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EVALUATION OF IFQS IN THE PACIFIC HALIBUT FISHERY IN ALASKA: WERE THE MANAGEMENT SAFEGUARDS SUCCESSFUL?

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EVALUATION OF IFQS IN THE PACIFIC HALIBUT
FISHERY IN ALASKA: WERE THE MANAGEMENT
SAFEGUARDS SUCCESSFUL?

BY
JESSICA MENGES

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
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ABSTRACT

Alaskan fisheries are steeped in centuries of tradition and decades of innovative management. The Pacific halibut fishery is the oldest fishery in the United States managed under an individual fishing quota (IFQ) system. As such, the Pacific halibut fishery serves as an ideal system to study the long-term impacts of an IFQ system. A frenzy of research focused on the system after its implementation in 1995, which created an excellent baseline. However, interest in the halibut fishery faded as other IFQ programs began popping up around the world.

Over two decades later, the Pacific halibut fishery remains understudied in its current, contemporary state. Additionally, the success of the management provisions put in place to safeguard the small-boat fleet has never been investigated. This research seeks to fill a gap in the literature by comparing contemporary results to initial studies on Pacific halibut IFQs and being the first to examine the safeguards. Specifically, it analyzes the social impacts of IFQs and uses the data gained to present management alternatives. Finally, these interviews brought to light a number of issues currently facing the IFQ system that were not addressed in the interview questions, but that subjects strongly felt needed to be included.

Using qualitative interview and survey methods, data were collected in the field over a three-month period in Sitka, AK in 2018. This thesis details the opinions of fishermen regarding the Pacific halibut IFQ program and the effectiveness of the management safeguards. It was found that subjects of this research study generally approve of IFQs, but that this approval seems to be linked to the participant's role in the

fishery. There was overwhelming support for the management safeguards, but participants felt many could be improved. Finally, these interviews brought to light a number of issues currently facing the IFQ system including balloon effects on other fisheries, barriers to entry, climate change, and conflicts with other sectors.

With the global dependence on ocean-sourced protein growing, it is essential to ensure resources are managed sustainably. Social management and sustainability are important facets of this and are imperative for the preservation of small, Alaskan, fisheries dependent, coastal communities.

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Sitka is such a special place dotted on the outskirts of the inside passage on the panhandle of Southeast Alaska. A true fishing town and a one of a kind place. I would like to thank all of the individuals who partook in this study and in general to a community that treated me like family. Conducting interviews in people's homes, boats, and around town was a truly enriching experience. I will never forget sitting hunched over in the galley of a small converted schooner fishing boat discussing fisheries management, whilst you can hear the crackling of bacon and flipping of pancakes in the background. Not only had I been warmly welcomed on board, but also offered breakfast and tea. The hospitality, even to outsiders, of Sitka is endless and I am forever grateful for the experiences and research that resulted from this.

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students, sparking my own interest in fisheries management, allowing me to be independent throughout this process, and faith in me to produce something I can be proud of.

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CHAPTER 1

INTRODUCTION

“Probably all the great sea-fisheries, are inexhaustible; that is to say, that nothing we do seriously affects the number of fish.”¹ Thomas Huxley said this in his 1883 address to the Fishery Congress not knowing the vast impact his words would have on the future of fisheries management.² Even today, over one hundred years later, some individuals still believe in the idea of the inexhaustibility of the seas.

Since 1883 there has been an incredible advance in technology and our ability to exploit natural resources has increased dramatically. Huxley’s statement no longer holds water and it is evident that the sea’s resources are unequivocally exhaustible. We now have many species that are in fact in dangerously overexploited. According to the National Oceanic and Atmospheric Administration’s (NOAA) most recent stock assessment in 2018, 41 stocks are overfished, and 30 stocks are on the overfishing list in the United States.³ As of 2018, the world’s population reached 7 billion and is estimated to rise to 10 billion by 2050.⁴ Currently, the global population consumes about 143.8

¹ Huxley, T. H. 1883. *Inaugural meeting of the fishery congress. Address delivered June 18, 1883*, pp. 1-40, at pg. 16. London.

² Worm, B., Hilborn, R., Baum, J.K., Branch, T.A., Collie, J.S., Costello, C., Fogarty, M.J., Fulton, E.A., Hutchings, J.A., Jennings, S., Jensen, O.P., Lotze, H.K., Mace, P.M., McClanahan, T.R., Minto, C., Palumbo, S.R., Parma, A.M., Ricard, D., Rosenberg, A.A., Watson, R., Zeller, D. 2009. Rebuilding Global Fisheries. *Science*. 325(5940): 578-585.

³ Fishery Stock Status Updates [Internet]. *NOAA Fisheries*; 2018 [cited 2019 March 30]. Available from <https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates>

⁴ Guillen, J., Natale, F., Carvalho, N., Casey, J., Hofherr, J., Druon, J.N., Fiore, G., Gibin, M., Zanzi, A., Martinsohn, J.T. 2018. Global seafood consumption footprint. *Ambio*. 48(2): 111-122.

million tonnes of seafood each year.⁵ To put this in perspective, capture fisheries and aquaculture make up 36% of the international food trade market, while meat only accounts for 10% of the global food market.⁶ Due to these facts, society now faces a time in which it has become crucial to sustainably and properly manage fisheries in order to ensure future food security.

As humans continue to fish down the food web and put excessive pressure on fish stocks, managers have turned to fisheries privatization as a go-to management technique for limiting exploitation. The popularization of Hardin's tragedy of the commons and the mis-conceptualization of private property rights has led to the coupling of rights-based fisheries management with resource stewardship and stock sustainability.⁷ Additionally, oversight of the original intentions and timeline of limited entry parameters spelled out in the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) has resulted in the idea that limited entry schemes are cemented in place. As stated by Carothers (2010), "The widespread circulation of this discourse has created a fertile context for increased fishery privatization, not under the auspices of maximizing wealth capture as previously articulated, but for the conservation of depleted resources."⁸

Federally managed fisheries off the state of Alaska serve as excellent case studies for the management of fishery *effort*. Fisheries management in Alaska is an extremely complex system influenced by different user groups, cultural traditions, economic

⁵ Guillen, J., Natale, F., Carvalho, N., Casey, J., Hofherr, J., Druon, J.N., Fiore, G., Gibin, M., Zanzi, A., Martinsohn, J.T. 2018. Global seafood consumption footprint. *Ambio*. 48(2): 111-122.

⁶ I.d.

⁷ Hardin, G. 1968. The Tragedy of the Commons. *Science*. 162(3859): 1243-1248.

⁸ Carothers, C. 2010. Tragedy of Commodification: Transitions in Alutiiq Fishing Communities in the Gulf of Alaska. *Maritime Studies*. 90(2): 91-115, at pg. 95.

markets, management working groups, complicated ecological interactions, and community remoteness. Alaska's fisheries are also an interesting case because Alaska is a place where fish stocks are relatively healthy and the management narrative is dominated by social management rather than ecological management.⁹ As stated by Carothers (2010) "In Alaska, where fish stocks remain generally healthy, the dominant narrative of the tragedy of the commons is not nearly as appropriate of a metaphor as is the tragedy of commodification (Greenberg 1998; Walley 2004), or the tragedy of the margins (Kleinen 2009). Privatizing the right to fish in Alaska has had fundamental impacts on the fishing lifestyle in remote coastal communities."^{10,11,12,13} Due to the fact that fisheries are the heart of Alaska's small coastal communities, it is extremely important to ensure the resource is properly managed both environmentally and socially. As a result, it is imperative that we as a society consider the effects of fisheries management and rights-allocation of Alaska's halibut fishery have had on vulnerable individuals and communities.

In this paper, utilizing data gathered from previous and current participants of Alaska's halibut fishery, I analyze the social impacts the IFQ fishery has had over the last two decades on an individual and community level. The data that was gathered is compared to previous data that was collected before and directly after the program

⁹ Carothers, C. 2010. Tragedy of Commodification: Transitions in Alutiiq Fishing Communities in the Gulf of Alaska. *Maritime Studies*. 90(2): 91-115.

¹⁰ I.d., at pg. 96.

¹¹ Greenburg, J. 1998. The tragedy of commoditization: The political ecology of the Colorado River Delta's destruction. *Research in Economic Anthropology*. 19: 133-149.

¹² Walley, C. 2004. *Rough Waters: Nature and Development in an East African Marine Park*. Princeton University Press, Princeton, NJ.

¹³ Kleinen, J. 2009. Tragedy of the margins: Land rights and marginality in Vietnam. Amsterdam: Paper presented at the People of the Sea V, Maritime Research Centre.

initially went into place. Additionally, the unique management safeguards used in the Alaska halibut IFQ fishery are also evaluated to expose the perceived successes and failures of these innovative restrictions. These interviews brought to light new, relevant issues facing the IFQ program. Due to the developed nature of the program, these issues have been culminating for some time and are at the forefront of IFQ controversy. As a result, the fishermen and researchers of this study felt strongly these issues were too important to omit. It is our hope that this research will be used to inform future fisheries management decisions and to demonstrate the social implications of such a program to those considering implementing new IFQ management plans.

PROBLEM STATEMENT

Fisheries are the heart of small Alaskan communities' welfare, culture, and economies. As a result, it is extremely important to ensure the resource is properly managed both environmentally and socially. The current literature lacks a holistic perspective on the social management of the Pacific Halibut IFQ fishery in Alaska. This research aimed to inclusively explore the opinions of current quota shareholders, crewmembers, and fishermen who have exited the industry concerning Pacific Halibut IFQs. More specifically, this study examined these participants' contemporary opinions concerning the social impacts of the system, the success of the safeguards, and modifications that should be made to the current system. Additionally, this research identifies significant, new challenges facing the Pacific halibut IFQ program, which should guide future work. It is extremely important that these new challenges are recognized because, due to the age of the program, they are not necessarily experienced yet by younger IFQ programs. These new challenges include IFQ balloon effects, barriers to entry, evasion of safeguards, trawling, charter fleet reallocation, and climate change. Finally, I hope this research informs fisheries management groups looking to utilize IFQs in the future and encourage them to consider the social impacts of such a program.

JUSTIFICATION FOR AND SIGNIFICANCE OF THE STUDY

IFQ SATISFACTION

Knapp (1997) studied the initial impacts of IFQs directly following their implementation in the Pacific Halibut fishery, but there has not been a follow-up study since that compares the initial impacts with the modern-day opinions of the program.¹⁴ This study uncovered the current impacts of the IFQ system and compared them to the initial impacts and opinions of IFQs found by Knapp in 1996 and 1997.¹⁵ However, this research differs from Knapp's studies because these methods deployed a more inclusive approach to expose marginalized groups' opinions. Knapp's study in 1996 included only longline captains and the proceeding 1997 study included only quota shareholders. This project aims to survey not just current quota shareholders, but also crewmembers and fishermen who have exited the halibut industry.

Knapp (1996) surveyed longline captains before IFQs were implemented in order to gauge acceptance of the program and found that those who thought they would receive quota preferred IFQs to other management techniques.¹⁶ This is presumably due to the economic gains associated with being awarded quota. Knapp (1996) found that "Support for IFQs was clearly related to whether or not captains expected their financial situation to improve with IFQs."¹⁷

¹⁴ Knapp, G. 1997. Initial Effects of the Alaska Halibut IFQ Program: Survey Comments of Alaska Fishermen. *Marine Resource Economics*. 12(3): 239–248.

¹⁵ I.d.

¹⁶ Knapp, G. 1996. Alaska Halibut Captains' Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43–55.

¹⁷ I.d., at pg. 52.

Knapp (1997) surveyed Pacific halibut quota holders to determine both positive and negative impacts of IFQs.¹⁸ It was determined that feelings towards the program were inversely correlated with how much quota each individual had.¹⁹ For example, those with more quota had positive attitudes towards the program and those with smaller amounts of quota were more likely to have a negative attitude towards IFQs.²⁰ Overall Knapp (1997) found that an equal percentage of participants held positive, mixed, and negative attitudes towards IFQs.²¹

There still remains an immense gap in the literature concerning the opinions of captains/vessel owners who were not awarded halibut quota and crewmembers (who inherently didn't get any quota) concerning the impacts of IFQ implementation. As a result, this study aims to explore IFQ satisfaction among a variety of stakeholders and to compare these contemporary results with the initial findings stated above.

¹⁸ Knapp, G. 1997. Initial Effects of the Alaska Halibut IFQ Program: Survey Comments of Alaska Fishermen. *Marine Resource Economics*. 12(3): 239–248.

¹⁹ I.d.

²⁰ I.d.

²¹ I.d.

EFFECTIVENESS OF SAFEGUARDS

There is a significant gap in the literature concerning the success of the safeguards put in place to mitigate the adverse impacts of the Pacific Halibut IFQ program. Nothing in the literature suggests coverage of this issue at all. Reportedly, some fishermen in Knapp's 1996 survey suggested changes for or commented on the block plan and ownership limits, but this was not elaborated on at all in the study.²² Currently, there is a debate taking place over the safeguards in the Pacific Halibut IFQ management scheme and whether or not they are necessary or need to be improved upon. This research aimed to inclusively explore the opinions of current quota shareholders, crewmembers, and fishermen who have exited the industry, concerning the perceived success of the safeguards in the Pacific Halibut IFQ fishery and if modifications should be made moving forward.

²² Knapp, G. 1997. Initial Effects of the Alaska Halibut IFQ Program: Survey Comments of Alaska Fishermen. *Marine Resource Economics*. 12(3): 239–248.

CASE STUDY FOR OTHER FISHERIES

Fisheries management in Alaska is deeply embedded in the culture of coastal communities. Specifically, halibut IFQ management is deeply rooted in coastal communities due to the age of the program. The maturity of the Pacific halibut management scheme and the high value of the resource makes the system an ideal case study for managers who are considering implementing IFQs in other fisheries. It is the intention of this research to serve as both an example and cautionary tale to fisheries managers. IFQs are not a magic bullet or cure-all, but they are a tool that can be successfully utilized by fisheries managers when implemented correctly and with caution. IFQs have compounding and lasting impacts, which can be mitigated by pairing the program with safeguards such as those in the Pacific Halibut fishery. This research should serve as a jumping off point to create a conversation surrounding the tradeoffs, challenges, and consequences of implementing a similar program in other fisheries.

CHAPTER 2

HALIBUT

Pacific halibut (*Hippoglossus stenolepis*) are the world's largest flatfish species.²³ Pacific halibut are native to the North Pacific Ocean from Santa Barbara, CA to Nome, AK.²⁴ Their diamond shaped bodies can grow in excess of 8 feet long, 5 feet wide, and weigh over 500 pounds.²⁵ As adults, they are most commonly mottled dark brown to grey on their right side, which is contrasted by a stark white color on their left side. They are benthic fish and bury themselves in the sand in order to hide their white posterior plane, while their brown anterior plane blends with the benthos. As juveniles, halibut have an eye on both their anterior and posterior sides, but as they grow one eye migrates to the right side. At this point, halibut begin swimming sideways with both eyes on top of their heads.

Pacific halibut are long-lived species, with the oldest one recorded at 55 years old.²⁶ As such, it takes a considerable amount of time for halibut to reach sexual maturity. Males reach sexual maturity at 5 years old and females at 12 years old.²⁷ They spawn in deep water along the continental slope in the winter, mainly in the Bering Sea, Aleutian Islands, Gulf of Alaska, and sometimes as far south as British Columbia.²⁸ Growth,

²³ Pacific Halibut [Internet]. *NOAA Fisheries*, [cited 2019 Feb 09]. Available from www.fisheries.noaa.gov/species/pacific-halibut

²⁴ I.d.

²⁵ I.d.

²⁶ I.d.

²⁷ I.d.

²⁸ I.d.

development, and migration patterns must all be taken into account in order to foster successful management.

Native Alaskans have been subsistence fishing for halibut for centuries, but the Pacific halibut fishery didn't begin until the late 1800s.^{29,30} As word of the great abundance of halibut out west reached the east coast of North America, Gloucester-style schooner fishing vessels began to flood to the west coast.³¹ By 1900 most sailing schooners were outfitted with gas engines. This advancement in technology meant an increase in efficiency that allowed fishermen to travel beyond Southeast Alaska in search of halibut.³² Steamer fishing vessels dominated the halibut industry in Alaska until the 1920s when it became clear that smaller vessels could deliver halibut more quickly.³³ In 1944 the first gear restriction for halibut was put in place, which banned the use of nets.³⁴ This transformed the commercial Pacific halibut fishing fleet into the longline industry we have today. Just as the industry evolved from sail to gasoline engine, the halibut fishery continued to expand as technological advances were made throughout history. Fishermen learned to become more efficient as equipment allowed their vessels and gear to become larger in size and scope, as well as more powerful and effective. Over time this excessive effort placed on the halibut fishery dwindled the season down from months to days and days to hours in order to retain a sustainable total allowable catch. Decreasing fishing windows lead to a race to catch as much fish as possible in a short amount of

²⁹ Thompson, William F, and Norman L Freeman. *History of the Pacific Halibut Fishery*. Vol. 5, Wrigley Printing Co, 1930.

³⁰ Pacific Halibut Industry History [Internet]. Deming (WA): *Halibut Association of North America*; [cited 2019 Feb 09]. Available from halibutassociation.org/history.html

³¹ I.d.

³² I.d.

³³ I.d.

³⁴ I.d.

time, which created the iconic Pacific halibut derby fishery. The derby fishery, caused by an exponential increase in efficiency, resulted in a scramble to institute a management scheme to control it.

HALIBUT AS A COMMON POOL RESOURCE

The Pacific halibut fishery is much younger than the Atlantic halibut fishery.³⁵ As the price for Atlantic halibut began to rise between 1820-1825 fishing pressure increased.³⁶ Depletion of Atlantic halibut stocks and the development of the Northern Pacific Railway sparked interest in the discovery of a western substitute species.³⁷ The deep-sea Pacific halibut fishery began in the last decade of the 19th century. Rising prices of Pacific halibut and expansion of technological capabilities led to input stuffing and increased exploitation.³⁸ As the local stock became depleted, fishing vessels traveled farther and farther offshore to exploit the distant water stock.³⁹ United States fishermen were competing with foreign fleets right up to Alaska's coast until 1959.⁴⁰ In 1959 Alaska became a state, which established a state-managed zone around the coast extending to 3nm.⁴¹ In 1966, the passage of the Bartlett Act extended U.S. jurisdiction to 12nm. However, this narrow area was not large enough to support the expanding U.S. commercial Pacific halibut fleet and competition beyond 12nm with foreign vessels continued until 1976. In 1976, the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was passed, which restricted foreign fishing beyond 200nm.⁴² With the U.S. Exclusive Economic Zone (EEZ), the state controls the fisheries

³⁵ Cunningham, S. 2005. *Successful Fisheries Management: Issues, Case Studies and Perspective*. Eburon Academic Publishing, Delft, Netherlands.

³⁶ I.d.

³⁷ I.d.

³⁸ I.d.

³⁹ I.d.

⁴⁰ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*. <https://www.npfmc.org/ifqpaper/>

⁴¹ I.d.

⁴² The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801-1891, at pgs. 70-71 (d))

within 3nm and between 3-200nm is controlled by the federal government. As a result, the Pacific halibut fishery became a federally managed fishery.

