

Master's thesis



Reconciling participants' values in the  
British Columbia Pacific halibut  
(*Hippoglossus stenolepis*) intersectoral  
allocation dispute

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*Reconciling participants' values in the British Columbia Pacific halibut (Hippoglossus stenolepis) intersectoral allocation dispute*

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## Declaration

I hereby confirm that I am the sole author of this thesis and it is a product of my own academic research.

A handwritten signature in black ink, reading "Ryan O'Connell". The signature is written in a cursive, flowing style. The first name "Ryan" is written with a large, looped 'R' and the last name "O'Connell" follows with a distinct 'O' and a trailing flourish.

---

Student's name



# Abstract

As commercial fisheries around the world make increasing use of rights-based allocation regimes to resolve allocation and management issues, these regimes may conflict with local, artisanal, recreational and other small-scale fisheries. Resolving intersectoral allocation disputes is often not a scientific or technical problem, but one of reconciling the values and objectives of the participants. Commercial and recreational anglers on the west coast of Canada have been involved in a decade-long dispute over the allocation of Pacific halibut (*Hippoglossus stenolepis*). This thesis documents the history of the dispute and records the fundamental objectives of the participants in the fishery to infer their values and examine the implications for resolving the dispute. The most important values reflected the evolution of two separate developments of how fishing rights are determined and distributed, those based on ancient public claims of the right to fish and those aimed at maximizing utility with finite stocks. Despite this conflict, responses indicate that participants from both sectors, as well as those from associated sectors, share similar values for the fishery that can be used to identify useful alternatives to reduce intersectoral conflict. Namely, the biological sustainability of the fishery is shown to be paramount among participants, while the overall economic benefits and fairness to resource users are also highly ranked. It is found that the separate fishing sectors have been assigned unequal and irreconcilable fishing rights that impede the fishery's participants from working together to achieve their shared objectives.

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# Acronyms

BC – British Columbia

BCWF – British Columbia Wildlife Federation

CIC – Commercial Industry Caucus

DFO – Department of Fisheries and Oceans Canada

FAO – United Nations Food and Agriculture Organization

FSC – Food, Social and Ceremonial

GIAB – Groundfish Integrated Advisory Board

HAB – Halibut Advisory Board

IPHC – International Pacific Halibut Commission

ITQ – Individual Transferable Quota

IVQ – Individual Vessel Quota

NTC – Nuuchah-Nulth Tribal Council

OCLC – Office of the Commissioner of Lobbying in Canada

PHMA – Pacific Halibut Management Association

SDM – Structured Decision-Making

SFAB – Sport Fishing Advisory Board

TAC – Total Allowable Catch



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# 1 Introduction

The dominant paradigm for global fisheries is one based on balancing harvests with conservation (Worm, et al., 2006; Pauly, et al., 2002). Achieving a sustainable harvest level should be of the highest priority for a fishery; fortunately, many fisheries, especially those in Western countries, have largely resolved this issue (Worm, et al., 2009; Hilborn, 2011). One of the most common tools used to achieve this balance has been rights-based management, often in the form of individual transferrable quotas (ITQs) (Arnason, 2005; Chu, 2009). ITQs have been very effective when paired with a science-based total allowable catch (TAC) because they combine catch ceilings with open markets and economic freedom for fishermen (Casey, Dewees, Turris, & Wilen, 1995; Chu, 2009). The ownership-like rights that ITQ licenses grant serve to entrench existing fishermen, giving them a stronger stake in the fishery as a whole (Shotton, 2001) and a clear incentive to conserve and improve the fishery. As a result, changes to allocation regimes that negatively affect the rights and economic returns of established commercial fishermen face significant hurdles.

While rights-based commercial fisheries have had clear success in improving stock management, reducing overfishing and increasing economic efficiency, there is evidence of potentially negative effects. Pinkerton and Edwards (2009) and Sumaila (2010) argue that the initial allocation of quota can alter the market and impede efficiency. Christensen et al. describe how the urban “consolidation of quota shares and processing capacity has been hard for many small fishing communities in Iceland” as many jobs have migrated to the capital, Reykjavik (Christensen, Hegland, & Oddsson, 2009, p. 116). Also in Iceland, Katie Auth found that residents in the remote Westfjords region, where the economy is quite dependant on the fishery, felt that rights-based management was “preventing individuals without quota from participating in meaningful deliberations and decisions regarding the future of the resource and the rules that govern it” (Auth, 2012, pp. 92-93). These effects can put pressure on communities and small-scale subsistence, artisanal, and recreational fisheries when they need to compete for catch shares.

At the same time, recreational fisheries are slowly gaining prominence as an issue of interest, in part due to their economic and social value as well as their effects on fish stocks (Coleman, Figueira, Ueland, & Crowder, 2004; Ihde, Wilberg, Loewensteiner, Secor, & Miller, 2011). Off the North American Pacific coast, Pacific salmon (*Oncorhynchus spp.*) have historically been the primary target of tidal water anglers, but declining abundance in the 1990s caused recreational fishermen to look for other opportunities (Gislason G. , 2006). Salmon stock declines coincided with the increasing widespread availability of GPS and Sonar technology and the Pacific halibut (*Hippoglossus stenolepis*) recreational halibut fishery in British Columbia (BC), Canada (See Figure 1) grew quickly. There was essentially no recreational fishery for BC halibut in 1980 (Gislason G. , 2006) but in 2012 it accounts for 15% (1,223,505lbs/ 554,973kg) of the halibut TAC.

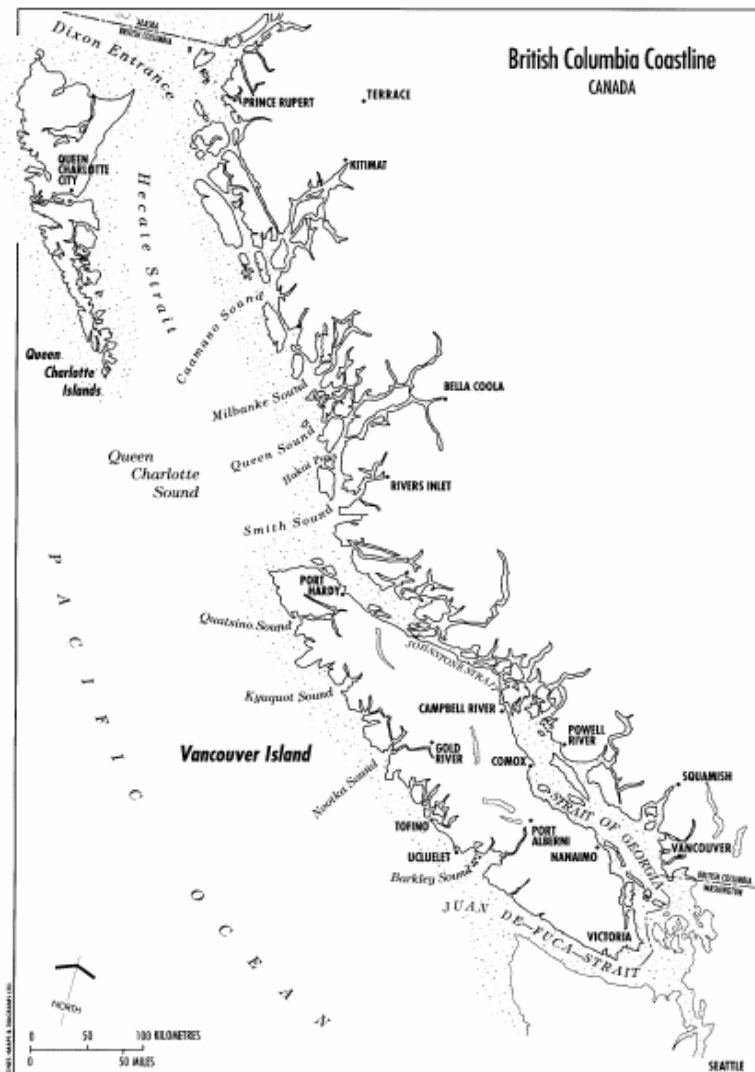


Figure 1 - Coastal area of the BC halibut fishery (GSGislason & Associates Ltd, 2004)



This significant amount of fish does not represent a serious conservation threat, because the TAC (including the recreational portion) is independently accounted by fisheries scientists. It is, however, a social and economic threat to the individuals, businesses and communities that have premised their lives and business decisions on those fish being taken by the commercial fishing sector. At the same time, a great many individuals, businesses and communities have come to depend on the businesses supporting recreational fishing. Commercial sector representatives counter that their licenses and long fishery history entitles them to their initial allocations, and that these allocations should only be altered through the market established to trade their quotas within their sector. But advocates of the recreational sector argue that they have an ancient common law right to fish that supersedes so-called 'exclusive' fisheries and that the price commercial fishermen are able to pay for their quotas, which lease at over \$5 per pound (0.45kg), are unaffordable, especially when halibut can weigh well over 100lbs (45kg).

Allocating a limited number of fishery resources amongst multiple and worthy fishery sectors is a looming and underdeveloped problem in modern fisheries management. There is no evident technical solution to the problem because there is no clear best use of the fishery resources. The best use of the resource depends on the values and objectives we have for our resources and our communities. Though there are many that will argue that maximizing the economic return is the best use (Pearse, 2006), doing so may compromise established legal rights to access public property (von Tigerstom, 1997) and those benefits may become concentrated in urban centres rather than rural, traditional fishing communities (Carothers, Lew, & Sepez, 2010). Intersectoral fishery allocation is a means to accomplishing broader social objectives, but they must be defined before allocation can be considered effective.

Over the past three decades, the BC commercial halibut fishery has gone from being a dangerous and low-value fishery to an oft-cited model of success and good governance (Casey, Dewees, Turris, & Wilen, 1995; Turris, 2010; Sporer, 2001). More recently however, this fishery has experienced ongoing conflict and instability over intersectoral allocation issues, threatening businesses and rural communities. These conflicts have, in turn, led to the need for political intervention in the management of the fishery that has largely failed to address the underlying issues. A credible and durable alternative would be

extremely valuable, not only as a resolution to this issue, but also to global fisheries that are increasingly dependent on rights-based approaches as a means to overcome diminishing fishery resources.

Relations between the commercial and recreational sectors have become extremely strained and the failure to resolve inter-sectoral allocation issues has resulted in the parties initiating sustained political lobbying efforts to advance the interests of their sector over those of the other sector (M. Paish, personal communication, January 4, 2012). The online registry of lobbyists provided by the Office of the Commissioner of Lobbying of Canada shows that the commercial sector's Pacific Halibut Management Association (PHMA) has been lobbying since at least 2007 while the Sport Fishing Institute (SFI), a recreational sector advocacy organization, actively lobbied between 1996 and 2004. (OCLC, 2012) Lobbying efforts on behalf of the recreational sector almost certainly continue through the present (SFI, 2011). This evidence suggests that the current management system is failing to account for the needs of individuals from both sectors who now seek external political support. Competing in this fishery is not only dependant on one's economic efficiency or the quality of products and services, but also the effectiveness of one's political lobby.

## **1.1 Purpose**

The purpose of this research is to examine the validity and usefulness of using a "values-based" approach to evaluating and implementing a more durable and credible intersectoral allocation mechanism. In doing so, this research can contribute greater understanding to the problems and solutions associated with intersectoral allocation of fishery resources, itself an underdeveloped field of study, as well as identifying means to resolve some of the negative consequences of the increasing use of rights-based approaches in fisheries management. It is hoped that the findings of this study will help those involved in the BC halibut allocation dispute to more efficiently achieve a cooperative solution and thereby improve the overall functioning of an industry that contributes substantial economic and social benefits to BC.

Additionally, this thesis seeks to contribute to our understanding of the effect of fisheries access regimes and the ways in which they impact social objectives for the resource. In this respect, it contributes to the discussion in Auth's recent thesis, *Fishing for Common*

*Ground.* Auth notes the ways in which modern rights-based fisheries have compromised the ability of residents to control their own fate in northern Icelandic fishing communities (Auth, 2012). In Canada as in Iceland, it is valuable to understand how modern fisheries management affects those who depend both directly and indirectly on fisheries resources. This thesis finds that pre-existing regimes must be respected, but that allowing them to dictate fisheries allocations gives disproportional power to the status quo and may hinder innovation and improved management. By considering the broad range of political, environmental, and economic objectives of fishery management regimes and the way the rights associated with those regimes affect people living and working on the coast, it is hoped that more proactive and beneficial approaches can be found.

## **1.2 Reviewed literature**

There have been no published studies on the intersectoral halibut allocation issue since 2006, in which Gislason (2006) states that “the intersectoral allocation process for halibut is innovative and unique in Canada, and perhaps in the world,” as well as noting that it was too early to determine if the process was working. Since Gislason’s report, no significant academic analyses of this fishery have been conducted; thus, a wide range of theory, examples and data on global fisheries allocation was reviewed in order to properly assess this fishery. Research for this thesis involves the review of literature regarding public fishing rights, resource management and access regimes, resource collapses, social preferences in allocation, international experiences, local management history and values-based decision making.

Complicating matters, there is no clear and direct standard for resolving allocation disputes. There is no scientific ‘better’ or ‘worse’ allocation framework, but there are differences in the outcomes. Ideal allocation depends on the objectives that the stakeholders, management, government and public have for the fishery resources, and their objectives depend on their values. Thus, it seems that systems of allocation and re-allocation must first consider values. Ralph Keeney and Robin Gregory are the primary proponents of “values-focused thinking” which argues that underlying values of stakeholders should be identified and compared before pursuing alternative situations

(Keeney R. L., 1996; Gregory & Keeney, 1994). This approach and the methods they describe form the core methodology of this thesis.

Two core theoretical principles are extremely influential in how fisheries allocation problems are understood. Broadly classified, these are Garrett Hardin's *The Tragedy of the Commons* and the common law *Public Right to Fish*. The right to fish is seen as an ancient public right, flowing from the *Public Trust Doctrine* and placing ownership of fisheries in the hands of 'the people.' The development of conservation concerns and economic rationalization systems such as individual transferrable quotas are traced back to Hardin's *Tragedy*. These concepts are often viewed as inherently in opposition to each other, a tension which this thesis evaluates for veracity in relation to intersectoral allocation.

Globally, intersectoral allocation has been most prominently addressed by governments and industry in New Zealand (NZ) (Borch, 2010), and to a lesser extent in Australia (McIlgorm, 2001), the United States of America (USA) (Johnston, Holland, Maharaj, & Campson, 2007; Abbott, Maharaj, & Wilen, 2009; Sutinen & Johnston, 2003), and other Canadian fisheries (DFO, 1999). NZ and Australia also experienced similar conflict between fishing sectors within a decade after adopting ITQs in their commercial fisheries. There, the adoption of stronger co-management regimes, backed up by targeted legislation and area-specific management measures, appears to have reduced conflict by granting the recreational sector specific rights and responsibilities that increase the incentives for fishing sectors to cooperate (Kearney R. E., 2001). It is, however, not clear if this has permanently solved the problem, or merely displaced it. Nor does it mean that intersectoral allocation will not become a public problem again.

### **1.3 Justification**

This issue represents a microcosm of numerous important issues in modern fisheries management. Intersectoral fisheries allocation is a relatively undeveloped field of fisheries management, with increasing importance as many stocks decline (Worm, et al., 2006), global seafood consumption grows (FAO, 2010) and recreational angling pressure expands (Granek, et al., 2008). Due to these pressures, more recreational fisheries, as well as artisanal and other small-scale fisheries, can expect to face harvest limits and more conflict with large-scale commercial fisheries. This will require fishery managers to make hard

decisions about the priorities for their fisheries in order to balance the needs of user groups while also achieving stock management and conservation goals. Effective mechanisms for balancing the allocation needs of diverse groups will be useful worldwide.

Preserving the viability and socio-economic benefits from the BC halibut fishery is extremely important to the residents of the BC coast. Combined, the commercial and recreational halibut fisheries are worth hundreds of millions of dollars annually to the BC economy<sup>1</sup>. The fishery is an especially important part of the economy in small coastal towns that depend heavily on the commercial halibut fleet, the associated commercial processing infrastructure, and the numerous sport lodges and recreational guiding services. Halibut have monetary, nutritional, and cultural value to communities and individuals across the coast.

But these benefits are threatened by the unstable and ineffective mechanisms used in the fishery to allocate between sectors. Political attempts at solutions, such as the February 2012 reallocation to an 85/15 formula, are associated with significant risks to all parties if they create winners and losers. Politicians risk alienating voters with an unpopular decision, no matter how much merit and justification that decision may have. When the stakeholders expect a political decision, they will attempt to influence the decision through lobbying instead of through efforts to cooperate and share the resource. The time and money spent on expensive lobbying is essentially wasted value from the fishery, excess that could have been reinvested in stewardship of the resource. Here, previous imposed decisions were not effective in resolving the conflict, and the result was four expensive consultation processes, as discussed in chapter 2. This system is thus detrimental to all participants in the fishery, including commercial fishermen, recreational fishermen, guides, lodge operators, First Nations, coastal communities, and federal politicians. The resulting uncertainty makes planning very difficult for businesses involved in fishing and those that service fish harvesters, and limits the public from participating in a shared, important pastime. An effective, logical, and flexible re-allocation mechanism would provide long-term stability and certainty to coastal individuals, businesses, and communities.

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<sup>1</sup> The commercial halibut sector catches average in excess of \$120 million landed value annually (BC Ministry of Environment, 2007). The recreational sector is significant as well, though its total value is harder to measure. The recreational fishing industry throughout BC, which includes tidal and non-tidal water fisheries, was approximately \$248 million in 2005 (BC Ministry of Environment, 2007). For further economic information on BC fisheries, see GSGislason and Associates Ltd (2004).

