teddlie & Tashakkori, 2009).

In some instances, respondents felt unable to provide a rating for either their current or desired involvement in a given fisheries management category. Due to potential differences in interpretation of the rating scale between respondents, current and desired scores of each category were treated as paired responses. As such, ratings were only included in analysis if a response was given for both current and desired involvement in a given category, to ensure that the means of current and desired ratings could be compared. Further, the aggregate calculation of overall involvement (i.e., averaged involvement of the six management categories) was not calculated for associations where full ratings (i.e., both current and desired) were given for less than four of the six fisheries management categories.

In ranking the six fisheries management categories in order of priority for fishermen involvement, some respondents felt unable to rank certain categories, resulting in different sample sizes between management categories. The percentage of respondents giving a certain ranking response was calculated as a valid percent (i.e., including only those respondents who provided a ranking for a given management category).

Furthermore, some respondents felt some or all of the management categories to be equal in priority. In these cases, ties in priority rankings between management categories were permitted, so as to most accurately reflect the perceived importance of fishermen involvement in each category relative to the others.

3. Results and Discussion

Thirty-one fishermen's association representatives participated in the study, representing nine fisheries across the province of Nova Scotia, and 32% of the 98 fishermen's associations on the compiled list of associations obtained from **the Nova Scotia Department of Fisheries and Aquaculture** and the **Nova Scotia Fisheries Sector Council.** Lobster and groundfish associations together represented 65% of associations interviewed, with 12 and 8 respondents speaking with regard to these fisheries respectively. Given the broad range of associations interviewed, associations representing other fisheries were too few for meaningful quantitative analysis. Insights about these other fisheries (and with regard to other contextual factors) brought up by respondents in qualitative interviews, were still used, however, as these contribute to a better understanding of the differences in experience and perspectives. Respondents were largely fishermen acting as volunteer executives within the fishermen's association they represented, though some respondents were also hired staff.

3.1. Overall Current & Desired Involvement

Applying the ten-point scale of fishermen involvement in fisheries management, where 1 represented 'no fishermen involvement' and 10 represented 'full involvement or exclusive fishermen responsibility', nearly identical results were found (i.e., just over 4 on the ten-point scale) for both (1) the mean of ratings of current overall fishermen involvement in fisheries management, averaged across all respondents, and (2) the aggregate calculation of overall involvement (i.e., the mean (across all respondents) of the mean (across the six management categories) rating of current fishermen involvement in management). The mean rating of desired overall fishermen involvement, and the mean

of the desired score, averaged across management categories, were also similar to one another at 7.6 and 7.0 respectively (Figure 1).

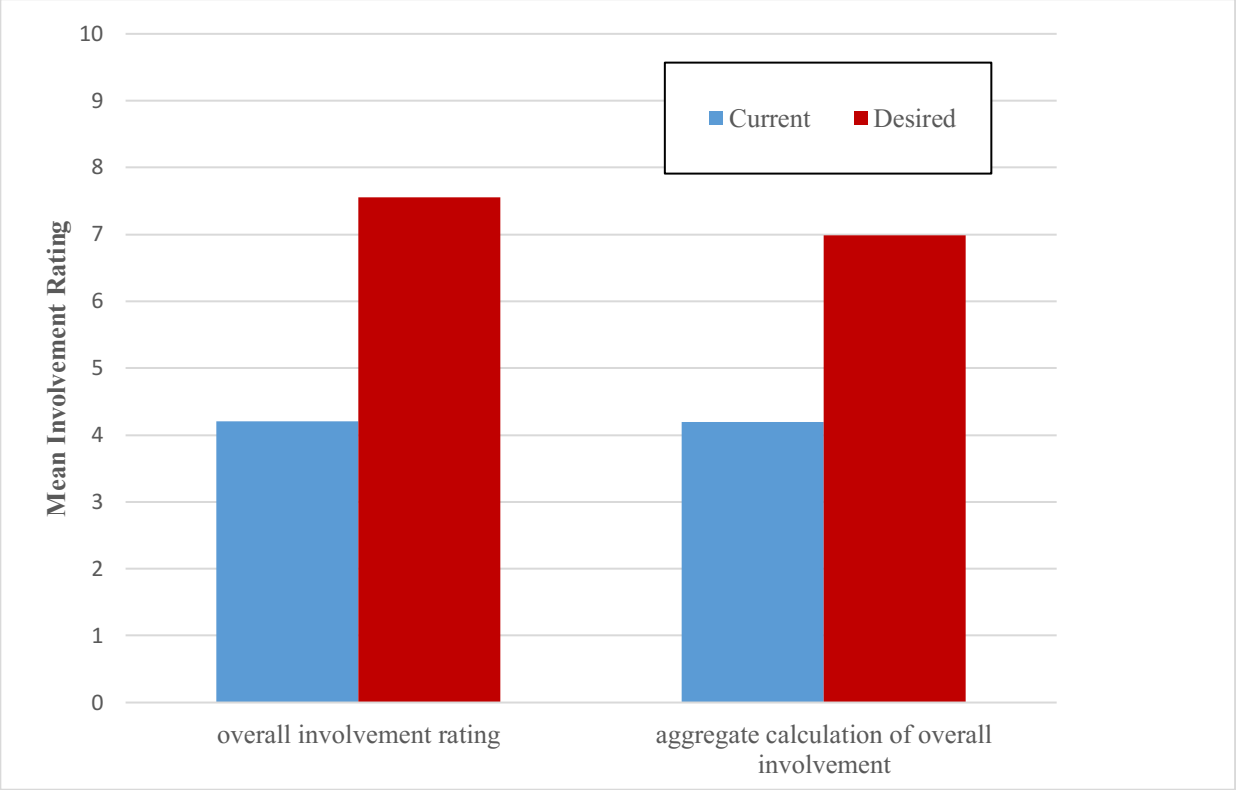


Figure 1: Mean score for perceived current and desired involvement in fisheries management overall – all associations (n=27)

Though fishermen gave widely variable involvement ratings, suggesting a significant difference in experience of, and desire for, involvement between respondents, results indicate a general desire for greater involvement in fisheries management overall. Using the difference between the desired involvement and the current involvement ratings as a measure of dissatisfaction, varying degrees of dissatisfaction were found among respondents. Overall, however, 93% of respondents rated their desired involvement higher than their current levels, with the remaining respondents (n=3) expressing satisfaction with their current levels. Some wished for sole fishermen responsibility, expressing a desire for full devolution of fisheries management authority to fishermen – even though generally recognizing that this is not feasible or likely to occur. The majority

of respondents, however, expressed the need or the desire for a greater sharing of power than they presently experience, whereby the government and industry would share in management, often with the suggestion that the government be given oversight and generally play a more supportive or facilitative role.

An assessment of fishermen involvement in fisheries management overall provides only a limited picture of the nature of either current or desired involvement, since the question remains as to where involvement is taking place, or should take place, among the multitude of management tasks. The roles played by government and industry in the decision-making process, and the type of management tasks fishermen are granted, or are able take on, speaks to the quality – i.e., nature and extent, of 'co-management' in place (Mazur, 2010). These complexities are addressed in the following section.

3.2. Qualifying Involvement: Involvement by Management Category

There are many different functions inherent in fisheries management, falling into a range of management categories. A review of fisheries management literature highlighted the following six management categories: 1) **direction-setting, planning and policy development**; 2) **harvest management**; 3) **compliance and enforcement**; 4) **ecosystem stewardship, conservation and enhablitation**; 5) **research**; and 6) **organizational management and development** (Table 1). (List adapted from Pinkerton & Weinstein, 1995; Graham et al., 2006). Analysis of current and desired fishermen involvement across these management categories, as perceived by respondents (Figure 2), showed mean current involvement to be highest in the category of **organizational management and development** (5.3 on the 10-point scale), followed closely by **harvest management** (5.0). **Compliance and enforcement** was the management category with lowest mean current involvement (3.0).

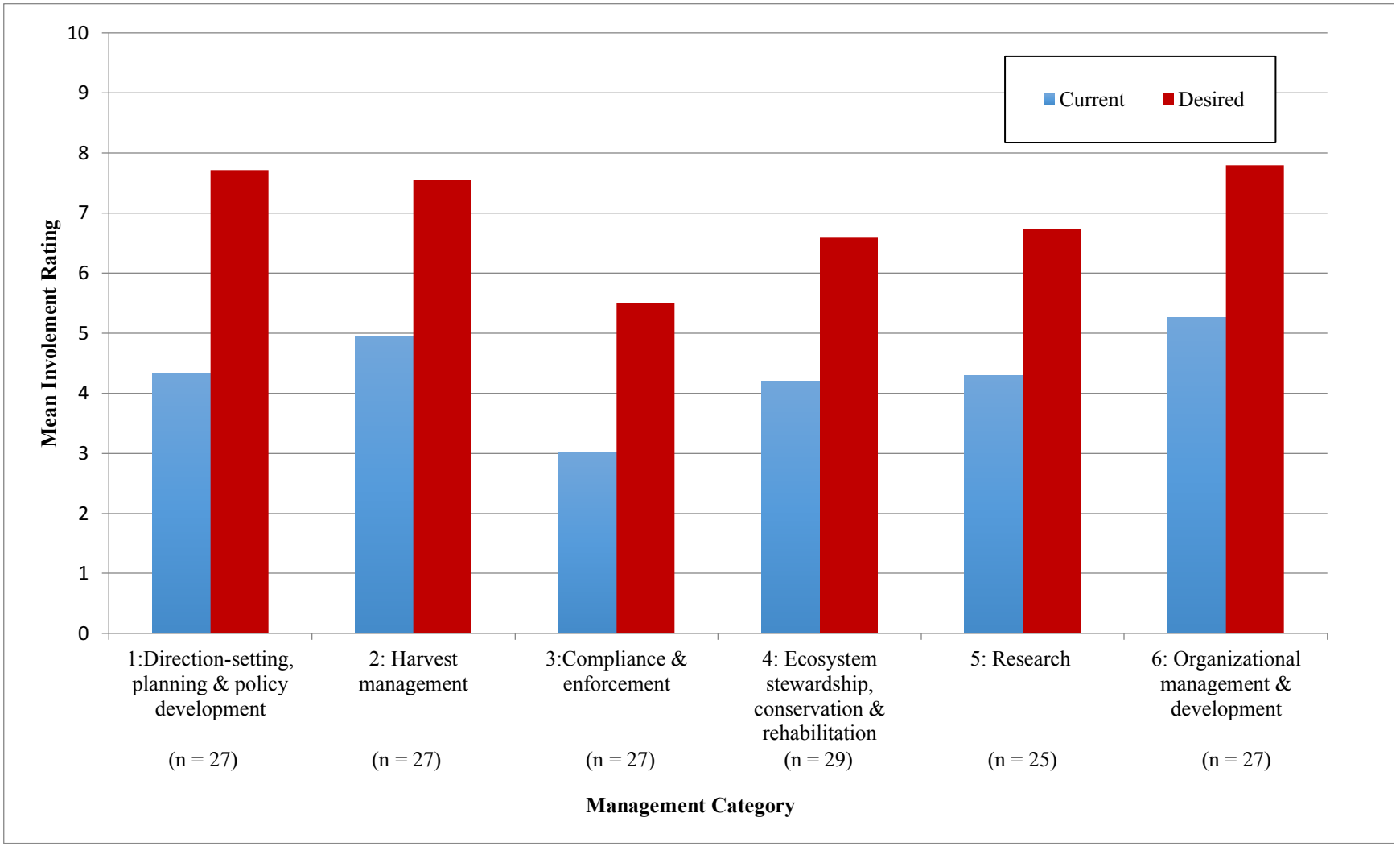


Figure 2: Mean score for perceived current and desired involvement in fisheries management by management category – all associations

Variation in mean desired involvement between management categories was again relatively small, with **organizational management and development** again scoring highest (7.8), followed closely by **direction-setting, planning and policy development** (7.7) and **harvest management** (7.6). Desired involvement in **research** and **ecosystem stewardship, conservation and rehabilitation** scored similarly at 6.7 and 6.6, respectively. **Compliance and enforcement** was again lowest, with a mean desired involvement rating of 5.5.

While the difference between a given respondent's current and desired involvement ratings was seen to indicate their level of dissatisfaction with the extent of their current involvement, the gap between mean desired and mean current involvement offers insight into the unrealized potential for engagement more broadly. Whereas a few respondents had a desired involvement below their current level, for select management categories, the mean difference between current and desired ratings were in all cases positive (Figure 3), indicating a general desire for greater involvement in all management categories. This 'engagement gap' was remarkably similar between management categories, lying within the range of 2.3 to 2.6 for all categories, with the exception of **direction-setting, planning and policy development**, which stood out as having a slightly larger engagement gap (mean difference between current and desired involvement ratings at 3.4).

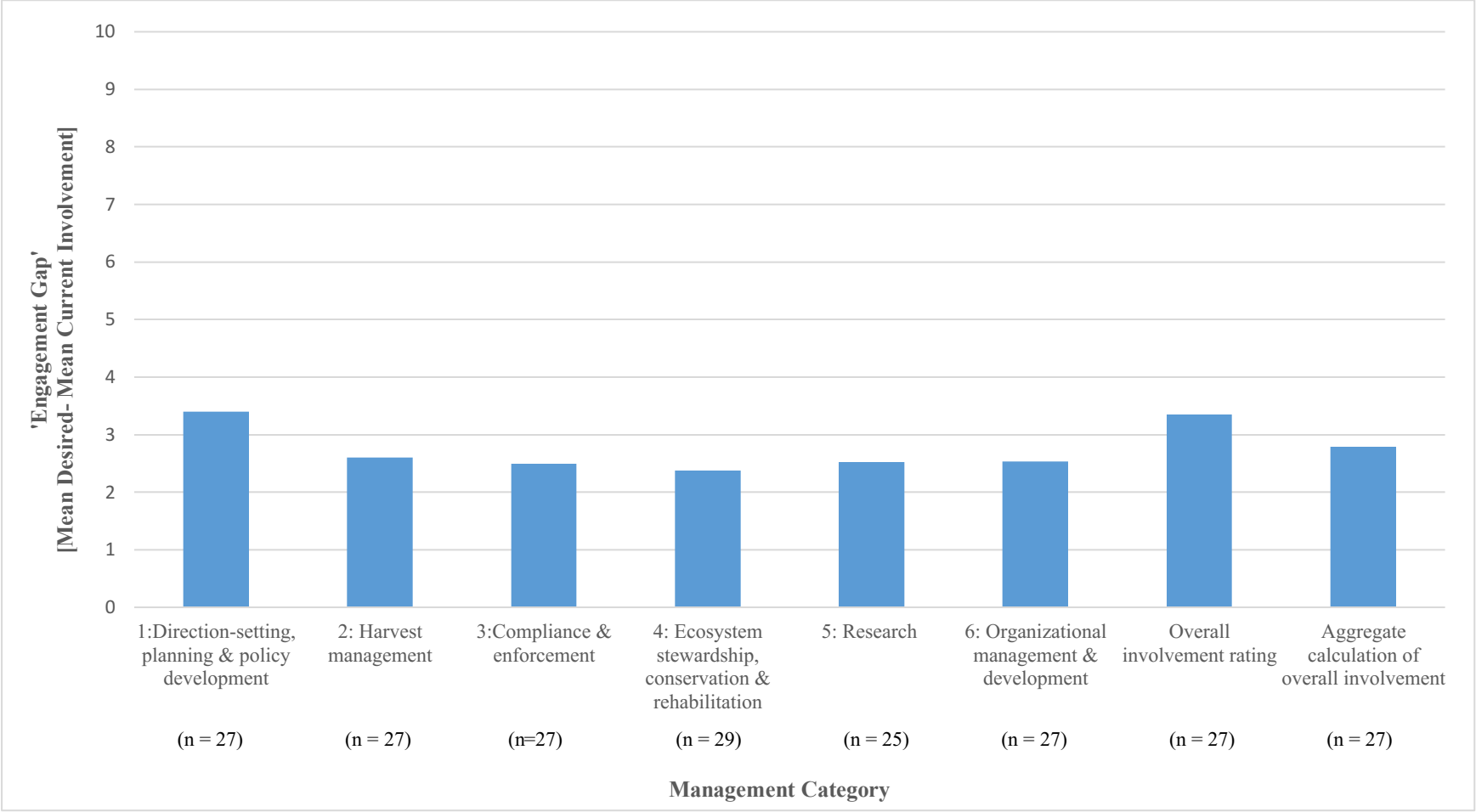


Figure 3: Engagement gap (i.e., mean difference between current and desired involvement) in fisheries management overall and by management category – all associations

While the 'engagement gap' can be seen to indicate an overall readiness and willingness on the part of respondents for their associations to take on a larger role in fisheries management, the similar gap size across management categories raises the question as to whether this gap might also represent an underlying psychological phenomena – i.e., an ongoing desire for greater involvement regardless of current levels. Since respondents' involvement ratings reflect a snap-shot of their constructed reality based on how it is currently perceived and experienced, rather than a static end-truth (Mertens, 2005; Creswell, 2003; Mackenzie & Knipe, 2006), one might also expect that their 'ideal' (i.e., desired) levels of involvement, as stated, might shift with changes in context, including changes in 'current' involvement. Desired involvement, for example, may be constrained by the limits of what respondents feel their associations would be able to take on. The achievement of greater involvement may also affect awareness of its benefits. As Borrini-Feyerabend et al**.** (2000) write: "While co-management plans and agreements are being implemented, the people with access to the natural resources generally develop a heightened sense of responsibility and legitimacy of their role" (p.59), suggesting that with increased involvement, fishermen may feel empowered to take on more.

Co-management is increasingly seen as an adaptive management approach (Cundill & Fabricius, 2009; Fabricius & Currie, 2015; Stringer, Dougill, Fraser, Hubacek, Prell, & Reed, 2006; Plummer, Armitage, & de Löe, 2013; Plummer, 2009, among others). Defined as "an ongoing process that allows stakeholders to share responsibility within a system where they can explore their objectives, find common ground, learn from their institutions and practices, and adapt and modify them for subsequent cycles" (Fabricius & Currie, 2015, p.148), adaptive co-management emphasizes the importance of 'learning by doing' and the importance of "adopt(ing) a 'soft systems' approach (Checkland, 2000) which allows objectives to shift and be re-defined as stakeholders become more aware of the complexities, their common interests and their differences (Cundill, Cumming, Biggs, & Fabricius, 2012)" (Fabricius & Currie, 2015, p.152). Thus, while a greater understanding of desired levels of involvement, as it is currently conceptualized, and the consequent unrealized potential for engagement is a useful tool in the formulation, and direction, of strategies for enhanced fishermen involvement, it is important to recognize

that "co-management is by nature a dynamic and iterative system (…) in which the parties and their relative influence, positions and activities are continuously re-adjusted" (Carlsson & Berkes, 2005, p.67).

Priority for involvement rankings for each management category (Table 2) show **harvest management** to be the management category most frequently ranked as being of greatest priority for involvement (with 57% of the respondents who ranked their order of priority for fishermen involvement in this category citing involvement in **harvest management** as top priority), followed by involvement in **organizational management and development** and **direction-setting, planning and policy development** (with 44% and 42% of those responding ranking these categories as being of top priority, respectively). Involvement in **direction-setting, planning and policy development**, however, received higher priority rankings more consistently, with 81% of those responding ranking this category within the top three priority areas for involvement (93% for **harvest management**). Perceived priority for involvement in **organizational management and development**, on the other hand, was more spread out, with only 60% of those responding ranking this category to be among the top three areas of priority for involvement, comparable with the ranking spread for priority for involvement in research (with 68% ranking it among the top three). At the other end, **compliance and enforcement** and **ecosystem stewardship, conservation and rehablitation** ranked lowest in priority, with **compliance and enforcement** most frequently ranking lowest in priority (29%), but both ranking among the bottom three categories with similar frequency.

Table 2: Fishermen's association representatives' ranking of order of priority for fishermen involvement in fisheries management by management category – all associations (n=31).

MANAGEMENT CATEGORY / RANKING	1: Direction-setting, planning and policy development	2: Harvest management	3: Compliance & enforcement	4: Ecosystem conservation, rehabilitation & stewardship	5: Research	6: Organizational management & development
1	42%	57%	21%	25%	32%	44%
2	35%	21%	3%	13%	16%	4%
3	4%	14%	24%	8%	20%	12%
4	4%	7%	10%	8%	12%	20%
5	0%	0%	14%	33%	12%	4%
6	15%	0%	28%	13%	8%	16%
N	26	28	29	24	25	25

	1	2	3	4	5	6
1&2	77%	79%	24%	38%	48%	48%
3&4	8%	21%	34%	17%	32%	32%
5&6	15%	0%	41%	46%	20%	20%
N	26	28	29	24	25	25

	1	2	3	4	5	6
Sum (1,2,3)	81%	93%	48%	46%	68%	60%
Sum (3,4,5)	19%	7%	52%	54%	32%	40%
N	26	28	29	24	25	25

Note:

- Values represent (valid) percentage of respondents giving a certain rank for each category (i.e., excluding those who did not respond). 1 represents greatest priority.
- Not all respondents felt able to rank all categories, resulting in difference sample sizes (n) between management categories.
- Some respondents felt certain management categories to be equal in priority. Ties between management categories were permitted.

While variation in mean current and desired involvement between management categories was relatively small, these results, when combined with the qualitative explanation of rating responses and priority rankings, demonstrate that both current and desired levels of fishermen involvement across the different aspects of fisheries management is not uniform. The following explores these differences and attempts to obtain a better picture of the story behind the numbers, by looking at the perspectives and experience, offered through interview results, which shaped respondent's responses.

3.2.1. Analysis of Differences among Management Categories

Organizational management and development

Findings show that, overall, representatives of fishermen's associations see fishermen to be currently most involved in **organizational management and development** (5.3) (Figure 2). Respondents widely recognized the need for good organizational management and development in order to participate effectively in the various aspects of fisheries management, with this category also receiving the highest mean scores for desired involvement (7.8). As Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association, put it: "**It's huge. Without that you have no capacity to be involved in any of the rest of them** (i.e., other management categories)." However organizational management and development scoring highest in current involvement did not always correlate with significant organizational capacity within the organizations, but rather often spoke to the fact that responsibility for management functions within this category tends to lie almost exclusively in the hands of fishermen.

Though some associations expressed that they are actively engaged in trying to develop and strengthen their organization, for example, through educating and engaging their membership on fisheries management issues, a representative of the Gulf of NS Bonafide Fishermen's Association mentioned that, by and large, **"there is nothing being done in this area by anyone"** (i.e., government or fishermen). Many respondents conveyed the desire for higher involvement in organizational management and development than they currently possess, but often felt caught in a catch-22, whereby an initial lack of capacity

restricted their ability to invest in organizational management and development and to increase their organizational capacity:

> I'd like to see it (involvement) higher. I mean we try to do a lot of stuff, but once again it just comes down to time. A lot of times we try to have a meeting and the guys are out on the water... Time and money. I mean, there's some things that we could do if we had a little more money to help the guys out (Don Hart, president of the Halifax West Commercial Fishermen's Association).

Some respondents, such as the president of the Area 19 Snow Crab Fisherman's Association, were happy with the government staying out of their association's management and development. However, several felt that the DFO should play a larger role in supporting fishermen's associations in growing their capacity for meaningful involvement in fisheries management:

> I think, from the management side, it's DFO's responsibility to start creating that culture. (office assistant of the Gulf of NS Bonafide Fishermen's Association)

While very few respondents expressed a desire for lower involvement than they currently possess, an exception was the Gulf of NS Fishermen's Coalition, whose respondent rated their desired involvement well below their current levels, which he saw as 'full fishermen responsibility,' expressing the sentiment that "**DFO could do a lot more in bringing associations together on common fronts.**" These perspectives help justify the lower priority for involvement rankings given by some respondents to **organizational management and development** versus other categories (Table 2), despite the widespread view of its fundamental importance.

Harvest management

Many of the fisheries management decisions in which respondents expressed the greatest desire for involvement pertained to functions of **harvest management**. Of the six fisheries management categories looked at, **harvest management** most frequently ranked highest in terms of priority for fishermen involvement (Table 2) and rated second highest for current involvement (5.0) (Figure 2), suggesting that this is also an aspect of fisheries management where involvement is perhaps more easily achieved.

According to Nielsen et al. (2004), the practical application of co-management has, by and large, focused on increasing fishermen involvement in implementation aspects of fisheries management. **Harvest management** is focused on the practicalities of fisheries operations with regard to 'how the fishery is run' – i.e., "planning and overseeing the capture of fish and other marine species, and involves planning how, when, and how much is harvested, as well as monitoring the fishery" as opposed to "the larger management goals established in the fisheries management planning process" (Graham et al., 2006, p.51). A number of respondents noted having been able to achieve significant involvement in a variety of **harvest management** functions, including monitoring and assessing stock status and determining harvest limits for their fishery, within certain government constraints. Flexibility in the opening and closing of fishing seasons was also described by a number of respondents as largely possible, as well as managing harvest by regulating the number of daily hauls permitted, or days per week that fishing is permitted to take place, and taking part in initiatives aimed at protecting stocks and regulating size limits of the catch.

Harvest management "directly affects how and when people fish", and therefore has an immediate "impact on local incomes and livelihoods" (Graham et al., 2006, p.51). As such, it is not surprising that many respondents felt involvement in this category to be of particular importance. Mean desired involvement within this management category was similar to that in **organizational management and development** as well as **direction-setting, planning and policy development**. However, **harvest management** ranked higher in terms of priority for fishermen involvement (Table 2).

Direction-setting, planning and policy development

While mean desired involvement in **direction-setting, planning and policy development** was on par with that in the above mentioned management categories, the mean current involvement level in this category was lower (4.3) and very similar to the mean current involvement in **ecosystem stewardship, conservation and rehabilitation** as well as **research** functions of fisheries management (Figure 2). Current levels were also higher

than might have been expected based on what was heard from qualitative responses. Some respondents were relatively satisfied with their role in **direction-setting, planning and policy development**, expressing the sentiment that as long as their input was reasonable they felt it to be well-received by the DFO, within the limits of what was possible within the current co-management framework. However, most respondents questioned how meaningful their involvement in **direction-setting, planning and policy development** was and whether a 'seat at the table' had any impact on whether their voices were being heard when it comes to defining fisheries policy or management objectives, particularly where any decisions made through the consultation process are merely passed on as recommendations over which the Minister has full discretion.

Many respondents, even among those who rated their current involvement as relatively high, voiced a sentiment to the effect that there is no meaningful involvement in this category. This perspective is highlighted in the following statements:

> We have zero input (in developing policy). When we go to these advisory meetings, if you'll say what they want you to say, they'll agree with you. They'll agree with the person they want to agree with, so I don't know what it serves to have fishermen around the table (Ron Wolkins, president of the Southwest Fishermen's Rights Association).

> We are involved in that we do attend all the meetings… but, do they actually listen to us? (…) They're going to do what they're going to do (Nellie Baker-Stevens, coordinator of the Eastern Shore Fishermen's Protective Association).

> How effective are we in setting policy? We don't set policy. DFO does and we react to it, we adjust to it. We live with it and in some cases if it's an issue we can't live with, we fight it after the fact. We have very little influence prior (…) The way the process (co-management system with the DFO) works, is we're given the information – this is what's happened, this is what's going to happen… And our response is – what can we do to change that decision or at least make it so that we can live with it? But it's not that the Department consults with Industry then makes the decision. That doesn't happen. What happens is they deliver policy or management decisions, and you react on the level of capacity that you have to react (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association).

Alongside the desire to be included in decision-making 'prior to, rather than after the fact' and have their voices integrated into decisions being made, there was a common desire for greater involvement in **direction setting and policy development** at the local scale, as well as greater satisfaction with involvement in this category when considered at this level.

While remarkably similar between management categories, the engagement gap (as calculated by the difference between mean desired and mean current involvement) was somewhat larger with regard to involvement in **direction-setting, planning and policy development** (3.4) (Figure 3). **Direction-setting, planning and policy development** was also significantly more likely than other categories, after **harvest management**, to rank among the top three management categories in terms of priority for fishermen involvement in fisheries management (Table 2). These results suggest that greater involvement in this aspect of fisheries management, while widely regarded as being particularly difficult to achieve, may be an important area of focus for improvement, if the co-management approach is to hold much credibility with fishermen.

Nielsen et al. (2004) describes how in much of the world "the practical adaptation by governments of the co-management approach has most often been limited to involving fishing communities in the implementation process," (p.154) through what he terms an "instrumental co-management" approach, whereby "governments have generally not perceived co-management as a means to introduce more democratic principles into fisheries management, but have recognized co-management as an instrument to reach its management objectives more efficiently" (p.154). The perspectives and experience of those Nova Scotian fishermen's association representatives interviewed echoed this finding. Many respondents communicated that, while many fisheries management responsibilities (and costs) are being downloaded onto fishermen's associations, "**the government is still running the show**" (Ashton Spinney, president of the LFA District 34 Lobster Management Board), and that in these aspects of fisheries management the top-down command and control structure of conventional fisheries management remains the

norm, making any real co-management impossible. As Dick Stewart, manager of the Full Bay Scallop Association, put it:

> Co-management is just a buzz word from Ottawa and doesn't mean much. There are areas where we have fairly well established fisheries that have meaningful input but when it gets down to the nitty gritty… We generally get the cost of doing it (i.e., fisheries management) but they still have all the power (Dick Stewart, manager of the Full Bay Scallop Association).