The Pacific halibut fishery remained an open-access fishery from 1977-1994.⁴³ Open-access fostered a culture of adaptive fishing, which is fishing when income is necessary.⁴⁴ In other words, flexibility in profession was possible, which allowed halibut to be harvested primarily for subsistence purposes and profit when necessary. This further allowed fishermen to remain diversified in their fishing practices. Due to the expansion of the U.S. fishing fleet, which was facilitated by governmental monetary incentives and capital stuffing, sustained halibut stocks began to change in the 1970s-1980s.⁴⁵ In the 1990s the Alaskan halibut stock began to seriously decline.⁴⁶ In order to control effort, total allowable catch (TAC), limits and season length limits were put in place. Increased effort created “the race for fish” forcing the season to become shorter and shorter. In 1995 the Alaskan halibut season was only two days, exemplifying a derby fishery. The season opening date was announced months in advance without any possible consideration of weather. This forced vessels out in dangerous weather conditions. Further, during the 48 hours crews were trying to harvest as much halibut as possible. In order to do so, crews wouldn't sleep for 48 hours straight and vessels would deploy as much gear as possible even if they knew they wouldn't be able to retrieve it all, which led to ghost fishing. Vessels were overloading triggering stability issues and sinking. Halibut

⁴³ Cunningham, S. 2005. *Successful Fisheries Management: Issues, Case Studies and Perspective*. Eburon Academic Publishing, Delft, Netherlands.

⁴⁴ Carothers, C. 2010. Tragedy of Commodification: Transitions in Alutiiq Fishing Communities in the Gulf of Alaska. *Maritime Studies*. 90(2): 91-115.

⁴⁵ Cunningham, S. 2005. *Successful Fisheries Management: Issues, Case Studies and Perspective*. Eburon Academic Publishing, Delft, Netherlands.

⁴⁶ I.d.

were not properly cared for because ice and slush were jettisoned to accommodate more fish and fish were often not gutted or cleaned during the opener. All of these factors led to an extremely low poundage price for halibut and the loss of many fishermen at sea.

In 1973, Alaska's state constitution was amended to allow for limited entry fisheries programs.⁴⁷ In 1976, the North Pacific Fisheries Management Council (NPFMC) was established for the purpose of coastal fisheries management. The first, official motion in the NPFMC to institute individual fishing quotas (IFQs) for halibut was in 1991. After 14 years of deliberation on behalf of the council, IFQs were instituted in the Pacific halibut fishery in 1995.

⁴⁷ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*. <https://www.npfmc.org/ifqpaper/>

THE PARADOX OF THE COMMONS

“The tragedy of the commons” was coined by Garrett Hardin in 1968 with the publication of his paper that focuses on the demise of common pool resources and exponentially rising populations.⁴⁸ Almost a century after Huxley stated that the seas were inexhaustible, Hardin is arguing that the worlds resources are in fact finite.^{49,50} Hardin argues that in a world where finite resources are shared by the many that rational individuals act within their own self-interests.⁵¹ Because the resource is shared by all, the individual gains all of the benefits from increasing their own exploitation, but the negative impacts of this increased exploitation are split between all of the users.⁵² In following with this logic, why wouldn't the individual continue to overexploit if rewards always outweigh the costs? In a situation where each rational individual utilizing the common resource uses this logic to act in self-interest, a tragedy of the commons is created.⁵³ According to Hardin, “Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.”⁵⁴ Hardin goes on to offer many solutions for solving problems created by commons by suggesting the creation of private property or keeping areas as public property, but allocating access to the public areas.⁵⁵ Access, he

⁴⁸ Hardin, G. 1968. The Tragedy of the Commons. *Science*. 162(3859): 1243-1248, 1244.

⁴⁹ Worm, B., Hilborn, R., Baum, J.K., Branch, T.A., Collie, J.S., Costello, C., Fogarty, M.J., Fulton, E.A., Hutchings, J.A., Jennings, S., Jensen, O.P., Lotze, H.K., Mace, P.M., McClanahan, T.R., Minto, C., Palumbo, S.R., Parma, A.M., Ricard, D., Rosenberg, A.A., Watson, R., Zeller, D. 2009. Rebuilding Global Fisheries. *Science*. 325(5940): 578-585.

⁵⁰ Hardin, G. 1968. The Tragedy of the Commons. *Science*. 162(3859): 1243-1248.

⁵¹ I.d.

⁵² I.d.

⁵³ I.d.

⁵⁴ I.d., at pg. 1244.

⁵⁵ I.d.

proposes, would be allocated by auction, merit, lottery, or first come first served.⁵⁶

Hardin also argues that in order for society to relinquish their “freedoms” and “rights” in the commons there must be a certain level of mutually agreed upon coercion.⁵⁷ In other words, in a world with an exploding population, restricting the commons enhances freedom rather than confining it.⁵⁸ This is where the paradox of the commons is created; allowing unrestricted access to the commons created the freedom to profit and breed, but these freedoms are eventually restricted due to over overexploitation generated by rational selfishness. However, it is important to remember that Hardin was using the logic explained above to build an argument for population control and “abandoning the commons in breeding.”⁵⁹

Regardless of Hardin’s intentions for the use of this logic, it has now been applied to many other common pool resources, including fisheries. In the 1970s a wave of privatization swept across U.S fisheries.

Before the 1970s fisheries were managed using traditional tools such as utilizing a total allowable catch (TAC), closed seasons, closed areas, vessel construction limitation, size limits, sex limits, and gear restrictions. The use of these traditional tools controls the quantity of fish removed from the commons. However, it does not effectively control the amount of individual effort placed upon the commons. At this point, fisheries management becomes more about managing human actions rather than the resource itself.

⁵⁶ Hardin, G. 1968. The Tragedy of the Commons. *Science*. 162(3859): 1243-1248.

⁵⁷ I.d.

⁵⁸ I.d.

⁵⁹ I.d., at pg. 1248.

DEVELOPMENT OF IFQS

Fisheries were essentially managed as open-access, common pool resources until the 1970s. After this time fisheries were managed under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), which was passed in 1976.⁶⁰ The initial version of this act called on managers to use traditional tools to control fishing effort and preserve fisheries in conjunction with limited entry systems when vitally necessary. Limited access privileges were included in the act in hopes that they would reduce fishing effort, overfishing, and economic inefficiencies.⁶¹ It is believed that when individuals are given ownership over a resource it incentivizes them to responsibly fish and preserve the resource.⁶² However, it is not universally agreed upon that ownership creates stewardship.⁶³ After all, as argued by Hardin, humans are rational beings that act in self-regard.⁶⁴

Exclusive fishing privileges in the form of catch shares are now present in 16 U.S. fisheries.⁶⁵ There are many forms of limited access, but the new fad seems to be Individual Fishing Quotas (IFQs), which are also known as Individual Transferable Quotas (ITQs). IFQs essentially allocate fishing access to a privileged group of individuals. Fishing access is allocated in the form of catch shares or quota shares, which

⁶⁰ The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801-1891, at pgs. 70-71 (d))

⁶¹ Carothers, C., Lew, D. K., Sepez, J. 2010. Fishing rights and small communities: Alaska Halibut IFQ transfer patterns. *Ocean & Coastal Management*. 53(9): 518-523.

⁶² Hardin, G. 1968. The Tragedy of the Commons. *Science*. 162(3859): 1243-1248.

⁶³ I.d.

⁶⁴ I.d.

⁶⁵ Holland, D. S., Speir, C., Agar, J., Crosson, S., DePiper, G., Kasperski, S., Perruso, L. 2017. Impact of catch shares on diversification of fishers' income and risk. *Proceedings of the National Academy of Sciences*. 114(35): 9302-9307.

are percentages of the TAC for a particular fishery. More specifically, IFQs are “allocations of fish harvesting quotas to individuals or firms, specifying that a certain amount of fish or shellfish of a certain species may be caught in a specific area during a specific time frame.”⁶⁶ The initial allocation method assigns quota to shareholders. A popular way of doing this is basing initial allocations on catch history over a certain time period in a fishery. Depending on the trade rules quota can be leased or sold for profit by the shareholder.

The shift from open-access fisheries to exclusive output controls shifted a kin-based lifestyle of subsistence and commercial fishing to a business lifestyle focused on profit generation.⁶⁷ Output controls in the form of IFQs also cause a shift in values from making a living to generating wealth.⁶⁸ According to Criddle and Macinko (2000) economists have largely abandoned input controls, especially after failed limited entry schemes in the 1970s.⁶⁹

Before the 1970s Alaska and Canadian halibut fisheries were managed without access restrictions and were only limited by the timing of openings and a yearly TAC.⁷⁰ Discussion of IFQs for the Pacific halibut fleet began by the NPFMC in the 1970s. As a result, speculative fishing began in 1978, but the Pacific halibut IFQ program did not start until 1995.⁷¹ When this new management plan was implemented it was the largest fishery

⁶⁶ Criddle, K.R., Macinko, S. 2000. A requiem for the IFQ in US fisheries? *Marine Policy*. 24: 461-469, at pg. 461.

⁶⁷ Carothers, C. 2015. Fisheries Privatization, social transitions, and well-being in Kodiak Alaska. *Marine Policy*. 61: 313-322.

⁶⁸ I.d.

⁶⁹ Criddle, K.R., Macinko, S. 2000. A requiem for the IFQ in US fisheries? *Marine Policy*. 24: 461-469.

⁷⁰ I.d.

⁷¹ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*. <https://www.npfmc.org/ifqpaper/>

in the U.S. in terms of participants to utilize IFQ management.⁷² Creating an IFQ fishery greatly extended the halibut season from a few days to a 6-month season that runs from March to November.⁷³

Initial allocations of Pacific halibut shares were awarded to vessel owners and leaseholders in perpetuity based on fishing history.⁷⁴ This was due to the fact that managers believed that vessel owners had risked the most effort and capital in the fishing industry.⁷⁵ As a result, crewmembers, hired captains, and individuals who didn't fish in that period were not gifted any quota. Those who fished during the years of 1988, 1989, or 1990 received an initial allocation of quota.⁷⁶ If eligible based on these three qualifying years, fishermen's quota allocation was based on the best five of seven years from 1984 to 1990.⁷⁷ The awarded quota share was transferrable; meaning that it could be bought, sold, and leased barring a few restrictions.⁷⁸ In 1995, when the program began, a single 5,000lb quota share was worth \$350,000.⁷⁹

All Pacific halibut quota shares are area specific, including areas, 2C (Southeast, AK), 3A (Central Gulf of Alaska), 3B (Western Gulf of Alaska), 4A (eastern Aleutians), 4B (western Aleutians), 4C, (Bristol Bay around the Pribilofs), 4D (Bering Sea, Bering

⁷² Knapp, G. 1996. Alaska Halibut Captains' Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43-55.

⁷³ Knapp, G. 1996. Alaska Halibut Captains' Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43-55.

⁷⁴ 58 C.F.R. § 59343.215 1993, at pg. 59378.

⁷⁵ I.d., at pg. 59378.

⁷⁶ I.d., at pg. 59378.

⁷⁷ I.d., at pg. 59387.

⁷⁸ I.d., at pg. 59381.

⁷⁹ Knapp, G. 1996. Alaska Halibut Captains' Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43-55.

Strait, and Beaufort Sea), and 4E (Bristol Bay).^{80,81} Further, the following bounds were used to create the program⁸²:

1. Vessel categories:
 - a. Vessel size is broken down based on catching and processing capabilities. The two major categories are freezer boats and catcher boats. Freezer boats have the ability to process and freeze at sea, compared to catcher boats, which use slush and ice to hold fish. Ultimately this impacts the length of trip each boat can take. Catcher quota is further divided into three subcategories based on length;
 - Freezer boats → A-shares
 - Catcher boats >60ft → B-shares
 - Catcher boats 35-60ft → C-shares
 - Catcher boats <35ft → D-shares
2. Leasing and sale of shares:
 - a. Freezer boat A-shares may be leased or sold to any other qualified person in the freezer category.
 - b. Catcher vessel boats may lease up to 10% of their shares during the first three years of the program. Catcher vessel shares may only be sold to individuals who are, U.S. citizens, is a crewmember, is onboard when the fish are landed, and signs the fish ticket. Finally, corporations and partnerships may only buy catcher vessel quota if they received an initial allocation of shares.
3. Ownership limits:
 - a. Gulf of Alaska (GOA): Cannot own more than 1% of the total tonnage available for the GOA.
 - b. Bering Sea and Aleutian Islands: Cannot own more than 1.5% of the total tonnage available for this area.
 - c. All areas: or cannot own more than 0.5% of the tonnage available for all areas combined.
4. Enforcement:
 - a. All sales, transfers, or leasing must be approved by the U.S. Secretary of Commerce or his/her designee.
 - b. No trawler can purchase fixed gear quota.
 - c. Overages above 10% count against quota allotment for the next year.
 - d. A debit card system will be used to log catch.
 - e. Vessels must keep all legal-sized halibut (no high grading).

⁸⁰ Fisheries Figures, Boundaries, Regulatory Areas, EFH and Critical Habitat [Internet]. Anchorage and Juneau (AK): *NOAA Fisheries Alaska Regional Office*; [cited 2019 Feb 09]. Available from alaskafisheries.noaa.gov/maps

⁸¹ 58 C.F.R. § 59343.215 1993, at pg. 59394.

⁸² 58 C.F.R. § 59343.215 1993, at pgs. 59406, 59408, 59409.

5. CDQ development:
 - a. Allotment to “disadvantaged Western Alaska Native communities.”⁸³
 - b. 20%-100% of the quota is set-aside in several smaller areas in the Bering Sea and Aleutians.

Many of these restrictions and parameters vary from area to area; the focus of this study was on area 2C, Southeast Alaska.

The bounds stated above were initially laid out before the start of the program but were restructured in the 1990s. The first change occurred in 1993 and is referred to as the “Block Plan,” or amendment 31.⁸⁴ The block plan was put in place to slow, prevent, and mediate consolidation of large blocks of quota. Initial allocations greater than 20,000lbs would remain as regular, freely divisible quota shares, but those that were issued as less than 20,000lbs would become quota share blocks.⁸⁵ Additionally, any quota shares less than 1,000lbs could be “swept up” or combined to form larger blocks up to 1,000lbs.⁸⁶ Finally, quota shareholders could own up to two blocks in one management area (this has since increased to three blocks).⁸⁷ The Block Plan became effective at the onset of the program, in 1995.⁸⁸

In 1996 the IFQ program was further refined with the “Buydown Amendment,” or amendment 42/42.⁸⁹ The Buydown Amendment stated that catcher vessels’ quota shares can be used on vessels of the same class or smaller. This means that in all areas except 2C, B-shares can be fished on C-class vessels and C-shares can be fished on D-class

⁸³ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17, at pg. 8. <https://www.npfmc.org/ifqpaper/>

⁸⁴ 50 C.F.R. § 676 1994.

⁸⁵ I.d.

⁸⁶ I.d.

⁸⁷ I.d.

⁸⁸ I.d.

⁸⁹ 50 C.F.R. § 676 1996.

vessels. In area 2C, B-class buy down is only allowed for quota share blocks less than 5,000lbs.⁹⁰ This broadens the potential quota pool for vessels in smaller size classes.

In 1996, the amount of quota that could be swept up in the IFQ program changed. Previously it was set at less than 1,000lbs, but has since been increased to 3,000lbs.⁹¹ This was done in order to create “economically fishable” blocks.⁹² In other words, fishermen felt that the cost associated with fishing smaller blocks did not outweigh the profits from small blocks. However, increasing block size increases profit with minimal increases to operating costs.

In 1999 the IFQ program was modified in order to specify requirements for hired skippers. This modification required the quota shareholder to invest in a portion of the boat if they did not wish to be on board during fishing operations. There was originally no minimum ownership interest set, but in 1999 an ownership minimum was set at 20% of the vessel their quota was being fished on.⁹³ In 2014, this was further amended to include a 12-month requirement for the minimum 20% vessel ownership interest.⁹⁴ Also in 2014, a clause was added stating that initial quota share recipients could not fish catcher boat-derived quota with hired masters that had been transferred after February 12th, 2010.⁹⁵ The amendments stated above were a direct response to the halibut fleet’s

⁹⁰ 50 C.F.R. § 676 1996.

⁹¹ 50 C.F.R. § 679 1996.

⁹² Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17, at pg. 10, <https://www.npfmc.org/ifqpaper/>.

⁹³ Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program [Internet]. Anchorage (AK): North Pacific Fishery Management Council, National Marine Fisheries Service, 1-474; 2016 Dec [cited 2019 Feb 10]. Available from https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

⁹⁴ I.d.

⁹⁵ I.d.

increased reliance on hired masters.⁹⁶ An increase in hired masters is potentially devastating to the fleet because it decreases quota turnover making entrance more difficult and creates a disconnect between the major industry profiteers and the fishermen.

The IFQ program has been amended over time, but the goal of the program has remained relatively constant. Some of the intended outcomes of the development of IFQs were decreased gear conflicts, decreased ghost fishing from lost gear, increased safety, increased season length, improvement of product quality, and increased product value.⁹⁷ Although not stated, these outcomes are direct resultants of fleet consolidation. According to Pautzke and Oliver (1997), in order to determine if IFQ development is appropriate in a certain fishery the following things must be considered, fair and equitable initial allocation, social and economic costs and benefits, and creation and comparison of the value of IFQs to the per pound price of the resource.⁹⁸ In the case of the Pacific halibut IFQ program, the initial allocation was discriminating and imbalanced, the social costs were extremely high but considered insignificant, and quota price has far surpassed that of the dock price for halibut. For example, in the first year of the program the ex-vessel price was \$2.01/lb. and the quota price was \$11.77/lb., but in 2014 the ex-vessel price was \$6.07/lb. and the quota price was \$44.29/lb.

⁹⁶ Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program [Internet]. Anchorage (AK): North Pacific Fishery Management Council, National Marine Fisheries Service, 1-474; 2016 Dec [cited 2019 Feb 10]. Available from https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

⁹⁷ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

⁹⁸ I.d.

In conclusion, some of the most important features of the program to note are initial gifting of quota in perpetuity, transferability of quota, and the permitting of leasing activity. In area 2C specifically, as well as in other management areas, many safeguards have been put in place to combat the notorious consequences of the Pacific halibut IFQ system.

HALIBUT MANAGEMENT

Development, enforcement, monitoring, and amending of the Pacific halibut IFQ program requires the effort and coordination of many different working groups. Due to the expansiveness and value of Alaska's resources, these relationships cross state and national boundaries.

The state of Alaska has the highest commercial landings in the United States.⁹⁹ Pacific halibut is the fourth most valuable fishery in Alaska.¹⁰⁰ User groups of the Pacific Halibut fishery in Southeast Alaska include Alaskan Natives from the Tlingit Tribe, Alaskan citizens, and various fishermen from the lower forty-eight. Southeast Alaska has a rich fishing history that dates back thousands of years to when the Tlingit Tribe is believed to have arrived in Sitka, AK.¹⁰¹ Tlingit translates to "people of the tides."¹⁰² Much of the tribe was and still is dependent on halibut and other fish for subsistence and livelihood.¹⁰³ Sitka is still home to a large population of Tlingit Natives who continue to struggle for fishing rights as they are managed jointly with other commercial fishermen.

The International Pacific Halibut Commission (IPHC), the North Pacific Fishery Management Council (NPFMC), Pacific Fishery Management Council (PFMC), and the National Marine Fisheries Service (NMFS) are responsible for managing the Pacific

⁹⁹ Commercial Fisheries Statistics [Internet]. Silver Springs (MD): NOAA Office of Science and Technology; [cited 2018 April 23]. Available from <https://www.st.nmfs.noaa.gov/commercial-fisheries/>
¹⁰⁰ I.d.

¹⁰¹ Sitka Maritime Heritage Society [Internet]. Sitka (AK): A Short Maritime History of Sitka, Alaska; [cited 2018 April 23]. Available from <http://www.sitkamaritime.org>

¹⁰² Richardson, G. History of the Tlingit People [Internet]. *The Tlingit People*; [cited 2018 April 23]. Available from <https://thetlingitpeople.weebly.com/history.html>

¹⁰³ I.d.

halibut stock.¹⁰⁴ The IPHC was established in 1953 and was mainly responsible for managing Pacific halibut until the late 1970s.¹⁰⁵ The IPHC is a coordinated effort between the United States and Canada. In 1979, due to extended jurisdiction in 1976, the IPHC shifted its focus away from direct management, but continued to mainly oversee biological management of the resource.¹⁰⁶ Currently, the IPHC is mainly responsible for using the latest scientific information to set harvest limits and to make recommendations to the NPFMC regarding season length and minimum size requirements.¹⁰⁷

The NPFMC is one of eight regional management councils responsible for managing the United States' coastal fisheries. The NPFMC is unique because it only oversees the management of fisheries off a single state's coast (Alaska).¹⁰⁸ However, Washington and Oregon interests are represented by voting members on the council. The NPFMC consists of 3 Washington, 1 Oregon, 6 Alaska, and 1 NMFS voting members.¹⁰⁹ These members work closely with a 13-member scientific and statistical committee and a 24-member industry advisory panel.¹¹⁰ All members of the NPFMC are required to disclose any related financial interests held by themselves, their spouse, children, or organization they are associated with.¹¹¹ The Northern Pacific Halibut Act of 1982 delegated all decisions concerning limited entry and allocation to the Pacific Fishery

¹⁰⁴ Knapp, G. 1996. Alaska Halibut Captains' Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43-55.