Finally, this research analyses the usefulness of attempting to solve the intersectoral allocation problem through values-focused thinking. This is a system that has been shown to be useful for land-use planning with stakeholders (Gregory & Keeney, 1994), corporate decision-making (Keeney R. L., 1996), and balancing environmental and economic conflicts (Gregory & Long, 2009; Gregory & Wellman, 2001). If this can be shown to be an effective tool, it presents a simple method for exploring effective solutions to problems with opposing stakeholders.

## 1.4 Research questions

The re-allocation deadlock reached in the BC commercial halibut fishery raises a number of important questions. In attempting to understand the underlying root causes of the conflict, research must focus on both the policy options and the operational values of the fishery's participants. This thesis tests this hypothesis by asking the question:

- Can a common set of values be identified upon which to base British Columbia Pacific halibut (*Hippoglossus stenolepis*) fishery allocation policy?

The fishery participants are the least well documented aspect of this issue, and so addressing the first question requires asking:

- What are the inherent and underlying values of the stakeholders involved in the current British Columbia Pacific halibut (*Hippoglossus stenolepis*) fishery allocation dispute?

Knowledge of the values of the fishery participants is invaluable in planning alternatives for the fishery because “alternatives are relevant only because they are means to achieve values” (Keeney R. L., 1996). Thus, identifying participant values is a critically important aspect of assessing alternatives.

Once values have been identified, they can then be considered in relation to alternatives, which leads to the third research question:

- What are the full range of allocation policy mechanisms that could be considered for the British Columbia Pacific halibut (*Hippoglossus stenolepis*) fishery?

Answers to this come from theoretical and practical literature, both from BC and global sources. There are a handful of alternatives advocated by participants in this fishery, all of which have merit. But there are also alternatives used and considered in NZ (Borch, 2010), Australia (McIlgorm, 2001), and USA (Abbott, Maharaj, & Wilen, 2009; Johnston, Holland, Maharaj, & Campson, 2007; Sutinen & Johnston, 2003) which are not part of the current BC halibut discourse.

Answers to the above three questions can then be used to address the final question:

- Do various policy options exist that meet the underlying values, goals and objectives of the participants in the British Columbia Pacific halibut (*Hippoglossus stenolepis*) fishery?

If one or more alternatives align with consensus or predominant values for the fishery, then implementation of said policy or policies is expected to resolve or reduce conflict and uncertainty in this fishery. The findings could reduce the need for imposed political solutions, and instead provide guidance for future systematic approaches to multisectoral fisheries allocation problems.

## 1.5 Methods

Potential interviewees were identified through industry research and preliminary interviews to represent a broad and balanced base of fishery stakeholders, including recreational fishermen, commercial fishermen, independent fishermen, corporate fishermen, First Nations, local communities, and fishery management. The participants' values were then identified through semi-structured interviews, which ask interviewees to describe their objectives for the fishery. Responses were further questioned in order to break objectives down to their fundamental and means forms. As discussed in Chapter 2, a *fundamental objective* does not serve to achieve any objective other than itself, while a *means objective* serves to achieve another objective. The fundamental objectives were then compiled, with repetitions removed, and the complete list was sent to each participant, requesting them to rank the objectives based on their own priorities. The responses were then combined into a qualitative ranking of the overall fishery values. This ranked list was

then compared to alternatives identified through participant interviews and literature-based research.

## **1.6 Limitations**

This research considers only the values of individuals currently involved in the fishery. Those outsiders who only desire to participate, have strong opinions on the fishery, or have recently left the fishery do not have a voice. The reasons for these exclusions are both practical, because interviewees needed be limited in number, and driven by the scope of the research, which prioritises alternatives that resolve conflict among existing users. Conclusions, if adopted, could provide a barrier to new entrants the fishery. Whether or not this is a desirable result is not considered.

This research was conducted with limited resources, which limits the number of interviews possible. Participants were therefore selected based on their high-level statuses within their stakeholder group, under the assumption that individuals at that level will be more knowledgeable and experienced in the fishery. This could marginalize the concerns of the ‘ordinary’ fishermen, in favour of the elites. Ultimately, it is impossible to survey all fishery stakeholders, so marginalization of this type is an inherent risk when surveying an entire industry.

## **1.7 Paper organization**

The next chapter further situates this thesis into the theoretical environment of fisheries re-allocation and BC halibut management. Beginning with the development of legal fishing rights and managing fisheries for utility-generation, the chapter explores how the interplay between these divergent interpretations of fisheries management influences how we perceive commercial and recreational fisheries. These concepts are then considered in relation to a wide range of management options. The interview system and methodology used are further explained in chapter 3. Results are presented in chapter 4 and the discussion section in chapter 5 compares these results to the research questions and theoretical background, assessing alternatives that align with fishery values. The thesis



concludes with comments on the effectiveness of the research and suggests avenues for further research and resolution of these halibut allocation issues.

## **2 Theoretical overview**

### **2.1 Introduction**

Literature related to allocation issues *within* commercial fisheries is plentiful; however, very little of it relates to allocation *between* fishing sectors. Pearse, commenting on intersectoral allocation for the local salmon fishery suggests that the reason intersectoral allocation is “so much more onerous an issue in fisheries than it is in the management of other resources is not because fish are common property but because of the way governments grant rights to harvest” (Pearse, 2006, p. 123). To Pearse, allocation rights are problematic when “based on vague criteria” (Pearse, 2006). This chapter, therefore, seeks to understand the implications of various social, legal, economic, and practical criteria that exist for the allocation of fish stocks within a sector and between other sectors.

This chapter frames much of its analysis through two allocation models, claims-based allocation and utility-based allocation. These models were taken from a NZ fishery advice paper and further elaborated on by Gibbs and Stokes who point out that “while these two models provide a way of looking at allocation options when a stock is introduced to the quota management system, they do not provide adequate guidance on subsequent allocation decisions” (2006, p. 4). Here, they provide a way of looking at the theoretical concepts behind allocations that highlights the primary goals of allocation options. However, before these concepts can be further discussed, an historical review of the BC halibut fishery is presented below.

## **2.2 History**

### **2.2.1 Current overview**

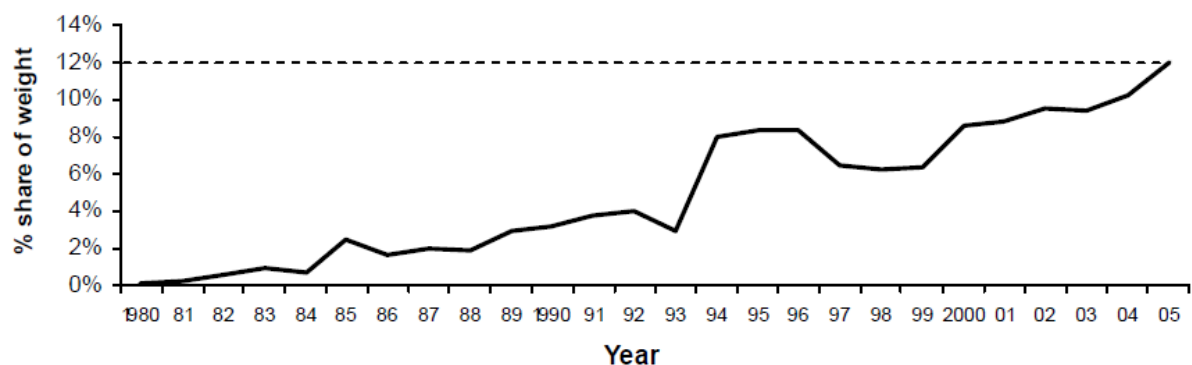
The harvest of halibut on the west coast of North America is divided into two primary sectors, the commercial and the recreational sectors. While there is also a more limited aboriginal fishery, it is the allocation between the commercial and recreational sectors that has been the source of most of the conflict to date. The commercial sector in BC, which has operated under an individual vessel quota (IVQ) system since 1991, is perceived as one of the best managed commercial fisheries in the world, receiving Marine Stewardship Council (MSC) certification in 2009, and is often cited as a model for successful rights-based management (Chafee & Turriss, 2009). The fishery is managed by Fisheries and Oceans Canada (DFO) under an international treaty through the joint Canada/USA International Pacific Halibut Commission (IPHC). Scientists for the IPHC review stock data every year and recommend a TAC for BC, and several American regions, to fish towards. Initially, 435 vessels received IVQs in 1991, though some temporary transfers were allowed in 1993 and full transfers have been legal since 1999. Transfers allow the most efficient producers to purchase or lease the quota of less efficient IVQ holders, thereby benefitting all parties and improving the efficiency of the fishery (Turriss, 2010). The result is that there were only 148 active vessels with halibut licenses in 2011, though 69 vessels targeting other species landed halibut as well (Gilroy, Erikson, & MacTavish, 2011). The current system allows these other vessels to lease the quota they need to account for their halibut bycatch, reducing incentives for discards of bycatch.

Since 2006, all BC groundfish, a fisheries management group to which halibut belongs, have been managed under the Pilot Commercial Groundfish Integration Plan (CGIP). Groundfish integration includes transferable quotas for all groundfish fisheries, 100% at-sea and dockside monitoring, and vessel accountability for all catch. An innovative video-monitoring system allows all catch to be monitored as it leaves the water. These measures address significant bycatch and discard issues previously associated with groundfish fisheries. Currently, all legal-size fish caught can be landed regardless of license because fishermen can lease the specific amount of quota they need to account for their individual catches. Recently, this system has even been extended to account for damage to corals and sponges (Vancouver Sun, 2012). The DFO, environmentalists, and the professional

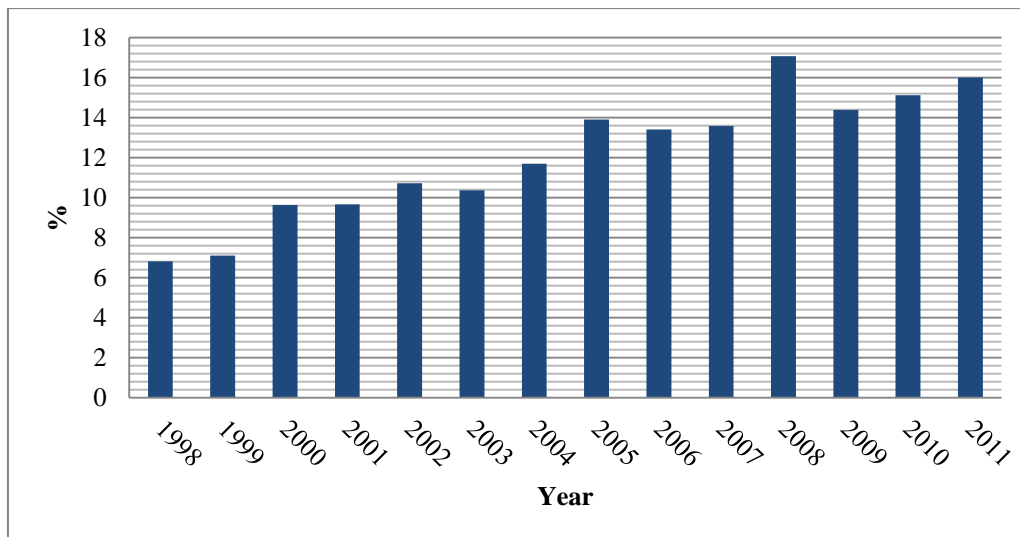
organizations representing commercial groundfish interests have found CGIP successful. A review of the pilot integration program indicated that environmental performance is high and the industry is profitable, and recommended its continuance (DFO, 2010),

### 2.2.2 Growth of the recreational sector

The recreational fishery for halibut has also established itself and grown substantially in the last 20 years. Prior to 2004, total recreational sector catches were unregulated. The total number of halibut caught by recreational anglers had no annual limit, though daily limits applied to individual anglers. The sector's seasonal catch was estimated prior to the season's beginning, and was subtracted, along with the First Nations Food, Social and Ceremonial (FSC) catches, from the IPHC-determined Canadian TAC to determine the commercial TAC. By 2004, the recreational catch had surpassed 10% of the total Canadian halibut TAC, and was growing. See Figure 2 below for the historical growth of the BC recreational halibut fishery dating back to 1980, and see Figure 3 for the recent recreational share of the overall BC halibut fishery up to 2011.



*Figure 2 - Recreational share of combined commercial-recreational halibut harvest  
(Gislason G. , 2006)*



*Figure 3 - Recreational halibut catch as a percentage of total catch (T. Karim, personal communication, March 6 2012)*

### **2.2.3 The Kelleher process**

The growing catch of halibut by recreational anglers prompted a series of consultation sessions between DFO and representatives of the two sectors in 2000. That year, DFO hired Stephen Kelleher, a prominent BC lawyer and conflict resolution specialist to advise on:

- 1 An allocation arrangement of pacific [sic] halibut for the commercial and recreational fishing sectors; and*
- 2 How allocations may change over time*

(Kelleher, 2002)

Kelleher did not attempt to consider the economic contributions of the sectors or to recommend an allocation framework that substantially favours economic efficiency. His report was written based on consultation with representatives from DFO, the Commercial Sector Allocation Subcommittee of the Halibut Advisory Board (HAB), and the Executive Committee of the Sport Fishing Advisory Board (SFAB), as well as information and data drawn from the parties, IPHC, and a previous process facilitated by economist Dr. Edwin Blewett in 2000. Kelleher's review was the basis for determining the initial 88/12 allocation arrangement as outlined below.

In 2002, Kelleher's report was published, in which he recommended an allocation of 91% for the commercial sector and 9% for the recreation sector. This was based on DFO catch data which suggested that the recreational sector had caught 9% of the non-FSC TAC in 2000 and 2001. This estimate would later prove to be incorrect, as DFO's recreational catch monitoring system poorly accounted for halibut catches and failed to account for the growing catches in that sector. In his report, Kelleher recognised that current recreational monitoring was poor, and recommended that recreational allocation be set at whatever the true recreational catch was in 2000 and 2001 (Kelleher, 2002). Though Kelleher desired that the two sectors be able to exchange quota freely between themselves, he acknowledged that it was not currently possible and that the SFAB opposed such a move. Instead, Kelleher recommended that when the recreational sector caught less than its total allocation, the catch "should be credited to a nominal account [that] can be drawn upon in the future when its allocation is exceeded" (Kelleher, 2002).

There are issues with the report within the halibut community. Allegations of improper consultation and incorrect statements have been made (G. Kristianson, personal communication, March 13, 2012). If true, this points to both the difficulty of achieving mutually agreed-upon findings in this contentious issue, and the related problem of achieving effective consultation. It is not the purpose of this paper to identify or directly address potential issues of both substance and process in the Kelleher report, but this thesis attempts to further clarify and make public the values of the fishery's participants and to build on Kelleher's work to create a better understanding of the fishery and its allocation issue.

#### **2.2.4 Reforms**

Following Kelleher's report, DFO Minister Robert G Thibault made the 2003 decision that the commercial/recreational allocation percentage would be 88/12, respectively, until the parties could reach an agreement on a 'market-based' allocation transfer system. Also announced was a promise to not shut down the recreational sector in-season, implying that recreational catch would either be supplemented with commercial quota or limited by standard fisheries management regulations like bag limits and/or area closures.

In 2004, due to widespread concerns that DFO's current recreational catch monitoring system was underestimating halibut catches, an independent company was contracted to improve the system. Due to an ongoing problem with a lack of biological data in some areas, especially remote areas, effort was made to collect biological samples from a significant number of fish from all statistical areas in BC (D. Adams, personal communication, March 7, 2012). This data has since been maintained and used as a proxy to supplement the biological catch data when DFO is unable to collect enough from a given statistical area (D. Adams, Ibid). The effect has been that DFO is able to produce more accurate and timely estimates of the recreational halibut catch by month and area (D. Adams, personal communication, March 7, 2012).

To incorporate the principles in Thibault's 2003 decision, DFO would use the previous year's recreational halibut catch as an estimate for the current year. Thus when the recreational sector caught less than its allotted 12% in 2003 and 2004, the PHMA was able to purchase the excess quota in 2004 and 2005. The recreational sector does not have a legal entity which can hold that money, so the PHMA administered a trust account with the funds. In 2005, the recreational sector was estimated to have caught 12% of the TAC (though current figures put the catch at closer to 14%); therefore, there was no additional quota to sell to the PHMA in 2006. Current figures show that the recreational sector was above its 12% ceiling in 2005 and has been every year since (see figure 3). Using the funds generated by leasing quota to the PHMA in 2004 and 2005, this overage was compensated for in 2008, 2009, and partially accounted for in 2010 when the account was emptied. However, management controls on the fishery began in 2008 in order to reduce its catch, including reduced daily bag limits and shorter seasons (BC Wildlife Federation, n.d.). Certainly, these measures did limit recreational take, but even still the recreational catch for 2011 was estimated to be 275,000lbs (124,737kg) more than the sector's allocated catch ceiling.

### **2.2.5 Further consultations**

In response to the growing recreational catch share, representatives from the SFAB, PHMA, the Province of BC, DFO, and the Nuuchahnulth Tribal Council (NTC) First Nations began a series of meetings in the winter of 2007/2008 facilitated by Hugh Gordon. Often referred to as the Gordon Process, this resulted in a consensus solution that DFO

would secure enough quota to grant the recreational fishery 20% of the TAC. This cost, estimated at \$25 million would be repaid through recreational licensing with the creation of a 'halibut stamp,' purchased by the individual angler in addition to the regular fishing licence. Already in use for several other fisheries in BC, such as salmon, every angler who wished to fish for halibut would pay an additional sum for the privilege when purchasing a license. A stamp would be affixed to the license as proof. Not only would this cover the costs of the additional quota, but it was expected to also generate funds to pay for improved fishery management (BC Wildlife Federation, n.d.). In late 2009, the federal government announced this solution would not be implemented because it conflicted with the federal *User Fee Act*, which requires public consultation before government can impose new fees.