As fishermen have gained greater influence in other aspects of fisheries management, the lack of felt involvement in **direction-setting, planning and policy development** may become even more striking, as expectations of what 'co-management' should mean are not met. Respondents' comments regarding the actual and potential benefits of co-management often emphasized the empowerment of fishermen and fishing communities by giving them a mechanism to shape their own future through greater industry autonomy. However, when the reality of the 'co-management' approach in place is felt to be a downloading of costs without the 'institutional reform' required for genuine participation in defining policy and management objectives, fishermen are left frustrated and with the overarching feeling that so-called co-management is just another form of 'business as usual' (Nielsen et al., 2004).

Ecosystem stewardship, conservation and rehablitation

Current and desired involvement in **ecosystem stewardship, conservation and rehablitation** (4.2; 6.6) and **research** (4.3; 6.7) functions of fisheries management rated very similarly to one another (Figure 2). **Ecosystem stewardship, conservation and rehablitation**, however, despite being widely regarded as of critical importance for the continued health of the fisheries as well as to the livelihoods of the fishing communities most immediately and directly affected by their health, was frequently ranked low, and consistently lower than **research**, in terms of priority for fishermen involvement (Table 2). Lower priority for involvement in **ecosystem stewardship, conservation and rehablitation**, relative to other management categories, was not, however, indicative of a lack of concern for conservation. Rather, qualitative responses highlighted a general desire for the government to invest more in this category, as well as the feeling that

significant work on behalf of associations is already in place, or that such work is not necessary, given the current health of stocks, or not possible, due to the ecology of targeted species or harvest technology used.

While a number of respondents spoke of significant local initiatives, often largely self-funded and developed independently of DFO, to rehabilitate or strengthen stocks, the question of who should be paying for conservation and rehabilitation initiatives was also raised. Feeling the DFO to be too hands-off in this category and not financially supportive enough of **ecosystem stewardship, conservation and rehablitation** initiatives, three respondents actually wanted less involvement than they currently have. As Wiber, Berkes, Charles, and Kearney (2004) note, "major equity issues arise when the profits and benefits of large-scale activities accrue to limited segments of society while costs are imposed on local societies and the environment" (p.4). The desire to be involved in **ecosystem stewardship, conservation and rehablitation** was, at times, tempered by resentment over this inequity (i.e., feeling fishermen should not be the ones responsible for these tasks when, by and large, they have not been the ones causing the need).

Further, the question of the possible effectiveness of fishermen's associations in grappling with many conservation and rehabilitation issues was raised by a number of respondents and affected desired levels of involvement in this category. Many felt these issues to be often beyond the scope of their meaningful influence, particularly in the face of industry power differentials whereby the government is seen to be too often following the agenda of the larger-scale, more mechanized, industrial fishing enterprises, which were felt not only to be responsible for much of the ecological damage in the first place, but also more financially able to take on conservation and rehabilitation initiatives.

Research

While current involvement in **research** was rated similarly to that of **ecosystem stewardship, conservation and rehablitation** (Figure 2), involvement in **research** aspects of fisheries management ranked higher in terms of priority for fishermen involvement (Table 2). Many respondents referenced DFO being increasingly limited in its budget for research and industry needing to take it on themselves to ever greater degrees. While

most expressed a willingness, even the desire, for their associations to take on these roles, the capacity to do so was not always there.

> Fishermen are willing to participate in research and science to the fullest extent that they can. The only thing is cost. Yeah, they keep downloading and downloading more and more of the cost of everything. As long as we can pay and as long as it's a gain, we don't mind (chair of the Gulf of Nova Scotia Herring Federation).

Some associations, such as Guysborough County Inshore Fishermen's Association, have developed considerable capacity to take on a large amount of research, through projects that the association either partners on or directly coordinates and conducts.

> We have a marine lab and a hired lobster technician… We do studies with the DFO biologists, we collect all the data, do the analysis here in our lab. Our lobster tech then gives it to the Department of Fisheries. We put all that information together (…) The DFO is involved in some aspects of the project – their biologist is involved, but they don't initiate the projects. They do contribute but not financially. They're our projects; they're our questions. They use some of our data to suffice what they're required to do for research. And we share it with them free of charge (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association).

However, their success is far from the norm. More typically, associations will pay for, or contribute towards, and conduct data collection, either their own or work done to the protocols set out by the DFO. Data are then given to DFO which typically analyzes and interprets that data and incorporates the results into management plans and/or presents the results at the regional advisory process, as they see fit (personal communication, office assistant of the Gulf of NS Bonafide Fishermen's Association).

As many representatives of various associations noted, it is a very expensive proposition to undertake science. Qualitative interview data highlighted that many respondents wanting greater fishermen involvement in **research** limited what they gave as their desired level of involvement as a result of the financial costs that would be associated with taking on a larger role. Kevin Squires, president of the MFU local 6, rating both current and desired involvement in this category as very low, spoke of there being

interest, but simply not enough cash to go around to take on this work. This sentiment was widely echoed, with one respondent considering their association and membership as wanting less involvement than they currently possess, largely out of a lack of capacity to do more. As George Zinck, president of the Prospect Area Full Time Fishermen's Association, stated:

> We're good right now where we are (with re. involvement). I think we're at the point where we're doing as much as we can do, and still be able to do the other things we have to do (George Zinck, president of the Prospect Area Full Time Fishermen's Association).

A number of respondents also voiced the sentiment that **"information fom the fishermen isn't really solicited, in terms of what fishermen have observed**" (Hubert Saulnier, president of the MFU local 9), nor did some respondents feel their input to be particularly well received, making them ill-inclined to invest themselves in this aspect of fisheries co-management.

Qualitative interview data highlighted a lack of faith in government science on behalf of many respondents. The feeling that management decisions are too often made on unsound data, however, has spurred many associations to take on as much research themselves as they are capable of, to make up for the what was widely perceived as inadequate government research being done. As Harold Berry, director of the Yarmouth County Fixed Gear Association, stated:

> The federal government is withholding a lot of funding, and unfortunately a lot of the groups (i.e., fishermen's associations) just aren't in a position to take over some of the stuff that's being downloaded onto them. At the end of the day, however, it seems like the smaller groups, whether it be lobster, groundfish, or herring, they're just gonna have to pick up a bigger portion of science because, if not, I suspect there will be very little science done (Harold Berry, director of the Yarmouth County Fixed Gear Association).

Many respondents echoed findings in the literature that "research is not only about acquiring information – it is also about empowerment, transformation and changing the status quo" (Graham et al**.,** 2006, p.68). As fishermen become more involved in research,

they become more able to shape the type of questions asked; ensure that their knowledge and insights are taken into account; and maintain ownership over, and better understanding of the information it garners, which can, in turn, give them a stronger voice in other aspects of fisheries co-management (Chuenpagdee, Fraga, & Euán-Avila, 2004; Wiber, Charles, Kearney, & Berkes, 2009).

Compliance and enforcement

Compliance and enforcement rated lowest for both mean current (3.0) and desired (5.5) involvement (Figure 2), however the engagement gap in this category was on-par with that in most other management categories (Figure 3), indicating that most respondents still desire greater involvement in this category than is currently experienced. Qualitative data, however, highlighted that the wish for a greater role in this category pertained only to certain management functions. Respondents, representing almost all fisheries, conveyed a desire for greater input in developing fishing rules and bylaws, a role widely felt to be effectively non-existent. Echoing arguments seen in the co-management literature (Hilborn, Orensanz, & Parma, 2005; Pinkerton & John, 2008), many voiced the sentiment that greater fishermen ownership of decisions made would result in greater support for fishing rules and regulations and consequently enhance voluntary compliance.

> When you (i.e., the gov't) just restrict, and say this is the hard line (…) that's where we run into problems. I think we have very little flexibility there. It comes down from a high-up level, says 'this is what you're gonna do', and then hands it down to us. So you're not involved in the process. You're only involved in the aftermath of the process. You may change it a little, but probably not enough to make it as effective as it well should be (Gary Dedrick, president of the Shelbourne County Quota Group).

All respondents conveyed recognition of the need for good enforcement. However, by and large, they did not want to be the ones policing and enforcing regulations and bylaws, many expressing an aversion to 'squealing,' or imposing laws on their neighbours, though some associations have willingly taken on a significant degree of self-policing. Instead, most voiced frustration at insufficient government commitment towards satisfactorily carrying out what they saw to be the government's role.

> The government's not investing in this… That's the biggest issue. They download it, they cut their budget so thin that they aren't able to do the job (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association).

> We want our resource protected. The fishermen complain that they don't see the fishery officers. They expect to see them more on the wharfs talking to them, checking them out. They want that, because that protects the resource; that looks after them (Nellie Baker-Stevens, coordinator of the Eastern Shore Fishermen's Protective Association).

Several respondents raised the issue of there being insufficient enforcement on the water or at the docks, with several voicing the frustration that even when they do inform on infractions, it is a wasted effort as those in violation of the rules are rarely caught.

> They (the DFO) are closing enforcement offices, which means that if there is an enforcement issue they (enforcement officers) may have to travel up to 2 hours to get there… The fish are going to have been cooked and eaten and digested before the fishery officer gets there. There's almost no point in them coming (Harold Berry, director of the Yarmouth County Fixed Gear Association).

Others complained that, if caught, the penalties for non-compliance are not often enforced or are not sufficiently severe.

Despite the expressed desire for a greater role in this category, **compliance and enforcement** ranked the lowest of the six management categories looked at in terms of priority for fishermen involvement (Table 2), indicating that involvement in these aspects of fisheries management are felt to be of less importance than in other categories. What was generally felt to be more important to fishermen is that the government, which was largely felt to be passing off enforcement to industry, so as to make up for a lack of funds and manpower, satisfy their role in this category more successfully.

3.3. Comparing Involvement Between Fisheries

Relative levels of perceived fishermen involvement across management categories varied by fishery. Of the two fisheries focused on in this study, representatives of lobster associations, on average, rated their current involvement in fisheries management higher than those representing groundfish associations, across all management categories with the exception of **compliance and enforcement**, regarding which groundfish associations rated their involvement slightly above that of lobster associations (Figure 4). The largest difference between fisheries in current involvement can be seen in the categories of **organizational management and development** and **ecosystem stewardship, conservation and rehablitation**, followed by **research**, with mean current involvement for lobster associations receiving considerably higher current involvement ratings than groundfish associations in these categories.

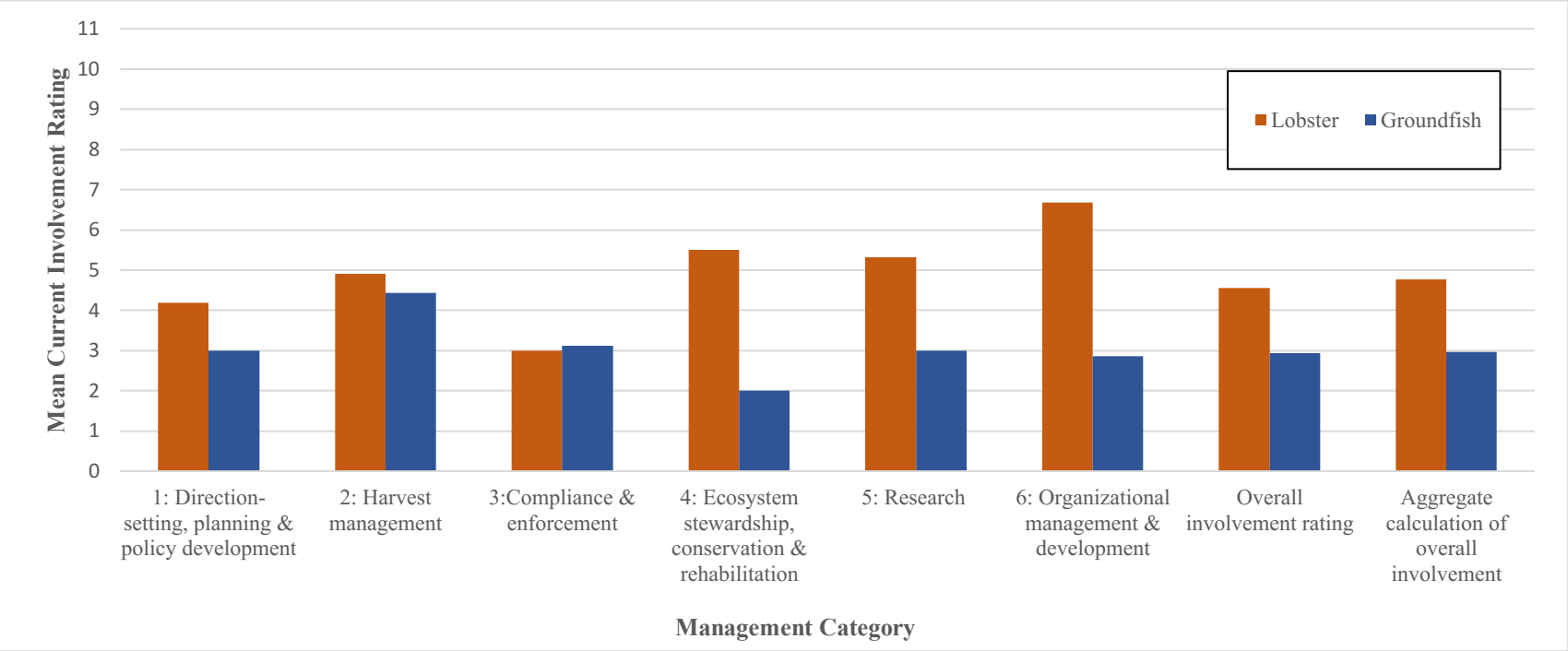


Figure 4: Mean perceived current involvement ranking by fishery (lobster and groundfish) and management category and in fisheries management overall.

Management Category	1: Direction-setting, planning & policy development		2: Harvest management		3: Compliance & Enforcement		4: Ecosystem stewardship, conservation & rehabilitation		5: Research		6: Organizational management & development		Overall rating		Overall – aggregate	
Fishery	L	G	L	G	L	G	L	G	L	G	L	G	L	G	L	G
N	11	8	11	8	10	8	11	8	11	6	11	7	10	8	10	8

Desired involvement across management categories was much more similar between the two fisheries (Figure 5), with lobster associations, on average, expressing a greater desire than groundfish associations in **direction-setting, planning and policy development**, **harvest management**, and **organizational management and development**, and less than groundfish associations in the categories of **compliance and enforcement** and **ecosystem stewardship, conservation and rehabilitation**. Mean desired involvement in **research** was equal in the two fisheries.

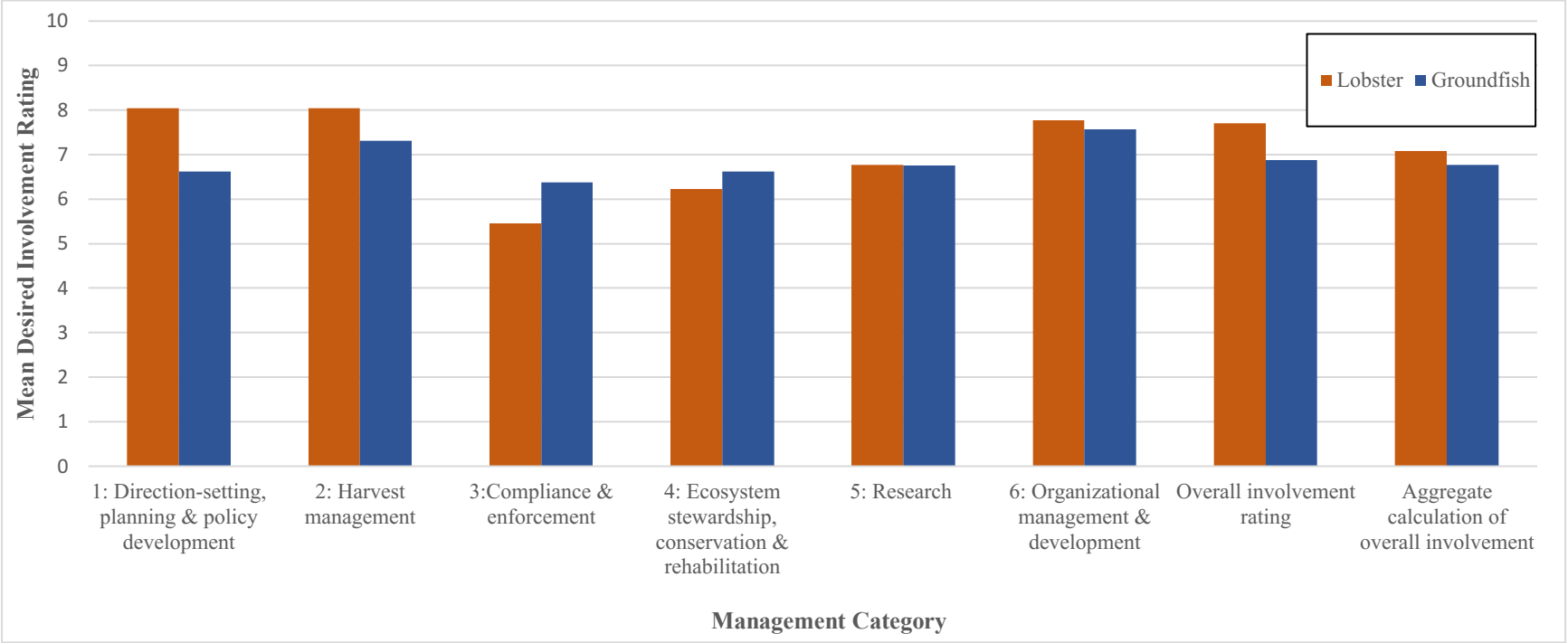


Figure 5: Mean perceived desired involvement by fishery [lobster (L) and groundfish (G)] and management category and in fisheries management overall.

Management Category	1: Direction-setting, planning & policy development		2: Harvest management		3: Compliance & Enforcement		4: Ecosystem stewardship, conservation & rehabilitation		5: Research		6: Organizational management & development		Overall rating		Overall – aggregate	
Fishery	L	G	L	G	L	G	L	G	L	G	L	G	L	G	L	G
N	11	8	11	8	10	8	11	8	11	6	11	7	10	8	10	8

The unrealized potential for engagement, or 'engagement gap' (as calculated by the difference between mean current and mean desired involvement ratings) (Figure 6), was greatest for groundfish associations in all categories except **direction-setting, planning and policy development** and **harvest management**, though the difference between the two fisheries in these categories was quite small. The largest engagement gaps were in the categories of **organizational management and development** and **ecosystem stewardship, conservation and rehabilitation**, followed by **research**. Qualitative responses suggest that the slightly larger engagement gap observed on behalf of lobster associations in **direction-setting, planning and policy development**, despite their having expressed greater current involvement in this and nearly all aspects of fisheries management, may be partially explained by their having achieved a comparatively greater voice and resulting increased awareness of its benefits. As the above comparison of involvement of all fishermen's associations between management categories highlighted, there was a widespread sense among respondents of frustration with government sharing, or downloading, of fisheries management responsibilities within select management categories only, while largely retaining a command and control approach when it comes to defining policy and management objectives. Lobster associations, having achieved greater involvement in other categories, may be more acutely aware of, and therefore unhappy with, the disparity in power-sharing between management categories. Both lobster and groundfish association representatives ranked **direction-setting, planning and policy development** as being an area of high of priority for fishermen involvement (Table 3).

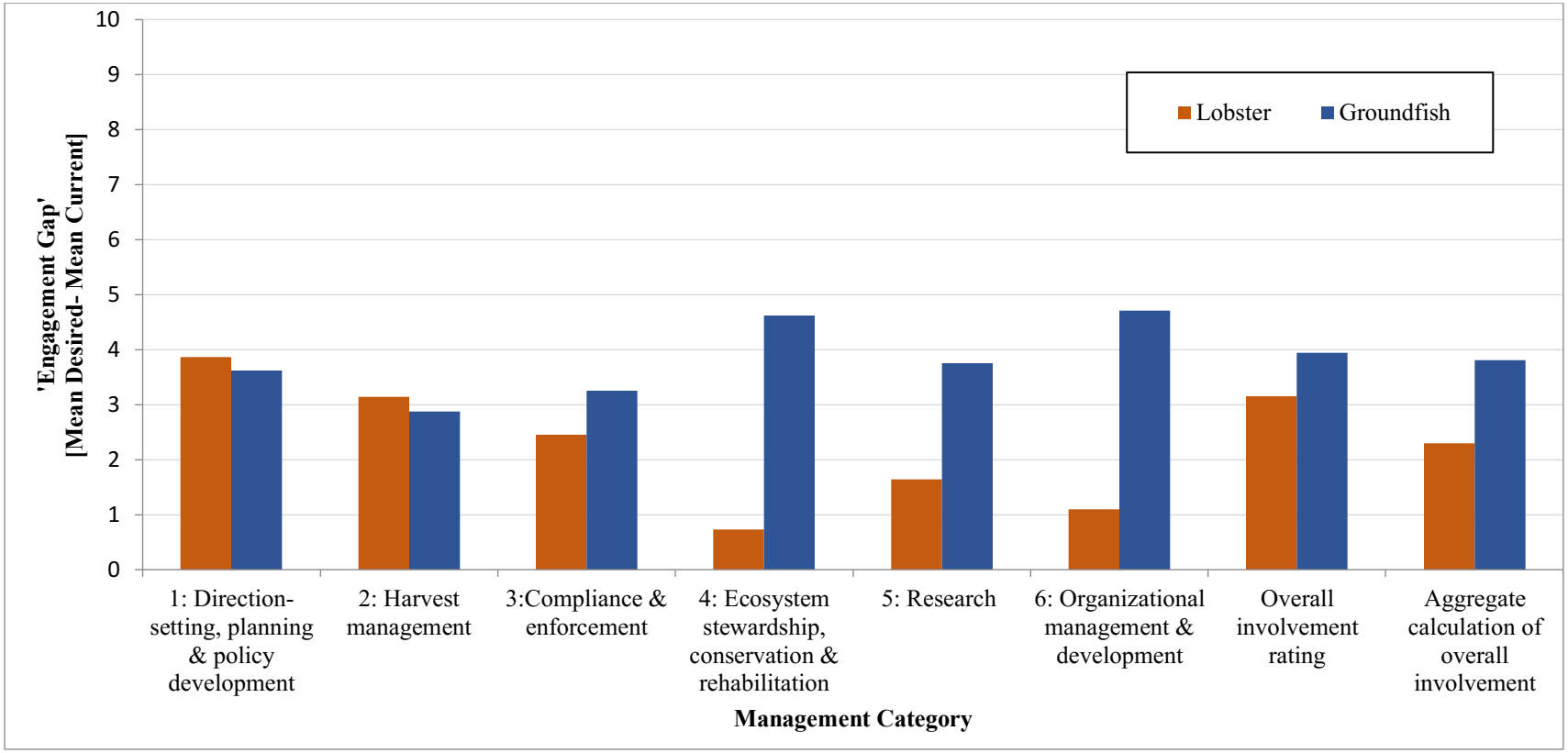


Figure 6: Engagement gap (i.e., difference between mean desired involvement and mean current involvement) in fisheries management by fishery (lobster (L) and groundfish (G)) and management category and in fisheries management overall.

Management Category	1: Direction-setting, planning & policy development		2: Harvest management		3: Compliance & Enforcement		4: Ecosystem stewardship, conservation & rehabilitation		5: Research		6: Organizational management & development		Overall rating		Overall – aggregate	
Fishery	L	G	L	G	L	G	L	G	L	G	L	G	L	G	L	G
N	11	8	11	8	10	8	11	8	11	6	11	7	10	8	10	8

Table 3: Fishermen's association representatives' ranking of priority for fishermen involvement in fisheries management by fishery (groundfish: n=8, and lobster: n=12) and management category.

MANAGEMENT CATEGORY / RANKING	1: Direction-setting, planning and policy development		2: Harvest management		3: Compliance & enforcement		4: Ecosystem conservation, rehabilitation & stewardship		5: Research		6: Organizational management & development	
FISHERY G= groundfish; L= lobster	G	L	G	L	G	L	G	L	G	L	G	L
1	38%	45%	50%	45%	13%	25%	13%	30%	38%	20%	13%	67%
2	25%	27%	25%	18%	0%	0%	13%	20%	25%	10%	0%	8%
3	13%	0%	13%	27%	38%	17%	13%	0%	25%	20%	25%	8%
4	0%	9%	13%	9%	0%	25%	13%	10%	13%	10%	38%	0%
5	0%	0%	0%	0%	38%	0%	38%	40%	0%	30%	0%	0%
6	25%	18%	0%	0%	13%	33%	13%	0%	0%	10%	25%	17%
N	8	11	8	11	8	12	8	10	8	10	8	12

MGMT CATEGORY	1		2		3		4		5		6	
FISHERY	G	L	G	L	G	L	G	L	G	L	G	L
1&2	63%	73%	75%	64%	13%	25%	25%	50%	63%	30%	13%	75%
3&4	13%	9%	25%	36%	38%	42%	25%	10%	38%	30%	63%	8%
5&6	25%	18%	0%	0%	50%	33%	50%	40%	0%	40%	25%	17%
N	8	11	8	11	8	12	8	10	8	10	8	12

MGMT CATEGORY	1		2		3		4		5		6	
FISHERY	G	L	G	L	G	L	G	L	G	L	G	L
Sum (cat 1,2,3)	75%	73%	88%	91%	50%	42%	38%	50%	88%	50%	38%	83%
Sum (cat 3,4,5)	25%	27%	13%	9%	50%	58%	63%	50%	13%	50%	63%	17%
N	8	11	8	11	8	12	8	10	8	10	8	12

Note:

- Values represent (valid) percentage of respondents giving a certain rank for each category (i.e., excluding those who did not respond). 1 represents greatest priority.
- Not all respondents felt able to rank all categories, resulting in difference in sample sizes (n) between management categories.
- Some respondents felt certain management categories to be equal in priority. Ties between management categories were permitted.

Lobster and groundfish association representatives reported similar levels of both current and desired involvement in **harvest management** (though lobster associations had scores slightly higher in both cases), and both ranked fishermen involvement in this category as being of high priority (Table 3). Harvest is managed differently, depending on the fishery in question, though in all cases "harvest management takes place within the context of certain pre-determined catch and/or effort limits" (Graham et al., 2006, p.53) set by government. The inshore lobster fishery is managed by input control, which limits fishing effort whereby a set number of traps are 'attached' to each of a limited number of licenses. Then fishermen can catch as much as they can, within that effort limit, and within their Lobster Fishing Area (LFA) and designated fishing season (DFO, 2011). Each LFA has its own Advisory Committee and management plan, adjusted for local conditions, allowing for a degree of community level management (Charles, 1997; Peacock & Annand, 2008). Areas for harvesting and fishery access, however, are set by government, resulting in some association representatives rating their involvement in harvest management as quite low.

> There's not a lot that can be decided on there. There are small changes in season openings and closings that can be made, but it's (harvest management) largely mandated (Kevin Squires, president of the MFU local 6).

A number of lobster association representatives, however, rated their association's current involvement significantly higher, conveying satisfaction with initiatives developed to regulate harvesting within these constraints. Leonard Leblanc, president of the Gulf of NS Fishermen's Coalition, for example, described their level of involvement as full co-management, speaking of the association having achieved a significant role in monitoring and assessing of stock status through local initiatives.

Lobster associations tended to show a greater degree of acceptance of the current harvest management system. However, despite general satisfaction with how lobster harvest is presently managed, Kevin Squires, president of the MFU local 6, made the important point that satisfaction with management decisions does not necessarily equal satisfaction with ones' involvement in their formulation.

> I think generally speaking people are reasonably happy with the season and the access and these kinds of things. So, in a lot of ways people are happy with the level it's (involvement) is at, because there are no decisions to be made. But in truth you always want those questions to be put to you every year. You might say, 'no, we're happy,' but you've demonstrated your responsibility. We want high involvement, but are not necessarily dissatisfied with how things are currently managed (Kevin Squires, president of the MFU local 6).

The inshore fixed gear <45' groundfish fishery in Atlantic Canada is managed through a community quota approach, whereby each of the eight community management zones established across the province, each representing several fishermen's associations, are managed by a community management board (CMB) (Peacock & Annand, 2008). Community quota, determined by DFO following their stock assessment surveys, is allocated to the CMBs, which then have the autonomy to implement much decision-making on how to harvest the assigned allocation. The eight CMBs have taken variable approaches, with "the harvesting options at the association level ranging from a competitive fishery (by gear type) within an overall quota to an industry-developed and delivered ITQ initiative. Combinations or permutations of these approaches were also used in the other community groups" (Peacock & Annand, 2008, p.106).