¹⁰⁵ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

¹⁰⁶ I.d.

¹⁰⁷ I.d.

¹⁰⁸ I.d.

¹⁰⁹ I.d.

¹¹⁰ I.d.

¹¹¹ The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801-1891, at pgs. 70-71 (d))

Management Council (PFMC) and NPFMC.¹¹² Beyond this, the main responsibility of the NPFMC is to recommend management actions for fisheries in the EEZ to the U.S. Secretary of Commerce.¹¹³ For waters off the U.S. west coast the, PFMC is responsible for allocating catch limits and developing regulations that align with recommendations from the IPHC.

In area 2C and specifically in Sitka Sound, NMFS implemented a Local Area Management Plan (LAMP).¹¹⁴ The Sitka Sound LAMP is intended to eliminate competition for Pacific halibut between commercial and subsistence users.¹¹⁵ The LAMP bars commercial and charter operations from fishing inside Sitka Sound.¹¹⁶

These working groups and regulations are responsible for managing the interactions between many different user groups all seeking to utilize the same resource off the coast of Alaska. All in all, the NPFMC is responsible for allocating catch and establishing regulations that align with the scientifically-backed recommendations of the IPHC, whilst NMFS is responsible for implementing and enforcing these regulations.¹¹⁷

¹¹² Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

¹¹³ I.d.

¹¹⁴ Sitka Sound Local Area Management Plan (LAMP) [Internet]. Anchorage and Juneau (AK): NOAA Fisheries Alaska Regional Office; [cited 2019 Feb 09]. Available from alaskafisheries.noaa.gov/fisheries/ss-lamp

¹¹⁵ I.d.

¹¹⁶ I.d.

¹¹⁷ I.d.

SITKA, A FISHING TOWN

Sitka is a small coastal town on Baranof Island, located on the panhandle of Southeast Alaska. Sitka is home to about 9,000 people and supports a large Native Alaskan population (about 16%).¹¹⁸

Sitka has a small-town feel created by small streets, family-run shops, and a welcoming community. The waterfront is relatively commercialized to support a locally based fishing fleet and a massive influx of tourists shuttled in from cruise ships anchored in the sound. As you move inland from the waterfront, paved roads turn to dirt, the business district becomes neighborhoods and the neighborhoods back up against large mountains heavily traveled by hikers and grizzly bears. Sitka is located in the heart of the world's largest temperate rainforest, the Tongass National Forrest.

Sitka is only accessible by boat or plane, isolating it from the closest large city, Juneau. It is also strategically situated on the outskirts of the Inside Passage, which explains its rich history dotted with military occupation. As you walk down the main strip in Sitka the Russian presence is still very dominant and projected in the form of Russian doll shops, fur shops, and the large Russian Orthodox Cathedral that anchors the center of town. If one takes to the water, they will also notice multiple concrete bunkers and lookouts speckled around Sitka on its small surrounding islands. These concrete structures were used as lookout points in World War II for armed Japanese submarines.

¹¹⁸ About Sitka [Internet]. Sitka (AK): City and Borough of Sitka Alaska – Residents; 2019 [cited 2019 Feb 09]. Available from www.cityofsitka.com/residents/about/index.html

Sitka supports a large fishing fleet consisting of over 2,000 registered vessels, making it the largest small boat fleet in Alaska.¹¹⁹ Of these 2,000 vessels, 632 are commercial fishing vessels.¹²⁰ Sitka is located in halibut management area 2C, but some boats based out of Sitka hold permits to also fish outside of area 2C. These boats participate in a diverse set of fisheries including King salmon, Coho salmon, Sockeye salmon, Pink salmon, Chum salmon, sablefish, halibut, spot prawns, lingcod, rockfish, etc. According to NOAA, commercial fishing engagement and reliance is high in Sitka, as well as recreational fishing engagement.¹²¹ According to the Alaska Department of Fish and Game (ADFG), commercial fishing supports the second largest income percent by household in Sitka, second to “services.”¹²² In order to support the large fleet, the City of Sitka has five expansive harbors; ANB, Crescent, Eliason, Sealing, and Thomsen Harbor. According to the Sitka Economic Development Association (SEDA), these five harbors contain 1,315 boat slips.¹²³ Sitka is also home to two large fish processing plants, Sitka Sound Seafoods and Silver Bay Seafoods. Commercial, recreational, and charter fisheries provide jobs to a large portion of Sitka’s community. According to SEDA Sitka is ranked #14 in the U.S. by weight and #11 by value:¹²⁴

¹¹⁹ Marine Services [Internet]. Sitka (AK): *Sitka Economic Development Association (SEDA)*. 2015 [cited 2019 Feb 09]. Available from www.sitka.net/marine-services/

¹²⁰ I.d.

¹²¹ Mapping Social Vulnerability [Internet]. Silver Spring (MD): *NOAA Office of Science and Technology*; [cited 2019 Feb 08]. Available from www.st.nmfs.noaa.gov/humandimensions/social-indicators/map

¹²² Koster. Sitka, Harvest [Internet]. (AK); *Alaska Department of Fish and Game*; 2013 [cited 2018 Feb 18]. Available from

<http://www.adfg.alaska.gov/sb/CSIS/index.cfm?ADFG=harvInfo.Harvest&CommID=313&Year=2013>

¹²³ Marine Services [Internet]. Sitka (AK): *Sitka Economic Development Association (SEDA)*. 2015 [cited 2019 Feb 09]. Available from www.sitka.net/marine-services/

¹²⁴ I.d.

Harvesting

- Resident commercial fishing permit holders (active) = 566
- Total permits issued = 1,055
- Permit holders who fished = 446
- Permits fished = 718
- Commercial fishing vessels homeported in Sitka = 669
- Total Pounds Landed = 36,501,268
- Estimated Gross Earnings = \$38,346,917

Processing – Shore Side

- Wholesale value of seafood processed in Sitka = \$48,019,694
- Net weight pounds processed in Sitka = 85,591,436 lbs.
- Raw fish tax (support city harbors) = \$1,009,033
- Seafood processing jobs = 1,102

Beyond commercial fishing, Sitkans also look to the ocean for subsistence purposes. Many Alaskans are reliant on their ability to harvest their own food. From deer hunting to fishing to berry picking Alaskans are resourceful in finding wild products with which to fill their freezers. In addition to black-tail deer and mountain goat, Sitkans work hard to harvest fresh fish to feed their families. In 2013, Sitkan's subsistence harvested 904,498.8lbs of fish, which demonstrates the vitality of fisheries to families in Sitka.¹²⁵

Sitka is critically positioned for this study due to its large fishing fleet, ability to support alternate livelihoods, participation in fisheries management, and unique fishery management safeguards. Sitka is economically and culturally linked to commercial fisheries; fishing has not only become a profitable livelihood, but a way of life.

¹²⁵ Koster. Sitka, Harvest [Internet]. (AK); *Alaska Department of Fish and Game*; 2013 [cited 2018 Feb 18]. Available from

SAFEGUARDS & AREA 2C

Area 2C in Southeast Alaska is of special interest when studying Pacific halibut IFQs because many of the unique safeguards laid out at the onset of the program have remained intact. These seven main restrictions were put into place as safeguards to combat consolidation, trading, and non-fishermen quota ownership.¹²⁶ Many now attribute these to the success of Pacific Halibut IFQs as other programs without these have failed miserably at retaining social fairness, eluding consolidation, and keeping purely capital-driven investors out of the industry. The safeguard restrictions pertinent to area 2C for Pacific halibut IFQs are as follows^{127,128}:

1. Vessels must abide by size classes associated with quota permits (A, B, C, D).
2. Owner on board clause: quota shareholders must be on board during fishing operations.
3. Block plan: smaller quota shares less than 20,000 lbs. cannot be consolidated with other permits.
4. Only quota share recipients or crewmembers with 150 days of experience in a U.S. fishery may buy quota.
5. Ownership caps: total landings of any vessel may not exceed 1% of the TAC in area 2C and total landings of a single quota holder may not exceed 0.5% of the TAC in area 2C.
6. Buydown Amendment: quota can only be sold down vessel class and not up. The delineation between vessel classes has become merged in other areas.
7. Leasing/purchasing provisions: catcher boats are barred from leasing quota. Buyers of quota must be U.S. citizens, crewmembers, or those that partake in vessel operations.

¹²⁶ Knapp, G. 1996. Alaska Halibut Captains' Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43–55.

¹²⁷ I.d.

¹²⁸ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

Safeguards 5 and 6 are unique to area 2C because the ownership caps are based only on the TAC of the single management area and in other areas some of the delineations used in the buy-down amendment have been vertically integrated.

According to the North Pacific Fishery Management Council (NPFMC), “The primary intent of the Council in adopting these provisions was to maintain a diverse, owner-operated fleet and prevent a ‘corporate’, absentee ownership of the fisheries.”¹²⁹ Both the owner on board clause and days of experience clause were put in place to restrict the entrance of non-fishermen into the industry. The block plan was put in place to make entrance into the fishery affordable.¹³⁰ Generally, when IFQs are put in place it is common for permit prices to be momentous and block new entrance into the fishery, which can lead to a greying/aging fleet. The block provision was intended to prevent this and allow new entrants via these small blocks of quota. Finally, the total landings and buydown amendment (1996) were put in place to prevent consolidation at all levels, but specifically in classes where vessels may be more efficient.¹³¹ In other words, these safeguards help maintain a healthy small-boat fleet and keep wealth evenly distributed throughout the fishery.

¹²⁹ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17, at pg. 11. <https://www.npfmc.org/ifqpaper/>

¹³⁰ I.d.

¹³¹ I.d.

KNOWN IMPACTS OF HALIBUT IFQS

There were many negative and positive implications that resulted from the enactment of IFQs in the Pacific Halibut fishery. Knapp (1997) found that fishermen frequently stated that the quota allocation was too small, there were many administrative burdens, and the initial allocation was unfair.¹³² Holland, et al. (2017) found that IFQs reduced fleet diversification, which leads to increased financial risk and a reduction in income stability.¹³³ They also concluded that the ability to diversify in Alaska has become extremely controlled because of the inability of people to enter the fishery due to high quota prices.¹³⁴ Brinson and Thunberg (2016) found that due to IFQs, Alaska has seen the largest reduction in active fishing vessels over the history of all U.S. programs.¹³⁵ In 1995, before IFQs were implemented, there were 3,432 active Pacific Halibut vessels, but in 2013 only 937 vessels remained.¹³⁶ Additionally, Carothers (2013) found that 84% of fishermen surveyed believe that IFQs are changing fishing lifestyle resulting in a privileged class of fishermen and 75% stated that they are changing community values.¹³⁷ Finally, Sinclair (1983) concluded that social consequences of

¹³² Knapp, G. 1997. Initial Effects of the Alaska Halibut IFQ Program: Survey Comments of Alaska Fishermen. *Marine Resource Economics*. 12(3): 239–248.

¹³³ Holland, D. S., Speir, C., Agar, J., Crosson, S., DePiper, G., Kasperski, S., Perruso, L. 2017. Impact of catch shares on diversification of fishers' income and risk. *Proceedings of the National Academy of Sciences*. 114(35): 9302–9307.

¹³⁴ I.d.

¹³⁵ Brinson, A. A., Thunberg, E. M. 2016. Performance of federally managed catch share fisheries in the United States. *Fisheries Research*. 179: 213-223.

¹³⁶ I.d.

¹³⁷ Carothers, C. 2013. A survey of US halibut IFQ holders: Market participation, attitudes, and impacts. *Marine Policy*. 38: 515-522.

limited entry systems outweigh economic benefits because limited entry is a flawed system that is detrimental for isolated fishery dependent regions.¹³⁸

Despite these negative outcomes, there were many benefits that resulted from the implementation of IFQs in the Pacific Halibut fishery. Prior to 1995, thousands of halibut boats caught the total TAC in a few 24-hour periods. This type of derby fishing dramatically reduced safety, increased gear abandonment, decreased fresh fish supply throughout the year, decreased market price, and increased the cost of rescue efforts. Knapp (1996) found that some captains preferred IFQs because it allowed them to choose when to go out in order to avoid bad/unsafe weather conditions, increased safety on board, created better market prices, reduced crowding of fishing grounds, and fostered a less stressful work environment.¹³⁹ Knapp (1999) found that 85% of those sampled believed IFQs made fishing safer.¹⁴⁰ Many of the statements recorded included references to weather, shorter trips, the elimination of derby fishing, and the ability to work at a more comfortable pace.¹⁴¹ Finally, Brinson and Thunberg (2016) found that the season length increased from 0.1 years to 0.7 years and the average price increased from \$1.91/lb to \$4.86/lb.¹⁴²

¹³⁸ Sinclair, P. 1983. Fishermen divided: The impact of limited entry licensing in northwest Newfoundland. *Human Organization*. 42(4): 307-313.

¹³⁹ Knapp, G. 1997. Initial Effects of the Alaska Halibut IFQ Program: Survey Comments of Alaska Fishermen. *Marine Resource Economics*. 12(3): 239–248.

¹⁴⁰ Knapp, G. 1999. Effect of IFQ management on fishing safety: Survey responses of Alaska Halibut fishermen. *ISER working paper series*, 1-11.

¹⁴¹ I.d.

¹⁴² Brinson, A. A., Thunberg, E. M. 2016. Performance of federally managed catch share fisheries in the United States. *Fisheries Research*. 179: 213-223.

CHAPTER 3

METHODOLOGY

Data were collected over a three-month period from June to August 2018 in Sitka Alaska. Data collection consisted of a qualitative, multi-step, mixed method approach. General observations occurred first, followed by semi-structured interviews, and surveys. Interviews were transcribed and combined with the typed data from the surveys. Statements were sorted for each question to capture to views of each participant. Due to the qualitative nature of this project, the captured opinions show *perceived* IFQ satisfaction and *perceived* safeguard effectiveness of the subjects sampled for this study. Finally, to ensure consistency of sorting, only one researcher was responsible for transcribing and sorting responses. As researchers, we tried to eliminate bias, but with a project such as this, there is inherent objectivity in sorting responses and categorizing subject's opinions.

GENERAL OBSERVATIONS

The first few weeks in Sitka were spent acclimating to community life and behaviors, as well as building instrumental relationships. During this time general observations concerning fishing operations and local traditions were observed and recorded. These loose observations were recorded as field notes that included annotations on estimated crew size, dominant fishing gear types, number of boats at the docks, etc. During these first few weeks, invaluable relationships and connections were made with locals that became crucial in the process of soliciting interviews. Sitka's fishing community is close-knit, so it took considerable time and effort to build relationships and trust that would allow for the formation of paths of communication. Without living, working, and being involved with the community for a significant amount of time, these interviews would not have been possible. It is well known throughout the social science community that more reliable interview results are yielded from a researcher who lives within the community as a polite observer rather than one approaching the question from the outside.¹⁴³ Throughout the summer the researcher lived, worked, went commercial halibut fishing, processed fish on local boats, helped local fishermen offload fish, attended local tribal meetings, worked with a local fisheries conservation organization, and hosted community outreach events in Sitka. This active involvement caused the researcher to become a well-known face in the community, which allowed for interviews that otherwise would not have taken place.

¹⁴³ Moore, A. 2018. Personal Communication. The University of Rhode Island.

SEMI-STRUCTURED INTERVIEWS

Semi-structured interviews were conducted with two main groups of subjects, current Pacific halibut fishermen and former Pacific halibut fishermen. Current fishermen included four main groups of subjects; quota holders who were initial recipients, quota holders who have since bought in after initial implementation of IFQs, crewmembers, and hired skippers. Former fishermen consisted of four main groups of subjects; those who were excluded from initial allocation and never bought in, those who have sold all their IFQ, previous crewmembers, and medical transferees (those who hire skippers to fish their quota due to a non-chronic medical condition). Snowball sampling was utilized to locate subjects. All interviews were conducted face-to-face, recorded, and transcribed at another time. All interviews were conducted in Sitka, AK and most commonly occurred at fishing harbors, on subject's boats, at subject's houses, or in Alaska Longline Fishermen's Association's local office. The choice of where to meet was most often left to the interviewee to ensure they were comfortable in the interview setting. Interviews lasted anywhere from 30-120 minutes, depending on the interviewee's availability and depth of answers. A list of sample questions is provided in appendix one of this paper, but only served as a guide to facilitate the sharing of opinions and stories. The key and most important questions are bold-faced. After the interview data were transcribed, statements from each question were grouped into major, reoccurring themes and compared to previous findings by other researchers.

SEMI-STRUCTURED SURVEYS

This research transpired during the busy fishing season, which meant that many individuals who wanted to participate in the face-to-face interview process were unable to because they were out at sea. In order to facilitate their participation, open-ended email surveys that utilized Google Forms were used in lieu of face-to-face interviews. The questions asked during the interviews and surveys were the same to retain consistency. In addition to the structured, open-ended questions, there was a section of the survey in which participants could add any thoughts they had or share any stories they found to be pertinent. In order to compile fishermen's emails for the survey Alaska Longline Fishermen's Association's subscription program was utilized, in addition to contact information given by local experts and research subjects during snowball sampling. The quoted responses from these surveys were integrated for analysis and sorting with the transcribed interview data.

CHAPTER 4

RESULTS

PACIFIC HALIBUT IFQ SATISFACTION

In total, 31 individuals participated in this study (n=31). Of those 31 individuals, 22 participated in face-to-face, semi-structured interviews and 9 submitted their responses on the Google Form survey. The face-to-face interviews lasted anywhere from approximately 15 minutes to 120 minutes and on average took about 35 minutes. In total, 754 minutes were used to create the transcriptions utilized in analyzing the results of this study.

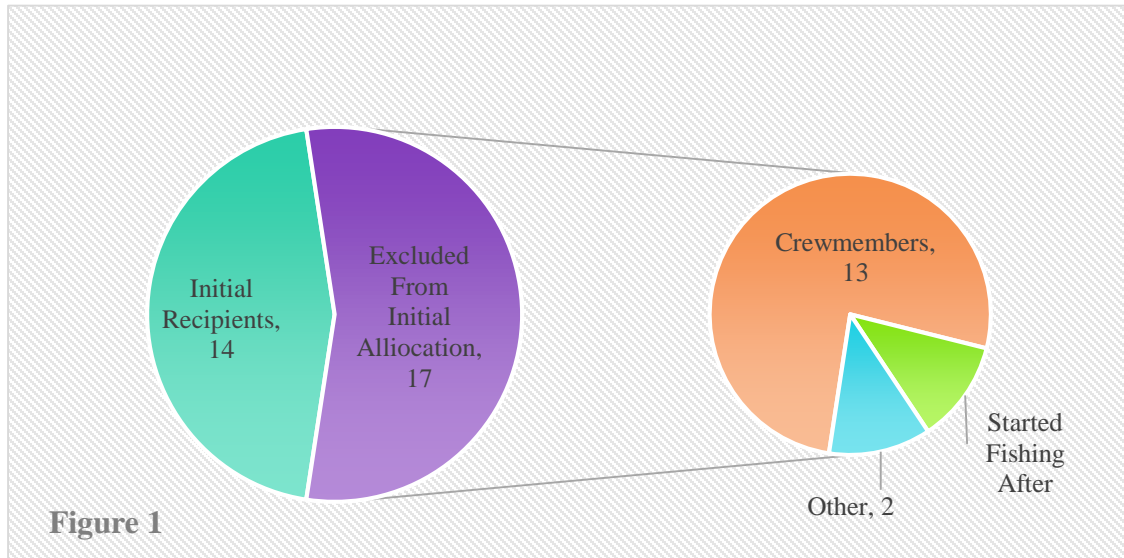


Figure 1: Research subject demographics based on the Pacific halibut IFQ system. Those excluded included, crewmembers, those who started fishing after IFQs, and other/unknown.