Following up in 2010, DFO announced a new mediated process, to be led by prominent labour leader the late Roger Stanyer, which would consider several alternatives in 2010. The details and results of this process remain confidential, so specifics are few and understandings are based on verbal information provided by participants. It appears that there were four policies under consideration, but that the two favoured by the recreational sector held little appeal for DFO or the commercial sector, who are reported to have preferred an experimental program that would facilitate leasing of small amounts of quota by individual anglers. One DFO representative spoken to stated that the alternatives were supplied by DFO, and that the department was seeking feedback. Some representatives of the recreational sector report that this intractability led to a failure of the process, and that the recreational sector walked out in protest. Interestingly, this story is not shared by commercial sector representatives interviewed. Unfortunately, there can be no public record of the process which ended in late 2010 or 2011.

However, the experimental project mentioned above was attempted in the 2011 season, and continues in 2012. Under this program, interested recreational anglers can sign up and lease small amounts of halibut quota from commercial quota holders. Those who lease quota may fish for it from April 1<sup>st</sup> to December 31<sup>st</sup>, months after the public fishery closed in 2011. This program would allow a participating guide to operate under the program while his clients fish under his authority. It does not account for bycatch of species other than halibut, thus any rockfish (*Sebastes spp.*) caught while fishing under this program must be released where they will almost certainly die (Granek, et al., 2008). In 2011,

447lbs (203kg) of halibut were transferred to recreational fishermen under this program (SFI, 2011).

Through 2011, the most recent halibut consultation process was headed by Randy Kamp, British Columbia Member of Parliament for Pitt Meadows–Maple Ridge–Mission and Parliamentary Secretary to the Minister of Fisheries. This was an attempt to gather information in order to solve the problem through the political executive. Kamp is engaged in researching the subject and made a private recommendation to DFO Minister Keith Ashfield. On February 17, 2012, Ashfield announced a new allocation formula of 85% to the commercial sector and 15% to the recreational sector (DFO, Greater certainty in the Pacific halibut fishery, 2012). The commercial sector was not compensated for the re-allocation. Reaction from both sectors to the latest political decision has been negative. Commercial sector participants describe a loss of rights and income, while recreational sector participants still do not feel that their needs or rights have been met. Further illustrating the conflict, commercial fishermen blocked the door to Nanaimo-Alberni Member of Parliament James Lunney’s office with a concrete block with the words “Thanks for the 3% back stab” on March 2<sup>nd</sup> (Cunningham, 2012). Similarly, concrete blocks were placed in front of a recreational boat launch overnight in Victoria, spray-painted with the words “sport refuse to conserve with commercial” and “compliments from the halibut fleet” (Stafford, 2012). Figure 4 shows one of the latter concrete blocks. It seems clear that Minister Ashfield’s announcement only served to inflame tensions and conflict.





*Figure 4 - Concrete barrier placed at a boat launch in Victoria (Stafford, 2012)*

## **2.3 Conflicting uses**

In attempting to understand the nature of intersectoral fishing conflict and the means of resolving it, it becomes clear that conflict between recreational and commercial fishing sectors is not unique to the BC halibut industry. Notable problems have occurred in the USA, especially in the Gulf of Mexico (Johnston, Holland, Maharaj, & Campson, 2007) and Alaska (Berman, Sharman, & Kim, 1997); Australia (McIlgorm, 2001); and New Zealand (Borch, 2010). Generally, this is a growing issue in countries that have strong commercial and recreational marine fishing industries. Recreational fishing pressure has shown recent growth in these countries (Borch, 2010; Ihde, Wilberg, Loewensteiner, Secor, & Miller, 2011) as it has for BC halibut. This increase has negative effects on pressured stocks, which may anger commercial fishermen whose livelihoods depend on those stocks. If left unmanaged, this results in a competition where each sector tries to increase its share of the TAC at the expense of the other sector.

### **2.3.1 Differences between sectors**

Resolving intersectoral conflict in fisheries presents difficulties, because of the differences between the sectors which are highlighted in academic and management discourses

(Gislason G. , 2006; Kearney R. E., 2001). Gislason (2006) provides a simple, effective table outlining these differences:

	<b>Commercial Fishery</b>	<b>Recreational Fishery</b>
<b>Activity</b>	<ul style="list-style-type: none"> <li>• Renewable Resource Extraction</li> <li>• Processing</li> <li>• Marketing</li> </ul>	Outdoor Recreation
<b>Product</b>	Fish	Angling Experience <ul style="list-style-type: none"> <li>• Catching Fish</li> <li>• Harvesting Fish</li> <li>• Aesthetics</li> </ul>
<b>Output Measure</b>	Tonnes	Angler-days
<b>Producing Sector</b>	<ul style="list-style-type: none"> <li>• Commercial Fishermen</li> <li>• Processors</li> <li>• Retailers</li> </ul>	<ul style="list-style-type: none"> <li>• Independent Anglers</li> <li>• For-Hire Businesses</li> </ul>
<b>Consumers</b>	Seafood Consumers	Anglers

*Figure 5 - Differences between commercial and recreational sectors (Gislason G. , 2006)*

Whereas a commercial fishery extracts commodities from the resource for sale on the market, a recreational fishery uses access to the resource for leisure. Business interests have developed around recreational fishing to facilitate it, but they are not as integral to the sector as they are for the commercial fishery. These interests, however, may generate substantial value and employment, as well as landings and sectoral participation. Generally, commercial fishery operators strive to maximize profits by increasing the value of their product, which is tied to the amount of fish landed; the perceived quality of those fish (related to the freshness of the fish and the current supply on the market); and reduced operating costs. The purchasers of commercial fishery products range from large-scale seafood processors, distributors, and retailers to consumers who buy fish off the dock, directly from the fisherman.

Specific data, especially for the recreational sector, is lacking. This leads to statements of broad characteristics, inferred from global cases. There is no comprehensive and publicly available research quantifying and comparing the environmental, economic, and social

effects of these specific fisheries and their participants. Certainly, this leads to overgeneralization in some cases when one attempts to construct sectoral models based on the available literature. What is required for proper understanding of this fishery is concrete and specific knowledge of the objectives, values, and contributions of participants within these sectors.

### **2.3.2 The commercial recreational sector**

Fishing guides and fishing lodges, as well as the anglers they service, constitute the so-called ‘commercial recreational sector,’ which certainly blurs the lines between the two traditionally-viewed sectors and has only seemed to further complicate attempts to find common ground. Technically, a guide is not an angler (Kelleher, 2002) and representatives from the BC halibut fishery are quick to reiterate this, arguing that they are nothing more than a service provider and that it is the client who is the angler. But this sub-sector is entirely premised on access to recreational fishing opportunities and its primary purpose is to enhance the catching experience of the ‘real’ anglers. In the words of Abbott and Wilen, guides “produce a multidimensional recreational service for which harvest and landings are important yet partial drivers of trip demand” (Abbott & Wilen, 2009). The numbers of BC halibut caught with guides are believed to be significant, possibly even representing a majority of the halibut angled; although no data has been published. Contrary to the BC situation, in Alaska, there has been a concerted move towards regulating guides as a separate sector. In BC, any separation of angler and guide has been strongly opposed by the recreational sector. It may be, as many in the commercial sector argue, that the money and vociferousness behind the recreational sector’s lobby has stemmed from guide and lodge interests, but there is no proof of this, nor is it clear that such a situation would be inappropriate. In fact, there appear to be some resident anglers in BC who consider themselves halibut anglers but do not own a boat capable of reaching halibut grounds. For them, guides are necessary service providers who represent their interests. Regardless, this strong sub-sector has fuelled conflict between the two sectors.

### **2.3.3 Differences within fishing sectors**

Further separating recreational from commercial fishermen are their institutions and organizations. Commercial operators have incentives to work together (Pearse, 2006),

especially when open access derby-style fishing is replaced by quota-management. The PHMA, which represents the majority of commercial fishermen and halibut quota holders in their dealings with government, is evidence of this. This creates a stable and powerful industry voice and simplifies management for government. Recreational fisheries, in contrast, have more diversity and much less cohesiveness uniting them to engage with management (Kearney R. E., 2001; Borch, 2010). There are many more anglers than commercial licence holders, but, other than those in the ‘commercial recreational sector’ their direct individual interests in the fishery are generally much less and not based on their ability to earn a livelihood. One of the reasons for angling is to “get away from it all,” which is quite contrary to organizing and going to meetings. This was a problem initially expected by the NZ Ministry of Fisheries when it attempted a major consultation process in 2000 (New Zealand Ministry of Fisheries, 2000); however, the widespread reaction to this process, largely organized by a group known as Option4, demonstrates the ability of recreational fishing interests to come together in self-interest (Borch, 2010).

#### **2.3.4 Sectoral similarities and shared objectives**

Though the academic emphasis may be on the differences between these two sectors, there are clear similarities. As discussed in (Cowx & Cooke, 2006), both sectors share the “potential to affect negatively fish, fisheries, and aquatic habitats” and that recognizing this similarity should reduce the polarized views that arise, as in the BC halibut fishery. Similarly, both sectors have a stake in strong stock management and conservation in order to sustain future harvests. Kearney (2002) describes a situation in Australia where the misperceptions each sector had of the other one created substantial conflict and kick-started a co-management process that ultimately found that most stock damage was caused by activity outside the fishery. As well, both sectors are somewhat benefitted by appealing to a public/consumer perception of a natural product and experience, one free of unnecessary human influence. The commercial sector has sought to improve the value of its product by emphasizing these qualities through improved transparency and traceability (This Fish, 2011) and third-party eco-certification (Marine Stewardship Council). Perception of sustainable harvests, are important to both sectors to maintain the social license to continue fishing, though the degree of this depends on the specific operator and his markets. Similarly, a sense of wilderness experience can impact the value of a

recreational fishery. This may include limited contact with other anglers and increased contact with non-target species. The research in this thesis aims to identify further similarities.

## 2.4 Development of fishing rights

The conflicts that arise in intersectoral fisheries allocation, which can be “particularly acute” when only the commercial sector uses individual quotas while catch grows in the other sector, are due to the way these fisheries are granted rights (Pearse, 2006). But how does fisheries management proceed from this and reduce conflict while preventing overuse? To Pearse, the options are between choosing government intervention and market mechanisms. Certainly, government intervention is undesirable from nearly all perspectives, not only because it tends to be slow and unwieldy, but also because there is likely no political benefit in allocating away from a sector.

But are market based mechanisms the only other option, and if so, are they better? Markets are a useful tool for achieving the maximum value for goods and services efficiently with mutually-beneficial trades, but there is no shared measurement for the value of fish across sectors, making value-maximization extremely difficult (Pearse, 2006). Gibbs and Stokes (2006), via the NZ Ministry of Fisheries (New Zealand Ministry of Fisheries, 2005), identify two systems for thinking about fisheries allocation: *utility-based* and *claims-based*. Under utility-based allocation, quota is prioritized to those who can produce the most value from the utilization of the resource (Gibbs & Stokes, 2006). Presumably, this would also allow management to identify its own specific utility goals to be achieved in the fishery, such as economic maximization, rural community support, or environmental protection and then proceed to implement means of maximizing these effects. Sutinen (1993) shows how this might work to achieve one objective: high efficiency under high enforcement costs in this case. This approach has merit when management has specific objectives that it wishes to achieve and can articulate them clearly to obtain consensus and support from participants.

In contrast, under claims-based allocation, management grants fishermen and their sectors the right to fish based on their pre-existing claims (legal, historical, etc) and then allows the participants to maximise their own utility. Many suggest this is to be done by market-

driven quota transfers, but if all sectors are organized, this does not need to be the case. The latter is clearly the preferred method of most writers reviewed here, including (Pearse, 2006; Gislason G. , 2006; Kelleher, 2002; McIlgorm, 2001).

Thinking about allocation in terms of claims versus utility provides more options than does a system that relies on government versus market options. Take for example the analysis by Sutinen (1993) where he argues that fishery sectors should actually receive increased allocation relative to their enforcement costs (ie, the most expensive sector to police should receive more allocation). Doing so is predicted to reduce regulation violation by reducing incentives to poach, reduce the costs of enforcement, and improve overall economic return. A strategy like this is utility-based, but is enacted by government to take advantage of market realities. It is harm-reduction. But it severely disincentivizes individuals and sectors from taking proactive management steps. In the BC halibut case, BC's commercial groundfish fleet has high quality and cost-effective catch monitoring, accounting and reporting relative to the recreational sector. As mentioned later, this even provides a basis for assigning strong quota claims to the commercial fishery. To do so, however, may be to ignore overall economic benefit according to Sutinen's analysis. Thus, short term economic maximization is achieved, but long term economic success is compromised by incentives that reward self-interested behaviour. Sutinen makes assumptions that may not apply to this fishery<sup>2</sup>; however, the principle behind the approach is valid.

#### **2.4.1 Public trust doctrine and the right to fish**

There has been an historical evolution of the public right to fish in Canadian tidal waters that coexists with, and cannot be eliminated by, property rights. These rights may even be superior to property rights. Public fishing rights are part of the broader public trust doctrine, which preserves "the right of the public to use water and other resources" and requires these resources to be managed for the good of the public (von Tigerstom, 1997).

The public trust doctrine developed in early Roman law in which "the air, rivers, sea and seashore were common property, for all citizens to use" (von Tigerstom, 1997). This

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<sup>2</sup> Sutinen assumes that an increase in bag limits increases the amount of fish taken in a year and that there are constant high enforcement costs. This may not be the case as BC halibut angling interests that appear to be happy with a relatively low 2 fish per day bag limit. As well, I have found no indication that there are high enforcement costs during seasonal closures.

concept was later incorporated into British common law and used in the Magna Carta of 1215, initially to regulate the use and ownership of rivers (Kidd, 2006). At the time, the King was the *de facto* owner of all river beds and shores, and could grant a fisherman the right to erect a weir across a river, thereby restricting the public from navigating the river. This also upset adjacent land owners (Pearse, 2006). Chapter 33 of the Magna Carta mandated the removal of all fish weirs in English freshwater. Despite the fact that this clause was likely not intended to guarantee public fishing access, courts have until recently held that the crown cannot grant exclusive fisheries in tidal waters (Schauer, 1940; Gullett, 2006; Pearse, 2006). This is because the public trust doctrine holds that these common property resources, while held as a property right of the Crown, are subject to the public's right to use public trust lands, waters, and their resources "necessary to individual survival and livelihood, including navigation, commerce, and fishing" (von Tigerstrom, 1997, p. 2). From these rights stem both the right to recreational angling and commercial fishing, as well as the responsibility of government to hold these resource properties in public trust.

#### **2.4.2 Limitations on the right to fish**

Though the right to fish is a well-established legal tradition in Canada, the federal government can certainly still regulate fishing, as it has done through licences, gear restrictions, and bag limits, in order to protect the fishery and fulfill its duties under the public trust doctrine (Pearse, 2006). This includes the right to limit the number of licences, which it began doing in 1985, giving the existing license holders a *de facto* exclusive fishery (Pearse, 2006). Thus it is now within the power of Parliament (and only Parliament) to grant exclusive fisheries, "even in waters where there is a public right to fish" (Hogg, 1985). Though to be clear, it is not certain whether the current quota rights in the BC halibut fishery qualify as an exclusive fishery because there is still a limited public fishery.

#### **2.4.3 Implications for allocation**

When applying the right to fish to disputes between public and private uses, there is no clear priority for allocation. For von Tigerstrom, the public trust doctrine means that conflicts between public and private uses must always be resolved in favour of the public interest. This may be true, but it is a legal issue that would likely need to be decided by the

courts or parliament. While the public trust doctrine means that common property resources like halibut must be managed for the benefit of all Canadians, the right to fish does not mean that public access is always the most publicly beneficial use. The use of greatest benefit to the public is currently undefined.

#### **2.4.4 Tragedy of the commons**

Strong fishing rights are certainly valuable to fishermen, but if stock damage effectively prevents access to fish for fishing, the public right to fish is rendered useless. A thorough and convincing literature base has developed this point, describing the need to regulate the public right to fish, lest stocks or habitat be irrevocably damaged. This utility-based approach to fisheries allocation developed out of Hardin's (1968) seminal prediction that open-access resources are destined to deteriorate due to overuse by self-interested individuals. This theory has led to the development of fishery policies very different to those flowing from the right to fish, the most prominent such policies are those related to ITQs. Corresponding to an international movement towards defined shares in the 1970s (Pearse, 2006), the transition from public rights to utility-management occurred organically in the BC halibut fishery as Canada began a process of giving this fishery increased definition (Kelleher, 2002). Beginning in 1977, Canada extended jurisdiction to 200 miles from shore and signed a bilateral protocol with the USA, restricting each country's fishing fleet to its own waters. It also began limiting entry into the (commercial) fishery, thereby giving existing fishermen an (undefined) share in the fishery. The establishment of IVQs in 1991 later gave definition to the share each fishing vessel was entitled to.

#### **2.4.5 Hardin and property access regimes**

Hardin's analysis has been hugely influential in the more than 40 years since it was published, but our understanding of the rights-regimes in place in resource management have evolved considerably from Hardin's original analysis. Hardin, of course, describes the inevitable collapse of exhaustible resources when each user is free to pursue his own utility to the detriment of the other users. "Freedom in a commons brings ruin to all," he proclaims (Hardin, 1968, p. 246). But a commons, in this understanding, is a completely unmanaged resource; an unregulated, *open-access regime* (Walker, 2009). This is different



from a *common property regime*, in which access to the resource “is shared, but is exclusive to particular social groups who define rules-of-use” (Walker, 2009, p. 286).