Though the mean score of current involvement in **harvest management** was slightly lower for groundfish associations than for those focusing on lobster, qualitative interview data highlighted that representatives of groundfish associations feel their associations to be fairly highly involved in **harvest management** on a local level through these groundfish CMBs. Comparison between the two fisheries also shows that, whereas lobster associations revealed having achieved comparatively greater involvement in a number of other management categories, involvement in **harvest management** is the category in which groundfish associations feel they have achieved the most input (Figure 4). The sentiment voiced by Gary Dedrick, president of the Shelbourne County Quota Group, that "**Once the quota is out, I think that we're kind of home free, and we can do our own thing**" was echoed again by a number of respondents, including Harold Berry, director of the Yarmouth County Fixed Gear Association, who stated: "**Locally, we basically run the whole thing. We either set or control or change these things (re. decisions on how and**

when fishing will take place) on a yearly basis." Others, while similarly noting considerable local level control regarding many harvest management functions, highlighted a lack of involvement at a higher level.

Whereas **harvest management** was most frequently ranked as the category of highest priority for fishermen involvement by groundfish association representatives (Table 3), **harvest management** followed **organizational management and development** as the category of perceived top priority by lobster association representatives, with 67% of those responding ranking involvement in the latter category as being of primary importance (versus 45% in **harvest management**). Rankings show that groundfish association representatives, on the other hand, despite revealing considerable dissatisfaction with current levels of involvement in **organizational management and development**, resulting in a significant engagement gap in this category (Figure 6), view involvement in this category as being of significantly lower priority, with only 13% of groundfish respondents ranking involvement in this category as top priority, and 63% ranking it within the bottom three (Table 3). This difference in prioritization may be partly explained by the differences in current involvement the two fisheries have been able to achieve. Having achieved greater involvement in **organizational management and development**, and most other management categories (Figure 4), lobster association representatives may be more acutely aware of the critical importance of empowering their associations to better participate in co-management of their fisheries and take on various management tasks.

While both lobster and groundfish associations communicated equal desire for involvement in **research**, lobster association representatives cited greater current involvement on behalf of their associations in this category and greater satisfaction with this involvement, resulting in a smaller engagement gap in this category (Figure 4, 6). **Research** was also seen as much lower in terms of priority for fishermen involvement by most lobster associations representatives (Table 3).

Speaking in reference to research that had to be undertaken to support their petition to DFO for changes regarding harvest restrictions based on lobster size, Kevin Squires, president of the MFU local 6, described significant involvement in many functions of **research** on behalf of their members. However, he still rated their involvement as non-existent as this involvement occurs outside DFO's co-management structure.

> We're developing research plans; we're collecting data; we'll be participating in the analysis of the data; because it's publicly funded, the ownership will remain with the public ownership, but there will be (fishermen) management of it. But again… those are essentially outside the co-management structure. DFO doesn't come to the table with an agenda that says what science projects we should undertake and why should we undertake them and how we should undertake them and do you want to be involved. They don't do that; they will use whatever information is available. So, this is an example of our members developing a project and bringing the information to the DFO (Kevin Squires, president of the MFU local 6).

As in this case, such local studies are often used to "help generate support for, or opposition to, proposed management measures (…) Many fishermen and communities also donate time, boats and expertise" to conduct research (Graham et al., 2006, p.52).

Examples of highest involvement in **research** on behalf of groundfish associations were often given in reference to the annual halibut survey, with respondents whose associations have been involved in this conveying great satisfaction with the level of fishermen involvement that has been achieved. The survey was initiated by, and is extensively funded by industry, with each sector group in Nova Scotia voluntarily giving a share of their quota, based on the percentage they receive, into the pot of fish allocated to the survey. The survey is completed by commercial hook and line fishermen (with onboard DFO observers) through the Atlantic Halibut Council (personal communication, Harold Berry, director of the Yarmouth County Fixed Gear Association). "**It's a survey that is done by fishermen, paid for by fishermen, and owned by fishermen**" (Don Hart, president of the Halifax West Commercial Fishermen's Association). As a result, fishermen have great confidence in the results.

> That's real co-management at its finest. You pay, you say… and it's worked very well. We're involved there (in the halibut survey) from the bottom up, and DFO

> needs us, and when they need you, you have more input into what they do. (…) When you raise money, and you have control over the research (…) they have to answer back to you. When government has to answer to the people, that's a different story (…) They have to be accountable (Gary Dedrick, president of the Shelbourne County Quota Group).

Outside of the halibut survey, however, involvement in **research** was often described as quite low. The DFO conducts their stock assessments, typically with government boats and with little input from the harvesters. As a result, many fishermen mistrust the information generated by government scientists and are consequently skeptical of management measures (president of the Upper Bay Scallop Association, personal communication).

> I wish it (involvement) was higher because I think if we had more ownership of more surveys… if we had enough money to hire our own scientists, we could fight DFO side by side. (…) With the halibut survey, we actually own those results and they can say this, but we can say that. So we have a leg to stand on (Don Hart, president of the Halifax West Commercial Fishermen's Association).

Harold Berry, director of the Yarmouth County Fixed Gear Association, talked about wanting to run industry surveys on other species as well. A lot of inshore boats are hook and line boats whereas the DFO tends to conduct their surveys with mobile boats (i.e., draggers). This, he argued, cannot adequately reflect the stocks of species more difficult to catch by mobile harvesting methods, resulting in quota allocation lower than many fishermen think fish stocks can support.

Some groundfish association representatives also spoke about having made efforts to participate in research but, finally giving up, having been ill-received by government. Bill Williams, chair of the Southwest Nova Fixed Gear Association, for example conveyed having paid for and conducted research about their local fisheries and having presented it to DFO, only to have it rejected by government for use in stock assessment and management planning. "**After you do that a couple of times, I mean then why would you bother? So, there hasn't been much involvement in research since then**" (Bill Williams, chair of the Southwest Nova Fixed Gear Association).

While this may be an issue for any fishery, due to challenges associated "with having fishermen's data recognized and used" (Graham et al., 2006, p.52), it highlights a lack of trust, as revealed by many groundfish associations, in government science. That many groundfish fishermen see poor government science, which ignored their local knowledge, as having been largely responsible for the collapse of their fishery 30 years ago might help explain why groundfish associations see their involvement in **research** aspects of fisheries management as such a high priority. Fishermen involvement in **research** was ranked as being of primary importance second most frequently (38% of respondents), after **harvest management** (50%), and ranked on par with **direction-setting, planning and policy development** (Table 3). Involvement in **research** and **harvest management**, however, ranked equally most frequently among the top three areas of priority (88%, respectively), demonstrating the importance placed on involvement in this category by groundfish associations.

With regard to **ecosystem stewardship, conservation and rehablitation** aspects of fisheries management, lobster associations have again attained significantly more involvement than groundfish (Figure 4), and were generally considerably more satisfied with their current level of involvement, resulting in a much smaller engagement gap (i.e., difference between mean current and mean desired involvement ratings) in this category (Figure 6). Lobster associations also more frequently ranked fishermen involvement in this management category as being of higher priority (Table 3). Many respondents felt **ecosystem stewardship, conservation and rehablitation** to be closely linked with **harvest management**, since "**the way you harvest and manage your harvest has a direct effect on conservation and rehablitation**" (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association), and gave examples of regulation of the harvest of egg-bearing females and of lobster outside certain size limits as important conservation measures. Several also spoke of significant local initiatives, often developed independently of DFO, to rehabilitate or strengthen stocks, including the running of hatcheries. In many areas, however, lobster stocks are doing very well and, some argued, not in need of further protection. Whereas the MFU as a whole conducts lobster enhancement by running a hatchery and releasing grown lobster into areas where

production is low (Hubert Saulnier, president of the MFU local 9, personal communication), Hubert Saulnier, president of the MFU local 9, spoke about how, at present, locally there is no need for such initiatives:

> Our local populations are doing very well – in fact they're increasing, and that's in a way a problem and why prices are so low (Hubert Saulnier, president of the MFU local 9).

The sense that much is already being done to strengthen lobster stocks and that in most areas stocks are already strong, may explain the smaller engagement gap in this category for lobster associations (Figure 6).

Whereas the ratings of desired involvement were very similar between fisheries, the engagement gap was much greater among groundfish associations (Figure 6), as a result of their lower current involvement in **ecosystem stewardship, conservation and rehablitation** This difference between fisheries might be partly attributable to the fact that groundfish stocks have yet to recover from the drastic declines of the 1990s and thus there was some frustration with a lack of adequate rehabilitation of stocks to support the struggling fishery. Harold Berry, director of the Yarmouth County Fixed Gear Association, mentioned having presently no involvement in this category and a desire for significantly more. However, he also pointed out that "**there's only so much fixed gear can do**" He, as well as others, spoke of their association's lack of capacity (largely financial) to do more and that conservation and rehabilitation activities are not as straightforward with regard to groundfish as they are in lobster, as a result of differences in ecology (e.g., depth and proximity to shore) and harvest techniques.

Lobster associations rated both current and desired fishermen involvement in **compliance and enforcement** lowest of all management categories (Figure 4 and 5), and, despite communicating a desire for greater involvement than they currently possess (Figure 6), also gave this category lowest priority for fishermen involvement (Table 3). Groundfish associations, on the other hand, while also seeing involvement in **compliance and enforcement** as low in terms of priority for fishermen involvement, cited slightly greater

levels of current involvement in this category than did lobster associations and rated current involvement in this category relative to most other management categories (Figure 4). Overall, groundfish associations also desired for more involvement in these aspects of fisheries management than did lobster association representatives (Figure 5).

While fishermen are not particularly involved in the majority of DFOs **compliance and enforcement** procedures, dockside monitoring to assess catch as well as the "at-sea" portion of the costs of fisheries observers, in the case of groundfish, are paid for by industry (Peacock & Annand, 2008). Some associations have also set up their own means of regulating and/or penalizing infractions. Most groundfish representatives, for example, spoke of there being higher involvement on the local level through their community management boards (CMBs). Membership requires the signing of legally binding contracts that bind fishermen to their association's penalty provisions for violation of their rules. Penalties, developed, implemented and enforced by the associations, were described as often constituting reductions in quota and/or time at sea, but can even result in expulsion from the association in the case of serious infractions (George Zinck, president of the Prospect Area Full Time Fishermen's Association, personal communication). Penalties are "not the purview of government, unless such actions result in measures that would be illegal, be contrary to Conservation Harvesting Plans (CHPs) or be contrary to the management measures required for all community groups" (Peacock & Annand, 2008, p.105). .

> In our management plan, we actually have a section dedicated to sanctions. We put the management plan out that you must do x, y and z to go fishing. If you go out and catch more than you're allowed, we have sanctions put in place (…) DFO, I mean, they put the rules in place. They've invented the wheel, we've brought it home and we've modified it for our group following all the DFO regulations… The six hour hail out, the dockside monitoring, the at sea observers, all that stuff is in place and we follow it. So to say they gave us the rules, we have implemented them, and then we've taken it a step further (Don Hart, president of the Halifax West Commercial Fishermen's Association).

A number of respondents mentioned that the rules imposed by their associations are often stricter, and felt to be more effective, than those imposed by the DFO. This reality is supported by findings in the co-management literature (e.g., Deacon, 2012; Graham et al.,

2006), as "agreeing to follow community rules makes individual harvesters accountable to their management body and their community. It creates accepted standards for group behaviour and moral pressure to comply" (Graham et al., 2006, p.60). Even where the rule of law functions well and government is able to regulate, associations often devise 'fixes' for what is seen as ineffective or incomplete regulation (Deacon, 2012).

4. Conclusion

While there was widespread agreement among interview respondents of the value of fisheries co-management, and an overarching readiness and desire on behalf of industry for greater involvement in fisheries co-management, this project highlights the practical complexity of co-management. Whereas the co-management literature has tended to, by and large, look at levels of involvement along a single 'ladder of participation,' this research reinforces the growing recognition of the importance of recognizing variability in both current and desired fishermen involvement in fisheries management across fisheries management categories (Jentoft et al., 1998; Charles, 2001; Nielsen et al**.,** 2004; Pinkerton & Weinstein, 1995; Pinkerton, 2009). Identifying and understanding these differences – i.e., in which management tasks, and to what extent, fishermen feel they are presently, or can and/or should be involved – allows a more nuanced picture of the realities of co-management, thereby better permitting the evaluation of the realities of co-management against its stated objectives.

The shift towards more collaborative resource management is widely seen to have emerged from "considerations of both democracy (involvement of citizens in decisions concerning their own livelihood) and efficacy (to reduce implementation costs and improve compliance)" (Nielsen et al**.**, 2004, p.154). However, the nature and extent of fishermen involvement required for more economically efficient fisheries management, a goal many governments have tried to achieve through the increased downloading of certain responsibilities and costs onto industry (Wiber et al**.,** 2004), may not be the same as the involvement required to achieve a more equitable management system, whereby fishermen are empowered through a real sharing of decision-making power. In which

management categories fishermen are involved, and to what extent, speaks to the quality of the co-management arrangement - i.e., "their relative emphasis on democracy and efficacy aspects" (Nielsen et al., 2004, p.154).

Insight into the nature and extent of fishermen involvement in fisheries management in Nova Scotia, obtained through this research, highlighted that while fishermen's association representatives tend to feel that a degree of co-management has been achieved in certain components of fisheries management, the comparative lack of involvement in others has created a situation whereby many fishermen continue to see themselves as mere 'recipients of instruction' (Jentoft, 2005), without having the real power required to meaningfully contribute to outcomes of the 'co-management' process.

The perception of higher current involvement in **harvest management**, for example, in comparison to other categories, might suggest that fisheries co-management in the province has, in some ways, been moving in the right direction. However, the larger engagement gap, as calculated by the difference between mean current and mean desired involvement, in **direction-setting, planning and policy development** (a management category where involvement was widely regarded as critical for meaningful co-management, and which qualitative data showed most respondents felt meaningful involvement has not been achieved) suggest that this may be an important area for improvement if the 'co-management' approach is to hold much credibility with fishermen.

Just as certain categories of management (i.e., those that focus on implementation aspects of fisheries management as opposed to real decision-making power) are more readily downloaded by government onto industry than others, certain management responsibilities are more readily taken up by resource users. Knowing in what capacity and to what extent fishermen desire to be involved in fisheries management, offers further insight into "the types of management tasks which can and/or should be co-managed" (Mazur, 2010, p.4), as the willingness and capacity on the part of fishermen to take on

downloaded management tasks is critical to their successful implementation (Wiber et al., 2004). (See Chapter 3 for discussion on barriers to fishermen involvement).

Though a number of association representatives voiced the wish that government would do more to help strengthen their associations, highly desired involvement in **organizational management and development**, for example, suggests that respondents recognize the critical importance of empowering their associations to better participate in co-management of their fisheries and take on management tasks. On the other hand, desired fishermen involvement, as well as priority for fishermen involvement, was lowest in **compliance and enforcement**, indicating that though fishermen want greater involvement in certain aspects of this management category (e.g., developing fishing rules and bylaws), for the most part they prefer not to be the ones policing and enforcing them, desiring that the government largely maintain responsibility for these functions.

The insights, regarding current and desired fishermen involvement in fisheries management in Nova Scotia, obtained by assessing involvement across the various fisheries management categories, highlights the value of this approach and suggest that evaluating fishermen involvement in co-management by first disaggregating fisheries management into its various management categories could shed greater light on the realities of co-management in other contexts and around the globe. The barriers to greater fishermen involvement in one category of fisheries management may be different from those constraining involvement in another. Disaggregating fisheries co-management into its various components allows for a new way of looking at co-management, one which acknowledges these important differences and thereby allows for the formulation of more effective strategies for achieving meaningful fishermen involvement in the management of fisheries resources.

Chapter 3: Barriers to Fishermen Involvement in Fisheries Co-Management

1. Introduction

1.1. Co-management

The conventional approach to fisheries science and management, as practiced since the early 1940s, relied exclusively on scientific and top-down methods, largely failed to incorporate local knowledge or management systems adopted by the resources' users (Riedlinger & Berkes, 2001) and tended to be out of touch with local realities, with resource users often given no part in the decision-making process (Garcia, 2005; Varjopuro et al**.,** 2008; Berkes et al., 2001, Andrew et al., 2007). The result has been fisheries crises – overexploited stocks, habitat degradation and strained fishermen livelihoods worldwide (Berkes, 2009; Pauly et al., 2003; Bocking, 2004). This, in turn, has led to a reexamination of conventional management theory and the development of new concepts and approaches in fisheries research and management in the search for better ways to sustainably manage fisheries in terms of both ecological and social objectives (Berkes, 2003).

One of the shifts in resource management discourse has been a move away from top-down, 'command and control' resource management and lack of coordination among resource users and governmental resource management towards a greater emphasis on "decentralization, devolution, regionalization and more collaborative decision-making" (Suarez de Vivero et al., 2008, p.319) through various forms of co-management or 'shared stewardship'. As the importance of fishermen's participation and shared decision-making in the management of fisheries has gained increasing acceptance, co-management has come to be recognized as a means towards a "more appropriate, more efficient and more equitable management" of resources (Pinkerton, 1989, p.5) that balances economic objectives with social justice and environmental health (FAO, 2009).

Broadly defined by Berkes et al**. (**1991) as "the sharing of power and responsibility between government and resource users" (p.6), the concept of co-management has,

however, been interpreted differently by various academic, government, non-government and international organizations. While co-management is a participatory form of management, the term can describe a number of different arrangements, depending on "the roles of government and other stakeholders in the decision-making process, the types of management tasks which can and/or should be co-managed, the stage in the management process when co-management is introduced" (Mazur, 2010, p.4), as well as how much influence and responsibility is shared.

Given the variations in co-management practice, a useful conception of a continuum of co-management arrangements has been described by Berkes et al**.** (1991), who argue that there are various levels of co-management corresponding to the extent of local-level involvement and shared decision-making in resource management, as well as the degree of integration of local and state level management systems. Co-management, therefore, does not describe a single management model, but rather represents a broad spectrum of arrangements that involve different levels of power-sharing/degrees of involvement, lying between two management extremes - fully centralized control, where the resource users are instructed about decisions that the government has already made, and self or community-based management, where power is delegated to resource users to make decisions and the government is merely informed of these decisions.

Just as the term co-management has been variously defined, and finds different expression depending on how it is conceptualized, fishermen involvement is also constrained by, and emergent from, a range of cross-cutting factors and conditions. There is a growing body of literature exploring factors that affect the ability of resource users to manage their resource, as well as looking at general preconditions for 'successful' co-management of fisheries or other local resources and barriers to its successful implementation (Armitage et al., 2009; Berkes et al., 2001; Felt, 1990; McConney et al., 2007; Napier et al., 2005; Nielsen & Vedsmand, 1999; Ostrom, 1990; Pinkerton, 2003; Pinkerton, 2009; Pomeroy, 2007; Pomeroy et al., 2001; Singleton, 2000; etc.). While most authors agree that 'conditions for success' are context-specific (Pinkerton, 2009), a number of these conditions are nevertheless recurrent in the literature. Plummer (2009)

offers a useful synthesis of this research, whereby he identifies and classifies these 'conditions for co-management success' as either exogenous or endogenous variables.

Exogenous variables include: 1) "ecosystem changes or resource alterations that precipitate (real or perceived) crisis" (Sen & Nielsen, 1996; Pomeroy & Berkes, 1997; Plummer & FitzGibbon, 2004; Pinkerton, 1989; Olsson et al., 2004; McConney et al., 2007; Armitage et al., 2009); 2) "legal mandates, policy prescriptions, and/or resources support (or reductions) by government"; 3) "the social and political context within which co-management is embedded"; and 4) "meso-scale" social and economic drivers (Folke et al., 2003, as cited in Plummer, 2009, p.7).

Endogenous variables influencing co-management, on the other hand, were cited as including the human, social, physical, and financial capital employed by organizations and individuals (Plummer & Armitage, 2007, as cited in Plummer, 2009); attributes of organizations and individuals such as leadership, financial stability, and the strength of social networks in relation to their ability to generating knowledge, bridge organizations, and contribute towards social learning (Berkes, 2009, as cited in Plummer, 2009; Kearney et al**.,** 2007). The discussion of barriers to co-management in the literature tends to emphasize the absence of these 'conditions for success.'

Despite the rhetoric supporting fisheries co-management, the reality is that meaningful fishermen involvement is not always easily achieved (Suarez de Vivero et al., 2008). Chapter 2 demonstrates that fishermen involvement in fisheries management in Nova Scotia, Canada, varies depending on the management category looked at, with involvement in some aspects of fisheries management remaining quite low. Dissatisfaction with the current nature and extent of involvement was expressed by nearly all fishermen representatives interviewed, with most conveying a desire for greater involvement in at least some aspects of all management categories explored. It is clear that improvement is needed in order to advance to a more inclusive, widespread application of co-management in Canadian fisheries. A first step in closing the gap between the rhetoric and reality of co-management is a better understanding of the

barriers, or challenges that have been faced in achieving involvement on the ground. As such, the goal of this chapter is to provide insight into the barriers fishermen feel are limiting their involvement in fisheries management.

1.2. The Nova Scotia Fishery

The focus of this study is the Eastern Canadian province of Nova Scotia. As elsewhere in Canada, the national government has articulated the need for collaboration in commercial fisheries management via "management decisions based on shared information, on consultation with stakeholders, and on their advisory or management participation in the planning process" (DFO, 2002, p.11). This is meant to take place through formal consultation processes meant to "allow for enhanced input from resource users and other stakeholders into the management and conservation measures affecting a fishery" (DFO, 1999b, p.3), while maintaining Ministerial discretionary powers set out in the ***Fisheries Act*** (Fisheries Act, 1985; Wilson, 2008).

Over the last several decades, Nova Scotian fishermen's associations, generally formed around geographically-based communities of interest (i.e., local fishing fleets) (Graham et al., 2006), have provided local fishermen with the means to come together on important issues and to promote the community's interests with government agencies such as the Department of Fisheries and Oceans (DFO) (Boudreau et al., 2002). Not all fishermen in Nova Scotia are required to be represented by a local fishermen's association – determined by their region and the fishery in which they participate. However, in the face of increasing government devolution of certain fisheries management functions onto industry, these associations have come to provide an increasingly broad range of services and to play a growing role in the management of their fisheries resources (Wilson, 2008).

The Nova Scotia commercial fishing industry provides an important economic base for many coastal communities, with many relying directly (or indirectly) on participation in the fishery for their livelihood (Charles, 1997; Pinfold, 2007). Nova Scotia's fisheries remain characterized by a relatively large number of primarily small-scale 'owner

operated' fleets – "ones in which each fishing enterprise is owned and operated by an individual fish harvester" (Graham et al., 2006, p.21). Unlike some other provinces, which are characterized by having most fishermen represented by a single fishermen's association, Nova Scotia hosts a significant number of fishermen's associations, of various size and organizational structure, spread across the province. This multitude and diversity of associations offers a wide range of perspectives and experience regarding fishermen involvement in fisheries management and makes the province a valuable geographical focus for this study.

2. Methodology

2.1. Data Collection and Rationale

The results of in-depth telephone interviews, conducted with fishermen's association representatives in Nova Scotia, are used to identify barriers felt to be constraining fishermen's desired involvement in fisheries co-management. Fishermen's associations across the province were selected randomly from a compiled list of Nova Scotia associations obtained from **the Nova Scotia Department of Fisheries and Aquaculture** and the **Nova Scotia Fisheries Sector Council.** Initial contact was made with the primary contact person for each association. However, interviewees for each fishermen's association were determined by the associations themselves.

Respondents were asked to speak on behalf of the fishermen's association and membership they represent. While meant to be reflective of the experience of the whole, it is important to acknowledge that responses are individual opinions inherently framed by the respondent's own background and experiences, and may not represent the perspectives of all local fishermen. The fact that interviews were conducted with association representatives ensured that selected respondents were most likely to be active and knowledgeable in fisheries 'co-management' and best able to reflect on the experience of fishermen as a whole. The position of each respondent within their fishermen's association is cited as held at the time of interview (2013).

The interview instrument consisted of three components (See Appendix 2: Interview Guide). The first section explored contextual information pertaining to the role of the respondent, the association they represent, and the fishery they identified as most important to their membership, as some associations were multi-species associations, representing fishermen in more than one fishery. The second section asks respondents to rate their current and desired involvement overall, and in six fisheries management categories, on a one to ten rating scale, depicting a spectrum of arrangements involving different levels of power-sharing and lying between two management extremes: 1 representing fully centralized control, where the 'community' is instructed about decisions that the government has already made (i.e., no fishermen involvement); and 10 representing self or community-based management, where power lies fully in the hands of the 'community' to make decisions and the government is merely informed of these decisions (i.e., exclusive fishermen responsibility). This provided a numerical picture of the perceived nature and extent of current involvement in the management of the fishery identified as most important to the membership of each fishermen's association interviewed, and allowed analysis of trends in: the extent of current fishermen involvement in fisheries management; respondents desired levels of involvement in each of these categories and their levels of dissatisfaction with current involvement (as calculated by the difference between current and desired involvement ratings); and the consequent unrealized potential or greater engagement, or 'engagement gap' (mean difference between current and desired involvement) (See Chapter 2 for discussion on the nature and extent of involvement). Factors affecting fishermen involvement are also explored, as respondents provided verbal explanation of their ratings and reflected on enablers or constraints to achieving their desired levels of involvement in fisheries management overall and in each management category. The third section of the interview explores participants' reflections on co-management overall as well as key constraints to having been able to achieve their desired involvement.

The interview was pilot tested in Nov 2012 with two Nova Scotia fishermen's association representatives, selected as a result of their collaborative relationship with the thesis supervisor and/or mutual affiliation with a community-university research alliance, to

obtain feedback on the interview questions, wording, and length. Slight modifications to some of the interview questions were made, based on suggestions and comments from pilot results, and a few items removed or added, before the remainder of the interviews were conducted between January and June 2013. Ethics approval, from the Dalhousie University Research Ethics Board was received before commencing the interview process and participant consent obtained prior to each interview (See Appendix 3 for consent form). All respondents were offered the opportunity to review the interview questions before the interview date and encouraged to have the interview questions on hand during the call to help facilitate the interview process. Interviews took an average 1.5 hours to complete.

2.2. Data A nalysis

All interviews were audio-recorded and transcribed verbatim. Survey data (i.e., numerical rating of current and desired involvement and prioritization of involvement by management category rankings) were entered into a Microsoft Excel® spreadsheet where statistical analysis, summary tables, and graphs were constructed. As discussed extensively in Chapter 2, the use of a continuous one to ten rating scale, with only endpoints defined, permitted results to be analyzed as interval scaled data (Treiblmaier & Filzmoser, 2009). This justified the calculation of mean involvement ratings, as well as the use of regression analyses. Contextual variables pertaining to each association were also tabulated to allow for analysis of commonalities and differences in perspectives and experiences between associations and, combined with respondents' qualitative data, used to help explain any observable trends. The mixed methods approach to this research, combining quantitative survey with qualitative interview data, thus allowed for a greater understanding of and validation of research results.

In analyzing barriers to achieving desired levels of fishermen involvement in fisheries management, relevant passages of interview data were reviewed, inventoried, categorized and coded for emerging ideas and themes using qualitative data analysis techniques (Corbin & Strauss, 2008; Strauss & Corbin, 1990). Coding – "a systematic way in which

to condense extensive data sets into smaller analyzable units through the creation of categories and concepts derived from the data" (Lockyer, 2004, p.137) and to "facilitate the organization, retrieval, and interpretation of data" (p.137), resulted in a descriptive assessment of the critical factors and conditions that constrain fishermen's objectives for involvement in fisheries management, as perceived by fishermen's association representatives interviewed.

As the interview was designed to address specific research questions and followed a number of set questions, the central research questions shaped the coding scheme (Bogdan & Biklin, 1998) and many of the responses were already organized by theme as determined by the specifics of the questions asked. Each interview was largely structured around assessing current and desired fishermen involvement in the following six fisheries management categories: 1) **direction-setting, planning and policy development**; 2) **harvest management**; 3) **compliance and enforcement**; 4) **ecosystem stewardship, conservation and rehablitation**; 5) **research**; and 6) **organizational management and development** (See Table 1 and Chapter 2 for discussion of management categories), and what respondents believed to be the primary contributing factor(s) that enabled or constrained the involvement of their association and membership in each of these. The research questions and interview framework developed for this study were, therefore, used to structure the initial coding system to conceptualize and categorize data. Barriers to involvement were coded as pertaining to involvement in these six specific fisheries management categories. Key barriers to involvement in fisheries management overall were also assessed.

The coding system followed the open, axial and selective coding method outlined by Strauss & Corbin (1990). This iterative and multi-step process consisted of three primary steps:

1) Initial (open) coding involved an initial review of interview transcripts and the classifying and assigning of meaning to interview text (i.e., developing barrier codes) through "the process of breaking down, examining, comparing, conceptualizing and categorizing data" (Strauss & Corbin, 1990, p.61). Categories/concepts of barriers to

involvement were identified with no limit to the number or variety of categories generated. As such, this stage generated numerous barrier codes, with some clearly linked to, or overlapping with, others. Since many barriers to fishermen involvement in fisheries management are not mutually exclusive, but rather often deeply interlinked, and many respondents brought up multiple barriers in tandem, single passages of text often received multiple barrier codes. However, barrier codes were assigned based on how barriers were discussed by respondents, recognizing that a given barrier could fit into multiple barrier categories.

