

FISHERIES MANAGEMENT AND FISHERIES LIVELIHOODS IN ICELAND

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Abstract

This dissertation explores the long-term implications of Iceland's nationwide Individual Transferrable Quota (ITQ) system on rural communities and small-boat fishing livelihoods drawing on two years of ethnographic research in Northwest Iceland, a nationwide mailed survey of small-boat fishermen, and the compilation of fisheries human dimension indicator data for the lumpfish fishery. Results from ethnographic interviews and participant observation show that while there is a wide range of complex political, social, and environmental changes affecting coastal communities, the changes brought on by the ITQ system are perceived to have been particularly significant. Survey results suggest that the majority of small-boat fishermen perceive the ITQ system as serving the goal of wealth accumulation over the goal of resource conservation. Survey respondents and interview informants report high cultural connections to fishing through family history, but express concern that future generations may be precluded from fisheries livelihoods due to the prohibitory cost of entry into the ITQ system. Furthermore, survey responses, ethnographic interviews, and indicator data suggest that non-ITQ fisheries like the lumpfish fishery and the *strandveiðar* season do not serve as substantial platforms to support newcomers to fisheries. These non-ITQ fisheries can make individuals and communities more resilient by providing extra income and, at the same time, can offer social flexibility to access a fishery of cultural and historical value. However, survey and interview data also suggest that the *strandveiðar* fishery has resulted in new rifts in communities as Icelandic society struggles with differing perceptions of equitable access to marine resources. Survey and interview data show how decision-making power lies in the hands of a few dominant interest groups, leaving small-boat fishermen and rural communities at a disadvantage with little power to meaningfully influence national politics. Finally, the compilation of human indicator data in the lumpfish fishery highlights concepts of multiple (social, economic, and biological) goals in fisheries management and the benefits of participatory governance structures. Conclusions from this dissertation underscore the complexity of fisheries systems and the important role equity plays in sustainable fisheries management and governance.

Dedication

This dissertation is dedicated to the memory of my father, George Chambers, who passed away before this work was finished. His passion for learning and asking questions influenced my career choices, and his kindness towards others and fascination with the many types of humanity in the world inspired me to no end. I can only hope that my writing, creativity, and critical thinking are half as good as his.

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I was not very old when I got an inkling that some of the fishermen felt aggrieved at my grandfather because he sometimes sold fresh fish for the pot cheaper than others did; they called it underhand to compete at cut prices against good men. But how much is one lumpfish worth? And what is the value of a pound of haddock? Or plaice? One could answer just as well by asking, What does the sun cost, and the moon, and the stars? I assume that my grandfather answered it for himself subconsciously: that the right price for a lumpfish, for instance, was the price that prevented a fisherman from piling up more money than he needed for the necessities of life.

The Fish Can Sing, by Halldór Laxness, page 44

General Introduction

Fisheries management and Iceland

The sustainable management of the world's forest, marine, freshwater, and wildlife resources is necessary for human survival, health, and well-being. Many of the world's marine fisheries are overfished or in serious decline (Worm et al. 2009) and are faced with other complex challenges such as climate change, pollution, political unrest, or territorial disputes, so the design of good management systems for fisheries has never been more crucial. Marine fisheries consist of myriad ever-changing ecological, social, economic, and political factors that can create complicated management scenarios (Symes 2006). While the foundation of a healthy fishery is a robust fish stock, there are other economic and social goals that are also important to consider in the design of management rules and structure (Jentoft and Chuenpagdee 2009; Anderson et al. 2015).

Fisheries provide employment, stability, and a cultural and historic identity for individuals and coastal communities all over the world (Kooiman and Centre for Maritime Research 2005). At the same time, biological or economic end-goals such as catch limits or restricted licensing can often overshadow social and cultural end-goals such as access, participation, and equity (Pascoe 2006; Symes 2006; Ommer et al. 2011; Urquhart et al. 2011). In particular, management scenarios that restrict fisheries access can severely impact rural communities that have limited alternative economic options (Lowe 2011; Himes-Cornell and Kasperski 2016) and cut off essential cultural and historical connections to fishing livelihoods and ways of life central to community and personal identity (Lowe and Carothers 2008). Furthermore, management schemes have the potential to create new power imbalances or deepen existing ones in communities or between fishermen and governing bodies, creating long-standing inequities that further alienate local people from marine resources (Eythórsson 2000; Carothers 2015).

The management of fisheries resources by restricting access to fishing through the privatization of the right to fish has grown in popularity around the world in recent decades (Gordon 1954; Christy 1996; Scott 1999; Costello et al. 2008). Privatized fisheries schemes, such as Individual Transferrable Quota (ITQ) systems, can support economic efficiency end-goals, but can fall short of social goals like equity and access. ITQ schemes can have particularly disproportionate negative impacts on coastal communities and fishing livelihoods. In general, fishing right ownership tends to accumulate in the hands of a small number of individuals and also migrates outside of fishing communities, which can lead to rural job loss

in both catching and processing sectors (Pálsson and Helgason 1995; Batstone and Sharp 1999; Skaptadóttir 2000, 2007; Karlsdóttir 2008; Knapp 2011; Olson 2011). Additionally, the consolidation generated by ITQs is often linked not only to local economic decline, but also to loss of individual and occupational well-being and changes in human-nature relationships (Pálsson and Helgason 1995; Lowe and Carothers 2008). ITQ systems are also linked to conversations about the moral considerations of privatization (Bourassa and Strong 2000; Maurstad 2000; Holm and Nielsen 2007; McCormack 2007, 2010; Karlsdóttir 2008; Memon and Cullen 1992), strained personal relationships in small communities (Pálsson and Helgason 1995; Eythórsson 1996; St. Martin 2007; Carothers and Chambers 2012), and legal issues of human rights and indigenous claims (Batstone and Sharp 1999; Copes and Pálsson 2000; McCormack 2010; Carothers 2011; Einarsson 2011).

The isolated Atlantic island of Iceland is often hailed in the management literature as having one of the most sustainably managed fisheries in the world, and this fame is due largely to the adoption of a nation-wide ITQ system (Arnason 1995; Danielsson 1997; Arnason and Gissurson 1999; Arnason 2005; Hannesson 2005; Marchal et al. 2016). Although Iceland's nationwide ITQ system is over 30 years old, it remains a topic of public and political debate, particularly because of the continued effects on small-scale fisheries and communities (Pálsson and Helgason 1995; Eythórsson 1996, 2000; Skaptadóttir 2000, 2007; Benediktsson and Karlsdóttir 2011; Einarsson 2011; Einarsson 2015; Kokorsch et al. 2015; Matthíasson et al. 2015). At the same time, Iceland has a long-standing cultural, historical, and economic connection to marine fisheries (van den Hoonaard 1992; Hastrup 1985; Kristjánsson 1985; Pálsson 1991; Durrenberger and Pálsson 2015), which makes it a suitable study site for this dissertation research.

All fisheries in Iceland are managed under the Ministry of Industry and Innovation. The Marine Research Institute (*Hafrannsóknastofnun*) gives official scientific advice for all species and fisheries, but final TAC decisions are set by the Minister of Industry and Innovation. The Directorate of Fisheries (*Fiskistofa*) supervises compliance with other regulations such as area closures and gear restrictions and general administration of the ITQ system and licensing. No discards are permitted in any fishery, and most catch from small boats is landed at designated "fish markets" that give real time landing and quota status updates to the Directorate of Fisheries and then sell the catch through a centralized daily national auction. In this highly centralized governance system, all management decisions are made with the TAC advice from the Marine Institute. There is a chance for unions

representing various fisheries interest groups to lobby, but this is informal, infrequent, and often the different stakeholders are not given equal access to voice their concerns.

Approach and organization of the dissertation

Sustainable fisheries management is inherently reliant upon human social, economic, political, and legal systems; in other words, the focus of fisheries management is not fish, but people (Ostrom 1990). People are part of specific organizations and institutions with designated power to control the decision-making processes that formulate the specific rules and regulations to enact fisheries management goals. The arrangement of the people themselves in the decision-making process is referred to as governance (Jentoft and Chuenpagdee 2015). Sustainable fisheries are therefore predicated upon a flexible governance arrangement that can respond not only to changes in fish abundance, but also fluctuations in consumer demand, costs associated with fishing, and other social trends (Jentoft et al. 1998; Armitage et al. 2009; Omner et al. 2011). Co-management, adaptive management, adaptive co-management, stakeholder engagement, community-based resource management, and interactive governance are all forms of participatory governance that highlight the importance of flexibility and power-sharing in the fisheries decision-making process (Jentoft 2000; Kooiman and Centre for Maritime Research, 2005), and these governance arrangements can lead to stewardship and equitable fisheries management that supports the complex goals of fisheries resource management (Pomeroy and Berkes 1997; Armitage et al. 2009, Cox et al. 2010; Gutiérrez et al. 2011).

An important part of participatory governance is the inclusion of data from social sciences that can help to design, monitor, and evaluate fisheries management scenarios. After the call by geographers, anthropologists, political scientists, and other social scientists, social and cultural research in fisheries management governance has been increasingly included in formal governance processes (Jentoft et al. 1998; Symes 2006; Symes and Phillipson 2009; Omner et al. 2011; Urquhart et al. 2011; Poe et al. 2014). Social science research can be particularly important in understanding small-scale fisheries and rural communities by highlighting the significance of cultural values in fisheries systems (Pinkerton 1989; Chambers and Kokorsch in press).

The major goal of this dissertation is therefore to explore the impacts that specific management and governance structures can have on the individuals and communities that are so intimately linked to fisheries using methods and theories primarily from the social sciences. This study is based on a theoretical background from the field of political ecology, an

interdisciplinary field that aims to address the political and economic forces that are linked to natural resource management (Robbins 2004). This theoretical approach describes the creation of new social conflicts and the further entrenchment of existing inequalities by providing a clear analysis of unequal power relationships and marginalized voices in social-ecological systems that is left out of apolitical framings of natural resource management (Greenberg and Park 1994; Robbins 2004; Biersack and Greenberg 2006; Zimmerer 2006). In fisheries, those who use a political ecology lens explore how overexploitation of a fishery resource is not an inevitable outcome due to self-maximizing or greedy individuals, but rather a complex relationship driven by global capitalistic processes and industrialization that have transformed fisheries in recent decades (Mansfield 2004). Similarly, imbalances in political power can differentially impact those in rural communities who do not have equal access to decision-making processes as those in urban communities (Holen 2004; Bavinck 2015), and can give greater legitimacy to scientific knowledge over local knowledge (Finlayson 1994; Pálsson 1998; Jentoft 2000; Verelst 2013) and economic management goals over other social goals (St Martin 2007; Carothers 2010; Carothers 2015; Høst 2015).

Icelandic small-scale fisheries and rural communities are the central topic of focus because of their historical and cultural connections to and continued dependence on fisheries. First, Chapter 1 focuses on description and comparison of small-boat fishermen¹ throughout Iceland to understand their current perceptions, attitudes and experiences in fishing and fisheries management. Chapter 2 then takes a more in-depth approach by focusing on the individuals in rural communities in Northwest Iceland to understand how different changes in communities, relations of power, and conflicts over access to fisheries resources affect fishing livelihoods. Finally, Chapter 3 uses an interdisciplinary approach to explore the themes of the dissertation at the level of an entire fishery. Using data from the social and natural sciences, this chapter highlights the interplay of social, economic, and biological management goals in the lumpfish fishery. The lumpfish fishery is a small-scale, seasonal fishery, and it is one of the only fisheries in Iceland not managed by ITQs, so it makes for an interesting interdisciplinary case study in fisheries management and governance.

¹ In Icelandic, the term “fisherman” (*sjómaður*) refers to both males and females, so this dissertation uses the English word “fisherman” in the same way.

Chapter 1: Thirty years after privatization: A survey of Icelandic small-boat fishermen¹

Abstract

Iceland's nationwide privatized Individual Transferable Quota (ITQ) system is over thirty years old, but remains a topic of public and political debate, particularly because of the continued effects on small-scale fisheries. A national survey of small-boat fishermen was distributed to: 1) identify major defining characteristics of participants in ITQ and non-ITQ fisheries, 2) document and examine differences in satisfaction with fisheries management, and 3) evaluate the existing options for newcomers to participate in small-boat fisheries. Survey results indicate that Icelandic small-boat fishermen are engaged in multiple management systems within a wide range of boat sizes. Those who held quota were more satisfied with the current ITQ system compared to those who did not hold quota; however, nearly all fishermen were still critical of fisheries management in Iceland and the two major non-ITQ options of lumpfish and coastal fishing were not perceived to offer significant opportunity for entry-level fishermen. Dissatisfaction stemmed from the lack of decision-making power, a distrust of scientific advice, and the perception that the ITQ system did not serve the purpose of protecting fisheries resources, but was rather oriented only toward economic goals. The dynamic nature of Icelandic small-boat fishing livelihoods and the pervasive negative attitudes thirty years after ITQ implementation demonstrate the need for culturally appropriate and equitable fisheries management schemes where success is measured in social as well as economic and biological terms.

1.1 Introduction

The privatization of access to marine resources represents a dramatic shift in the ways human societies have traditionally organized around marine resources. Under privatized fisheries, the right to fish, once governed by commons arrangements, becomes a limited and tradable commodity. The push for privatization of marine resources began in the early 1950s with the development of fisheries economics and bio-economic modeling [1, 2]. In this emerging view of fisheries, overcapitalization was a major problem that led to inefficiencies in the system as too much capital was used to catch fish, dissipating the potential aggregate wealth and potentially threatening the long-term viability of fish stocks. The primary justification behind

¹ Chambers, C. and C. Carothers. Thirty years after privatization: A survey of Icelandic small-boat fishermen. In press in *Marine Policy*. 10.1016/j.marpol.2016.02.026

the implementation of privatization schemes is therefore to reduce overcapitalization by making the right to fish a private commodity [3-8] so that less efficient fishermen sell out of the system, theoretically resulting in a more economically efficient fishery.

This framing of fisheries that puts economic efficiency as the primary goal can minimize other important social aspects of fisheries systems. In particular, small-scale fishing operations and rural coastal communities can be irreversibly and disproportionately impacted by the transformations generated by fisheries privatization schemes. For example, crew and boat owners lose jobs as increasing costs force small-boat owners to sell fishing rights [9], remaining crew receive less shares [10] or become wage laborers [11], women and migrant workers lose jobs when small-scale on-shore processing facilities close due to decreases in fish deliveries [12], local fishing practices and values become marginalized [13, 14] and existing social inequalities in rural communities can deepen, causing tension between those who hold fishing rights and those who do not [15].

As research exploring the social impacts of privatized fisheries continues to accrue [11, 16, 17], there is evidence that the logic behind privatization — that individuals are inherently self-interested profit-maximizers — does not apply to all small-scale fisheries. Individual private property mechanisms are based on a largely asocial view of how people organize around resources [18, 19], and small-scale fishermen are constrained by, and operate under, complex cultural, political, and historic aspects in addition to economic considerations [e.g. 20-23]. Fisheries can be a way to make only a small amount of money without the intent to increase production or build up status [24], a flexible opportunity to maintain income in times of few options [20], a rural livelihood that blends small commodity and subsistence production [25], and an activity that weaves together cultural, familial, and historic ties to a way of life not fully centered on commercial gain and full engagement in commercialized fisheries [26]. Small-scale fisheries worldwide are therefore important to creating and maintaining community sustainability through flexible arrangements that respond to local social and environmental conditions [23, 27].

This paper explores the current status of Iceland's small-boat fisheries within the larger context of a national fisheries privatization system to provide a better understanding of the ways privatized fisheries management affects small-boat fishermen's ability to engage in culturally and historically important livelihoods. Privatized access fishery systems can take on many forms and vary greatly in their specific regulations on transferability, species covered, initial allocation, boat sizes, etc. In Iceland, the variation in possible management structures combined with the ease of enacting policies for a comparatively small population

of fishermen has led scholars, politicians, and others in the public sphere to remark on the “experimental” nature of fisheries privatization [28-32]. In fact, at the time of implementation, the ITQ system was often referred to as a temporary measure to protect fish stocks. Thirty years after fisheries privatization changes began, this so-called experiment has generated dramatic transformations that are still unfolding. Recent scholarship regarding Iceland’s fisheries privatization has focused on human rights and the legality of the ITQ system [33], the involvement of stakeholders and power imbalances in the management process [28], the changes in longline fishing practices [34], and fisherwomen’s experiences of change [35]. This paper explores the current status of the Icelandic ITQ system with particular focus on small-boat fisheries and fishing livelihoods. First, this paper documents the basic characteristics of individuals participating in the major small-boat fisheries. Second, it explores fishermen’s satisfaction with the current management arrangements and examines how individuals take part in governance processes. Third, it assesses the ability of Iceland’s small-scale fisheries to support entry-level fishermen. This research aims not to evaluate the effect of Iceland’s privatized management system on small-boat fisheries *per se*, but to understand the legacy of past fisheries management decisions, or “experiments,” for individuals who are currently participating in small-boat fisheries.

1.2 Icelandic fisheries

Iceland was one of the first countries to develop a nationwide privatized Individual Transferable Quota (ITQ) system, in which fishermen or companies can buy and sell fisheries quota, which is a percentage of a yearly total allowable catch (TAC) of one species [36]. Before the ITQ system, Icelandic fisheries were managed by various combinations of gear restrictions, area closures, licensing, effort restrictions and catch quotas, and were subsidized by the Icelandic government with mechanisms such as loans from public funds and debt restructuring [6, 12, 30]. First instituted with transferability restrictions in the early 1980s to demersal species, the ITQ system became fully transferable and was expanded to the majority of commercial fish species for boats over six Gross Registered Tonnes (GRT) with the 1990 Icelandic Fisheries Management Act, while boats under six GRT were exempt [36]. In general, quota for each species was allotted to vessels based on their fishing record in the three years prior to ITQ implementation. For all species in the ITQ system, the Marine Research Institute (*Hafrannsóknastofnun*) gives official scientific advice and final TAC decisions are made by the Minister of Industry and Innovation (Figure 1.1). “Cod equivalents” are a common factor in quota trading, in which other species are given a weighted value in

relation to their market value compared to cod. Administration of the ITQ system and licenses is undertaken by the Directorate of Fisheries (*Fiskistofa*), which also oversees compliance with other regulations such as area closures and gear restrictions. No discards are permitted in any fishery, and catch from small boats is landed at designated “fish markets” that give real time landing updates to the Directorate of Fisheries and then sell the catch through a centralized daily national auction [37].

After implementation of ITQs, changes in fisheries participation were immediate. Quota consolidated in larger companies and boats, and migrated away from rural communities. Many small-boat owners felt forced to sell out of the system due to increasing cost of quota, and public discontent with the equity of privatized fisheries continued to grow [12, 21, 38, 39]. In 2003, the community quota system (*byggðakvóti*) was enacted, in which each year, the Ministry gives quota directly to fishermen who will land the fish in particular communities under regulations specific to the community. (There were 7000 metric tons of cod equivalents assigned to the community quota system in the 2014–2015 fishing year, less than 2% of the 2015 TAC in cod equivalents). Then in 2004, handline and longline small boats under 15 Gross Tonnes (GT) were split away from the large-scale industrial ITQ fisheries in a small-boat ITQ system to counteract the accumulation of quota by large factory trawlers and companies. In 2009, the post-economic crash government instituted a new non-ITQ small-boat hand line season called “coastal fishing” (*strandveiðar*) in an effort to offer access for newcomers to fishing lifestyles, partly in response to rulings by the United Nations Human Rights Committee on the social equity problems of the privatization of fisheries resources [40], and partly to revitalize small coastal communities that had suffered from loss of ITQs. Coastal fishing is also managed under the Ministry and Directorate of Fisheries, and includes four regions that each have a portion of the same TAC used in the ITQ fisheries (totaling 8,600 metric tons in 2015, less than 2% of the 2015 TAC in cod equivalents). Coastal fishing with a maximum of four jig machines is allowed for 14 hours per day from Monday to Thursday during May, June, July and August and is subject to a daily catch limit of 650 kg of cod equivalents of demersal species, mainly cod, saithe, and rockfish. The other non-ITQ fishery, the small-boat spring lumpfish roe gillnet fishery, has always existed outside of the ITQ system and is managed by limited entry licensing as well as days-at-sea (32 continuous days as of the 2015 season), and net length and mesh size restrictions put into law by the Ministry and Directorate of Fisheries (Figure 1.1).

As shown in Figure 1.1, there are five major fishery sectors in Iceland, and four of these categories relate to small-boat fisheries: small-boat ITQ, coastal fisheries, community

quota, and lumpfish. These categories are not exclusive and there is often overlap in participation between small-boat fisheries, and between large and small-boat fisheries. Currently, small-boat fisheries are defined as long line, hand line, and gillnet boats under 15 meters in length and 30 GT. Shrimp boats, larger long liners, Danish seines, purse seines, and pelagic and bottom trawlers over 30 GT are included in the large-boat ITQ fishery. In 2014, small-boat fisheries consisted of around 1,418 boats (compared to 267 large boats) and employed around 1600 individuals full time. In the 2014-2015 fishing year, the total catch for small-boat fisheries was about 8% of the total catch landed in Iceland (or 91,740 metric tons, compared to 987,556 metric tons for large-boat fisheries), and 14% of the small boat catch (or 1% of the total catch) was landed by non-ITQ fisheries [41].

1.3 Methods

This research explores the experiences and attitudes of Icelandic small-boat fishermen engaged in different fisheries management arrangements under the Icelandic Ministry of Industry and Innovation. Data were collected with a national questionnaire mailed in August 2013 (at the end of the 2012–2013 fishing year, which runs from September–August). It assessed a conceptual framework of themes gathered through earlier phases of ethnographic research in Northwest Iceland (August 2011–August 2013) that included participant observation on fishing boats and fish processing plants, and semi-structured interviews with fishermen, their families, and community leaders. Mailed surveys were chosen as a compliment to the previous qualitative research because surveys collect data from a larger number of individuals that can be extrapolated to a sample population, minimize response effects based on the interviewer [42, 43] and can be used to test ethnographic understandings. Salant and Dillman’s multi-step process was used to establish four direct contacts with the respondents [43]. After back translating [42] and pre-testing the survey with key informants, first a letter was sent announcing the survey, and then a survey packet was mailed seven days later. Seven days after that a reminder postcard was sent, and finally a second survey packet to those who did not respond four weeks after the first mailing.

The Directorate of Fisheries 2012 license database was used to produce a stratified random list of 500 small-boat fishermen (44% of the total database) from the listed 1,145 unique addresses of registered small fishing boats (long line, hand line, and gillnet boats under 15 GT). Small boats are technically defined as those vessels under 30 GT, but at the time of sampling the majority of boats fell under 15 GT which was therefore reflected in the sampling stratification. Addresses affiliated with large boats (shrimp boats, large long liners,

Danish seines, purse seines, and pelagic and bottom trawlers over 15 GT) were excluded from the sample list. The list of 500 boat owners was stratified to equally sample fishermen in the three main management schemes for small boats in Iceland: small-boat ITQ fisheries (including a “hook and line” ITQ system), lumpfish, coastal fishing, and any combination thereof (Table 1.1). Community quota holders were not sampled as a specific group because there is significant overlap between community quota holders and small-boat ITQ fisheries, and because community quota can also be given to large-boat ITQ holders. Crew members are not included in the database and therefore the survey sampled only boat owners and license holders. The survey was made up of four sections related to dominant themes in small-boat fisheries identified in earlier research phases: demographics and fishing participation, employment and community, fisheries management, and conservation and environment. Questions consisted of Likert scales, multiple choice, and open-ended responses. Differences between quota holders and non-quota holders, fishery type, and other demographic variables were analyzed using Kruskal-Wallis tests to compare differences in continuous data (summed Likert items and income) and Pearson’s chi-squared tests to compare differences in categorical data (multiple choice questions). Open-ended responses were coded and analyzed for thematic similarities; exemplar quotes from those responses are presented to give deeper context to the discussion of survey results.

1.4 Results and discussion

1.4.1. Survey response and fisheries participation

Of the 500 surveys mailed, 21 were returned as undeliverable, and 164 were completed and returned for an adjusted response rate of 34.2% (representing 14% of the total population of small boat owners in Iceland). This response rate is on the higher end of the average response from mailed surveys to targeted occupational groups in Iceland (25–35%) (University of Iceland Social Science Research Institute, pers. com.) and is similar to the range of 13-35% from other recent studies of resource users using a comparable method [44–48]. Surveys were returned from respondents from primary fishery groups within small-boat fisheries (both self-identified primary small-boat fishery and their participation in the 2013 fishing year) in similar stratified percentages as were sampled (Table 1.1); however, 11% of respondents identified as being primarily part of the large-boat ITQ system.

Those who primarily took part in the large-boat ITQ system were therefore accidentally sampled because they also held permits for a small-boat fishery, most often coastal fishing. This reflects a challenge in labeling and surveying Icelandic fishermen for

research purposes and also illustrates an important aspect of Icelandic fisheries and a characteristic of many fisheries worldwide: individuals are engaged in multiple fisheries over the year, as well as through the course of their lifetimes. While 11% of respondents identified their primary fishery to be large-boat ITQ fisheries, a larger number (28%), actually participated in large boat fisheries in the 2012–2013 fishing year (Table 1.1), suggesting that participation in a large-boat fishery does not always lead to identification with that fishery. Furthermore, 60% reported participating in large-boat fisheries at some point in their fishing career, most commonly as a skipper or crew member.

1.4.2 Satisfaction with fisheries management

Although survey respondents were engaged in relatively powerful positions in small-boat fisheries — as quota holders, captains, and owner-operators — dissatisfaction with the ITQ system and its related politics was common in survey results. To assess satisfaction with fisheries management, a seven-item Likert scale (Cronbach's alpha = 0.828) was developed including statements focusing on: fishermen's involvement in management, protection and utilization of fishery stocks, economic efficiency, and the ability of the current system to ensure stable employment in fisheries. Respondents answered using a 5-point scale, "1" for aspects they were strongly dissatisfied with and "5" for aspects they were strongly satisfied with. The summed score for each respondent was calculated to reflect overall satisfaction with management (total range 7–35; 7 = highly dissatisfied, 21 = neutral, 35 = highly satisfied).

Overall satisfaction was low to neutral and there were no significant differences between fisheries (Table 1.2). Because of the complexity of fisheries participation mentioned above, a fisherman could consider an ITQ fishery his primary fishery even though he mostly rents the quota to land the fish and vice versa: a coastal fisherman could consider coastal fisheries his primary fishery, even though he makes money from leasing quota. Therefore, rather than participation in or identification by a certain fishery, possession of quota itself best predicts satisfaction with fisheries management: those who held quota were more satisfied with current fisheries management (Kruskal Wallis $\chi^2 = 12.511$ $p < 0.001$). However, it should be noted that both quota holders and non-quota holders remained at the lower end of the overall satisfaction scale (quota = 18.77, non = 15.39). The two primary sources of dissatisfaction and proposed alternatives are discussed below.