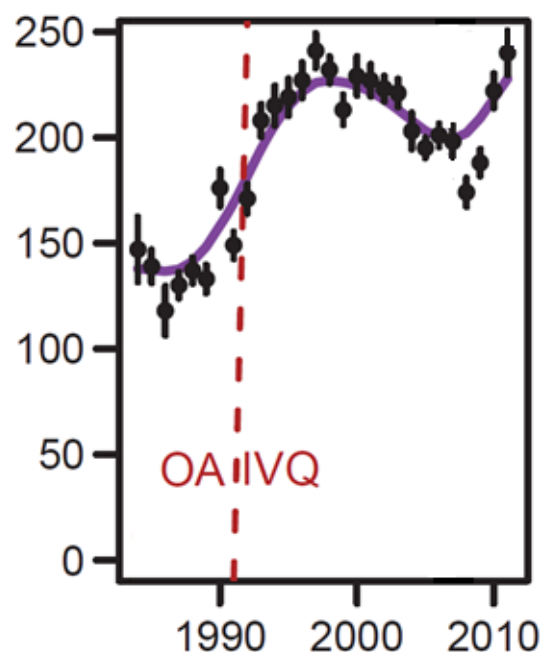
#### **2.4.6 Property access regimes**

In the case of BC marine fisheries, it is important to recognise that they are common property resources, not open access resources, but this distinction is not always clear. Within the genre of common property regimes, Satria et al (2006) further identify three overlapping sub-genres: *state property*, in which government regulates access; *private property*, delegating to corporations or private individuals control over access to the resource; and *communal property*, which tends to be viewed as a traditional, even tribal, system by modern literature. Availability of access is what distinguishes these systems from open access systems. In any form of common property management, relatively large groups of individuals may be permitted to access and subtract from the resource, but in all of these systems there is regulatory capacity to prevent overexploitation (Walker, 2009). Though it may seem counter-intuitive, private property systems, such as the contemporary BC halibut commercial fishery, are still a sub-section of common property regimes because catch is allocated to private individuals for the purposes of maximizing public utility. This action is premised on the narrative that the best use of the resource is maximum economic extraction and that private actors in open markets are more effective at achieving economic efficiency than government regulation is. As well, observers may mistake marine fisheries for de facto open-access regimes, bound to suffer tragedy (Griffith, 2008), but we must remember that other forms of access regulation are possible and even prevalent (Satria, Matsuda, & Sano, 2006; Walker, 2009).

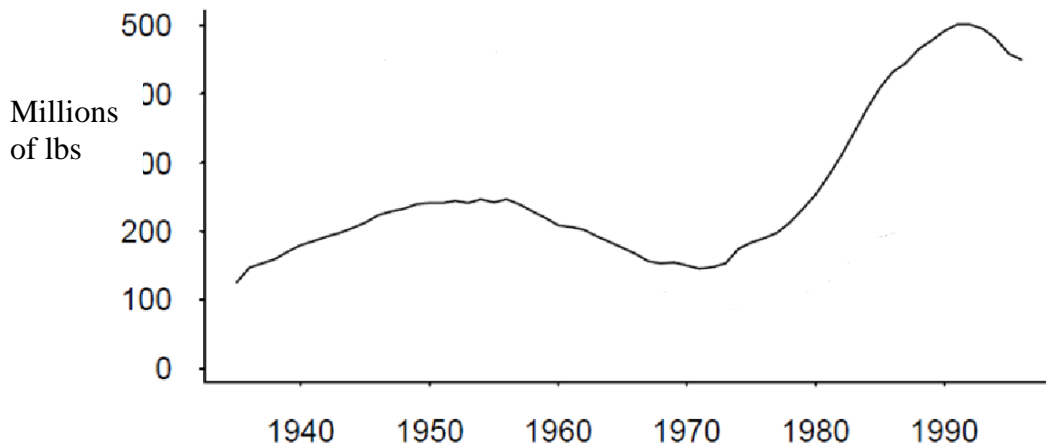
None-the-less, there is a common view that common property resources are inherently susceptible to the same fate as unmanaged, open access resources. Under this utility-based view, the public right to fish no longer matters due to the threat of resource collapse; in other words, there is no sustainable utility in the unregulated, or under-regulated, right to fish. Griffith (2008) takes a view representative of a lot of fisheries writing, arguing that TACs are not enough, that “without allocating it to individuals, a destructive race for fish results.” In this conception, the tragedy of the commons results from all fisheries, even when regulations are employed, unless private quotas are utilized (Griffith, 2008; Stokstad, 2008; Costello, Gaines, & Lynham, 2008).

### 2.4.7 The effects of access regimes on halibut stocks

The BC halibut fishery is a good example of how this narrative of biological collapse is not accurate, and the fishery also points to a more accurate, economic interpretation of quota use (Salomon, et al., 2010; Parslow, 2010). Management with IVQs began in 1991, but there is no corresponding increase in stock health needed for evidence of the conservation effectiveness of IVQ-based management. Figure 5 demonstrates that the stock within BC showed signs of growth prior to 1991 (IPHC, 2012). Figure 6, which shows the total reproductive biomass of the entire pacific halibut stock in Canada and the USA, similarly shows no signs of improvement that would correspond with Canada's 1991 implementation of IVQ management nor with the 1995 adoption of ITQ management for halibut in Alaska. This is not presented as evidence that individual quota management is bad for fish stocks, nor that another system is better in that respect, but simply that there is room for other management options to achieve conservation goals. Though rights-based management can establish useful preconditions for better conservation, stock improvements should not be considered an inherent benefit.



*Figure 6 - Commercial WPUE (weight per unit effort) in lbs/skate for the IPHC BC halibut stock assessment fishery. The black dots indicate the average,  $\pm 2$  standard errors of the mean. The curved line indicates the trend. The dashed line indicates the transition from 'open access' to IVQs (IPHC, 2012).*



*Figure 7 - Reproductive biomass in millions of pounds for the total IPHC-managed Pacific halibut stock (Sullivan, Parma, & Clark, 1999)*

#### **2.4.8 The effects of ITQs and IVQs**

Quota-based management has shown to be effective in managing the economic effects of a fishery. Generally, this system can improve fishery efficiency by removing the need for fishermen to catch fish as quickly as possible during limited openings. Known as the ‘rule of capture’ externality, which refers to the externality one fisherman imposes on all others when he removes a fish from the available stock, fishing this way has led to ‘derby’ fisheries in which an entire season’s catch may be caught in a single trip (Casey, Dewees, Turriss, & Wilen, 1995). For example, in 1991 the halibut season was 6 days long (Casey, Dewees, Turriss, & Wilen, 1995). This produces dangerous working conditions, substantial gear loss which was believed to be ‘ghost fishing,’ reduced product quality due to rushed handling and market gluts, inefficient overcapitalization of the fleet and TAC overages due to poor control over fishing effort (Casey, Dewees, Turriss, & Wilen, 1995).

All of these concerns have been improved by the adoption of the IVQ system, thereby producing substantially better economic returns for license holders (Casey, Dewees, Turriss, & Wilen, 1995) (Turriss, 2010). The efficiency created by the IVQ system however, has also resulted in fewer boats targeting halibut, fewer people employed per boat, as well as lower pay for deckhands (Casey, Dewees, Turriss, & Wilen, 1995). Those fishermen who held licenses prior to the 1978 entry limitation and 1991 quota establishment have seen the

value of their licenses rise dramatically. Some sold their licenses and others simply lease their quota to active fishermen. The high price of quota has made entry into the fishery very difficult. In 1995, Casey et al found that “most fishermen report being better off under the IVQ program and feel IVQs conserve halibut resources better than previous management systems” (Casey, Dewees, Turris, & Wilen, 1995, p. 228)

#### **2.4.9 Managing with ITQs**

The primary reason that quota-based management, such as the BC halibut IVQ fishery, is so effective is that government is not required to have complete knowledge of the fishery in order to manage it. Instead, the market is opened up and participants self-regulate in order to meet their own economic requirements. “As those involved in managing fisheries are aware, day-to-day exigencies rarely allow the luxury of collecting detailed data that will permit the proper evaluation of new programmes” and that “characterizing the ‘capacity’ of a fishing fleet is a complex and difficult, if not fruitless, task” (Shotton, 2001, p. iv). Unfortunately, knowing the capacity of the fleet is quite necessary for effectively managing fisheries that are not share-based. Managing efficiency in an environment of which we have little data is precisely what markets are so good at. Therefore, large-scale, commercial fisheries that prioritize utility-based solutions are probably ideally managed with markets and quotas. Removing the regulators from utility-maximization decisions also allows them to concentrate on important matters such as habitat protection and stock conservation.

### **2.5 Allocation methods**

This section explores the usefulness and effects of fishery allocation systems that prioritize either public claims or economic utility. Initially, both options presented are intended to inform on the complete range of alternatives available. However, specific allocation tools at use in other jurisdictions are identified and summarized, with notes as to their applicability in the BC halibut fishery.

### **2.5.1 Claims-based allocation**

An allocation system dedicated to claims-based allocation would be characterized by meeting two conflicting claims, the public right to fish and the quasi-property rights of commercial quota holders. In this respect, the final allocation would likely be determined by the courts, though legal analysis suggests that public and recreational fishing rights would stand to acquire the bulk of the fishing rights (von Tigerstom, 1997). Such a fishery would be predicted to allow for as many citizens to fish as possible within conservation limits. Maximizing individual claims in allocation means that the fishery is measured in terms of the number of fishermen, not the quality of the fishing activity. The recreational fishery would, therefore, likely have priority access because there are so many more anglers than commercial fishermen, and because they catch far fewer fish per person.

Based on previous political decisions, commercial interests do have a claim to 85-88% of the TAC, but individuals within the fishery only have claim to a percentage of the *commercial* TAC. And commercial quota licenses have not been recognized by the government as true property, as demonstrated by the February 2012 uncompensated reallocation decision (DFO, Greater certainty in the Pacific halibut fishery, 2012). Thus it is conceivable that the collective claim by the sector would simply be reduced because fewer individuals participate in it. Such a fishery might also opt to include additional commercial operators, each catching less fish. These small-scale boats might not prove to be profitable on their own, but government subsidies could help them stay in business and exercise their claims to the fishery.

This hypothetical scenario is interesting because it illustrates an almost ideal recreational fishery from a claims basis, minus the possibility for overcrowding, and a greatly altered commercial fishery. Claims-based reasoning may thus be a useful principle for structuring a recreational fishery, but it does not appear to be useful model for intersectoral allocation.

### **2.5.2 Utility-based allocation**

Typically, there are two competing tools for accomplishing utility-efficient allocation with a recreational fishery: centralized management and open markets. Centralized management requires staff collecting data on the fishery and using that information for economic analysis as Bishop and Samples (1980) do. As previously discussed, this type of

fishery management is theoretically effective, but it demands extensive and ongoing data collection, the collection of which is expensive and prone to error. Efficiency through open markets and tradable quota, as DFO is trying on an experimental basis for BC halibut, allows quota to flow unobstructed between sectors. But a number of market realities mean that the recreational sector is not well set up to participate in a quota system shared with the commercial sector. These include the high price of quota, which commercial fishermen can afford due to the much larger economy of scale at which they operate, the no-cost initial allocation of halibut quota to commercial operators, which subsidizes those fishermen who received that initial allocation, and the fact that commercial fishermen can sell their catch to recoup their financial costs. See Table 1 for quota costs. Recreational fishermen may acquire significant utility from their catches, but that does not necessarily translate into a financial acquisition capable of covering the cost of quota. In some fisheries, such as Icelandic cod, recreational fishermen may sell their catch to pay for their quota.

*Table 1 - Price of leasing and purchasing BC halibut quota (Nelson, 2011)*

<b>Year</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Lease price/lb</b>	2.15	3.00	3.25	3.15	3.25	5.15
<b>Sale price/lb</b>	29.00	33.00	35.00	35.00	40.00	50.00

One of the great strengths of the current commercial halibut fishery is that it does appear to maximize utility for its participants (Turris, 2010). Quota holders are able to maximize the return on their quota by fishing, to receive a constant return without fishing through quota leasing, or to cash out of the fishery altogether by selling their quota. Active fishermen are able to lease the specific amounts of quota needed for their fishery. The open market system allows all of these transactions and decisions to occur in a natural way, without using costly and fallible government intervention to achieve this kind of rationalization. Furthermore, the fishery is not dependant on government subsidies the same way that many other fisheries are (although the initial ‘gifting’ of quota and minimal rent collection could also be considered subsidies).

It is important here to recognise the contention that anglers generate more economic value per fish than do commercial fishermen (Bishop & Samples, 1980; Brown & Bishop, 1974; Edwards, 1990). If true, this would present a strong argument for high recreational

allocation. These claims tend to compare the gross spending of anglers to the landed value of commercially-caught fish (Bishop & Samples, 1980). This is an apples and oranges comparison of little use as a comparison or as an economic argument because it stems from the perception that expenditures on tackle, transportation, lodges and the like are measurements of economic value when, in fact, “neither expenditures nor revenues are notions of economic value” (Edwards, 1990, p. 21). Economic value in this fishery is measured by the combination of consumer and producer surplus (Edwards, 1990; Criddle, Herrmann, Lee, & Hamel, 2003). In order to understand the economic effects within the fishery, it is important to conduct studies similar to those done by Berman et al(1997) and Criddle et al (2003) in Alaska, in which “detailed expenditure accounts” of anglers (Berman, Sharman, & Kim, 1997, p. 312) are combined with their “baseline demographic information,... attributes of [their] recent sportfishing trips... and [their] preferences regarding hypothetical trips” (Criddle, Herrmann, Lee, & Hamel, 2003, p. 294). This kind of information on BC’s recreational halibut fishery has not been published. Thus, it is not, with any degree of certainty, known how the value of the recreational sector compares to the commercial sector. Currently, there does exist good information on tidal water recreational fishing in BC as a whole,<sup>3</sup> but it is not specific enough to inform the current intersectoral halibut allocation issue.

An entirely utility-based allocation would likely also still see a strong recreational fishery alongside the commercial fishery (Bishop & Samples, 1980; Edwards, 1990) though making a concrete determination would require significant additional data. While recreational fisheries generate a comparatively large amount of utility from a relatively small amount of fish, they have a much more limited capacity to catch fish than does the commercial fleet. This dynamic has produced situations with limited fishery resources where utility-maximization means only recreational fishing (Cook & McGaw, 1996). BC halibut, however, are much more plentiful than the Miramichi Atlantic salmon described by Cook and McGraw and would not be overfished solely by the recreational fishery at its current capacity and subject to its current regulations. This, however, does not mean that the recreational sector should get priority access under utility-based allocation. Declining marginal value of allocating fish to either sector means that the allocation that generates the most economic value is likely to balance the demands of both sectors, as in the

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<sup>3</sup> Gislason (2004) produced numbers on employment, expenditures, wages, and detailed angler-days for the entire tidal water angling sector

hypothetical graph in Figure 8 (Edwards, 1990). Again, the data required to make this determination is currently not available, although if it were collected, one could predict how changes to the fishery would affect the economy as Lew and Seung have done for Alaska's halibut (Lew & Seung, 2010). Finally, a utility-maximizing recreational fishery would be likely to have an enhanced value-added sector including guides, lodges and a pay-per-use structure that prioritizes maximum economic return per angler rather than maximizing the number of anglers.

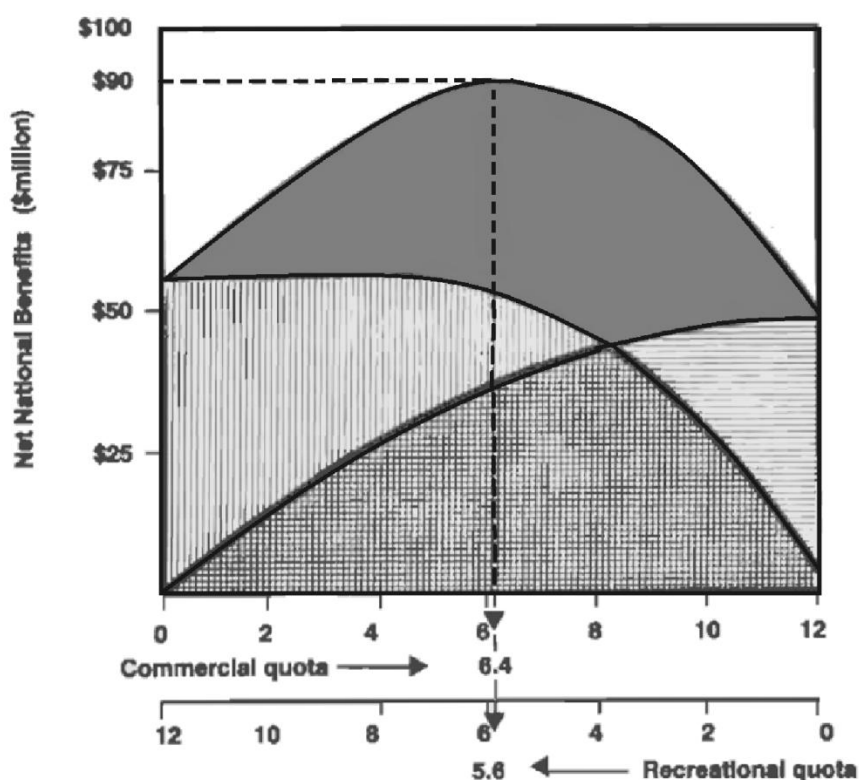


Figure 8 - Net benefits from allocation of 12 million pound TAC quota in a hypothetical fishery (Edwards, 1990)

Abbott, Wilen and Maharaj (Abbott, Maharaj, & Wilen, 2009; Abbott & Wilen, 2009) have extensively explored the topics of applying utility-maximizing approaches, or rationalization, to commercial recreational fishing. They have found that there are differences between commercial fisheries and commercial recreational fisheries, but that in open-access regimes, both suffer from the “race to fish” which significantly reduces their value (Abbott, Maharaj, & Wilen, 2009). These result in three primary inefficiencies: vessels owners are incentivized to carry too few anglers per trip, guides invest too much in the ability to catch fish and not enough in “non-catch-related aspects of trip quality,” and



too many guides will enter the fishery, “leading to excess capacity and underemployment in the sector” (Abbott & Wilen, 2009). This problem can be addressed through the implementation of ITQs for commercial recreational fisheries, probably allocated to the guides and businesses themselves in order to simplify and reduce the costs of management (Abbott, Maharaj, & Wilen, 2009). This approach is currently being pursued in Alaska for its commercial recreational halibut fishery and a similar approach is used by the BC provincial government, which manages some freshwater fisheries by allocating a set number of angler ‘rod days’ to licenced angling guides on designated high quality steelhead trout (*Oncorhynchus mykiss*) rivers. This would also serve to minimize the numbers of new entrants to the fishery, an otherwise predictable development if the sector increases profitability. This approach has clear economic advantages for BC halibut, and could somewhat reduce the recreational harvest of halibut. It could also minimize underemployment in the fishery, maximizing the return for those who remained.