2) The second (axial) stage of coding, integrated and grouped barrier codes together into more specific focused categories. Coded text was re-reviewed to confirm that barrier categories accurately represented interview responses, and to simplify and relate codes to each other by eliminating, combining, subdividing, and drawing "connections between categories" (Strauss & Corbin, 1990, p.96).

3) The third (selective) stage of coding, is the process whereby "previously identified discrete concepts and categories are further defined, developed, and refined and then brought together to tell a larger story" (Price, 2010, p.158). The identification of repeating ideas and underlying themes resulted in the formulation of a list of six barrier categories (Table 4), telling the 'story' of what was felt by representatives of fishermen's associations in NS to constrain fishermen involvement in fisheries management. Four of the six barrier categories were classified as external to the association and/or industry and the remaining two spoke to barriers internal to the association and/or industry. A number of barrier subcategories within these primary barrier categories were also defined.

Table 4: Barrier categories

EXTERNAL BARRIERS – supra-industry/association level: Gov't Barriers
1. BROADER POLITICAL AND ECONOMIC CONTEXT
1.1. Government priorities and agenda
1.2. Government funding/budgetary constraints
2. POLICY & LEGISLATIVE FRAMEWORK
2.1. Constraining federal legislation/policy
2.2. Constraining provincial legislation/policy
3. DFO ORGANIZATIONAL STRUCTURE & OPERATIONS
3.1. DFO organizational structure
3.2. DFO operations
4. GOVERNMENT PROCEDURES/MECHANISMS FOR INVOLVEMENT
4.1. DFO structures for involvement
4.2. Government transparency & accountability
4.3. Consultation process
4.4. Communication challenges
4.5. Relationship challenges
INTERNAL BARRIERS – barriers at the industry/community/association level
1. ORGANIZATIONAL CAPACITY/COMPETENCIES
1.6. Organizational governance
1.6.1. Leadership/management capacity
1.6.2. Knowledge/skills capacity
1.7. Financial capacity/resources
1.8. Membership/community commitment/support
1.9. Conflict within association
2. INTER-ASSOCIATION/INTRA-INDUSTRY LACK OF COLLABORATION

Quantitative analysis of the qualitative barrier data, specifically the computation of frequency of barrier categories mentioned overall and between respondent groupings (i.e., by fishery), allowed for an assessment of barriers in terms of which are most felt and by whom. Respondents were unrestricted in the number of barriers they could mention, and not all respondents mentioned an equal number of barriers or mentioned a given barrier

with the same frequency. In tabulating frequency of barriers mentioned overall (or within groups of respondents), each barrier category mentioned by a given respondent was counted one time, regardless of how frequently that respondent brought it up. Counts of how many respondents mentioned a given barrier category code or sub-code and how many and which barriers categories were mentioned by whom were tabulated in Microsoft Excel ® where summary tables of frequency counts and valid percentages (i.e., including only those who answered each given question), and graphs were constructed. Barrier frequencies were then examined by fishery, specifically lobster and groundfish associations, to look for differences or similarities in experience and perspective between respondents.

In order to explore possible relationships between the type and number of barriers identified by fishermen's association representatives, and their perceived degree of involvement or satisfaction, linear regressions were conducted to compare: 1) the proportion of internal versus external barrier categories mentioned versus current involvement ratings and measure of dissatisfaction (as calculated by the difference between current and desired involvement scores); and 2) current overall fishermen involvement ratings versus the proportion of total barrier categories mentioned by a given respondent.

3. Results and Discussion

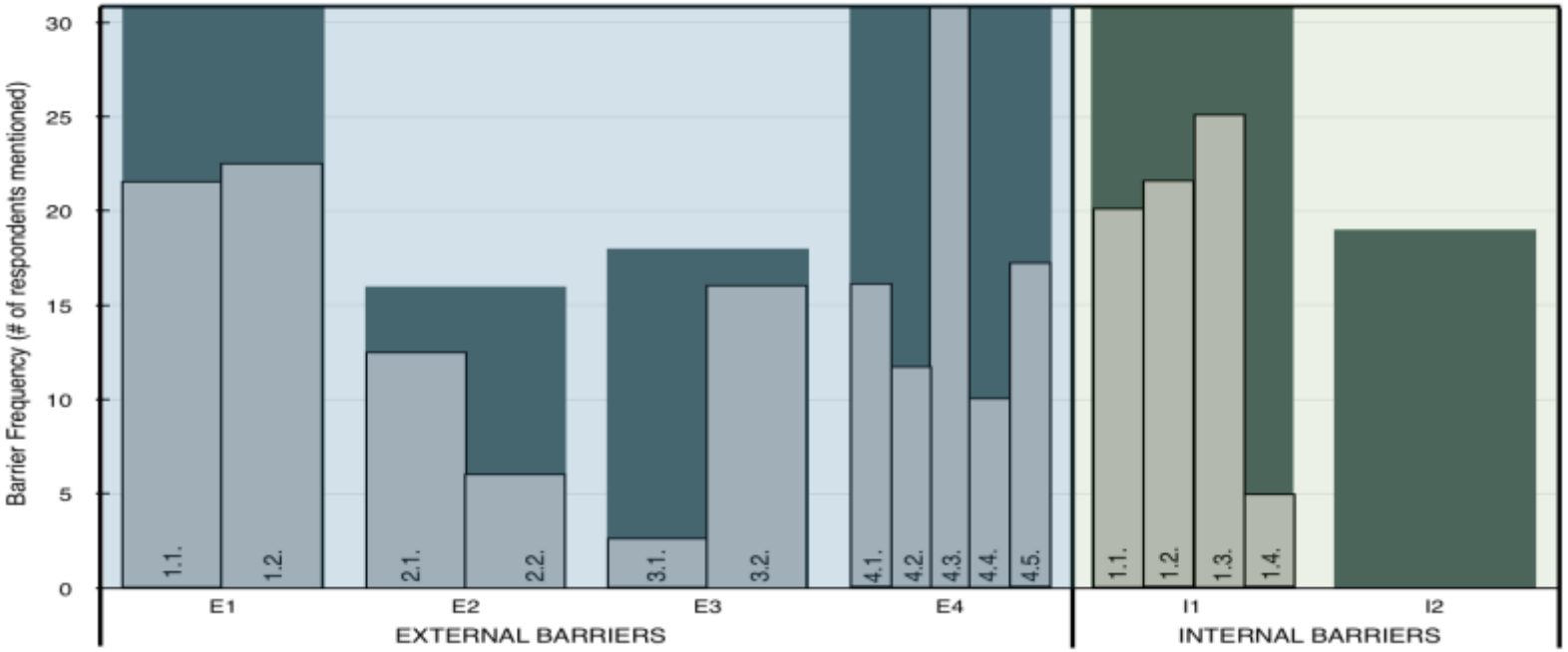
Thirty-one fishermen's association representatives participated in the study, representing nine fisheries across the province of Nova Scotia, and 32% of the 98 fishermen's associations on the compiled list of possible contacts obtained from **the Nova Scotia Department of Fisheries and Aquaculture** and the **Nova Scotia Fisheries Sector Council**. Lobster and groundfish associations together represented 65% of associations interviewed, with 12 and 8 respondents speaking with regard to these fisheries respectively. Respondents were largely fishermen acting as volunteer executives within the fishermen's association they represented, though some respondents were also hired staff.

Despite a desire on the part of fishermen in many parts of the world to take greater part in fisheries management, and frequent government rhetoric that supports it, there are many issues that constrain fishermen involvement. The barriers brought up by Nova Scotian fishermen's association representatives were many, varied and often interlinked, encompassing challenges and constraints both internal and external to their associations and/or fishing industry.

3.1. Barrier Categories and Frequency Analysis

Qualitative analysis of interview data illuminated six primary barrier categories, each reflecting forms of constraints to fishermen involvement. Each of these categories was classified as either external or internal to the fishermen's association and/or industry level, and all but one of which encompass a number of barrier subcategories. External barrier categories related to: 1) the broader political and economic context; 2) policy and legislative framework; 3) DFO organizational structure and operations; and 4) government procedures and mechanisms for fishermen involvement. Internal barriers fell into just two primary barrier categories - those pertaining to: 1) intra-association barriers (i.e., the organizational capacity and/or competency of the given fishermen's association); and 2) inter-association barriers (i.e., lack of collaboration between fishermen's associations) (Table 4).

All respondents brought up both external and internal barriers as affecting their involvement in fisheries management in general (Figure 7). However, Figure 8 indicates that external factors were more frequently cited by the association representatives interviewed as key barriers to achieving greater involvement, with 17 and 24 respondents mentioning internal versus external barriers as key barriers, respectively. The following section explores the above mentioned external and internal barrier categories in greater depth.



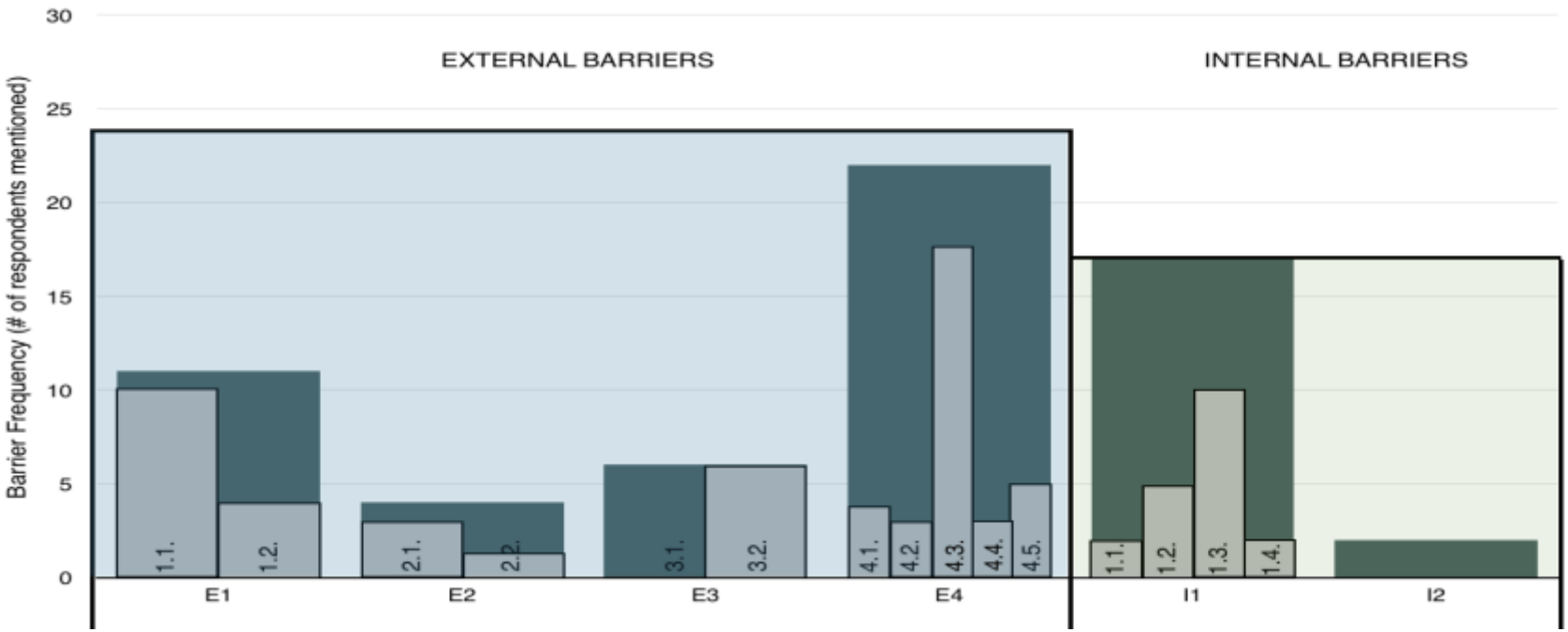
E1. Broader political & economic context
1.1. Gov't priorities & agenda
1.2. Gov't funding/budgetary constraints
E2. Policy & legislative framework
2.1. Constraining Federal legislation/policy
2.2. Constraining Provincial legislation/policy
E3. DFO structure & operations
3.1. Organizational structure
3.2. Operations

E4. Gov't procedures/mechanisms for involvement
4.1. DFO structures for involvement
4.2. Gov't transparency & accountability
4.3. Consultation process
4.4. Challenges with engagement
4.5. Relationship challenges

I1. Organizational capacity/competencies
1.1. Organizational governance
1.2. Financial capacity/resources
1.3. Membership/community support
1.4. Conflict within association
I2. Conflict within industry/lack of collaboration

Figure 7: Frequency that barrier categories were mentioned as general barriers to fishermen involvement in fisheries management, by NS fishermen's association representatives interviewed

Note: width of bars insignificant.



E1. Broader political & economic context
1.3. Gov't priorities & agenda
1.4. Gov't funding/budgetary constraints
E2. Policy & legislative framework
2.1. Constraining Federal legislation/policy
2.2. Constraining Provincial legislation/policy
E3. DFO structure & operations
3.1. Organizational structure
3.2. Operations

E4. Gov't procedures/mechanisms for involvement
4.1. DFO structures for involvement
4.2. Gov't transparency & accountability
4.3. Consultation process
4.4. Challenges with engagement
4.5. Relationship challenges

I1. Organizational capacity/competencies
1.1. Organizational governance
1.2. Financial capacity/resources
1.3. Membership/community support
1.4. Conflict within association
I2. Conflict within industry/lack of collaboration

Figure 8: Frequency that barrier categories were mentioned as key barriers to fishermen involvement in fisheries management, by NS fishermen's association representatives interviewed

Note: width of bars is insignificant

3.1.1. EXTERNAL BARRIERS

External barriers, relating to the wider context within which the fisheries operate, were most frequently attributed to: 1) the broader political & economic context in which fisheries management operates, and 2) government procedures for fishermen involvement, with all respondents mentioning barriers related to both of these categories (Figure 7). In terms of key barriers, government procedures for fishermen involvement was identified as being the primary constraint to achieving greater fishermen involvement in the fisheries management process (Figure 8).

E1. Broader political and economic context

Barriers attributed to the broader political and economic context (E1) were categorized as relating either to: 1) Government priorities and agenda (E1.1.), i.e., the political agenda shaping fisheries management and/or process and DFO mandate, as well as broader government priorities seen to impact the fisheries and possibility for fishermen involvement in their management; 2) or Government funding and/or budgetary constraints (E1.2), which encompassed barriers attributed to cutbacks to government investment in aspects of fisheries management, which then limited the possibility for fishermen involvement in fisheries management (e.g., cutting science budget), cutting of DFO staff and/or means for fishermen involvement (e.g., changes to the advisory process), as well as constraints associated with the government offloading of certain roles, responsibilities and costs of fisheries management onto industry. Both of these barrier subcategories received similar frequency of mention, with 22 and 23 respondents (i.e., 71 and 74% of respondents), respectively, raising these categories as general barriers to greater involvement. Government priorities and agenda was, however, more frequently highlighted as a key barrier (Figure 8 and Table 5).

Table 5: Number and percentage of respondents mentioning each barrier category as a general or key barrier to fishermen involvement in fisheries co-management

	Barriers mentioned		Barriers mentioned as key barriers	
BARRIER CATEGORY	# of respondents	% of respondents	# of respondents	% of respondents
N (responded)=	31	31	29	29
EXTERNAL: supra-industry/organization level: Gov't barriers	31	100%	24	83%
1) Broader political & economic context	31	100%	11	38%
1.1. Government priorities and agenda	22	71%	10	34%
1.2. Government funding/budgetary constraints	23	74%	4	14%
2) Policy & legislative Framework	16	52%	4	14%
2.1. Constraining Federal legislation/policy	13	42%	3	10%
2.2. Constraining Provincial legislation/policy	6	19%	1	3%
3) DFO Organizational structure & operations	18	58%	6	21%
3.1. DFO organizational structure	3	10%	0	0%
3.2. DFO operations	16	52%	6	21%
4) Government procedures/mechanisms for involvement	31	100%	22	76%
4.1. Structures for involvement	16	52%	4	14%
4.2. Government transparency & accountability	12	39%	3	10%
4.3. Consultation process	31	100%	18	62%
4.4. Challenges with engagement	10	32%	3	10%
4.5. Relationship challenges	17	55%	5	17%
INTERNAL: barriers at the industry/community/organizational level	31	100%	17	59%
1) Organizational capacity/competencies	31	100%	17	59%
1.1. Organizational governance	20	65%	2	7%
1.2. Financial capacity/resources	22	71%	5	17%

	Barriers mentioned		Barriers mentioned as key barriers	
BARRIER CATEGORY	# of respondents	% of respondents	# of respondents	% of respondents
1.3. Membership/community commitment/support	25	81%	10	34%
1.4. Intra association conflict	5	16%	2	7%
2) Inter-association/intra-industry lack of collaboration	19	61%	2	7%

Note: Percentage values are given in valid percent (i.e., percentage of those that responded)

Interview data highlighted a sentiment, expressed by the majority of respondents, that barriers to the equitable participation of fishermen in fisheries management are frequently based in the socio-economic, and political context of today's society, and a government agenda that tends to favour the large-scale, corporate-owed, fisheries. Some respondents argued that this government agenda, combined with political pressures from vested interests, has resulted in a so-called 'co-management' that entrenches unequal power relationships in the fisheries by enabling the larger and more corporate owned and commodity oriented fleets to dominate the fishery and management decisions while undermining small-scale owner-operator fishermen.

Many respondents related feeling undermined by a government agenda where "money, power and corporations rule" (respondent asking to remain anonymous) and an anxiety over the resulting fate of their communities. These comments reinforce the idea that government represents the 'big guy's' interests, not those of small-scale fishing communities. Some expressed feeling the government's agenda to be a deliberate attempt to weed small scale independent producers out. This sentiment is highlighted in the following quotes:

> I think once again it just comes back to them wanting to get rid of the smaller guys fishing… make it tougher for the smaller boats. There's a lot of fear in the industry, it's only a matter of time before they get rid of the under forty-five foot fleet. I think that there is a conspiracy, maybe I'm wrong, but what they do is just a death by a thousand cuts for small fishermen (Don Hart, president of the Halifax West Commercial Fishermen's Association).

> There were too many boats on the water and not enough fish, so they (DFO) decided they would start eliminating fisherman and boats and the big thing was they eliminated the small fisherman, the hand liner, the small dragger. They took the capacity out of the fishermen in these small communities, forced them out of the fishery and let them go to the oil patch out in Alberta and put sixty-five-foot company boats on the water instead, with only three or five men operating them and catching ten times the amount of fish (...) The bureaucrats just want to work with the companies. It's all about the corporate agenda (president of the Upper Bay of Fundy Fish Draggers Association).

Many of the funding and/or budgetary constraints raised by respondents emphasized a climate of continued cutbacks, downsizing of government services and deregulation of management, consistent with a neo-liberal political and economic agenda (Neis, Binkley & Gerrard, 2005). Limited allocation of government financial resources in support of various management functions (e.g., investing in science, compliance and enforcement, etc.), including the closing of fisheries offices, cutting of biologists and other staff, etc. was raised by many respondents as a constraint to their being able to be further involved in these aspects of fisheries management. As one respondent put it:

> It all boils down to cost and DFO has no funding. They (the government) download it, they cut their budget so thin that I don't think that they are able to do the job… (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association).

Where budget restrictions limit the ability of DFO staff to accomplish their mandate, there can be little in which fishermen might take part. Another respondent expressed:

> We do the best that we can do with what we've got. They (the DFO) got no money; they can't do nothing. They haven't got people; they're laying people off, you know. We try… Yeah, there should be more involvement, but there's no money. You know when there's no money, it really don't matter (Nellie Baker-Stevens, coordinator of the Eastern Shore Fishermen's Protective Association).

Cuts to, or the elimination of, various management committees and assessments were also raised as increasingly limiting the means for fishermen involvement in the fisheries management process. Harold Berry, director of the Yarmouth County Fixed Gear Association, for example, spoke about how most species have been shifted from having annual to, now, three-year roll-over quota assessments due to budgetary constraints, which locks fishermen into a set quota for this period, regardless of fluctuations in stock.

E2. Constraining policy and legislative framework

Barriers relating to constraining policy and legislative framework (E2) were subcategorized as either federal (E2.1) or provincial (E2.2.). While constraining policy and legislatve framework was the least frequently mentioned barrier category, numerous respondents expressed feeling hindered by many of the current federal fisheries policies and regulations, which they felt to be out of date. Many also emphasized that consultation does not equate to decision-making power and that when "whatever 'rights' created for fishers are themselves subject to future ministerial discretion" (Wilson, 2008, p.127), whereby decisions made through the consultation process are merely received by government ministers as recommendations, any significant or meaningful involvement in fisheries management is impossible to achieve, as any gains in terms of achieving a greater voice in fisheries management can be "rapidly subverted by changes in policy or government" (p.128).

Provincial policy and legislation was less frequently raised as constraining fishermen involvement in fisheries management, as the federal government is constitutionally mandated to manage the country's fisheries (Constitution Act, 1867). The Nova Scotia government, however, enacted the **Fish Harvester Association Support Act** (FHOSA) in 1996 (**Fish Harvester Association Support Act**, 2011), with the goal to "support and encourage harvesters to create a unified collective to ensure their interests are represented in matters related to the fishing industry" (NSDFA, n.d., para 1). This is accomplished by mandating, in the regions where fishermen voted in referenda to implement the provisions

of the Act and avail themselves of the support mechanisms of this legislation, that all license holders be members of an accredited fishermen's association and pay membership dues, as established by the association.

The majority of respondents expressed the benefits of such efforts to support the organizational capacity of fishermen's associations. Mandatory membership offered associations greater power in terms of membership numbers as well as better financial capacity to take on a variety of tasks and/or hire staff. Kevin Squires, president of the MFU local 6, also pointed out that in regions where fishermen had voted to opt out of the support offered by FHOSA legislation, such as his own, the democratic process within the associations can be challenged, as when membership is voluntary, members can simply leave the association if votes regarding contentious issues do not go their way, thereby undermining the financial stability and capacity of the association. However, several respondents also raised frustrations with regard to regulations around the voting structure in the referenda on whether to implement FHOSA legislation in a given region, as well as the organizational requirements for an association to be accredited. Many smaller associations did not have the necessary membership size to qualify and therefore, regardless of whether FHOSA was implemented in the region, could not gain the benefits accredited associations were now entitled to.

E3. DFO organizational structure and operations

The third external barrier category, describes barriers to fishermen involvement attributed to DFO organizational structure (E3.1) and operations (E3.2), i.e., the approaches, practices and operational guidelines of DFO used in the implementation of policy. The DFO's internal organizational structure is highly institutionalized, characterized by an arrangement whereby staff and departmental functions are separated into a number of 'branches' (e.g., science, fisheries management, policy and planning, etc.) and movement across these functions "tends to be minimized by the narrow disciplinary knowledge base that define each functional group" (Lane & Stephenson, 2000, p.386). The management of Nova Scotia's fisheries is executed through two, of the six total, DFO administrative

regions across the Country: The Maritimes Region and the Gulf Region, with each headquartered in different parts of the Maritimes and with a somewhat different operational management structure and decision-making process (DFO, 2014). Barriers raised with regard to DFO organizational structure primarily referenced challenges associated with navigating complex bureaucracy involving 'too many layers of government' and a hierarchical and centralized decision-making structure that requires staff to increasingly seek permission from above regarding management decisions, making any real power-sharing through co-management structures (e.g., advisory boards) difficult to achieve, regardless of the willingness of DFO staff. As Ashton Spinney, former president of the LFA District 34 Management Board, writes:

> The individuals that government has there might be the finest kind of people to work with but the powers that be like to be the one pulling strings. So, we're never really talking to the one that is trying to co-manage. We're talking to a puppet. So many times you see their hands are tied. And it doesn't make it easy. It makes it really challenging. Politics, that's the biggest area that has caused a lot of difficulty over the years. Because it constrains the department from being able to do things. The person that you're working with is not able to do what needs to be done (Ashton Spinney, former president of the LFA District 34 Lobster Management Board).

Barriers raised with regard to DFO operations most frequently cited the challenges of overlapping or unclear jurisdictions, and inappropriate physical or administrative fishing boundaries. The Northhumberland Fishermen's Association, for example, has been fighting for the creation of subzones (i.e., the delineation of smaller geographic areas for the purpose of controlling fishing access), so as to grant greater autonomy to the local fishermen in making decisions about how they operate in their local area, arguing that when managed as part of a too large area, there are so many competing voices that it becomes impossible to have meaningful say.

Respondents alluded to a number of well-studied characteristics of large government bureaucracies known to constrain involvement, including a fragmentation of responsibilities and authorities, whereby different aspects of resource management (e.g., stock assessment, habitat and enhancement, and research) are divided among different

government branches (Lane & Stephenson, 2000; Pinkerton & Weinstein, 1995; Yaffee, 1997). Several spoke about how the DFO, being a large government resource management agency, is resistant to change with many policies or procedures, such as fishing boundaries, restriction in fishing gear, quota, or size limits, etc., having become entrenched, regardless of their being the best approaches. This is supported by Ostrom's (1990) concept of path dependence, which purports that institutional practices become established as routine and difficult to change, since "once an institutional solution emerges, the set of acceptable options narrows" (Soltan, Uslaner, & Haufler, 2001, p.8), due to a tendency to favour past or preexisting choices, whether or not the circumstances surrounding prior choices are still applicable.

E4. Government procedures and mechanisms for involvement

The final external barrier category, Government procedures and mechanisms for involvement, contained five subcategories, each of which is examined here in the order of the frequency with which they were raised.

Dissatisfaction with DFO's consultation process (4.3) was widespread, with this barrier subcategory identified by fishermen's association representatives to be the primary area of constraint to fishermen involvement in fisheries management. Barriers to fishermen involvement associated with the government's consultation process were raised by all respondents (Figure 7). This barrier category was also raised as key barrier by 62 percent (n=18) - more than any other category (Figure 8 and Table 5). Most respondents questioned how meaningful their involvement in the advisory process was and whether a 'seat at the table' had any impact on whether their voices were being heard. As Nellie Baker-Stevens, coordinator of the Eastern Shore Fishermen's Protective Association, expressed: "**We can go talk all we want, but the challenge is will it make a difference at the end of the day**" Others expressed a similar sentiment, suggesting that their voices were heard or represented only insofar as they towed the line,' did not push any boundaries and/or supported the dominant and government defined management

structures and/or worldview. As one respondent, asking to remain anonymous on this point, stated:

> I bet I'm not the first one to say it: money, power and corporations rule. Maybe there is a consultation… but no matter what's felt, the ruling will come out a week later (in their favour). So, we call it an 'information session' instead of a 'consultation session.'

Ron Wolkins, president of the Southwest Fishermen's Rights Association, expressed a similar sentiment:

> We have zero input. When we go to these advisory meetings, if you'll say what they want you to say, they'll agree with you. They'll agree with the person they want to agree with, so I don't know what it serves to have fishermen around the table (Ron Wolkins, president of the Southwest Fishermen's Rights Association).

Representatives of two of the associations interviewed (Cyril Burns, president of the Northern Cape Breton Fishing Vessel Association, and Bill Williams, chair of the Southwest Nova Fixed Gear Association) expressed being so disenchanted by the greater clout given to the more corporate-owned offshore sector, that despite being invited to attend DFO advising committees, they refuse to take part. "**It just gets to the point of why bother (being involved)"** (Bill Williams, chair of the Southwest Nova Fixed Gear Association).

Further, many respondents questioned the stage in decision-making at which they can be involved, and spoke about being largely excluded from policy formulation and left with the means to merely react to decisions already made. Comments such as "**they ask us before they tell us what they've already decided**" (office assistant of the Gulf of NS Bonafide Fishermen's Association) sum up the sentiment of many of the respondents.

Guysborough County Inshore Fishermen's Association is an example of an association that is very engaged, sitting on 38 different advisory boards and committees (personal communication, Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association).

> We have a say but it really falls on deaf ears. There's a clearly defined consultation process between the federal government and the fishing industry. We are very involved, but they do not abide by it. There's no consultation. They come and inform us of what it is, the decisions they've made or they are going to make. And then the process is for us to respond to that. If we can scream and yell and justify enough to the media or to whomever that that shouldn't happen – then maybe it won't happen that day. And in some cases, we can get some things removed but in most cases they're there to tell you what's going to happen and then it's done. That's pretty much how it works (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association).

Relationship challenges (E4.5) between the DFO and industry were raised as being a barrier to involvement by 55 percent of respondents (n=17) (Figure 7 and Table 5). There was consistent sentiment, among these respondents, of unsatisfactory government-industry relations, which many largely attributed to mutual distrust between government and some industry sectors. Some representatives spoke about many fishermen's distrust and anger towards DFO as being a remnant of 'bad blood' from past disputes that has not yet faded, as well as a lack of faith in the government's ability to solve management problems (or not make them worse), resulting in long-held antagonism and resistance to working together or even communicating.