1.4.2.1 Source of dissatisfaction 1: The purpose of the ITQ system

A major source of dissatisfaction with fisheries management came from tensions regarding the “purpose” of the ITQ system: what its major end goals *should* have been, compared to how the system is currently operating in practice. The majority of survey respondents (76%) were involved in commercial fishing during the time privatization policies were being implemented (1984–1990) and had observed the ITQ system unfolding. Respondents expressed a shared understanding that the ITQ system was originally meant for environmental end goals, but that the focus on economic end-goals tended to overshadow environmental goals, as the following response to an open-ended question highlights: “*The quota system has become an economical system, conducted in Excel. It is no longer a system for ecosystem protection and resource utilization.*”

Although the history behind support for ITQ systems does in fact stem from economic theory, some countries, including Iceland, implemented ITQs in a time of concern over stock depletion. The need for ITQs is often discussed both in terms of stock protection and economic efficiency, and these discourses have become difficult to separate [11, 49]. Increasingly, environmental and conservation rationales are used to justify ITQ implementation, although the linkage between ITQs and positive environmental outcomes is not well supported and many examples show a negative relationship (as reviewed in [11]). In Iceland, legal documents stated that ITQs were meant to be a temporary measure to protect fish stocks in light of declines in the Canadian and Norwegian cod fisheries [40]. However, in practice, the focus of the Icelandic ITQ system has always been on economic efficiency. The neoliberal economic logic is that fisheries contribute immensely to the state of the Icelandic economy as a major export good and therefore increase the overall standard of living to the benefit of the nation as a whole [50].

1.4.2.1.1 Focus on economic end goals leads to unfair leasing arrangements

One of the mechanisms related to the economic focus of the ITQ system and fishermen’s subsequent dissatisfaction is the quota market itself. The ITQ system in its present form was viewed by many respondents to be a source of corruption that continues to unfold, as the following survey responses illustrate:

Managing a fishery is necessary, but they should abolish quota, that's where you find the most corruption.

This is all that has changed: the quota system is unfair and makes things harder for those who are not doing the money-laundering.

In small-boat fisheries, accusations of corruption, money-laundering and unfair business practices are most often related to the practice of quota renting and leasing. Leasing arrangements create inequity in fishing communities [51] and our previous ethnographic research suggested that details about quota ownership, renting, and leasing would be difficult and sensitive data to collect and therefore the following data do not reflect the complex relationships between quota renters and holders and between communities. Those who rent fear being viewed as somehow less of a fisherman, or as someone not able to take care of their own fishing business. Those who hold quota and lease it out fear being seen as greedy, or as making unethical business transactions by leasing or selling quota away from their home community. The following comments from different respondents help to illustrate experiences of quota rental:

Only a small number of individuals have control over all the quota in the country and they seem to not be able to share even a single kilo with others. They seem to see every increase in quota as their own property and at the same time they say that they cannot pay a normal fee for the resources, but still they themselves have dividends that are even higher than the resource fee. Still they are able to rent out the quota to fisheries at a price that is half or even 2/3 higher than the market price [of the quota itself]. This needs to be changed. This is unfair to the nation.

Not everyone sits at the same table in all fisheries systems. The renters have to pay all the same fees (licenses, harbor fees, etc.) as those who have had quota allocated to them for free over the years. On top of that they have to pay the rent for the quota, which is out of this world – so there is little left to live off of.

How can it be that the possessor of quota, however he might have got it, can rent it out - as an example, cod for 200 ISK/kg - but the one catching the fish, with all included costs (boat, crew, equipment, labor) gets perhaps 260 ISK for the kilo. The best fishing business is probably the one that can rent out as much as they can without all the extra costs.

You cannot become anything else than a slave. Personal security is not good. The owners of the quota can take it away whenever they want and leave the skipper and crew unemployed.

Our results suggest that just over half of respondents (53%) did not hold quota, and 25% of non-quota-holders rented quota. On the other hand, 49% of those who hold quota also rent quota, and 47% of quota holders reported leasing anywhere from 2-100% of their quota out (although 15% left this question unanswered). Therefore those who hold quota are more likely to rent additional quota (Pearson $\chi^2 = 12.867, p < 0.001$). The renting market therefore consists mainly of those already invested in the quota system, rather than those who do not hold quota but participate in ITQ fisheries by renting from quota holders. Others have suggested that “contract fishing” has declined over time [50]. The findings of this study suggest that it may be more appropriate to think of the quota rental market as having changed from “contract fishing” by those who do not hold quota to “semi-contract fishing” by those that do hold at least some quota. These individuals do not hold “enough” quota for one reason or another, and are therefore subject to the same leasing practices that create inequity as those who do not hold quota.

1.4.2.1.2 Focus on economic end goals leads to discards and the “tragic commons”

A second mechanism related to small-boat fishermen’s dissatisfaction with the purpose of the ITQ system with focus on economic end goals can be seen in the environmental concerns about ITQ management. There is a general consensus in the scientific community that cod, the single most important species in Iceland, was overfished in the 1970s and 1980s. Over 500,000 metric tons of cod were landed in 1955, and close to 450,000 metric tons in 1981 [52]. After the implementation of the ITQ system for cod in 1984, cod landings regularly exceed the TAC, and often that TAC exceeded the TAC recommended by the Marine Research Institute. In the late 1990s, there was continued concern over the collapse of Atlantic cod stocks [53] and the Harvest Control Rule (HCR) for cod was enacted in 1996, which now states that the TAC for cod must be a direct calculation of 20% of the biomass of year 4 and older cod estimated by the Marine Research Institute. TACs and landings continued to decline more or less until 2009, but since then have been steadily increasing and the 2015–2016 fishing year TAC is set at 239,000 metric tons [52]. Currently, there is a general upward trend of spawning stock biomass and recruitment, suggesting that, at least by

these measures, the cod stock is performing well, and projections show cod spawning and reference stock biomass increasing to pre-1980 levels by 2019 [52].

Many fishermen, however, view the decrease in overall cod catches compared to the 1980s as a cause for concern. Fluctuations in the cod stock can be caused by a variety of factors, such as environmental regimes shifts that influence prey availability or water temperature, as well as overfishing or other human activities. The primary environmental concern of small-boat fishermen was not overfishing as such, but the discarding of catch and the potential related negative impacts on fish stocks, as explained through the following comments from different respondents:

The system is profitable and efficient from the business operations perspective, the biggest problem of this system is the bad treatment of the natural resources.

The “tragic commons” is still a problem. In the way fishermen treat the natural resource, like discarding fish. I have witnessed these things and many others have told me similar stories. One example I know of happened aboard a trawler owned by one of the big fisheries that got a lot of small haddock in their nets. They took all the big ones, then the smaller ones were dumped back into the ocean. Instead of moving to another location, they threw the nets in the same place and did the same thing when the nets came back up. An identical case also happened on another trawler with medium-sized cod. This is the result of the regulations that states that ships can bring in 5% more than their quota (and no less than 50% of their quota); the fishermen started picking out the biggest fish and throwing out the small ones. There are many more stories just like these and it makes it difficult to see how these regulations are supposed to protect and sustain the fish-stock.

A lot of fish is dumped. Cod has been dumped, and haddock, all depending on what types they have quota for. Then they come to shore with specific amounts of fish that give the most money and the other fish is dumped.

The “dumping”, or high-grading, of lower value fish and the discard of species fishermen do not have quota for can be a sensitive subject to study because legally all catch must be landed and therefore it can be difficult to obtain accurate discarding data. Prior estimates of high-grading in Iceland are low for large-boat fisheries [54] as well as small-boat

fisheries [55]. However, earlier phases of our research suggested that the presence of high-grading and discarding of no-quota catch was something about which small-boat fishermen were concerned. To obtain some estimate of the presence of discarding in small-boat fisheries, survey respondents were asked to report simply the presence or absence of discarding in the fisheries in which they participated in during 2013. Those who participated in coastal fishing reported the lowest incidence of discarding (30% of coastal fishers reported some form of discarding), followed by small-boat ITQ (39%), lumpfish (49%), and large-boat ITQ (59%). The frequency or amount of discarding would be difficult to estimate using a mailed survey technique, and therefore these self-reported discard data may not fully clarify discarding practices or their ecological significance. However, the mere acknowledgement of discarding activity by the small-boat fishermen themselves in both the ITQ and non-ITQ fisheries alike provides a counter-example to literature focusing on ITQs as a conservation tool [56-57] and supports previous analyses suggesting that private ownership itself does not always ensure care for the resource and solve issues of the tragedy of the commons, and in fact may encourage destructive practices like discarding [58-64].

Those engaged in ITQ fisheries become the rational actors that the economic logic of the system is based upon, making the best choice of the options available to them to ensure the economic viability of their fishing business, sometimes engaging in environmentally negative behaviors. In the same way, those in non-ITQ fisheries are similarly bound to the ITQ system due to Iceland's landing and no-discard rules: as bycatch comes up for which they do not have quota, they are forced to either illegally discard the catch, rent quota for the day to land that particular species, or pay the penalty of landing catch without quota. Again, whether they like it or not, sometimes the best economic option for a non-ITQ fisherman is to discard his catch. The dissatisfaction of small-boat fishermen concerning end goals of fisheries management is therefore due to the fact that they felt forced to engage in discarding as a result of the current ITQ scheme, although they recognized the potential negative environmental impacts, as one respondent explained:

The government has certainly tried to limit the amount of fish thrown away but at the same time they have tried to undermine the issue and some even tried to suppress it. The spokesmen for the quota system have tried to deny all suggestions for improvements, since they experience it as an attack on the system in a whole, but not a smaller issue that can be fixed. The clearest case of that happened a decade ago. Some fishermen video-taped others dumping small fish back into the ocean and brought it to

the media. They had no choice since fishing was their livelihood and they, just like others, had to feed their families. The orders for the dumping came from the captain that had received his orders on land, it was based on the situation of quota on the ship. When the fishermen had enough of this they filmed that video. After the news story broke, other similar cases seemed to pop up from everywhere and others wanted to come forward and tell their stories. This came to an end quickly when the head of the Directorate of Fisheries stepped up and was interviewed on the television, he stated that fishermen caught dumping fish in the ocean would be prosecuted. In other words, he said that the pawns that were made to dump the fish would be held responsible, but not the ones giving the orders. By doing this they prevented more stories surfacing and a general discussion on the matter. It would be fun to compare this to the Icelandic bank collapse in 2008. What would people say if a judge stated that he was going to make the cashiers and the employees of the banks responsible for the criminal activity in the banks? Or even attack all those who would come forward and reveal the criminal activity they had witnessed amongst the executives?

1.4.2.2 Source of dissatisfaction 2: Decision-making power

The second major source of dissatisfaction with fisheries management was related to the governance of Icelandic fisheries itself. Governance can be defined as the social and political institutions that are involved in fisheries, while management can be considered as the specific arrangement for fisheries decided upon by the governance process [27]. In many respondents' minds, the ITQ system itself had been linked with the governance institutions so that it was impossible to think of one without the other. As one respondent wrote: *"[In the past] I could be in charge of my own fishing, instead of leaving it to the theories of not-so-bright politicians."* Put another way, small-boat fishermen perceived the ITQ system itself as no different from the human political institutions and processes that govern the rules surrounding the ITQ system. This is due to the specific relationship among the players involved in the Icelandic fisheries decision-making process.

The theoretical design of the ITQ system accounts for the buying and selling of quota to be carried out under market dynamics, leaving the Marine Research Institute with the task of recommending a yearly TAC upon which the quota percentages are based. This creates a simplified management system, where fishermen (or social science data focused on fishermen and fishing communities) have no official input. As Christensen *et al.* note: "In Iceland, fishermen formally play a small role in the management system, but in practice they

have easy and direct access to the Minister, who has the final say in most matters” [50]. In practice, however, this direct and easy access is not equal across all types of fishermen, and the TAC decisions by the Ministry and specifics of regulations set by the Directorate of Fisheries can depend heavily upon lobbying by specific trade unions (see [28] for a detailed analysis of stakeholder engagement). For small-boat fishermen, there is one main union (National Association of Small Boat Owners: *Landssamband smábátæigenda*), and most local chapters gather once a year to discuss issues. Each local chapter sends a report to the chairman, who then speaks for all small-boat owners at the national level. The infrequent and relatively disengaged involvement cannot respond to current issues in a timely matter, as this survey comment illustrates:

A man came by the other day to close a big area for coastal fishing — because of one boat that had too much fish — then they went to the next fjord and were going to close off an even bigger area. Then they closed off the whole area, it wouldn't have been necessary, this is arrogance and abuse of power.

The exclusion of fishermen themselves from formal and flexible decision-making processes has led to dissatisfaction and distrust in governance institutions as small-boat fishermen, particularly those in rural communities, do not often have easy and direct access to the Minister. A sense of helplessness permeated the surveys with comments such as: “*They are always changing the rules,*” and “*We don't make the rules.*” Fishermen in all small-boat systems generally perceived little or no agency or power in the decision-making process:

The Marine Research Institute and the Directorate of Fisheries are controlled by men that think they know everything but don't know much and don't listen to anything, that's my experience.

Increased interference by others has often made the fishermen's life harder through the years and their views have not been given credit.

The Marine Research Institute is dangerous for the industry. The ones who sit at the desks don't know anything about us and want to control everything, we are not listened to. They close areas without knowing what they are doing.

The Marine Research Institute is in an ivory tower with their advice that not always, but many times, are way out of tune with what is happening out on the fishing grounds. But they seem to have gotten themselves in such a position with the government that their conclusions are not questioned.

The majority of respondents (87%) agreed with the Likert statement “The government needs to consult with fishermen when it comes to fisheries management” (Figure 1.2), but did not agree that need was actually taken into account in making policy. There is no guarantee that local comments or concerns are brought up officially, and even if they were, the Ministry and the Directorate of Fisheries are under no formal obligation to take union lobbies or fishermen’s knowledge into account whether the topic be area closures, season openings, gear restrictions, or stock health and status. The mismatch between fishermen’s knowledge and the scientific research was highlighted by many respondents as a specific reason for dissatisfaction with the governance process:

You can calculate the business environment. But the size of a fish-stock? How can people predict the size of the stock in the ocean when they cannot count all the reindeer in the country that you can see with your own eyes and are only located on the east coast.

Fishermen need to be listened to, trawl surveys cannot be the only criteria used, because the trawlers are always using the same areas and the same equipment.

The lack of inclusion of fishermen’s knowledge and the unequal power in the decision-making process highlight a paradox in neoliberal fisheries theories. Some scholars have explored the theoretical groundings of fisheries rights privatization that allow for the reduction of the role of the state by the transferring of fishing right allocation power to the market [16, 65]. These scholars highlight the paradox that while the market is seen as the fair arbiter of fishing rights, often privatization systems require oversight by political institutions that can in fact further existing inequalities or create new unequal power arrangements. Scholars question whether equality and limitations on commodification can exist in general neoliberal fisheries management and governance [66-68], but in Iceland it has in fact increased political divide, creating both unequal political governance arrangements as well as differential impacts on small-boat fisheries.

1.4.2.3 Alternative management arrangements

In a multiple choice question, 38% of respondents stated that an ITQ system was the best future arrangement for small-boat fisheries in Iceland; among them, 26% thought quota should not be transferable, but the rest were generally satisfied with the basic idea of an ITQ system. The other 62% believed that small boats should operate under a completely different system, and listed those ideas in an open-ended question. Those responses were then coded and categorized into four major options. The most popular option was some kind of regional system, followed by temporal limits, catch limits, and a national quota that is rented from the government every year with built-in breaks to newcomers or by local area (Figure 1.3).

The devolution of power to a regional system was explained by many respondents to not only offer a solution to developing a more equitable management system, but a more democratic governance system as well, where local councils would have control of community and regionally-based quota in addition to the decision-making process itself. The popularity of a regional control system is a slight contrast to the findings of Kokorsch *et al.* [28], who sampled stakeholders from Icelandic large and small-boat fisheries as well as processing workers and others such as office-workers in fisheries support services. Among all stakeholders, the study found a non-transferable quota system was most preferred rather than a regional system [28]. This difference in findings highlights the importance of understanding the views of various stakeholders, and specifically those more under-represented groups such as small-boat fishermen. In fact, our study found that 58% of small-boat survey respondents felt ITQs were the best option for large boats, which further exemplifies the importance for variable management schemes for different kinds of fisheries. Furthermore, there was a common belief among survey respondents that large and small fishing operations could co-exist given the right management scenario, as one fishermen wrote:

Nature has done it for us, good fisheries can have both – one end you have large trawlers going after open water species and then small boats are close to shore. Those close to the coast will always be limited by gear, small boat size, weather — so you don't need to worry much about them.

This acknowledgement of the different sizes and types of fisheries with corresponding management systems is similar to warnings by critics and proponents alike that ITQs are not a one-size-fits-all solution [21, 68, 69]. In Iceland, however, although there are some policies

aimed specifically at small boats and rural communities, the governance process and management arrangement are based upon free transferability of access rights for both large and small boats. Seminal research in the early stages of the ITQ system found that fishermen strongly resisted fisheries privatization on moral grounds, considering it evil or immoral because individual labor was devalued with the increasing focus on capital accumulation through private ownership [70]. The concept of ownership continues to be a complex theme to explore in Icelandic fisheries. In response to the Likert statement “Ownership is the best way to protect fishery resources,” 49% disagreed, but 25% were neutral and 26% agreed, and there were no statistical differences between fishery type or quota ownership (Figure 1.2). The lack of clarity in these responses is most likely due to the fact that recent public discourse in Iceland regarding fisheries management and the *de facto* ownership of marine resources has acknowledged the shortcomings of private and corporate ownership, calling for an exploration of the options in state or community collective ownership. The question for many small-boat fishermen therefore seems to be not *whether* fish stocks or the right to fish can be owned, but *who* can own them. The ideas of regional management and community quotas are based upon ownership, but have less focus on accumulation and capital gain as the current private ownership system. This important difference led Christensen *et al.* [50] to conclude: “... the opportunity to manage fisheries by for example adaptive, regional, species-specific criteria as a complement to the ITQs exists. Such measures might detract from the economic efficiency of the current system, but could address some of the emerging and pressing biological and social issues facing the system.”

1.4.3 Access to fisheries resources

Survey respondents valued the fact that they could participate in fisheries as a tie into Icelandic national culture. In fact, 94% agreed that fisheries are a part of the Icelandic national identity (Figure 1.2). The act of fishing was often referred to as something that should remain an option for all Icelanders to try. One respondent summed it up like this:

It is good for anybody to try their hand at something within the fishing industry. Fishing is in our blood. From person to person — and this will make a living for the nation for a long time.

As in many other cultures around the world, fishing is an inherited livelihood. Individuals reported a mean of 3.2 generations of family engaged in fishing; however, many

responses to the question “how many generations of your family have been involved in commercial fisheries?” suggested much deeper connections to fishing livelihoods, e.g., answers included: “*since the 1800s,*” “*from the beginning of Icelandic history,*” “*since the oldest men remember*”, “*all mine before and after,*” and sometimes simply “*all.*” There were no significant differences between fishery group or quota-holding and generations fishing, suggesting at least one cohesive thread in Icelandic small-boat fishermen: fishing is an activity deeply-rooted in family and personal history. As one respondent wrote: “*I was raised in a family of fishermen and therefore fishing is like a drug. You never get rid of the interest in fishing.*” Although fishing is part of a national identity and access to fish resources is a constitutional right of all Icelanders [40], the start-up costs can be overwhelming for newcomers who wish to try fishing. The following sections explore the specifics of these barriers to entry often linked with ITQ systems, and assess the current options for newcomers in non-ITQ fisheries.

1.4.3.1 Barriers to entry

One common aspect of ITQ systems is the decreased access for newcomers to enter fisheries. Other research shows the negative impact of fisheries privatization schemes on those attempting to enter fisheries [9, 15, 71-73] as original quota holders stay in the system and access for newcomers is limited. This “greying of the fleet” is present in Icelandic small-boat fisheries as well. As one respondent wrote, “*There are very few young men and women who can afford to pay that much to work.*” Respondents explained that as the quota became tied up in exchange between larger companies paying higher prices, the cost of purchasing quota became prohibitive to new small-boat fishermen.

Youth and newcomers to fisheries represent a striking gap in the survey responses and the authors have no reason to expect a response bias as many small-boat fishing companies are single-person entities. Ten out of the 164 respondents had been fishing for less than 5 years, and three were under the age of 30. Survey respondents were on average 58 years old (range 21–80, SD = 13) and had over 30 years of fishing experience (range 2–61, SD = 16). And although 44% of survey respondents had worked as crew at some point in their career, averaging 13 years crew experience, the majority was now skippers or captains, representing perhaps the last generation of small-boat fishermen to work their way up through fisheries as was once common, from crew to skipper to owner. At the same time, survey respondents also reflect something of an anomaly; they are the generation that was gifted the original quota and have fought to keep that quota and build their fishing businesses.

As the quota holders' fishing businesses grew, so did their percentage of income from fisheries. Respondents who held quota earned significantly more of their income from fisheries compared to those who did not hold quota (Kruskal-Wallis $\chi^2 = 17.296$, $p < 0.001$), suggesting a key difference between quota-holding and non-quota-holding small-boat fishermen. In popular discourse, the former are considered full-time fishermen, the latter as part-time or leisure fishermen (although they sell the catch for profit). About a fourth of survey respondents (27%) fished exclusively outside of the ITQ system in the 2012–2013 fishing year (meaning lumpfish, coastal fishing, or combining the two, and did not rent or hold quota) and they made less than half of their yearly income from fisheries. However, the common framings of full time or part-time fishermen are limited and our data reflect on a slightly more nuanced understanding of fishing as an occupation. There was strong agreement (75%) among all respondents to the Likert statement “it is not possible to make enough money in fishing for the year outside the ITQ system” (Figure 1.2). More tellingly, those who did not hold quota were more likely to respond “no” to the question “Would you advise a young person to enter your primary fishery?” (Pearson $\chi^2 = 5.076$, $p = 0.024$).

The question is therefore whether fishermen have the upward mobility to move from part-time or newcomer to a full time quota-holding fisherman. This flexibility is an important and traditionally common trait in small-scale fisheries [23, 27]. In response to the statement: “I have the flexibility to join other fisheries if my primary fishery is not doing well in any given season,” those engaged in non-ITQ fisheries disagreed most strongly (Figure 1.4). Those that were engaged in all three small-boat fisheries perceived themselves to be most flexible, suggesting that individuals who participate in ITQ fisheries have the flexibility to engage in additional non-ITQ fisheries, not the other way around. The non-ITQ fisheries and their limited ability to support upward mobility of newcomers into small-boat fisheries are reviewed below.

1.4.3.2 Non-ITQ option for newcomers: Coastal fisheries

Coastal fishing is a relatively new system and participation varies year to year as the system settles. The majority (73%) of survey respondents had tried coastal fishing at some point while just over half (56%) fished it in 2012–2013, 19% exclusively (Table 1.1). While the coastal fishing system was designed to allow open entry into small-boat fisheries, our survey suggests it is not enough to meaningfully impact true newcomers in fisheries. For example, the average age of the 31 survey respondents who fished coastal fisheries exclusively in 2013 was 60 years old, and they had 30 years of fishing experience, which is no different from the

average of all small-boat fishermen combined. Coastal fisheries participants made on average less than one fourth of their income from fisheries and 67% would not advise a young person to enter that fishery. Respondents felt it was simply too hard to make money in coastal fisheries and made comments such as, “*This is only for people who really enjoy this and are passionate about it because it is not very profitable,*” and “*I have a son that bought a boat a year ago [to fish coastal fishing]. He's fishing as much as he can but it just doesn't work for him without my help.*” The high cost of participating in coastal fisheries comes from the costs of boats, jig machines and bait, captain licenses and safety regulations, plus fuel and time spent away from home — a fourth of coastal fishing participants lived in larger areas and fished in smaller communities. Finally, as was noted above, large-boat fishermen were accidentally included in the survey because they held coastal fishing permits. These details regarding cost and flexibility suggest that coastal fisheries most benefit individuals who are already engaged in fishing or who are financially established in other trades or professions, not newcomers in rural communities.

1.4.3.3 Non-ITQ option for newcomers: Lumpfish

The lumpfish fishery can be equally restricting. In the 2012–2013 fishing year, 10% of survey respondents fished only lumpfish, and their median income from fisheries was between 20–30% of total yearly income. Although lumpfish is not part of the ITQ system, it is managed by limited licenses (under 500) that can be expensive and not often available for sale, and additional costs come from captain licensing and safety regulations. Because it is a seasonal roe fishery, lumpfish fishing has historically been combined with other fisheries, and participation can vary greatly year to year based on roe price forecasts. Respondents did not consider it a true entry-level fishery that allows participants to save up for investment in more year-round fisheries. Lumpfish fishermen were split on advising a young person to enter fisheries; those who answered “no” cited short seasons, increasing costs and rules, and low or fluctuating price for roe. The half who would advise a young person to enter the lumpfish fishery commented that it was meaningful work, fun, and new entrants were important to maintain fishing knowledge. Our earlier phases of ethnographic data also suggest that lumpfish fishing is host to unique historical and cultural aspects such as passing along knowledge, and in that way has always been considered a very different fishery from other commercial fisheries, where participation is not focused on the intent to become a full-time fisherman.

1.5 Conclusion

A number of concerns facing small-boat fishermen are the result of Iceland's ongoing neoliberal experimentation in fisheries. An experiment implies a temporary situation that could be discarded if the experiment results were unfavorable. What supposedly began as an experiment, however, has taken hold in an important way and the ITQ system is entrenched and difficult to change. The specific mechanisms that lead to negative impacts and experiences for small-boat fishermen and rural communities were not one time shocks to a system that otherwise has since reorganized, but continue to affect small-boat fisheries 30 years after initial privatization in Iceland.

This research has shown that: 1) Icelandic small-boat fishermen have important cultural, historical and non-economic connections to fishing, 2) quota holders and non-quota holders alike express dissatisfaction with fisheries management because the focus on economic end goals tends to overshadow other biological or social management goals, and 3) cost and access barriers exist in the non-ITQ fisheries as well as ITQ fisheries.

While this research has detailed the complexity of small-boat fishermen and fisheries, the major thread related to small-boat fishing today is the design of the governance system. Icelandic small-boat fishermen are engaged in multiple fisheries and have a wide range of experience and knowledge, but at the same time are completely separated from the decision-making process, which is essentially the same for ITQ and non-ITQ fisheries alike. Although small-boat fishermen are not without political preferences, their voices are under-represented in current governance arrangement. This research has shown that when natural resource users are disengaged from governance processes, and when local concerns are not addressed, the legitimacy of the governance system is devalued – therefore threatening not only the long term sustainability of the resource but violating principles of equity and human rights as well. This chronic underrepresentation can be offset by alternative forms of management and the creation of opportunities for knowledge transfer to the next generation and a space for their inclusion in current fisheries.