Another tool for achieving efficiency in recreational allocation is the use of harvest tags, as described by Johnston et al (Johnston, Holland, Maharaj, & Campson, 2007). Similar to harvest tags used extensively in terrestrial game management, fishery tags provide some revenue to management, “increased control over total catch, improved information for management and increased long-term benefits to anglers” (Johnston, Holland, Maharaj, & Campson, 2007). This approach is very similar to applying a tax to the fishery and would likely provide a mild deterrent to entry into the fishery, thereby improving the fishery for those who remain. This effect and the collection of funds by management, would be maximized if the tag price was set at market rates. Further, funds collected could be used to purchase more quota for the recreational fishery if necessary. Tags would also not need to be physical tags attached to fish; a simple system based on recording catches on a card is in use in Washington and Oregon’s halibut fisheries (Johnston, Holland, Maharaj, & Campson, 2007), and in use in BC’s chinook salmon fishery. However, harvest tags are essentially the ‘stamp’ solution proposed following the Gordon Process, which was rejected because it required government to conduct additional public consultation on a new user fee. This is unfortunate, because this solution does not challenge the public right to fish, as it provides no exclusivity of access. It does continue to manage the fishery as a public trust, recouping social costs when an angler removes a fish for himself. As well,

tags are useful when fishery participants object to the “ownership” of quotas on ethical grounds. Refer to Chapter 4 for further discussion on this topic.

### **2.5.3 Allocation through co-management**

Laying somewhere between decentralized markets and centralized government management, co-management enables both sectors to work together to determine better initial allocation and re-allocation systems. Allocating resources using co-management means granting access rights to those users who demonstrate the capacity to manage their own activities while achieving broader social goals as well. This tool is described separately from utility and claims-based allocation systems because it can be set up to achieve either, and the existence of co-management does not necessarily exclude the use of other utility or claims-based tools.

In questioning what is ‘right’ in allocation, one finds an interesting ambiguity in the term. Legal and claims-based arguments use the word ‘right’ as a noun (Lam & Pauly, 2010), as in, “a *right* to fish”. This use of the word shows up in the BC halibut context where it is used by both sectors, and is well used by New Zealand anglers (Borch, 2010). Lam and Pauly describe the disconnect in current usage between this use of ‘right’ and the normative, adjective ‘right,’ (as in, “the *right* way to fish”). There is value in connecting these two meanings through an ethic of stewardship in which fishing the right way delivers the right to fish (Lam & Pauly, 2010). Rewarding environmentally, socially, or otherwise, desirable fishing practices with higher levels of allocation creates a strong incentive to commercial and recreational fishermen alike to behave. Stewardship, writes Granek et al., “is an important factor because it facilitates support of management and conservation measures and a high level of commitment. High stewardship among fishers also fosters trust among stakeholder groups and between stakeholders and researchers” (2008, p. 1131). When a fishing industry or sector works collectively to manage itself, it significantly reduces taxpayer-funded management, which benefits all citizens.

Perhaps the strongest form of stewardship is what (Hughey, Cullen, & Kerr, 2000) refer to as “collectivization” in fisheries, a broader term that refers to the trend towards various forms of co-management in fisheries worldwide. If a government chooses to enter into a formal co-management arrangement with a fishery sector or industry, it is largely

enshrining permanent fishing rights to those fishermen. The commercial halibut sector in BC has moved in that direction, though here it is not fully developed, such that it may be referred to as “advisory management” (Hughey, Cullen, & Kerr, 2000, p. 122). In New Zealand, which has a commercial fishery very similar to that for BC groundfish “fishing industry groups have realised that as long as they are using a common resource they must manage that resource collectively. While [quota management] provides security of ownership (and is based on output control), voluntary collective self-management (based on input control) helps provide for sustainable utilisation” (Hughey, Cullen, & Kerr, 2000). Co-management then, provides both a recognition of the moral right to fish, and a right to access fish.

In order to get value from the the catch monitoring fees that they were paying to DFO, commercial halibut fishermen formed the PHMA in 1997 (Gislason G. S., 2000). The PHMA represents over 80% of the commercial halibut fishery in BC and has as a key objective the advancement of co-management in the commercial fishery . This echoes the “rapid” move to co-operation that occurred in New Zealand’s commercial fisheries when a quota system was implemented (Hughey, Cullen, & Kerr, 2000). As in the New Zealand case, it is in the best interests of fishermen in a rights-based fishery to co-operate on fishery issues like quota trading, user-funded research and catch accountability (Hughey, Cullen, & Kerr, 2000). Thus there appears to be a potential link between legitimacy and cooperation. The quota system may facilitate this link.

The high quality of catch monitoring and by-catch accounting paid for by the commercial fishery provides it additional legitimacy (Gislason G. S., 2000). This elevated legitimacy may well be appropriate: the recreational fishery is currently unable to account for its rockfish bycatch, which incurs such a high mortality rate that managers assume it to be 100% (Granek, et al., 2008), and as noted in 2.2.4 total angled halibut catch were historically underestimated by DFO. In another local case, DFO was looking to make drastic cuts in rockfish catches off the BC coast in 2000. By working through the SFAB with DFO, recreational anglers were able to reduce their take of rockfish by over 75%, which allowed remaining fisheries to continue relatively unaffected (Granek, et al., 2008). This was achieved though fisheries management measures, as well as the identification and protection of 164 Rockfish Conservation Areas (RCAs) which are completely closed to fishing (DFO, 2007). Granek et al. (2008) also attribute the resulting conservation to the

“initiative of recreational fishers.” In this case, collective action was necessary to provide greater fishing freedom to individual anglers, a topic explored more eloquently by Lam and Pauly (2010). However, recreational catches of rockfish remain a concern, and monitoring and accounting for them is not as effective as it is for their commercial counterparts (Wallace, 2012; Gislason G. , 2006). This concern is ongoing and is repeatedly used to rebuttle recreational sector claims of a strong environmental record.

It must be noted that the recreational sector is not presently capable of co-management and that it would likely require government support to achieve it. Recreational fishers “need to be empowered to take on management responsibilities, including the right to organize themselves and to require everyone they represent to become members to protect themselves against free riders, to levy fees to finance their activities, and to make rules and enforce them. In addition, most need help with capacity development, finance, and other resources” (Pearse, 2006, p. 131). Organizational models for anglers need not be limited but Sutinen and Johnston offer a strong theoretical model which blends “management devolution, strengthened harvest rights, and co-management” (Sutinen & Johnston, 2003).

## **2.6 Conclusions**

Hardin’s 1968 “The Tragedy of the Commons” is featured earlier here for its influence in modern resource management discourse, not for its direct accuracy. In fact, that article contains serious factual problems as it relates to medieval English pastures (Walker, 2009). Such pastures were not open access at all, but governed by communities that “often dealt with conflicts and ecological problems by creating rules about their use” (McCay & Acheson, 1987, p. 16). Cooperation among resource users is potentially a viable and efficient means of regulating resource access. In the formal context of Canadian fisheries, such cooperation is called co-management. Moving forward, it is important to note both the importance of maintaining a healthy resource, as well as noting that “the tragedy of the commons” may be avoidable without sacrificing access to the community of resource users.

This chapter has reviewed the literature relating to the development and application of two divergent principles, the tragedy of the commons and the public right to fish. They may potentially be reconciled through increased participant responsibility and co-management.

In order to more fully assess the applicability of this and other allocation theories, an understanding of the values and objectives of this fishery's participants is required. The primary effects of one or more of these allocation systems would need to correspond with the values of the participants in order for the system to be considered applicable.

## **3 Research methods**

### **3.1 Introduction**

Decision-making, especially in a natural resource setting, often requires making tradeoffs between multiple desirable outcomes (Gregory & Keeney, 1994). The classic framing of this point is the conflict between economic development and environmental protection, in which picking either side requires sacrificing something valuable (Gregory & Keeney, 1994). These tradeoffs only become more complex than this in real-world situations. In the case of BC halibut allocation, there may be conflicts and tradeoffs between local community economic benefits vs. national economic benefits, direct job creation vs. greater economic efficiency, protecting property rights vs. protecting historical rights of access, maintaining a management system vs. building a new one, or promoting the stock value of one species vs. sacrificing the stock value of another species.

These decisions are often made with imperfect knowledge of the status quo or of the effects of the decision. Environmental and economic data are commonly questioned and incomplete, but there are other facts that may be unknown as well. Public opinion is hard to assess for relatively minor issues and is rarely known. Stakeholder opinion may be sought out, but this is not always the case. The precautionary principle and the related precautionary approach provide guidance and reason to make decisions within uncertainty, but they are more useful in the binary environment vs. economy context than they are in multifaceted decisions. Even when there is good data on one topic there must still be tradeoffs with all the other factors at play. In Gregory and Long's (2009) project, participants were able choose allocations and harvest levels of a critically low abundance salmon population, Cultus lake sockeye salmon (*Oncorhynchus nerka*), while balancing

conservation concerns. Results enabled multi-sectoral fisheries and successful conservation to occur in unison.

The methods for this thesis are based on the work of Ralph Keeney, Robin Gregory, Katharine Wellman, and Graham Long which develop and practice a means of decision making in complex natural resource contexts (Gregory & Keeney, 1994; Gregory & Wellman, 2001; Keeney R. L., 2006; Gregory & Long, 2009). These works take the position that “public policy problems must be structured and understood as decisions” (Keeney R. L., 2006, p. 739). And further, that the decisions one makes are important not for the alternative situations they create, but because of whether or not those alternatives achieve one’s values. If one identifies and structures the values one desires to see supported, then decision-making becomes a proactive opportunity, rather than a fire-fighting, reactive process (Keeney R. L., 1996).

## 3.2 Terms

In this literature, the terms *values* and *objectives* are used regularly and almost interchangeably. I have not found a suitable definition of the two terms, but I have come to infer an understanding of them. In my work (and I believe in Keeney and Gregory’s works), *objectives* are the goals that participants have for the situation in question. *Values* are an articulation of importance. Thus, an objective seeks to achieve outcomes that are consistent with values. Values and objectives are thus articulated in very similar ways. If one of my objectives is to conserve a fish stock, then I value conservation of that stock. If one of my objectives is to maintain a long fishing season, then I value a long fishing season, and so on. Values and objectives share a close and simple similarity.

Another set of terms used throughout the literature cited are *fundamental objectives* and *means objectives* (Keeney R. L., 1996). A means objective is an objective which actually serves to achieve another objective. A fundamental objective does not serve to achieve any objective other than itself. With the halibut fishery, a means objective may be to have a long season open to fishing. But this serves the function (among others) of preventing oversupply of fish and fishing-related services in a short timespan. This, in turn, serves to improve the profits of businesses and to provide more access to charter boats for recreational anglers. Within the context of the fishery, this is the fundamental objective.

### 3.3 Scope and limitations

Keeney (1996) describes the process used to consider values for strategic planning by BC Hydro, a publicly-owned electricity utility in BC. This differs from the halibut case primarily because it allows Keeney to work with a single, structured organization rather than a fractured, industry. The first step used in his work is to identify the objectives through semi-structured interviews, the process of which is primarily begun with the question “what would you like to achieve in this situation?” Keeney lists 10 question-techniques that may be applied depending on the situation. He states that it is helpful to question the responses with questions like “why?” in order to arrive at clear and explicit objectives. The second step is to structure the listed objectives between fundamental and means objectives, again, asking “why?” or “why is \_\_\_\_ important?” when clarification is necessary. The third step is to create alternatives using the objectives listed as guides. Finally, decision opportunities are identified in order to push for alternatives. In this thesis, it is not feasible to pursue the final two steps with the diverse range of participants involved in this fishery. The range of stakeholders are too busy and too diverse to work at length in the development of alternatives, when the process is unofficial and is being undertaken in a purely academic setting.

In “Creating Policy Alternatives Using Stakeholder Values” (1994), Keeney and Long show how policy can be constructed based on values by using the example of a land use process in Malaysia which they facilitated. As in the case of BC halibut, this study involves a range of participants representing different views. However, their study had participants who valued pure conservation of the existing ecosystem. This is not the case in the BC halibut fishery, which is essentially premised on some resource extraction.<sup>4</sup> Their paper identifies three simple sets “to structure a decision with stakeholders:” setting the decision context, identifying the objectives, and identifying alternatives (Gregory & Keeney, 1994). The decision context must be broadly set so as to not preclude possible alternatives. To illustrate: if this thesis were to only attempt to determine the ideal allocation between commercial and recreational sectors, it might miss out on a host of other policy options that achieve participant objectives and aid in the resolution of the

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<sup>4</sup> That is not to say that increased conservation is not a possible alternative to this study. By not fishing for a season or more, the stock value of halibut would be projected to increase, thus it may be worthwhile to delay fishing. At the extreme end, the quota system in place could theoretically displace fishing altogether since quota is valuable and tradable, and not fishing increases the value of that quota.

dispute. Objective identification, including the separation of means and fundamental objectives, is essentially the same here as it is in Keeney's 1996 example. Identifying alternatives, however, is quite different due to the participants involved. Though alternatives are still developed based on values, the broad forum setting of Gregory and Keeney's study allowed alternatives to be considered and suggested as a group. Bringing together so many people for a lengthy workshop was considered not practical and beyond the scope of this thesis, so alternatives were developed for this study based on current literature and suggestions made during the semi-structured interviews. Note that Keeney and Gregory recommend considering the alternatives suggested by stakeholders.

In (Keeney R. L., 2006), this *policy-from-values* process is described without applying it to a specific case study. His paper is written to facilitate future studies like this thesis; however, this makes it necessarily broad with many processes that will not be useful for all situations. Keeney gives five steps to be applied:

1. Identifying general values
2. Defining objectives
3. Structuring objectives
4. Specifying attributes to measure the objectives
5. Quantifying the relative desirability of possible consequences

The first two steps together are essentially the same as the first step in Gregory and Keeney's 1994 and 1996 studies, although it does allow for additional data collection like public consultation and surveys.

Structuring of objectives in this work includes more than fundamental and means objectives, it also includes:

*"Process objectives:* objectives concerning how the decision is made rather than what decision is made; [and]

*Organizational objectives:* objectives influenced by all of the decisions made over time by the organization with responsibility for making the policy decision at hand"  
(Keeney R. L., 2006, p. 743).



Process objectives were not expected to be and were not expressed by participants as, important factors in the BC halibut situation. Organizational objectives are too complex for the scope of this thesis to cover, although they could be inferred from corporate planning documents. The Minister responsible for DFO has the ultimate decision responsibility, and s/he is operating a very large and complex organization with other political matters to consider. It is a monumental task for an outsider to define these objectives.

Finally, the remaining two steps involve a complex quantification system for defined objectives and consequences. Within the halibut context, quantifying the objectives of all stakeholders would likely be very contentious and would require extensive and prolonged input by them, possibly including private financial and fishing information they would not be willing to share with competitors. Furthermore, assigning numerical values to a wide range of consequences as recommended by Keeney is beyond the current scope of this research and risks becoming extremely arbitrary and fouling the results.

One variant of this values-focused thinking is structured decision making (SDM), which uses the principles of decision analysis expressed by Keeney and Gregory, but does so in a stakeholder roundtable setting, using scientific facts and stakeholder values. Ideally, this method is useful for stakeholders to collectively evaluate “objectives and measures of performance, identifying and evaluating alternatives and making choices based on a clear understanding of uncertainties and tradeoffs” (Gregory & Long, 2009). The elements of SDM are useful for considering scientific findings and the tradeoffs that occur between conservation and development objectives. The case of halibut allocation is similar, in that while conservation is not the primary concern, it is an important underlying constraint, and in this case it is not so much scientific findings that must be integrated as economic ones. The process itself is not directly useful for this thesis because of its requirement for substantial expert participation and a significant commitment on the part of stakeholders. However, it has been used very successfully in another mixed BC fishery, the Cultus Lake sockeye salmon fishery (Gregory & Long, 2009), thereby suggesting that the process used here has at least some promise.

As noted, one difference between this project and many of the published uses of values-focused thinking and SDM is their need to balance environmental protection with

economic activity. In the context of BC halibut, most of this work is already done by the IPHC in determining the TAC. The overall level of environmental exploitation on halibut is agreed upon by all stakeholders and the question lies in what to do with those halibut that will be harvested. There are some other conservation considerations, notably the take of rockfish bycatch and habitat destruction, but these are seen as secondary to the primary concerns of allocation. By working with all willing participants, this study allows for the identification of alternatives in which participants have the potential to work together. This could lead to a move away from the IPHC TAC to a lower harvest level for the purpose of rebuilding the stock and its value. Rebuilding the stock, either through reduced overall landings or reduced landings of individuals of a certain size, could result in long-term benefits to committed fishery stakeholders. This could likely only occur if all participants were involved, otherwise those that did not would be free riders, benefitting from other's voluntary actions. However, participants interviewed have demonstrated little to no interest in such an objective.

### **3.4 Methods**

With the strengths and weaknesses of these related systems considered, a methodology hybridized from these papers was developed. Some modifications are needed to accommodate the fact that it is not feasible to conduct this study in the workshop-like setting that occurred in Malaysia. But one must consider that a wide range of perspectives are being considered, unlike Keeney's previously cited 1996 work with BC Hydro. Thus, stakeholder objectives were developed through one-on-one interviews with participants. The techniques for doing so come from Keeney's 1996 "Value-focused thinking: Identifying decision opportunities and creating alternatives", where they are best articulated. All participants must have input into the final list of fishery objectives, but they must be consulted individually because there is no forum to do so publicly. The final stage, the development of alternatives, is recommended in the literature cited to be qualitative in consultation with stakeholders or heavily quantitative. Neither process is workable for this thesis, and so the two systems are combined with a simple structure that quantifies participant values and permits a qualitative assessment of them.