Others spoke of challenges associated with government officials distrusting fishermen. Many respondents referenced DFO's sense of cultural superiority and tendency to believe that, without strict regulation, fishermen are likely to decimate stocks for short-term gain, resulting in their dismissing fishermen knowledge in favour of more 'educated' or 'scientific' knowledge. This perspective is supported by Weeks' (2000) findings that "scientists hold a 'privileged position' relative to the public in the policy arena as a result of their mandates to manage based on best available science" (p.105, as cited in Soto, 2006, p.50), resulting in hierarchical power dynamics that undermines the valuing of fishermen's knowledge and input.

Relationship challenges were cited most frequently with regard to involvement in **compliance and enforcement** aspects of fisheries management (Table 6). Several respondents described enforcement officers staging 'sting operations,' hiding in the

woods with high powered binoculars until mistakes are made, instead of working with industry to find solutions.

> There's not much collaboration. I would love to have enforcement officers actually participate in solving some of the problems. It (their approach) seems to be more confrontational than productive. The whole process and philosophy of co-management has to be revisited (Leonard Leblanc, president of the Gulf of NS Fishermen's Coalition).

Respondents spoke about how fishermen are left with the feeling that they are perceived by government as criminals, are under attack, and are left with a resistance to working with government in other management capacities as well.

Table 6: Number and pecentage of respondents mentioning each barrier category as a barrier to fishermen involvement in each fisheries management category

BARRIER CATEGORY	Direction-setting, planning and policy development		Harvest management		Compliance & enforcement		Ecosystem stewardship, conservation & rehabilitation		Research		Organizational management & development	
	#	%	#	%	#	%	#	%	#	%	#	%
N (responded)=	27	27	21	21	27	27	25	25	30	30	19	19
EXTERNAL: Supra-industry/organization level - Gov't Barriers	27	100%	19	90%	22	81%	16	64%	27	90%	7	37%
1) Broader political & economic context	11	41%	9	43%	17	63%	10	40%	20	67%	3	16%
1.1. Government priorities and agenda	11	41%	8	38%	6	22%	7	28%	8	27%	1	5%
1.2. Government funding/budgetary constraints	2	7%	1	5%	13	48%	4	16%	13	43%	2	11%
2) Policy & legislative Framework	3	11%	3	14%	4	15%	4	16%	4	13%	2	11%
2.1. Constraining Federal legislation/policy	2	7%	2	10%	4	15%	2	8%	2	7%	1	5%
2.2. Constraining Provincial legislation/policy	1	4%	1	5%	1	4%	2	8%	1	3%	1	5%
3) DFO organizational structure & operations	7	26%	3	14%	2	7%	4	16%	1	3%	0	0%
3.1. DFO organizational structure	1	4%	0	0%	0	0%	0	0%	0	0%	0	0%
3.2. DFO operations	6	22%	3	14%	2	7%	4	16%	1	3%	0	0%
4) Government procedures/mechanisms for involvement	22	81%	13	62%	11	41%	10	40%	14	47%	7	37%
4.1. Structures for involvement	8	30%	3	14%	2	7%	2	8%	4	13%	2	11%
4.2. Government transparency & accountability	3	11%	3	14%	3	11%	0	0%	3	10%	1	5%

BARRIER CATEGORY	Direction-setting, planning and policy development		Harvest management		Compliance & enforcement		Ecosystem stewardship, conservation & rehabilitation		Research		Organizational management & development	
	#	%	#	%	#	%	#	%	#	%	#	%
N (responded)=	27	27	21	21	27	27	25	25	30	30	19	19
4.3. Consultation process	17	63%	10	48%	6	22%	7	28%	7	23%	4	21%
4.4. Challenges with engagement	0	0%	2	10%	1	4%	1	4%	1	3%	0	0%
4.5. Relationship challenges	4	15%	4	19%	7	26%	4	16%	2	7%	2	11%
INTERNAL: Barriers at the industry/community/organizational level	12	44%	7	33%	8	30%	16	64%	21	70%	13	68%
1) Organizational capacity/ competencies	9	33%	4	19%	8	30%	16	64%	20	67%	10	53%
1.1. Organizational governance	2	7%	0	0%	1	4%	0	0%	3	10%	7	37%
1.2. Financial capacity/resources	5	19%	0	0%	1	4%	5	20%	13	43%	6	32%
1.3. Membership/community commitment/support	4	15%	3	14%	6	22%	13	52%	8	27%	4	21%
1.4. Intra association conflict	1	4%	1	5%	0	0%	1	4%	1	3%	0	0%
2) Inter-association/intra-industry lack of collaboration	8	30%	3	14%	0	0%	2	8%	2	7%	3	16%

Note: percentages are given in valid % (i.e., percentage of those that responded)

DFO structures for fishermen involvement (E4.1) included barriers relating to a lack of, or what was deemed inadequate, formal structures for involvement. Some respondents spoke of advisory meetings being increasingly rarely held, or being inaccessible in location. Others spoke about a lack of formal recognition of their associations by the DFO. The mechanisms for fishermen involvement in management are not uniform across the province, even, at times within the same fishery. Whereas in most areas fishermen's associations "obtain seats on scientific advisory boards, (which provides) an opportunity to review and comment on scientific information and stock assessment reports and participate in establishing management goals for the fishing season" (Graham et al., 2006, p.52), Kevin Squires, president of the MFU local 6, described, for example, that the DFO has opted to not have fishermen's associations represented on the LFA advisory board in their region, but instead grants seats to individual fishermen as community representatives. This, he felt, resulted in a major challenge to developing organizational capacity or any means of fishermen being meaningfully involved.

> The co-management approach that DFO oversees and controls doesn't require people to be organized or be appropriately represented by larger groups other than themselves. Without the requirement to be organized... to contribute to an organization, the organization is unable to build capacity. This is our biggest challenge… A lack of organizational development, which related back to a lack of formal recognition. Until the industry is required or compelled to provide advice and information through a formal structure, they won't do it. (…) If we don't have to be, then individuals who are interested or troublemakers have the same place at the table as an organization, and there's no impetus for people to join organizations. Any John Doe can go in and talk to fisheries and say he represents somebody or I can go with a membership of 500 people or 1000, or whatever, and I have no more standing than that person would. (…) So, you're not going to build the capacity when there's no need for it. And until DFO establishes formal ways for people to be involved and requires them to do so through the organization and requires them to have that capacity to enter into the co-management regime, then we're not going to do it. Interested individuals might try, but there's only so much one can accomplish with no formal structure (Kevin Squires, president of the MFU local 6).

Some respondents, having acted in their leadership roles for extended periods of time, have managed to form constructive relationships with local politicians or government representatives higher up the DFO chain of command and reported attempts at input into the management of the fishery through these means, or even direct contact with Ottawa –

i.e., appealing to top management at the DFO and sometimes going directly to the Minister of Fisheries, at times successfully and other times not. Some expressed this tactic as being one that has enabled greater involvement than would be otherwise available to them through what was felt to be a too infrequent, ineffectual and in some cases non-existent advisory process. According to one respondent:

> There is no other way… Usually, if you have been around as long as I have, you have friends in Ottawa you can run things off of and they might start some kind of process for you. It's the only way you can get any action now. DFO is really reluctant to hold advisory board meetings (Ronald Heighton, president of the Northhumberland Fishermen's Association).

However, others felt that the greater political sway held by some associations, enabled through these political connections, was raising resentment and undermining the voice of associations without this means of influence. While tensions were cited between associations, this was predominantly seen as a procedural fault on behalf of government for having permitted greater sway to those with access to alternate channels of influence (e.g., through political contacts).

Government transparency and accountability (E4.2) and challenges with engagement (E4.4), though less frequently raised, were still mentioned by approximately a third of respondents, respectively, as constraining their involvement in fisheries management (Figure 7 and Table 5).

Comments regarding government transparency and accountability (E4.2) related to frustration with what was felt to be a lack of sufficient government follow-through and transparency in information and decision-making, as well as government projects or decisions imposed with little or no notice to industry, which, Hubert Saulnier, president of the MFU local 9, expressed often puts fishermen in a reactive mode, even if developments might be positive.

Challenges raised regarding engagement (E4.4) spoke to limited, or lack of effective, communication channels with DFO officials, as well as a confusion, at times, over who to

speak to, as upper levels of government have become more involved in management decisions once made at lower levels. With reductions in staff, associated with increased government cutbacks, it was felt by some that not only do government staff not have the time needed to engage effectively with fishermen's associations, but that decreased job stability has also resulted in a lack of continuity in staff, whereby temporary positions are replacing permanent ones and workloads are increasingly juggled between too many individuals.

> The key players don't stick around so much anymore. And when you get someone new, you have to restart the whole process. This lack of continuity is a real challenge (office assistant of the Gulf of NS Bonafide Fishermen's Association).

The accessibility of DFO language was also raised as a barrier to fishermen involvement.

> Everything is an acronym with the government (…) the bureaucrats are known for that, for talking above your head (Gary Dedrick, president of the Shelbourne County Quota Group).

> They have a meeting every year on stock assessment and unless you're a scientist you might as well stay home. It's presented in a way… that science lingo and stuff... for the ordinary person sitting there, when it's all said and done, they don't know a hell of a lot more when they leave than when they started (Bill Williams, chair of the Southwest Nova Fixed Gear Association).

The above mentioned external barriers, whether a result of a lack of government capacity or commitment, were seen to not only undermine fishermen's involvement in fisheries management in and of themselves, but also to have exacerbated a number of the internal barriers identified by respondents as further constraining their involvement in fisheries management.

3.1.2. INTERNAL BARRIERS

Barriers to fishermen involvement in fisheries management identified by interview respondents and classified as internal to the association and/or fishing industry included

those pertaining to: 1) intra-association barriers (i.e., various aspects of organizational capacity and/or competency of the given fishermen's association; and), and 2) inter-association barriers (i.e., lack of collaboration between fishermen's associations).

I1. Organizational capacity

Fisheries co-management requires that not only government, but also resource-users possess the capacity to participate. While there is no real consensus in the literature on what constitutes organizational capacity (noted by Christensen & Gazley, 2008, p.266), it has been defined by the World Bank as "the ability of people to work together, organize themselves, and mobilize resources to solve problems of common interest" (Narayan, 2002, p.17) and can be seen as "a set of attributes that help or enable an organization to fulfill its missions" (Eisinger, 2002, p.117, as cited in Christensen & Gazley, 2008, p.266). Organizational capacity is therefore multi-faceted, affected by a number of factors. Barriers to organizational capacity (I1) raised by respondents fell into four subcategories: Constraints relating to 1) organizational governance; 2) financial capacity; 3) membership or community commitment and support and, 4) conflict within the organization.

Constraints to organizational governance (I1.1), more specifically with regard to the leadership and/or management capacity and knowledge and skills capacity held within the organization, were raised as a general barrier to fishermen involvement by 65 percent of respondents (n=20) (Figure 7 and Table 5), though such barriers were cited much less frequently as key barriers than barriers related to financial capacity and membership or community commitment and support (Figure 8 and Table 5). Respondents emphasized that many fishermen's associations lack effective leadership, or that their leadership too often lacks the capacity or political coordination to effectively address the increasing number of tasks they must take on, or to navigate a complicated political process. As one respondent put it:

> The fishing industry is probably one of the most complicated, complex, and diverse in rules and regulations, departments that's out there. It is a hugely complicated industry, with the rules and the licenses and the conditions of license and then the rules and regulations within the associations… that the associations have a right to draw up on their own. It's very complex. You have to remember, a lot of fishermen are in their 50s and 60s. Many only went as far as grade 8 because fishing was robust and very profitable. (It was also much less regulated (when they started) and so they never learned the legalities of the fishery. They didn't need to (executive director of the Scotia Fundy Inshore Fishermen's Association).

Fishermen's associations today not only provide a means for their members to come together on important issues and to promote the community's interests with government agencies such as the Department of Fisheries and Oceans (DFO) (Boudreau et al**.,** 2002), but, in the face of increasing government devolution of certain fisheries management functions onto industry, also provide an increasingly broad range of services to their members and to play a growing role in the management of their fisheries resources (Wilson, 2008; Boudreau et al**.,** 2002). Many fishermen's associations are multi-species, representing fishermen at multiple advisory boards at, at times, local, regional, provincial as well as national levels, putting strain (both financial and human resource) on these associations (Boudreau et al**.,** 2002).

As Graham et al**.** (2006) note, fisheries in more industrialized countries, such as Canada, are complex and characterized by a maze of regulations that are often difficult to understand and navigate (p.22). This is particularly a problem for individual fishermen "who may not have the time, resources, or capacity to do so entirely on their own" (Graham et al., 2006, p.22), but it is an issue even for many of the fishermen's associations in the province, which are largely run by fishermen who carry out these tasks often on a volunteer basis. While respondents were mixed in opinion as to whether fishermen should be representing fishermen (as opposed to hiring someone to do so for them), there was widespread agreement with regard to the significant challenge of recruiting, maintaining and supporting adequately skilled and knowledgeable staff, and the consequent lack of continuity in leadership or, more often, burn-out of the few left running the associations for years or even decades at a time. One respondent described how the worst meeting of any organization is the election of officers meeting, as "**nobody**

shows up in case they might get elected" (chair of the Gulf of Nova Scotia Herring Federation). Trevor MacInnis, president of the Inverness South Fishermen's Association, expressed having tried for the past three years to find a replacement, so that he might step down. "**It's not something that anybody's jumping at, let's put it that way**," he said.

George Zinck, president of the Prospect Area Full Time Fishermen's Association, identified maintaining good organizational governance to be the critical challenge facing their organization:

> When we (i.e., the present group of people running the association) go, who's going to do it? Instead of there being less work for the management boards and associations, there's going be more. There's more every year. I spend almost all my time looking after the management board and the association. I get expenses. That's it. It's a huge time commitment and no one wants to do it. When it's volunteer, it's a lot to ask of somebody... you can't get these fishermen to volunteer to do a lot of work when they're busy fishing. It's a case of work and sleep; it's very labor intensive. And to do this now, you can't go in there and do the job with a grade five education. There's too much involved. So, it's hard to get somebody to take this on… We're going to have to hire someone after I'm finished. I think that's coming, you know (George Zinck, president of the Prospect Area Full Time Fishermen's Association).

The second, and clearly inter-linked, capacity-oriented barrier subcategory that impacts all other dimensions of organizational capacity - the lack of financial capacity of fishermen's associations to carry out their objectives (I1.2), was raised slightly more often than barriers to organizational governance (I1.1), both as a general and key barrier to greater fishermen involvement in fisheries management. Respondents frequently spoke of their associations having a lack of adequate funds to compensate their leadership or hire staff to take on these roles for them. In some cases, a lack of funds was also cited as having prevented associations from joining umbrella associations or even getting to advisory meetings (the attendance for which fishermen representatives receive no government compensation and often little more than travel expense, if that, from their associations).

Stable, long-term and diverse funding is critical to both building and sustaining organizational capacity (Frederickson & London, 2000; Claussen, 2011). Interview

participants stressed how continual government cutbacks have resulted in an instability of funding streams, while also putting more and more of certain fisheries management responsibilities and costs onto industry's lap. Greater involvement was largely associated with greater, often tremendous, expense, which many associations simply cannot feasibly take on, of feel they should. As Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association, expressed:

> Who has the resources to be involved with all these aspects of co-management. Where does that money come from? Should government pay for it all? Industry pay for it all? If it's co-management, it should be shared. Everybody should be contributing. Both in time and resources - and where it makes sense and at the level that it makes sense. It can't all be downloaded on the industries. That's what's happening now. We've gone from the government paying for 100% to industry paying 100%. That doesn't work. Nobody can afford either of those things. And we've jumped from one to the other. There's no in-between (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association).

Dick Stewart, manager of the Full Bay Scallop Association, expressed doubt as to the potential for co-management when so much of the cost lies with industry, without a corresponding handing down of any real decision-making authority:

> It's a nice sounding word but DFO has talked around it for the last 20 years and now we're getting more co-management and what that means is they keep all the management and the industry gets all the co, which is the expenses of running it. (Dick Stewart, manager of the Full Bay Scallop Association).

The downloading of responsibility and cost was, however, seen by respondents as both an opportunity and a threat, depending on the association's capacity to take on these functions. A number of respondents recognized this as an opportunity for greater say in how their fisheries are managed. However, many also noted that "**with these oppoturities come hdlish challenges**" (Kevin Squires, president of the MFU local 6). The challenges of taking on these new costs and responsibilities were especially acute among the smaller associations lacking the resources, as well as the time or skills, to build the necessary capacity to take on additional management roles. Those associations that felt more able to absorb the downloading of costs and responsibilities, frequently raised the lack of

government planning and short time frames given to industry to take on various tasks, with many expressing that with a more gradual and supported transition, many associations would welcome the greater autonomy that could come with carrying a greater proportion of management cost.

Similar to organizational governance capacity, financial capacity was frequently identified as being foundational for all types of work the association does. When there is an inability to carry out the association's mandate, due to inadequate funding or other factors, the faith of the association's membership is also undermined, further compounding the challenges to achieving the organizational capacity necessary to participate as fully as is possible in co-management.

The third, and most frequently mentioned, barrier subcategory of organizational capacity that was identified related to community and/or membership commitment and support (I1.3), with 81 percent of respondents (n=25) citing this as a general barrier and 34 percent (n=10) of those who identified key barriers, citing this as key (Figures 7 & 8 and Table 5). As Graham et al. (2006) state, "the only credibility an organization has to speak about an issue comes from having a strong and involved membership" (p.81). Fishermen's lack of motivation to be involved within the association, and, through it, in fisheries co-management with government, was attributed to a number of factors, the most significant of which was a lack of trust in the government and disenchantment with the 'co-management' process. The latter was felt to not involve them or incorporate their knowledge and values in fisheries management and decision-making in a meaningful way, regardless of whether they have a 'seat at the table'.

Many respondents spoke of low turnout at association meetings, which they largely attributed to a feeling among their membership of there being no point to the process; that participating in 'co-management' is a waste of their time as their input has no effect. While, low membership turnout at association meetings is not necessarily indicative of problems with membership support, Gary Dedrick, president of the Shelbourne County

Quota Group, described how it can still limit the strength of the organization's voice with DFO.

> We've got one general meeting a year and you hardly got enough (membership turn-out) for a quorum. That can be seen as good and bad. The good thing is that tells you – if you're gonna be an optimist – that everything is going okay, so people really don't come, when they have no reason to come. Being the pessimist, you might interpret it instead as being a sign that they don't really give a shit, and thay are gonna do what they are gonna do anyway'. In any case, it (low turnout at meetings) is very unfortunate. I firmly believe that numbers talk. And if I could, if I had a meeting and a hundred people show up to it, don't worry, DFO knows, and they'll listen. If I have a meeting and ten people show up, and they know that probably 150 should be there, they feel 'what's it to them anyway? So, it's a kind of a catch-22 (Gary Dedrick, president of the Shelbourne County Quota Group).

Many respondents noted that while membership commitment and support is frequently mobilized in times of crisis or when the industry is faced with particularly large issues, as soon as the crisis is over, levels of engagement plummet. Kevin Squires, president of the MFU local 6, expressed the frustration of how this leaves many associations operating in a reactive instead of proactive mode and might be seen to undermine the credibility of participation.

> If you've got a crisis or a big opportunity, you can find people to show up and do some work in those instances. But the day that the crisis is over, then all of a sudden the interest wanes… and then finding people to do the necessary work of maintaining the operations/functioning of the association can be very difficult (Kevin Squires, president of the MFU local 6).

Other factors cited as constraining community and/or membership commitment and support included the challenges associated with engaging fishermen who are uneducated in the process. Many respondents also referenced the inherent independent nature and shortsightedness of many fishermen. As fishing has become a less appealing or less feasible option of employment in many of Nova Scotia's coastal communities, the demographics of those participating in the fishing industry has changed. Several respondents spoke of how many of the young people in their communities are seeking work in the cities or out west, leaving behind a rapidly aging population of fishermen, who may have neither the capacity nor the desire to innovate. Many current fishermen

fished in past times when the fisheries flourished and were largely unregulated. Having lived through the groundfish fishery collapse, many have been left with a distrust in the government, which is widely felt to have caused these crises though mismanagement. Some respondents spoke too of their memberships' distrust in the association and/or leadership, at times, of being largely resistant to change, and of conveying a general desire to 'leave well enough alone.'

Despite these many factors, there was widespread consensus among respondents that the primary reason for low fishermen engagement is a lack of interest in being involved due to the perception among many fishermen that they are up against a government climate and management regime that does not meaningfully include fishermen in the process. This perception among fishermen, though clearly interlinked with, and affected by, the external barrier identified above of an inadequate consultation process (E4.4), was categorized separately, as it was offered as explanation for many fishermen's lack of willingness to participate in the process, independent of whether the respondent identified the consultation process as a problem. As one respondent put it:

> We should have a say. But we should also say it. A lot of times there's such little involvement and such little interest from the fishermen that they just let it be, life is passing them by and they're just kind of doing their thing... burying their head in the sand... (Trevor MacInnis, president of the Inverness South Fishermen's Association).

The lack of faith in the co-management process and its outcomes (i.e., the sense that involvement makes no difference) can quickly spiral into a situation where the consequent lack of engagement further promotes a lack of voice for fishermen.

Conflict within the association (I1.4) was the fourth barrier subcategory relating to organizational capacity noted by respondents, though this subcategory was much less frequently raised, both as a general and key barrier to fishermen involvement (Figures 7 and 8). So, while tensions between fishermen due to: personality conflicts; over who gets to take part in profitable fisheries research with DFO (e.g., the halibut survey); or, most notably, between the younger and older generations were raised, these were felt to be

relatively minor constraints to fishermen's associations' ability to participate effectively in fisheries management.

I2. Lack of inter-association or intra-industry collaboration

A lack of inter-association or intra-industry collaboration (I2) (i.e., collaboration between associations and between fishing sectors) constituted the second internal barrier category highlighted by interviewees. This was seen as a more significant barrier overall than conflict internal to the association. A number of respondents talked about a general lack of collaboration or cohesive voice within the industry and stressed the importance of working together to achieve a stronger industry voice in fisheries management.

Unlike some other Canadian provinces, such as Prince Edward Island or Newfoundland, which have one organization, or union, that represents all fishermen in the province, Nova Scotia is characterized by having a multitude of fishermen's organizations of varying size and degree of organization, representing different fisheries, harvest type, regions, or local management approaches (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association, personal communication). Some respondents emphasized the need for, or value of, having many associations, so as to represent the diversity in perspectives and experience among fishermen across the province and give more power to the smaller voices than may happen with larger, consolidated organizations. The president of the Upper Bay of Fundy Fish Draggers Association, for example, mentioned having formed their own small organization, so as to be able "to represent what and who we are," independent of the larger collective. Despite this effort towards greater say in their future, he also spoke about how larger associations with greater power and more of a corporate voice still dominate.

Others, however, emphasized (1) the challenges associated with the lack of united cohesive voice that comes with there being so many associations pushing their own agendas instead of working together to find compromise, and (2) the potential political and economic gains of greater collaboration and unity on a larger scale.

> There are way too many organizations. Every Tom, Dick and Harry has got a different opinion and wants to form a group to accommodate that, rather than to try and work together to encompass most of them by finding consensus as a whole. The attitude is 'I'm going to give my two cents worth,' when, in reality, it's always a waste of time because if you're only one voice against many, you don't have a big effect (Dale Richardson, president of the Swordfish Harpoon Quota Society).

There was also the perception among respondents that the DFO, owing to a lack of common regional position among the many associations, goes to whatever voice supports their mandate.

> If DFO, or even the provincial fisheries, are looking for a decision, they can always find a group that are against it so they can do whatever they want. There's never unanimity. If we had one or two organizations, you would get better representation and have an organization that had a little bit of clout (Dick Stewart, manager of the Full Bay Scallop Association).

> Now DFO, at times they'll migrate towards that capacity when it suits their agenda. When it doesn't, they'll migrate towards the lack of capacity and their consultation reflects what they want to hear (Ginny Boudreau, manager of the Guysborough County Inshore Fishermen's Association).

While 61 percent of respondents (n=11) mentioned a lack of collaboration as a general constraint to their ability to achieve greater involvement, it was considered a key barrier by only 7 percent of those who responded (n=2), making it the least frequently mentioned category in terms of key barriers (Figures 7 & 8 and Table 5). However, whereas most respondents, being relatively dissatisfied with the current nature and extent of their involvement in fisheries management (See Chapter 2), focused their comments on the barriers they have experienced (the interview asked respondents to reflect on both enabling and constraining factors to having been able to achieve desired levels of fishermen involvement in fisheries management), those that did speak about enabling factors often referred to the importance of inter-industry and/or intra-association collaboration. Many respondents spoke to the potential or real benefits of collaboration, both between fishermen's associations or more broadly (e.g., partnerships with universities in research initiatives or fisheries umbrella organizations, etc.) in terms of gaining political weight, potential for co-learning, and/or sharing of resources. In the face

of increasing government downloading of management responsibility and cost, several respondents expressed that working together will be the only way they are going be able to take this on.

3.2. Barriers by Fisheries Management Category

Chapter 2 demonstrated that the degree of fishermen involvement in fisheries management is variable, depending on the management category in question. Not surprisingly, the type of barriers faced in achieving greater involvement in fisheries management were also shown to be dependent on which management category is considered. Key barriers to fishermen involvement were given for fisheries management overall and not for specific management categories. Figure 9 shows the frequency of internal versus external barrier categories mentioned by fishermen's association representatives interviewed with regard to each fisheries management category (See Table 1 and Chapter 2 for presentation of the six management categories). External barriers were cited more frequently than internal barriers by respondents in all but two management categories (of which one was a tie). The difference between frequency of mention of external versus internal barriers was greatest with regard to involvement in the management category of **direction-setting, planning and policy development**, followed by **compliance and enforcement** and **harvest management**, with external barriers to involvement in these aspects of fisheries management cited by more than twice as many respondents than internal barriers (27:12; 22:8; and 19:7, respectively) (Figure 9; Table 6). More detailed analysis showed barriers relating to government procedures and mechanisms for involvement (E4), particularly those regarding limitations to DFOs consultation process (E4.4), figured most significantly as constraining fishermen involvement in **direction-setting, planning and policy development**, and **harvest management**, whereas barriers to greater involvement in **compliance and enforcement** were cited more frequently as being a result of the broader government political and economic context (E1), particularly a lack of sufficient government funding (E1.2) (Table 6).

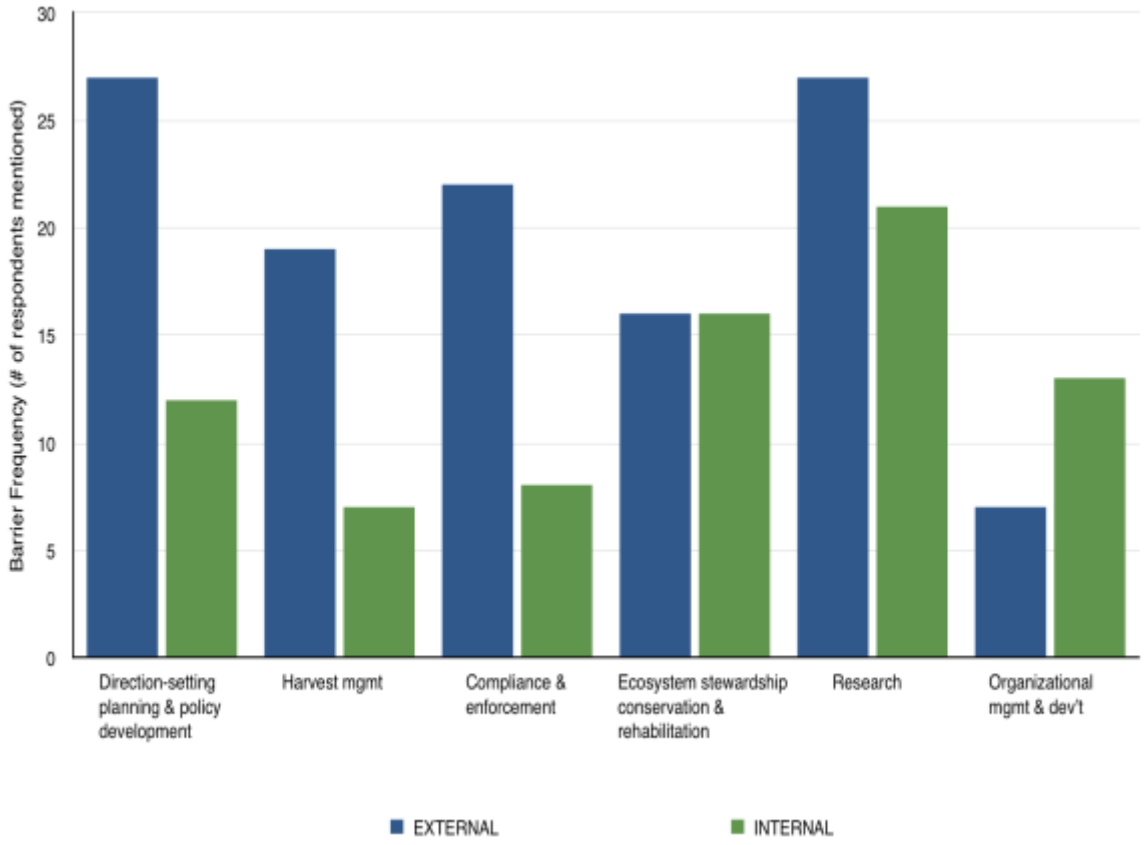


Figure 9: Frequency of Barrier Type (i.e., Internal vs External) mentioned by fishermen's association representatives interviewed for each fisheries management category

Barriers were most frequently cited (as determined by the sum of respondents citing external and internal barrier categories) with regard to involvement in **research**, followed by **direction-setting, planning and policy development** aspects of fisheries management, with external barriers constraining involvement in **research**, again, most frequently referencing challenges associated with cutbacks in government funding (Table 6). While still less frequently mentioned than external barriers, internal barriers figured more prominently as constraining fishermen involvement in **research** than in any other management categories (Figure 9). Data analysis showed this to be primarily explained by a lack of financial capacity within many fishermen's associations to take on the increasing government offloading of tasks onto these associations (Table 6), despite a significant desire to do so. Fisheries research is largely funded by industry, with many fishermen's associations often investing not only considerable money, but also large

amounts of time, as well as boats & expertise towards data collection (Graham et al., 2006). As Wiber et al. (2004) write, the devolution of these management tasks places significant demands on local organizations. Many respondents similarly noted - It's a very expensive proposition to get into a lot of science.