Bottom-up fisheries management, especially in small-boat and small-scale fisheries with local and regional characteristics can empower local fishermen to make environmentally, economically and socially wise decisions in their fishing operations, as well as benefit rural fishing communities that are so culturally, historically and economically dependent on fisheries. An updated, flexible fisheries governance system that would allow for newcomers and larger participation in year-round fisheries would offer more secure access and employment to culturally important livelihoods, as well as deter negative environmental

behavior based on economic incentive related to a national ITQ system. Co-management or other forms of participatory management would create a platform for discussion or incorporate fishermen's knowledge in decision making processes, particularly from small-boat fishermen who — as this research has shown — access fisheries resources in different ways, times, and who have vested cultural and historic ties to fisheries. Paving a path towards truly sustainable fisheries means taking the unique and dynamic social and cultural aspects of small-scale fisheries into account.

1.6 Acknowledgements

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1.7 Figures

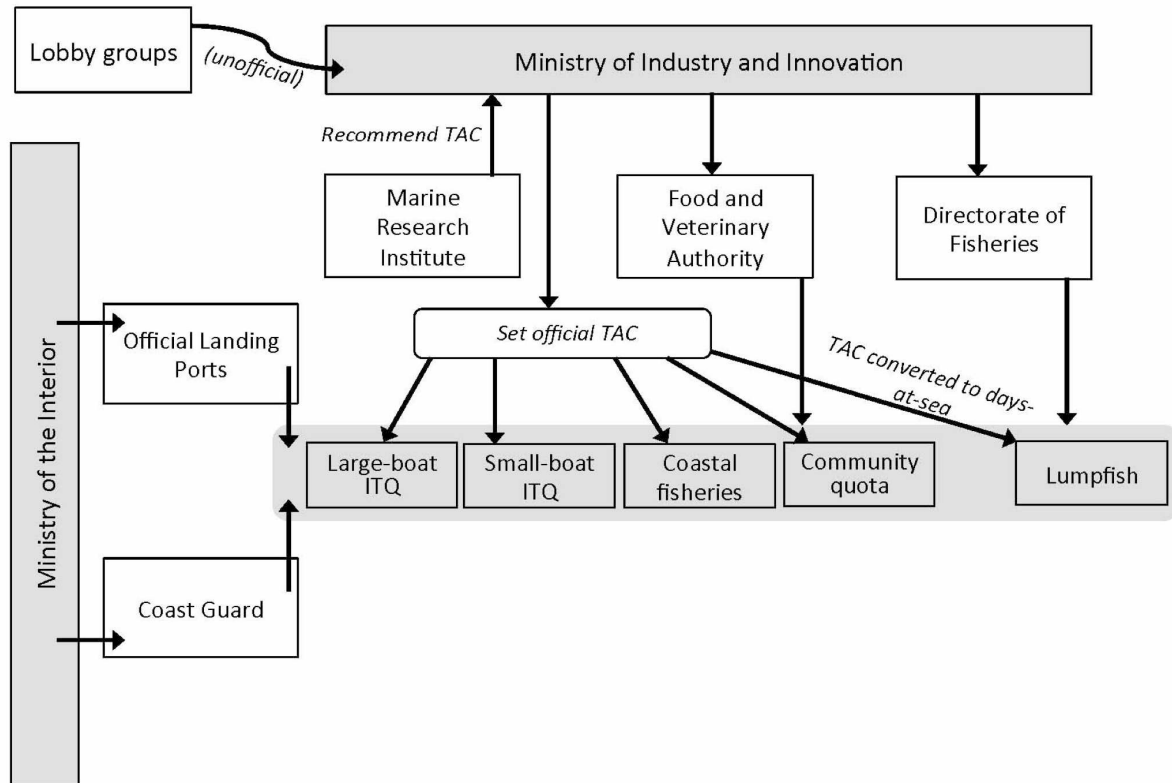


Figure 1.1: Schematic overview of Icelandic fisheries governance.

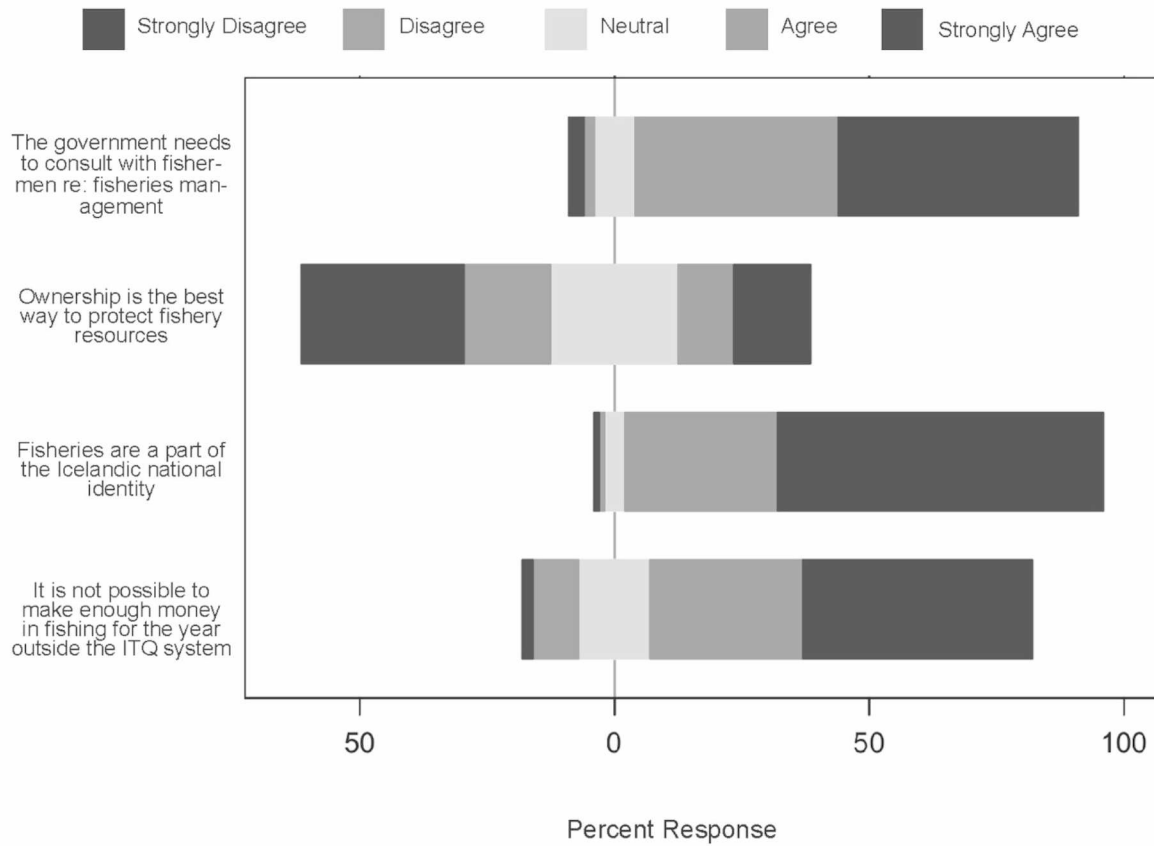


Figure 1.2: Percent agreement in response to selected Likert statements. Figure by J.M. Coleman using function 'likert' in package 'HH' [74] in the statistical program R [75].

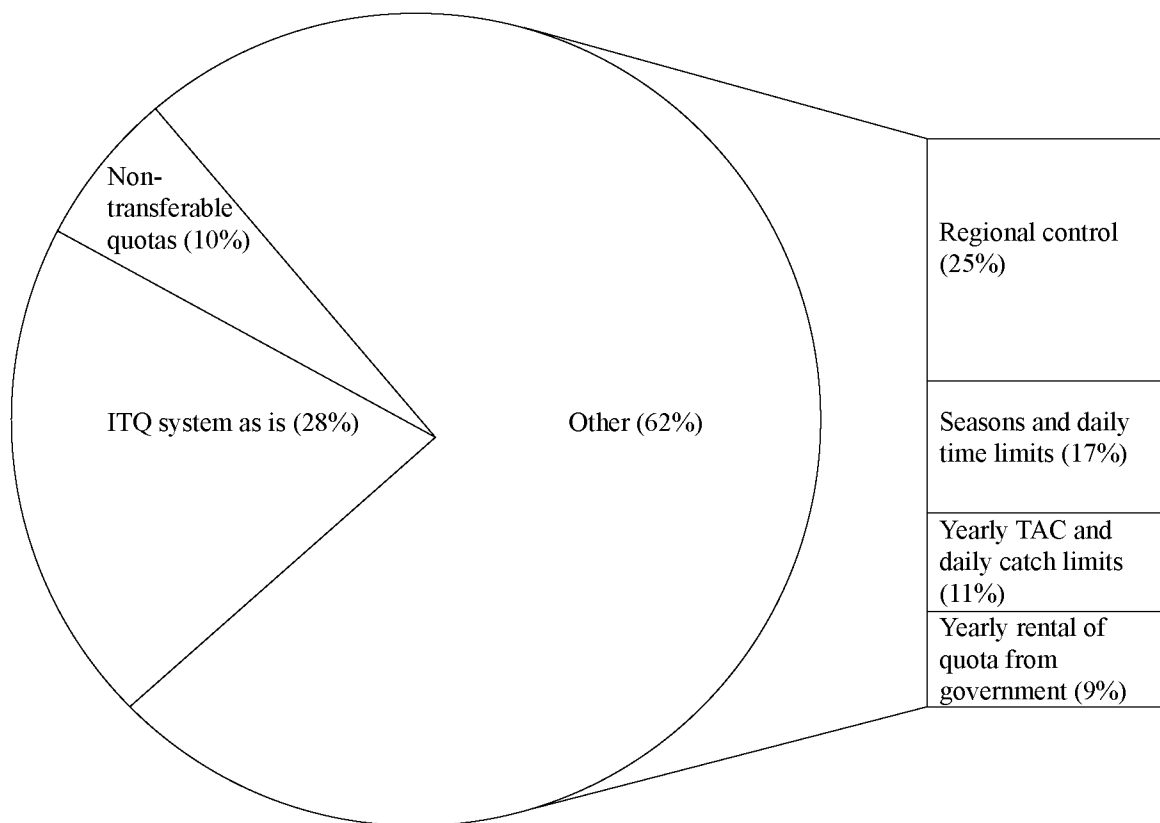


Figure 1.3: Survey responses to the multiple choice question: “What is the best management scheme for Icelandic small-boat fisheries?” All percentages reported are the proportion of total responses.

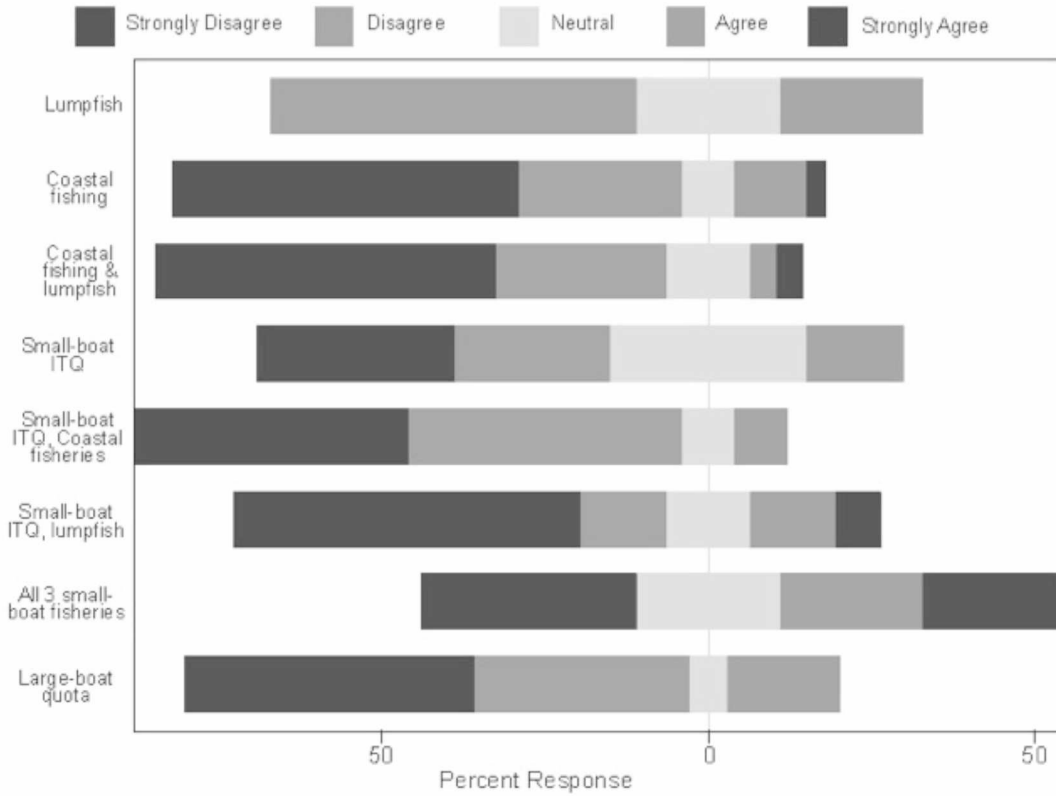


Figure 1.4: Percent agreement by fishery group to the Likert statement: “I have the flexibility to join other fisheries if my primary fishery is not doing well in any given season.” Figure by J.M. Coleman using function ‘likert’ in package ‘HH’ [74] in the statistical program R [75].

1.8 Tables

Table 1.1: Small-boat fisheries population, sample size and response rates for mailed survey. Surveys were returned from respondents in similar stratified percentages as were sampled.

	2012 database total	Surveys sent	Surveys returned: <i>Self identified primary fishery</i>	Surveys returned: <i>2012-2013 fishing year participation</i>
Primary Fishery	1145	500	164	164
Lumpfish	142 (12%)	72 (14%)	12 (7%)	16 (10%)
Coastal fishing	460 (40%)	115 (23%)	38 (23%)	31 (19%)
Lumpfish & coastal fishing	114 (10%)	80 (16%)	23 (14%)	19 (12%)
Small-boat ITQ	206 (18%)	94 (19%)	36 (22%)	23 (14%)
Small-boat ITQ & lumpfish	133 (12%)	63 (13%)	15 (9%)	11 (7%)
Small-boat ITQ & coastal fishing	48 (4%)	37 (7%)	13 (8%)	9 (5%)
All three small-boat systems	42 (4%)	39 (8%)	9 (6%)	9 (5%)
Large-boat ITQ		<i>Not sampled</i>	18 (11%)	46 (28%)

Table 1.2: Mean satisfaction with current fisheries management by fishery type (median = 17, mode = 17, range = 7-33, possible range = 7–35)

Primary Fishery	Mean satisfaction	Number	Standard deviation
All three small-boat systems	15.22	9	6.92
Lumpfish & coastal fishing	15.91	23	5.90
Small-boat ITQ & lumpfish	16.13	15	4.84
Coastal fishing	16.34	38	5.24
Lumpfish	16.75	12	7.52
Small-boat ITQ & coastal fishing	17.38	13	6.42
Large-boat ITQ	17.72	18	6.21
Small-boat ITQ	18.67	36	6.36

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Chapter 2: “Little kings”: Community, change and conflict in Icelandic fisheries¹

Abstract

Scholars of political ecology have long been interested in questions of access, equity, and power in environmental management. This paper explores these domains by examining lived experiences and daily realities in Iceland’s fishing communities, 30 years after the implementation of a national privatized Individual Transferrable Quota (ITQ) fisheries management system. Drawing upon ethnographic data collected over two years in the rural coastal communities of Northwest Iceland, we explore: 1) how the ITQ system relates to other complex social and environmental factors facing coastal communities today, 2) how attempts to alleviate negative impacts of the ITQ system have led to new rifts in communities, and 3) how the decision-making power of a few dominant interest groups in national politics leaves small-boat fishermen and rural communities at a disadvantage. In the words of our study participants, the Icelandic fisheries management scheme has created “little kings” in rural communities, where each little king acts in his own best interest, yet has no recourse to collective power and no platform to meaningfully influence national politics. In this volatile political situation with cross-scale implications, it is difficult for fishermen, their families, and community members to imagine ways that power over and access to the fisheries resource can be redistributed.

2.1 Introduction

“Do fishermen try to work together? Ha! No. We are all little kings.”

-Small-boat fisherman, Hvammstangi, 26 March 2012

Small-boat fishermen in rural Icelandic communities recognize the tension between the acknowledged benefit of organizing as a collective voice and the perceived need to compete with each other for individual advantages. The result of this competition between fishermen is often described through the expression “little king” (*smákóngur*). Now a common term used among fishermen, political leaders, and community members, “little king” can carry multiple meanings, ranging from derogatory (e.g., reference to people micromanaging their surroundings) to proud (e.g., reference to oneself as a leader). Little kings are individuals

¹ Chambers, C., G. Helgadóttir, and C. Carothers. Little kings: Community, change and conflict in Icelandic fisheries. In review in *Maritime Studies*.

who think they are in control, but actually are not, who are forced to act as if they are in control, or who are in control of a very small turf, zealously guarding it and thereby creating various obstacles for others. A little king is also an attitude that is portrayed through the inherently different interests in fisheries created by overlapping identities: community residence, quota-ownership, species fished, gear used, boat size, and so on.

Seminal work in the 1990s explored feudal metaphors in the discourses surrounding Iceland's Individual Transferrable Quota (ITQ) fisheries system (Helgason and Pálsson 1997; Pálsson and Helgason 1995). In the ITQ system, the right to fish became a limited and transferrable commodity through the possession of a percentage (or quota) of a Total Allowable Catch (TAC) of a particular species. For many fishermen who were not awarded enough quota, the only way to stay active in fishing was to buy or lease quota from others who were given or had accumulated quota, and therefore be under the direct control of another for access to fisheries resources. A new discourse centering on these relationships emerged: fishermen became "tenants" (*leiguliðar*) under the control of "quota kings" (*kvótakóngar*, also called "sea lords," *sægreifar*). Today, the power imbalance that created quota kings is still present despite many changes in Icelandic fisheries and culture, and another new reality is emerging – the little king, as both quota-holders and non-quota holders.

This paper uses a political ecology framework to describe the making and dynamics of little kings and their communities, under what constraints they operate in rural coastal communities, and how national politics and power keep the little kings in place, contained in their kingdoms. The manifestation of unequal power relationships and marginalized voices in natural resource management and the intersection of culture, environment, economics and politics are central topics of focus within political ecology (Greenberg and Park 1994; Robbins 2004; Zimmerer 2006). Exploring the interactions between actors in situations of unequal power helps to clarify and describe the uneven distribution in access to and responsibility for natural resources (Biersack and Greenberg 2006; Robbins 2004). Power is, among other things, the ability to control access to resources, often for economic gain (Jentoft 2007), and examples of the impacts of power imbalances can be found in virtually all aspects of resource management, ranging from the disenfranchisement and exclusion of local people from protected areas, to land appropriation for resource extraction (Robbins 2004). In fisheries, power inequities also often exist between scientists and fishermen, as scientific knowledge is often given greater legitimacy than fishermen's knowledge (Finlayson 1994; Pálsson 1998). Imbalances in political power can differentially impact those in rural communities who do not have equal access to decision-making processes as those in urban

communities (Bavinck 2015; Fabinyi et al. 2015; Verelst 2013). The current trend of neoliberal fisheries resource management (Pinkerton and Davis 2015), such as Iceland's ITQ system, can lead to the creation of new social conflicts and the further entrenchment of existing inequalities (Benediktsson and Karlsdóttir 2011; Carothers 2010). Increasingly, the goal of rent maximization that serves as one motive for privatization of harvest opportunities is given greater legitimacy, and therefore power, over other social goals in fisheries management schemes (Breslow 2016; Carothers 2015; Høst 2015; St. Martin 2007).

As this paper will explore, the extent to which the little kings have been created through the ITQ system is not always easily determined - little kings also ascend as an outcome of other complex factors in Icelandic society. Therefore, before discussing the specifics of little kings, we first present results exploring characteristics of Icelandic fisheries and coastal communities. First, we describe how changing coastal communities are not only impacted by the ITQ system, but also by rural outmigration, environmental and technological changes, and other factors that are part of the complex local realities of contemporary coastal communities in Iceland. Second, we explore how the attempt to alleviate negative impacts of the ITQ system through the quota-free *strandveiðar* season has in fact led to new power struggles in Icelandic fisheries. Third, we review rural community members' experiences with political power at the national decision-making level. Finally, we end with a discussion of the creation and maintenance of little kings through mechanisms described in the three results sections: complex changes in Icelandic coastal communities; the tensions in Icelandic society regarding the concepts of equity and power in fisheries management and governance that are brought to light in the conflict over the *strandveiðar* season; and power imbalances in the national fisheries governance process. Little kings are different from quota kings in the amount of actual power they hold in fisheries politics. This paper therefore aims to tell a more complete story of the winners and losers in the Icelandic fisheries system, where even those small-boat quota-owners in rural communities who might be considered by others to be winners - albeit as little kings who have limited control - are still impacted by the ways that specific policies regarding fisheries access or decision-making processes have been put into motion.

2.2 Icelandic fisheries

The rich marine system off Iceland has supported centuries-long human utilization of marine resources, including fishing, whaling, seal hunting, eider down gathering, driftwood collecting, and bird egg gathering (Hastrup 1998; Pálsson 1991; Pálsson and Helgason 1996).

Utilization of these resources has included varying degrees of commerciality. Before the 19th century, Icelandic farmhands fished cod during the spring spawning season, departing in rowboats directly from the land on which they worked (Kristjánsson 1985). Fish stations developed towards the 19th century as seasonal farm workers moved closer to the best fishing grounds for longer periods during the year. Larger fishery operations accessing Icelandic waters at that time were limited to foreign vessels, mainly from France, Spain, and England (Pálsson 1991). In the beginning of the 20th century, Icelanders began to operate their own larger boats with engines. The catch of demersal species doubled from 1905 to 1914, and by 1930, 23% of the Icelandic work force was involved in fishing or processing. When Iceland gained independence from Denmark (in 1944), the development of fisheries became a top priority for the growing nation with access to few other natural resources. The ensuing shift from a small-scale peasant economy to a large export-driven fleet occurred quickly, and since then, fisheries have always been a matter of national interest (van den Hoonaard 1992).

In 1975, after incrementally increasing its fishing jurisdiction for the previous 20 years, the Icelandic government extended its EEZ (Exclusive Economic Zone) to 200 miles, and asserted a right to exclude foreign fleets from that zone. During that same time, discourses about property ownership in fisheries emerged, centering on increasing national economic efficiency, and in the early 1980s, the Icelandic government first introduced the privatized ITQ system.¹ Quota was bound to fishing vessels and was based on the boat's average catch over the three previous years. The 1990 Fisheries Management Act created a comprehensive ITQ system that comprised the vast majority of species and fisheries (Arnason 2005). Under the Act, quotas were made freely transferable with minor restrictions on consolidation or transfer between regions (Runolfsson 1999), which allowed for the consolidation that continues into the present. Over time, quota rights migrated away from small boat owners in small communities to larger businesses in urban areas (Pálsson and Helgason 1995), who, in turn, invested their capital from quota into larger and sometimes foreign businesses and banks (Eythórsson 1996). In 1992, the twenty biggest fishing companies held 36% of the total quota. By 2001 their holdings increased to 59% (Haraldsson 2001). Consolidation continues: in 2015, the twenty biggest fishing companies held 70% of the total quota (Icelandic Directorate of Fisheries 2016). The number of vessels and fishing companies continue to decrease, but those that remain continue to grow – the fleet consists of ever larger boats, businesses accumulate ever more quota, and are increasingly vertically integrated, combining catching and processing activities.

Many scholars have explored the ways in which the implementation of ITQs has remade fisheries systems in Iceland, with particular focus on how conflicts emerged in the system or surrounding the system (Eythórsson 1996, 2000; Karlsdóttir 2008; Pálsson and Helgason 1995). ITQs have also affected the economic and social structure of coastal communities as the entitlement to fish became detached from place and became the property of individuals who were free to sell their quota outside the community. As fishing declined, so too did demand for support services and processing, which led to further declines in population and local commercial activity as people moved away to find other income opportunities (Eythórsson 2000; Karlsdóttir 2008; Pálsson and Helgason 1995, Skaptadóttir 2000, 2007). Social relationships have changed in coastal communities as a new type of division between the haves and have-nots has emerged in terms of quota ownership, which leads to further unresolved political animosity among those who own quota and those who do not (Eythórsson 2000; Karlsdóttir 2008; Kokorsch et al. 2015; Pálsson and Helgason 1996). Inequalities between regions have also deepened as economic activity associated with fishing moved from coastal communities to the capital area where the quota kings are based (Benediktsson and Karlsdóttir 2011; Mariat-Roy 2014). The relationship between fishermen and policy makers and scientists has also grown increasingly strained and distrustful (Pálsson 1998). Additionally, for Icelanders, the opportunity to engage in fisheries has largely changed from being a basic human right to being a commercial activity where fisheries are assets that are owned and sold for profit (Einarsson 2011; Pálsson and Helgason 1995). Resistance discourses have emerged centering around altered social relationships, immorality, danger and greed. While legal challenges to Iceland's ITQ system have been unsuccessful in the national court (Einarsson 2011; Eythórsson 2000; Pálsson and Helgason 1995), the UN Human Rights Council recently ruled that Iceland's ITQ system violated the human right to work. This led to the creation of the quota-free fishery *strandveiðar* season in 2009 that was designed to support community development in regions with declining fisheries access (Chambers and Carothers in press; Einarsson 2011, 2015a).

2.3 Methods and study area

We conducted ethnographic field research in Northwest Iceland from September 2011 to September 2013 in the eight coastal communities in Húnaflói Bay and Skagafjörður Fjord in Northwest Iceland (Figure 2.1; all field research, interviews, and participant observation were conducted by C. Chambers). These eight communities, ranging in population from 72 in Dranganes to 2,600 in Sauðárkrúkur, represent a contrasting scope of dependence on and

participation in fisheries that provides the variation needed to investigate themes of community, change and power. Over 60 interviews were conducted with 46 individuals to qualitatively explore their perceptions and experiences in fishing and fishing communities.

We first conducted exploratory interviews with key informants - individuals identified by fellow community members as being particularly knowledgeable about fisheries, fisheries management, and their coastal communities. The 18 key informants included fishers and their families, community leaders, processing plant owners and employees, as well as biologists and other research specialists. Informants were interviewed multiple times over the course of the research. We also utilized extensive participant observation during fishing trips and in small- and large-scale on-shore fish processing to gain first-hand knowledge of Icelandic fisheries and rural communities.

Purposive snowball sampling (Bernard 2006: 192) was used to identify 28 additional individuals for semi-structured interviews. Those individuals were selected to reflect recognized expertise in different kinds of fisheries, degree of engagement in fisheries, and knowledge of Icelandic fisheries in general. In many cases, we were able to obtain an exhaustive sample by interviewing all individuals of interest in the community. As with key informant interviews, semi-structured interview topics included personal history and participation in fisheries, experience of changes over time, relationship with other fishers in the community, importance of fisheries and fish processing to coastal communities, the next generation and entry level opportunities in fisheries and fish processing, and involvement in and perception of fisheries management.