All subjects were either previous or current Pacific halibut fishermen and 2 of the 31 were Alaskan Natives. Of the 31 individuals, 14 were initial recipients of IFQs and 17 received no quota from the initial allocation (figure 1). Initial allocation to a single

individual ranged from 5,000lbs to 120,000lbs. Of the 17 who were left out of the initial allocation of IFQs, 13 were crewmembers, 2 started fishing after the IFQ program was implemented, and 2 are unknown as they did not specify on the Google survey (figure 1).

From the various questions posed to research subjects to gauge acceptance of IFQs, it was determined that overall the subjects sampled generally approved of the Pacific halibut IFQ program. There were 22 subjects that expressed approval for the IFQ program, 8 that disapproved, and 1 that was indifferent (table 1). Within the group of

	Overall	Initial Recipients	Not Initial Recipients
Approved	22	12	10
Disapproved	8	2	6
Indifferent	1	0	1

Table 1: IFQ satisfaction based on allocation status.

initial recipients, 12 approved and 2 disapproved of Pacific halibut IFQs (table 1). Within the group of those excluded from initial IFQ allocation, 10 approved, 6 disapproved, and 1 was indifferent concerning Pacific halibut IFQ management (table 1).

Further examination must be given to the group excluded from the initial allocation that disapproved of IFQs in order to understand the subjects' rational. As shown in table 2 the large majority of those excluded from initial IFQ allocation that disapproved of Pacific halibut IFQs are/were crewmembers (table 2).

	Not Initial Recipients That Disapprove of IFQs
Crewmembers	5
Started Fishing After IFQs	1

Table 2: The largest majority of those who were excluded from the initial allocation and disapprove of IFQs were/are crewmembers.

All subjects were also asked their opinions regarding what impact Pacific halibut IFQ management had on them as individuals and on their communities (tables 3 and 4). In general, the majority of subjects who were initial recipients of Pacific halibut IFQs believed that the program had both a positive impact on their individual lives their community (table 3).

Initial Recipients	Individual	Community
Both (N, P)	0	2
Negative	2	5
Positive	12	7

Table 3: Initial IFQ recipients' opinions concerning the impacts of IFQs on both a community level and an individual level (N=negative, P=positive).

However, those subjects who were not awarded quota during the initial allocation believed that Pacific halibut IFQ management had a negative impact on their community, but a positive impact on their individual lives (table 4).

Not Initial Recipients	Individual	Community
Both (N, P)	0	3
Negative	6	10
Positive	8	2
Indifferent	2	2
Unclear	1	0

Table 4: Opinions of those excluded from the initial IFQ allocation concerning the impacts of IFQs on both a community level and an individual level (N=negative, P=positive).

Those individuals who generally approved of the Pacific halibut IFQ management scheme expressed similar beliefs as those found by Knapp (1996), Knapp (1999), and

Brinson and Thunberg (2016).^{144, 145, 146} Many subjects referenced the improvements in safety, better quality halibut, longer seasons, the ability to pick their weather, better price for halibut, and added market stability as positive impacts of the Pacific halibut IFQ system. In almost every interview, subjects compared their experiences during the derby days with that of their current fishing experiences:

“[Compared to the derby days there’s] a longer season, a lot higher price, a lot safer, less gear costs, less bycatch, yeah I can’t really think of anything better about the derby system.”

“Although we listened to the weather forecast it didn't matter, you went anyway. And it was stressful, and you pushed things hard and you did things you shouldn't have done, and it didn't matter what the weather was. It was not very safe, and you didn't handle the fish nearly as well as you do now because you didn't have time to. And you took what you could get for price because since it was only open a couple days a year then the processors could do what they wanted with the price. Today in the IFQ fishery, well as soon as IFQs started, we started letting our kids come halibut fishing. We wouldn't let them before because they were too young, and it was too dangerous. Although they went on other fisheries. And today you get to pick when you fish within the 9-month time period, but you can really pick it day by day with weather. If you don't like the looks of the weather you don't have to go, you don't have to endanger yourself and your crew. And to me that's huge. And the other thing that's huge is that the public gets fresh halibut 9 months out of the year instead of 3 or 4 days out of the year. And the fish is much better cared for and I think it's a much better use of the resource.”

During the Pacific halibut derby fishery, time was so restricted that fishermen would spend all the time they could just getting the fish in the boat. This meant fish were not properly dressed for hours or days. Additionally, ice and slush were often forgone to create more room in the holds for halibut. As a result, not only were fish not gutted, they

¹⁴⁴ Knapp, G. 1997. Initial Effects of the Alaska Halibut IFQ Program: Survey Comments of Alaska Fishermen. *Marine Resource Economics*. 12(3): 239–248.

¹⁴⁵ Knapp, G. 1999. Effect of IFQ management on fishing safety: Survey responses of Alaska Halibut fishermen. *ISER working paper series*, 1-11.

¹⁴⁶ Brinson, A. A., Thunberg, E. M. 2016. Performance of federally managed catch share fisheries in the United States. *Fisheries Research*. 179: 213-223.

were not iced until the derby was over and the crew had time to prepare for delivery.

Many subjects gave powerful accounts of how the handling of the halibut resource has changed since the implementation of IFQs:

“You didn’t have a choice of when you fished before, good or bad weather you had to do it. It also was, it was like a rush. You went out, you caught as many fish as you could, and you come back and then you waited in line and typically you were still cleaning because you didn’t have time to actually process the fish at the time you were fishing them. Right, so I mean just the whole quality of the whole thing was just a nightmare. I mean I remember the [boat] in Port Alexander, it would be sinking from the weight of the fish, there’d be like 4 inches of water on the deck because it had sunk down two feet just about to the point where it was just underwater because it had so many fish. And they couldn’t process them, they couldn’t manage them. I mean the whole thing was a freaking nightmare. And on top of that, you know I mean, when I finally did start fishing IFQ after losing the job I, you know the price just started going up and up and up, and the quality just got better and better and better. I mean, to me, it’s just night and day, the difference...I cannot understand how anyone would prefer the derby, even people that lost their jobs. I lost my job and I was happy about it.”

“The last derby fishery that I remember, I actually left Alaska for a little while because I was really only going up seasonally at that point and an old friend of mine called me up for that last 48-hour halibut opener, which I think would have been in the fall of 94 or 95...So I did and that was our last 48-hour opener and the weather was really, really bad. And we all got weathered in in Pelican and had a lot of fun. But that’s the only time I actually felt like wow I’m not going to make it physically through this opener, I think I’m going to have to say I can’t do it. And about that time our skipper called it, he’s like the weather’s just too bad, we’ve gotta go in. So, I was like whew! But of course, I’m thinking like oh my god we’re leaving those fish in the water, which of course people did back in those days because you know you’d set a bunch of gear, as much as you possibly could think that you could possibly haul in 24 hours or 48 hours...If the weather came up you were in a tough situation, you had to decide whether to keep fishing. You had to decide whether to leave your gear in the water, knowing you won’t be able to harvest those fish after it closes. So basically, you’re shaking live fish or dead fish, or you know re-bites, which is dead fish that have now been eaten by a live fish which has now died.”

“It opened, the weather was pretty nice, people set their gear, and then the weather blew up. So, you got all this gear in the water and for a lot of people, smaller boats, the weather was so tough they couldn’t pick it up. So, the gear

just sat there in the water. The fishery was over, it was like a one-day fishery, so all of a sudden, the fish are you know you couldn't haul the gear. The Coast Guard would be out there in the helicopter and you couldn't haul the gear after it closed, so people just let it sit there And I came out [trolling]...and I bet I counted 20 longline strings in a couple of miles that were just sitting there. This was just like 3-4 days after it closed. Guys would come and pick up the gear because it's valuable, but all the fish were dead...So that's when I became a real advocate for IFQs."

When thousands of boats are catching the majority of the halibut for the global market in a matter of days or hours, how do managers and enforcement agencies properly gauge how much bycatch there is or how much halibut is unnecessarily wasted? This answer is, realistically they cannot. These accounts vividly paint the wasteful picture that the halibut fishery was before IFQ management.

Managing the halibut fishery as a derby had significant impacts on safety.

Fishermen depended on just hours or days to make a significant portion of their yearly income. As a result, safety was often sacrificed in order to keep fishing. One of the most commonly mentioned reasons for supporting the Pacific halibut IFQ program is the improvement of safety, which was caused by being able to pick your weather, work at a more relaxed pace, and the reduction of fishing pressure:

"When you talk to the old guys that did the derby for longer than I did I mean they're still nursing injuries from the derby. Things like, oh I gaffed my foot and we just fished anyways and now I have a limp, or oh I smashed my finger and instead of going to the hospital we fished anyways and now I don't have a finger...The injuries people work through, just because there was no other choice and if they had a choice they would probably would have been fine. They would have just gone in and gotten it taken care of and everything would have been fine, but no instead they just continued to work."

"Yeah [IFQs] have changed my life. It's made that fishery so much safer. And you didn't go out with this feeling in the pit of your stomach of whose turn is it to get in trouble. And you know there was regular sinking's during the derbies."

“It’s changed it where it’s just so much safer and the quality of the product is so much better. And I like that, I like being able to say no I don’t want to go today, I don’t like that forecast.”

“The derby fishery was the reason the IFQ program got traction. Every halibut opening, we would have here, people were going to die. Fish were wasted, incredibly wasted. You know you have a two-day opening, people knew that maybe a set or two wasn’t gonna work out very well. They’d intentionally set more gear than they knew they could haul, so in case one was bad they could drop it and go to another, leaving a whole lot of dead fish in the water. It was really wasteful. And just the intensity of it all...you know we’d probably spend ten days getting ready for a two-day fishery. So, you know, you put all this time and effort into it and of course the night before it opens you get a big storm that blows through and you know as the skipper you can’t tell these guys ‘hey we aren’t gonna go.’ You know because they got ten days, they took time off from their jobs or whatever, so you would go. And it was really risky in some cases and that’s when people died. And you know the exhaustion of it all. We’d have these 48-hour openings and they’d start at like noon, but you know you were nervous, you didn’t sleep very well the night before. So you go out there and even if the weather was decent you’d start at about noon, so you fished through the first night until noon the next and you know you’re doing pretty good, but the second night...you were really tired...I was the one on the roller and I know a couple of times I fell asleep standing up at the roller and starting to hallucinate. It was just a great situation to get mangled. I can’t say enough bad about [the derbies], it was a terrible way to manage a fishery.”

Subjects in favor of IFQs also stated the positive impacts the management program had on the price and market for Pacific halibut fish. Due to the fact that the season was extended, fresh halibut was provided to the market all year, the fish were handled and processed better, and fishermen could choose to go fish when the price per pound was higher. This resulted in an overall higher dock price for halibut:

“What happened was that the market eventually corrected for these avalanches of poor-quality fish that were coming during the derby days and the fresh market started to grow, people started to eat more halibut...By the early 2000s, the price was starting to go up. So that definitely had an effect on our own fishing economy. It improved greatly because of that fact.”

Additionally, IFQs are transferrable and as a result, hold significant monetary value. This provides fishermen with some financial flexibility:

“... [IFQs have] enabled me to stay in the commercial fishery, I guess. They also have allowed me to grow my business in predictable ways. Borrowed against them to buy more quota and stuff like that. So, it’s been good.”

“Before IFQs there was no way for like fishermen to really build something to retire on and this kind of allowed people to build up a little something to retire on when they get old. Like any business, you build it up and then you can pass it on to your kids or sell it and have a little bit of retirement.”

“...pre IFQ there wasn't an option for holding a portion of the quota, and in response to implementation of that program we’ve made investments and planned our, you know, retirement so to speak or our whole investment strategy on the rules of the IFQ program.”

This study demonstrated that overall, the research subjects expressed more general support for the Pacific halibut IFQ program than opposition to IFQs. However, even two decades later there is still a large portion of fishermen who disapproved of the Pacific halibut management program. In a nutshell, the IFQ program simply decreased fishing effort by removing a large portion of individuals from the fishery. In other words, the fleet becomes significantly consolidated. As stated by Grimm, et al., (2012), in 1935 there were less than 5,000 U.S. fishing vessels and by 1975 this increased to approximately 17,000 fishing vessels, however, landings remained around 2.9-3.8 billion pounds despite the dramatic increase in the number of vessels fishing.¹⁴⁷ IFQs don't change the overall TAC or necessarily improve the health of the fishing stock, but rather take the resources from the many and redistribute them to the few. In turn, the people who are gifted access to the fishery feel as though the resource is better providing for

¹⁴⁷ Grimm, D., Barkhorn, I., Festa, D., Bonzon, K., Boomhower, J., Hovland, V., Blau, J. 2012. Assessing catch shares’ effects evidence from Federal United States and associated British Columbian fisheries. *Marine Policy*. 36(3): 644-657.

them because they have less competition and access to a larger portion of the stock.

Simply put, IFQs are effective at generating wealth for those with fishing history. This sentiment was expressed by many subjects:

“You really haven't done anything for the [fisheries] by bringing IFQs into it, besides make a bunch of millionaires.”

“But we fought really hard against it because we felt like what the IFQ system does is it creates wealth. It privatizes the fish. The state of Alaska limited entry system does a really good job of spreading that wealth out throughout the fleet. It was created with the idea in mind of giving the maximum number of people a reasonable way to make a living. And, you know, commercial fishing program in Alaska has done that really well. IFQs on the other hand, the tendency to consolidation, and to do it on fewer and fewer boats with stacking of permits, and fishing other people's quota, it was an obvious problem. So, you know, we fought really hard against it.”

The fleet consolidation that results from IFQs creates a domino effect that reduces the number of jobs in the community and the amount of capital flow through the community. The question then becomes do we want to increase the value of the resource or provide jobs to more people in the community? The fishing economy doesn't just provide jobs to fishermen, but also to processors, gear supply stores, grocery stores, schools, etc.:

“There was a lot more movement of money through a lot more of these towns prior to IFQs. Which is not to say the IFQs caused the stagnation, but you know some of the underlying problems are still not being addressed...Now you have all of these IFQ holders holding onto their stock and making a bunch of money and you know hoarding it in one place or just keeping it to themselves as opposed to during the derby years you had a lot of flow of money going to the town and now...it's not like that anymore...less predictability, and less movement of financial transactions.”

“I feel like it stratified the economy and that's never a good thing...I think that a lot of the people who own the majority of the IFQs don't live in Alaska...and the state of Alaska doesn't have an income tax, so it doesn't benefit locally.”

Another consequence of fleet consolidation and the reduction in competition is the expansion of temporal and spatial impact. Due to the decrease in fishing pressure the length of the Pacific halibut season has greatly increased, which allows individuals more harvest time. Could this extension of the season increase levels of bycatch? Additionally, before IFQs the halibut stock was only fished a few times a year; does switching to a nine-month season and expanding temporal impacts have any unintended consequences on the stock? One fisherman commented on this:

“It [the IFQ program] must have had some effect. We’ve gone from fishing the ocean for a week a year to fishing it for months a year. What’s that effect? ... So I think that probably having, you know, 11.5 months where they were unmolested had a different effect on the school than fishing it for a longer period of time.”

Also due to the decreased competition, boats are sparse while fishing so fishermen don’t tend to travel to distant fishing grounds as frequently as they did during the derby days. What ecosystem impacts could this be having? One subject explained this phenomenon:

“[People] can fish in inside waters, so that’s another change that happened. When you had the derbies, everybody had to spread out, but now people are hammering areas. You know why burn the fuel to go 200 miles away when you can now take your time, and everyone fishes the same 30-mile area.”

This is also supported by a 2007 study concerning artisanal fishing behavior.¹⁴⁸

Abernethy, et al. (2007) found that fishermen’s behavior is likely driven by family tradition, tradeoffs with leisure time, and cost of fuel and gear.¹⁴⁹ Traveling to distant

¹⁴⁸ Abernethy, E., Allison, E.H., Molloy, P.P., Cote, I.M. 2007. Why do fishers fish where they fish? Using the ideal free distribution to understand the behaviour of artisanal reef fishers. *Canadian Journal of Fisheries and Aquatic Sciences*. 64: 1595-1604.

¹⁴⁹ I.d.

fishing grounds requires extra time and fuel, without a guaranteed return on those investments.

It has been made clear by the data stated previously that disapproval for Pacific halibut IFQs is much higher among subjects who were not gifted quota. The largest majority of those not gifted quota were or are crewmembers. Many consider crewmembers to be the ones who fared the worst during IFQ allocation. Due to the fact that vessel owners and leaseholders ‘risked the most’ effort and capital they were awarded the quota.¹⁵⁰ However many subjects felt that this was unfair and misguided:

“So, all over Southeast Alaska and all over Alaska there were people that were completely cut out when they did [IFQs]. And ignored the maritime law, which the way crewman worked for millennia, you know it came from Britain, you were not paid wages, you got a share, you were a partner, you worked your way up through the program where your shares increased. Like you started out at a quarter share, then you went to half share, three quarters share, full share. It was a big deal to be a full share guy, but when they did the IFQs they said they have no investment, no skin in the game, which wasn't true. Crewman paid for the lost gear, they paid for the insurance, they paid for the fuel, and they paid for the groceries. They paid for everything except the boat.”

This research is critical to the existing body of literature because it captures the opinions of many crewmembers and those who were not awarded any quota. According to Carothers (2015), crewmembers and next-generation fishermen are disproportionately impacted by resource privatization.¹⁵¹ In other words, there are those who receive the windfall and those who do not. The literature is greatly lacking in capturing the views of

¹⁵⁰ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

¹⁵¹ Carothers, C. 2015. Fisheries Privatization, social transitions, and well-being in Kodiak Alaska. *Marine Policy*. 61: 313-322.

these individuals because “Those who likely fared the worst exited fishing and are thus challenging to locate.”¹⁵² This is evident and supported in the current scientific literature, which largely focuses on the opinions of quota holders and captains (Berman & Leasak, 1994, Carothers, 2015, Carothers, 2013, Carothers & Lew, 2010, Knapp, 1996, Knapp 1997, Knapp & Hull 1996, Kotlarov, 2015).^{153, 154, 155, 156, 157, 158, 159, 160} This research seeks to shed light not only on the opinions of the ‘haves’ but also the ‘have nots’:

“Of course, it was very controversial with letter writing and anti-IFQ and pro-IFQ and others. And we were all looking at other ways to manage the system, but I think it was very controversial and divisive in the fishing community because you could see the factions and they call it privatization of a resource...For me, it was a big, those who have and those who have not, so that's very transparent.”

According to one crewman interviewed, “The crewmen called them ‘I F[expletive] Yous’ And they were, they were you know”. It was an extremely divisive time to be in Sitka, AK. Relationships were destroyed or strained based on individual’s opinions concerning the potential Pacific halibut IFQ program. As one might guess, those who knew they would benefit were on one side of the battle while those who might lose

¹⁵² I.d., at pg. 317.

¹⁵³ Berman, M., & Leask, L. 1994. On the eve of IFQs: Fishing for Alaska’s Halibut and Sablefish. Review of Social and Economic Conditions, Institute of Social and Economic Research. *University of Alaska, Anchorage*. 29(2):1-20.

¹⁵⁴ Carothers, C. 2015. Fisheries Privatization, social transitions, and well-being in Kodiak Alaska. *Marine Policy*. 61: 313-322.