In contrast, internal barriers to involvement in **ecosystem stewardship, conservation and rehablitation** aspects of fisheries management were shown to be instead largely attributed to a lack of membership and/or community commitment and support (Table 6). The lower commitment and support for fishermen involvement in this category, however, was generally not indicative of a lack of concern for conservation, but rather highlighted a sentiment, expressed by many association representatives, that too much responsibility for **ecosystem stewardship, conservation and rehablitation** currently falls to the associations, and that the government should be investing more in this category. Others expressed that such work is not necessary, given the current health of stocks, or feasible, depending on the ecology of targeted species or harvest technology used.

Organizational management and development was the only fisheries management category where internal factors were more frequently raised than external as constraining fishermen involvement (Table 6 and Figure 9). Internal barriers to involvement in this category, raised by respondents, encompassed various constraints to organizational capacity, including inadequate leadership and/or inadequate funds to compensate leadership or hire necessary staff to carry out the organizational work required for effective participation in fisheries co-management, as well as the difficulty in engaging membership support. A general lack of collaboration between associations, resulting in associations working in isolation instead of together to strengthen their organization and voice, was also, though less frequently, raised. Fewer respondents raised barriers with regard to involvement in this management category, followed by **harvest management**, possibly explained by the fact that current involvement in these aspects of fisheries management was felt to be higher than in other the categories (See Chapter 2).

The fact that the devolution of some fisheries management functions to industry is much more common than others was a source of frustration for many respondents. The government's offloading of an increasing amount of management responsibility onto fishermen's associations, for example, through continual cutbacks in funding for science or funding for various management committees, combined with associations taking on greater self-management in a number of management categories, has resulted in a greater role for industry in some aspects of fisheries management. However, as Ashton Spinney, president of the LFA District 34 Lobster Management Board pointed out, "**the government is still running the show**" – a sentiment repeated by George Zinck, president of the Prospect Area Full Time Fishermen's Association:

> They download everything on us, but when it comes to the crunch time, they still dictate what we have to do (George Zinck, president of the Prospect Area Full Time Fishermen's Association).

Despite many respondents expressing the desire for greater involvement in **direction setting, planning and policy development**, for example (See Chapter 2), there was a repeated sentiment that in these aspects of fisheries management, the DFO remains opposed to giving away their powers and has largely downloaded management responsibilities onto fishermen's associations "without a real transfer of control or decision making power" (Graham et al., 2006, p.15), thereby maintaining the top-down command and control structure of conventional fisheries management, whereby fishermen continue to be mere 'recipients of instructions' (Jentoft, 2005). As one respondent put it:

> Co-management is just a buzz word from Ottawa and doesn't mean much. There are areas where we have fairly well established fisheries that have meaningful input but when it gets down to the nitty gritty… We generally get the cost of doing it but they still have all the power (Dick Stewart, manager of the Full Bay Scallop Association).

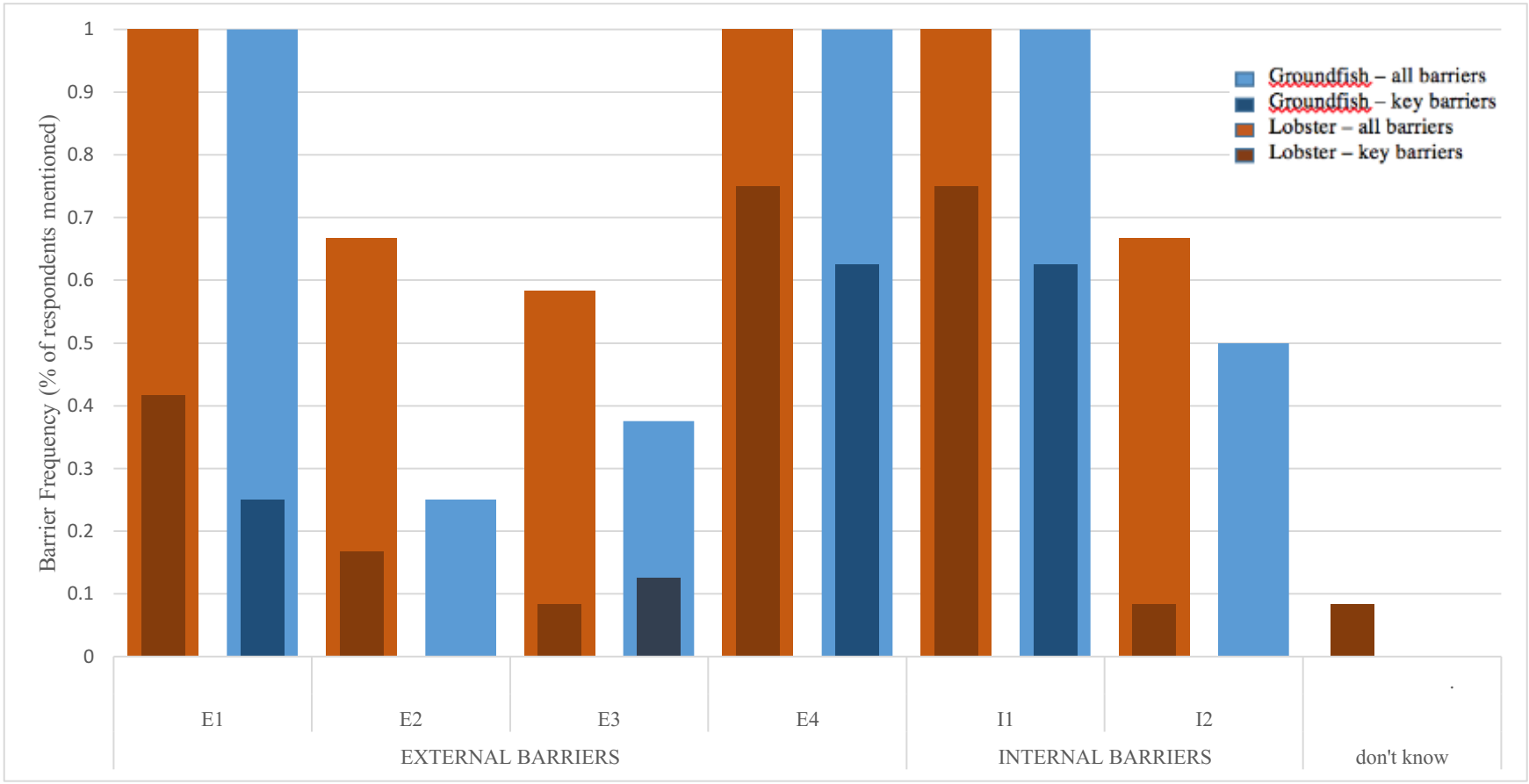
This sentiment was echoed by many fishermen's association representatives interviewed, revealing the widespread perspective, even among those that ranked themselves as highly

involved on the co-management spectrum presented in the survey (See Chapter 2), that there is in fact no 'real' co-management in the ideal sense of the term.

3.3. Exploring the Context Behind Fishermen Involvement

Just as the achievement of greater involvement in fisheries management varies across associations (See Chapter 2), one might expect that barriers to involvement might also vary, depending on the unique circumstances of each association. In order to identify ways of potentially addressing these barriers and improving fishermen's involvement in management, it is helpful to understand the context behind these differing experiences and determine which barriers are widely relevant across associations, or alternatively, more case specific.

Figure 10 shows the difference in overall and key barriers experienced by groundfish and lobster associations, respectively. Lobster association representatives identified more barriers on average, and, unless equally mentioned, more barriers within each barrier category, with the exception of DFO **organizational structure and operations**, regarding which key barriers were cited twice as often by groundfish associations than by lobster. However, groundfish and lobster association representatives agreed that: (1) the broader political and economic context; (2) government procedures and mechanisms for involvement, and; (3) organizational capacity encompass the most frequently felt barriers to fishermen involvement overall. Key barriers were also most frequently cited as falling within these categories, most significantly within the latter two for both fisheries. These data indicate that, despite some variation in frequency of barriers felt, by and large groundfish and lobster fishermen experience the same types of barriers, suggesting that similar strategies might be applicable to improving involvement in both of these fisheries. Associations representing other fisheries were too few for meaningful quantitative analysis.



E1: Broader political and economic context
E2: Policy & legislative framework
E3: DFO structure & operations
E4: Gov't procedures/mechanisms for involvement

I1: Organizational capacity/competencies
I2: Inter-association/intra-industry lack of collaboration

Figure 10: Percentage of NS lobster (n=12) and groundfish (n=8) association representatives that mentioned each barrier category as a general and key barrier to fishermen involvement in fisheries management.

Other factors, beyond the fishery, that might influence the types of barriers to fishermen involvement in management that a given association face include: (1) their region (affecting: the types of fisheries existing in the area; the composition of the fleets as well as rules and regulations regarding the fishery; accreditation and mandatory membership requirements; as well as structures for involvement in place); (2) the health and nature of the resource (Pinkerton, 2009); (3) harvest license type; (4) the characteristics of the community, including association history as well as accreditation status, size, staffing, funding, corporate connection, etc. (Agrawal, 2002; Pinkerton, 2009); (5) the nature of the community's relationship with outside groups and government (Pinkerton, 1993; Pinkerton, 2009); etc. Given the broad range of associations interviewed and number of associations with certain context variables too few for meaningful analysis, it was not possible to analyze these factors in this study; this offers a possible avenue for future research.

To explore the relationship between fishermen involvement and barriers identified, a comparison was made of the number and type of barriers mentioned by respondents and their stated level of current involvement and dissatisfaction with involvement in fisheries management, as calculated by the difference between current and desired involvement ratings. Comparing the proportion of internal versus external barriers mentioned by interview respondents to their level of dissatisfaction and current involvement in fisheries management overall showed no significant relationship between involvement and type of barriers experienced. However, linear regression comparing the level of current fishermen involvement in management overall against the proportion of total barrier categories mentioned by a given respondent, showed with 99% confidence ($p=0.0138$) that **the higher the level of involvement experienced, the fewer barriers are likely to be identified as constraining that involvement** (Figure 11). Since this analysis does not demonstrate the direction of the causal connection, it cannot be said whether this result indicates that the fewer barriers an association faces the more they are involved in fisheries management, or that the more involved the association is, the fewer barriers association representatives perceive.

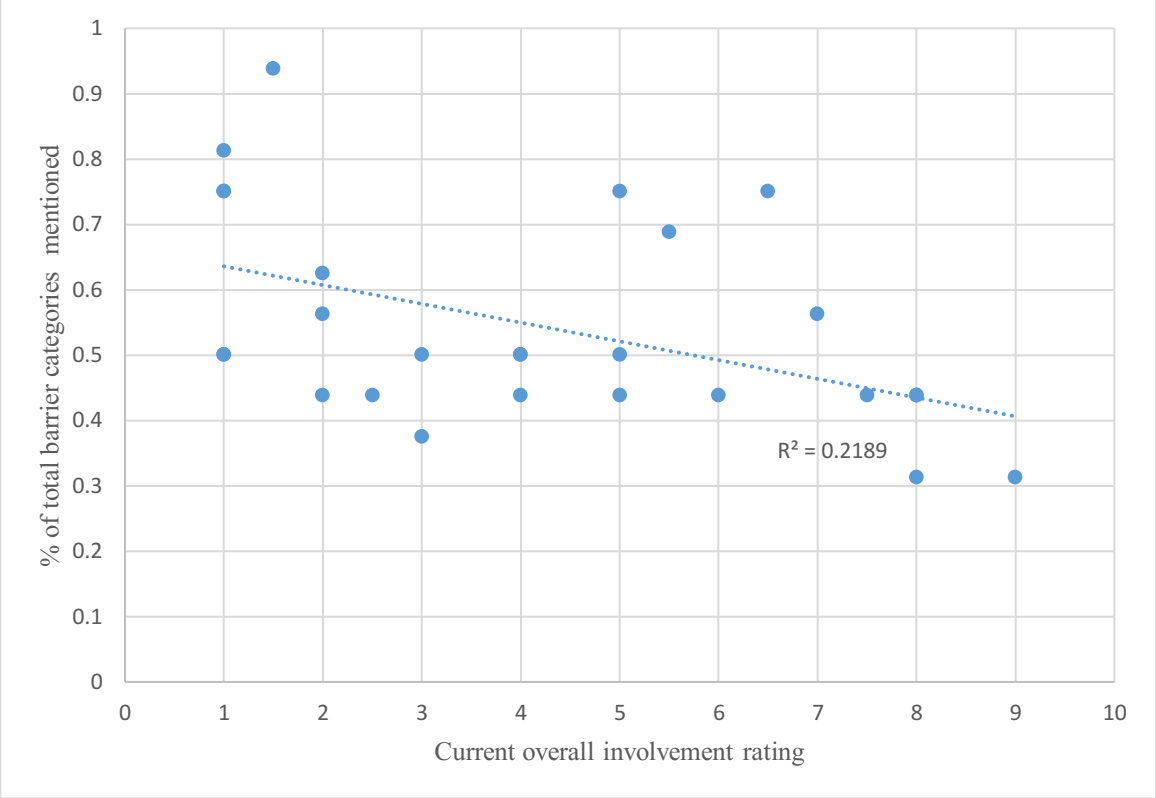


Figure 11: Level of current involvement vs. proportion of barriers mentioned

4. Conclusion

Co-management certainly holds promise for a "more appropriate, more efficient and more equitable management" of fisheries resources (Pinkerton, 1989, p.5), and has been gaining increasing consensus in the literature, with a growing number of governments emphasizing increased collaboration as an important part of their natural resource management strategies (Nielsen et al., 2004). However, how 'co-management' is conceptualized varies with regard to what is considered to be: the appropriate "roles of government and other stakeholders in the decision-making process; the types of

management tasks which can and/or should be co-managed; and/or the stage in the management process when co-management is introduced" (Mazur, 2010, p.4). The term co-management may therefore, not surprisingly, be used by different parties – whether community or government - to describe, at times, very different power sharing arrangements or management approaches.

Where involvement in, or responsibility for, certain management tasks is shared with industry without any real accompanying "transfer of control or decision-making power" (Graham et al., 2006, p.15), fishermen are often left frustrated, disappointed, and with the sentiment that 'co-management' is nothing more than 'business as usual' (Nielsen et al**.,** 2004), as their expectations and hopes for genuine involvement remain unmet. This lack of empowerment, Nielsen et al**.** (2004) argue, can in fact make 'co-management' worse than the more conventional 'command and control' management approach in that the legitimacy of the management system is undermined and trust further threatened, while 'co-management' objectives remain largely unmet.

This research shows that there are numerous barriers preventing fishermen from being more involved in fisheries management in Nova Scotia. Barrier categories most frequently raised by association representatives and recognized as being particularly critical related to: 1) government procedures and mechanisms for involvement, most notably an inadequate consultation process; 2) insufficient organizational capacity to participate effectively in co-management; as well as 3) a broader political and economic context that many felt undermines fishermen's voices being heard. While co-management has been increasingly touted by government and academics alike as a more socially equitable and environmentally sustainable approach to the management of fisheries resources than conventional top-down management practices, these issues were felt by fishermen to significantly limit the possibility that this potential of co-management be reached.

The barriers to fishermen involvement in fisheries management uncovered in this research are consistent with findings presented in other research. However, a review of

co-management literature found more frequent discussion of conditions or prerequisites that can enhance the emergence of co-management or co-management success than presentation of barriers per se (Olsson et al., 2004; Armitage et al**.,** 2007; 2009; others). Requisites for co-management often emphasized similar social and institutional factors raised by respondents and presented earlier in this chapter, notably: the importance of collaborative relationships and trust (Pinkerton, 1989); equitable power-relations and empowerment of resource users; appropriate government structures and processes (Röling & Wagemakers, 1998; Reed, 2008); capacity at all levels – community as well as agency (Cordova, 1997; Reed, 2008); social networks, collective action and strong organizational leadership (Pinkerton, 2003; Pinkerton, 2009); as well as supportive policy and enabling legislation (Cordova, 1997; Pomeroy & Berkes, 1997; Wondolleck & Yaffee, 2000), among others (Schusler, Decker & Pfeffer, 2003; Schusler, 2001; Pinkerton, 2003; Pinkerton, 2009; Pinkerton & Weinstein, 1995, Reed, 2008; etc.).

This research, however, demonstrated the significant inter-linkages between barriers. The internal barrier of organizational capacity, for example, was shown to be highly affected by external factors. The governmental funding environment and downloading of management responsibility and cost puts greater financial burden into the laps of fishermen's associations thereby, at times, straining their ability to be organized. Further, a lack of adequate membership commitment and support (identified as the most pervasive barrier to organizational capacity) was found to be largely attributed to fishermen feeling disenchanted by a consultation process felt to be not only ineffectual but perceived to be giving greater voice to corporate interests in the fishery, while actively disregarding the input of small-scale fishermen. These insights suggest that a lack of organizational capacity is largely a systemic problem that cannot be separated from its wider political and institutional context. Efforts to address organizational capacity, therefore, need also to change the system, so that it inspires and motivates fishermen towards involvement and mobilizes community leadership. Fishermen involvement in fisheries management is contingent on both internal capacity as well as an external environment that supports involvement. Therefore, strategies to improve levels of fishermen involvement must

address barriers both internal and external to the fishing industry and fishermen's associations.

Whereas this study focused solely on the involvement of fishermen in fisheries co-management, as perceived by fishermen's association representatives in Nova Scotia, expanding this scope to obtain a broader assessment of barriers to fishermen involvement across the country and in other parts of the world, and to determine whether this research's finding that **the higher the level of involvement experienced, the fewer barriers are likely to be identified as constraining that involvement** is true in other fisheries and other regions, would be a valuable avenue for future research.

Chapter 4: Discussion and Conclusion

1. Introduction

Previous chapters of the thesis have shown that fishermen involvement in fisheries management is not straightforward. Fisheries management is complex, involving a multitude of diverse management tasks, some more suitable or more likely to be shared with resource users (Nielsen et al**.,** 2004; Pinkerton, 2009). Chapter 2 demonstrated that fishermen involvement in various fisheries management categories is not uniform. Nor are the barriers fishermen's associations face in achieving desired fishermen involvement, though Chapter 3 demonstrated some barriers to be: a) more universally experienced by fishermen in Nova Scotia; and b) more applicable to involvement in certain aspects of fisheries management. This chapter looks back at the nature and extent of fishermen involvement in fisheries co-management in Nova Scotia and the factors felt, by fishermen's association representatives interviewed, to have constrained their greater involvement in fisheries management, summarizes the main findings and presents some key lessons learned. Limitations of this study, including methodological constraints and limitations in scope are also identified and possible directions for future research explored.

2. Summary of Research Findings and Reflections on Lessons Learned

2.1. Assessing the Nature and Extent of Fishermen Involvement

Despite the theoretical and government assertions that supports the importance and value of co-management, this research indicates that, overall, fishermen's association representatives in Nova Scotia feel that there remains a gap between co-management theory and the realities of how it is played out on the ground, when it comes to the management of fisheries resources in the province. As user involvement in co-management has tended to, by and large, be evaluated against a single scale of involvement (e.g., Arnstein, 1969; Pinkerton, 1994; Sen & Nielsen, 1996; Pomeroy & Berkes, 1997) and fisheries management is, in fact, complex, involving a multitude of

varying management tasks, it can be difficult to ascertain the specific realities of how fisheries co-management operates in practice (i.e., which management tasks are shared and to what extent) (Pinkerton & Weinstein, 1995; Pinkerton, 2009). Knowing not only to what extent, but in what capacity fishermen are currently and wish to be involved provides a better picture of the realities of co-management, which in turn can help direct strategies to enhance fishermen involvement to the most desired and appropriate management tasks, thereby increasing the ability of more collaborative approaches to accommodate fisheries management needs of the future.

While a few of the fishermen's association representatives interviewed for this research expressed overall satisfaction with their associations' current levels of involvement in fisheries management, many respondents expressed frustration with the discrepancies in current involvement between management categories. Insight into the nature and extent of involvement in fisheries management in Nova Scotia obtained through this research found that fishermen, while wanting greater involvement in all categories, are currently most involved, and most desire involvement, in certain specific management categories. A major one of these is **organizational management and development**. Interview data, however, demonstrated that this finding more reflects a high degree of current responsibility than involvement per se in these tasks. Though a number of association representatives voiced the wish that government would do more to help strengthen their associations, high desired involvement in this category suggests that they recognize the critical importance of empowering their associations to better participate in co-management of their fisheries and take on management tasks.

Harvest management also rated highly for both current and desired fishermen involvement and rated highest in terms of priority for fishermen involvement. Though there remains the desire for greater involvement than has been achieved in this category, high scores for current involvement, in comparison to other categories, might suggest that fisheries co-management in the province has, in some ways, been moving in the right direction.

Desired involvement was similarly high with regard to the category of **direction-setting, planning and policy development**. Current involvement was, however, somewhat lower and the engagement gap, as calculated by the difference between mean current and mean desired involvement, was greatest in this category. Many felt the government, despite downloading a number of management tasks onto industry, has largely retained their top-down approach in this aspect of fisheries management. Respondents also ranked **direction-setting, planning and policy development** highly in terms of priority for fishermen involvement, indicating that increasing fishermen involvement in **direction-setting, planning and policy development**, though seen as difficult to achieve, is also regarded as critical for meaningful co-management and may be an important area for improvement if the 'co-management' approach is to hold much credibility with fishermen.

Both current and desired fishermen involvement in **research** and **ecosystem stewardship, conservation and rehabilitation** were found to be very similar. However, **research** ranked higher than **ecosystem stewardship, conservation and rehabilitation** in terms of priority for fishermen involvement, indicating that while fishermen desire greater involvement in both categories, they are more eager, or willing, to take on greater management responsibilities and costs relating to the former.

While fishermen involvement was lowest in **compliance and enforcement**, this category also rated lowest in terms of desired involvement, as well as in priority for fishermen involvement, indicating that though fishermen want greater involvement in certain aspects of this management category (e.g., developing fishing rules and bylaws), for the most part they prefer not to be the ones policing and enforcing them, desiring that the government largely maintain responsibility for these functions.

2.2. Barriers to Involvement

There is a growing body of research that seeks to elucidate the preconditions for successful co-management of natural resources (e.g., Pomeroy et al., 2001; Olsson et al.,

2004; Armitage et al**.,** 2007; 2009; Pinkerton, 2009). This study builds on this research by exploring instead barriers to fishermen involvement in fisheries co-management, as identified by fishermen's association representatives themselves. This study also highlights the relative weight of barriers felt, as determined by the number of associations raising each issue, both in constraining desired involvement in fisheries co-management overall and within six fisheries management categories.

Qualitative analysis of interview transcripts highlighted a number of barrier categories, both internal and external to fishermen's associations and/or the fishing industry, felt by respondents to be constraining fishermen involvement in fisheries management in the province. The barrier categories most frequently raised, and identified as most critical, by respondents related to: 1) government procedures and mechanisms for involvement, most notably an inadequate consultation process; 2) insufficient organizational capacity to participate effectively in co-management; as well as 3) a broader political and economic context that many felt undermines fishermen's voices being heard. These, as well as the variety of other barriers identified by respondents, highlight the interconnectedness of many of the barriers facing fishermen and the importance of addressing these in tandem - strategies to enhance fishermen involvement in co-management must be conducted at several levels, both internal and external to the fishing industry. Meaningful fishermen involvement in co-management clearly requires robust local institutions with the organizational capacity (i.e., human and financial resources) to represent fishermen. Organizational capacity is, however, linked to the wider political and institutional context within which 'co-management' operates. A move toward more cooperative management requires that the system inspire and motivate fishermen involvement by empowering fishermen with the sense that their voice will be heard by linking involvement to decision-making through a democratic process that is equitable, just and transparent with "well-defined policies (...) for enabling communities to participate in and influence policy processes" (Fabricius, Folke, Cundill, & Schultz, 2007, p.10).

3. Study Limitations and Implications for Future Research

This research was limited by the time and logistical constraints inherent in a Master's thesis, which impacted the potential scope of the project. The research focuses the analysis of fishermen involvement on the perspectives and experiences of industry representatives, asked to speak on behalf of the fishermen's association and membership they represent. While it is important to acknowledge that responses are individual opinions inherently framed by the respondent's own background and experiences, and may not represent the perspectives of all the fishermen they represent, the focus on association representatives served to ensure that selected respondents were most likely to be active and knowledgeable in fisheries 'co-management' and best able to reflect on the experience of their membership. Although beyond the scope of this study, interviewing multiple individuals at different levels within a given association might help to determine the extent to which the perceptions of association representatives reflect the experience of the fishermen they represent.

As not all fishermen in Nova Scotia are represented by a local fishing organization – determined by the fishery and region in which they participate, and in some parts of NS the DFO does not consult with fishermen's associations regarding the management of some fisheries, but instead liaises with port representatives or individual fishermen (Kevin Squires, president of the MFU local 6, personal communication). Gathering insight on fishermen involvement in fisheries management through interviews with association representatives may furthermore not represent the perspectives of all local fishermen. Speaking to these individuals and the fishermen they represent could provide a fuller picture of fishermen involvement when and where it occurs independent of fishermen's associations. As most members of fishermen's associations are license holders, this research also leaves out the perspectives and experience of fishermen working as crew.

It is also important to recognize that, while it is primarily through fishermen's associations that the Canadian government seeks to incorporate the interests of the fishing

community into fisheries co-management, not all interests within the broader fishing community are represented in such associations. This research examines the involvement of a subset of the fishing community – fishermen represented by fishermen's associations. As Syenseke (2009) writes, the concept of local involvement "has to be contextualized and analyzed using the questions; why? how? and for whom?" (p.215). This research addresses the 'why' and 'how' – in examining how co-management is played out on the ground – but, in focusing on fishermen's associations, does not address the question of who more broadly **should** be included as co-management partners. This is an important topic that warrants further study.

This research also did not assess the involvement of First Nations communities in fisheries management. Although the compiled list of Nova Scotia fishermen's associations used in this research included a few First Nations groups, none of these appeared in the random selection process used in identifying associations to interview. "Aboriginals in Canada have had a long history of involvement in fisheries" (McGaw, 2003, p.417). While for decades, First Nations communities were largely excluded from commercial fisheries, as a result of systems of limited entry with high capital cost of entry (McGaw, 2003), in 1999 the Aboriginal treaty right of First Nations in Eastern Canada to "access the fisheries for commercial purposes" (McGaw, 2003, p. 417) was affirmed by the Supreme Court of Canada in the Marshall decision (R.v. Marshall, 1999). Since then, "co-management has been put forward by both First Nations and DFO as a mechanism through which First Nations' Title and Rights can be reconciled with current governance structures and processes" (First Nations Fisheries Council, n.d., para 2). Looking at the nature and extent of First Nation communities' involvement in fisheries co-management is an important avenue for future research, and one that warrants focused study. As the Assembly of First Nations (AFN, 2010-11) highlights, "there is a clear difference between Canadian "stakeholder" fishers and First Nations "rights holder" fishers" (p.6). "While fisheries stakeholders are legally limited in their participatory role as fisheries managers, First Nations are not. First Nations are given a legal basis for management and joint-management of fisheries resourced by the Constitution Act, various treaties and settlement terms, comprehensive land claim acts, the Indian Act, and Supreme Court

decisions" (AFN, 2010-11, p.5). These aspects will need to be addressed in future research on co-management involving First Nations and co-management boards which involve First Nations.