Field notes and interview transcripts from audio-recorded interviews were first translated by C. Chambers, G. Helgadóttir and E. Harðardóttir, and then inductively coded for emergent themes in Atlas.ti and Microsoft Word (Bernard 2006: 492; Muhr 2004; Strauss and Corbin 1994). While certain broad themes were under direct investigation in this study, this style of inductive analysis allowed us to build stronger and deeper theoretical models based on the relationships between a larger number of themes (Bernard 2006: 492; Ryan and Bernard. 2003; Strauss and Corbin 1994). We found themes by exploring conflict, how individuals solve certain problems, social relationships, and similar domains that related to our research topic (Spradley 1979: 200). Exemplary quotes from interviews and participant observation are presented to give deeper context to the discussion of these themes identified through the coding process.

2.4 “Left-over shells”: Community and change

The trend of rural depopulation shows little signs of reversal in Iceland (Bjarnason 2014; Karlsdóttir and Jungsborg 2015). One major cause of this decline is the loss of jobs in the fishing industries that were central to rural coastal communities (Bjarnason and Thorlindsson 2006; Stefánsdóttir 2010), a trend also observed in many coastal communities around the world (Corbett 2013; Donkersloot and Menzies 2015). As reviewed above, fishing rights in the form of quota were sold away from rural communities to larger, centralized companies, often followed by the closing down or moving of associated processing facilities and support industries. Over time, the market price of quota has increased so that small-scale fishermen are often unable to purchase or rent quota (Chambers and Carothers in press). Small-scale and part-time fishermen are particularly important for sustaining economies in small communities where there are few other economic opportunities, so when access to fisheries is lost, the individuals emigrate and the community loses crucial social, human, and economic capital, which further exacerbates depopulation trends (Bjarnason and Thorlindsson 2006). Although the link between the ITQ system and rural depopulation can be difficult to separate from other contributing factors, including regional and national cultural trends (Hall et al. 2002), rural community residents in Northwest Iceland assert that the ITQ system was the major cause of migration and related population decline:

When the quota system was introduced, the fishermen got quotas allocated to their vessels. This created a big concern for the nation since some quota owners sold their quota away, leaving middle-aged people that couldn't sell their belongings and became prisoners in their own local communities. Everywhere you could hear the same story. The villages had depopulated, sometimes by more than half. What happened? The quota had been sold and the inhabitants had been left behind, with nothing to do - and the communities broke down.

-Processing plant employee, Sauðárkrókur, 17 February 2012

The worst thing to ever happen to Iceland, excluding Black Death and the Mist Hardships,² was when the quota was introduced, and made open to re-selling. That act has destroyed many communities in the countryside, including [my home town], a blooming village that had steady jobs for decades. There, the municipality sold trawlers and fish factories to [a bigger company] that later closed everything down and moved the quota away. Now [that whole municipality] is only a place to

sleep for the people that still haven't left after that. The quota that was *never* supposed to be sold away from any community.

-Small-boat fisherman, *community name omitted*, 5 October 2012

Views expressed by these informants highlight two important and related trends, consolidation and rural disengagement/depopulation. Although the above informant emphatically states his perception that the quota was not supposed to be sold away from rural communities, the consolidation through the sale of quota is in fact an expected characteristic of ITQ implementation (Carothers and Chambers 2012), the results of which are often misleadingly described as an “unintended consequence” or a negative side effect to small communities (Arnason 2005; Matthíasson 2003). In subsequent sections, we review attempts to alleviate the effects of these unintended consequences on rural fishing communities, but first we explore the daily realities experienced by individuals remaining in coastal communities today. Employment in the fisheries industry continues to decline in Iceland as a whole, but even in the study communities of Northwest Iceland, historical and cultural connections to specific fisheries endure. Both large and small fisheries and associated industries like processing, on-shore baiting, and gear repair continue to exist under a multifaceted mixture of political, social, and environmental changes. Below, we use the examples of the communities of Drangsnæs and Skagaströnd to highlight and describe the complexity of changes related to fishing livelihoods experienced in rural communities.

2.4.1 Drangsnæs and Skagaströnd

The calendar hanging in the break room at the fish processing plant in Drangsnæs lists the birthday of each of the 72 village inhabitants, and everyone in Drangsnæs is, in some way, connected to fishing. In this small village with 13 small boats and one large seiner nestled in the harbor (Figure 2.2), National Fisherman's Day (*Sjómannadagurinn*) is a bigger celebration than Iceland's Independence Day. One young woman, Erla,³ had just moved back to town to be closer to family. Although she was busy taking care of a new baby and young toddler, Erla couldn't stay away from the processing plant and accepted family members' offers to babysit as a chance to get in on the action of the springtime lumpfish boom. She also helped her father on the boat and baited longline hooks back on shore. Her husband had never been to sea before, but started fishing with her father. This was his only option for a job in Drangsnæs, one he felt lucky to have and took very seriously. As an outsider, he said, “It's

hard to get into fishing unless you are already in a family who fishes, you have to be connected somehow” (4 April 2012).

As was the case with Erla and her family, the presence of intrapersonal ties to the primary industry (fishing or farming) is a strong predictor of individuals’ decision to stay in or move back to a rural community in Iceland (Bjarnason 2014; Nilsson et al. 2012) and elsewhere (Kraack and Jane 2002; Lobley et al. 2010). Of the numerous and complex reasons for migration, the perception of reduced occupational opportunities through decreased quota ownership and fisheries opportunities plays a central role (Bjarnason and Thorlindsson 2006; Magnusson 2006). These two aspects considered together mean that as fewer individuals are engaged in fisheries, there are, first, fewer ties of younger generations to place-based fisheries that would influence the decision to stay, and second, fewer job opportunities that then influences the decision to leave. Fishing has traditionally been a family activity steeped in connection to history, and many current small-boat fishermen come from a long line of fishing families (Chambers and Carothers in press). It is a matter of pride for fishermen to know that they will have someone to whom to pass down the fishing business, and particularly the boat itself. Now, the rare luck of having an interested child to whom to pass down a fishing business is an exception rather than the rule. As one middle-aged boat-owner said: “There is a man with a 14-year old son who is going to stay here to fish. Us guys on the boat were talking one day, and one said, ‘Oh *lucky*, this guy. His son *wants* to be a fisherman” (5 April 2012).

An individual’s “want”, or what for some might be more accurately described as “need”, to leave their home community involves a complex decision matrix, the weighing of opportunities only partly related to fisheries (Bjarnason and Thorlindsson 2006, Bjarnason 2014, Corbett 2013, Donkersloot 2011, Kraack and Jane 2002; Lowe 2015). While quota consolidation leads to decreased access opportunities and family connections, technological changes also reduce the need for labor in the processing and catching industries (Skaptadóttir 2000), and general negative attitudes have emerged towards jobs in fisheries particularly for youth and women, who view fisheries as an industry without any upward mobility (Donkersloot 2011; Skaptadóttir and Proppé 2005; Karlsdóttir 2006, 2008; Power et al. 2014). Furthermore, many participants in our research expressed the common perception that “teenagers have different needs these days.” Personal choice and individual taste for lifestyle and education options are significant predictors of migration independent of geographical identities. Because of the ease of travel and communication, leaving home physically no longer means severing ties completely with friends and family (Bjarnason and Thorlindsson

2006). The educational structure of Iceland also adds to the loss of youth from rural communities (Bjarnason and Thorlindsson 2006; Karlsdóttir and Jungsberg 2015; Nilsson et al. 2012). After compulsory education is completed at age 16, youth in rural communities have to leave to attend vocational or high schools located in larger communities. This is similar to trends observed elsewhere in rural fishing communities (Corbett 2007; Karlsdóttir and Jungsberg 2015).

Across Húnaflói Bay, a Skagaströnd resident reflects on the importance of fisheries to a place like Dranganes and the link to rural decline:

[Dranganes residents] are so spiritual and strong... ‘I was born here and I will die here and I must fight.’ They have this mentality of keeping with the fishing, I don’t know how they do it. Maybe it’s because the people who wanted to leave have already left.
-Community leader, Skagaströnd, 18 November 2011

Skagaströnd is a visible example of the complexity of changes in fishing communities, where population trends are often closely tied to the multi-faceted social and environmental aspects of fisheries (Figure 2.3). Skagaströnd was built up by Danish merchants in the early 1900s and the population steadily rose with opportunities in herring processing and fishing until the collapse of the fishery in the early 1960s. After that, opportunities slowly rose again, partly because the community invested in a freezer trawler and formed a local cooperative, and partly because of the general increase in cod fishing around Iceland. Skagaströnd’s population reached its peak in the late 1980s (Figure 2.3), and has been in steady decline since quota became transferrable in 1991. Because of the loss of quota held in the community, various fishing industry operations have shut down over time (Figure 2.3).

Much like Dranganes, Skagaströnd is still known as a strong fishing community, and yet residents and local leaders worry about the trends of rural decline as opportunities in fisheries continue to decrease. The primary symbols of change are what a local Skagaströnd community leader called the “left-over shells of fishing,” repurposed fisheries infrastructure: the fish processing plant has been refurbished as a laboratory for scientists, and the freezing plant is now studio space for an artist residency. The various changes associated with fisheries, however, can be slow, with delayed or unknown effects and are not always easily identifiable in population fluctuations. Many informants noted that although the quota system was a drastic change in fisheries, a suite of other kinds of changes in fisheries has also affected the community. Technological changes in boat capacity and design, machine baiting,

and on-board freezing meant tremendous change in this small community. As processing increasingly moved off-shore and to centralized onshore facilities, Skagaströnd lost land-based fish processing jobs, but gained employment through the purchase of a trawler. And perhaps most importantly for many informants, boom and bust cycles of herring and shrimp reside in many individual's memories as major drivers of change (Figure 2.3). As one fisherman said: "If the fish would go this place would go too."

2.5 "Where there is money there is envy": The quota-free *strandveiðar* season

Gunnar and his wife Jóhanna have plenty of experience trying to continue their fishing operation in Hólmavík. They are an example of a successful small fishing business. Although Gunnar is an original recipient of quota and grew up in a fishing family, maintaining his fishing operation has not been easy. They employ about 10 people, which is a large operation for a small community in Northwest Iceland. Gunnar and Jóhanna recognize the importance of their business in the community. Creating jobs for locals is something they pride themselves on in their self-described role as little kings. They purchased a new boat so their daughter's partner could fish and continue to learn new skills and gain experience; they also hire locals to work in the onshore baiting shack, providing an important employment opportunity outside the farming season. Like their counterparts in Skagaströnd, they echo the importance of the ever-fluctuating nature of fisheries. "Like any good fisherman", Jóhanna says, you "always have to be on your toes and ride the waves of new opportunities." One of those recent opportunities has come not from a new species to fish or new market for existing species, but in expanded regulatory possibilities opened up through the *strandveiðar* season. Below, we explore the reasoning behind *strandveiðar* and the impacts it has had in rural coastal communities.

Strandveiðar is an open-access, or quota-free, fishing opportunity that began in 2009. The season runs from May-August. Participants can use up to four jig machines to fish Monday through Thursday, for up to 14 hours a day or a maximum of 650 kg of bottom fish each day. The coastline is split into four areas, each with a monthly total allowable catch (TAC) limit. Once the total catch of the area reaches the TAC, all fishing is shut down in that area until it opens again for the next month (Icelandic Directorate of Fisheries 2016). Boats are typically operated by a single fisherman, who cannot fish in an ITQ fishery at the same time as fishing in *strandveiðar*. Quota owners who wish to participate in *strandveiðar* must therefore finish fishing their quota for the year before fishing in the *strandveiðar* season. The intentions, and subsequent measures of success of the *strandveiðar* program, are to increase

accessibility of fisheries resources to new entrants and thereby increase economic benefits to rural coastal communities.

Following implementation the general consensus around the country was that the presence of *strandveiðar* boats rejuvenated communities and gave hope for the future (Einarsson 2011; Halldórsson 2010; Mariat-Roy 2014). Major benefits of *strandveiðar* to rural communities include the economic opportunities of increased fish processing, support services, and harbor fees (Halldórsson 2010). There are no residency requirements, only that fish must be caught and landed in the region where the boat is registered. Because of this, a fisherman can live in one place, but fish and land fish in a different community. Our study community of Norðurfjörður is one such place. With only 52 year-round inhabitants in the entire municipal area, the harbor bursts with life during the summer *strandveiðar* months (Figure 2.4), and residents, community leaders, local business owners and fish industry employees welcome the increased activity. However, with the general positive consensus of many community members and fishermen around Iceland towards the *strandveiðar* season, there also exist undercurrents of conflict and insider/outsider dynamics between fishermen:

There are too many boats now because of *strandveiðar*. They come here because the fishing is good, but we don't want to share with them - they come from elsewhere and aren't invested in the community. It's better if people stay here year round, not to just take off the top.

-Small-boat fisherman, Hólmavík, 2 August 2012

Competition between fishermen is a common occurrence in fisheries around the world. The introduction of the *strandveiðar* season has added new complexity to the way competition is manifested in Icelandic fisheries. As reviewed above, *strandveiðar* is generally considered favorable, and a success, in terms of community development. On the ground, however, there are echoes of conflict between fishermen regarding the other major purpose of *strandveiðar*: the opening up of access to fisheries resources. To explore the impact of *strandveiðar* on individuals rather than communities as a whole, we used interview data to develop a typology of the popular characterizations of different *strandveiðar* participants (Figure 2.5) and perceptions of for “whom” *strandveiðar* “should” be. Below we present this typology with examples from various informants to explore new forms of relationships between fishermen and the act of fishing that have come into existence through the *strandveiðar* season.

2.5.1 A: No quota and B: Small quota

Hafsteinn grew up in the sparsely populated area near Norðurfjörður, but now lives elsewhere and comes back to fish *strandveiðar* in the summer. He learned to fish, hunt seals and gather sea bird eggs with his father and grandfather, but moved to a larger community for school and had not come back permanently. However, he had made a career out of fishing, and was very proud of that. At 36 years old, he does not own quota, but instead tries to make-do fishing lumpfish in the spring, *strandveiðar* in the summer, and then, he said:

... after that - rent quota, it's all you can do... 300 kronur per kilo [\$1.13 per pound in August 2012]. But it's fun, and I don't know anything else apart from computers.

That's what I went to school to learn... but fishing is exciting. It's in my blood like most of us [from this area].

-Norðurfjörður, 7 August 2012

For younger fishermen like Hafsteinn who do not own quota, *strandveiðar* can be an important part of the fishing year (Figure 2.5: A: No quota). These individuals either do not have the credit history or personal capital to invest in purchasing quota, do not wish to participate in ITQ fisheries for political reasons, or often have other on-shore sources of income to supplement their fishing activities. “Small quota” *strandveiðar* fishermen share many of the same characteristics as “No quota” fishermen (Figure 2.5: B: Small quota). They do own quota, and like those in the “No quota” group, *strandveiðar* can significantly help individuals with smaller amounts of quota who switch into the *strandveiðar* season once their quota has been caught for the year. For example, Gunnar and Jóhanna's daughter's partner is supported in the summer months through *strandveiðar*, and under their help and guidance he intends to save money to invest in more quota in the future.

Like many small-boat fishermen, Hafsteinn had a vested cultural, familial and historical interest in fishing, and he stated that “*strandveiðar* is only a few years old, but it is halfway there to give people some freedom.” This idea of having the freedom to pursue one's own culturally-rooted fishing career is related to one of the original goals of *strandveiðar* season: to open up the right to fish. However, this broadened access, while beneficial to many small-boat fishermen and fishing communities, has had certain drawbacks, as the following informant explained:

The *strandveiðar* season was intended to open up the industry to new entrants. Good idea... It was ruined by letting everyone get access to it. The ones who were in the industry already and the ones that had sold themselves out should not have been granted access to *strandveiðar*. Those were not new entrants.

-Small-boat fisherman, Hofsó, 24 May 2012

2.5.2 C: *American Dream*

Many small-boat fishermen share the perception expressed above: that there are many current *strandveiðar* fishermen who owned quota and then sold it, choosing to engage only in *strandveiðar* – a very different history than that of Hafsteinn, for whom *strandveiðar* opened up an opportunity to return “home,” even if only in the summer. During an interview one informant spoke of a fellow community member who started fishing in the 1970s, and fished full time until he sold all of his boats and quota around 2005. He didn’t fish for about five years, but then purchased a new boat to fish *strandveiðar* and therefore he “gets to come back in for free.” The informant noted, “It wasn’t supposed to be like that – but these old quota guys know *exactly* what they’re doing.” The common perception that *strandveiðar* is unjust highlights underlying concerns of fishermen about access to marine resources. *Strandveiðar* is thought to first take fish from long-term quota owners who try to maintain a fishing business all year, and second, make it now possible for a fisherman to sell quota for profit and then return to continue to fish for free. One informant summed it up like this: “It’s sad in my mind, that the guys who sold the quotas are now fishing again and taking the fish away from others.” *Strandveiðar* therefore creates a new form of conflict among fishermen regarding access to fisheries resources and the right to fish. As one community member noted regarding the differing perceptions of *strandveiðar* and the negativity of some fishermen toward the *strandveiðar* program: “Where there is money there is envy.” The new rifts created by the *strandveiðar* season are symptomatic of larger questions of private property rights, the commoditization of fishing rights, and access. Varying perceptions exist as to who are, and who should be, the rightful owners of Iceland’s fish stocks.

Accusations of excess capital accumulation through perceived unfair access in *strandveiðar* are extremely common among fishermen and coastal community members. The third category of *strandveiðar* fisherman, “*American Dream*” fishermen (Figure 2.5: C) is therefore based on the popular perception that many *strandveiðar* fishermen are motivated by the financial gain, or the “American dream,” of fisheries. For many current small-boat quota

owners, *strandveiðar* is seen as an unfair blow to fishing operations that have been difficult to maintain. Current small-boat quota owners are often individuals who have been engaged in fishing for several decades and who were original quota recipients (Chambers and Carothers in press, Halldórsson 2010). While it can be difficult to track the histories of *strandveiðar* participants as the system and participants settle over time, there is some research to support the idea of the dominance of the “*American Dream*” fisherman over the previously-described “*Small quota*” and “*No quota*” types. A survey conducted with the first season of *strandveiðar* participants found that 40% of respondents owned quota, 64% considered fisheries to be their major profession, and 80% had operated a fishing boat before entering *strandveiðar* (Halldórsson 2010). However, estimates of how much quota was sold by *strandveiðar* fishermen prior to 2009 are unavailable because quota ownership and sales details were not collected. Similar research by Chambers and Carothers (in press) has likewise shown that *strandveiðar* participants have an average of 30 years of fishing experience, suggesting that at least some characteristics of the “*American Dream*” typology fit with information collected on current *strandveiðar* fishermen.

Other than those former full-time fishermen who sold quota to engage only in *strandveiðar*, or quota-owners who wish to make extra money, a second type of “*American dream*” *strandveiðar* fisherman exists. These individuals are what was referred to by many as “the doctors and lawyers from Reykjavík” – people who have income from other professions, but who become involved in *strandveiðar* to make extra money or experience a taste of the fisherman’s life. Although doctors and lawyers could certainly be classified as “new entrants,” those in rural communities often view these individuals in a negative light. As one small-boat owner put it, “*strandveiðar* means that people who didn’t have any idea about what fishing means or is can begin to fish.”

While individuals’ motivation behind engagement in *strandveiðar* may vary, the fishermen who sold their boats and quota before *strandveiðar* was enacted could not have known they would be able to fish again without quota. Many informants suggested these individuals might have sold quota not because of greed but because it was the only financially viable option at the time and because they were worried about the future. Similarly, those “doctors and lawyers” are making use of opportunities presented to them. As one informant who would be classified as a “lawyer from Reykjavík” noted, “650 kilo a day is not enough to provoke greed.” For him, *strandveiðar* was certainly a way to make money, but also something he still had to work at and did not feel is easy money; he was simply

making use of the options available to him to “try something new.” The accusations of the greed of both quota-sellers and “doctors and lawyers” that are specifically central to the “*American Dream*” typology, while extremely common, appear to more accurately reflect the internal concerns and struggles of fishermen than a characterization of the *strandveiðar* participants themselves. As one small-boat fisherman said:

I believe that strong forces in society want to monopolize all fishing in Iceland. One sign of this is how the regulations of *strandveiðar* make things difficult. Already, some individuals feel that they own the fish in the sea; some quota owners even feel like the introduction of *strandveiðar* is an infringement on their rights.

-Small-boat fisherman, Skagaströnd, 18 July 2012

2.5.3 D: *Icelandic Dream*

The fourth category of *strandveiðar* typology, the “*Icelandic Dream*” fisherman, represents a departure from the first three categories of *strandveiðar* participants because the only motivation of this type of fisherman is the pursuit of leisure, or the “*Icelandic dream*” of owning a small boat (Figure 2.5). *Strandveiðar* is considered by many fishermen and community members to not be beneficial overall for newcomers due to the restricted amount each boat is allowed to fish and the cost of the boats, as the following small-boat fishermen explained:

Originally, *strandveiðar* was meant to increase new entrants in the sector. I think that has not worked out as it should have. Many have sold out of other systems and could therefore easily fund their entry into *strandveiðar* while newbies have to take huge loans. I think that they, the newbies, should at least be given more part in fishing. They could for example be allowed to fish longer.

-Small-boat fisherman, Norðurfjörður, 7 August 2012

It's not possible to be in fisheries really so you have to do something else. You have to have money to buy into even *strandveiðar*, and if you have money then why wouldn't you do something else, like invest in a bank.

-Community leader, Hvammstangi, 1 September 2012

Today *strandveiðar* fishermen fish 30-40 tons in 4 months, this is not enough to create new fishermen. The system we have today should be called leisure fishing, since it is only an extra job.

-Small-boat fisherman, Skagaströnd, 21 August 2012

The idea that *strandveiðar* is in practice not good for newcomers, but at the same time should not be for those who owned quota previously has led many to consider it, as the above informants described, a leisure activity. “*Icelandic Dream*” fishermen have the freedom to be at sea and take part in fishing activities that many still consider an integral part of Icelandic culture and history (Chambers and Carothers in press). Although many in the “*No quota*”, “*Small quota*”, and even “*American Dream*” *strandveiðar* participants certainly have strong connections to the lifestyle of fishing, these individuals are seen as at least still partially concerned with the ability of *strandveiðar* to generate income. However, for the “*Icelandic Dream*” fishermen, participating in fisheries as a “way of life,” retirement activity, or because “some men get depressed on land,” means they are distinct from the other participants because for them, *strandveiðar* is not meant to generate an income or support continued engagement in fisheries. This categorization has a romantic quality often assigned to older fishermen, from both small and large-boat careers. Informants often spoke of “the 80 year old guy who needs to be at sea or he will just die.” One informant put it this way:

I would like *strandveiðar* to be the 60-plus guys who just can't be away from the sea but who can't work on the trawlers anymore. I love that idea; they could fish just for a few months in good weather.

-Community leader, Skagaströnd, 16 November 2011

2.6 “Greed, gangs and politics”: Fisheries governance at the national level

The former government that associated themselves with a left-democratic policy did not have the courage to change the fishing policy. I was hoping that due to the poor condition of the economy they would increase the quota, take the income from that and then rent the quota out at a fair price and divide it in a fair way, but that didn't happen. The new government will not change anything. The financial support brought to their parties is too high and weighs a lot when it comes to their election campaign.

Do we live in a banana republic after all? Really. So I say, like this guy famously said a few years ago: God bless Iceland!

-Small-boat fisherman, Sauðákrókur, 20 April 2013

On 6 October 2008, in speaking of the banking collapse to a nation in shock, Prime Minister Geir H. Haarde closed with the words, “God bless Iceland” (Benediktsson and Karlsdóttir 2011, Icelandic Prime Minister’s Office 2008; Durrenberger and Pálsson 2015). The statement, as Durrenberger and Pálsson (2015) note, uncommon in Iceland for its reference to God, became a tag for loss, meltdown, and surrendering to a higher power in uncertain times. The informant quoted above used the phrase to link the despair and loss of the economic meltdown with similar feelings toward national fisheries policies in his reference to Iceland as a banana republic with a powerful political elite and an export-based, single resource industry. Beyond the local dynamics of conflict between fishermen as discussed in the above section, there exists a larger-scale struggle between the governed and the governing body.

As we have reviewed above, fishermen in rural coastal communities operate under a complex mixture of social, political, environmental, technical and historical dynamics. Evolving fisheries regulations, such as *strandveiðar*, bring new power relationships and conflict. Regarding fisheries at the national level, however, fishermen in rural coastal communities tend to be in general agreement with each other. They share concerns about corruption in the political system, unfair decision-making processes, and the focus on policies that ignore the needs of small-boat fisheries or rural communities. When asked what the guiding principles behind Icelandic fisheries governance were, one informant simply responded: “greed, gangs and politics,” and another: “The monopoly in the industry from year to year has created a powerful, small power-gang that take everything. These men have the government in their pocket.” The extent to which politics and power are engrained in Icelandic fisheries is often contested, although in everyday public discourse and even most academic analyses, it is accepted as common knowledge (Benediktsson and Karlsdóttir 2011; Eythórsson 2000, Kokorsch et al. 2015; Mattiasson 2003). Below, we explore the imbalance of power in fisheries governance through the eyes of individuals living in rural communities.

Icelandic fisheries are governed under the Ministry of Industry and Innovation, under which the Marine Research Institute gives biological advice, and the Directorate of Fisheries oversees administration, compliance and licensing (see Chambers and Carothers in press for an overview of the governance structure and Kokorsch et al. 2015 for a detailed description

of stakeholders). Although the Marine Research Institute is tasked with giving official TAC recommendations to the Ministry, this advice is sometimes not followed and TAC is set higher than the recommendations (Woods et al. 2015). This is possible because although there is no official venue for stakeholder input, lobbying by certain interest groups appears to influence the decisions made by the Minister. The most powerful lobby group is Fisheries Iceland (SFS: *Samtök fyrirtækja í sjávarútvegi*), which was formed in 2014 as a combination of the Federation of Icelandic Fishing Vessel Owners (LÍÚ: *Landssambands íslenskra útgerðarmanna*) and the Federation of Icelandic Fish Processing Plants, along with several other industry partners. Other unions include the Federation of Captains and Mates (*Farmanna og fiskimannasamband Íslands*), the Icelandic Union of Marine Engineers and Meal Technicians (*Félag vélstóra og málmteknimanna*), and the Federation of Seamen (*Sjómannasamband Íslands*). LS (*Landssamband smábátaeigenda*), the National Association of Small Boat Owners, has considerably less power and influence, but is nonetheless the only outlet for the concerns of small-boat fishermen. The following informants described this unequal power structure:

It has been tailor made for LÍÚ [now SFS] through the years. The banks provided loans for certain people to buy quota, the ordinary person can't have access. Now they are forgiving the debts of these people. The big fishing companies pay into the election funds for some parties and then they want to get rewarded after the elections. The big fishing companies have total control in the media and they own them and run them. The Marine Research Institute is partial towards the big fisheries and the guard dogs of the quota system are in the universities where young people are indoctrinated to believe that the quota system is the best in the world. The technical training school is run by LÍÚ [now SFS], there you learn about the quota system. It is not good to have the biggies against you.