¹⁵⁵ Carothers, C. 2013. A survey of US halibut IFQ holders: Market participation, attitudes, and impacts. *Marine Policy*. 38: 515-522.

¹⁵⁶ Carothers, C., Lew, D. K., Sepez, J. 2010. Fishing rights and small communities: Alaska Halibut IFQ transfer patterns. *Ocean & Coastal Management*. 53(9): 518-523.

¹⁵⁷ Knapp, G. 1996. Alaska Halibut Captains’ Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43–55.

¹⁵⁸ Knapp, G. 1997. Initial Effects of the Alaska Halibut IFQ Program: Survey Comments of Alaska Fishermen. *Marine Resource Economics*. 12(3): 239–248.

¹⁵⁹ Knapp, G., & Hull, D. M. 1996. *The first year of the Alaska IFQ program: a survey of halibut quota share holders*. Institute of Social and Economic Research, University of Alaska Anchorage.

¹⁶⁰ Kotlarov, A. 2015 Characterizing Crew and Fuel Price Impacts: A Survey of Pacific Halibut and Sablefish Quota Share Holders, Technical Memorandums. NMFS-F/AKR 11, 89 p.

their livelihoods were on the other side. Neighbor against neighbor. According to one subject, "...if you were not one of the ones that were 'in' you were nothing. Nobody wanted to talk to you, they don't care, yeah it was really ugly." As expressed by this subject, privatization often shifts the power relationships between quota holders, skippers, crew, and neighbors in the community.¹⁶¹ When the Pacific halibut IFQ management scheme was enacted a significant number of crewmembers lost their jobs due to the immediate consolidation of the fleet (subjects' use of the term 'deckhand' is equivalent to 'crewmember'):

"[The] overall the effect I think of the IFQ system was a major loss of deckhand jobs...It's a little bit of a sharecropper situation now, where my friends can't afford to go out and catch their own fish. I mean they could, but why would they when they can go walk on another boat and have their friend [catch it]. [The quota holders] do a lot of the crew work, so the [captain] has one crew member and takes 2 [walk-ons] ...So there's just less jobs and the crew shares went down...So that was one of the big changes, was the cut in deckhand jobs and the lowering percentage that goes to the deckhands."

"And certainly, deckhands felt like cattle, you know, you were like a cog. You no longer had any relevance, you could be replaced because, you know, there were lots of people looking for deckhand jobs."

"What it did was immediately pitted people, the ones who knew they were going to be extremely wealthy because of this and the rest of the you know all of the deckhands. Basically, if you were a deckhand and you didn't buy quota you were out of luck...Yeah, it was a horrible time in this town and certainly in the fishing fleet in this town...If you were not one of the ones who set it up to benefit you, who chose the years, the qualifying years? I know people who fished halibut and black cod for years before that, but you know maybe they hadn't been around those years or had been injured, or whatever, for some reason they didn't fish, or they fished minimally during the years that counted and they got almost no quota. And some of those were really the people that pioneered the fishery."

¹⁶¹ Carothers, C. 2015. Fisheries Privatization, social transitions, and well-being in Kodiak Alaska. *Marine Policy*. 61: 313-322.

All of the ‘have nots’ of halibut IFQs were not just crewmembers. Some individuals expressed they had been fishing their whole lives but had been injured or otherwise obligated during the narrow qualifying years. This barred them from eligibility for quota, and as a result, some have never fished for halibut again. A few subjects explained that this was what had happened to them:

“I had \$30,000 in just longline gear for example. And I had done about \$30,000 worth of work to my boat to make it efficient...And you know I competed, I could catch. But I started crewing and I couldn't get back to Sitka to do a 24-hour halibut opening and because I didn't make a delivery in those three years, I didn't know about that language either, it wasn't available to the public. **I didn't get one pound and I had fished halibut for 20 years before the deadline and there's a lot of people like that.**”

Finally, Pacific halibut IFQs had adverse effects on communities throughout Alaska. According to Carothers (2015), privatization is a “fundamental driver of social change in fishing communities.”¹⁶² The ripple effect felt throughout communities is explained by several subjects below:

“There's a lot less boats participating in the, particularly the halibut fishery, by half than there was in the derby years. So, I see that affecting the support sector mostly. I mean the people who are in have more, but having more boats supported a much more active, shipwrights, and fiberglass, and machinists, and you know all of that that goes along with that...So when you lose that support sector the fleet and the community becomes less viable. So, Sitka has been able to maintain that, but it's not easy. But the smaller communities have not been able to maintain that small sector and if you lose that and you lose your processor then that fish goes out of town and you lose all of that raw fish tax and sort of that economic activity generated by landings. So big impacts on communities for sure, but much more so the rural or remote rural communities than the ‘urban’ bigger Alaskan communities like Sitka, Petersburg, and Ketchikan.”

“The entity that [IFQs] hurt the most was the villages. The only cash economy in Alaska on the coast in the villages is fishing. And all the villages

¹⁶² Carothers, C. 2015. Fisheries Privatization, social transitions, and well-being in Kodiak Alaska. *Marine Policy*. 61: 313-322, at pg. 313.

here in Southeast, all of them, would fish halibut. They'd fish in little skiffs; the historic makeup was in thirds. A third were skiffs., a third were medium-sized boats...and a third were large boats. And those three different sizes of boats each caught a third of the [TAC]. The skiffs, there were a lot more of them, caught a third of the [TAC]. The middle-sized boats, there were a less than the skiffs, caught a third of the [TAC], and the large boats caught a third of the [TAC]. And when they went to the derbies, as they got compacted, the skiffs got cut out because the people over in Angoon couldn't go out in a 40-knot blow when there was an opening.”

The second subject makes an interesting point, that they believe the weeding out of small-boat fishermen began before IFQs. That it actually began with the poor management of the derby style fishery. Due to the fact that small boats couldn't risk going out in bad weather for a derby, many lost their fishing history, which made them ineligible for IFQ allocation.

Overall, 20 out of 31 subjects believe that Pacific halibut IFQs have had some sort of negative impact on their communities. This is significant because only 8 out of 31 subjects believe that Pacific halibut IFQs have had a negative impact on their individual lives. This is similar to what Carothers (2015) found when studying fisheries privatization in Kodiak, Alaska.¹⁶³ In that 2015 study, the researchers found that respondents were more unified in identifying negative impacts to the community versus individual well-being.¹⁶⁴ I think the data presented supports the assertion that this is due to the fact that the monetary gains were greater for individuals compared to communities. In the case of Pacific halibut IFQs community economies seem to be taking the hit. An alternative explanation for this is the time that has passed since the implementation of the Pacific halibut IFQ program. As explained by one subject:

¹⁶³ Carothers, C. 2015. Fisheries Privatization, social transitions, and well-being in Kodiak Alaska. *Marine Policy*. 61: 313-322.

¹⁶⁴ I.d.

“[IFQs] tore the community apart during the years of fighting over IFQs, the gap years, and then when the quota program went into place. And it took a lot of years for that to settle down. There’re some people who really fought it, but once it went down bought in and really made it work for them. And there’s some people who were still bitter and unhappy about it, but there are more and more people I guess who IFQs have been the reality ever since they entered the fishery. So, there’s over time I would say it’s, that rift is healing.”

These data do include the views of several subjects who did not begin fishing until after the implementation of the IFQ program. This may have skewed the opinion of IFQs in the positive direction.

In conclusion, it can be affirmed that, in general, among the subjects of this research support for Pacific halibut IFQs outweighs the opposition. Regardless, there are still flaws of the program that must be analyzed in order to understand the full and lasting impacts the Pacific halibut IFQ program has had on fishing communities.

SAFEGUARD EFFECTIVENESS

The Pacific halibut IFQ program is unique from other IFQ programs because of the numerous measures put in place to safeguard the industry from known impacts of privatization. Numerous fishermen in this study attributed the success of the Pacific halibut IFQ program to these safeguards; “Without these caveats, the IFQ plan would have been a big mistake.” Before implementing the IFQ program the NPFMC, with the help of many researchers, NGOs, and fishermen, analyzed other IFQ programs around the globe. The intention was to create a hybrid program that would hopefully avoid many of the well-known problems that traditionally accompany resource privatization. Some of these problems include consolidation, sharecropping, and outside ownership. One subject, who was a member of both the NPFMC and the IPHC stated that:

“And it was super controversial, and we tried to really build our program based on what we learned from the New Zealand program. To respond to the way corporations had taken over and consolidation of the quota had really pushed out the little guys...Sort of all the social caveats that are in place to try and protect the small boat fleet.”

The seven safeguards of the Pacific halibut IFQ program are what sets it apart from other catch share programs. Additionally, area 2C (Southeast, AK), is one of the only management areas where these safeguards have not been vertically integrated and have remained intact. However, the vessel size categories safeguard was disregarded for this study because it is not unique to this program and the leasing provision included in the safeguards was disregarded because in area 2C catcher boats are barred from leasing quota.

Each subject was asked their opinion concerning their perceived effectiveness of each safeguard. Additionally, they were asked if there were any ways they thought the safeguards could be improved or added to for the benefit of future fisheries.

Owner on Board

The owner on board provision states that the owner of the halibut quota must be on board while that quota is being fished. According to subjects, the rate of return on quota investment is quite good from an outside perspective. As a result, investors were initially quite interested in purchasing quota, but the combination of these safeguards has prevented these ventures. Owner on board was intended to keep the fleet as an owner-operator fleet. However, there are ways around this provision. For example, quota holders that have A-shares (freezer boat shares) may lease out their quota, initial recipients of quota are exempt from being on board, vessel investment of a certain level (20% in area 2C) exempts the quota holder and medical transfers.¹⁶⁵ There are many local terms for these types of quota holders including, absentee owners and slipper skippers.

Of the 31 subjects, 21 thought the owner on board safeguard was successful in accomplishing its goals, while 6 felt it was ineffective, and 4 did not state a clear preference (table 5).

	Owner on Board Safeguard
Successful	21
Not Successful	6
No Response	4
Table 5: Subjects' perceived effectiveness of the 'owner on board' safeguard.	

¹⁶⁵ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

The subjects who thought this provision was successful, stated reasons were the retention of a small boat fleet, a fisherman operated fishery, quota price control, quota turnover, safety, and the introduction of a form of inefficiency. Outside investment was a big fear when managers were developing the Pacific halibut IFQ program, but as one subject stated this safeguard helps combat this, while also contributing to price:

“If you could invest in IFQ and not be part of the fishery, as in not get on the boat, the prices of IFQ would go through the roof because it’s a good investment. And the only reason why people don’t invest for the sake of investing is because they have to be there.”

One subject presented an interesting perspective that the quota owner acts as a check system for safety. These individuals have to go out on a boat that they do not necessarily own and have to trust that it is going to deliver them home safely:

“If you have to go out on the boats then you’re going to care about the safety and condition of the boat and so it helps improve the safety of it. And if you actually have to eat and sleep with the crew you kind of help with the pay scale on that, you know, so I think that’s a good thing...the real value is in actually owning the quota...So, by having an owner on board you’re making sure that the value of the fishery stays with those who are actively fishing it.”

Finally, subjects believed it would *eventually* lead to a turnover in quota. Now, those who have A-shares or were initial recipients do not have to be on board. However, initial recipients will eventually pass on and those who purchase their quota will not have this luxury. This means that when people get older and no longer want to be onboard, they will sell their quota to the next generation. Currently, on the contrary, initial recipients hoard their quota because they view it as a retirement fund that continues to collect value while they stay at home.

To this point, many subjects believed this safeguard was rendered ineffective due to all of the loopholes. These loopholes have resulted in the transformation of the fishery,

“I would argue that we are further and further away from an owner-operator. We started out as that primarily and we are barely even a shred of that anymore.” Beyond initial recipients, there are other loopholes that can be long-term:

“That’s only in Southeast. It hasn’t been that effective because the medical transfer has been so liberal. And it took me a while to figure out, I was kind of mad for a while, I was like how are all these guys fishing this quota and they don’t have the guys on board? And then I did a medical transfer and I figured out just what the deal was, where I think it’s three years per injury, so you say ‘oh my shoulder hurts’ for three years and then you go back and so ‘oh it’s my knee’ and then you go back and ‘oh it’s my elbow,’ and there’s nine years right there with three different things. That has not been effective...In effect, it’s made less quota available for transfer and probably pushed up the price. So, it hasn’t helped young people get into the fishery, but it’s helped that old guy who’s been dependent on the fishery most of his life to keep making that money.”

In addition to medical transfers, there is the ability to invest in the fishing vessel. This also allows you to skirt around the owner on board safeguard.

A few of the arguments that supported this safeguard asserted that owner on board had controlled the price per pound of halibut quota. Contrarily, many other subjects claimed the exact opposite:

“The price of quota has gotten so high that the cost of servicing the debt on quota is higher than the cost of leasing quota. So...if you are a fisherman trying to get into the fisheries, if you are to follow the intent of owner on board, you are asked to spend more money on the quota than you would have to lease it. And until the, the uh, debt service is less on the quota, that is the correct opportunity to follow.”

“I like the socio-economic effects of owner on board, but I don’t think you can allocate the access to the resource and control the value of it. And 70 dollar a pound halibut is overpriced. And somehow there is a view that somehow it is moral to pay Wells Fargo nearly all of your money, but it is immoral to pay that to another fisherman. And that’s where I find it interesting; the fishermen being the bank in my mind is not different, but people view it differently.”

Although these responses are mixed, fishermen generally believe the owner on board safeguard has been successful. Overwhelmingly, 3:1, subjects believe this provision is responsible for the retention of an owner-operated fleet.

Block Plan

Originally, the block plan stated that blocks less than 20,000lbs could not be consolidated with other permits.^{166,167} The 20,000lbs threshold has come down considerably due to the cuts in quota and health of the halibut stock. Currently, the block plan bars individuals from owning more than 3 blocks of halibut quota. There are two types of quota, blocked and unblocked; blocked cannot be combined with other blocks, but unblocked can. As a result, unblocked quota provides fishermen with more flexibility and the ability to expand their ownership to a certain level. Previously, block ownership was limited to two blocks and some argue that block ownership should be decreased back to this level. The intention of the block program was to prevent excessive consolidation.

Of the 31 subjects, 22 thought the block plan provision was successful in accomplishing its goals, while 6 felt it was unsuccessful, and 3 did not state a clear preference (table 6).

	Block Plan Safeguard
Successful	22
Not Successful	6
No Response	3

Table 6: Subjects’ perceived effectiveness of the ‘block plan’ safeguard.

¹⁶⁶ Knapp, G. 1996. Alaska Halibut Captains’ Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43–55.

¹⁶⁷ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

The block plan can serve as a hindrance and limit to consolidation. Restricting the number of blocks limits the amount quota and results in quota turnover. Over time, however, the size of unblocked that can be combined has increased. The process of combining smaller amounts of quota is called 'sweep-ups.' Originally, these small pieces were intended to provide affordable entrance into the fishery, but many fishermen claimed these were unworkable:

“The sweep-up provision was just something that came about because a lot of people had little pieces of quota that weren't worth gearing up to go out for. So, to allow that small amount of consolidation was, I think, a good idea. And I personally bought little pieces and as the amounts that you're allowed to sweep-up grew a little bit then that's how I kind of build mine.”

Subjects also claimed that the block plan has been successful at maintaining a stratified fleet with a strong small boat presence:

“The block proposal and the block system was a great idea...Because there's all different sizes of operators and the big ones always want more, and the small ones are okay with a little.”

Controlling consolidation in this manner levels the playing field between large operators and small operators, resulting in the retention of small boat operations.

Finally, those who believed the block plan to be successful stated that it introduces inefficiencies that result in quota turnover. If a big block of quota comes up for sale and a fisherman would like to buy it, they must first sell one of three of their smaller blocks in order to purchase the new block. Often times this is seen as a hindrance, but at the same time forces people to put quota on the market to move up.

The most common critiques and perceived failures of the block plan were thought to be due to the sweep-ups. Increasing sweep-up levels decreases the number of small blocks on the market or eliminates small blocks entirely. Small blocks may be

unworkable for those who own their own vessels and may have to justify the costs of operation. On the other hand, small blocks are a great way for crewmembers to build capital to invest in larger portions of quota. If a crewmember purchases quota, they can fish it on their captain's boat. This is not only beneficial for the crewmember, but also the captain because it brings more quota on the vessel. Those who argue against the success of the block plan state that the scenario explained above is now unreachable due to excessive consolidation produced by sweep-ups:

“You can't afford [the blocks], you can't afford a thousand pounds [now].”

“My husband was one of the creators of the block amendment...and that's helped, it has helped safeguard against consolidation, but now you have a really aging fleet. The average skipper age is probably mine, which is 65...and young people can't afford to get in... It's a huge problem now that, you know, reflects back that same thing that you consolidated wealth.”

According to an Alaska-based quota brokerage, the last 2C halibut sold was B-class quota and sold for \$65.00/lb.¹⁶⁸ The maximum sweep-up limit in area 2C is 1,999lbs.¹⁶⁹ If you were able to purchase a small block of 1,999lbs, this would cost you \$129,935. The average weight of a single halibut in area 2C is approximately 30lbs.¹⁷⁰ This means you would max out your quota with about 66 fish. The current dock price is around \$5.50 per pound for halibut. One fisherman estimated that between 65-75% of the money leaves the boat for expenses; fuel, crew, maintenance, licensing fees, ice, food, bait, etc. If you only

¹⁶⁸ Sold Halibut IFQ Quota, 2C [Internet]. (AK): *Alaskan Quota & Permits Broker*, Alaska Quota & Permits LLC; 2019 [Cited 2019 Feb 18]. Available from www.alaskabroker.com/listings/halquota_sold.html

¹⁶⁹ Halibut IFQ Quota Share, 2C [Internet]. (AK): *Alaskan Quota & Permits Broker*, Alaska Quota & Permits LLC; 2019 [Cited 2019 Feb 18]. Available from www.alaskabroker.com/listings/halquota.html#quota_twoc

¹⁷⁰ Stewart, I., Webster, R. 2017. Overview of data sources for the Pacific halibut stock assessment, harvest strategy policy, and related analyses. *Prepared for the International Pacific Halibut Commission*, IPHC-2018-AM094-09. <https://iphc.int/uploads/pdf/am/2018am/iphc-2018-am094-09.pdf>

pocketed 35%, without interest, it would take about 34 years to pay off one small block. This means halibut quota is a long-term investment, but how is one able to sustain their operation on a small or non-existent profit margin? And how are young people able to justify investing in an expensive market that is not guaranteed to retain value over time? After all quota shares are a percentage of the TAC, they are not set in stone. As noted by several fishermen they have taken many cuts, one which was around 75% of the TAC. These questions will be addressed in following chapters.

Sea Day Requirement

The sea day requirement states that only crewmembers or initial quota share recipients with 150 days of experience in a U.S. fishery may buy quota.^{171,172} The key phrase here is ‘U.S. fishery.’ This means that fishermen who are not Alaskan residents may own Alaska Pacific halibut quota. According to NMFS, in 2018, there were 2,575 IFQ permits for halibut/sablefish and CDQ halibut IFQ permits combined.¹⁷³ Of the 2,575 quota shareholders, 1,945 have registered addresses in Alaska.¹⁷⁴ Of the remaining 621 permits, 389 were registered to Washington state addresses and 104 were registered to Oregon state addresses.¹⁷⁵ The remaining 128 permits were registered to varying states including, but not limited to, Massachusetts, Florida, Hawaii, Colorado, Maine, and

¹⁷¹ Knapp, G. 1996. Alaska Halibut Captains’ Attitudes Towards IFQs. *Marine Resource Economics*. 11(1): 43–55.

¹⁷² Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

¹⁷³ Permits and Licenses [Internet]. Anchorage and Juneau (AK): *NOAA Fisheries Alaska Regional Office*; 2018 [cited 2019 Feb 18]. Available from alaskafisheries.noaa.gov/permits-licenses?field_fishery_pm_value=Individual%2BFishing%2BQuota%2B%28IFQ%29%2BHalibut%2FSablefish%2Band%2BCDQ%2BHalibut%2BIFQ

¹⁷⁴ I.d.