Whereas the above describes limitations with regard to the depth of the research, future research may also expand its breadth. This study focused solely on the involvement of fishermen in fisheries co-management, as perceived by fishermen's association representatives in Nova Scotia. Expanding this scope to obtain a broader assessment of the nature and extent of fishermen involvement across the country and in other parts of the world, and the barriers they face in achieving their desired involvement, would be a valuable avenue for future research.

As improving fishermen involvement will require that industry and government work together toward a shared vision and a commitment towards similar goals, another useful avenue for future research would be to similarly assess government perspectives on fishermen involvement. How would government representatives rate current fishermen involvement in the various aspects of fisheries management and what do they consider to be appropriate or desirable levels of fishermen involvement? Co-management is a broad concept; coming to consensus on what fisheries co-management should mean and/or look like is a critical first step, if it is to be meaningfully achieved.

Research limitations also existed in terms of data collection and analysis. As noted in the thesis, many fishermen's associations in the province are run by volunteer fishermen who are constrained by fishing season. As a result, association representatives were not all reachable and/or available for interview, which may have resulted in a bias towards associations with greater organizational capacity (e.g., ability to maintain staff).

While random sampling of fishermen's associations yielded a fairly representative cross-section of NS fishery associations, the relatively small number of associations, particularly for some fisheries, also prevented me from performing any real statistical analysis, making substantive generalizations, or looking at differences between fisheries – other than lobster and groundfish not possible.

This research focused the exploration of commonalities and differences in perspective and experience among fishermen's associations to (1) an overall assessment across all respondents, and (2) a comparison between the two most important and widespread fisheries sectors in the province, those for groundfish and lobster. Other factors, beyond the fishery, that might influence the types of barriers to fishermen involvement in management that a given association face include: (1) their region (affecting: the types of fisheries existing in the area; the composition of the fleets as well as rules and regulations regarding the fishery; accreditation and mandatory membership requirements; as well as structures for involvement in place); (2) the health and nature of the resource (Pinkerton, 2009); (3) harvest license type; (4) the characteristics of the community, including association history as well as accreditation status, size, staffing, funding, corporate connection, etc. (Agrawal, 2002; Pinkerton, 2009); (5) the nature of the community's relationship with outside groups and government (Pinkerton, 1993; Pinkerton, 2009); etc. Limited data available on many of these factors precluded the use of stratified sampling of associations to capture and analyze involvement against a range of association sizes, organizational structure, etc. The broad range of associations interviewed and number of associations with certain context variables too few for meaningful analysis, also made it impossible to analyze for these factors in this study; this offers a possible avenue for future research.

Despite widespread use of the term 'co-management', and agreement amongst respondents of its value, this project highlighted the conceptual complexity of the concept. The multitude of possible interpretations of co-management, and consequent differences in the understanding of the rating scale used to assess levels of involvement, demonstrated, as Kevin Squires, president of the MFU local 6, expressed, that "**it's difficult to distinguish between what you want co-management to be from what it could be… and what it is**." While differences in interpretations may be seen as a limitation to the survey instrument, as it resulted in some data having to be removed to ensure comparability of survey results, it highlighted that many elements contribute to one's understanding of involvement and co-management. A better understanding of co-

management should not only disaggregate fisheries management into its various components (as argued in Chapter 2), but must also take into account these varying conceptualizations. Further research could examine fishermen involvement at different levels (i.e., regional versus local), and could better separate 'involvement' from 'responsibility'.

The survey framework used in this thesis for assessing involvement in fisheries management provides a structure with which to analyze co-management, but does not evaluate whether greater fishermen involvement of fisheries resources results in better, or more sustainable, management (See Pinkerton (2009) for a discussion on conditions that increase the possibility for community involvement to contribute to the social, ecological and economic objectives of co-management). The extent to which greater fishermen involvement has achieved co-management goals is another possible avenue for future research.

4. Looking Forward

Pinkerton (2009) argues that, to make a difference and participate meaningfully in co-management, "communities must have a bundle of rights to participate in the management system at multiple levels" (p. 245). She describes these rights as lying on a continuum from weaker and smaller-scope rights (i.e. lower order rights, including involvement in data collection and analysis and functions of harvest management) to stronger and larger-scope rights (i.e., highest level rights, including involvement in policy development and defining management goals).

The results of this research show that some management tasks (e.g., Pinkerton's lower order rights) are more readily shared, as the government moves to offload certain costs and responsibilities onto industry; whereas others, particularly **direction-setting, planning and policy development**, are more tightly guarded. If 'co-management' does not increase involvement in aspects of management that also empower fishermen through a real sharing of decision-making power which allows them to meaningfully contribute to

outcomes of the 'co-management' process, a collaborative relationship will be difficult to maintain.

As Jentoft (2005) notes, "empowerment is both a condition and a goal of fisheries co-management" (p.1). Co-management, he argues "is a question of (…) arming disempowered stakeholders with the tools necessary to (…) negotiate from a positon of strength rather than from an underdog position" (p.6). While fishermen involvement in implementation aspects of fisheries management, such as research, may not reflect real sharing of decision-making power, "research is not only about acquiring information – it is also about empowerment, transformation and changing the status quo" (Graham et al**.,** 2006, p.68). As fishermen become more involved in research, they become more able to shape the type of questions asked; ensure that their knowledge and insights are taken into account; and maintain ownership over, and better understanding of the information it garners, which can, in turn, give them a stronger voice in other aspects of fisheries co-management (Chuenpagdee, Fraga, & Euán-Avila, 2004; Wiber et al., 2009). As a result, involvement in research might be seen as offering a valuable starting point (i.e., means of moving from involvement in smaller-scope to larger-scope management tasks involving higher levels of responsibility). However, as this, and other research (e.g., Wiber et al., 2009), have noted, fishermen involvement in research is affected by the capacity of industry to take it on.

While this research focuses on barriers to fishermen involvement, as perceived by fishermen association representatives, those respondents that did speak about enabling factors often emphasized the importance of collaboration, both between fishermen's associations or more broadly (e.g., through partnerships with community-based institutions or academic and scientific institutions in research initiatives, for example, or participation in fisheries umbrella organizations, etc.) in terms of gaining political weight, as well as its potential for co-learning, and/or sharing of resources. In the face of increasing government downloading of management responsibility and cost, several respondents expressed that working together will be the only way they are going be able to take this on.

5. Conclusion

While this research shows that there are numerous barriers preventing fishermen from achieving their desired involvement in fisheries management in Nova Scotia, and that many fishermen's association representatives remain dissatisfied with the levels of fishermen involvement that has been achieved, it also demonstrates that both current and desired involvement varies depending on the fisheries management category looked at. The insights regarding fishermen involvement obtained in this study by disaggregating fisheries co-management into its various components demonstrate the value of such an approach in better understanding how co-management is being played out on the ground, i.e., in which aspects of fisheries management co-management has been more or less successful. Knowing in what capacity (i.e., in which management categories) and to what extent fishermen desire to be involved in fisheries management, offers further insight into the willingness and capacity on the part of fishermen to take on management various management tasks.

While there is widespread and increasing acceptance in the resource management literature and among governments and resource users alike of the value of fisheries co-management, and an overarching readiness and desire on behalf of industry for greater involvement, this project highlights the practical complexity of co-management. This way of looking at co-management could help facilitate the formulation of more effective strategies for achieving meaningful fishermen involvement in the management of fisheries resources.

Appendix 1: Detailed Methodology

1. Introduction

This chapter details the methodology and underlying research paradigm used to frame the study and outlines the approach to data collection and analysis used to achieve the project's stated objectives. It describes the mixed method design of the project as they were selected to best describe the nature and extent of both current and desired fishermen involvement in fisheries management, as perceived by fishermen's association representatives in Nova Scotia, and to determine what barriers have been found to constrain the achievement of desired fishermen involvement in the management process. Description of, and rationale for, the various aspects of the research design is presented, including an outline of the interview design and development followed by sections describing participant criteria and selection process, and approaches to data collection and analysis. The chapter concludes with a discussion on issues of validity and reliability of the research and a description of how the ethical conduct of research was ensured.

2. Selection of Research Paradigm and Methodology

Defined by Somekh and Lewin (2005) as the "principles, theories and values that underpin a particular approach to research," a project's methodology provides a frame of reference for the research and influences "the way knowledge is studied and interpreted" (p.349). As such, the research methodology, or conceptual lens, employed in a research project not only shapes the research methods – i.e., the strategies of inquiry and approach to the collection and analysis of data in a research study, but, as "quantitative and qualitative data are both created by means of the particular conceptual 'lens' used by the researcher" (Maxwell, 2010, p.477), can influence the results. It is therefore important to acknowledge the conceptual lens that frames a research project.

The primary conceptual lens used to guide the analysis and methodological approach of this thesis was the interpretivist/constructivist research paradigm. Interpretivist

/constructivist approaches to research seek to explore "the world of human experience" (Cohen & Manion, 1994, p.36.) The researcher, therefore, relies upon the "participants' views of the situation being studied" (Creswell, 2003, p.8) to create knowledge, theory and meaning from subjective descriptions of a given reality (Mertens, 2005; Creswell, 2003; Mackenzie & Knipe, 2006). This approach suited this project as it explores fishermen involvement through the lens of fishermen's association representatives' perspectives and experiences, therefore reflecting a snap-shot of respondents' constructed reality based on how it is currently perceived and experienced, rather than a static end-truth.

The research was also influenced by the pragmatic research paradigm, which forwards the idea that research questions should guide the research methods and encourages the researcher to pragmatically apply "multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis in a mixed-methods study" (Creswell, 2003, p.12) to try to best explore and understand the research problem. In line with this thinking, this research employed a mixed methods approach, combining qualitative and quantitative approaches within (e.g., use of qualitative interview incorporating quantitative survey ranking scale), and across stages of the research process (e.g., through both data collection and analysis) of a single study (Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2009).

Quantitative and qualitative methods were combined so as to allow: a) enhanced triangulation of data (i.e., corroboration/validation of research findings); b) elaboration and clarification of results; and c) the discovery of contradictions between results (Denzin, 1978; Greene et al. 1989; Creswell & Plano Clark, 2007; Teddlie & Tashakkori, 2009), all of which permit a clearer, more nuanced picture of fishermen involvement in fisheries management than could be acquired through one method alone, while improving validity of results.

3. Data Collection and Rationale

3.1. Interview Design/ Development

An initial comprehensive literature review was conducted on fisheries management process and co-management theory. This research provided the theoretical understanding necessary to develop a survey for assessing the nature and extent of fishermen involvement in fisheries management across Nova Scotia.

The interview instrument consisted of three components (See Appendix 2: Interview Guide). The first section explored contextual information pertaining to the role of the respondent, the association they represent, and the fishery they identified as most important to their membership, as some associations were multi-species associations, representing fishermen in more than one fishery. The second section surveys respondents on their current involvement overall and in six fisheries management categories, their aspirations for co-management (i.e., desired involvement), and factors affecting their involvement (See Chapter 3 for analysis of barriers felt).

In order to assess the nature of fishermen involvement in fisheries management in the second section of the interview, six key management categories were developed: 1) **direction-setting, planning and policy development**; 2) **harvest management**; 3) **compliance and enforcement**; 4) **ecosystem stewardship, conservation and rehabilitation**; 5) **research**; and 6) **organizational management and development.** Each of these encompass several key functions (See Table 1 and Chapter 2 for discussion of management categories). This division of fisheries management into subcategories was adapted from Pinkerton and Weinstein's (1995) approach and the table of management functions that commonly occur within community-based fisheries management, as outlined by Graham et al. (2006).

To calculate the extent of involvement (current and desired) along the co-management spectrum, as perceived by representatives of fishermen's associations, respondents were asked to rate the **predominant level** of fishermen involvement in fisheries management

overall and in each management category – since involvement within the different functions of a given management category might not be equal – against a scale of one to ten, where 1 represented 'no fisher involvement' and 10 represented 'full involvement/exclusive fisher responsibility.' The use of this rating framework for assessing involvement by management category allowed for data to be collected and analyzed in a standardized format, the results to be easily compared, and assessed for difference in experience or perspective.

The use of a continuous one to ten rating scale, with only endpoints defined, permitted results to be analyzed as interval scaled data, "making it possible to interpret not only the order of scale scores but also the distance between them" (Crawford, 1997, para.11), thereby justifying the use of statistical techniques that rely on "the calculation of the arithmetic mean as the measure of average" (Treiblmaier & Filzmoser, 2009, p.3). This means of measurement, often termed a semantic differential scale, since "each end of the scale is labelled with a word/phrase (or semantic) that is opposite in meaning to the other" (Crawford, 1997, para.25), is often used in evaluating social attitudes (Al-Hindawe, 1996), and is recognized in the literature as being a valid and reliable alternative to Likert style scales (Al-Hindawe, 1996; Treiblmaier & Filzmoser, 2009), which generally present fewer and well defined categories. This one to ten rating scale (1) makes "the semantic understanding of the various categories less important (as long as the anchor points are clearly defined)" (Treiblmaier & Filzmoser, 2009, p.6).

Respondents also provided verbal explanation of their ratings and were asked to reflect on enablers or constraints to achieving their desired levels of involvement in each management category (See Chapter 3). This served to substantiate and contextualize their numerical responses and also allowed differences in interpretations of the rating scale to be more easily identified.

The third section of the interview explores participant's reflections on co-management overall as well as key enablers or constraints to having been able to achieve their desired involvement (See Chapter 3). Further, respondents were asked to rank the six fisheries

management categories in order of priority for fishermen involvement. Recognizing that "involvement in fisheries management does not always happen in any particular order, nor are (management) activities always easily separated from one another" but rather "reinforce each other" and should consequently be "integrated, complementary, ongoing, and simultaneous" (Graham et al., 2006, p.27), priority ranking provided information on the perceived importance of involvement in each management category with respect to one another and offered a means of triangulation with desired involvement ranking results.

The interview/survey was pilot tested in Nov 2012 with two Nova Scotia fishermen's association representatives, selected as a result of their collaborative relationship with the thesis supervisor and/or mutual affiliation with a community-university research alliance, to obtain feedback on the interview questions, wording, and length. Feedback was also obtained from experts in the field (supervisory committee). Slight modifications to some of the interview questions were made, based on suggestions and comments from pilot results, and a few items removed or added, before the remainder of the interviews were conducted between January 2013 and June 2013. Ethics approval, from the Dalhousie University Research Ethics Board was received before commencing the interview process and participant consent obtained prior to each interview.

3.2. Research Participant Criteria and Selection

Fishermen's associations across Nova Scotia were selected randomly from a compiled list of Nova Scotia organizations obtained from the **Nova Scotia Department of Fisheries and Aquaculture** and **the Nova Scotia Fisheries Sector Council**. Communications with potential interview respondents was initiated through e-mail invitation, or by phone when no e-mail address was available, to secure interest and commitment. Contacts were notified of the project, its timeline, intended outcomes, as well as their potential role, and their participation in the project requested. The intended value of this research, in the form of knowledge sharing and lessons learned, was also expressed and commitment made to return the results to all participants on project completion.

Initial contact was made with the primary contact person for each fishermen's association, however interviewees for each fishermen's association were determined by the associations themselves. One representative was interviewed for each fishermen's association examined, however representatives of the 'locals' of the larger members, such as the Maritime Fishermen's Union, were also interviewed. Respondents were asked to speak on behalf of the fishermen's association and membership they represent. While meant to be reflective of the experience of the whole, it is important to acknowledge that responses are inherently framed by the respondents own background and experiences. However, while interview responses represent individual opinions, the interview of association representatives ensured that selected respondents were most likely to be most active and knowledgeable in fisheries 'co-management'.

Samp le size

The guiding principle of grounded theory in determining appropriate sample size in qualitative research is the concept of theoretical saturation, i.e., where the researcher stops data collection at the point where further sampling yields no further information in answering research questions (Seale, 2003). In the case of this research, additional interviews would have provided additional data points for analysis of involvement in fisheries and of context variables with too few respondents to analyze quantitatively, and may have therefore allowed for a fuller picture of fishermen involvement, beyond the lobster and groundfish focus taken in Chapter 2. Given the decent spread of fisheries and regions represented and the extent of qualitative analysis used in this study, it was felt, however, that, keeping in mind a realistic scope of a Master's thesis, Creswell's (1998, p.64) suggestion of 20-30 respondents for grounded theory methodology sufficient.

Thirty-one fishermen's association representatives participated in the study, representing nine fisheries across the province of Nova Scotia, and 32% of the 98 Nova Scotian fishermen's associations on the compiles list of potential contacts. Groundfish and lobster associations together represented 58% of respondents with eight and twelve respondents

speaking regarding these fisheries, respectively. The position of each respondent within their fishermen's association is cited in this thesis as held at the time of interview (2013). Respondents were largely fishermen, acting as volunteer executives within the fishermen's associations, though some respondents were also hired staff.

3.3. Data Collection and Rationale

Surveys were administered through predominantly in-depth semi-structured telephone interview, and directed to representatives of fishermen's associations within Nova Scotia to ascertain the nature and extent of fishermen involvement in the fisheries management process (current and desired) and their perspectives on factors affecting this involvement. All respondents were offered the opportunity to review the interview questions before the interview date and encouraged to have the interview questions on hand during the call to help facilitate the interview process. Interviews took, on average, 1.5 hours to complete.

Although telephone interviews are less frequently used, and often touted as inferior to face-to-face interviews in qualitative research, there is growing acceptance of this form of data collection as an effective interview tool (Opdenakker, 2006; Novick, 2008; Carr & Worth, 2001). Telephones have been shown to have the potential of permitting greater participant comfort by allowing respondents to talk with greater privacy and anonymity from "their own turf" (McCoyd & Kerson, 2006, p.399, as cited in Novick, 2008, p.393), and allow for drastically increased access to "geographically disparate subjects" (Novick, 2008, p.393), resulting in both a time and cost savings. Given time and budgetary constraints of a Master's thesis, the telephone interview was deemed the most appropriate mode of interview for this project and allowed for a broader scope and larger number respondents to be interviewed than would have been possible through an in-person interview approach.

Interaction-adaptation in the field

Although the interview questions were pre-determined, and the interview instrument initially developed to be conducted as a structured interview with a series of open and closed ended questions and survey, this approach was in some cases modified to accommodate the comfort and preferences of a given respondent. In cases where respondents were resistant to the structured interview format, a more formal or semi-structured conversation style interview format was followed, whereby the respondent was permitted to largely lead the conversation. This approach is supported by research indicating that conversational interviewing, also known as flexible interviewing, where interviewers are free to deviate from the interview script so as to accommodate feedback from research participants and/or clarify the meaning of questions, can significantly increase data quality/validity (Schober & Conrad, 1997; Cohen, Manion, & Morrison, 2000). Flexibility in sequence, and explanation of interview questions asked was thus permitted, without altering the nature of questions asked.

4. Data Analysis

Interviews were audio-recorded, transcribed verbatim into Microsoft Word®, and reviewed for accuracy before analysis. All survey data (i.e., numerical rating of current and desired involvement and prioritization of involvement by management category rankings) were entered into a Microsoft Excel® spreadsheet where mean involvement ratings were calculated, and summary tables and graphs were constructed. Contextual variables pertaining to each association were also tabulated to allow for analysis of commonalities and difference in perspectives and experience between associations and, combined with qualitative analysis of respondents' interview data, used to help explain any observable trends. The mixed methods approach to this research, combining quantitative survey with qualitative interview data and analysis, thus allowed for a greater understanding of and validation of research results.

4.1. Assessment of Current and Desired Involvement and the Unrealized Potential for Engagement

Involvement ratings for each of the six fisheries management categories, and in fisheries management overall, provided a numerical picture of the perceived nature and extent of current and desired involvement in the management of the fishery identified as most important to the membership of each fishermen's association interviewed, and allowed for analysis of: (1) the extent of fishermen involvement in fisheries management; (2) respondents desired levels of involvement in each of these categories; as well as (3) respondents' levels of dissatisfaction with this involvement, as calculated by the difference between current and desired involvement ratings. Looking at the mean difference between current and desired involvement ratings offered insight into the unrealized engagement potential, or 'engagement gap'.

Mean current and desired involvement, and the consequent engagement gaps, were calculated for each fisheries management category and for two measures of involvement in fisheries management overall: (1) the overall rating of the association and membership's involvement, as given by the respondent; and (2) the aggregate overall rating, as determined by averaging the scores (each out of 10) given for each of the six fisheries management categories. The second of these measures of overall involvement, where the rating of involvement for each management category is given equal weighting in the assessment of fishermen involvement overall, offered a means of triangulating the overall involvement rating given by the respondent, which may have been weighted towards certain management categories due to particular satisfaction or dissatisfaction in a given area.

Despite attempts at consistency in questioning and clarity in wording, some differences in interpretation of the rating scale were evident. Most respondents seem to have interpreted the rating scale as reflecting a co-management spectrum, or 'ladder of involvement' in line with the theoretical scales of involvement presented in the co-management literature (e.g., Pinkerton, 1989; Pinkerton, 1994; Sen & Nielsen, 1996; Berkes et al**.,** 1991;

Pomeroy & Berkes, 1997; Carlsson & Berkes, 2005; Pomeroy & Williams, 1994, etc.), as intended, with management arrangements lying between two hypothetical management extremes – fully centralized control, and 'true' self or community-based management.

However, some respondents seemingly rated their involvement on a scale where the highest involvement rating ("full involvement or exclusive fishermen responsibility") was seemingly interpreted as limited by what the respondents thought was possible, i.e., as involved as possible within the current management framework. This was not the intended interpretation, and use of this data would therefore confuse the results. Osborne and Overbay (2004) argue that when dealing with data issues, such as those arising from the misunderstanding of a question, re-calculation or re-estimation of the correct answer is recommended so long as there is sufficient information is available to do so. If such responses cannot be 'corrected,' they should, they argue, "be eliminated as they do not represent valid population data points" (Osborne & Overbay, 2004, p.2). In line with this thinking, and in order to effectively analyze responses, certain scores were removed when they were very obvious outliers to the co-management scale interpretation, (i.e., where the interpretation was very clearly and significantly at odds with that of the other respondents) or where the verbal explanation of a given respondent clearly contradicted their rating response, indicating that they did not understand the question as intended and making the rating response meaningless and confusing the analysis. Where possible to do so consistently across management categories, a few ratings were also modified to make one particular respondent's responses internally consistent. The remaining responses were included in analysis as answered.

In some instances, respondents felt unable to provide a rating for either their current or desired involvement in a given fisheries management category. Due to potential differences in interpretation of the rating scale between respondents, current and desired scores of each category were treated as paired responses. As such, ratings were only included in analysis if a response was given for both current and desired involvement in a given category, to ensure that the means of current and desired ratings could be compared. Further, the aggregate calculation of overall involvement (i.e., averaged

involvement of the six management categories) was not calculated for associations where full ratings (i.e., both current and desired) were given for less than four of the six fisheries management categories.

4.2. Rankings of Management Categories by Importance for Involvement

In ranking the six fisheries management categories in order of priority for fishermen involvement, some respondents felt unable to rank certain categories, resulting in different sample sizes between management categories. The percentage of respondents giving a certain rating response was calculated as valid percent (i.e., percentage that is calculated using only those respondents who provided a ranking for a given management category). Furthermore, some respondents felt some or all of the management categories to be equal in priority. In these cases, ties in priority rankings between management categories were permitted, so as to most accurately reflect the perceived importance of fishermen involvement in each category relative to the others.

4.3. Comparative Analysis of Respondents' Perspective and Experience

This paper focuses the exploration of commonalities and differences in perspective on and experience of fishermen involvement in fisheries management among fishermen's associations representatives to (1) an overall assessment across all respondents, and (2) a comparison between the two most important and widespread fisheries sectors in the province, those for groundfish and lobster. The latter focus on two fisheries is because, given the broad range of associations interviewed, the other fisheries looked at had too few respondents for meaningful quantitative analysis. Insights about these other fisheries (and with regard to other contextual factors) brought up by respondents in qualitative interviews, were still used, however, as these contribute to a better understanding of the differences in experience and perspectives.

4.4. Barrier Analysis

In analyzing barriers to achieving desired levels of fishermen involvement in fisheries management, relevant passages of interview data were reviewed, categorized and coded for emerging ideas and themes using qualitative data analysis techniques (Corbin & Strauss, 2008; Strauss & Corbin, 1990). Coding – "a systematic way in which to condense extensive data sets into smaller analyzable units through the creation of categories and concepts derived from the data" (Lockyer, 2004, p.137) and to "facilitate the organization, retrieval, and interpretation of data" (p.137), resulted in a descriptive assessment of the critical factors and conditions that constrain fishermen's objectives for involvement in fisheries management, as perceived by fishermen's association representatives interviewed.

As the interview was designed to address specific research questions and followed a number of set questions, the central research questions shaped the coding scheme (Bogdan & Biklin, 1998) and many of the responses were already organized by theme as determined by the specifics of the questions asked. Each interview was largely structured around assessing current and desired fishermen involvement in the following six fisheries management categories: 1) **direction-setting, planning and policy development;** 2) **harvest management;** 3) **compliance and enforcement;** 4) **ecosystem stewardship, conservation and rehablitation;** 5) **research;** and 6) **organizational management and development** (See Table 1 and Chapter 2 for discussion of management categories), and what respondents believed to be the primary contributing factor(s) that enabled or constrained the involvement of their association and membership in each of these. The research questions and interview framework developed for this study were, therefore, used to structure the initial coding system to conceptualize and categorize data. Barriers to involvement were coded as pertaining to involvement in these six specific fisheries management categories. Key barriers to involvement in fisheries management overall were also assessed.

4.4.1. Creating Barrier Categories

The coding system followed the open, axial and selective coding method outlined by Strauss and Corbin (1990). This iterative and multi-step process consisted of three primary steps:

1) Initial (open) coding involved an initial review of interview transcripts and the classifying and assigning of meaning to interview text (i.e., developing barrier codes) through "the process of breaking down, examining, comparing, conceptualizing and categorizing data" (Strauss & Corbin, 1990, p.61). Categories/concepts of barriers to involvement were identified with no limit to the number or variety of categories generated. As such, this stage generated numerous barrier codes, with some clearly linked to, or overlapping with, others. Since many barriers to fishermen involvement in fisheries management are not mutually exclusive, but rather often deeply interlinked, and many respondents brought up multiple barriers in tandem, single passages of text often received multiple barrier codes. However, barrier codes were assigned based on how barriers were discussed by respondents, recognizing that a given barrier could fit into multiple barrier categories.

2) The second (axial) stage of coding, integrated and grouped barrier codes together into more specific focused categories. Coded text was re-reviewed to confirm that barrier categories accurately represented interview responses, and to simplify and relate codes to each other by eliminating, combining, subdividing, and drawing "connections between categories" (Strauss & Corbin, 1990, p.96).

3) The third (selective) stage of coding, is the process whereby "previously identified discrete concepts and categories are further defined, developed, and refined and then brought together to tell a larger story" (Price, 2010, p.158). The identification of repeating ideas and underlying themes resulted in the formulation of a list of six barrier categories (Table 4), telling the 'story' of what was felt by representatives of fishermen's associations in NS to constrain fishermen involvement in fisheries management. Four of

the six barrier categories were classified as external to the association and/or industry and the remaining two spoke to barriers internal to the association and/or industry. A number of barrier subcategories within these primary barrier categories were also defined.

4.4.2. Barrier Frequency

Quantitative analysis of the qualitative barrier data, specifically the computation of frequency of barrier categories mentioned overall and between respondent groupings (i.e., by fishery), allowed for an assessment of barriers in terms of which are most felt and by whom. Respondents were unrestricted in the number of barriers they could mention, and not all respondents mentioned an equal number of barriers or mentioned a given barrier with the same frequency. In tabulating frequency of barriers mentioned overall (or within groups of respondents), each barrier category mentioned by a given respondent was counted one time, regardless of how frequently that respondent brought it up. Counts of how many respondents mentioned a given barrier category code or sub-code and how many and which barriers categories were mentioned by whom were tabulated in Microsoft Excel ® where summary tables of frequency counts and valid percentages (i.e., including only those who answered each given question), and graphs were constructed.

4.4.3. Assessing Context

Barrier frequencies were then examined by fishery, specifically lobster and groundfish associations, to look for differences or similarities in experience and perspective between respondents.

In order to explore possible relationships between the type and number of barriers identified by an association, and that association's degree of involvement or satisfaction, linear regressions were conducted to compare: 1) the proportion of internal versus external barrier categories mentioned versus current involvement ratings and measure of dissatisfaction (as calculated by the difference between current and desired involvement

scores); and 2) current overall fishermen involvement ratings versus the proportion of total barrier categories mentioned by a given respondent.