The process for this study is as follows:

## **1 Initial scoping interviews**

Initial scoping interviews were held with priority stakeholder representatives in order to determine the decision context. This was done with one high profile representative of the commercial sector, one from the recreational sector, one from management, and an independent contractor with significant experience working on these issues from within the province. This determined the overall context for the following steps.

## **2 Participant identification**

Priority stakeholders from various sectors, including recreational, commercial, environmental, management (federal), the province, First Nations, and coastal communities, were identified and interviews were requested. It should be noted here that the PHMA Board declined all participation in this study, and that one high profile representative from DFO was only willing to recommend official publications as indicators of policy.

## **3 Objectives identification**

Participants were asked to identify their objectives as per the methods described in (Keeney R. L., 1996). All responses were recorded, with participant permission, and all objectives stated were recorded. If the participant was willing, means objectives were separated from fundamental objectives during the interview. Interviews were conducted with new participants from each primary sector until saturation was reached and no new objectives were stated by new interviewees.

Participants were asked about their objectives regarding the fishery, *not* regarding the conflict. Groups and individuals may have the objective of gaining political favour or discrediting a certain viewpoint for the purposes of advancing their cause, but this is not seen as useful in working towards a cooperative solution.

## **4 Alternatives identification**

Participants were asked if there are alternatives that they envision or favour, and what their consequences are.

## **5 Consolidation and ranking**

When all interviews were complete, fundamental objectives from all interviews were brought into a single master list and repeated or redundant objectives were removed. Objectives from relevant literature published by important stakeholder groups were also included. This list was then distributed to participants via email for a ranking based on priority. Participants were told that they could rank multiple listed objectives as not a priority, if indeed they are not considered relevant. Ranked objectives were then returned to me.

## **6 Quantitative assessment**

Results of participant rankings were compiled to determine the most important objectives of the fishery and those objectives that are most shared.

## **7 Qualitative assessment**

Overall weighted values were compared to allocation and management alternatives. Alternatives suggested by participants in the interviews were considered. If any alternatives correlate to the results from participants, then they are recommended.

This process produces quantifiable data that can be used to infer industry (and coast)-wide values for the BC halibut fishery. It also results in a substantial input of qualitative inputs, stated by participants during the semi-structured interviews. These results are considered important in their own rights, and are used to further clarify the applicability of theoretical alternatives.

# **4 Results**

## **4.1 Participants**

Following the initial scoping interviews with four high profile industry representatives and analysts, a list of 14 halibut industry participants willing to participate was developed. The list was composed of four individuals who could represent the recreational sector, four representatives of the commercial sector, one representative of the environmental sector,

one representative of the provincial government, two representatives from DFO, a representative of First Nations fishing interests, and a representative of coastal communities across BC. The name of each interviewee has been kept confidential and has been assigned a letter between A and N for identification purposes. See Table 2 for the letters assigned to the interviewees and their sector.

*Table 2- Participating interviewees and their sectoral allegiance*

<b>Interviewee</b>	<b>Sector</b>
A	Recreational
B	Recreational
C	Recreational
D	Recreational
E	Commercial
F	Commercial
G	Commercial
H	Commercial
I	DFO
J	DFO
K	Provincial
L	Local Community
M	First Nations
N	Environmental

Letters A through D were assigned to the recreational sector interviewees. Of the four recreational sector interviewees, one ('C') worked for a major lodge and guiding company, while the other three were anglers with professions or were retired. One ('B') described himself as a "fisheries politician." All four have been involved in the Sport Fishing Advisory Board, resided on southern Vancouver Island, and none had participated in the BC recreational halibut quota program.

Of the four commercial representatives, two ('E' and 'F') were members of the Pacific Halibut Management Association, but as noted earlier, the PHMA did not officially participate in this process and these participants did so as individuals, not as representatives of the Association. 'E' was a commercial fisherman residing on the west coast of Vancouver Island (WCVI), who claimed to lease approximately 1500lbs (680kg) of halibut quota every year to account for his halibut catch, which amounted to about 20% of his total catch. 'F' resided on the east coast of Vancouver Island (ECVI) and claimed to

be a commercial fisherman since 1977. He owns two commercial fishing vessels, one for salmon and one for halibut and groundfish. In the 2012 season, he held about 34,000lbs (15,422kg) of quota and leased an additional ~25,000lbs (11,340kg) last year. In addition to participating in the PHMA, he is a delegate on the Halibut Advisory Board (HAB), the Commercial Industry Caucus (CIC), and the IPHC board. Commercial fisherman 'G' has been a commercial fisherman for 9 years and has owned his own boat for 8 years. He fishes for salmon and groundfish, participating in the Northern Trollers Association but no halibut management groups. He leases about 30,000lbs (13,607kg) of halibut quota per year. The final commercial fisherman ('H') was an executive for a large commercial fishing and processing company. The volume of this company's landed halibut is unavailable, but approximately 40% of the landings are permanently held as quota, while the remaining 60% are leased.

Of the two DFO personnel interviewed, one ('I') worked in commercial fishery management and the other ('J') worked in recreational fishing management. Interviewee 'I' was informative in an early scoping interview, but was uncomfortable with providing departmental fishery objectives, instead recommending a DFO discussion document (DFO, n.d.) and Ministerial statements (DFO, 2011; DFO, Greater certainty in the Pacific halibut fishery, 2012) from which to infer departmental objectives for the commercial fishery. 'I' was also unable to rank overall objectives as per step 5 of this methodology. On the other hand, interviewee 'J' provided a list of objectives for the management of the recreational fishery and was subsequently able to rank overall objectives.

Provincial representative ('K') was a long-time former federal government employee and current provincial public service employee with substantial experience working with fisheries. Interviewee 'L' was chosen as a representative for coastal communities because of his position as a publicly-elected board member of the WCVI Alberni-Clayoquot Regional District and for his high level involvement with West Coast Aquatic, a forum for participants from governmental and non-governmental sectors to focus on elements of coastal planning. Representing the views of First Nations, 'M' was a fisheries biologist for a large council of First Nations on Vancouver Island. He has participated in HAB, Groundfish Integrated Advisory Board (GIAB), and several of the intersectoral halibut consultation processes described in Chapter 2. Finally, 'N' was the Sustainable Fisheries Analyst for a major environmental organization in the area.

## 4.2 Objectives

Interviews with participants yielded between 1 and 7 identifiable fundamental fishery objectives per interview. In addition to these objectives and the objectives gleaned from the DFO documents mentioned above, objectives were identified from a document titled “A Vision for Recreational Fisheries in British Columbia 2009-2013” which was written to express the vision, principles and goals for the overall recreational fishing sector. The document was endorsed and signed off by members of the SFAB, by DFO and the BC government and, as such, is a reliable indicator of the recreational sector’s goals and objectives. A similar document for the commercial sector, entitled “Vision for a modern seafood industry in British Columbia,” from the BC Seafood Alliance was also utilized for objectives (BCSA, n.d.). All of these objectives were compiled into a single master list of 33 total fundamental objectives, which was then pared down to 11 objectives by removing repeat and redundant statements. This final list of objectives is shown in Table 3.

*Table 3 - Intersectoral fundamental objectives of participants in the BC halibut fishery*

Objective
Resolve intersectoral conflict related to halibut allocation
Achieve an allocation system with long-term flexibility
A process agreed-upon by all sectors to develop allocation arrangements
Treat all users with respect and fairness
Manage halibut as a food source
Manage the fishery as a common property resource
Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage
Maximise long-term economic opportunity and prosperity
Maintain and/or grow the economic health of coastal communities
Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users
Biological sustainability, productivity, and diversity

Table 3 was distributed to participants, requesting that they rank these objectives according to their own priorities using a numerical scale where the number 1 indicated their most important objective(s). The number 2 indicated the second most important objective(s), 3

indicated the third most important objective(s), and so on. Objectives that were not shared or deemed important were indicated with a 0 and when one or more objectives were deemed equally important, the same number was used multiple times.

When prompted to address their underlying, fundamental objectives, interviewees did not always follow the same paths of logic as their peers. In one example, interviewee ‘N,’ from the environmental sector, argued that sustainable use of the ecosystem was extremely important in its own right. Many other interviewees who came from fishing backgrounds, including ‘M’ representing First Nations, felt that ecosystem sustainability was important because it supported sustainable fishing, which was tied to the above socio-economic objectives. Similar situations occurred with food, jobs, culture, and fairness.

## 4.3 Rankings

Three of the original participants did not return the ranked objectives. Interviewee ‘I,’ as a representative of the management agency, did not feel professionally comfortable ranking a set of values, as previously mentioned. Upon being presented with the ranking system, interviewee ‘A’ became uncomfortable with the methodology and chose to not participate in this exercise. For unknown reasons, interviewee ‘G’ ceased communication before he could send in his ranked objectives. This meant that data would only be provided by one DFO representative and from three commercial and three recreational sector representatives.

Upon receipt, rankings were given a simple weighted score in which a ranking of 1 equalled 11 points, a ranking of 2 equalled two points, and so on. A blank or 0 indicated 0 points. Where interviewees gave duplicate rankings, indicating objectives of equal importance, an average score was distributed to each objective. For example, interviewee ‘C’ provided two “1”s, which together represent rank 1 (11 points) and 2 (10 points). Therefore, both objectives received the average between the two ranks’ scores, 10.5 points. Table 4 summarized the intersectoral ranked objectives, sorted by its overall ranking:



*Table 4 - Weighted intersectoral fishery objectives, including ranking and percentage of prioritized support*

Objective	Total weight	%	Rank
Biological sustainability, productivity, and diversity	103.5	15.68%	1
Maximise long-term economic opportunity and prosperity	72.5	10.98%	2
Treat all users with respect and fairness	72	10.91%	3
Maintain and/or grow the economic health of coastal communities	65	9.85%	4
Resolve intersectoral conflict related to halibut allocation	63	9.55%	5
Achieve an allocation system with long-term flexibility	58.5	8.86%	6
Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	56	8.48%	7
Manage the fishery as a common property resource	56.5	8.56%	8
A process agreed-upon by all sectors to develop allocation arrangements	44	6.67%	9
Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	36	5.45%	10
Manage halibut as a food source	33	5.00%	11

These results can be further broken down by sector. Table 5 contains the ranked objectives of the commercial sector representatives. They ranked the economic benefits of the industry above all others, although the biological sustainability of the resource and fair treatment were also ranked highly. Intersectoral consensus was of almost no value.

*Table 5 - Ranked objectives of the commercial sector interviewees*

Commercial Sector Objective	Total weight	%
Maximise long-term economic opportunity and prosperity	25.5	18.61%
Biological sustainability, productivity, and diversity	21	15.33%
Treat all users with respect and fairness	19	13.87%
Resolve intersectoral conflict related to halibut allocation	12.5	9.12%
Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	12.5	9.12%
Maintain and/or grow the economic health of coastal communities	12	8.76%
Manage halibut as a food source	11.5	8.39%
Achieve an allocation system with long-term flexibility	10	7.30%
Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	9.5	6.93%
Manage the fishery as a common property resource	2.5	1.82%
A process agreed-upon by all sectors to develop allocation arrangements	1	0.73%

Table 6 displays the recreational sector results. The biological sustainability of the resource and common property management were the highest ranked objectives. Its value as a food source was very lowly ranked, despite the general agreement that recreational fishermen pursue halibut primarily for their high quality flesh.

*Table 6 - Ranked objectives of the recreational sector interviewees*

Recreational Sector Objective	Total weight	%
Biological sustainability, productivity, and diversity	32	16.33%
Manage the fishery as a common property resource	31	15.82%
Maintain and/or grow the economic health of coastal communities	24.5	12.50%
Maximise long-term economic opportunity and prosperity	24	12.24%
Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	19.5	9.95%
Treat all users with respect and fairness	16.5	8.42%
Achieve an allocation system with long-term flexibility	16	8.16%
Resolve intersectoral conflict related to halibut allocation	13.5	6.89%
A process agreed-upon by all sectors to develop allocation arrangements	8	4.08%
Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	8	4.08%
Manage halibut as a food source	3	1.53%

The results of all other sectors are in Table 7. These results show less range between the highest and lowest ranked objectives than do the other sector's results. Nonetheless, biological sustainability is notably more valued than any other objective.

*Table 7 - Ranked objectives of First Nations, environmental and government interviewees*

FN, ENGO and Government Objective	Total weight	%
Biological sustainability, productivity, and diversity	50.5	15.44%
Resolve intersectoral conflict related to halibut allocation	37	11.31%
Treat all users with respect and fairness	36.5	11.16%
A process agreed-upon by all sectors to develop allocation arrangements	35	10.70%
Achieve an allocation system with long-term flexibility	32.5	9.94%
Maintain and/or grow the economic health of coastal communities	28.5	8.72%
Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	27	8.26%
Manage the fishery as a common property resource	23	7.03%
Maximise long-term economic opportunity and prosperity	23	7.03%
Manage halibut as a food source	18.5	5.66%
Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	15.5	4.74%

Complete data results by interviewee are available in the appendix.

## 4.4 Trends and implications of this data

The primary lessons from this exercise are:

- The biological sustainability of the fishery is paramount for those who use and depend on it
- Overall economic benefits are also very important. Their distribution in coastal communities is valued less than the total benefits, but distribution is still important in its own right
- Resolving the current conflict in a fair way remains important to the overall industry; however, doing so democratically with fishery stakeholders is of less importance.
- The nutritional and cultural aspects of the fishery are generally considered to be of less importance, but may still remain somewhat important as they were identified in the interviews

The biological sustainability, productivity, and diversity of the fishery is the clear priority for participants in the fishery. All respondents except for one gave it the highest ranking.

Avoiding a “tragedy of the commons” is a clear first priority for the fishery and any allocation regime should reflect this.

Intersectorally, both maximizing the long-term economic opportunity and prosperity and treating all users with respect and fairness were also highly valued, with almost no difference between their scores. These objectives were also in the top three for the commercial sector.

The category of First Nations, environmental, government and community representatives is relatively broad, but showed a strong preference for fair and democratic conflict resolution. While the sustainability and health of the resource remains the clear priority for this group, the four following objectives related to allocation and management also scored highly. Reducing conflict, allocation flexibility, management fairness, and intersectoral agreement on allocation methods all received similar scores, indicating management and observer preferences.

Common property-based management is an interesting value because it is a very real legal expectation of management (see 2.4.1). Though it could be seen as a means objective, several participants from the recreational sector explicitly identified it as an inherently valuable objective. The phrase has become something of a talking point among advocates for the recreational sector, possibly losing its original meaning. If that sector’s representatives wish to further hold this as an objective, there may be value in identifying the features of such management that are desirable and pursuing them. The challenge for this thesis is in adding precision to what common property management means and what attributes indicate whether it is being met.

Not only is halibut meat a significant reason anglers seek these flatfish, it is the final product produced by the commercial sector, so it is surprising that the objective is the lowest-ranked on both the overall and recreational rankings. The importance of halibut as a food source was raised by recreational fishermen ‘A’ and ‘D,’ who felt that access to fresh, local, organic protein was a major reason for them to go fishing. Halibut grow very large and strong, but they are not known for their spirited fighting ability and anglers rarely practice catch and release while targeting them. It was also ranked as a ‘0’ by the First Nations interviewee, ‘M,’ who also mentioned the food was a very important reason First Nations people target the fish. It is possible that the phrase was confusing for many

participants. Interviewee 'B' did not rank the objective, stating "don't understand intent." Regardless, this thesis considers the extraction of food from the resource to be a less important objective from the perspective of the identification of useful allocation regimes.

The objective "treat all users with respect and fairness" is notably ranked very high by most sectors and always ranks above the more pointed conflict resolution goals "resolve intersectoral conflict related to halibut allocation" and "achieve an allocation system with long-term flexibility." In part, this almost certainly speaks to the uncompensated reallocation of 3% quota from the commercial to the recreational fishery, announced by the Minister in February, 2012 (DFO, Greater certainty in the Pacific halibut fishery, 2012). Both publicly and in private, commercial fishermen widely decried this reallocation and perceived it as "unfair." Similarly, many recreational fishermen feel that the initial allocation of 88% to the commercial sector and the ability of those quota holders to lease quota and not fish it, is also unfair.

Other than the biological sustainability and the food source (except for the recreational sector) clauses, there are no objectives with significantly more or less support across the fishery. In almost all cases, every listed objective was seen as valuable, even if it was not given priority in ranking. This shows that the values of participants are remarkably similar, regardless of their sector. This is a very promising finding for those seeking resolution to this conflict.

## **4.5 Means objectives**

It is noteworthy that for many, biological sustainability, despite its high overall ranking, was not considered to be a fundamental objective, but rather a means objective, useful for achieving a host of sustainable economic and cultural activities, but not important in its own right. However, regardless of its classification or inherent value, the sustainability of the resource is clearly the most important objective for participants. Even if biological concerns are a means objective, they are more important than any of the fundamental objectives. As such, it is worthwhile to note other important means objectives that were not considered in the final ranking table, but were still expressed as particularly important.

Long fishing seasons were described as very important by both commercial and recreational fishermen. Several fishermen from both sectors raised the issue but participants agreed that this was important because it helped achieve other social and economic goals. Commercial fishermen currently operate with long seasons under IVQ management and they clearly desire to maintain this system as a means to maximize value and quality, though there seems to be some fear that challenges from the recreational sector could damage or remove these benefits. Recreational fishermen felt that the shortened season they currently operate under is damaging to lodge and guiding businesses because it hurts their ability to plan their seasons, as well as to private anglers who feel their right to fish should not be restricted arbitrarily by season.