¹⁷⁵ I.d.

Arizona.¹⁷⁶ Finally, of the 2,575 permits, 80 were registered to an incorporated company or corporation.¹⁷⁷ Of the 80 corporations, 26 were located in Alaska, 41 in Washington, 8 in Oregon, and 5 between California, Montana, Wyoming, and Utah.¹⁷⁸ According to Pautzke and Oliver (1997), the original intent of these safeguards was to maintain an owner-operated fleet and prevent absentee corporation ownership.¹⁷⁹ However, there were corporations that were the initial recipients of quota.¹⁸⁰ Additionally, corporations and partnerships are permitted to purchase catcher vessel quota if they received an initial allocation of quota shares.¹⁸¹

Seemingly, it may have made more sense to limit the ownership of Pacific halibut IFQs to Alaska residents, but this would be in direct violation of the Interstate Commerce Clause of the U.S. Constitution.¹⁸² The Interstate Commerce Clause prevents the creation of state policies that favor state citizens and businesses at the expense of non-citizens that conduct business within the state.¹⁸³ One subject commented on the discrepancy between non-resident and resident permits:

“There’s a lot of heavy hitters from down south. If you look at the uh CFEC table of income by permit, they break it down between resident and nonresident, nonresidents beat them every time...Interstate commerce clause, thou shalt not make rules that at a federal level make preference to one state over another.”

¹⁷⁶ Permits and Licenses [Internet]. Anchorage and Juneau (AK): *NOAA Fisheries Alaska Regional Office*; 2018 [cited 2019 Feb 18]. Available from alaskafisheries.noaa.gov/permits-licenses?field_fishery_pm_value=Individual%2BFishing%2BQuota%2B%28IFQ%29%2BHalibut%2FSabfish%2Band%2BCDQ%2BHalibut%2BIFQ

¹⁷⁷ I.d.

¹⁷⁸ I.d.

¹⁷⁹ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17. <https://www.npfmc.org/ifqpaper/>

¹⁸⁰ I.d.

¹⁸¹ I.d.

¹⁸² Commerce Clause [Internet]. Ithaca (NY): *Legal Information Institute*, Cornell Law School; 2018 Sept [cited on Feb 21]. Available from www.law.cornell.edu/wex/commerce_clause

¹⁸³ I.d.

Of the 31 subjects, 20 thought the 150 sea days provision was successful at keeping quota in the hands of fishermen and preventing absentee ownership, while 4 felt it was unsuccessful, and 7 did not state a clear preference (table 7).

	Sea Day Safeguard
Successful	20
Not Successful	4
No Response	7

Table 7: Subjects’ perceived effectiveness of the ‘sea day requirement’ safeguard.

Many subjects thought that this safeguard was effective, but the tracking and verifying of sea days is elusive and there are no guidelines for how to do so. Of those who thought this safeguard was successful, they stated that 150 days of experience in a U.S. fishery paired with the owner on board clause prevents non-fishermen from investing in the industry. But how do you define fishing experience? And how do you define fisherman?:

“If they’re trying to drill down to what is actually fishing...If somebody is a slipper skipper or a walk-on, are they actually a fisherman? But we have permit holders that come on the boat and they’re out on the ocean and they’re either observing or you know ripping gills on deck. And if they come along and say that isn’t a fisherman then they are going to get down to a physical test of how much work are you doing, and it gets really confusing. So, I think that the original intent of that safeguard is effective, but when they try to revisit it on an ongoing term it gets sticky. And that was one of the IFQ committee issues of trying to weed out walk-ons, but if somebody has a quota share and is missing a leg and you try to say you aren’t a fisherman anymore, good luck on that.”

These questions are complicated and convoluted. After all, the MSFCMA doesn't even define the term fisherman.¹⁸⁴

¹⁸⁴ The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801-1891, at pgs. 4-12 (d))

Additionally, some subjects stated this clause was successful because it required quota holders to be U.S. citizens, whereas other Alaska fishing permits do not:

“The big thing that is very interesting is that you have to be a US citizen. Now one of my friends fished here for 22 years, in order for him to get his IFQ quota he had to become a US citizen. He wasn't, he was a swiss...He said, ‘I’m glad it happened, I’ve always been meaning to do it, but I needed something to kick me in the butt to do it.’ So that was a good thing, whereas a lot of permits and stuff, you do not have to be, State of Alaska permits, you do not have to be a U.S. citizen to own a state of Alaska permit.”

Those who thought the 150 sea days safeguard had been unsuccessful in keeping the quota in the hands of halibut fishermen argue two flaws in particular. One is that this clause does not specify experience in a certain fishery. This means that fishermen who are involved in other, more profitable, fisheries can swoop in and buy quota:

“Why should some guy who had a windfall of millions of dollars [in the Bering Sea crab fishery] come impact me because he has 150 sea days and wants to ride along. I used to think [the 150 sea days] was a good thing, but I think it’s pretty useless right now. It’s better than nothing, at least you could say I was a fisherman at one time.”

The second is that the 150 sea days cutoff is arbitrary and essentially meaningless because there is no genuine way to track this and verify the authenticity:

“Back in the day when you were first able to apply for you know the ability to buy quota, we were all just deckhands and our skipper said, ‘hey go fill this paperwork out.’ And back then I don’t think that anybody was really keeping an eye on whether you, I mean nobody asked me about how many hours I’d had, I just received the certificate.”

Regardless, the majority of subjects still felt that the sea day requirement is successful and better than the alternative of nothing at all.

Ownership Caps

Ownership caps were intended to restrict the amount of quota one individual could own and the amount of quota one vessel could fish. This distinction between

individual and vessel is important in this case because the thresholds are different. The cap for individuals in area 2C (Southeast, Alaska) is 0.5% of the TAC and the cap for vessels in area 2C is 1% of the TAC.

Of the 31 subjects, 20 thought ownership caps were successful in accomplishing their goals, while 3 felt they were unsuccessful, and 8 did not state a clear preference (table 8).

	Ownership Caps Safeguard
Successful	20
Not Successful	3
No Response	8

Table 8: Subjects’ perceived effectiveness of the ‘ownership caps’ safeguard.

Ownership caps are critical when discussing fishing operations. For example, an individual can only fish 0.5%, but may be on a boat with other quota holders and when combined they cap the vessel out at 1%. Rather than taking out more than one vessel, they fish all of the quota on a shared vessel. This example implies that the quota holders are onboard the vessel, but this isn’t always the case. Fishermen, however, are innovative and find ways to make the vessel caps work for them. Rather than investing in and having the overhead of owning quota, fishermen purchase multiple vessels to bring quota holders on.

Many of the subjects of this research believe the ownership caps have been successful at preventing consolidation. The amount of consolidation varies from area to area based on the parameters set for the cap. This is another thing that makes Southeast, Alaska unique and arguably more successful:

“The most important thing we should have done was put that cap on an area like we did in Southeast. Whereas a half of a percent of an area rather than a half a percent of all of Alaska that you can take out of one area...Having your

vessel use caps by area I think really helps tie the solution to the area you're talking about. And you can have different ones for different areas.”

The main criticism of the ownership cap safeguard is that 0.5% is far too high. If the ownership caps were lowered it would further distribute wealth and quota to more people. It would also require more vessels because each individual vessel would be capped out more quickly. Additionally, it would keep vessels smaller because a large boat is unnecessary to land a smaller amount of quota. More vessels would mean more gear must be purchased, more crew must be hired, and more supplies brought on board. If the intent of the ownership cap safeguards was truly to prevent consolidation, retain more jobs, and keep small boats operating, then it would be best to lower this cap. Simply, a smaller cap would support more boats, create less consolidation, and generate more jobs.

Overall, the majority of subjects surveyed for this research believe owner caps are successful, but most agree that it might benefit the industry and Alaska to lower the cap.

Buydown Amendment

The buydown amendment utilizes the separation of vessel classes (A, B, C, D) and is intended to widen the quota pool for smaller vessels.¹⁸⁵ For example, D-class vessels can fish B, C, and D-class quota, C-class vessels can fish B and C-class quota, B-class vessels and fish B-class quota, and A-class vessels may only fish A-class quota. Southeast Alaska is the only area that has not blurred the lines between vessel classes for the buydown amendment:

“When the program was first approved it couldn't go down or up. We later changed it to allow it to go down. And in this area [2C] that's still the way it is. But in some of the other areas [the] line dividing between C and D has been eliminated so that's all one category.”

¹⁸⁵ Pautzke, C.G., Oliver, C.W. 1997. Development of the Individual Fishing Quota Program. *North Pacific Fishery Management Council*, 1-17, 7. <https://www.npfmc.org/ifqpaper/>

This is yet again another reason why area 2C is a unique management area to study. According to Dawson (2005), the policy objective of the Pacific halibut IFQ plan and the block amendment in, particular, was the prevent “a full-scale reorganization of the fleet, which might result in larger vessels dominating quota at the expense of smaller vessels.”¹⁸⁶ In area 2C vertical integration has not been implemented, which has benefited the area, but this is not the case in other management areas. According to Dawson (2005), vertical integration is a mark of failure for an IFQ program.

	Buydown Amendment
Successful	19
Not Successful	5
No Response	7

Table 9: Subjects’ perceived effectiveness of the buydown amendment.

Of the 31 subjects, 19 thought the buydown amendment was successful in accomplishing its goals, while 5 felt it was ineffective, and 7 did not state a clear preference (table 9). Of the subjects surveyed that owned boats, most owned C-class vessels, which may have skewed the results concerning the buydown amendment. Overwhelmingly subjects approved of this amendment because it widens the pool of quota available to smaller boats, while barring larger boats from buying small boat quota. Presumably, this keeps competition for quota between smaller operations, which in turn should be reflected in the price.

Seemingly, it is cheaper and more manageable to own a C-class vessel compared to higher vessel classes. Additionally, C-class vessels can purchase quota from both C

¹⁸⁶ Dawson, R. 2005. Vertical Integration in the post-IFQ halibut fishery. *Marine Policy*. 30(4): 341-346, at pg. 7.

and B-class pools. These two factors combined may increase the C-class fleet and in turn have unintended consequences for B-class vessel owners. Two B-class vessel owners that were interviewed spoke to the negative impacts of this amendment on B-class vessel owners:

“Another thing is you could fish down but not up, so everybody who could afford to buy quota well they just bought A-class and B-class and fishing it on their C-class boats. So that eliminated a whole class of boats...So the B-class got kind of totally wiped out by the C-class holders...So even if I wanted to get into the quota system, I don't think I could even buy B-class, there's not much available.”

“Out here it took away any reason to own a B-class vessel. So, if you have a B-class boat now you are just pulling just off the B-class pool. If you have a C-class boat you were previously just pulling off of C, but now you can pull off of C and B.”

If more B-class vessel owners were interviewed these results may have been different. In order to fully understand the implications of the buydown amendment future research should include a larger variety of vessel class owners.

Additionally, as stated previously, fishermen are innovative, and often times will find ways around what they regard as excessive regulation. The excessive regulation, in this case, being vessel size, which is delineated based on only length. This can create safety issues as unseaworthy vessels are constructed to create larger vessels that can hold more fish, while still fitting within a smaller vessel size class:

“It [The buydown amendment] benefits smaller boats a little bit, but we also do have the super 58s, I have one of those, 58x26 feet wide, which is not a small boat anymore. It's legislated inefficiency.”

Overall, the buydown amendment is extremely important and relatively successful in the general sense of large boats versus small boats. Generalities aside, may it have been

better to not have allowed buying down or up? This would have further restricted competition within each of the individual vessel classes. It is difficult to project what impact this may have had on fleet size, quota price, and safeguard satisfaction. However, before the program was changed and vertical integration was avoided, market transactions increased.¹⁸⁷ In the end, being able to only buy down is still far more beneficial than being able to buy down *and* up. In this case, where only buying down is permitted, a large portion of B-class quota is fished on lower class vessels, but one can speculate that if buying up was permitted this would have eliminated much if not all of the smaller class quota.

Conclusions

Overall, regardless of quota status and vessel size, it seemed to be agreed upon among the research subjects surveyed, that the safeguards have been effective and successful in accomplishing their goals and preserving the Pacific halibut IFQ small boat fishery. Nevertheless, during interviews, many fishermen suggested ways in which the safeguards could be improved. Many scenarios were suggested for improvement within the bounds of the Pacific halibut IFQ program and ways in which the program should be improved before it could be implemented elsewhere. These improvements and modifications are discussed in the following chapter.

¹⁸⁷ Dawson, R. 2005. Vertical Integration in the post-IFQ halibut fishery. *Marine Policy*. 30(4): 341-346.

MODIFICATIONS, CHANGES, AND IMPROVEMENTS TO IFQS

One of the main goals of this research was to cultivate ideas for improvement, both for the current Pacific halibut IFQ system and IFQ management schemes in general. The current Pacific halibut IFQ management plan has been in place for over two decades and the majority of the people interviewed were involved with either the development of the program, were initial recipients, were fishing in the community when IFQs were implemented and/or come from generations of fishermen. As such the individuals interviewed for this study should be considered experts in the field. Expertise built on years of real-world experience and working within the system.

Each subject was asked if they thought the IFQ system or its safeguards could be improved upon, modified or added to. Suggestions focused on limited entry/transferability, out of state ownership, initial allocation, ecosystem-based fisheries management (EBFM), leasing, owner on board, and community quota entities (CQEs).

Limited Entry/Transferability

Numerous subjects suggested a modified system of limited entry. The three important facets to the suggested system are leasing, perpetuity, and transferability. Several subjects stated that the program would have had entirely different outcomes had leasing been permitted or the permits were non-transferrable. If the permits were non-transferrable, they could not be bought and sold on an open market. This in turn would lower the associated price of quota.

Out of State Ownership

As discussed in previous chapters, handling out of state ownership of quota is elusive and hard to address because of the Interstate Commerce Clause. Additionally, Pacific halibut is managed federally, not at the state level. Regardless, numerous fishermen expressed interest in addressing the disparity between out of state and in state ownership. Perhaps, instead of directly discriminating against non-residents of Alaska by barring them from owning quota, a limit could be placed on the amount of quota allowed to be held out of state. Concerned subjects stated that they thought the number of out of state permits was harming the state of Alaska because that income exits the state. Simply put, once the quota and associated revenue leave Alaska, there is no guaranteed way to capture some of that within the state. It would be very difficult to mediate this problem without addressing federal law.

Initial Allocation

One of the leading criticisms of the current Pacific halibut IFQ program was the manner in which the initial allocation took place. The qualifying years to many were seemingly narrow and arbitrary. Additionally, another principal criticism is that these permits were gifted for free and in perpetuity. One suggestion included spreading out the initial quota allocation beyond just those who had fishing history from a few select years:

“You know, if anything, the initial allocation of quota share, you know if a program was to be designed again, I would probably be in favor of a somewhat different initial allocation and not the big windfall for the people who had the history during those years and maybe spread it out a little more to the people who participated...anyways it’s going to be a windfall but I guess spread it out a little more and don’t concentrate it so much on that narrow qualifying period.”

Instead of gifting away the quota, it also could have been sold. The opportunity to initially buy the quota could be controlled within either a lottery or auction framework.¹⁸⁸ This would avoid the ‘great giveaway of quota’:

“I mean why did my dad deserve to get that quota? Just because we were there in the golden era? We were just there in the qualifying years, he was just the right age at the right time. And that gave him rights to that stuff forever? I mean they could have not given it to the fishermen and sold it to them...I think the idea was kind of to set up this free market, tradeable, kind of like a stock thing. Everyone kind of liked that, it was kind of going with the politics of the era or something. But it didn't all have to be given to these people.

“I mean it’s hard to pick winners and losers, that’s where if the government would have sold it to these people at the get-go then I think it would have started at more of a level playing field. And then you could have had a chunk of money and set up an endowment like what a lot of universities have going on for management...Since you’re not making any more quota now, to get young people in you gotta take quota from the people that got it, or you have to have lots of outside money, state or federal dollars, that would buy that quota and offer it to young people below market rates. Some kind of subsidized form of entry. I think all that would do is drive up the price more...Suddenly you’re in an artificial market”

These suggestions should be included in the proposals for future quota share programs.

We see no plausible reason for why multiple distribution methods should not be considered that address both price and equity.

EBFM

Ecosystem-based fisheries management (EBFM) is a place-based tool that manages multiple stocks, while also considering ecosystems dynamics, habitat, and abiotic factors.¹⁸⁹ It is considered a more holistic approach to resource management and

¹⁸⁸ Bromley, D.W., Macinko, S. 2007. Rethinking Fisheries Policy in Alaska: Options for the Future. Prepared for the Alaska Department of Fish and Game, Juneau, Alaska.

¹⁸⁹ Fogarty, M.J. 2014. The art of ecosystem-based fishery management. *Canadian Journal of Fisheries and Aquatic Science*. 71: 479-490.

allocation.¹⁹⁰ EBFM for Pacific halibut would consider spawning grounds, migration patterns, other fisheries, predator/prey interactions, bycatch, etc. EBFM could be incorporated within the current IFQ system but would require the cooperation and assistance of many working groups and fisheries representatives. One subject stated the need for this:

“Yeah if I was going to change anything on the IFQ system, really this would be for all fisheries the herring, mean all of them, a fishery shouldn't just count for the only fish they're catching, it should count for all fish they effect. Whether that be a feeding fish like herring or halibut where they're killing the young, fisheries should account for everything So if [trawling is] affecting other fisheries, it should affect what they can do.”

EBFM is gaining in popularity, but can be extremely difficult to implement, especially in developed fisheries. However, the potential benefits of such a system are considerable.

Leasing

Under the current IFQ system in area 2C leasing of B, C, and D quota is forbidden. Many of the current safeguards directly address and prohibit leasing.

However, some subjects argue that leasing would allow an avenue for fishermen who do not possess or cannot afford quota, to participate in the fishery. One fisherman explains the opportunities associated with leasing:

“I think that leasing is the opportunity and I think that should be planned on in an IFQ system, rather than trying to control it to make it more complicated. If they try to destroy the hired skipper clause you will force the quota holders to actually become the lender. And the difference between a hired skipper quota holder and a bank, is the bank or a conventional note can be passed down through generations. That right now, the hired skipper ends with those quota holders, but if they force them out of the current system and into an actual loan arrangement with the harvest boats then those people will actually be able to hand that debt off to their heirs and it will go for decades longer...I just think that if you leave the quota on the open market you end up at this

¹⁹⁰ Fogarty, M.J. 2014. The art of ecosystem-based fishery management. *Canadian Journal of Fisheries and Aquatic Science*. 71: 479-490.

position where you're looking at leasing or you're looking at Wells Fargo. And which is the lesser of two evils?"

In the situation explained above safeguards would still have to be put in place to prevent non-fishermen or corporations from investing in quota. The benefits described above only exists if the loan arrangement is between two members of the industry. Despite the opportunities explained by the subject above, managers should be wary of leasing because it could result in decreased quota ownership and turnover among subjects. Private leasing also has to potential to unleash a Pandora's box of other socially damaging problems.

Owner on Board

Several arguments were made against the current owner on board provision that exists in the Pacific halibut IFQ program. Numerous individuals were unhappy with the loopholes surrounding this clause, as well as the trickle-down effects that come with having the owner on board. One fisherman who was instrumental in developing and instituting the safeguards as both a member of the NPFMC and IPHC discussed the regrets they had concerning this provision:

"Yeah to me [owner on board] is essential. And that's where we made a mistake...We thought we were maintaining an owner-operated fleet, we knew there was a little loophole to allow people who were initial recipients to use a hired skipper, we had no idea how big a loophole that was and how much that's changed the fleet. So I would, if I could do it again or if I could make a change, and we already have changed to really limit that into the future, so to get to that second generation where everybody has to be on board, but I would have fought harder...If I could do it again, if it was up to me, I would not allow that kind of a loophole."