-Small-boat fisherman, Skagaströnd, 24 July 2012

Iceland is supposed to have democracy, there is no democracy in this country, and you are not even allowed to be an Icelander and fish freely as a small-boat fisherman. You get arrogance from the authorities, where people are demonstrating their power and working like some secret service. Small-boat owners are especially bullied, and it's like everything is done to make sure that nothing is being taken away from the quota owners, who are in fact not the owners. The nation has been lied to, that we

have the best quota system in the world, it is complete nonsense and it is only customized for the few chosen ones that think they own the country and the fish. Very few places have as much injustice as Iceland.

-Small-boat fisherman, Hólmavík, 5 June 2013

And as the following informant stated, the quota system could be compared to the emperor's new clothes, or a situation in which no one believes the benefits of the quota system, but assumes that everyone else does believe:

The quota system is built on the same grounds as the adventure about the emperor's new clothes by H.C. Andersen. It was LÍÚ [now SFS], along with politicians that forced the Marine Research Institute to take action, and they still do. Often the LÍÚ [now SFS] gang behaves like they are their own state inside this country.

-Small-boat fisherman, Hólmavík, 2 June 2013

Controlling groups with powerful rhetoric focused on larger fisheries therefore result in a situation where the opinions of small-scale or rural fishermen and the differing motivations for engagement in fisheries become obsolete in the streamlined decision-making process. Policies that favor larger fisheries are based on the end-goal of export to a global market focused on economic efficiency, rather than local consumption and production that may focus on other social or environmental values (Smith and Chambers 2015). Many fishermen in rural communities witness the incompatibility between the national goals of the quota system and the goals of rural development, as highlighted in the following comment:

Here all workers in the fish factory and the trawlers were fired and no one said a word. People were lied to and told that another ship would be bought while the matter was being put to rest. Lies! The company bought a 30 metric ton boat, no locals hired, and a small factory in [the capital area] was bought and all the fish are transported there on trucks for processing. Why? Well because the owners that inherited the company do not want to live in a crappy town like [here], and the rest of the quota is rented out, around 3000 – 4000 metric tons, so that these people can update their four wheel drives. This system is terrorism.

-Community member, *Community name omitted*, 12 February 2012

Another example of this incompatibility is the perceived strict regulations on small-boat fisheries. As discussed in previous research (Chambers and Carothers in press), small-boat fisheries that are so crucial to rural communities are often treated with the same assumptions and regulations as large-scale fisheries. Small-scale fishermen recognize that their operations do, however, vary from large-scale fisheries:

It's harder to become a fisherman in Iceland than anyone can imagine – and having all your family depending on you when you go fishing under already extremely restricted regulations, that's tough shit to deal with.

-Small-boat fisherman, Hofsós, 22 September 2011

Every Icelander has this dream to buy a small fishing boat and to go fishing but the government tries to erase that dream by refusing to really open fisheries. They think open access would be bad for buyers.

-Small-boat fisherman, Norðurfjörður, 4 August 2012

Worrying about open access with small boats is like worrying that the women walking with the baby carriage will ruin the sidewalk.

-Small-boat fisherman, Drangsnæs, 29 May 2012

The above comments refer to open access with traditional effort-based fishing controls as an alternative to ITQ management, and previous research has shown that the majority of small-scale fishermen in Iceland prefer non-ITQ alternatives for managing their fisheries (Chambers and Carothers in press). The inability to voice these opinions to decision-makers, or participate in discussions that might bring beneficial changes to small-scale fisheries, is expressed in the common phrase "to go south" (*að fara suður*), highlighting the tension between national politics and local realities. "To go south" is used when someone from the rural countryside physically travels to the capital area of Reykjavík for supplies, medical care, to visit family and so on. It can also be used when someone moves away from a small community for employment or education opportunities and symbolizes rural decline. In our research, informants commonly referred to their inability "to go south" in terms of participating in fisheries politics – demonstrating the relationship of rural fishermen to the central institutions in Reykjavík. One ethnographic study in a rural Icelandic fishing village in the early 1970s noted the common usage of this phrase in fisheries politics, and the

characteristics of the usage of the term still apply today (van den Hoodnard 1972). Both literally and figuratively, it is difficult for rural community members “to go south” and the phrase suggests an uneven power arrangement, where the periphery must always “travel” to the center. The 1970s ethnographic fieldwork was written before the large-scale adoption of the quota system, and in that way we can see that the figurative distance between Iceland’s center and periphery existed at least to some degree before the development of the ITQ system. Over time, however, this distance appears to have widened, and while small-scale fishermen and those in rural communities continue to express their views, there is an increasing pessimism about the ability to make a positive change for the future of small-scale fisheries and rural coastal communities in Iceland:

I am part of the group of people that thinks the original distribution was a mistake and it was probably the biggest theft of the Icelandic history. On the other hand, I made peace with it a decade ago, that probably it was too late to turn back and that the nation had to accept what had happened. But the ones who dare to point out the flaws in the quota-system have been judged beforehand and accused of wanting to do irresponsible fishing or have even been called communists – probably by people that do not even know what the term communist means. Criticism can be good and it can be used to do good things better. Unfortunately some people see criticism as inherently bad and that it’s an attack on the individual or the system he stands for.
-Large-boat fisherman, Sauðárkrókur, 24 March 2013

I was raised by people who have been fishing and working in fisheries and related occupations. I have done most jobs on the sea from childhood – I have been at sea for more or less 50 years. I have a lot to say about the quota system and I could give a long lecture about it, but I am now too old to be engaged in this bullshit. What I find worse is where my nation is at, to let these strong pressure groups run everything here. It’s sinister to think about. I have nine grandchildren and it’s impossible that any of them will make a living as fishermen.
-Small-boat fisherman, Sauðárkrókur, 23 March 2013

The future... it totally depends on politics... nobody can know. LIÚ [now SFS] is all about politics, and the small boats and communities are not always happy [with SFS’s

political stances]. The trawlers have such big political influence and one minister after another gets cold feet.

-Community leader, Hvammstangi, 27 November 2011

2.7 Discussion

Regarding fisheries management, a key informant said, “The thing is, you see, there are too few trees in the forest.” At first it seems as though the “trees” are fish, and that he is expressing an environmental concern about decreasing numbers of fish, or perhaps explaining how in the quota system he could not catch as many fish. However, this seemingly out of place terrestrial metaphor in fact relates to the most important land-based aspect of fisheries: the people. The “trees” are fishermen, and in the informant’s perception, there are not enough trees to make a proper forest – a proper contingent of fishermen with a cohesive voice. The “forest” of fisheries instead is a barren and sparse place, with no new trees, no diversity of trees, only a few tall ones remaining few and far between. Although many older fishermen spoke of competition and lack of coordination between fishermen as an integral part of fisheries, they noted that there is an increasing need to form a collective voice to protect certain ways of life and fishing operations. The very nature of the forest has changed, and what remains is a collection of *little kings*.

The little kings in Icelandic fisheries today operate in increasingly difficult to navigate social and political circumstances. As featured in Drangsnæs, youth migration and connection to community are largely affected by fisheries management policies, but are compounded by broader trends in education opportunities, lifestyle tastes, and technical changes in the fishing industry that reduce the need for labor. Personal choices and preferences are bound by very real limitations on occupation and education opportunities, creating little kings through this individual decision-making process regarding migration. It is becoming increasingly unlikely that informants’ grandchildren would even want to make a living in fisheries as personal identity and pride come from other, less geographically or lifestyle-based sources (Bjarnason 2009). Similarly, as highlighted in Skagaströnd, fisheries systems and fishing communities are inherently entwined in complex drivers of change such as fluctuations in marine resources and advancements in technology. In this instance, a whole community like Skagaströnd could be considered a little king, with some agency to enact positive change, but always subject to larger complex environmental, economic, and social changes in fisheries.

Little kings are created through, and caught up in the complexity of relationships of the haves and have-nots in Icelandic fisheries. The overarching political structure in fisheries management and governance acts as a compounder that affects the intensity, direction and speed of changes in a system already in constant flux, creating new classes of haves and have-nots. Little kings engaged in fishing today are an entrenched social group where everyone wants to be their own boss, but at the same time is restricted, with limited control to respond to larger drivers of change. Small-scale fishermen and coastal community members expend time and resources defending their own niches, which leaves little time or resources for engaging in national political discourses. Furthermore, the lack of power to engage in decision-making processes, or to “go south,” in turn creates an ever-changing substructure of haves and have-nots within small-scale fisheries and rural communities. While quota kings in urban centers are the most easily-identifiable category of haves, subtler concepts exist. For example, Gunnar and Jóhanna’s quota ownership and general success may categorize them as haves, but at the same time, as small-boat fishermen, they are also under constant stress – grateful for new opportunities such as *strandveiðar* that offer some hope in the increasing precariousness of small-scale fisheries. A non-quota owner like Hafsteinn would be considered by most a have-not, although some quota-owners in small communities would feel wronged by his participation in *strandveiðar*. The fishermen and community leaders whose rural communities stand to greatly benefit from new opportunities like *strandveiðar* paradoxically do not have meaningful power in fisheries decision-making processes.

Although many small-boat fishermen and rural community residents would agree on its economic benefits to coastal villages, *strandveiðar* does not appear to significantly change the status quo of Icelandic fisheries with regards to access, ownership, and equity. Conflicts exist over ideas of proper “type” of *strandveiðar* participant and the *definitions* are often at odds with each other and raise more questions that current fishermen and coastal community members are struggling to answer. Is Hafsteinn’s engagement in *strandveiðar* a more proper or acceptable use of quota-free fishing than that of a doctor, lawyer, or former quota owner? Can *strandveiðar* help sustain Iceland’s rural fishing communities? Is *strandveiðar* for newcomers or retirees? Is *strandveiðar* intended to support an already existing fishing business or a side income in addition to another career? Is the purpose of *strandveiðar* to sustain fishing for leisure or fishing for profit?

Two themes are central to understanding the current manifestation of conflict in Icelandic fisheries: differing philosophies regarding access to fisheries and the ability of the

governance process to address equity in opportunity and outcome. Because fisheries have been a market economy in modern times as Iceland pushed for independence from Denmark and even earlier with the trade of dried and salted cod, it is not market production and export that are the underlying cause of tension regarding fisheries, but the portability of fishing rights and their consolidation in the hands of a select few (Helgason and Pálsson 1997). Prior to the 1960s, marine governance in Iceland revolved around the exclusion of foreign fishing vessels, whereas domestic vessels were given open access to all major fisheries under various effort controls (Guðmundsson et al. 2004). While there is evidence that the idea of ownership in fisheries is becoming engrained in Iceland, at the heart of the issue is the distinction between private and collective property (Chambers and Carothers in press). Although the majority of literature on natural resource management in Iceland centers on fisheries, the evolution of the private property structures of Icelandic fisheries management is similar to the development of management of land, water, and geothermal resources, which reflects a larger trend in Icelandic governmental policy design (Benediktsson and Karlsdóttir 2011; Benediktsson 2014; Icelandic Ministry of Industries and Innovation 2006). While these resources were once held under common property arrangements, each is increasingly shifting to variations of private property schemes in the neoliberal era, although important principles such as “freedom to roam” (*almannaréttir*) still allow for a public right of passage on uncultivated land (Nature Conservation Act 1999).

The concentration of money, access rights, and power in the hands of a few individuals through private property is at odds with the Nordic welfare model that guided much of Icelandic policy making in the past, where citizens are provided opportunities for productive employment that benefits their private lives, but also can be taxed for the public good (Holm et al. 2015). Therefore, these shifting governmental ideologies result in an on-going tension in Icelandic society with regards to who should access, control and own natural resources. At the base of much of this tension is a disconnect in the concept of equity in access to resources. The Icelandic Fisheries Management Act says the fish are the right of all Icelanders (small-boat fishermen, as well as doctors and lawyers in *strandveiðar* and big businesses) (Althingi 2006; Einarsson 2015b). In practice, however, neoliberal policies such as ITQ systems often ignore issues of equity (Pinkerton 2015), meaning that certain groups tend to gain greater control based on their positions of power. A growing number of fishermen in rural communities are therefore asking if it would be possible to imagine a more equitable fisheries management scheme and governance arrangement, where big businesses would not be on an equal playing field with small communities, where stronger policies

would exist to support the equitable right to fish for individuals in rural communities historically dependent on fisheries, and where power-sharing would be a primary foundation in the fisheries decision-making processes.

2.8 Conclusion

Little kings exist as entire communities reacting to the ups and downs of environmental, technological and social changes, as family units trying to maintain their cultural and historical connection to fishing, and as individual fishermen making the best of economic opportunities to make a living. These little kings have no collective power or platform to meaningfully influence national politics and no concerted effort of resistance has emerged among fishermen as the in-fights between fishermen dominate, although research like this study shows that there are common threads for small-boat fishermen and rural communities around which to unite. Those in rural communities are distanced from decision-making processes held in the capital area, and yet their world has been widened by politics and power over the years. National politics are dominated by a small number of powerful individuals with vested interest in the economic efficiency of the ITQ system. Although disagreement is not uncommon in natural resources management, Icelandic fisheries are at least in part an example of conflict stemming from unequal power relations in the ITQ system. Volatile political situations with large power imbalances like the current Icelandic fisheries governance system make it hard to enact new rules and to imagine ways that power can be redistributed.

A common topic of discussion in Iceland in many social and political circles – ranging from everyday citizens, to community leaders, to national politicians and planners – centers on the extent to which government policies should support rural communities, and how society is changing to favor urban areas. The various impacts of the sale of quota on small-scale fishermen, processors and rural communities were anything but unexpected, and although subsequent implementations of ITQ systems in other countries have attempted to include safeguards for small-scale fisheries and rural communities, early phases of Iceland's national ITQ system had very few policies aimed at protecting those more likely to suffer negative and unequal consequences from the ITQ system (Chambers and Kokorsch in press). This research has shown the ways that attempts to counteract negative impacts of the quota system with policy making can in fact created new struggles. Shifting categories of a single stakeholder group labeled “fishermen” alongside of differing ideas of what a fisherman is and who Icelandic fisheries should benefit continue to stall consensus. Many large fishing and

processing operations favor a national fisheries system that gives the largest overall benefit to Iceland as a nation, and do not support the ideology behind programs that give special allowances for smaller communities and fishing operations. This continuing clash in Icelandic fisheries is therefore rooted in not only the rules of the management system itself, but larger questions of governance design, stakeholder power, and national constitutional rights as equity issues in access to fish continue to be left unresolved.

2.9 Endnotes

¹ Herring fisheries had been under a quota system since 1975, and capelin since 1980.

² The “Mist Hardships” (*Móðuharðindin*) were resultant from the eruption of the volcano Laki and the lingering poisonous gas cloud from 1783-1785, when a quarter of the population died due to crop failure, livestock death, and flouride poisoning.

³ All names of informants have been changed, and in some places the community identity has been omitted to protect anonymity.

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2.11 Figures

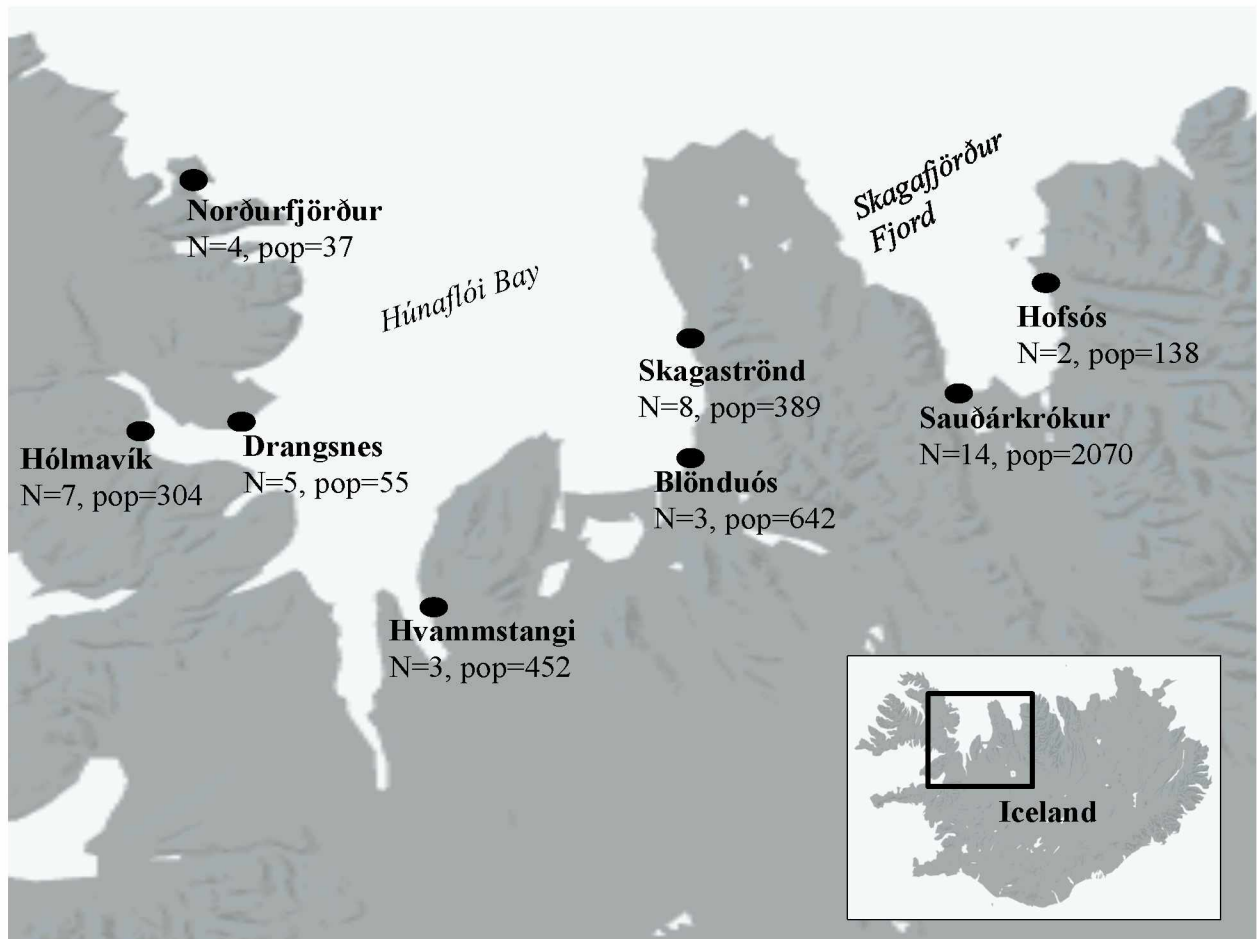


Figure 2.1: Research communities in Northwest Iceland, number of informants, and 2013 population of individuals over age 15 (Statistics Iceland 2015).



Figure 2.2: The small but critical harbor at Drangsnæs, population 55. Photo: C. Chambers.

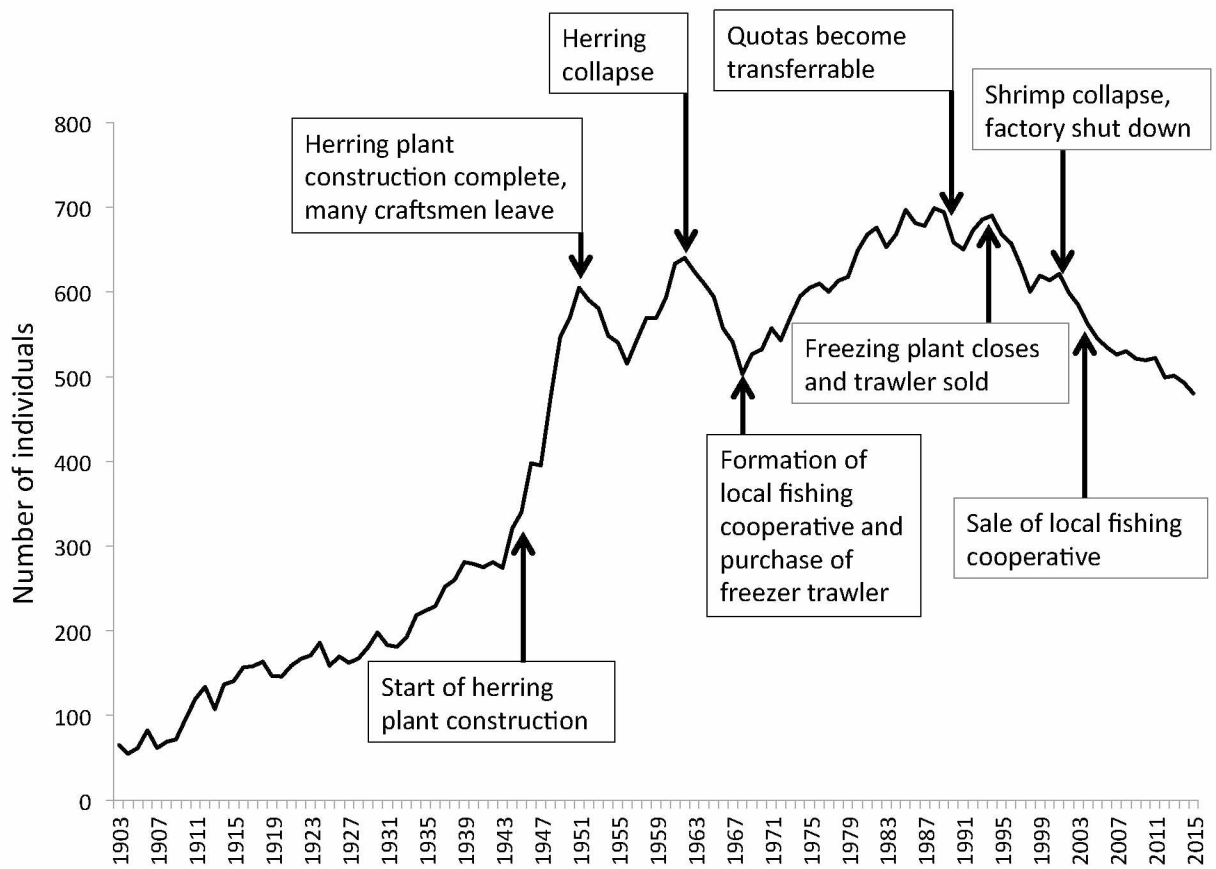


Figure 2.3: Skagaströnd population changes and major fisheries-related events. Population data from Statistics Iceland (2015).



Figure 2.4: The Norðurfjörður harbor, full of *strandveiðar* boats in late summer. Photo: C. Chambers.

Typology of <i>strandveiðar</i> participants	
A: No quota	<ul style="list-style-type: none"> ▪ Combine lumpfish and <i>strandveiðar</i> without owning quota. ▪ Participate in fisheries without quota to make a political statement or for financial reasons.
B: Small quota	<ul style="list-style-type: none"> ▪ Those whose quota is so small that <i>strandveiðar</i> can help supplement income.
C: “American Dream”	<ul style="list-style-type: none"> ▪ “To get rich quickly.” ▪ Often have other careers. ▪ Includes those who sold their quota, or who own greater amounts of quota. ▪ Not necessarily motivated by greed, but view <i>strandveiðar</i> as a way to make extra money.
D: “Icelandic Dream”	<ul style="list-style-type: none"> ▪ “Way of life.” ▪ “<i>Strandveiðar</i> fulfills a dream of so many.” ▪ Many begin fishing on big boats but dream of retiring and owning a little boat. ▪ “The 80-year-old guy who <u>needs</u> to be at sea.” ▪ “Leisure-fishing.”

Figure 2.5: Typology of *strandveiðar* participants, based on informants’ perceptions of themselves as well as fellow fishermen engaged in *strandveiðar*.

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Chapter 3: Multiple goals of fisheries management: A case study of the Icelandic lumpfish fishery¹

Abstract

This paper explores the Icelandic lumpfish fishery in order to describe the various social, economic and ecological dimensions of a fishery and then evaluates the capacity for participatory governance in the fishery. Fisheries are managed for a complex mixture of biological, social, and economic goals, but often, biological goals are given priority. Responding to a need for greater inclusion and measurement of social and economic goals, we use the lumpfish fishery to address how human dimension indicators can be collected for a fishery, and how the various indicators can be considered along with biological management goals. The small-scale lumpfish fishery has never been included in Iceland's ITQ (Individual Transferrable Quota) system and therefore provides a noteworthy case study of fisheries management and governance given the overall dominance of ITQ fisheries. Results show that the lumpfish fishery is extremely important to the cultural and economic fabric of rural communities, particularly as a place for knowledge transfer between generations and a source of local pride. Participation in the fishery each year is heavily influenced by the landing price; however, permit holding remains tied to local communities, suggesting that management strategies must take more than economic or environmental goals into account. The flexibility to participate in the lumpfish fishery can aid in resilience strategies by individuals and communities to provide extra income, but at the same time can offer a social flexibility to access a fishery of cultural and historical value. Flexible participatory governance arrangements that incorporate social, economic and environmental goals address the relationships between the resilience of rural fishing communities, economic and environmental fluctuations, and issues of access to fishery resources that this research highlights through the Icelandic lumpfish fishery.

3.1 Introduction

Commercial fisheries encompass multiple complex social, ecological, and economic factors that can influence how management schemes are designed. Definitions of a “sustainable”

¹ Chambers, C., C. Carothers, G. Helgadóttir, K. R. Criddle, and A. Seitz. Multiple goals of fisheries management: a case study of the Icelandic lumpfish fishery. Prepared for submission to *Polar Geography*.

fishery can vary and therefore prioritize different management end goals. Management scenarios that maximize ecological end goals (*e.g.*, ensure ample fish resources for the future and minimize negative environmental impacts) may not satisfy economic goals (*e.g.*, increase profitability, stabilize income, or maximize regional economic impacts) or social goals (*e.g.*, allow equitable access for fisheries or fishing communities with historical and cultural significance) (Jentoft and McCay 1995; Jentoft and Chuenpagdee 2009). For example, keeping catch levels under a certain amount using effort controls such as daily or annual catch limits can fulfill certain biological goals, but may cause a race-for-fish that is detrimental to the social and economic sustainability of fisheries and fisheries-dependent communities or may exacerbate discard mortality when catch limits are reached and gear is abandoned. Programs such as ITQs (Individual Transferrable Quotas) can support economic efficiency end goals, but can fall short of supporting social goals related to equity and access (Chambers and Carothers in press; Matthíasson et al. 2015). Similarly, opportunities created through management schemes that prioritize local participation and access thus meeting sociocultural goals may not succeed in minimizing adverse biological impacts or maximizing economic rent.

Because of this entwined nature of fisheries, for a fishery system to be considered truly sustainable it must not only maintain robust fish stocks, but also promote economic and social well-being for individuals and communities and the fishing industry. Known as the triple bottom line, or the 3 “E’s” (Figure 3.1; United Nations’ World Commission on Environment and Development 1987; Anderson et al. 2015), the current model of sustainable fisheries management acknowledges the equal representation of biological, social, and economic considerations that are defined by the end goals of equity, ecology, and economy (Jentoft et al. 1998; Symes 2006; Symes and Phillipson 2009; Urquhart et al. 2011; Ommer et al. 2011). Although maximizing sustainable yield has been the dominant paradigm in fisheries management and although ecological end-goals have begun to factor in fisheries management schemes, consideration of socio-economic, or “human-dimensions”, goals is only just beginning to be factored into fisheries management (Pascoe 2006; Symes 2006; Urquhart et al., 2011; Ommer et al. 2011).