5. Reliability and Validity of Results

To increase the validity and reliability of results, a number of methods of cross validating findings were used. Denzin (1978) defines four types of triangulation (data, methodological, theory and investigator triangulation), of which the first two were primarily used in this research. Data and methodological triangulation were achieved through the study's mixed method design, making use of multiple sources of data and multiple approaches of study (i.e., through combining quantitative with qualitative data collection and methods of analysis). Looking at involvement quantitatively, with use of a numerical rating scale, as well as through qualitative interview, allowed for comparison and corroboration between qualitative and quantitative assessments of current and desired involvement and helped identify contradictions between, and to some degree correct for, differences of interpretation common in survey style interviews (Denzin, 1978; Creswell & Plano Clark, 2007; Greene et al., 1989; Teddlie & Tashakkori, 2009).

Elements of Denzin's (1978) fourth category, investigator triangulation, defined as involving more than one researcher in a single study, was achieved through feedback obtained from supervisors, academics and two Nova Scotian fishermen's association representatives in the development of the interview /survey instrument. In order to confirm validity of interpretation, all respondents were given the opportunity to review quotations attributed to them prior to the publication of the thesis, for accuracy of interpretation by the researcher and to ensure that they were still comfortable with the representation of their words in association with the information given in the interview.

6. Ethical Considerations and Sharing

Ethics approval, from the Dalhousie University Research Ethics Board was received before commencing the interview process and participant consent obtained prior to each interview (See Appendix 3 for consent form). The questions posed to interview respondents in this study attempt to extract their perceptions on the nature and extent of fishermen involvement in fisheries management and the factors affecting this involvement. Therefore, the data collected was not of an overly personal or sensitive nature to participants. Nevertheless, as outlined by the consent agreement, individual names of interviewees are not attributed in the thesis to information provided, unless the participant specifically and officially stated that they choose to be named. However, since interview respondents were selected as a result of their role in a given fishermen's association, and given the uniqueness of knowledge which that individual may be providing, complete anonymity was not guaranteed. All respondents declined confidentiality, opting to be identified either by name or by their position within the associations they represent for most information shared. In line with the philosophy of ongoing consent, participants were given the opportunity to review quotations attributed to them prior to the publication of the thesis for accuracy of interpretation by the researcher and to ensure that they were still comfortable with the representation of their words and/or the use of their names in association with the information given in the interview.

How Knowledge is Shared

As Gallagher, Creighton, and Gibbon (1995) point out, ethical guidelines for research have traditionally been developed for positivistic methodologies that have typically involved: a separation between researcher and 'subject'; the exporting of knowledge from the research (community) setting to academic ones; and the control of research findings lying in the hands of the researcher or academy. While this is a university thesis written in academic language that might be seen to privilege certain types of knowledge and ways of communicating, the project was also motivated by a desire to pursue research of mutual gain to the fishing communities being studied. This research aims to provide

insight into barriers to, and opportunities for, achieving enhanced fishermen involvement and to potentially help result in the development of strategies for enhanced involvement in the management of local resources. The intended value of this research, in the form of knowledge sharing and lessons learned, was expressed to participants and a commitment made to share digital copies of the thesis in its entirety with participants, as well as a short summary of study results upon request.

Appendix 2 - Interview Guide

INFORMATION ON STRUCTURED INTERVIEWS

TELEPHONE SURVEY FOR REPRESENTATIVES OF FISH HARVESTER ORGANIZATIONS IN NOVA SCOTIA

Researcher: Melina Puley

Title of the research: Fish Harvester Involvement in Fisheries Management/ Governance in Nova Scotia, Canada

Introduction:

I'd like to start by telling you that I deeply appreciate you giving your time to participate in this study.

In the first part of the interview I will be asking you some questions regarding your organization and fishery, as well as any co-management arrangements currently in place. I will then ask you to reflect on your membership's involvement (current and desired) in various aspects of the fisheries management process as well as on factors that have enabled or constrained their involvement. I will then end with a few questions on your thoughts on co-management in general.

The entire interview should last no more than about an hour and a half.

Questions and prompts: (NB: the content of these interviews may be modified depending on results of document analysis, as some of these questions will be answerable through review of project reports, and/or in order to probe further discussion or to clarify the meaning of the questions).

SECTION 1: Contextual Information

1. What harvester's association/organization do you represent?

2. When was this association/organization founded?

3. What is the association/organization's mandate?

4. What is your role in this association/organization?

5. How long have you acted in this role?

< 1 year	1-2 yrs	3-5 yrs	6-10 yrs	11-15 yrs	16-20 yrs	21-25 yrs	26-30 yrs	>30 yrs	Unsure

6. Has your harvester's association/organization been accredited by the Nova Scotia Department of Fisheries and Aquaculture in accordance with the Fish Harvester Organization Support Act? Why or why not?

7. Is your association/organization a member of any fishery umbrella organizations (e.g CCPFH, EFF)? If so, please list.

8. How large is your membership?

9. Is membership compulsory? If not compulsory, what proportion of all eligible fishers belong to the organization?

10. Who is included in your association/organization's membership (i.e., crew members, boat owners, wider community, etc.)? What is the approximate percentage breakdown for each group?

11. What is your membership criteria? How was it determined (i.e., was it legislated or self-directed) and why in this way?

12. How many meetings of the association/organization are held per year, and on average, what proportion of the membership is present at organization meetings?

13. Is the executive or leadership group of the association/organization elected by the members? If elected, who is eligible to vote? If not elected, how are they appointed?

14. How many meetings of the executive or leadership group are held per year?

15. How are the operational costs of your association/organization funded?

16. What fishery/fisheries does your membership participate in?

17. Which of these fisheries do you consider to be the most important to your membership?

(**Most of the remainder of the interview will explore questions pertaining to this specific fishery. However, you will be offered the option to repeat the interview for an additional fishery, if you so choose).**

18. Why did you select this fishery as being most important to your membership?

19. What percentage of your membership is involved in this specific fishery?

20. What geographical region does your association/organization represent?

21. What are the current key management issues in this fishery?

22. Is your organization and/or its membership represented on any advisory committees for this fishery? If yes, please identify. **If no, please skip to question #26.**

23. How frequently do membership board/advisory committee meetings take place?

24. How, and by whom, is this/are these representative(s) selected (i.e., elected or appointed)?

25. Is your organization and/or its membership involved in the management/governance of this resource through any other formal or informal co-management arrangements with Government? If yes, please explain.

SECTION 2: Assessment of current fisher involvement, aspirations and factors affecting involvement

Co-management has been defined as "the sharing of power and responsibility between government and resource users" (Berkes et al., 1991). Co-management, however, can appear in many different forms, depending on the extent of local-level involvement and shared decision-making in resource management, as well as the degree of integration of local and state-level management.

Different levels of power-sharing and degrees of involvement can be seen to lie between two management extremes – at one extreme, fully centralized control, where the 'community' is merely told about decisions that the government has already made (i.e., no fisher involvement), and at the other extreme, self or community-based management, where fishers and fishing communities make all the management decisions (i.e., full involvement/exclusive fisher responsibility).

This section asks you to evaluate a number of management functions within 6 management categories (Direction setting, Planning & Policy Development; Harvest Management; Compliance & Enforcement; Ecosystem Stewardship, Conservation & Rehabilitation; Research; and Organizational Management & Development) and to make judgments about the predominant level of fisher involvement for each along a co-management spectrum, represented as a scale of 1 to 10 where 1 represents 'no fisher involvement' and 10 represents 'full involvement/exclusive fisher responsibility.' I will be asking for your opinions on your organization's and your membership's current level of involvement in each management category and their desired level of involvement in the future, as well as what factors you feel may have enhanced or constrained the involvement of your organization and/or membership within various aspects of the management process.

MANAGEMENT CATEGORY 1: Direction-setting, Planning & Policy Development

26. A) Overall, on a scale of 1 to 10, where 1 represents 'no fisher involvement' and 10 represents 'full involvement/exclusive fisher responsibility,' how would you rate the current extent of your organization's involvement in Direction-setting, Planning & Policy Development, which for the purpose of this survey includes:
    - Needs Assessment/identifying problems in the fishery
    - Creating long-term fisheries management plan (i.e., goal and objective setting, identifying indicators of success, etc.)
    - Developing policy

    for [**specific fishery stated as being most important in Q. 17**].

    B) How would you rate the current extent of your membership's involvement (if different from your organization's involvement) in Direction-setting, Planning & Policy Development for this fishery?

    C) On the same scale of 1-10, how much involvement do you feel your membership and organization would like to see in Direction-setting, Planning & Policy Development for this fishery?

    Note: Even though there may be some aspects within each management function that you may rate higher or lower, we are looking for an overall/average weighting of your members' current and desired involvement.

EXTENT OF INVOLVEMENT _____ MANAGEMENT CATEGORY: Direction-setting, Planning & Policy Development	1	2	3	4	5	6	7	8	9	10	Don't know
Current Involvement (organization)											
Current Involvement (membership – **if different from organizational involvement - above**)											
Desired Involvement											

27. Do you have any examples of where your organization and/or membership had exceptionally high or exceptionally low involvement, or were particularly satisfied or dissatisfied with their involvement, in any of the following functions of Direction-setting, Planning & Policy Development:

    - Needs Assessment/identifying problems in the fishery
    - Creating long-term fisheries management plan (i.e., goal and objective setting, identifying indicators of success, etc.)
    - Developing policy

    for the specific fishery you selected as most important?

28. What do you believe to have been the key contributing factor(s) that <u>enabled</u> or <u>constrained</u> the involvement of your organization and/or membership in Direction-setting, Planning & Policy Development for the specific fishery you selected as most important? Please give comment and examples.

<u>MANAGEMENT CATEGORY 2: Harvest Management</u>

29. A) Again, on the same scale of 1 to 10, how would you rate the current overall extent of your organization's involvement in Harvest Management, which for the purpose of this survey includes:

- Monitoring and assessing status of stock to determine harvest levels (e.g., tracking and documenting catches and landings)
- Setting level of catch (i.e., TAC, quota)
- Managing harvesting seasons (i.e., setting openings & closings)
- Managing areas for harvesting (i.e., setting fishing zones)
- Managing fishery access – determining membership criteria (regulation for licensing, etc)

for [**insert specific fishery stated as being most important in Q. 17**].

B) How would you rate the current extent of your membership's involvement (if different from your organization's involvement) in Harvest Management for this fishery?

C) On the same scale of 1-10, how much involvement do you feel your membership and organization would like to see in Harvest Management?

Note: Again, even though there may be some aspects within each management function that you may rate higher or lower, we are looking for an overall/average weighting of your members' current and desired involvement.

EXTENT OF INVOLVEMENT _____ MANAGEMENT CATEGORY: Harvest Management	1	2	3	4	5	6	7	8	9	10	Don't know
Current Involvement (organization)											
Current Involvement (membership – **if different from organizational involvement - above**)											
Desired Involvement											

30. Do you have any examples of where your organization and/or membership had exceptionally high or exceptionally low involvement, or were particularly satisfied or dissatisfied with their involvement in any of the following functions of Harvest Management:

- Monitoring and assessing status of stock to determine harvest levels (e.g., tracking and documenting catches and landings)
- Setting level of catch (i.e., TAC, quota)
- Managing harvesting seasons (i.e., setting openings & closings)
- Managing areas for harvesting (i.e., setting fishing zones)
- Managing fishery access – determining membership criteria (regulation for licensing, etc)

for the specific fishery you selected as most important?

31. What do you believe to have been the key contributing factor(s) that enabled or constrained the involvement of your organization and/or membership in Harvest Management for the specific fishery you selected as most important? Please give comment and examples.

MANAGEMENT CATEGORY 3: Compliance & Enforcement

A) On the same scale of 1 to 10, how would you rate the current overall extent of your organization's involvement in Compliance & Enforcement, which for the purpose of this survey includes:

- Developing fishing rules/bylaws
- Educating members/building awareness about the rules to improve compliance
- Enforcing bylaws and regulations (e.g., patrolling for violators, monitoring/verifying harvest or other resource use activities and compliance)
- Imposing penalties and sanctions for non-compliance/penalizing violators

for [**specific fishery stated as being most important in Q. 17**].

B) How would you rate the current extent of your membership's involvement (if different from your organization's involvement) in Compliance & Enforcement for this fishery?

C) How much involvement do you feel your membership and organization would like to see in Compliance & Enforcement for this fishery?

EXTENT OF INVOLVEMENT _____ MANAGEMENT CATEGORY: Compliance & Enforcement	1	2	3	4	5	6	7	8	9	10	Don't know
Current Involvement (organization)											
Current Involvement (membership – **if different from organizational involvement - above**)											
Desired Involvement											

32. Do you have any examples of where your organization and/or membership had exceptionally high or exceptionally low involvement, or were particularly satisfied or dissatisfied with their involvement, in any of the following functions of Compliance & Enforcement:

    - Developing fishing rules/bylaws
    - Educating members/building awareness about the rules to improve compliance
    - Enforcing bylaws and regulations (e.g., patrolling for violators, monitoring/verifying harvest or other resource use activities and compliance)
    - Imposing penalties and sanctions for non-compliance/penalizing violators

    for the specific fishery you selected as most important?

33. What do you believe to have been the key contributing factor(s) that <u>enabled</u> or <u>constrained</u> the involvement of your organization and/or membership in Compliance & Enforcement for the specific fishery you selected as most important? Please give comment and examples.

<u>MANAGEMENT CATEGORY 4: Ecosystem Stewardship, Conservation & Rehabilitation</u>

34. A) On the same scale of 1 to 10, how would you rate the current overall extent of your organization's involvement in Ecosystem Stewardship, Conservation & Rehabilitation, which for the purpose of this survey includes:

- Planning for habitat rehabilitation, enhancement or stewardship (setting strategies)
- Conducting habitat rehabilitation/ enhancement
- Planning for stock rehabilitation, enhancement or stewardship (setting strategies)
- Conducting stock rehabilitation/ enhancement (e.g., running hatcheries)
- Conducting habitat or ecosystem assessment/ monitoring

for [**specific fishery stated as being most important in Q. 17**].

B) How would you rate the current extent of your membership's involvement (if different from your organization's involvement) in Ecosystem Stewardship, Conservation & Rehabilitation for this fishery?

C) How much involvement do you feel your membership and organization would like to see in Ecosystem Stewardship, Conservation & Rehabilitation for this fishery?

EXTENT OF INVOLVEMENT _____ MANAGEMENT CATEGORY: Ecosystem Stewardship, Conservation & Rehabilitation	1	2	3	4	5	6	7	8	9	10	Don't know
Current Involvement (organization)											
Current Involvement (membership – **if different from organizational involvement - above**)											
Desired Involvement											

35. Do you have any examples of where your organization and/or membership had exceptionally high or exceptionally low involvement, or were particularly satisfied or dissatisfied with their involvement, in any of the following functions of Ecosystem Stewardship, Conservation & Rehabilitation:

    - Planning for habitat rehabilitation, enhancement or stewardship (setting strategies)
    - Conducting habitat rehabilitation/ enhancement

- Planning for stock rehabilitation, enhancement or stewardship (setting strategies)
- Conducting stock rehabilitation/ enhancement (e.g., running hatcheries)
- Conducting habitat or ecosystem assessment/ monitoring

for the specific fishery you selected as most important?

36. What do you believe to have been the key contributing factor(s) that enabled or constrained the involvement of your organization and/or membership in Ecosystem Stewardship, Conservation & Rehabilitation for the specific fishery you selected as most important? Please give comment and examples.

MANAGEMENT CATEGORY 5: Research

37. A) On the same scale of 1 to 10, how would you rate the current overall extent of your organization's involvement in Research, which for the purpose of this survey includes:
    - Developing a research plan/setting research scope
    - Conducting data collection
    - Conducting analysis of data collected
    - Managing access and ownership over data and research results
    - Applying findings to support fisheries management

    for [**specific fishery stated as being most important in Q. 17**].

    B) How would you rate the current extent of your membership's involvement (if different from your organization's involvement) in Research for this fishery?

    C) How much involvement do you feel your membership and organization would like to see in Research for this fishery?

EXTENT OF INVOLVEMENT _____ MANAGEMENT CATEGORY: Research	1	2	3	4	5	6	7	8	9	10	Don't know
Current Involvement (organization)											
Current Involvement (membership – **if different from organizational involvement - above**)											
Desired Involvement											

38. Do you have any examples of where your organization and/or membership had exceptionally high or exceptionally low involvement, or were particularly satisfied or dissatisfied with their involvement, in any of the following functions of Research:
    - Developing a research plan/setting research scope
    - Conducting data collecting
    - Conducting analysis of data collected
    - Managing access and ownership over data and research results
    - Applying findings to support fisheries management

    for the specific fishery you selected as most important?

39. What do you believe to have been the key contributing factor(s) that <u>enabled</u> or <u>constrained</u> the involvement of your organization and/or membership in Research for the specific fishery you selected as most important? Please give comment and examples.

<u>MANAGEMENT CATEGORY 6: Organizational Management & Development</u>

40. A) On the same scale of 1 to 10, how would you rate the current overall extent of your organization's involvement in Organizational Management & Development, which for the purpose of this survey includes:
    - Building capacity – creating new mechanisms to support fisher involvement in fisheries management (e.g., professional development for members, etc)

- Managing interpersonal conflict within fishery
- Managing conflict with outside interests

for [**specific fishery stated as being most important in Q. 17**].

B) How would you rate the current extent of your membership's involvement (if different from your organization's involvement) in Organizational Management & Development for this fishery?

C) How much involvement do you feel your membership and organization would like to see in Organizational Management & Development for this fishery?

EXTENT OF INVOLVEMENT _____ MANAGEMENT CATEGORY: Organizational Management & Development	1	2	3	4	5	6	7	8	9	10	Don't know
Current Involvement (organization)											
Current Involvement (membership – **if different from organizational involvement - above**)											
Desired Involvement											

41. Do you have any examples of where your organization and/or membership had exceptionally high or exceptionally low involvement, or were particularly satisfied or dissatisfied with their involvement, in any of the following functions of Organizational Management & Development:

    - Building capacity – creating new mechanisms to support fisher involvement in fisheries management (e.g., professional development for members, etc)
    - Managing interpersonal conflict within fishery
    - Managing conflict with outside interests

    for the specific fishery you selected as most important?

42. What do you believe to have been the key contributing factor(s) that enabled or constrained the involvement of your organization and/or membership in Organizational Management & Development for the specific fishery you selected as most important? Please give comment and examples.

OVERALL ASSESSMENT OF INVOLVEMENT

43. How would you rank the current extent of your organization's and membership's (if different) involvement in the management of this fishery overall? (using the same scale as that used to rank involvement in the various management categories)

	1	2	3	4	5	6	7	8	9	10	Don't know
Org											
Members											

44. Looking into the future, please rank the extent overall to which you feel your membership would like to be involved in the management of this fishery.

	1	2	3	4	5	6	7	8	9	10	Don't know

45. How do you feel fisher organizations have affected fisher and fishing community involvement in fisheries management in the Nova Scotia? (i.e., have they helped or hindered involvement and in what ways?)

46. In what ways has your organization specifically helped build fisher/fishing community involvement in fisheries management?

47. What, if anything, has industry done to help or hinder fisher/fishing community involvement in fisheries management?

48. What, if anything, has the Canadian government done to either help or hinder fisher/fishing community involvement in fisheries management?

49. Where have there have been challenges in achieving fisher/fishing community involvement in fisheries management?

50. How do you feel the changes referred to as fishermen "professionalization" have impacted fisher and fishing community involvement in fisheries management in Nova Scotia (i.e., has it helped or hindered involvement and in what ways?)

51. Is your organization involved in the Independent Fish Harvester's Movement? Why or why not?

SECTION 3: Closing reflections on fisheries co-management

52. Please rank the following management categories in order of most-to-least important to your organization in terms of involvement in co-management (where 1 means most important, and 6 means least important)?

___ Direction setting, Planning & Policy Development
___ Harvest Management
___ Compliance & Enforcement
___ Ecosystem Stewardship, Conservation & Rehabilitation
___ Research
___ Organizational Management & Development

53. What are some key benefits of fisheries co-management?

54. What are some key disadvantages/challenges of fisheries co-management?

55. What are some opportunities/possibilities for fisheries co-management?

Appendix 3 - Consent form

School for Resource and Environmental Studies Faculty of Management

Title of research:

Fishermen Involvement in Fisheries Management/Governance in Nova Scotia, Canada.

Principal Investigator:

Melina Puley
Masters of Environmental Studies Candidate School for Resource & Environmental Studies, Dalhousie University, Halifax, Nova Scotia Email: melina.puley@dal.ca
Phone: 416-699-8552

Academic Supervisor:

Dr. Anthony Charles: Saint Mary's University, Canada

Introduction

We invite you to take part in research being conducted by Melina Puley, a graduate student at Dalhousie University, as part of her Masters of Environmental Studies degree. Your participation in this study is voluntary and you may withdraw from the study at any time. The study is described below. This description tells you about the risks, inconvenience, or discomfort which you might experience. Participating in the study might not benefit you, but we might learn things that will benefit others. You should discuss any questions you have about this study with Melina Puley.

Purpose of the study

The purpose of this study is to gather information on fisher involvement in fisheries management in Nova Scotia, Canada, as well as factors affecting this involvement. This research will use literature and document review as well as a regional survey (conducted by telephone interview) of representatives of community-fisher organizations and wharf representatives across the province. This research will identify perceptions of current and desired involvement in fisheries management and determine what have been key constraining and enabling factors to achieving meaningful fisher involvement in the management process.

It is anticipated that this research will permit the identification of trends in fisher involvement in Nova Scotia, facilitate the sharing of knowledge and perspectives between community-fisher organizations and fisher wharf representatives and, hopefully, lead to enhanced fisher involvement in the management of fisheries resources in Canada's maritime province.

Study Design

This study will involve a telephone survey of representatives of community fisheries/ harvester's organizations and wharf representatives in Nova Scotia, as well as wharf representatives for local fisher groups, to gain insight into the nature and extent of fisher involvement in fisheries management (current and desired) as well as the enabling and constraining factors for achieving meaningful involvement.

With permission from the study participants, interviews will be digitally recorded and transcribed. The transcripts of these interviews may be analyzed by Melina Puley using computer software to find common themes among the responses.

Results will be presented in an academic thesis, and may be communicated in academic articles, at academic conferences and the thesis will probably be made available on the internet. This thesis and/or a short summary of study results may also be sent by email to you and other study participants upon request.

Who can participate in the study?

You may participate in this study as a survey respondent/interviewee if you are a representative of a relevant community-fisher organization or fishing wharf/port; have knowledge of the nature and extent of involvement of your membership in the management of your given fishery; and are willing to share your perspectives on the factors affecting this involvement. You must be willing and available to participate in a telephone interview between the dates of Sept 2012 and Dec 2012. As an audio recording of the interview is required for the subsequent analysis of interview data, permission to audio record the interview is also required for participation in this study. However should you agree to participate and later wish to withdraw from the study, the recording and interview transcripts will be destroyed.

Who will be conducting the research?

Melina Puley is the Principal Investigator for this project. She will coordinate, conduct interviews, transcribe the audio files and analyze the transcripts. The Academic Advisor (stated above) may be called upon to assist with the analysis of portions of the files or transcripts.

If you would like to request that your interview to be conducted in French, the survey will be translated into French and a translator will be hired to conduct interviews in the PI's place due to language limitations. The PI's French is however sufficient that she will be available to answer questions about the study when francophone participants wish to speak to her directly. In the event translators do become necessary, the translator will be required to sign a confidentiality agreement.

What you will be asked to do

As a survey respondent, you will be asked to participate in a single telephone interview with the principal investigator (or translator, if interview is conducted in French) that

explores your knowledge and perspective regarding fisher involvement in fisheries management/ governance in your given fishery. The interview should require no more

Possible risks and discomforts

This study is expected to involve minimal risk. You may experience some distress when asked to reflect on frustrating experiences. If you feel discomfort at any time, you may decline to answer questions and you may withdraw from the study at any time.

Possible benefits

No direct benefits are anticipated for this study. However, you may share your knowledge and perspectives about fisher involvement in the management/governance of a given fishery. The information gained from this study will contribute to knowledge about factors affecting fisher involvement in fisheries management in Nova Scotia, Canada, and hopefully facilitate an exchange of knowledge and perspective between community-fisher organizations and other stakeholder groups and will potentially result in the development of strategies for enhanced fisher involvement in the co-management of fisheries resources in Canada.

Compensation

There will be no monetary compensation for taking part in the study, however every effort will be made so that interviews occur at no cost to the individual (other than time).

Anonymity and Confidentiality

We would like to credit you for any information used acquired through your sharing of your knowledge. With your permission, direct quotations may also be included in the presentation of final results.

If you would prefer to remain anonymous, the Principal Investigator will make sure that your confidentiality is protected throughout your participation in this study as much as possible. However, since you have been asked to participate in this research as a result of your role in a fisher organization/harvester's association, and given the uniqueness of knowledge that you may be providing, complete anonymity may not in all cases be guaranteed.

With your permission, anonymous direct quotations will be included in the presentation of final results. Direct quotations may be associated with your position, but no names will be used. Direct quotations included in the final results will not contain information that may indirectly identify you as the speaker unless you have explicitly agreed to this. The Principal Investigator will contact you by telephone or email after transcription/ summarization of the interview to confirm that you give consent to have a specific quote used.

Only the Principal Investigator (and hired translator in the case of French interviews) will see the full transcripts of survey responses or hear the full recordings of the interviews;

the Academic Supervisor (as listed at the top) may see or hear portions of the transcripts so long as this is needed to assist with analysis. Only the Principal Investigator will have

access to electronic files containing transcribed interviews. Your name will not be associated with the audio files or transcripts. All electronic information (i.e., written transcripts of interviews) from this study will be kept on a password protected computer and external hard drive.

Questions

If you have any questions about this study, please contact the principal investigator, Melina Puley (contact information is on the first page of this consent form).

Problems or concerns

If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, you may contact Melina Puley (the principal investigator of this study) or Catherine Connors (the Director of Dalhousie University's Office of Human Research Ethics Administration) for assistance by phone at 902-494-1462 or by email at ethics@dal.ca

School for Resource and Environmental Studies Faculty of Management

PARTICIPANT CONSENT FORM FOR SURVEY

Researcher: Melina Puley

Title of the research: Fishermen Involvement in Fisheries Management in Nova Scotia, Canada.

Consent to participate in the study: I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I hereby consent to take part in this study. However I realize that my participation is voluntary and that I am free to withdraw from the study at any time.

(Please tick box) ☐ YES ☐ NO

Consent to audio recording of interview:

I hereby consent to the audio recording of this interview. I understand that should I agree to participate in this study and later wish to withdraw from the study, the recording and interview transcripts will be destroyed.

(Please tick box) ☐ YES ☐ NO

Consent for use of direct quotations: I hereby consent to allow the researcher to use direct quotations from my responses in this survey in writing and presenting study results. With my consent, I understand that these quotations may refer to my position and organization but will not refer to my name unless I formally agree to the use of my name in association with my quote. I understand that I will be contacted after the study to reaffirm consent to the use of specific quotes.

☐ YES ☐ NO

I agree that the researcher may use my full name in association with the information I provide today:

☐ YES ☐ NO

If yes, please state name: _____

I prefer that the researcher refer to my position and/or community but not my name

☐ YES ☐ NO

I give consent for the sharing of raw data with all identification removed for translation and/or transcription help.

☐ YES ☐ NO

Consent to be contacted for clarification and/or a follow-up interview:

I agree that the researcher may contact me for further clarification and/or follow-up interview as needed for any of the information you provided me with today?

☐ YES, the researcher can contact me for a follow-up interview.

☐ NO, I would prefer that the researcher not contact me for a follow-up interview.

Appendix 4 - List of Associations Interviewed

- 45' Shelbourne County Fixed Gear Quota Group
- Area 18 Snow Crab Fishermen's Association
- Area 19 Snow Crab Fisherman's Association
- Clam Harvesting Area Two Clammer's Association
- Eastern Shore Clam Harvesters Association
- Eastern Shore Fishermen's Protective Association
- Full Bay Scallop Association
- Gulf Nova Scotia Tuna Association
- Gulf of Nova Scotia Herring Federation
- Gulf of NS Bonafide Fishermen's Association
- Gulf of NS Fishermen's Coalition
- Guysborough County Inshore Fishermen's Association
- Halifax West Commercial Fishermen's Association
- Inverness South Fishermen's Assoc.
- Lobster Fishing Area District 34 Lobster Committee
- Maritime Fishermen's Union (MFU), Local 4
- Maritime Fishermen's Union (MFU), Local 6
- Maritime Fishermen's Union (MFU), Local 9
- Northern Cape Breton Fishing Vessel Association
- Northhumberland Fishermen's Association
- Nova Scotia Swordfishermen's Association
- Prospect Area Full Time Fishermen's Assoc.
- Richmond County Inshore Fishermen's Association
- Scotia Fundy Inshore Fishermen's Association
- Southwest Fishermen's Rights Association
- Southwest Nova Fixed Gear Association
- Swordfish Harpoon Association
- Tusket River Gaspereau Dip Netters Association
- Upper Bay of Fundy Fish Draggers Association
- Upper Bay Scallop Association
- Yarmouth County Fixed Gear Association

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