One of the trickle-down impacts discussed was the loss of crew jobs from ride-alongs. Quota holders who work on deck eliminate crew jobs from an already limited pool. It's a win, win for the skipper however because they do not have to invest in quota or pay an additional crew member. In turn, this makes the profits earned by both more significant.

Loopholes for owner on board cause fishermen to hold onto quota longer. Why wouldn't you hold onto quota if you can reap the benefits and build a retirement fund without having to be on board? This negatively impacts the industry as a whole because quota turnover is important for battling the greying of the fleet. Evasion and manipulation of owner on board will be further discussed in following chapters.

CQEs

Community quota entities (CQEs) are similar to quota banks. The purpose of a quota bank is to create an intermediate step between crewing and buying quota:

“Part of what we want to do with the fishery trust is to help the CQEs to work. So there is that intermediate between deck handing and not being able to afford your own quota, to owning your own quota where you could fish if the CQEs held the quota and you could get your boat and get your fishing history and fish some quota and then jump off into ownership...The community quota entity...are a subsequent action by the council to allow remote communities, small remote communities, so they have to be off the road system and less than 1,500 people I think it is, to become an entity, to form an entity to buy quota...Everybody else has to be an individual. And we were lukewarm on the idea at first because it's one more group to, like compete for quota, which it always drives up the price, but I guess increasingly to my view there needs to be some kind of support, some kind of bootstrapping helping the next generation. So, our trust is on helping individuals if CQEs can get to a reasonable level and help people transition to ownership might be a needed step. But that's still really controversial and with a lot of people worried about how it affects ownership over time and price of quota.”

The idea here is that CQEs could be applied beyond just remote communities. As stated by this subject, the notion, however, is very controversial. The suggested pool of quota has to be bought by some agency as quota comes up on the market or reallocated through the removal of quota from current quota holders. One fisherman stated that they felt quota banks would be severely unfair because without banks the ones that are willing to take the risk of investment are usually fully vested in the fishery and community:

“None of it comes easy, it takes time and I get the impression a fair number of new fishermen don't fully understand the commitment it takes to make it. Tying up more pounds in this manner does not seem fair to those willing to put in the time for long term goals.”

There are both drawbacks and benefits associated with quota banks. In reality, the competition created by pooling quota could be controlled and it would address one of the major issues facing the Pacific halibut fishery today, which is entry. The greying of the fleet and obstacles to entry will be further discussed in following chapters.

Conclusions

Overall, this research was successful in probing those involved with the Pacific halibut fishery for suggested modifications, additions, and improvements to the current IFQ system. Some of these suggestions are extremely innovative and should be considered moving forward. Management alternatives beyond the realm of IFQs will be discussed in the following chapters and will be mainly based on literature review. The suggestions above are indispensable because they are based on the opinions of expert fishermen who work within the IFQ system in their daily lives.

CHAPTER 5

ALTERNATIVES TO IFQS

United States catch share programs, such as IFQs, were popularized in the mid-1990s, starting with the Alaska halibut fishery in 1995.¹⁹¹ Several fisheries followed suit, including Pacific whiting (1997), Alaska pollock (1999), Bering Sea and Aleutian Island King and Tanner crab (2005), Gulf of Mexico red snapper (2007), Atlantic sea scallop (2010), Gulf of Mexico grouper and tilefish (2010), mid-Atlantic tile fish (2010), and Northeast multispecies groundfish (2010).¹⁹² According to Criddle and Macinko (2000), IFQs were promoted due to the failures of limited entry systems in the 1970s to capture sufficient available rent.¹⁹³ By turning the focus from input to output controls, economists were able to increase efficiency gains.¹⁹⁴

The Pacific halibut fishing industry was extremely unsafe and wasteful in the early 1990s. An immeasurable amount of halibut was being discarded, fishermen were dying, gear was being discarded, the season had become extremely stunted, and the quality of the halibut was exceptionally poor. Managers and fishermen felt as though something had to be done quickly before the whole system imploded. Since then, IFQs have been in place in the Pacific halibut fishery. It is usually claimed that the IFQ system has been in place for such a long period of time and an immense amount of investment

¹⁹¹ Grimm, D., Barkhorn, I., Festa, D., Bonzon, K., Boomhower, J., Hovland, V., Blau, J. 2012. Assessing catch shares' effects evidence from Federal United States and associated British Columbian fisheries. *Marine Policy*. 36(3): 644-657.

¹⁹² I.d.

¹⁹³ Criddle, K.R., Macinko, S. 2000. A requiem for the IFQ in US fisheries? *Marine Policy*. 24: 461-469.

¹⁹⁴ I.d.

has been consigned on the current system that it seems hard to remove or reform. However, over time it has become clear that social inequalities and rent-seeking behavior are tarnishing the image of the IFQ program.¹⁹⁵ Additionally, the greying of the fleet and barriers to entry are presenting new problems to a program that may have reached its expiration date. Several ideas for programs that would allow for the transition away from IFQs are emerging and should be considered before the current system becomes completely unworkable.

The state of the Pacific halibut fishery when IFQs were implemented was so disastrous and was unlike anything else we see today. This should be taken into account when considering IFQ management in the future. The IFQ system ‘works’ with Alaska halibut because of the unique state the fishery was in and the safeguards that were put in place to try and protect the small boat fleet. Outside of the specialized bubble that is the Alaska halibut fishery, the overwhelming consensus is that the social inequities of IFQ programs outweigh the economic gains.¹⁹⁶ Excessive consolidation has many unintended consequences and, in the end, when the season was extended immensely high levels of consolidation were not required to avoid safety and gear conflicts. We recommend that all available management options be exhausted before privatization schemes are considered. Some of the available management options include exhausting traditional management tools, fishing cooperatives, a lay-up system, and non-transferable quota

¹⁹⁵ Criddle, K.R., Macinko, S. 2000. A requiem for the IFQ in US fisheries? *Marine Policy*. 24: 461-469.

¹⁹⁶ Pinkerton, E. 2013. Alternatives to ITQs in equity-efficiency-effectiveness trade-offs: How the lay-up system spread effort in the BC halibut fishery. *Marine Policy*. 42: 5-13.

programs.^{197,198,199} The aim of all of these restrictions is to limit the profit-maximizing actions of fishermen, therefore decreasing efficiency. After all, successfully managing fish stocks means successfully managing the actions of harvesters.

¹⁹⁷ Criddle, K.R., Macinko, S. 2000. A requiem for the IFQ in US fisheries? *Marine Policy*. 24: 461-469.

¹⁹⁸ Pinkerton, E. 2013. Alternatives to ITQs in equity-efficiency-effectiveness trade-offs: How the lay-up system spread effort in the BC halibut fishery. *Marine Policy*. 42: 5-13.

¹⁹⁹ Bromley, D.W., Macinko, S. 2007. Rethinking Fisheries Policy in Alaska: Options for the Future. *Prepared for the Alaska Department of Fish and Game*, Juneau, Alaska: 1-38.

UTILIZE MORE OF THE TRADITIONAL TOOLKIT

The traditional toolkit in fisheries management usually consists of things like gear limits (fishing gear, boat length, etc.), closed seasons, and size/sex limitations.²⁰⁰ We would like to suggest additions to the toolkit, outside the box of what is traditionally used. Namely, the addition of gear limitations on shaft horsepower, size of propellers, and the number of propellers. A problem experienced with limiting vessel length is that fishermen expand their vessels in other dimensions (breadth, draft) to avoid a decrease in efficiency. However, moving large vessels proficiently, quickly, and safely through the water is directly dependent on the source of power used to move the vessel. Larger, heavier vessels require more shaft horsepower, larger propellers, or numerous propellers. Vessel propeller size can also create cavitation, which can cause a vessel to move less efficiently. For example, according to one subject, in trawl fisheries, the size of the net that can be pulled is directly dependent on shaft horsepower. Coupling limitations on shaft horsepower, propeller size, propeller pitch, and the number of propellers with vessel dimension restrictions could successfully limit efficiency in a fishery.

Another way in which the traditional toolkit could be utilized is by adding more specific temporal gear limitations. For example, in longline fisheries, the number of sets permitted for each vessel could be limited with regard to time (per day or per week). Inherently, limitations on the length of sets and number of hooks would have to accompany this kind of regulation.

²⁰⁰ Wilson, J. 1993. *Self-Governance in the Maine Lobster Fishery*. World Wildlife Fund, Gland Switzerland.

FISHING COOPERATIVES

Fishing cooperatives group fishermen into coalitions that fish a portion of the catch as a cooperative. Rather than assigning catch to individuals, catch is assigned to the cooperative and it is the decision of the cooperative how to divide it. According to Criddle and Macinko (2000), “Cooperative members depend on civil law to enforce contracts that partition the catch among a limited set of participants and rely on government to enforce usufructuary rights to a fraction of the resource.”²⁰¹ Simply put, the cooperatives are allowed access to the benefits of the public’s property, yet it is not owned by the cooperative or its members. This eliminates share concentration, absentee ownership, leasing, and transferability²⁰². In other words, all of these externalities are internalized by fishing cooperatives because they compartmentalize small groups of subjects.²⁰³ The lack of ownership and cooperation fostered by cooperatives is thought to promote resource stewardship more successfully than privatization.²⁰⁴

²⁰¹ Criddle, K.R., Macinko, S. 2000. A requiem for the IFQ in US fisheries? *Marine Policy*. 24: 461-469, at pg. 462.

²⁰² I.d.

²⁰³ I.d.

²⁰⁴ I.d.

LAY-UP SYSTEM

British Columbia's halibut fishery operated successfully under a vessel lay-up system for forty years.²⁰⁵ The lay-up system retained an extended season that lasted for 100-250 days and fostered an environment of co-management.²⁰⁶ Co-management was utilized for rulemaking, enforcement, and monitoring.²⁰⁷ Fishermen prevented the race for fish seen in the Alaska halibut fishery by simply utilizing gear and time limitations.²⁰⁸

Under the British Columbia halibut lay-up system, rules required that fishermen stop fishing or lay-up their vessels for 6-10 days after a fish delivery.²⁰⁹ Deliveries became naturally staggered and allowed fishermen to take time off for important holidays and leisure activities.²¹⁰ As demonstrated by Abernethy, et al. (2007) leisure activities are a significant driver of fishermen behavior.²¹¹ Utilizing and building this into management had a natural effect of extending the season and satisfaction with management. The accompanying rules of the lay-up program were intentionally kept simple and short enough to fit front and back on one piece of paper.²¹² The lay-up system utilized in New Hampshire's groundfish fisheries also used a limit on fishing days.²¹³ Funding for this program, the meetings, enforcement, and overall coordination came from the fishermen

²⁰⁵ Pinkerton, E. 2013. Alternatives to ITQs in equity-efficiency-effectiveness trade-offs: How the lay-up system spread effort in the BC halibut fishery. *Marine Policy*. 42: 5-13.

²⁰⁶ I.d.

²⁰⁷ I.d.

²⁰⁸ I.d.

²⁰⁹ I.d.

²¹⁰ I.d.

²¹¹ Abernethy, E., Allison, E.H., Molloy, P.P., Cote, I.M. 2007. Why do fishers fish where they fish? Using the ideal free distribution to understand the behaviour of artisanal reef fishers. *Canadian Journal of Fisheries and Aquatic Sciences*. 64: 1595-1604.

²¹² Pinkerton, E. 2013. Alternatives to ITQs in equity-efficiency-effectiveness trade-offs: How the lay-up system spread effort in the BC halibut fishery. *Marine Policy*. 42: 5-13.

²¹³ I.d.

themselves. They paid a small fee for every 1,000lbs of halibut they delivered.²¹⁴ The lay-up system was respected and supported by fishermen, economists, and managers due to impacts on the supply chain, the extended season, upward pressure on prices, balance among fleet sectors (vessel size), increased time for leisure and repairs, and fishermen involvement in rulemaking.²¹⁵

²¹⁴ Pinkerton, E. 2013. Alternatives to ITQs in equity-efficiency-effectiveness trade-offs: How the lay-up system spread effort in the BC halibut fishery. *Marine Policy*. 42: 5-13.

²¹⁵ I.d.

NON-TRANSFERABLE QUOTA PROGRAM

A non-transferable quota program was suggested by many subjects as a viable option to decrease effort. In such a program the permit is not owned by an individual, but rather is presented as a usufructuary right.²¹⁶ The permit would be leased from a governmental organization such as NMFS. These leased permits would have a fixed term, where at the end of the term they were returned.²¹⁷ The permits could be initially allocated based on catch history, or a limited number of equal permits parceled out to be distributed by auction or lottery.²¹⁸ The latter lottery distribution method means that each subject has an equal chance of receiving a permit. The ‘expiration date’ on the permits would have to be staggered and then redistributed also using an auction or lottery system.²¹⁹ The permits could be available at this time to vessel owners, skippers, crew, processors, or local communities.²²⁰ The permits could also be coupled with a use it or lose it provision to ensure active participation.²²¹ Moreover, revenue from leasing and royalties could be used for enforcement, community infrastructure, or as a method of transition from IFQ management. In other words, the new leased interest could be used to buyout historic participants, given the transition period was sufficient in length.²²² Once all subjects were transitioned into the system, the interest could be used for other community or fishery-related betterments.

²¹⁶ Bromley, D.W., Macinko, S. 2007. Rethinking Fisheries Policy in Alaska: Options for the Future. *Prepared for the Alaska Department of Fish and Game*, Juneau, Alaska: 1-38.

²¹⁷ I.d.

²¹⁸ I.d.

²¹⁹ I.d.

²²⁰ I.d.

²²¹ I.d.

²²² I.d.

CONCLUSIONS

The above management suggestions only scrape the surface. Many alternatives exist if managers are willing to think outside the box and craft schemes that are specialized and based on the fishery, area, participants, stock health, environmental factors, and tradition. It should go without saying that these alternatives focus on the management of *harvesters* and each can be placed within an ecosystem-based fisheries management framework. Current management systems have a grip on the public mind, limiting creativity for the future. We must step outside of this and consider more holistic approaches that encompass social, environmental, and economic facets.

CHAPTER 6

FUTURE WORK

The original intent of this research was to gauge contemporary, general satisfaction with the Pacific halibut IFQ program, effectiveness of the safeguards, find ways to improve the current program, and to suggest management alternatives to IFQ management. However, these interviews brought to light a number of issues currently facing the IFQ system that were not addressed in the interview questions, but that subjects felt strongly needed to be included. IFQ management and the safeguards are clearly important to Alaskan coastal communities, but it would be a severe injustice to overlook contemporary issues facing these communities. As the Pacific halibut IFQ program has developed over the last two decades several issues have arisen that should be addressed. These problems are nuanced and may not be experienced in similar programs of younger maturity. The pertinent concerns shared by many subjects revolved around IFQ balloon effects, barriers to entry, evasion of the owner on board safeguard, evasion of the ownership safeguard, trawling, the charter fleet reallocation, and climate change. These concerns and the information laid out in sections should guide future research in the field of fisheries management.

IFQ BALLOON EFFECTS

A common critique of and current problem with the Pacific halibut IFQ program is that the management scheme has caused a balloon effect of effort on the salmon troll fishery in Sitka. This is evident even in just the disparities between the number of halibut permits held versus the number of salmon troll permits held. Currently (2019) in Sitka there are 125 commercial halibut permits, compared to 382 commercial salmon troll permits (power and hand).²²³ There are over three times as many more active salmon permits than halibut permits in Sitka.

When Pacific halibut IFQs were first implemented many who were not initially allocated quota turned to salmon trolling as a way to diversify their income. To many, purchasing a vessel, gear, hiring a crew, and buying a salmon troll permit seemed like a more feasible investment than halibut quota; “A lot of us [deckhands] just bought trollers.” One participant went to far as to claim that Pacific halibut IFQs had created the large troll fleet that exists today.

Additional effort is also placed on the troll fishery due to entry issues associated with the Pacific halibut fishing industry. It is extremely expensive to become a commercial halibut quota owner. As a result, many use salmon trolling as a way to build capital and a means to invest in halibut quota. Traditionally, halibut fishing has always been paired with salmon fishing in Sitka as a way to weather bad halibut years and short openings.

²²³ McMichael, T. CFEC Public Search Application [Internet]. Juneau (AK): *Commercial Fisheries Entry Commission*, State of Alaska; 2019 [cited 2019 Feb 09]. Available from www.cfec.state.ak.us/plook/#lists

The balloon effects of the Pacific halibut IFQ program are not only felt in the salmon fishery. Those who were left out of the initial allocation scrambled to find ways to diversify their income. Some invested in quota, some left fishing behind, and some fled to other fisheries. It is recognized that the initial implementation of IFQs causes fishermen to flee to other fisheries. However, the literature focuses on the psychological impact IFQ implementation had on this behavior. According to Bromley and Macinko (2007), IFQ programs are intended to solve the derby fishery, but fishermen carry this mindset into other fisheries.²²⁴ Out of fear of IFQ implementation in other fisheries people begin the “race for history” in other open-access fisheries in anticipation of rationalization.²²⁵ This is essentially the same speculative fishing behavior that was exhibited in the Pacific halibut fishery when discussions of IFQs first began.

In conclusion, one of the unintended consequences of the Pacific halibut IFQ program was the ballooning of effort away from halibut and onto other commercial fishery stocks. This is a prevailing issue that needs to be addressed in current and future management. Acknowledgment is crucial because the balloon effects discussed will only be intensified by the increasing barriers to entry in the halibut fishery, decreased stock abundances, and climate change.

²²⁴ Bromley, D.W., Macinko, S. 2007. Rethinking Fisheries Policy in Alaska: Options for the Future. Prepared for the Alaska Department of Fish and Game, Juneau, Alaska.

²²⁵ I.d.

BARRIERS TO ENTRY

One of the biggest problems facing the Pacific halibut fishery is the greying of the fleet. Greying of the fleet has resulted from low rates of turnover, entry, and investment in the fishery. We speculate that this is due to the high cost of entry into the fishery and the risk associated with investing. Halibut quota has almost reached \$70 per pound, which can seem insurmountable as a young person trying to break into such a competitive fishery.²²⁶ Additionally, once the investment is made, it is not guaranteed to remain stable. Essentially you are investing in something that may evaporate, but the debt would remain.

Many of the subjects that did not approve of the IFQ system or thought it had had a negative impact on their community, identified the high price of quota and barriers to entry as the reasons why. Several subjects stated that they couldn't make the investment 'pencil out,' in other words the return on investment was not high enough to justify opportunity costs or to even just simply service the quota debt. Table 10 demonstrates It how the price of quota quickly outpaces the ex-vessel price. Ex-vessel price is the price per pound the captain receives at the dock (before other costs are subtracted).

Entry is one of the biggest failures of the Pacific halibut IFQ program and should serve as a significant deterrent for the consideration of future IFQ programs (table 10).

It seems as though solutions to entry are rare and carry their own set of controversial issues. However, there are a few viable options available to mature IFQ programs to

²²⁶ Sold Halibut IFQ Quota, 2C [Internet]. (AK): *Alaskan Quota & Permits Broker*, Alaska Quota & Permits LLC; 2019 [Cited 2019 Feb 18]. Available from www.alaskabroker.com/listings/halquota_sold.html

assist entrance, including a lease pool with proceeds used to compensate the transition of current quota holders from the industry.