One way that social and economic factors are analyzed and considered in fisheries management is through the collection of various indicator data. A range of human dimension indicators in fisheries exists for specific fisheries or various scales such as household or community, and regularly-compiled human dimension indicators vary by country and fishery (Criddle and Makino 2012). Currently, quantitative data are more often used in socio-

economic assessments, although tools for standardizing qualitative metrics are being developed as well (Jepson and Colburn 2013; Himes-Cornell et al. 2016). Commonly named indicators for human dimensions of fisheries include ex-vessel price, landings, landings value, income of fishermen, number of fishermen, number of permit holders, changes in export and trade volume and value, processor earnings, crew income, mental and physical health and occupational safety, training opportunities, permit and quota ownership, active vessel numbers, number of processors, and landings by community, as well as general demographic data such as unemployment, education, gender, and age (Pollnac et al. 2008; Lowe 2011; Colburn and Jepson 2012; Criddle and Makino 2012; Felthoven and Kasperski 2013; Anderson et al. 2015; Pollnac et al. 2015; Himes-Cornell and Kasperski 2016; Himes-Cornell et al. 2016).

Although indicators are often used to describe trends over longer periods of time and larger geographic areas, indices specific to a particular region or fishery can also play a crucial part in understanding how social, economic and environmental changes in fisheries impact fisheries-dependent communities and fishing livelihoods (Larsen et al. 2010; Lowe 2011; Criddle and Makino 2012; Felthoven and Kasperski 2013). Resource-dependent communities are often characterized by boom and bust cycles, but the diversity of marine resources often ensures opportunities or at least food for local consumption in periods of declining commercial fisheries, which can aid in community resilience (Robards and Alessa 2004; Himes-Cornell and Hoelting 2015). A major characteristic of resilient fishing communities is therefore the flexibility to access local resources when changes in species composition, price, or markets occur (Himes-Cornell and Hoelting 2015). However, modern fisheries management regimes can affect access to local resources if fishing rights migrate away from local communities, creating inflexible regulatory barriers for residents who traditionally relied on the option to switch among multiple opportunities in response to uncertainties and environmental and economic fluctuations (Allison and Ellis 2001; Olsson et al. 2004; Lowe 2011). A reduction in fisheries access and participation is quite often followed by other political and social changes such as population decline and the withdrawal of services that in turn fundamentally decrease options for the future and lead to less resilient systems (Rasmussen and Hamilton 2001; Bjarnason and Thorlindsson 2006; Folke 2006; Robards and Greenberg 2007; Huskey 2009; Lowe 2015).

Indicator data can also offer valuable insights on local dynamics that can affect overall governability and sustainability of fisheries resources (Lowe 2011). Governance is the set of management structures and the underlying philosophies embedded in those structures

(Poe et al. 2014). Sustainable fisheries are also predicated upon a flexible political governance structure that can respond not only to changes in fish abundance, but also fluctuations in consumer demand, associated costs with fishing, and other social trends (Jentoft et al. 1998; Armitage et al. 2009; Ommer et al. 2011). Fisheries-dependent social-ecological systems are inherently non-stationary, and inflexible governance strategies can make systems vulnerable to larger perturbations (Criddle 2012), so a crucial step in fostering the inclusion of social goals in fisheries outcomes is through the governance process itself.

Many scholars have focused on the benefits of fisheries governance structures that go beyond the typical top-down bureaucratic institutional arrangements to increase collaboration between various stakeholders and better address cultural values and social goals such as community resilience (Hanna 1995; Evans and Klinger 2008). Individual and community agency in the decision-making process is a key factor in enabling resilient coastal communities (Folke 2006) while participatory governance allows resource users to become more formally and directly involved in decision-making processes and to have collective power (Jentoft 2000). Literature focusing on various forms of participatory governance such as co-management (Pomeroy and Berkes 1997), adaptive governance (Österblom and Folke 2013), adaptive co-management (Olsson et al. 2004; Armitage et al. 2009), community-based resource management (Kearney et al. 2007), and interactive governance (Jentoft and Chuenpagdee 2015) highlights the importance of power-sharing, the nesting of management activities from local to national scales, and transparency and trust in fisheries governance. Although not appropriate in all instances, the reduction of power imbalances in fisheries management through participatory governance can solve many of the problems facing global fisheries today by enabling the development of rules that support the complex goals of sustainable natural resource management (Pomeroy and Berkes 1997; Armitage et al. 2009, Cox et al. 2010; Gutiérrez et al. 2011).

Best practices for fisheries participatory governance also include regionalization in the level of focus (Österblom and Folke 2013), where the concept of community is an important aspect. Participatory governance works best when it is closely tied with the realities of social life at the community level (Kearney et al. 2007). Community is not always geographically defined, but can instead refer to a community of a specific interest group, such as participants in a particular fishery (Berkes et al. 2001, 2005). And although there can be inherent power imbalances in communities, and communities themselves do not exist as one identity, participatory governance does have formal rules that add transparency to the process and decrease existing power imbalances at all levels (Jentoft 2000).

This paper uses the Icelandic lumpfish fishery to explore how various aspects of a fishery can be considered to describe, assess, and monitor the fishery. The lumpfish fishery, like many fisheries around the world, is managed primarily for biological end goals, but the fishery contains a host of other significant cultural and economic factors that can affect the success of management outcomes. We therefore focus on human dimension indicators in the lumpfish fishery to highlight the complexity of the fishery. We have studied these dimensions through ethnographic field research and the collection of indicator data from government and industry sources. The majority of Iceland's fisheries are managed through a nationwide ITQ system, where quota is traded between species, regions, and gear types, and where management decisions are made in a top-down organizational flow (for details on Iceland's fisheries management history and structure, see Chambers and Carothers in press). The small-scale lumpfish fishery, however, has never been included in the ITQ system and therefore provides a noteworthy departure from the dominant paradigm of fisheries management and governance in Iceland.

First, we describe the current and historical cultural connections of individuals to the lumpfish fishery and focus on various socio-economic factors affecting individual participation in the fishery. Second, we analyze various indicators related to fishing communities and potential geographic variations such as permit holding, population size, landings, and processing facilities. Third, we examine how the current management and governance arrangements relate to landings trends and the overall governability and sustainability of the fishery (Jentoft and Chuenpagdee 2015). Finally, we discuss the extent to which the lumpfish fishery's social, economic and environmental goals can be incorporated into a participatory governance arrangement.

3.2 The Icelandic lumpfish fishery

The lumpfish (*Cyclopterus lumpus*) is a North Atlantic species, commonly found both in pelagic and demersal waters from Canada to Norway, and when inshore, is often found attached to rocky substrate with a specialized sucker, or sometimes in floating mats of seaweed (Ingólfsson and Kristjánsson 2002). Lumpfish come inshore from March to August to breed, after which males guard nests (Thorsteinsson 1996; Kasper et al. 2014; Kennedy et al. 2015; Kennedy et al. in press). Post-hatching movements, migration patterns, genetics and spawning behavior are all topics of current research, because many of the life history details of lumpfish are still unknown (Kasper et al. 2014; Kennedy et al. 2015; Kennedy et al. in press). The Greenlandic-Canadian population of lumpfish is considered genetically distinct

from the Baltic Sea population, and from the Iceland-Norway population (Pampoulie et al. 2014).

Lumpfish were fished seasonally for local consumption for many centuries, long before the growth of the commercial fishery, which is thought to have begun in 1927 but substantially increased in the 1970s. The Icelandic lumpfish (*hrognkelsi*) roe gillnet fishery targets spawning females (*grásleppa*) and the majority of salted roe is exported as a luxury caviar-replacement item (Figure 3.2a). The males (*rauðmagi*: “red belly”) are much smaller and have a higher fat content than the females and the flesh is considered a delicacy in Iceland (Figure 3.2b) (Kristjánsson 1985). Females are almost never consumed in Iceland except for when they are air-dried (*sigin grásleppa*: “hung lumpfish”) (Figure 3.2c).

Iceland is currently a major supplier of lumpfish roe, following the 2003 collapse of the Canadian lumpfish fishery. In recent years, Greenland has emerged as a competing supplier. Exports of salted roe have ranged from a high of 1078 metric tons in 2010, to a low of 195 metric tons in 2000, and most recently 497 metric tons in 2014. Primary importers include Sweden and Germany (Statistics Iceland 2016). Roe was traditionally extracted aboard boats and the majority of carcasses were thrown overboard, but in 2012, Iceland instituted a compulsory landing requirement leading to the development of a market for frozen gutted lumpfish in China (Saulnier 2012; Vottunarfótan Tún 2014).

The fishery is regulated by limits on consecutive days-at-sea per license holder within a specified season (from around March-August depending on the fishing area), overall limits on days-at-sea per license holder, net length limits (75,000 m per boat), mesh size limits (10.5 and 11.5 inch gillnets), specific area closures, net soak time restrictions (4 days), and boat size limits (under 15 GT) (Icelandic Directorate of Fisheries 2016). The number of boats is regulated by a limited entry permit system that began in 1987 and allows for permit merging. Permits are tied to specific fishing areas (Figure 3.3) (Icelandic Directorate of Fisheries 2011), but there are no set rules about the percentage of total permits assigned to any specific area, and a permit holder may choose any area at the beginning of the season. Fishermen may choose to begin fishing any time after the season has opened, and each permit expires after the continuous days-at-sea limit is reached. In 2015, there were 397 boats with active permits, another 20 with inactive licenses, and 37 with licenses on hold. Currently, the days-at-sea regulation is determined by the Directorate of Fisheries based on a TAC (Total Allowable Catch) recommended by the Marine Research Institute based on stock status estimations from the annual groundfish survey and projected catch-per-boat-per-day. Current research shows that lumpfish cover large distances and there may be some indications of metapopulations

based on homing behavior, but there is effectively a single Icelandic population and therefore management under one TAC is appropriate from a biological perspective (Kennedy et al. 2015).

3.3 Methods

First, to describe and contextualize the social and cultural aspects of the lumpfish fishery, we collected data from ethnographic fieldwork that included participant observation and open-ended interviews conducted from 2011 to 2013 (all ethnographic fieldwork was carried out by C. Chambers). Participant observation aboard lumpfish boats and in lumpfish on-shore processing in the North, Northwest, West, and Westfjord regions of Iceland (Lumpfish fishing areas B-E; Figure 3.3) was employed to gain firsthand knowledge and experience in the various cultural, economic, and environmental aspects of the fishery (Bernard 2006). Key informants (n=19) in lumpfish fishing and processing were then chosen for semi-structured interviews based on their knowledge of and participation in lumpfish fisheries. Semi-structured interviews explored themes of familial connection to lumpfish fishing, involvement of youth and newcomers, importance of lumpfish to rural coastal communities, and involvement of fishermen in the management process. Notes from participant observation and interviews were transcribed, translated from the original Icelandic, and inductively coded for the main research themes in Atlas.ti (Strauss and Corbin 1994; Muhr 2004; Bernard 2006). Excerpts from interviews are presented in the results to provide context for common themes that emerged through the interview process.

For the second part of the research, we sampled lumpfish fishermen as part of a larger survey project on small-boat fishermen (Chambers and Carothers in press). The survey was mailed to a random sample of individuals who, in 2013, were active lumpfish license holders. The sample included license holders from around Iceland. The survey was designed to further explore themes that emerged during participant observation and interviews and to obtain demographic information on lumpfish fishermen (see Chambers and Carothers in press for a full description of survey methods). Questions consisted of Likert scales, multiple choice, and open-ended responses, and were designed to test differences between fishermen engaged in the various small-boat fisheries in Iceland. However, the sample size of fishermen engaged only in lumpfish fishing was not sufficiently large to support statistical hypothesis tests. Therefore, descriptive statistics were used to highlight trends in survey responses. Finally, we compiled the following socio-economic indicators based on existing data from government and industry sources:

Fisheries participation: (1) number of fishing vessels, (2) number of fishing households;

Fishing communities: (3) number of landing ports, (4) number of fishing communities (defined by permit holdings), (5) landings by community and region, (6) number of fish processing plants;

Landing and economic trends: (7) quantity and value of landings, (8) landings price, (9) quantity and value of exports, and (10) Catch per unit effort (CPUE).

Because of differences in type and detail of data available, we do not present longer time series data for certain indicators (*e.g.* processing facilities, landings price) or correlate larger trends in the fishery. Instead, variations in indicator data were analyzed in relation to ethnographic and survey data to present a holistic representation of the various dimensions of the lumpfish fishery.

3.4 Results

3.4.1 Cultural connections and fisheries participation

Lumpfish are present in a wide range of historical and cultural references and practices in Iceland. Around the country there are multiple place names associated with lumpfish fishing, and several sources show that from the 1700s there was detailed knowledge on fishing techniques and even rules in place to manage the amount of fish each person could take (Kristjánsson 1985). Varied fishing methods existed, including nets, hook and line, and a specialized spear. Women and children would wade out from the beach to spear lumpfish, and this practice became known as “fishing on foot” (*að fiska undir fæti*). The fish were dried, cured, salted, grilled, or made into a cheese, mainly for local consumption. In some areas, the skin was used for shoes because of the toughness of the skin, a practice that lasted until 1915 (Kristjánsson 1985). Many traditional and modern songs and poems reference lumpfish, and there is even a legend that says as Jesus Christ and his disciple Peter walked by the beach, Jesus spat into the ocean and it became a male lumpfish, and Peter’s spit became a female lumpfish. There is a common belief that if a female lumpfish is seen in shallow waters there will be a storm, and a person is said to be particularly lucky if a lumpfish swims up to one’s fishing hook. The fishery also plays a central role as a symbol of tradition and simplicity in

the novel *The Fish Can Sing* (*Brekkukotsannál*) by Iceland's Nobel Prize winning author Halldór Laxness. In it, one character says:

I have often pictured to myself at home the romance of [the farm]... how the lumpfish hangs from the spars in the fish-shed, pair by pair. [...] I am absolutely certain that here dwells the true Iceland: the national soul, the national anthem, Oh, God of Our Land. [...] No lumpfish is so good as hung lumpfish. My father always keeps hung lumpfish in the room where he sleeps. I sometimes sneak down to the cellar for a bite of it. To tell you the truth, I don't think there is any other food than hung lumpfish. (Laxness 2008, 153)

Lumpfish remains a central part of the identity of many rural villages in Iceland today. The male lumpfish is culturally significant as a herald of spring and there was a common saying among key informants, "Life is lumpfish" (*Lífið er grásleppa*), which is a paraphrase of a more common saying "Life is saltfish." Our ethnographic data suggests that, for what has always been a short, seasonal fishery, lumpfish fishing maintains the status of "life" through associations with fun, family connections, and community pride. For example, survey respondents were asked to identify what they felt was their primary fishery and why. For those who identified lumpfish as their primary fishery, descriptions of fun and family connections to the fishery were very common, such as: "This is a fun way of fishing," "I grew up doing this," "You could say I inherited it," and "I am a lumpfish man by nature." In fact, the term "lumpfish man" (*grásleppukarl*), referring to the female name of the species, is notable because few other fisheries in Iceland identify their participants by the target species. In most other fisheries, one is simply a "fisherman" (*sjómaður*).

Lumpfish fishing is often considered a very different kind of fishery compared to the ITQ fisheries in Iceland, and this is partly because it is a seasonal roe fishery, and partly because many of the individuals engaged in the fishery are not full-time fishermen. Of those lumpfish license holders who fished in 2013, survey results show that close to one third were not engaged in other fisheries and those individuals reported that a median of 20% of their yearly income was from fisheries (Table 3.1). However, many fishermen who engage in other small-boat fisheries have experience in the lumpfish fishery. Of the 164 small-boat fishermen sampled in the survey, 63% had participated in lumpfish at some point in their fishing careers (Table 3.2). The survey did not purposely sample individuals who were crew members only,

but of those respondents who had small boat crew experience, 59% had experience as a lumpfish crew member at some point in their fishing careers (Table 3.2).

The high percentage of small boat fishermen with experience in lumpfish, combined with interview data suggest lumpfish fishing provides for training, learning, and involvement of youth in ways that other fisheries do not. Key informants noted that lumpfish fishing presented a way to pass down knowledge and skills and, as noted above, a large percentage of small-boat fishermen obtain experience as lumpfish crewmembers. Informants described that as quota fishermen increasingly operate their businesses with considerations of cost as the bottom line, the space and time for extra crew – who might make novice mistakes, require pay, gear and safety training, and simply take up room on board – has dwindled. But, because lumpfish fishing is often carried out close to shore, and on day-trips with small crew numbers, novices and family members are more welcome to take part in crew activities.

Although many informants and survey respondents stated that there are opportunities for gaining experience through lumpfish fishing, they also expressed a common concern over increasing barriers for youth and newcomers (Chambers and Carothers in press). When asked the question “Would you advise a young person to enter your fishery?” survey respondents engaged in the lumpfish fishery more often answered “yes” compared to those engaged in other small-boat fisheries, but were nonetheless split on why or why not (Figure 3.4). Those who would advise a young person to enter the lumpfish fishery commented on the cultural values attached to the fishery, such as fun, pride, and familial history. Those who answered “no” stated that the decreasing season length, increased cost of boats, and low roe prices did not make the fishery viable overall (see also Chambers and Carothers in press). For example, in 2009, the price of small boats tripled as the demand increased with the introduction of a new quota-free season called *strandveiðar*. Many informants felt that this made it difficult for new lumpfish boats to start up since the lumpfish permits are most often sold along with a boat.

Lumpfish permits exist in perpetuity, but need to be activated every year before the season begins. For example, there are currently 36 permits that have not been used since 2010 or before, including four that have not been used since 1997–98. Although limited license permits were put into place in 1987, reliable records on the number of boats fishing each season only date back to 1997. Since 1997, participation has fluctuated from a high of 369 boats in 2011 to a low of 144 in 2007 (Figure 3.5). A typical boat has a crew of one or two fishermen plus the captain, but many times two captains will fish together on one boat, and then switch to the other boat, so there is significant overlap of individuals between boats. For

example, it is estimated that 650 individuals took part in the 2015 lumpfish fishery (Halldór Ármannsson pers. comm.). But because permits are tied to boats, official time series data for numbers of fishermen have not been collected. As a proxy for the number of individual fishermen, we developed an indicator of the number of fishing households based on the number of unique addresses listed in the boat license database. Based on data from 2007–2015, it is estimated that in any given year, 4–21% of all lumpfish households are multi-permit households (Figure 3.5).

The anticipated price of roe is thought to be the key predictor of the decision for a license holder to activate his license (Ólafsson et al. 2011; Marine Research Institute 2013). Our compilation of indicator data suggests that roe price and boat number indicator data follow similar trends (Figure 3.6). In 2011, for example, 369 boats took part in the lumpfish fishery when the roe price at the start of the season was 1050 Icelandic Kronur (ISK)/kg for the second year in a row (all roe prices are nominal and not standardized to reflect inflation). In contrast, in 2007, only 144 boats participated in the fishery when roe prices were 220 ISK/kg (Figure 3.6). Using landings data, we found that from 2008–2015, there were 80 boats that fished lumpfish every year (data from Icelandic Directorate of Fisheries 2016, organized by J. Kennedy). Similarly, there have never been fewer than 144 participating boats since official recording began, and informants felt that, because of cultural connections to the fishery, there will always be a certain small number of fishermen who fish lumpfish every year even with poor prices. However it is possible, given lower prices than those observed in 2007, that participation could fall further in the future. Nevertheless, even though the 2016 price (120 ISK/kg) was the lowest in recent history, 163 boats chose to activate licenses.

3.4.2 Fishing communities

Small-boat fisheries are particularly important to rural communities (Benediktsson and Karlsdóttir 2011; Chambers et al. in press) and lumpfish fisheries are no exception. In 2015, the majority of permits (60%) were registered to addresses outside the capital area in communities with fewer than 500 residents (Table 3.3) and the ten ports with the highest landings of lumpfish were located in rural areas (Table 3.4). When the number of permits held by community is standardized by population, it is possible to see the relative importance of the fishery to specific communities (Table 3.4). For example, in 2015, the community of Drangsnes had the third highest lumpfish landings (Table 3.4), but with a small population size, Drangsnes residents held the most permits per person (Table 3.5).

The number of communities that report lumpfish landings and that hold lumpfish permits fluctuates over time (Table 3.6), but there are several communities such as Drangsnæs where participation in lumpfish fisheries is nearly constant. Drangsnæs was of particular importance during the ethnographic interviewing and participant observation phases of this research, as there is an exceptionally widespread and special pride in the identification with lumpfish and relatively high permit holdings and landings as discussed above. As informants noted, “They say that people invented the lumpfish fishery here in Drangsnæs,” and “Everybody knows the best lumpfish are in Húnaflói Bay.” Tagging data suggests that the west coast of Húnaflói Bay (fishing area D, Figure 3.1) where Drangsnæs is situated appears to be one of the most important areas for lumpfish, along with Stykkishólmur in fishing area B and Raufarhöfn in fishing area E (Kennedy et al. 2015). Although these places are lumpfish hotspots with good breeding grounds, landings by area do not necessarily mirror population abundance and can vary slightly by year (Figure 3.7). For example, the greatest percentage of the total landings is often in fishing area E, but in 2010, landings were highest in area B (Figure 3.7).

Permit ownership is not tied to community, so a permit can be held by a community member residing in one fishing area, but be valid for a different fishing area, and there are no limits on the number of permits allowed to be assigned to any specific fishing area. Therefore, after the high landings in area B in 2010, many fishermen chose to move their permits to area B in 2011 (Figure 3.8). Other than this example, however, there are no identifiable trends in the percentages of permits *assigned to* particular areas from 2007–2015. The percentage of permits *held by* fishing area also remains relatively stable (Figure 3.9), indicating that the presence of the permit flexibility allowances does not affect the concentration of permit holding by larger urban communities or the concentration of fishing activity by fishing area.

Processing is also a major part of the importance of lumpfish to communities. Especially after the landing of the whole fish became mandatory in 2012, the link between lumpfish fishing and onshore processing has grown stronger through the creation of new land-based processing jobs (Saulnier 2012, Vottunarfótan Tún 2014). These extra onshore jobs add to the excitement around the lumpfish season, as the following informant explained:

Lumpfish is different, everybody wants to have fun and I want to be around people after the winter. It's nice, everybody gets excited and they hire more people during this time. (Processing plant employee, Drangsnæs, 4 April 2012).

Long-term data do not exist for the number of processors in either roe or frozen lumpfish, but it was estimated that in 2015 there were 10 large and 5 small processing companies that worked on lumpfish. Records from 2016 indicate that there are 19 lumpfish processors in 13 communities (Figure 3.10).

3.4.3 Landing and economic trends, management and governance

Although indicators for participation by community do not show major fluctuations, total lumpfish landings have varied greatly, from a high of 12,000 metric tons of whole body mass in 1984 to a low of 2,500 metric tons in 2000 (Marine Research Institute 2015) (Figure 3.11). For data obtained prior to the mandatory landing of the whole body, whole body mass is calculated by multiplying roe mass by four (Vottunarfostan Tún 2014). In 2010, lumpfish landings were 8,000 metric tons, the highest since 1987 and 50% more than in 2009. Because the fishery is primarily for export, the variations in the value produced in the fishery are tied to the amount landed (Figure 3.11), and the export quantity varies with landings (Figure 3.12). However, the increased export of whole frozen bodies has not created a significant change in the overall value of lumpfish export (Figure 3.13) or an increase in landings (Figure 3.11).

The biomass index and CPUE for lumpfish fluctuate as well. The biomass index increased from a low in 2000 until 2007, and then showed a decreasing trend until 2013. Similarly, CPUE reached a high in 2007, a low in 2011, and has been on an upward trend since (Marine Research Institute 2015) (Figure 3.14). There was some cause for concern with decreasing biomass and CPUE from around 2007–2013, but overall the lumpfish fishery management system is generally thought to have realized good outcomes (Vottunarfostan Tún 2014). The fishery performance is evaluated through the biomass index and the management goal is to keep fishing mortality (F_{proxy}) below the average from the reference period 1985–2011. The Marine Research Institute then recommends a TAC based on the calculation of fishing mortality; this TAC is then converted to days-at-sea by the Directorate of Fisheries. The days-at-sea limit decreased in 2013 from 50 to 32 days because the 2012 landings far exceeded the Marine Research Institute's recommended TAC (Vottunarfostan Tún 2014).

The lumpfish fishery is different from all other small-boat fisheries in Iceland because the season does not involve large boats and the resource itself is not formally accessed in another season or fishery (although there can be bycatch of lumpfish in trawl fisheries). Small-boat interests therefore have sole influence in the fisheries management decisions. The Marine Research Institute and Directorate of Fisheries give official advice and set regulations,

but the National Association of Small-Boat Owners (NASBO) has a strong consultancy status in the decision-making process. There is a fishermen's lumpfish committee with representatives from all over Iceland, and this group plus the NASBO representatives actively participates in international meetings with producers and buyers, and hold discussions on fishing and regulatory advice with the Marine Research Institute and the Directorate of Fisheries (Vottunarstofan Tún 2014). The major concern for NASBO is the roe price, which has been low for several years. In fact, NASBO requested a reduction from 32 to 28 days-at sea in 2014, out of concern that large landings volumes could flood the market with roe and further depress price and earnings for the fishermen and communities that rely on lumpfish fisheries. However, this recommendation was not accepted by the Directorate of Fisheries.

Despite being represented by the NASBO, survey results suggest that lumpfish fishermen are no different from other small-boat fishermen in feeling disengaged from the management process (Chambers and Carothers in press). Based on ethnographic data, we suggest that the low satisfaction with management is an overall reaction to the ITQ system and the governance arrangement in Iceland, rather than a reflection of the specifics of the lumpfish fishery itself, and that because of the small number of fishermen engaged solely in the lumpfish fishery, it was not easy to differentiate satisfaction or dissatisfaction with management of the lumpfish fishery from overall dissatisfaction with the management of ITQ fisheries. In addition, there is an ever-present concern that lumpfish will be incorporated into the ITQ system and a sense of loss of control that was present in interviews and surveys responses. As one key informant said:

There are some folks who want there to be lumpfish quota. I think they just want to make money... hope it will never happen. They just want to sell the quota. The people don't have control over lumpfish anymore.