Recreational interviewees also felt that being allowed to catch at least 2 fish per day and have 2 fish in their possession before returning to their place of residence was not only important, but was the minimum possession limit needed for a sustainable recreational fishing industry. Currently, anglers are allowed to keep one fish per day and hold two in possession. Additionally, only one of those two fish may be over 83cm. This is a new rule for 2012, approved by the SFAB and designed to curb recreational catch slightly and lengthen the season. Interviewees 'C' and 'D' reported a strong preference for 2 fish per day and a 3 fish possession limit.

Respondents were largely interested in improved data collection for the recreational fishery in order to provide better and clearer information for the management of the overall fishery. Representatives from both sectors claimed that better bioeconomic data, including angler activity and preference data, would provide a clear way forward. Representatives also thought that the data would support their sector's claim to increased allocation. Currently, DFO knows little about these elements of the recreational fishery with any degree of accuracy. Creel surveys and aerial over-flights estimate the total recreational catch by time and area, while also collecting biometric and genetic information about catches, but these estimates are rough, especially when compared to the commercial sector's precise catch, effort, and financial data. DFO estimates that "approximately 300,000" anglers participate in the halibut fishery and that 60% of their catches are associated with the commercial recreational sector (DFO, Pacific Recreational Halibut Fishery, 2011). Generally, studies of BC's tidal water fishery find that approximately 300,000 licenses are sold in total (GSGislason & Associates Ltd, 2004). This raises doubts

about whether DFO has defensible estimates of the total number of halibut anglers or their attributes and preferences.

## **5 Discussion**

This thesis began by asking a set of questions about the values associated with participants in the BC Pacific halibut fishery and how they relate to solutions to the ongoing halibut allocation dispute. It then sought to further explore the ways in which we understand the fishery and fisheries allocation. The values of participants in the fishery were then documented and explored. In the following discussion, these values will be systematically compared directly to a range of allocation approaches.

### **5.1 Addressing research question 1**

*Can a common set of values be identified upon which to base British Columbia Pacific halibut fishery allocation policy?*

Research into resource conflict resolution systems suggests that the answer is yes. Keeney, Gregory and others cited earlier have developed systems for exploring, comparing, and reconciling the values of resource stakeholders in ways that allow them to take advantage of decision-making opportunities and achieve productive and shared goals. However, values are complicated concepts that are difficult to define and easy to confuse or dismiss. Fortunately, values are directly related to our objectives because, as noted earlier, objectives exist to realize our values, and objectives are much easier to put into words. But out of necessity, objectives are often created to take a partial step towards realizing values because it often takes many steps towards achieving our ideals. Thus there are means objectives, which are steps in the direction we want to go, and there are fundamental objectives, the achievement of which is the realization of our values. With knowledge of what values mean and how to determine them, this research was able to identify a set of commonly held objectives within the BC halibut fishery. However, fully answering the first research question means asking the second research question.

## 5.2 Addressing research question 2

*What are the inherent and underlying values of the stakeholders involved in the current British Columbia Pacific halibut fishery allocation dispute?*

This thesis has identified the values present in a varied group of participants in this fishery as the following:

- Resolved intersectoral conflict related to halibut allocation
- An allocation system with long-term flexibility
- A process, agreed-upon by all sectors, to develop allocation arrangements
- All users are treated with respect and fairness
- Managing halibut as source of food
- Managing the fishery as a common property resource
- Allowing individuals currently working in the fishery to maintain their jobs and achieve a living wage
- Maximise the long-term economic opportunity and prosperity of the fishery
- Maintain and/or grow the economic health of coastal communities
- Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational and First Nations users
- The biological sustainability, productivity and diversity related to the fishery

This common set of values is expected to be useful in resolving the halibut allocation conflict. This list of values can be used to understand what fishery participants want to achieve within the fishery, and future allocation options should address those values. But in order to use this list of values, it is necessary to understand their effects, as well as the tools that can be used to achieve them. Based on the ranking exercise, all values are considered equal and sometimes achieving one value means making tradeoffs with other values. Table 4 in chapter 4 displays the values ranked across the range of interviewees. Alone, this information does not provide a clear way forward, but it hints at possibilities. Here, consideration is given to the top five objectives.



### **5.2.1 Biological sustainability**

The biological sustainability of the stock is, almost to a person, valued above all other objectives. In a conflict where each side is perceived to have deep, fundamental disagreements, this kind of unity is a positive step towards collaboration. Largely, this issue is both well taken care of by the IPHC and not typically an allocation problem. However, where the sectors can demonstrate stewardship and improve their non-TAC-related stock effects, they can boost their credibility and justify increased allocation. As stated by interviewee 'N' from the environmental sector, the bycatch of undersize halibut is a significant allocation concern. Reducing this bycatch problem would improve the overall stock levels. Doing so could be rewarded through allocation, but failing to do so could result in decreased allocation.

The IVQ system provides a possible means of addressing this bycatch problem. Undersize halibut catches could be capped and turned into IVQs in their own right. Quotas are now in use to cap non-fish ecosystem damage, including deep sea corals and sponges (David Suzuki Foundation, n.d.). An approach like this builds on the support commercial fishermen generally express for the IVQ system and market-based mechanisms. Additionally, it could be integrated with the recreational fishery, which also catches significant numbers of halibut under 32 inches (81.3cm).

The other important issue this fishery has with biological sustainability is that of the recreational sector's bycatch of rockfish, as mentioned in 2.5.3. Rockfish are of special conservation concern in BC because they are a slow-growing species with an almost 100% mortality rate when retrieved from deep water, as is the case when they are bycatch in the halibut fishery (Granek, et al., 2008). Current regulations for the recreational fishery permit only a single rockfish to be retained per day, but to comply fully with such a regulation, anglers would have to stop fishing for the day after catching a single rockfish because additional rockfish will also die if caught while the angler pursues halibut. There are concerns that anglers are killing more rockfish than one per person per day. Addressing this issue would provide the recreational sector with additional legitimacy when lobbying or negotiating for allocation. Increased fishing activity by the recreational sector would put more pressure on rockfish stocks; however, this is not the prime concern of this thesis. Such a problem could probably be dealt with through the existing Rockfish Conservation

Area program and a similar system used to resolve the halibut conflict (i.e.: quotas, priority access, tags, etc.)

### **5.2.2 Economics**

This research has found widespread support for economic-maximization through halibut fishery management. At this stage, the most important barrier to such an objective is our lack of knowledge of the recreational halibut fishery's bioeconomic and consumer/producer surplus data (such as expenditures, demographics, willingness to pay and the details of recent and hypothetical trips), as stated above in section 4.5. This information could indicate what the economic benefits of allocation to the recreational sector vs. the commercial sector are, including the effects on rural communities. An important question, however, would be: who should conduct this type of study? Under status quo conditions, that role falls to government. DFO is currently in the best position to undertake such a study, and the province may see value in contributing. However, in time the recreational sector could be empowered to take on a role like this itself, as the commercial sector has done. Certainly, the barriers to recreational sector co-management are greater than for the commercial sector, but achieving such status would allow the sector greater ability to negotiate with the commercial sector as equals and to conduct its own research.

### **5.2.3 Fairness**

Addressing fairness is perhaps a task better suited to process than policy. Management should take note of how highly it is valued in the fishery and ensure that they address this value. Interviewees 'E' and 'F' specifically described the uncompensated transfer of 3% of the commercial quota to recreational quota as "unfair." While the Minister does technically retain the right to alter allocation as desired, individuals pay a lot of money in order to plan and build their businesses around their quotas. Altering them will be perceived as unfair.

#### **5.2.4 Communities**

Some communities benefit more from recreational fishing activity and others benefit more from commercial fishing. Improving the benefits to these places is not about picking sides in allocation, it is about ensuring overall economic well-being and minimizing or reversing consolidation in urban centres. Many of these communities are doing very poorly from an economic perspective, which is having broader social and health effects (Times Colonist, 2012). Improving sustainable economic opportunities in communities like Port Alberni can serve to reduce crime, school attendance, and infant mortality rates (Times Colonist, 2012).

#### **5.2.5 Resolve the conflict**

Putting an end to this dispute, the effects of which interviewee 'E' reported to be particularly acute in small communities where individuals from both sectors encounter each other regularly on the docks, was identified as an important objective and is supported by participants in the fishery. These results provide a mandate for the industry and political management to pursue a resolution.

### **5.3 Addressing research question 3**

*What are the full range of allocation policy mechanisms that could be considered for the British Columbia Pacific halibut fishery?*

With the values of the participants in the halibut fishery established and understood, it is important to understand the range of allocation options. The research question was designed to address this need. Chapter 2, in looking at the theoretical basis for intersectoral allocation, uncovered several allocation options which are evaluated against this fishery's identified values here. This section will also address some of the alternatives identified by interview participants.

On the surface, the range of allocation options is somewhere on a spectrum between 100% recreational allocation and 100% commercial allocation. As has been discussed, neither of these two extremes is optimal, or even politically realistic, but a lot of the consideration for allocation looks to find an option between only these two polar opposites. The long running 88% commercial, 12% recreational allocation existed in this spectrum, as does the

new 85% commercial, 15% recreation allocation. Both allocations have been fraught with controversy due to stakeholders inevitably feeling short changed. Another similar option is a simple compensated transfer of quota from the commercial sector to the recreational sector. At this time, the recreational sector has neither the capacity nor the funds to acquire quota in that way, so it would have to be done by DFO and funded by the federal government. Such an action would likely be amenable to commercial quota owners and to the recreational sector, but those commercial fishermen who do not own quota themselves would likely be upset at the rise in halibut quota pricing as quota supply dropped. Deviating slightly from this spectrum are both the recreational sector's argument that it should receive priority, or a "Fixed-Number," access to the halibut (Sport Fishing Institute, 2011), and the proposals for market-based solutions that involve individuals or sectors purchasing and leasing quota rights. Either of the latter two options should function well in times of high halibut abundance. In fact both should work so well that they are able to create economic buffers to protect the sectors during short periods of low abundance. During sustained periods of low abundance, however, both systems will hurt either one sector or the other.

In theory, the primary reason for which fishery resources are initially allocated is public benefit. More than an ideal concept, the public trust doctrine legally requires that all natural resources be managed for the benefits of the public. As described above in 2.4.1, the question becomes, "what kinds of benefits are best for society?" Economic benefits are a common response, but there are cultural and environmental benefits to be considered, as well as legal rights. By considering the range of social benefits possible from allocation, the concept is broadened considerably to consider options that do not simply exist as a ratio between two opposing options. Rather, there exists a network of diverse and potentially overlapping options for determining allocation. Table 8 provides a simple summary of the effect of these options on the five most highly ranked values of participants in the fishery. The following section explores these effects in greater detail.

*Table 8 - Summary of the effect of five alternatives on the BC halibut fishery's primary values*

	Biological sustainability	Economic benefits	Fairness and respect	Benefit communities	Resolve conflict
Status Quo	Positive	Neutral	Negative	Neutral	Negative
"Fixed Number"	Positive	Neutral	Negative	Neutral	Negative
Harvest tags	Positive	Positive	Neutral	Neutral	Positive
Guide quotas	Positive	Positive	Negative	Negative	Neutral
Co-management	Positive	Neutral	Positive	Neutral	Positive

### **5.3.1 Status quo**

#### **Allocation tool**

Currently 85% of the allocation goes to the commercial sector and 15% to the recreational sector, but the Minister retains the right to alter this ratio at any time. Fish within the commercial sector are traded between vessel operators through an open quota market. If the annual TAC is large enough that the recreation sector is unable to catch its quota, then that quota is sold to vessel operators in the commercial sector at market value, and the profits are banked to purchase quota from the commercial sector in times of low abundance. Anglers may purchase commercial quota and fish with it, exceeding seasonal closures and bag limits, under an experimental program.

#### **Values**

This system has not been seen to threaten the biological sustainability of the resource since its inception more than 10 years ago. Economists have argued that the system is sound (Gislason G. S., 2000; Pearse, 2006), though many within the recreational sector claim that during times of low abundance, limits are too low and the season is too short for the sector's businesses to be sustainable. Individuals from both fishing sectors as well as the community/management sector have expressed shortcomings in the fairness of the current system. Commercial fishermen in particular find the uncompensated reallocation to be unfair, while recreational fishermen feel their voices are not heard in DFO and that their current artificially-shortened season is unfair. While it would be unfair to entirely place blame on one industry, rural poverty is a serious issue in some communities and there is little evidence that the current allocation system is helping as much as it could (Times Colonist, 2012). The current system has plainly not been able to resolve this conflict.

### 5.3.2 Recreational “Fixed-Number” and priority access

#### Allocation tool

The recreational sector is lobbying for priority access over as many fish as it can take under reasonable fishery restrictions, provided such access does not threaten the health of the stock (Sport Fishing Institute, 2011; BC Wildlife Federation, n.d.). Legally, under the principles of the public trust doctrine, their claims may be in the right (von Tigerstrom, 1997). Specifically, the proposal aims to do away with “a percentage form of allocation” that will vary with annual stock fluctuations and adopt an allocation based on the “needs” of the fishery, estimated to be around 1.5 million pounds (680,389kg) (BC Wildlife Federation, n.d.). Any fish left over at the end of the season could then be transferred for free to the commercial fleet, presumably to be fished the following season. There already exists a precedent for recreational priority for tidal water species in BC, as chinook (*Oncorhynchus tshawytscha*) and coho (*Oncorhynchus kisutch*) salmon are considered more valuable as recreational targets and anglers have priority over commercial fishermen when accessing these species during periods of low abundance (DFO, 2010).

#### Values

This system would not threaten the biological sustainability of the halibut stock if the recreational fishery can be properly accounted for. The economic effects of this are uncertain, while the recreational sector claims that this would have a positive effect, the reality is that the information to make this determination does not exist at present. A system like this would almost certainly not be perceived as fair by the commercial sector, despite the fact that in times of average to high abundance, the actual allocation ratio would be essentially the same as the intersectoral quota system currently in place. In times of average to low abundance, as has been the case for the last several years, the commercial sector would have reduced quota. There is no reason to think this allocation tool would negatively affect coastal communities as a whole, although those communities with stronger commercial than recreational halibut ties would be negatively affected in times of low abundance. Perhaps the most important critique of this tool is that it would not resolve the current intersectoral conflict. Unless halibut numbers rebounded and remained relatively high, the commercial sector would almost certainly continue lobbying government and seeking a more profitable allocation.

### **5.3.3 Harvest tags**

#### **Allocation tool**

A version of the harvest tag proposal by Johnston et al. has already been considered for this fishery, approved by all stakeholders, and then rejected by the federal government due to conflicts with the *User Fee Act* and the *Fisheries Act*. Enacting this sort of measure would require significant political will from the federal government, which has not been demonstrated to exist at present. This is unfortunate because the additional benefits of such a solution include improved data collection, funds generated for stewardship activities, resource rent dispersal, conservation incentives, maintained intersectoral quota trading and improved intersectoral relations. It was unclear to many of the respondents why DFO chose not to undertake the required consultations to introduce this new user fee as they could have expected considerable stakeholder support from all parties to the proposal.

#### **Values**

Harvest tags would pose no obvious problem for the continued viability of the stock or ecosystem. They would have positive economic effects because they support improved understanding of the fishery and participation in the intersectoral quota market. Tag fees, especially at market price, would probably prevent some from angling for them, but the price could be set low enough that this number could be minimal. Anglers targeting halibut already spend a lot of time and money to reach these deep water fish, so the additional price of a halibut tag would not be an unreasonable barrier to entry. Harvest tags would have no obvious effect on the health of coastal communities. Intersectoral conflict could be significantly reduced.

### **5.3.4 Quotas for guides**

#### **Allocation tool**

As described by Abbott, Wilen and Maharaj, and explained in further detail in 2.5.2 above, requiring guides to operate under a quota system would entail the provision of quota to professional fishing guides in order to rationalize that sub-sector of the fishery. It seems unlikely that this would be a workable solution at the current prices that commercial quota sells for, so commercial recreational quota would have to operate in its own market.

Presumably this quota would be comprised of quota removed from the recreational sector's 15%, with guides having the ability to further supplement their quota by purchasing or leasing it from the commercial sector. Abbott, Wilen and Maharaj predict there would be notable economic benefits from this move, but they would not be directly related to the commercial/recreational conflict. As such, it is not clear that this alternative would have much effect on the current conflict. If none of its initial quota was taken without compensation from the commercial quota and it removed a smaller portion of the recreational sector's quota than it did catch by anglers who use guides, then it might reduce pressure on the recreational sector to stay within limits. A good first step, both for the purposes of improved data collection and the purpose of applying quota to guides, would be to license them in a similar fashion to the way freshwater angling guides are licenced by the provincial government (GSGislason & Associates Ltd, 2004).

## Values

This alternative is projected to have neutral or positive economic and ecological effects. There is no data on this, but it is clear that at least some local anglers, including interviewee 'A,' fish for halibut but do not own a boat capable of reaching them. This 'A' and anglers like him use the services of guides. Paying market rates for quota to access a common property resource would likely not be perceived as "fair" by anglers in his situation. The least efficient guides are predicted to be forced out of the industry under this alternative. While they may not perceive this tool as fair, the number 10 ranked objective (maintain existing jobs) in this research demonstrates that this would not be a concern to the industry as a whole. Effects on rural communities could be negative because consolidation of the guiding sector under a rationalization program like this could draw jobs out of remote towns and into larger population centres and larger and more corporate guiding operations. It is not clear that this alternative would resolve the conflict.



### **5.3.5 Co-management**

#### **Allocation tool**

Enabling the recreational (and further enabling the commercial) sector to manage itself, to collect and hold funds and to encourage stewardship amongst its members, would further enable it to work more directly with the other sector in finding a solution to this conflict, but it would not solve the conflict on its own. Rather, it would enable the sectors to pursue one or more of the alternatives already discussed. For instance, a stamp or tag program might be easier to institute free from the confines of government. The recreational sector could choose on its own whether it wanted to divide itself between guides and anglers. It could raise funds, even take out loans, in order to purchase and/or lease quota from the commercial sector.