Year	Number of New Entrants into the Pacific halibut IFQ Fishery in Area 2C	Estimated Ex-Vessel Price	Halibut Quota Price (mean price per pound of IFQ)
1992	No IFQs	\$1.01	No IFQs
1993	No IFQs	\$1.27	No IFQs
1994	No IFQs	\$2.01	No IFQs
1995	151	\$2.04	\$11.77
1996	112	\$2.26	\$13.78
1997	59	\$2.24	\$16.77
1998	45	\$1.39	\$14.73
1999	42	\$1.99	No Data
2000	57	\$2.62	\$11.27
2001	43	\$2.11	\$12.32
2002	42	\$2.22	\$11.80
2003	47	\$2.95	\$12.56
2004	34	\$3.04	\$17.17
2005	28	\$3.08	\$21.89
2006	29	\$3.75	\$21.64
2007	25	\$4.41	\$22.40
2008	12	\$4.33	\$28.48
2009	12	\$3.08	\$22.22
2010	22	\$4.71	\$24.66
2011	10	\$6.51	\$34.12
2012	15	\$5.99	\$37.35
2013	17	\$5.17	\$42.13
2014	21	\$6.07	\$44.29
2015	16	\$6.33	No Data
2016	No Data	\$6.63	No Data
2017	No Data	\$5.87	No Data

Table 10: Count of new entrants into the Pacific halibut IFQ fishery in area 2C from the onset of the program to 2015.²²⁷ This can be compared with the rising ex-vessel prices (\$/lb) and quota prices (\$/lb). This data demonstrates ex-vessel prices both pre-IFQs (before 1995) and post-IFQs (1995-2017).^{228,229}

²²⁷ Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program [Internet]. Anchorage (AK): North Pacific Fishery Management Council, National Marine Fisheries Service, 1-474; 2016 Dec [cited 2019 Feb 10]. Available from https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf, at pg. 246.

²²⁸ “Fisheries Management Reports: Annual Ex-Vessel and Volume Prices - Halibut.” *NOAA Fisheries Alaska Regional Office*, NOAA, 2017, alaskafisheries.noaa.gov/fisheries-data-reports?tid=287.

²²⁹ Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program [Internet]. Anchorage (AK): North Pacific Fishery Management Council, National Marine

EVASION OF OWNER ONBOARD

Evasion of the owner on board requirement is a real concern in the current Pacific halibut fishery. One of the original intents of the owner on board safeguard was to keep the Pacific halibut fishery an owner-operated fleet. However, there are many loopholes and ways around this safeguard.

Vessel investment and medical transfers represent the two most recent and biggest facilitators of evasion of the owner on board provision. In 1999, the Pacific halibut IFQ program was amended to allow the use of a hired skipper, so long as the quota holder had a 20% minimum investment in the catcher vessel.²³⁰ This means that as long as the quota holder makes the appropriate investment in the vessel, they never have to be on board while their quota is being fished. The 20% ownership provision is extended to non-individual entities.²³¹ Several subjects expressed that this amendment moved the fleet farther and farther from owner-operated.

Medical transfers were added to the Pacific halibut IFQ program as an amendment in 2007.²³² According to the proposed amendment, medical transfers were intended to alleviate financial burdens associated with not being able to fish quota as the result of injury.²³³ The injury may be personal, or that of a family member if it can be

Fisheries Service, 1-474; 2016 Dec [cited 2019 Feb 10]. Available from https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf, at pg. 260.

²³⁰ Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program [Internet]. Anchorage (AK): North Pacific Fishery Management Council, National Marine Fisheries Service, 1-474; 2016 Dec [cited 2019 Feb 10]. Available from https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

²³¹ I.d.

²³² I.d.

²³³ United States, Congress, Balsiger, Jim. "Regulatory Impact Review and Initial Regulatory Flexibility Analysis for Proposed Amendments to Halibut and Sablefish IFQ Fishery Regulations." *Regulatory Impact*

proven that the quota holders' full-time care is necessary.²³⁴ Medical transfers may not be used if the quota holder is privy to other forms of leasing.²³⁵ There is no limit to the number of medical transfers one quota holder can receive.²³⁶ Numerous subjects expressed that they believe medical transfers are being abused. As long as the quota holder can fabricate multiple non-chronic, medical ailments, they can continue to receive medical transfers. Obviously, this is a skeptical view of the provision, and it is probably used responsibly in some cases. However, this concern is prevalent, and the validity of these assertions should be focused on in future research.

Evasion of owner on board undermines the initial intent of the safeguard, and if one of the true goals of the Pacific halibut program was to retain an owner-operated fleet the success of the program needs to be re-evaluated. These loopholes remove any incentive to sell quota to the next generation. In 1995 Pacific halibut harvest by hired masters only constituted less than 15% of IFQ landings.²³⁷ However, this has increased considerably, and in 2014 hired masters harvested more than 40% of IFQ landings.²³⁸ Future research should also focus on deterrents of hired masters, community impacts of hired masters, and provisions that could be implemented in future management schemes to prevent the negative impacts associated with evasion of owner on board.

Review and Initial Regulatory Flexibility Analysis for Proposed Amendments to Halibut and Sablefish IFQ Fishery Regulations, 2004.

²³⁴ I.d.

²³⁵ Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program [Internet]. Anchorage (AK): North Pacific Fishery Management Council, National Marine Fisheries Service, 1-474; 2016 Dec [cited 2019 Feb 10]. Available from https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

²³⁶ I.d.

²³⁷ I.d.

²³⁸ I.d.

MANIPULATION OF OWNERSHIP CAPS

Many current participants are investing in multiple vessels rather than quota. Vessel owners can take out multiple quota holders and lease A-shares, providing that their vessel doesn't exceed the 1% cap. As indicated by numerous subjects, due to the outrageously high prices of quota, buying a vessel is cheaper than quota. As a result, manipulation of the ownership caps in this manner can actually be seen as having a positive impact on the fishery. Manipulation provides a means of entry and expands the fleet and the number of crew jobs available. Additionally, because the vessel owner doesn't have quota overhead, they can afford higher crew shares.

It was also argued that owning multiple vessels may serve as a solution to the number of out of state subjects by retaining more revenue in the state. Many vessels from Washington utilize what is referred to as the "Seattle Model"; the hired skipper's vessels travel to Alaska, fish a vessel cap, and return back to Washington. Providing the same opportunities to these quota holders with vessels that fish out of Alaskan ports creates competition with Seattle based boats seeking to do the same.

Evasion of ownership caps by owning multiple vessels, but no quota is a new and upcoming trend in the Pacific halibut fishery. It is a behavior that has been normalized under the two-decade old IFQ system. Fishing in this manner may net more money than fishing and paying quota loans, but it is still only about 35% of the total revenue. What are the impacts of this normalized behavior and shifting norms concerning fishing practiced under IFQs? More research must also be done in order to understand negative and positive impacts evasion of ownership caps may be having on the fleet.

TRAWLING

In the focus area of this study, Southeast Alaska, trawling is banned. Trawling was banned in this area in 1998.²³⁹ However, many subjects expressed concerns that the trawl ban could be overturned in the future. Trawling not only does irreparable harm to bottom habitat, but it is also extremely non-selective. Dragging the doors and net weights across the bottom pulverizes anything in its path, leaving behind a bottom that has been ‘mowed.’ Even if bottom communities rebuild, the impacts are lasting. Collie, et al. (2005) found that fishing gear types that are dragged along the bottom greatly decrease megafauna diversity in both shallow and deep-water habitats.²⁴⁰ Bottom communities are also likely not allowed time to rebuild as trawling grounds are vast and fishing frequency is high. According to Amoroso, et al. (2018), the trawling footprint in the Gulf of Alaska is greater than 50%.²⁴¹ In addition to the damage trawling causes to bottom communities, the gear is extremely non-selective. Although trawling is banned in Southeast Alaska, trawling in other areas has a huge impact on the Pacific halibut stock. Pacific halibut spawning grounds are scattered throughout the Gulf of Alaska, Bering Sea, and the Aleutian Islands, which are all heavily trawled areas.²⁴² As a result bycatch of juvenile halibut can have a huge bottom-up effect on the directed fishery. According to Clark and Hare (2011), over 50% of the sub-legal Pacific halibut were taken in area 4, and mainly

²³⁹ Trawling: A Threat to Southeast Alaska Fisheries [Internet]. Sitka (AK): *Sitka Conservation Society*; [cited 2019 Mar 10]. Available from www.sitkawild.org/trawling_a_threat_to_southeast_alaska_fisheries

²⁴⁰ Collie, J.S., Hermsen, J., Almeida, F.P. 2005. Effects of fishing gravel on habitats: Assessment and recovery of benthic megafauna on Georges Bank. *American Fisheries Society Symposium*, 41.

²⁴¹ Amoroso, R. O., Pitcher, C. R., Rijnsdorp, A. D., McConnaughey, R. A., Parma, A. M., Suuronen, P., ... Jennings, S. 2018. Bottom trawl fishing footprints on the world’s continental shelves. *Proceedings of the National Academy of Sciences*. 115(43): 10275–10282.

²⁴² Clark, W. G., Hare, S. R. 1998. Accounting for Bycatch in Management of the Pacific Halibut Fishery. *North American Journal of Fisheries Management*. 18(4): 809–821.

by the Bering Sea trawl fleet.²⁴³ Because trawl nets are so large and non-selective the impacts of one mistake or one bad trawl could result in hundreds of pounds of bycatch. How are managers to be sure that they are accurately representing the juvenile halibut stock? How will bycatch from the *undirected* fishery impact the *directed* fishery? Due to the sheer volume of the trawl fleet, their incidental catch of juvenile halibut is often more individual fish than caught in the TAC for the directed fishery.

Many subjects advocated for a full trawl ban, stating that the halibut stock wasn't the only one taking a hit, but the negative impacts could also be seen in the sablefish and salmon stocks. Overall, 42% of subjects discussed trawling in their interviews and of those that discussed it, 100% saw it as negatively impacting the Pacific halibut fleet.

Although trawling in Southeast Alaska was banned in 1998, the impacts from trawling are still felt in the area. A full trawl ban would be extremely difficult to implement due to the increasing global demand for food and the sheer volume of protein that is harvested in trawl fisheries. However, trawl fisheries should be held to a higher standard for selectivity and bycatch. Bycatch levels should be lowered and treated as choke species in order to incentivize better fishing practices. Additionally, more research should focus on juvenile halibut stocks, recruitment, and the overall direct and indirect impacts trawling is having on other fisheries.

²⁴³ Clark, W. G., Hare, S. R. 1998. Accounting for Bycatch in Management of the Pacific Halibut Fishery. *North American Journal of Fisheries Management*. 18(4): 809–821.

THE CHARTER FLEET

The charter or guided sportfish industry has been rapidly growing in Southeast Alaska. As the charter fleet grew, management struggled to keep up, resulting in loose management for several years. Overall, the management of the Pacific halibut charter fleet has undergone many recent changes in response to overexploitation in this sector.

In 2003, guideline harvest levels (GHLs) were established for the charter fleet in areas 2C and 3A.²⁴⁴ GHL levels were set by NPFMC, but were not a hard cap.²⁴⁵ Instead, they were just a benchmark.²⁴⁶ In area 2C, the charter fleet exceeded these GHLs every year from 2004-2010.²⁴⁷ Additionally, although decreases in the halibut stock have resulted in the lowering of GHLs and the commercial TAC, over recent years, the percentage of the total catch taken by the charter fleet increased.²⁴⁸ This is termed by commercial fishermen as a reallocation to the charter fleet. Originally, the charter fleet catch was subtracted before the commercial catch was established, but now they are done at the same time.²⁴⁹ In other words, increasing reallocation to the charter fleet directly pulls quota from the commercial pool.

Several subjects expressed concern regarding the reallocation to the charter fleet. This is an extremely relevant, current, and controversial issue in the town of Sitka. Many

²⁴⁴ Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program [Internet]. Anchorage (AK): North Pacific Fishery Management Council, National Marine Fisheries Service, 1-474; 2016 Dec [cited 2019 Feb 10]. Available from https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

²⁴⁵ Call, I. L., Lew, D. K. 2015. Tradable permit programs: What are the lessons for the new Alaska halibut catch sharing plan? *Marine Policy*. 52(C): 125–137.

²⁴⁶ I.d.

²⁴⁷ I.d.

²⁴⁸ I.d.

²⁴⁹ I.d.

fishermen feel as though it is unfair that the reallocation has decreased the commercial TAC and devalued their quota, while people struggle to buy into the commercial fleet or service large quota loans. They also feel that it is unfair that the commercial sector continues to take larger cuts, while the percentage allocated to charter fishermen increases. Finally, numerous subjects felt that the charter fleet has had a negative impact on the stock all of the years they fished beyond the GHL.

While this research was being conducted there was another major change in Pacific halibut charter fleet management. In September 2018 the charter industry was approved to form a recreational quota entity (RQE) that can participate in the Pacific halibut and sablefish IFQ program in areas 2C and 3A.²⁵⁰ The RQE is an entity that charter fishermen can use to pool money in order to purchase quota to *augment* their allocation.²⁵¹ In area 2C the RQE is limited to purchasing no more than 1% of the commercial quota shares in a single year and cannot exceed 10% of the total commercial quota in the area.²⁵² There were mixed opinions among subjects concerning this proposal. Some felt it was good that they had to pay for quota rather than receiving it for free via reallocation efforts. Others felt that the additional competition on the quota market would further drive up quota prices, making them completely inaccessible to single individuals. Charter fishermen have the potential to “sell fish twice” according to one subject; they can sell access to the fish, the experience of fishing, and they can sell

²⁵⁰ 15 C.F.R. § 902 2018, and 50 C.F.R. § 300, 679 2018.

²⁵¹ *I.d.*

²⁵² NOAA Proposes Compensated Reallocation Program between Halibut Commercial and Charter Sectors [Internet]. Anchorage and Juneau (AK): *NOAA Fisheries Alaska Regional Office*. 2017 Oct [cited Feb 21]. Available from alaskafisheries.noaa.gov/node/56970

the actual fish. Some stated that the charter fleet owning quota would negatively impact the processors. Charters process their own fish to send home with clients or to keep themselves, so using quota to do this decreases the amount of halibut entering processing plants.

Allowing an RQE to purchase quota is a massive change to an IFQ system that introduces new competition into the quota market. It is unclear how this competition is going to impact the market, entrance into the commercial fleet, and the welfare of the commercial fleet in general. As a result, future research should follow the development of this new provision to measure the impact it has on the IFQ program and its viability for future generations.

CHANGE RIDDEN FUTURE

Beyond IFQs, fishermen are becoming increasingly concerned with the state of the halibut resource and how it may be impacted by a changing ocean in the future. Fishermen are worried and unsure about how halibut stocks will respond to excessive juvenile bycatch, warming ocean temperatures, changing ocean currents, changing ocean pH, increased pollution, etc. Some fishermen were also worried that climate change and decreasing stocks would devalue the quota they have invested in. Overwhelming, however, those who discussed climate change expressed that it was the biggest problem facing the industry, far bigger than IFQs:

“I mean I’m more concerned about what’s happening to the ocean than this quota program because then they are probably affected. Why aren’t these small fish growing as fast? Is that hormones in the ocean, is it the use of detergents, I mean is it fertilizers on land, is it overfishing? There’re all of these plausible scenarios in my mind, which could have some effect. And then you combine them all together and you’ve got a system where I wonder if you’re going to be able to commercial harvest in 20 years.”

Fishermen should be considered an untapped, wealth of knowledge concerning ocean change because many have been fishing the same grounds for decades or over numerous family generations and have invaluable observations concerning changes in environmental patterns. One fisherman stated that they would like to bridge that gap between scientists and fishermen to allow for an easier flow of information. Currently, they are using a social media group as a platform to start this change. It is the opinion of this research that more resources should be focused on studying climate change progression, impact, and solutions. All of the fisheries-related issues in this paper are important, but irrelevant if the fishery ceases to exist in the near future.

CHAPTER 7

CONCLUSION

This study aimed to present contemporary, modern-day opinions concerning the impacts of Pacific Halibut IFQs, determine the effectiveness of the management safeguards, identify improvements to the safeguards, and pose management alternatives to IFQs. The large majority of those that participated in this study preferred IFQs and found the safeguards to be successful in accomplishing their goals. However, it seemed that preference and positivity towards the IFQ system were linked to the subject's role in the community, fishery, and the initial allocation process. Regardless of demographics, the majority of subjects felt that the program had had an adverse impact on their community. Interestingly enough, many who thought the program had negatively impacted their community, believed it had positively impacted them individually. This suggests a discrepancy in the scale and level of impact IFQs can have. There was overwhelming support for the safeguards from all subjects regardless of demographics. The safeguards transformed the Pacific halibut IFQ program from something that would have been unsustainable, to something that is manageable and has become integrated into Alaskan communities. This integration is of course not without conflict and division of these tight-knit communities. The Pacific halibut IFQ program certainly would have been a momentous failure in many different aspects without these encompassing safeguards. Nevertheless, in a system whose aim is to manage the actions of human beings, there are always loopholes and new problems that arise as time passes and environments change.

In addition to these objectives, relevant issues outside of these realms were identified through in-depth conversations with participants. It is important as researchers to understand and be able to identify when new issues arise outside the sphere of the intended research questions. It is a great responsibility to be trusted to tell the stories of the fishermen who participated in this study. As such, it is extremely important to convey the arising issues that *fishermen* see as important. This is an essential step to close the gap between researcher and industry. As a result, this research expanded to include current issues including IFQ balloon effects, barriers to entry, evasion of safeguards, trawling, charter fleet reallocation, and climate change. It is the recommendation of this research that future studies focus on these areas, specifically, the cross section of these social phenomena, fields of hard science, and management practices. Studies should be inclusive to various demographics and have a high level of community involvement. It is our strong belief that this study yielded highly reliable and authentic results because of the trust gained through fostering relationships that were created by living and being part of a community.

It can be concluded that in general the Pacific halibut IFQ program thus far has been successful. This is attributed to the unique situation facing fishermen before IFQs were implemented. The halibut derbies were unlike anything other systems in modern fisheries have experienced and this should be taken into account when using the Pacific halibut IFQ program as a model for future management. There are several alternatives that lack the social consequences of IFQs and can accomplish similar goals of restricting effort and sustaining catch and biomass. The stories told by fishermen in this research should serve as cautionary tales to managers around the world that are heading towards

transitional periods. Even with the encompassing safeguards put in place, certain issues and social trauma cannot be avoided with a system that essentially selects winners and losers. All other appropriate management alternatives should be examined before considering privatizing a resource. This makes access to the resource more feasible for a larger portion of the population, while allowing fishing traditions to continue through generations.

Pacific Halibut is an incredibly important resource both economically and culturally to the people of Alaska. Improper management could not only result in the loss of a resource, but also the loss of a way of life for Alaskans. In conclusion, it is important to understand the implications of management schemes and look for ways to incorporate local knowledge and suggestions for improvement. There are no better people to ask than those who depend on, are culturally tied to, and have an innumerable passion for the resource.

APPENDICES

APPENDIX 1 – SAMPLE QUESTIONS

1. **Are you a Pacific Halibut fisherman or previous fisherman?**
2. **Are you an Alaskan Native or part of the Tlingit Tribe?**
3. What is your connection to the Pacific halibut fishery?
4. What class is/was your vessel?
5. **How much quota were you initially allocated if any?**
6. How much quota do you have now (did you buy, sell)?
7. **What fisheries do you participate in?**
8. Do you fish for subsistence or to provide a livelihood?
9. **Do you feel IFQs have changed your life since their implementation? Has this opinion changed over time?**
10. **Do you believe IFQs have impacted your community? If so, in what ways?**
11. Would you prefer the current IFQ system or an alternate method to IFQs? Why and what would you suggest?
12. **Do you feel the five safeguards/restrictions unique to this program are effective in accomplishing their individual goals?**
 - a. Quota shareholders must be on board (owner-operator clause).
 - b. Blocked holdings- smaller quota shares, less than 20,000 lbs., could not be consolidated with other permits.
 - c. Only quota share recipients or crewmembers with 150 days of experience in a U.S. fishery may buy quota.
 - d. Total landings of any vessel may not exceed ½% of the TAC in area 2C. No more than 0.5% of the TAC in area 2C per shareholder.
 - e. Quota can only be fished down vessel class and not up.
13. **How could the current safeguards in the Pacific Halibut fishery be changed, modified, or improved?**
14. **What does Pacific halibut fishing mean to you personally?**

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