The feeling of decreasing control is related to the low roe price, worries about the assimilation of lumpfish into the ITQ system, and also external pressure caused by the recent Marine Stewardship Council (MSC) certification (Vottunarstofan Tún 2014). The 2015 season was the first year the fishery had been MSC certified, and to comply with certification guidelines, the fishery must not go over the TAC recommended by the Marine Research Institute. As one fisherman put it, with MSC, "it's like we're almost into quota now." This increased emphasis placed on adhering to a TAC through days-at-sea regulations is troubling to many fishermen because of the perceived lack of knowledge regarding lumpfish

population dynamics. Lumpfish exhibit both demersal and pelagic behavior (Kennedy et al. 2015), so fishermen question the methods used by the Marine Research Institute to estimate TAC that are based on trawl surveys. Lumpfish is not considered a key Icelandic marine ecosystem species (Valdimarsson and Jónsson 2007), however, as one fisherman said, “Even little lumpfish is far too complicated to isolate to one type of science.” Many fishermen expressed interest in collaborating more with scientists and sharing their knowledge.

3.5 Concluding discussion

The lumpfish fishery is one example of a culturally and historically significant fishery that continues to play an important part in individual fishermen’s identity and the local identity of many fishing villages in Iceland. The individual decision to participate in the lumpfish fishery in any given year is heavily influenced by roe price. However, there is a core group of people strongly connected to this fishery as an intrinsic part of their lifestyle. Although there is always uncertainty related to global markets and environmental fluctuations, motivations other than monetary gain, such as community pride and tradition play a strong role in the decision to participate in the fishery.

The lumpfish fishery does not factor highly in overall landings or fisheries-generated revenue in Iceland, but does contribute to local identity, autonomy and access to fisheries resources. Lumpfish could therefore be considered a cultural keystone: a species of particular importance to the social system of a community and cultural identity (Poe et al. 2014, Garibaldi and Turner 2004). Although the concept of cultural keystone species strays from the ecosystem based fisheries management model, it is also helpful in considering that not all marine resources are equal, and that social-ecological systems have differential meanings attached to specific resources (Broch 2013). Indicator data showed that permit ownership remains local and although landings fluctuate by area and time, permits have not accumulated in urban areas over time. Lumpfish fishing therefore stays tied to place, because of resource availability and the distribution of the fish stock, and because of the continuation of permit holding by local residents based on cultural ties to the fishery. Cultural keystones like lumpfish therefore demand key consideration in management models.

Permit holding can be an important predictor of community and individual resilience (Lowe 2011; Broch 2013). The most resilient coastal communities may be those that diversify outside of fisheries (Magis 2010), however, the continued local access to marine resources can provide an important economic buffer and provide continued autonomy for communities whose cultural and historical identities are intimately linked with fisheries. As

discussed above, although lumpfish fishing is not generally understood to be an entry-level fishing opportunity because the start-up costs can be prohibitive, it can still provide important continued access to marine resources for crew members and part-time fishermen in coastal communities. Access rights to the majority of fisheries in Iceland continue to consolidate in the ITQ system, so Iceland's small-scale, non-ITQ fisheries like lumpfish offer a certain flexibility for those who rely on fisheries for part-time or seasonal income. When permit holders choose to activate their license, they bring added income to their families and extra activity to processing facilities in local communities. While access to lumpfish can be a source of resilience through additional income to fishermen and communities, flexible livelihood strategies for resilience must not only consider economic options. Lumpfish fishermen also build the resiliency of their communities when they have the flexibility to participate in a fishery that provides access to a culturally important livelihood activity, for themselves and for the next generation.

Sustainable fisheries management is contingent upon multiple factors and is inherently connected with a flexible governance arrangement. The lumpfish fishery is the closest thing to participatory fisheries governance in Iceland and a good example of the possibility of well-controlled fisheries, particularly in small-scale fisheries where participation is only partially driven by economic concerns. Interview and participant observation data suggest that respondents see more opportunities for lumpfish fishermen to be involved in the management process than for ITQ fishermen to be involved in the management process. At the same time, current fishermen wish to have their ecological knowledge and opinions on how to manage the fishery better considered in management decisions. Although it is difficult for the Marine Research Institute to have control over total fishing effort since they do not know who will be fishing before the season starts, the days-at-sea regulation appears to be successful. However, a more flexible form of participatory governance would serve both fisheries managers and fishermen alike by creating a decision-making platform that could respond to uncertainties in lumpfish roe markets and fishermen boat participation with increased collaboration between fishermen and the governing body. Several factors known to be associated with successful participatory governance scenarios are already present in the Icelandic lumpfish fishery such as multiple knowledge systems, clear property rights, and a small-scale fishery (Armitage et al. 2009), thus a more clearly formalized participatory governance structure would serve to further minimize uncertainty and foster collaboration.

By focusing on the lumpfish fishery in Iceland, this research has shown the complexity of the social, economic and environmental aspects of a single fishery. The data presented in this paper lay the groundwork for the development of further indicator metrics for the lumpfish fishery. A number of data gaps exist for human dimension factors in the lumpfish fishery, such as: number of full and part-time fishermen and crew, income or individual earnings, and processors. Additionally, the establishment of long-term data sets based on qualitative data would aid in measuring certain aspects of community well-being and resilience that can be important factors in assessing the performance of a fishery. Although this research has focused on a specific fishery because of its distinct management arrangements, the majority of lumpfish fishermen are engaged in other fisheries and no fishery exists in a bubble. Considering lumpfish alone in a single species management approach is in contrast with the trend and call for ecosystem-based fisheries management. Over time, the complex metrics presented here should be collected for a broader range of fisheries and communities in Iceland and included in ecosystem based fishery management considerations or other forms of sustainable fisheries management that include concepts of linked social-ecological systems. Understanding the interplay of social and environmental factors and their related management end goals and governance process is crucial in supporting truly sustainable fisheries in complex marine socio-ecological systems.

3.6 Acknowledgements

Thank you very much to the community members, fishermen and their families in Iceland who participated in various phases of this research. We are grateful for the cooperation of James Kennedy, Halldór Ármannsson, and Jacob Kasper. The authors also thank Andrey Petrov, the organizer of the Arctic-FROST (NSF PLR #1338850) annual meeting and early career scholars workshop in St. Petersburg, Russia in 2015 where this paper was first presented. This research was supported by the National Science Foundation Arctic Social Sciences Program (Award #1304681), the National Science Foundation Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS) Integrative Graduate Education and Research Traineeship (IGERT) program (Award #DGE-0801720), the Fulbright Student Program, and the Leifur Eiríksson Foundation Scholarship.

3.7 Figures

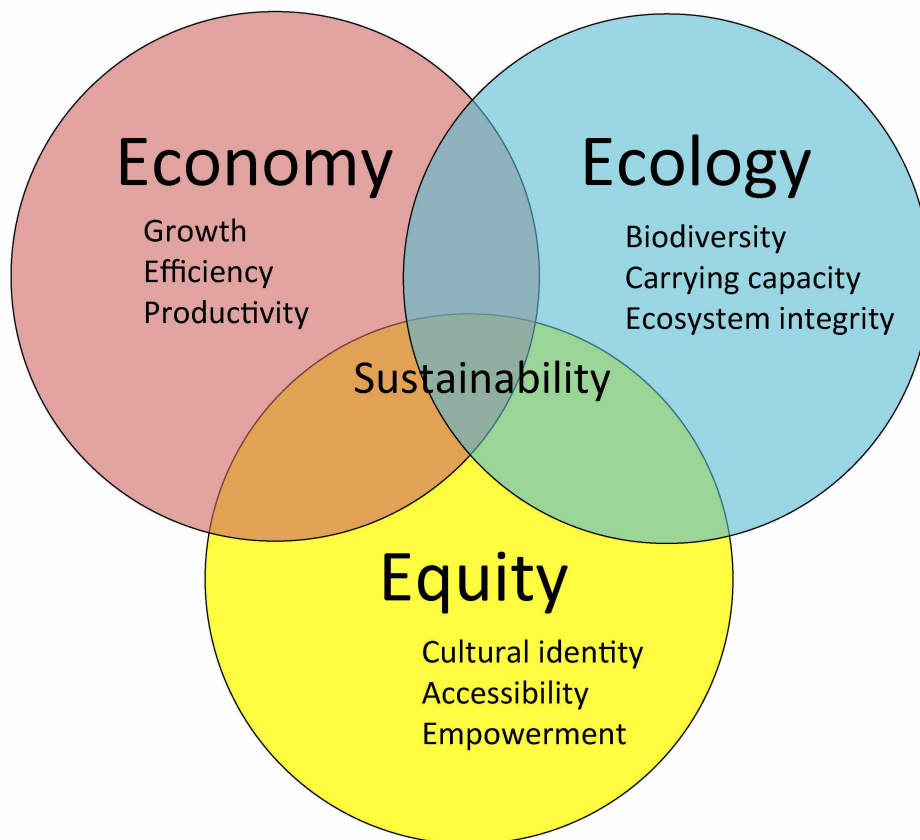


Figure 3.1: The triple bottom line, or 3 “E’s” of sustainability. Modified from UN World Commission on Environment and Development (1987).

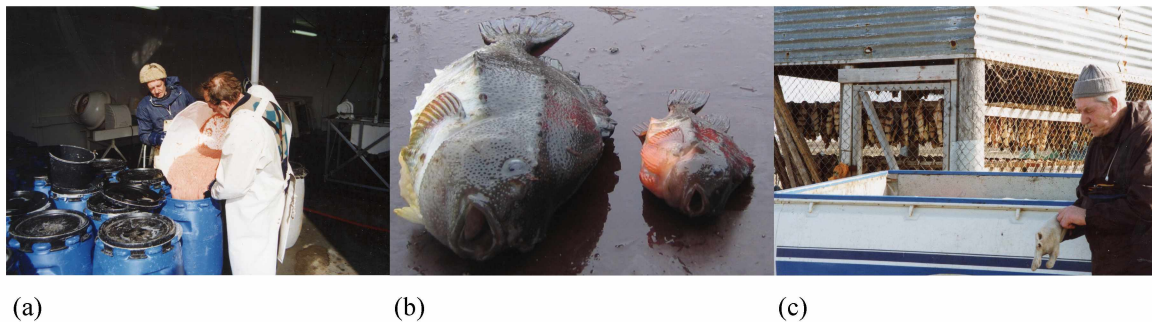


Figure 3.2: (a) Barrels of salted roe, Photo: Ó. Bernódusson, Ljósmyndasafn Skagastrandar. (b) Sexual dimorphism in lumpfish, Photo: National Association of Small-Boat Owners. (c) Hung female lumpfish, Photo: Ó. Bernódusson, Ljósmyndasafn Skagastrandar.

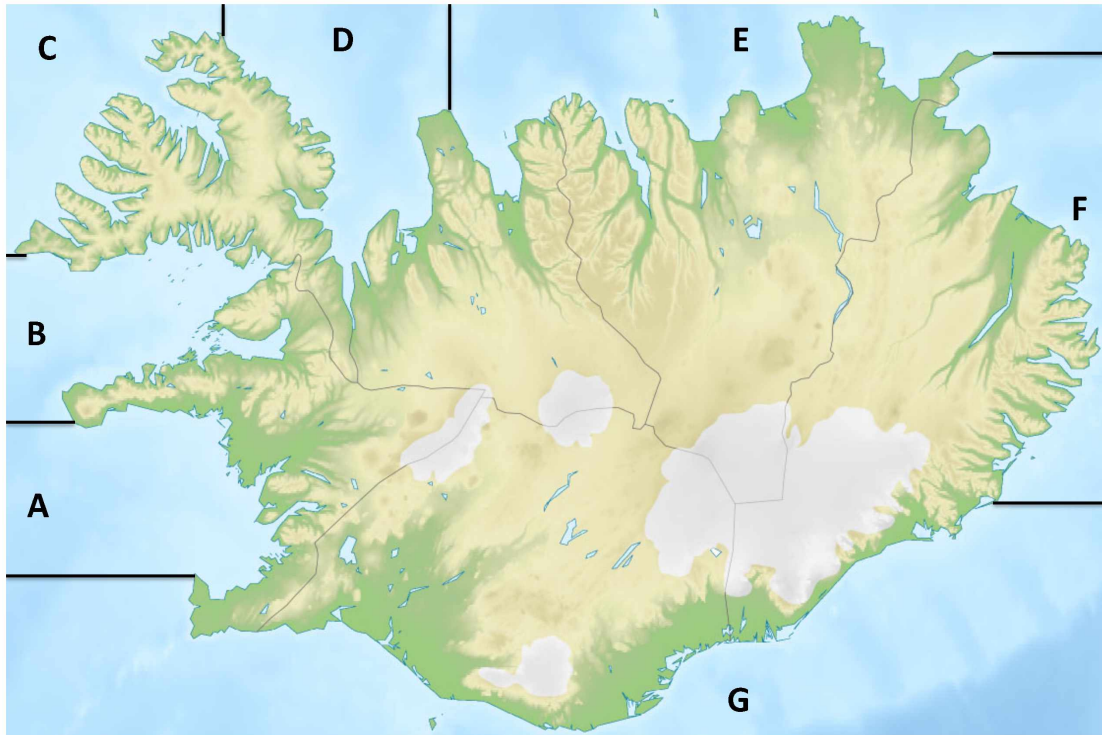


Figure 3.3: Lumpfish fishing regulatory areas, map modified from the Icelandic Directorate of Fisheries (2016).

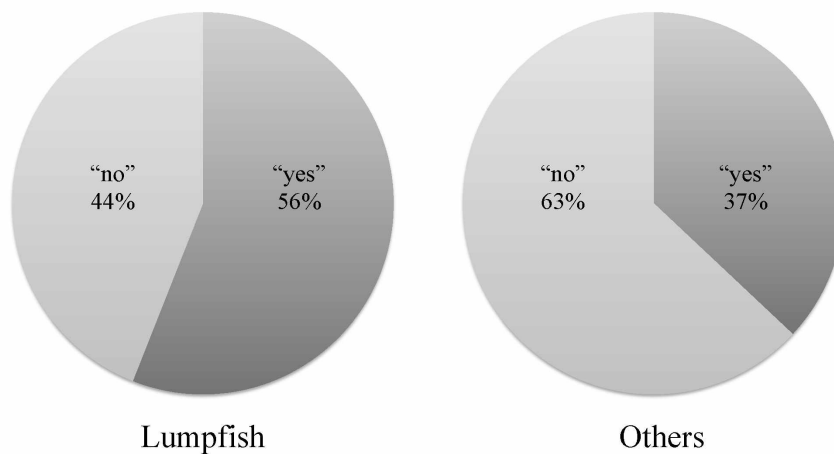


Figure 3.4: Lumpfish fishermen (both lumpfish only and combined with other fisheries) compared to non-lumpfish fishermen response to “Would you advise a young person to enter your fishery?” (Pearson $\chi^2 = 7.2556$, $p = 0.007$)

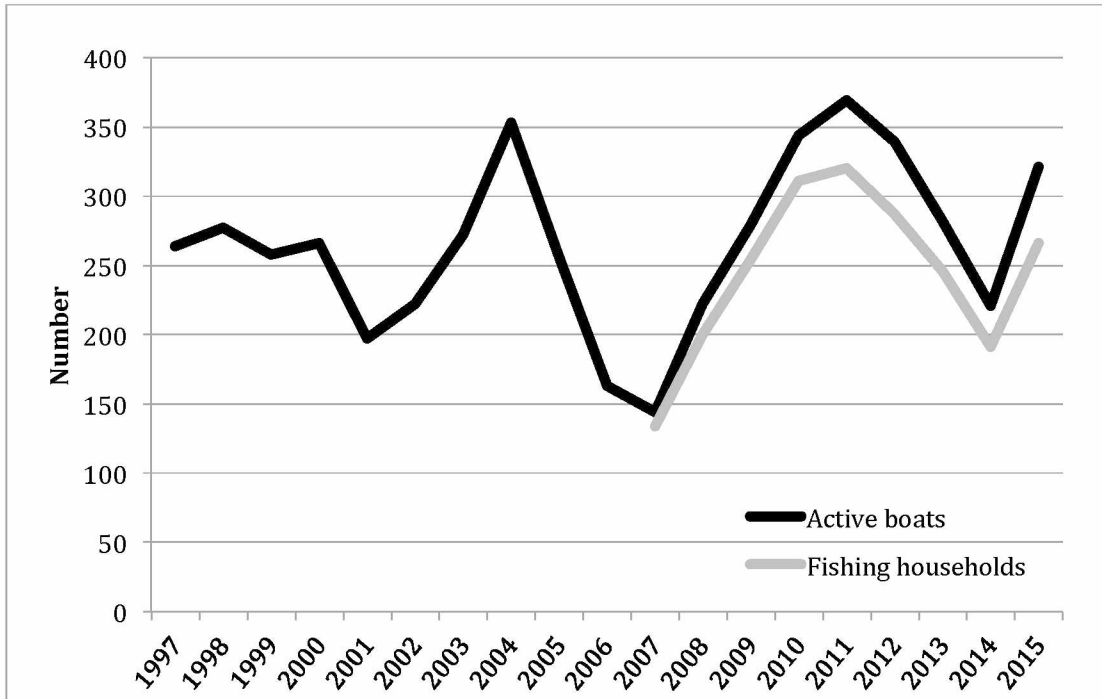


Figure 3.5: Number of boats participating in the lumpfish fishery, 1997–2015 (data from Marine Research Institute 2015 and Icelandic Directorate of Fisheries 2016).

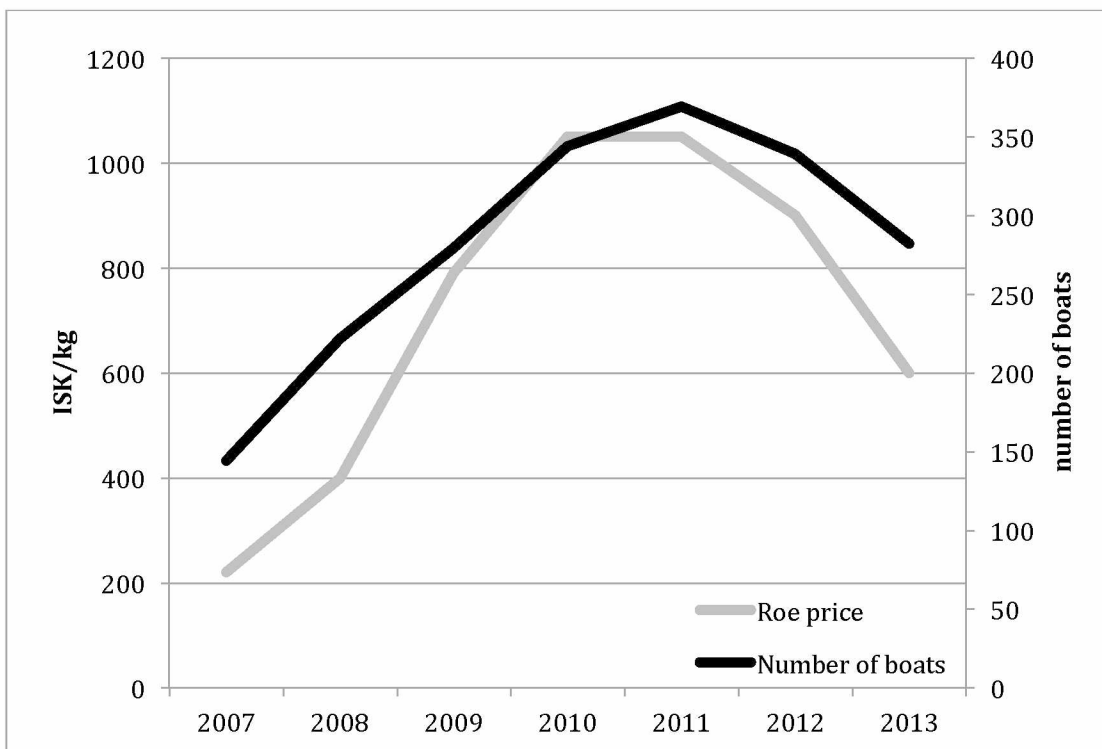


Figure 3.6: Number of boats and price of roe in Icelandic Kronur(ISK)/kg, 2007–2013 (data from National Association of Small-Boat Owners 2016).

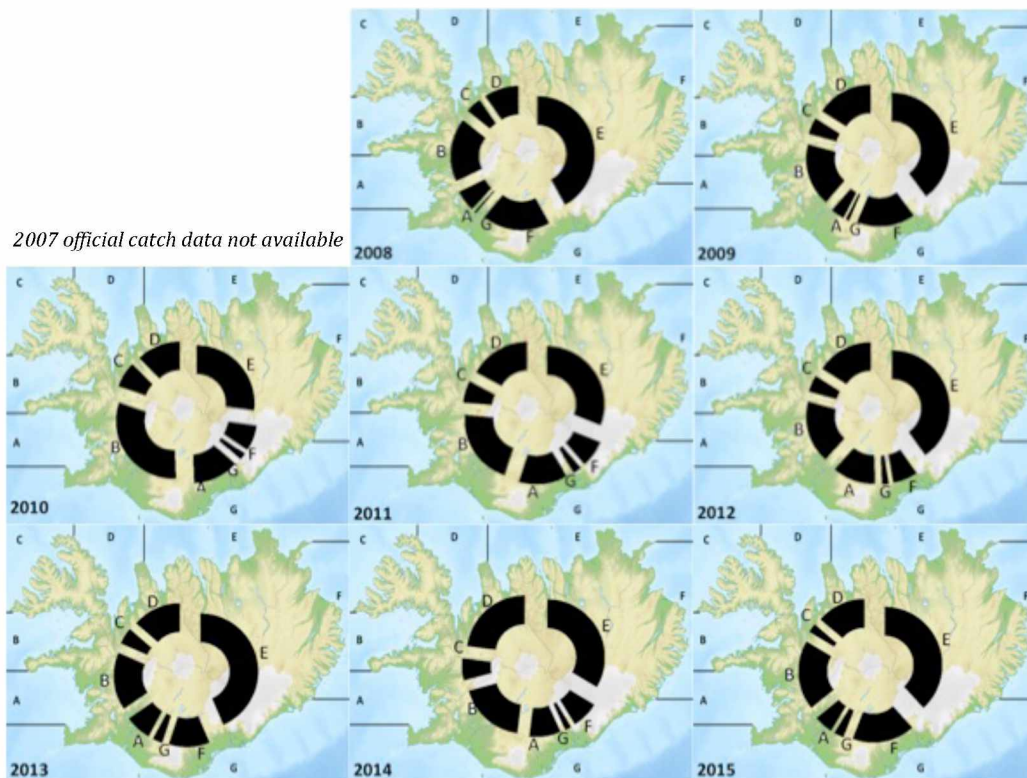


Figure 3.7: Percentage of landings by fishing area, 2007–2015 (data from Icelandic Directorate of Fisheries 2016, organized by J. Kennedy).

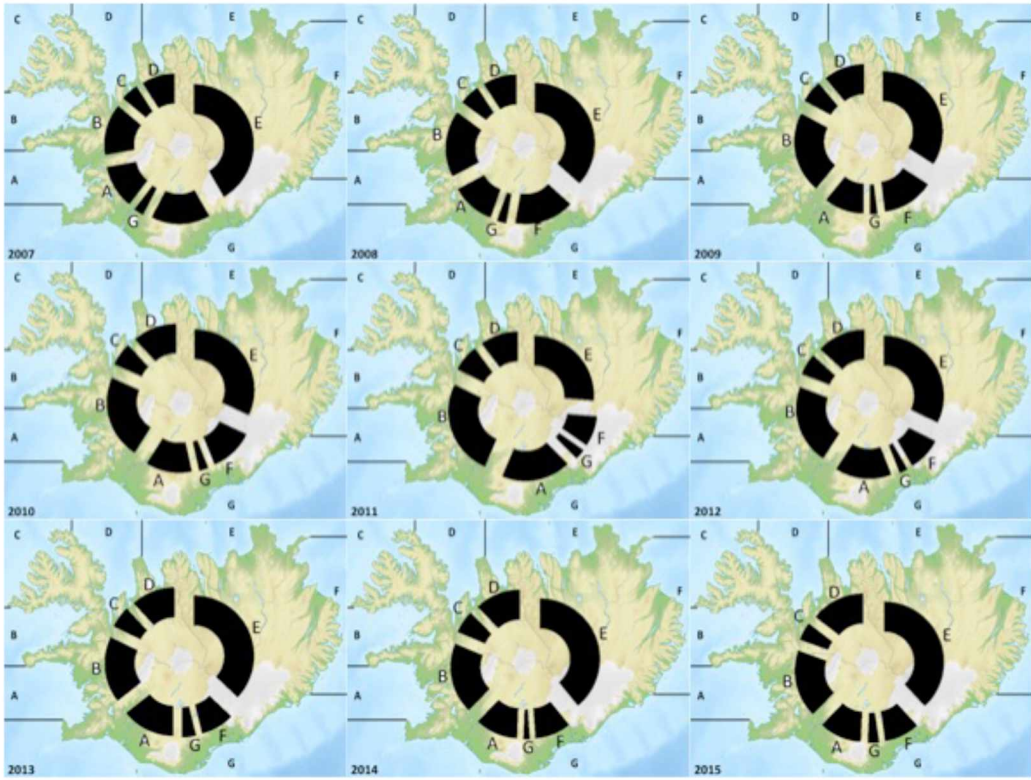


Figure 3.8: Percentage of permits assigned to fishing areas, 2007–2015 (data from Icelandic Directorate of Fisheries 2016).

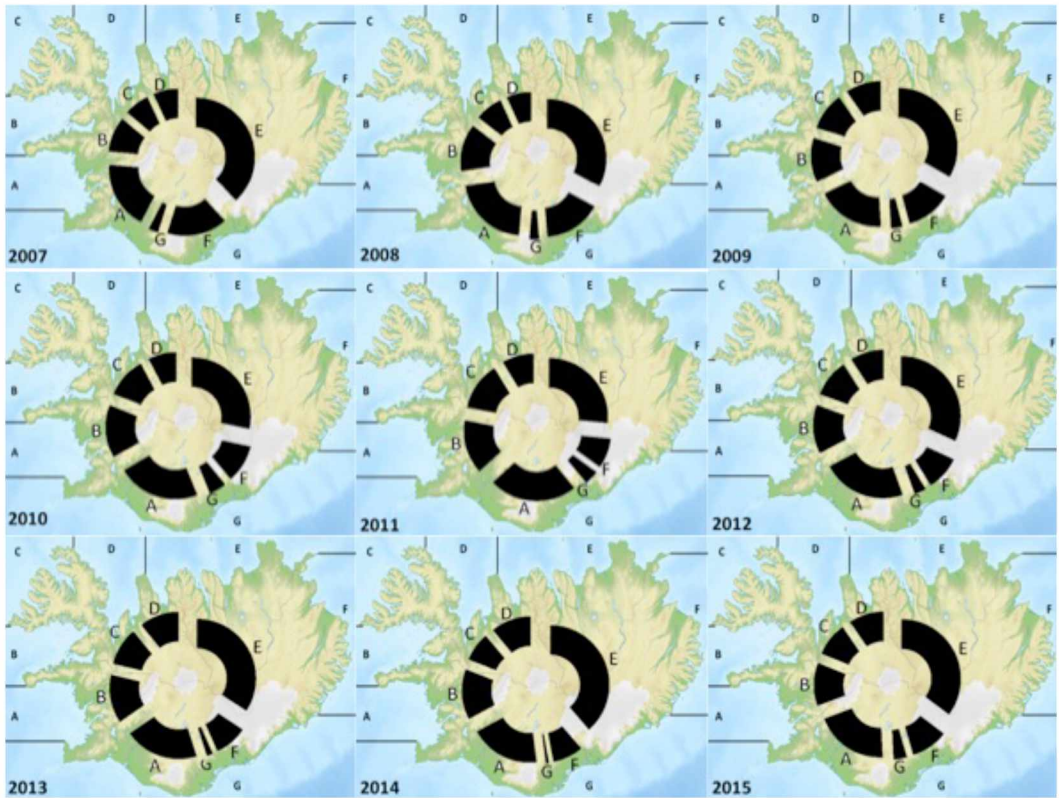


Figure 3.9: Percentage of permits held by fishing areas, 2007–2015 (data from Icelandic Directorate of Fisheries 2016).