#### **Values**

Biological and economic effects of co-management are negligible and it would be fair to all users. Coastal communities would not likely see a change, but conflict could be significantly reduced if the sectors were able to work together and remove themselves from the harmful political intervention characterized by the status quo. However, interviewee 'B' suggested that he would have a philosophical problem with co-management of a "common property resource," because he felt that the common property status should entail management by all of Canada. The research for this thesis suggests that there would be no legal conflict as long as the barrier to entry into the fishery were minimal for citizens, but if he represents a larger proportion of anglers, there could be a conflict of values that was not indicated by this research.

## **5.4 Addressing research question 4**

*Do various policy options exist that meet the underlying values, goals and objectives of the participants in the British Columbia Pacific halibut fishery?*

Yes. Using recreational harvest tags and enhanced co-management to improve management of the recreational halibut fishery is consistent with the underlying values, goals, and objectives of the participants in the fishery. Unfortunately, there is a perceived

legislative impediment to this solution. The research presented here can be seen as a further mandate to address this issue by the federal government, confident that doing so has the support of the halibut fishery as a whole.

This may be seen as merely a confirmation of what industry participants learned during and following the Gordon Process. The most significant difference is that this research demonstrates another possible means of accomplishing the goal of a recreational sector capable of purchasing quota from the commercial fishery and further co-operating with it on matters of stewardship with which the two would share responsibility.

In the absence of political leadership in this conflict, co-management is a means of potentially removing that particular political element from the equation and still achieving important fishery objectives. This research shows that this would be very beneficial to DFO, especially financially and politically, and so indicates that the Department should encourage, train, and facilitate a move towards increased co-management in both the commercial and recreational halibut fisheries.

## **6 Conclusions**

This thesis has explored the reasons and methods for distributing fishing rights between large commercial fisheries and smaller recreational fisheries, and owes a debt to Pearce (2006) for convincingly demonstrating the importance of this issue. This thesis suggests that while fisheries may once have been rather simple when the primary motivation was subsistence, they have since evolved into a complex industry which puts significant pressure on a limited resource held under an ancient code. It is therefore in society's best interest to carefully and fully plan and target the ways in which fishing rights are distributed. Furthermore, doing so should ideally occur after a thorough exploration of how we as a society value our fishery resources so that our values are embodied in management and allocation regimes. There are many potentially legitimate objectives to be pursued with wild fishery resources, but if we attempt to use them without a complete understanding of our values and objectives, then we are wasting valuable fish and

potentially creating conflict between fisheries users while damaging the communities that depend on them.

Resolving this dispute should improve the economic fortunes of all participants in the Pacific halibut fishery. The conflict reduces certainty for fishermen and associated parties, which damages their abilities to plan their businesses and to make economic forecasts. Additionally, it creates an incentive to spend money on political lobbyists in Ottawa rather than local infrastructure and improved management. These are the same problems seen in New Zealand's intersectoral fisheries disputes (Gibbs & Stokes, 2006). However, it is important to recognize that the dispute is not solely based on the allocation formula; rather, the 85/15 formula and the conflict are based on an allocation system that has primarily used political intervention for its decision-making and assigns inconsistent fishing rights in a manner that appears arbitrary and unfair to participants. The following are three recommendations to improve these fundamental problems

#### Consider the effects of new rights regimes on all resource users

When significant changes are made to “the way government grants rights to” fish (Pearse, 2006, p. 123), it is important to consider how these rights will impact the established and perceived rights of other users of the resource. In this example, defining allocation as a simple 88/12 split, in which individuals in the commercial fishery have the ability to manage their catches accordingly within their allocation while recreational anglers do not, hindered rights of the public to access the fishery. Granting IVQ rights empowered commercial fishermen to maximise their personal interests while also aligning those interests with stewardship of the resource. In isolation this is a major improvement in fisheries management, but when other users of the resource were not similarly empowered, participant behaviour in the two fisheries diverged, impeding cooperation. Hindered access for one sector of participants together with few mechanisms for intersectoral cooperation is thus a root cause of the conflict.

It is very important to consider these sorts of effects prior to implementing changes to fishermen's rights (McMurrin, 2000). Failure to consider the effects on all users of the resource, both current and potential, can have lasting political, social and economic effects. The uncertainty and economic damage seen in this conflict risks jeopardizing the substantial initial benefits of the IVQ system. Similar effects are likely to occur in other

mixed fisheries that incorporate rights-based management for one sector without fully considering the other sectors. Though considered largely outside the scope of this thesis, it is extremely important to consider the effects any changes have, and may have in the future, on First Nations (and possibly other community-based or subsistence) fishery stakeholders as well.

### Resolve the current halibut dispute

This thesis suggests that an approach focused on the values of all fishery participants, including management such as DFO, can provide a means of achieving resolution. Participants appear to share many of the same values for the fishery, including a common desire to achieve resolution. In pursuit of resolving this conflict through a values-based framework, an expanded approach would be ideal. This thesis is limited in its ability to draw together significant numbers of participants from all sectors, regions, and interests into a sustained conversation. However, an initiative backed by the sectors, the province, and/or DFO would have much more authority and legitimacy, improving the chances of its success. It would be preferable if such an initiative would either bring the respondents together for a live conversation about their values and objectives (such as done by Hugh Gordon, Gregory and Keeney (1994) and Gregory and Long (2009)), or expand this research's sample size significantly. Importantly, either approach would likely improve the initiative's representation, improving and adding confidence to the results.

### Implement enhanced co-management for all sectors

Strong co-management both enhances the abilities of the sectors to manage their own affairs and to work cooperatively to manage the overall fishery. A coast-wide organization to manage the recreational fishery may be necessary if it is to buy and sell halibut quota with the commercial fishery. It is not feasible for large numbers of individual anglers to purchase halibut quota at the prices that large-scale, commercial fishermen can afford. This can only be done by a sector that is able to manage its share of the fishery as a whole, including buying and selling quota, holding funds and charging license and/or species tag fees. Additionally, co-management potentially removes the undesirable need for political intervention in times of conflict. Rarely are any parties, including politicians, well-served by intervention; thus, the capacity and authority to negotiate and work out complex disputes on their own should benefit everyone involved.

## Further research

Additional knowledge of the economic behaviour of participants related to the recreational sector would be extremely useful for managing this fishery. Management currently operates without sufficient data to properly plan this fishery because we do not know how recreational fishermen value their fishing experience. This cripples management's ability to achieve economic efficiency in allocation. Allocating halibut catches for maximum economic efficiency requires knowledge of angler demographics, expenditures, recent trips, and preferences for hypothetical future trips. If an economically efficient intersectoral allocation is desired, and this research suggests that it is, this kind of information is necessary and could be collected using the methodologies of Berman et al. (1997) and Criddle et al. (2003).

Another important piece of further research should inquire as to what the specific legal implications of the public trust doctrine are for commercial and recreational fisheries disputes. If, as one legal scholar believes, that public, recreational fisheries should always have priority over private fisheries, then this should be definitively addressed (von Tigerstom, 1997). This paper acknowledges that this possibility exists, but the issue is not currently defined by the courts or legislators. Certainty on this issue could dramatically affect allocation, and provide a clearer framework for future allocation adjustments.

If the above issues with the management of the recreational fishery can be resolved through capacity-building to co-management, the sector will then be in a much better position to engage with the commercial sector in joint co-management. More than just the responsibility to manage its own affairs, such as monitoring and regulation, co-management would also confer the responsibility of the sector to form effective connections and relationships with the commercial sector. In addition to internal affairs, building the recreational sector's external affairs will require the development of intersectoral decision-making policies and processes. This can be informed by further research into international experiences, such as in Australia (Kearney R. E., 2002) and New Zealand (Hughey, Cullen, & Kerr, 2000).

## Concluding remarks

In moving forward with this issue and other future allocation issues, decision-makers are advised to incorporate First Nations representatives and their concerns into the

fundamental character of decision-making processes. In discussion with interviewee 'M,' it is clear not only that First Nations issues are significant in their own right, but also that these issues represent additional local and subsistence-fishery issues that could come into conflict with the rest of the fishery's management. First Nations currently receive a small allocation of halibut, with priority over commercial and recreational fisheries. If their needs or claims were to grow through modern treaties, population growth and/or other means, they could very quickly impact many operators in both sectors. Commercial and recreational interests that incorporate and reconcile First Nations interests early will be doing themselves a great service in the long run. Co-management processes might be excellent tools to do so. Consider that less than 20 years ago, the recreational fishery was thought too small to ever have an effect on the commercial fishery.

The allocation of Pacific halibut is but one example of a growing problem wherever mixed-sector fisheries exist. Similar to fish stock declines, allocation issues also pose social and economic threats to those that use and depend on fishery resources. Intersectoral allocation also presents politicians with a lose-lose situation should their authority be needed. In mixed-sector fisheries where either customary fisheries are growing or where right-based fishery management is being considered, one may expect conflict to ferment and undermine many of the benefits of modern fisheries management. There is wide-ranging merit in moving towards a paradigm based on balancing the rights of harvesters while ensuring conservation of the fishery's resource.

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## 8 Appendix

### 8.1 The request for interview circulated to prospective participants

Dear \_\_\_\_\_,

I'm working on a Master's thesis in resource management through a university in Iceland, the University of Akureyri. For my thesis, I am researching the values and objectives of the various sectors involved in the dispute over halibut allocation in BC. Given that all previous processes aimed at resolving this problem have been unable to produce a solution, I am interested in approaching the issue from a fresh angle. I plan to document the prioritized values of stakeholders based on their objectives, and explore all useful alternatives to the status quo.

To accomplish this, I propose to conduct a series of interviews with important participants and representative stakeholders from the sectors and fisheries management. The purpose of the interviews would be to compile a prioritized list of the fundamental objectives of the stakeholders. There are to be two rounds of interviews. The first round would not have structured interviews with set questions, instead I plan ask about specific and clear objectives for the fishery. The number of interviews conducted will depend on the number of willing participants and amount of new information produced, but I hope to speak to at least a couple representatives of each sector. A complete list of fundamental objectives can then be established based on all interviews. In the second round, I would like ask all participants to rank the listed objectives according to their own priorities. While I don't have a list of questions to provide, I can suggest that participants think of all objectives their organization(s) has for the fishery, as well as the values those objectives are based on.

If appropriate, I propose to compare alternatives and make recommendations based on the information collected. Ideal alternatives will prioritize those objectives shared and preferred by all stakeholder groups. Solutions based on shared values are theoretically able to avoid expensive conflict among users and negate the need for political interference. This approach considers all stakeholders equally and may reduce the political risk of an imposed solution.

If you can be available for an interview, please let me know. I am happy to discuss any questions you might have about this research.

Sincerely,

Ryan O'Connell

## 8.2 Further explanation of the research proposed, also circulated to prospective participants

*Towards a objectives-based allocation framework for BC halibut:*

### Research procedure

Following from the work by Gregory and Keeney (1994) and Keeney (1996), this work is an attempt to consider cooperative alternatives to the current Pacific halibut dispute. The explicit objectives of stakeholders can be used to identify opportunities and alternatives to the status quo (Keeney R. L., 1996). The primary research that I am conducting in this manner is a listing and ranking of the fundamental objectives of the fishery's stakeholders. The process for my research is as follows:

- 1 Participants are asked what objectives they wish to achieve within the fishery.  
“What would you like to achieve?”
  - a. Objectives must be as explicitly states as possible. This may require follow-up questions like “why?”, “why is \_\_ important?”, and “what do you mean by \_\_?”
- 2 Question: What are the consequences of the status quo on your objectives?
- 3 Question: Do you see alternatives to the current situation? What are their desirable and undesirable features?
- 4 Objectives listed are assessed as fundamental objectives and means objectives. A means objective contributes to the achievement of another objective and is a method to achieve an end. Fundamental objectives are ends unto themselves. This sorting process can occur in participation with the interviewee, if desired.
- 5 After all interviews have been conducted, a list of participants' fundamental objectives is compiled. I ask that participants rank the objectives according to their own priorities. This can be done by email for convenience.
- 6 Participants objectives will be examined to determine whether or not there are common fundamental objectives. **All research and analysis will be neutral and will consider only the facts of the fishery and conflict.** If alternate policies, arrangements, and transfer-mechanisms can be identified which align to these shared fishery objectives, then those alternates will be recommended. If no objectives can be found to have priority within the fishery, then my findings will be that there are no underlying objectives upon which to base a solution. If the fishery's objectives best support the status quo, then no recommendations will be made.

## 8.3 Email to interviewees requesting objectives-ranking

Hi \_\_\_\_\_,

Below is the compiled list of the fundamental objectives recorded during my research. As we discussed during our interview, I request that you please rank these objectives according to your own priorities. This can be done by replying to this email and typing a number for each objective into the table.

Type “1” for the most important objective(s), “2” for the second most important objective(s), “3” for the third most important objective(s), etc.

If you do not share one or more of these objectives, either do not rank it or type “0”.

If you consider one or more objectives to be equally important, use the same number on each objective.

For further instruction, please note the example table, found at the bottom of this email.

When you are done, please email me the completed table as soon as possible. If you have any questions, please do not hesitate to call me at any time.

Objective	Ranking (1-11)
Resolve intersectoral conflict related to halibut allocation	
Achieve an allocation system with long-term flexibility	
A process agreed-upon by all sectors to develop allocation arrangements	
Treat all users with respect and fairness	
Manage halibut as a food source	
Manage the fishery as a common property resource	
Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	
Maximise long-term economic opportunity and prosperity	
Maintain and/or grow the economic health of coastal communities	



Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	
Biological sustainability, productivity, and diversity	

Objective	Ranking (1-11)
Resolve intersectoral conflict related to halibut allocation	1
Achieve an allocation system with long-term flexibility	2
A process agreed-upon by all sectors to develop allocation arrangements	2
Treat all users with respect and fairness	3
Manage halibut as a food source	4
Manage the fishery as a common property resource	4
Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	4
Maximise long-term economic opportunity and prosperity	5
Maintain and/or grow the economic health of coastal communities	6
Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	7
Biological sustainability, productivity, and diversity	8

Thank you for help here and throughout my research.

Sincerely,

Ryan O'Connell

## 8.4 Objectives provided by recreational sector respondents

Objective #	Objective	Interviewee code Sector	A		B		C		D	
			Recreational		Recreational		Recreational		Recreational	
			Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight
1	Resolve intersectoral conflict related to halibut allocation	recreational 13.5			4	5.5	6	4	8	4
2	Achieve an allocation system with long-term flexibility	16			4	5.5	8	2	2	8.5
3	A process agreed-upon by all sectors to develop allocation arrangements	8			6	3	7	3	10	2
4	Treat all users with respect and fairness	16.5			5	4	4	6.5	5	6
5	Manage halibut as a food source	3			0*	0	0	0	9	3
6	Manage the fishery as a common property resource	31			2	10	1	10.5	1	10.5
7	Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	8			7	2	5	5	11	1
8	Maximise long-term economic opportunity and prosperity	24			3	8	2	9	3	7
9	Maintain and/or grow the economic health of coastal communities	24.5			3	8	3	8	2	8.5
10	Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	19.5			3	8	4	6.5	7	5
11	Biological sustainability, productivity, and diversity	32			1	11	1	10.5	1	10.5
			*(don't understand intent)							

## 8.5 Objectives provided by commercial sector respondents

Objective #	Objective	Interviewee code Sector	E		F		G		H	
			Commercial		Commercial		Commercial		Commercial	
			Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight
1	Resolve intersectoral conflict related to halibut allocation	Commercial total	2	10	5	2.5			0	0
2	Achieve an allocation system with long-term flexibility	10	0	0	1	10			0	0
3	A process agreed-upon by all sectors to develop allocation arrangements	1	0	0	10	1			0	0
4	Treat all users with respect and fairness	19	3	9	1	10			0	0
5	Manage halibut as a food source	11.5	8	4	2	7.5			0	0
6	Manage the fishery as a common property resource	2.5	0	0	5	2.5			0	0
7	Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	12.5	4	8	4	4.5			0	0
8	Maximise long-term economic opportunity and prosperity	25.5	5	7	2	7.5			1	11
9	Maintain and/or grow the economic health of coastal communities	12	6	6	3	6			0	0
10	Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	9.5	7	5	4	4.5			0	0
11	Biological sustainability, productivity, and diversity	21	1	11	1	10			0	0

## 8.6 Objectives provided by respondents from other sectors

Objective #	Objective	Others	Interviewee code		Sector		I		J		K		L		M		N	
							Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight
1	Resolve intersectoral conflict related to halibut allocation	37							3	6	1	9	3	9	1	9.5	8	3.5
2	Achieve an allocation system with long-term flexibility	32.5							2	7.5	1	9	2	10	3	4.5	9	1.5
3	A process agreed-upon by all sectors to develop allocation arrangements	35							1	10	1	9	7	3	1	9.5	8	3.5
4	Treat all users with respect and fairness	36.5							2	7.5	1	9	6	4.5	1	9.5	6	6
5	Manage halibut as a food source	18.5							4	5	4	3	8	1.5	0	0	3	9
6	Manage the fishery as a common property resource	23							1	10	5	1.5	8	1.5	0	0	2	10
7	Allow individuals currently working in the fishery to maintain their jobs and achieve a living wage	15.5							7	1	2	5.5	6	4.5	4	3	9	1.5
8	Maximise long-term economic opportunity and prosperity	23							6	2	2	5.5	5	6	3	4.5	7	5
9	Maintain and/or grow the economic health of coastal communities	28.5							5	3.5	3	4	4	7.5	2	6.5	5	7
10	Recognize the cultural importance of halibut fishing to coastal communities, including commercial, recreational, and First Nations users	27							5	3.5	5	1.5	4	7.5	2	6.5	4	8
11	Biological sustainability, productivity, and diversity	50.5							1	10	1	9	1	11	1	9.5	1	11