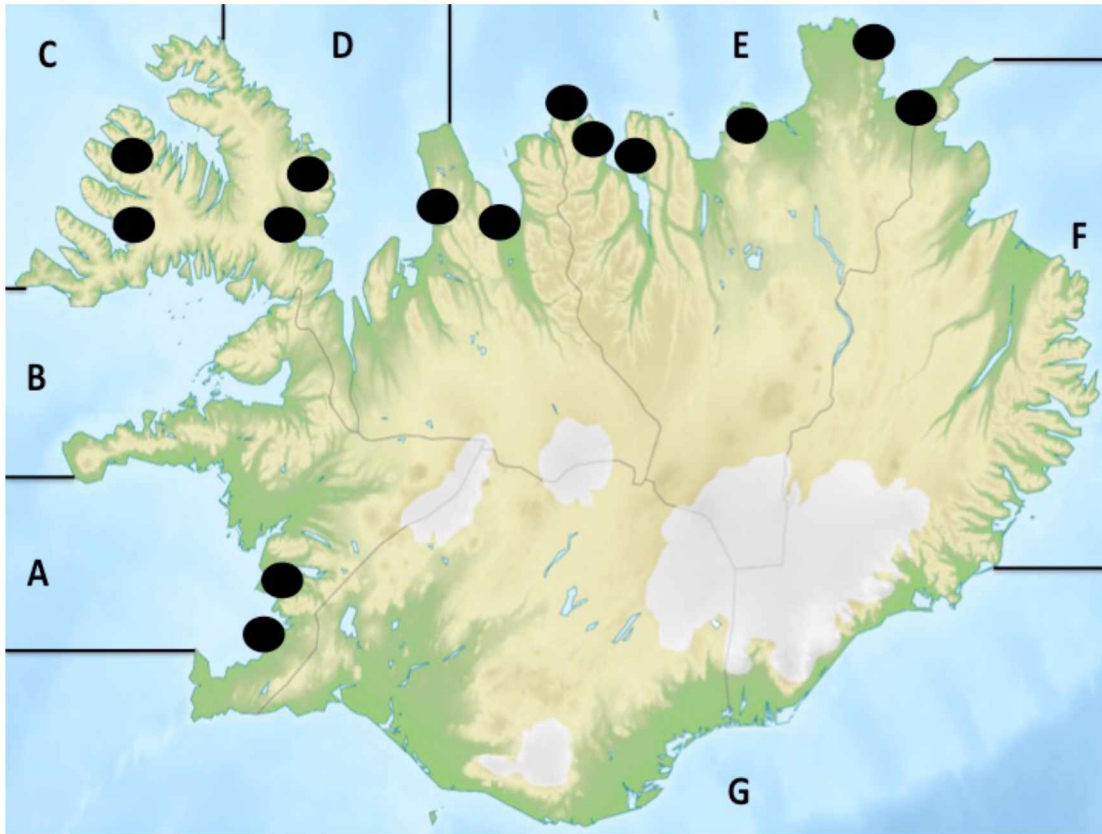


Figure 3.10: Lumpfish processing plants, 2016 (data from Icelandic Food and Veterinary Authority, 2016).

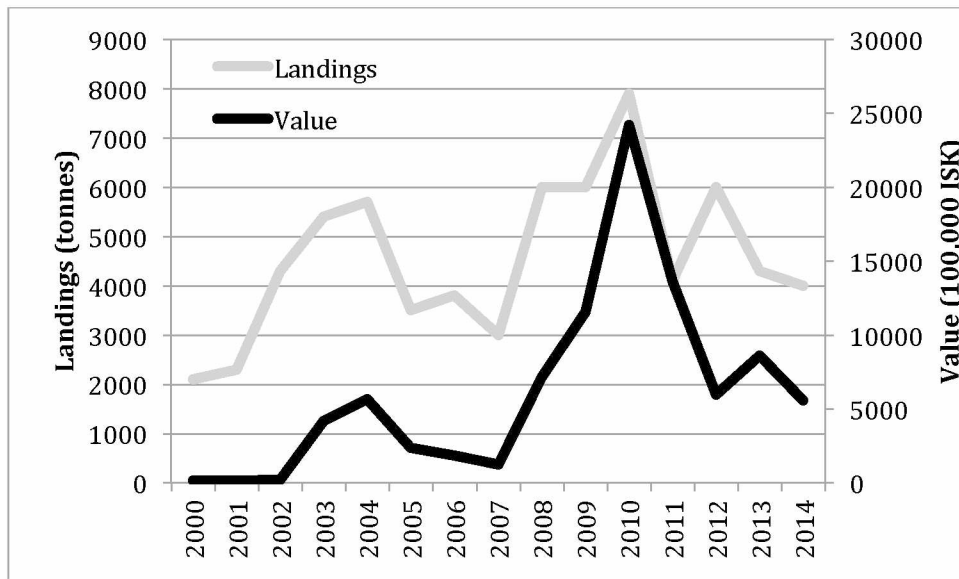


Figure 3.11: Landings and value (Icelandic Kronur: ISK) in the lumpfish fishery, 1990–2014 (Statistics Iceland 2016).

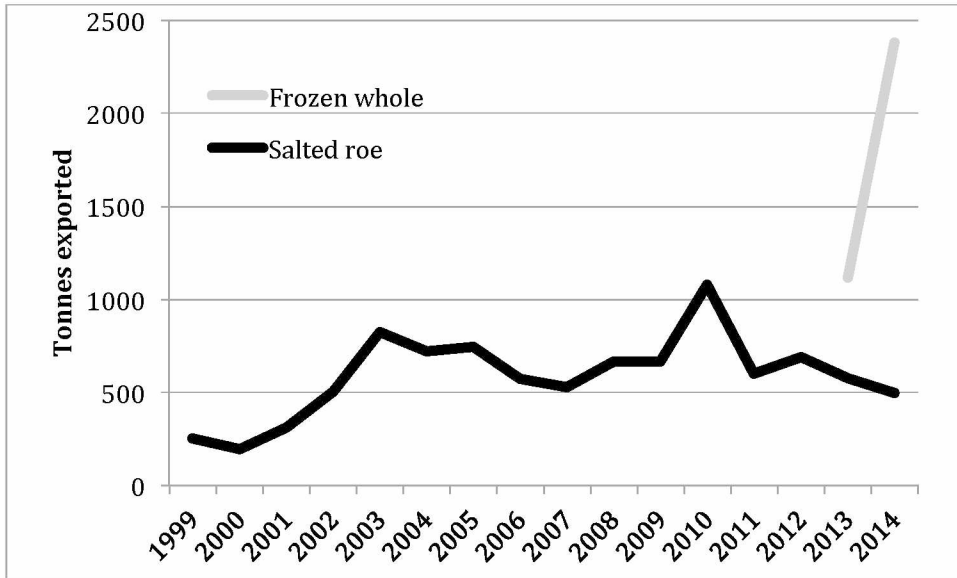


Figure 3.12: Export in metric tons of whole frozen lumpfish and salted roe, 1999–2014 (Statistics Iceland 2016).

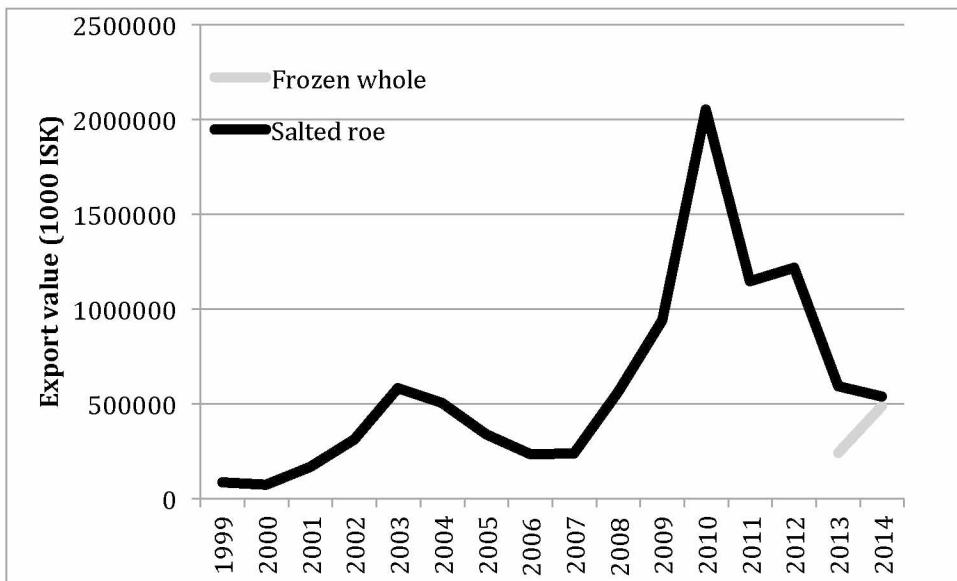


Figure 3.13: Export value of whole frozen lumpfish and salted roe (Icelandic Kronur: ISK), 1999–2014 (Statistics Iceland 2016).

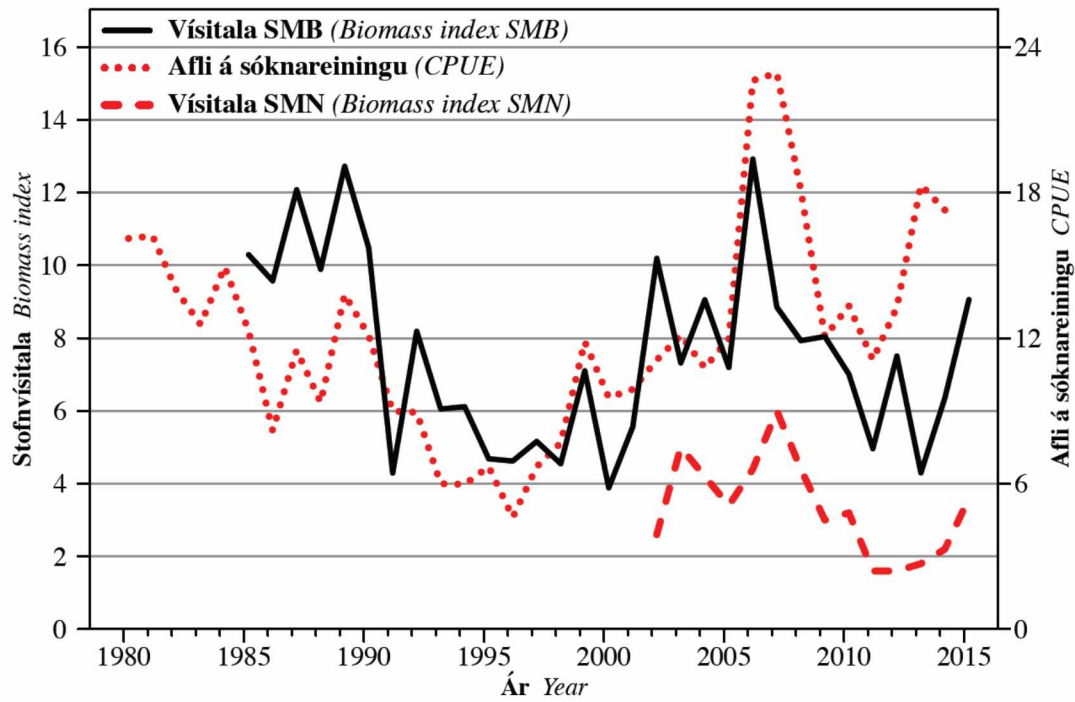


Figure 3.14: Female lumpfish biomass indices from the groundfish survey (SMB) and gillnet survey (SMN) and CPUE (Catch Per Unit Effort) in the female lumpfish fishery, 1980–2015 (reproduced from Marine Research Institute 2015).

3.8 Tables

Table 3.1: Engagement of lumpfish survey respondents in other fisheries

Fishery	% of lumpfish fishermen	Mode % income from fisheries
Lumpfish only	23	20
With large boat	23	100
With quota-free “ <i>strandveiðar</i> ” season	27	60
With small-boat ITQ	15	100
With small-boat ITQ and quota-free “ <i>strandveiðar</i> ” season	13	60

Table 3.2: Survey response regarding lumpfish fishing participation

	Number
Total lumpfish permit holders 2013	431
Total lumpfish boats that fished in 2013	282
<u>General survey response</u>	
<i>Total number respondents</i>	<i>164</i>
Those who have ever fished lumpfish	103 (63% of survey respondents)
Total number 2013 lumpfish permit holders	71 (43% of active lumpfish boats in 2013)
Those with lumpfish crew experience	23 (59% of those with crew experience)

Table 3.3: Number of communities by population size with lumpfish permits in 2015 (data from Statistics Iceland 2016)

Population	# of communities with 2015 lumpfish permits
Under 50	8
50-150	11
150-500	14
500-1000	11
1000-5000	9
Over 5000 (greater capital area)	6

Table 3.4: Top 10 lumpfish landing communities (data from Icelandic Directorate of Fisheries 2016).

Harbor	Metric tons landed in 2015
Stykkishólmur	650
Vopnafjörður	488
Drangsnes	469
Raufarhöfn	455
Bakkafjörður	428
Siglufjörður	364
Húsavík	353
Bjánslækur	299
Kópasker	277
Skagaströnd	224

Table 3.5: Top 10 lumpfish permit communities for 2015, standardized by population size (data from Icelandic Directorate of Fisheries 2016 and Statistics Iceland 2016).

Community	2015 # permits	2015 # permits per 100 individuals over age 15
Drangsnes	10	17
Bakkafjörður	10	14
Norðurfjörður, Gjögur & Djúpavík	5	10
Kópasker	9	9
Árskógssandur	7	8
Raufarhöfn	13	8
Grimsey	4	7
Borgarfjörður eystri	4	5
Patreksfjörður, Hjarðarnes, Bjánslækur & Barðaströnd	26	5
Hólmavík	13	5

Table 3.6: Number of communities with lumpfish permits held and presence of landings 2007–2015.

Year	# communities with permits	# communities with landings
2015	55	49
2014	46	40
2013	55	45
2012	59	48
2011	63	48
2010	65	52
2009	57	42
2008	52	42
2007	47	19

3.9 References

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General Conclusion

The primary goal of this dissertation was to explore the impacts that specific management and governance structures can have on the individuals and communities that are so intimately linked to fisheries. This research has also explored the reverse: individuals and communities can and should also have important influence in the design of fisheries management, and data from the social sciences are an essential component in sustainable fisheries management and governance. This dissertation used methods from the social sciences and the theory of political ecology to address the inherently interdisciplinary topic of fisheries. While the methods came primarily from the discipline of anthropology, a major theme that connects all three chapters is the importance of the inclusion of social science data in fisheries management in an interdisciplinary way. Although this dissertation is not interdisciplinary in the sense that it generates new knowledge in both the natural and social sciences, it is an example of research that addresses the larger structural and political issues of how different disciplines are included in fisheries management and the implications of un-sustainable fisheries management that does not include social science data.

At the heart of the conflict in Icelandic fisheries are two separate issues. The first is the design of the specific management rules and regulations. Iceland's ITQ system itself has created irreversible, long-term changes to rural coastal communities and fishing livelihoods, as economic goals tend to overshadow biological or social goals (Chapter 1). All three chapters described non-economic considerations such as community pride, family history, and identity present in small-scale fisheries and rural communities. Therefore, it is crucial to incorporate these social aspects in the design and operation of fisheries management systems.

The various negative social impacts of Iceland's ITQ system were predicted by social scientists at the time of its implementation, yet Iceland continues to have very few policies aimed at protecting those more likely to suffer negative and unequal consequences from the ITQ system. At the same time, new rifts in communities created by attempts to rectify negative impacts of the ITQ system show the difficulty of changing management structures once certain aspects of ITQ systems take hold (Chapter 2). The continued conflicts in Icelandic culture over "who fisheries should be for" highlight the importance of paying careful attention to the details of fisheries management design and the value that prior social science research could have in the management process.

This research has shown that the same rules do not apply to large- and small-scale fisheries (Chapters 1, 2), and even the definition of small-scale fishermen varies by gear, percent of income from fisheries, community, and through the course of a lifetime (Chapters

1, 2, 3). Fishing livelihoods therefore differ by individual, community, and fishery, so not all fishing livelihoods are equally impacted by implementation of particular fisheries management regimes (Chapters 1, 2). Similarly, access, particularly for the next generation, is a major theme running through this dissertation. Access to resources and flexibility over time ensure viable coastal communities and fishing livelihoods, and management scenarios that fail to take this into account are likely to exacerbate the decline of coastal communities (Chapter 3). Furthermore, this research described the complexity of factors affecting coastal communities today in addition to changes brought on by management policies. Economic fluctuations in markets (Chapter 3), environmental fluctuations, and social trends like migration (Chapter 2) all influence the daily realities of coastal communities and fishing livelihoods and can affect the long-term sustainability of any fisheries management regime.

The second major issue in Icelandic fisheries is the organization of the governance structure – the political power arrangement that impacts how management rules are made and enforced. Rural communities and small-scale fishermen are disengaged from the governance structures, and these situations of unequal power can further impact the overall sustainability of fisheries (Chapters 1, 2). When local communities are disengaged from governance processes, the legitimacy of the governance system is devalued. Sustainable fisheries management is contingent upon multiple factors and is inherently connected with a flexible governance arrangement (Chapter 3) that encourages sustainable resource use along with principles of equity and human rights (Chapters 1, 2).

Results from this dissertation contribute to advancing theories from political ecology and participatory governance. In recent scholarship from both bodies of literature, power distribution is a key concept in understanding the outcomes of fisheries management (Fabinyi et al. 2015; Jentoft and Chuenpagdee 2015; Breslow 2016). Natural resource management systems that do not address equity can undermine their own success. No fisheries governance or management system is perfect, but some value and enact the multiple goals of social equity, economic efficiency, and biological sustainability better than others. Participatory governance arrangements can create equitable platforms for discussion of management goals and allow for greater consideration of local interests, non-economic values, family and historical connections, and flexible livelihood strategies (Chapters 1, 3). The current volatile political situation in Icelandic fisheries, with large power imbalances and little consideration of small-scale fishing livelihoods, makes it difficult to develop new rules that positively influence the overall social, economic, and biological sustainability of Icelandic fisheries resources (Chapter 2). Theories from political ecology also address how conflicts are created

or shift between stakeholders through specific management decisions and arrangements (Beitl 2012). In Iceland, new levels of conflict were formed through the creation of a new quota-free fishery that was intended to offset the loss of opportunity for new entrants and the consolidation and redistribution of fish landings and processing that arose following implementation of ITQ fisheries management (Chapter 2); this new source of conflict can in turn threaten the sustainability of fisheries.

In many ways, sustainability is ensured by not only the rules of the management system itself, but larger issues of governance design, stakeholder power, and national constitutional rights. Although it is beyond the scope of this dissertation to offer specific management recommendations, general suggestions for a more inclusive governance system in Iceland include the formation of formal stakeholder advisory bodies and a scientific committee made up of experts from both natural and social sciences. Equity issues in access to fish and representation in the governance process must play a larger part in the design of a truly sustainable fisheries system for Iceland. Understanding the interplay of social and environmental factors and their related management end-goals and governance process is crucial in supporting truly sustainable fisheries in complex marine socio-ecological systems where protecting the social and cultural dimensions of fisheries is as important as protecting the fisheries resources themselves.

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Appendix 1: Institutional Review Board approval letter



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Institutional Review Board

909 N Koyukuk Dr. Suite 212, P.O. Box 757270, Fairbanks, Alaska 99775-7270

July 19, 2013

To: Courtney Carothers
Principal Investigator
From: University of Alaska Fairbanks IRB
Re: [277033-3] Fishing livelihoods and fisheries management in Northwest Iceland

Thank you for submitting the Amendment/Modification referenced below. The submission was handled by Exempt Review. The Office of Research Integrity has determined that the proposed research qualifies for exemption from the requirements of 45 CFR 46. This exemption does not waive the researchers' responsibility to adhere to basic ethical principles for the responsible conduct of research and discipline specific professional standards.

Title:	Fishing livelihoods and fisheries management in Northwest Iceland
Received:	July 18, 2013
Exemption Category:	2
Effective Date:	July 19, 2013

This action is included on the August 7, 2013 IRB Agenda.

Prior to making substantive changes to the scope of research, research tools, or personnel involved on the project, please contact the Office of Research Integrity to determine whether or not additional review is required. Additional review is not required for small editorial changes to improve the clarity or readability of the research tools or other documents.

Appendix 2: Written consent forms, English and Icelandic.

Informed Consent Form

Fishing livelihoods and fisheries management in Northwest Iceland

IRB #: 277033-1

Date Approved: 15 May 2012

Description of the Study:

I am asking you to take part in a research study about different kinds of fisheries management in Húnaflói and Skagafjörður. The goal of the study is to explore differences between different kinds of fishermen and opinions about and experiences with fisheries management. You are being asked to take part in this study because you were identified as particularly knowledgeable about fishing.

Please read this form before you agree to be in the project.

If you decide to take part, I would set up a 60 to 120 minute interview with you. I will ask you broad questions about your involvement in fisheries and your own experiences and opinions. I will ask you to reflect on changes that you've experienced over time and about your fishing business.

To better enable me to record the information I collect accurately, I would like to audiotape my interview with you. I will provide you with a copy of your interview. Recording, like participation in the study, is completely voluntary. If you prefer not to be audiotaped you will not be pressured to do so.

Risks and Benefits of Being in the Study:

I do not expect any risks for you if you take part in this study. You may feel uncomfortable being interviewed and/or audiotaped. I will make every effort to accommodate the interviews in a place and in a way that is most comfortable for you. You may not receive any benefits from taking part in this study. The knowledge that I collect in this study might help other researchers interested in fisheries management in Iceland and around the world.

Confidentiality:

Any information I collect for presentation or publication will not be linked with your name without written permission (for example, if I would like to quote you in further research, I would contact you again and ask for your permission to do so). The data derived from this study may be used in reports, presentations, and publications but you will not be individually identified. I will protect your confidentiality by coding your information with a number so no one can trace your answers to your name.

Voluntary Nature of the Study:

Your decision to take part in the study is completely voluntary. You are free to choose not to take part in the study or to stop taking part at any time during the interview or after it is completed. If you would like to erase the recording after the interview you may choose to do so.

Contacts and Questions:

If you have questions now, feel free to ask. If you have questions later, please contact:

Catherine Chambers
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If you have questions or concerns about your rights as a research participant, you can contact the University of Alaska Fairbanks Office of Research Integrity +1-866-876-7800 or fyirb@uaf.edu.

Statement of Consent:

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been provided a copy of this form.

Signature of Participant & Date

Printed Name of Participant

Signature of Person Obtaining Consent & Date

Upplýst samþykki fyrir þátttöku í rannsókninni
“Fishing livelihoods and fisheries management in Northwest Iceland”

IRB #: 277033-1

Date Approved: 15 May 2012

Lýsing á verkefninu:

Ég vinn að rannsóknarverkefni um fiskveiðar, sjómennsku og viðhorf til fiskveiðistjórnunar á Húnaflóa og í Skagafirði. Ég leita til þín um að taka þátt í þessu verkefni af því mér hefur verið bent á að þú þekkir vel til þessara mála.

Verkefnið er hluti af doktorsnámi mínu við University of Alaska og reglur skólans kveða á um að aflað sé upplýsts samþykkis þátttakenda í rannsóknum. Því bið ég þig vinsamlega að lesa eftirfarandi til að meta hvort þú samþykkir að taka þátt.

Þátttaka þín fælist í 60 – 120 mínútna viðtali þar sem ég mundi spyrja um þátttöku þína í fiskveiðum, reynslu þína og skoðanir á sjómennsku og fiskveiðum. Ég mundi einnig biðja þig að velta fyrir þér þeim breytingum sem þú hefur upplifað á starfsferli þínum við fiskveiðar.

Til að gera mér auðveldara að skrá upplýsingar rétt bið ég um leyfi til að hljóðrita viðtalið við þig. Ég mun láta þig fá eintak af viðtalinu. Þátttaka í viðtalinu er alveg frjáls og ef þú samþykkir ekki að viðtalið verði hljóðritað þá er það allt í lagi.

Hagsmunir af þátttöku í verkefninu

Ávinningur af því fyrir þig að taka þátt í verkefninu er lítið annað en tækifæri til að ræða um starf þitt og viðhorf við áhugasaman áheyranda og stuðla að meiri þekkingu um málefnið. Vitneskjan sem ég mun safna með þessum viðtölum getur aukið þekkingu þeirra sem að hafa áhuga á fiskveiðum og útgerð á Íslandi og um allan heim. Ég mun virða tíma þinn og reyna að gera þátttöku í þessu verkefni eins auðveldu og hægt er fyrir þig.

Trúnaður:

Upplýsingar sem ég safna til kynningar eða útgáfu verða ekki raktar til þín og ekki verður vitnað orðrétt til ummæla frá þér nema að þú veitir skriflegt leyfi til þess. Upplýsingarnar sem koma fram í verkefninu verða nýttar til birtingar, kynningar eða útgáfu án þess að tengja það við nafn þitt eða persónu. Ég mun halda trúnað við þið með því að númera upplýsingarnar frá þér svo enginn geti rakið þær til þín.

Val um að taka þátt:

Þú ert ekki skuldbundinn til þátttöku, þú getur tekið þátt og / eða hætt við þátttökuna hvenær sem er í viðtalinu eða eftir það. Ef þú vilt að ég þurrki út upptökuna eftir viðtalið mun ég auðvitað gera það.

Spurningar eða nánari upplýsingar:

Ef þú vilt spyrja einhvers nána, endilega gerðu það. Ef þú vilt spyrja einhvers síðar getur þú haft samband við undirritaðar:

Catherine Chambers
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Ef þú hefur spurningar um réttindi þín sem þátttakanda í rannsóknarverkefni getur þú haft samband við:

University of Alaska Fairbanks Office of Research Integrity +1-866-876-7800 eða fyrirb@uaf.edu.

Ýfirlýsing um samþykki:

Ég skil þær upplýsingar sem hér koma fram, spurningum mínum hefur verið svarað og ég samþykki að taka þátt í þessari rannsókn. Ég hef fengið eintak af þessu eyðublaði.

Dagsetning og undirskrift þátttakanda

Nafn þátttakanda

Dagsetning og nafn rannsakanda