

**Catch Share Policy and Job Satisfaction in the
West Coast Groundfish Trawl Fishery**

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Abstract

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In 2011, the West Coast Groundfish Trawl Catch Share Program introduced an Individual Transferable Quota (ITQ) system to commercial fisheries in Oregon, and Washington, and California. Introduction of catch shares was expected to change the context for decisions fishermen are required to make to operate in this fishery; particularly in trading, purchasing, and leasing quota for target and bycatch species. Such occupational restructuring potentially alters job satisfaction, a component of human well-being in a fisheries social-ecological system. Job satisfaction is connected to health and longevity, mental stress, work performance, and social factors related to family and community relationships. Fishermen in particular may value the “satisfaction bonus” provided by working on the water. There are few alternative occupations which provide similar levels satisfaction. Semi-structured interviews conducted among active fishermen of the West Coast Groundfish Trawl Fishery (WCGTF) sought to elicit patterns in job satisfaction that developed in the five years since ITQ introduction. Ten detailed in person interviews provided representative insights into new business decisions made and the

current structure of job satisfaction in the WCGTF. Analysis of interviews was conducted using tested indicator attributes of job satisfaction within a three-tiered framework based on Maslow's hierarchy of needs. Interview responses were categorized based on positive or negative patterns in description of satisfaction attributes. Effects of ITQ policy on job satisfaction vary by vessel role, between independent owner operators, hired skippers, and crew. Despite respondents' generally negative feelings toward the catch share program, overall satisfaction was described as "good" to "excellent," potentially resulting from the maintenance of "self actualizing" satisfaction attributes fishermen value highly; the challenge and adventure of working on the water. However, negative elements of satisfaction are associated with a decreased feeling of control and community solidarity. Increased operating costs resulting from fees for quota leasing, and at-sea observer monitoring contribute to a present sense of unpredictability in earnings for independent owner operators and crew, in contrast to positive feelings of stability for hired skippers and crew employed by processing companies. Policy elements of the catch share program related to quota leasing and at-sea observers may represent or affect attributes of satisfaction in contemporary ITQ managed fisheries requiring further study.

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Acronyms

EDC: Economic Data Collection

IFQ: Individual Fishing Quota

IOO: Independent Owner-Operator

ITQ: Individual Transferable Quota

JS: Job Satisfaction

NMFS: National Marine Fisheries Service

NOAA: National Oceanic and Atmospheric Administration

NWFSC: North West Fisheries Science Center

PCGF: Pacific Coast Groundfish Fishery

PFMC: Pacific Fisheries Management Council

POHSO: Processor Owned Hired Skipper Operated

PSMFC: Pacific States Marine Fisheries Commission

WCGTF: West Coast Groundfish Trawl Fishery

WCGCSP: West Coast Groundfish Catch Share Program

CHAPTER 1: Introduction

The purpose of this thesis is to understand how “Job Satisfaction”, as a component of social wellbeing, job satisfaction has evolved among active fishermen in the West Coast Groundfish Trawl Fishery (WCGTF) and the reasons underlying any such changes. The WCGTF, based in coastal California, Oregon and Washington underwent a major policy change in 2011 wherein an individual transferable quota system (ITQ) was introduced. With industry and management support, the Pacific Fisheries Management Council (PFMC) implemented the West Coast Groundfish Trawl Catch Share Program (WCGCSP) with the stated intent of meeting conservation goals, reducing harvest overcapacity, improving safety, and increasing overall economic efficiency. Prior to implementation, members of the industry and managers expressed concern regarding continued economic viability and the overfishing of a number of bycatch species encountered in the fishery (NMFS 2011).

ITQs have been observed to alter the social dynamic of fisheries in which they are implemented (Pollnac and Poggie 1988, Pinkerton 2009, Carothers 2015). Despite positive economic and ecological outcomes often associated with ITQs, there is lack of consensus among industry, managers and scholars as to the intended and unintended social outcomes of the policy. ITQ Implementation is connected to a number of social changes known to affect human well-being in fisheries, including changes in fishing season length, fishing trip duration, a reduction in the number of available jobs in fishery dependent communities, and development of an absentee quota owner class. (Pinkerton 2009, Abott 2010, Turris 2010, Carothers 2015, Szymkowiak and Himes-Cornell 2015) Such changes to the structure of fishing as an occupation can affect job satisfaction, a component of overall human well-being in the fishery. Job satisfaction is

associated with a host of variables including physical and mental health, longevity, and job performance, which in turn, can impact community structure, solidarity and compliance with regulations (Pollnac and Poggie 1988, Pollnac et al. 2011). Fishermen, in particular, are found to enjoy their work, especially the challenges associated with working on the water and pitting their skills against nature. (Pollnac, Pomeroy, and Harkes 2001). As a result, many fishermen receive a subjective “satisfaction bonus” that may keep them involved in fisheries despite declining fish stocks and decreased profitability; clearly the rewards of fishing go beyond simply providing a means of income (Gatewood and McCay 1990, Pollnac and Poggie 2006). Understanding what aspects of their occupation fishermen like, and crafting policy to maintain these attributes can aid in assessing non-economic rewards in addition to traditional bio-economic yield. Because of the great variability in structure between fishing communities and the design of ITQ programs to accommodate these differences, specific social impacts of policies like ITQs must be explored at the local and individual levels. To this end, understanding changes to job satisfaction in the PCGF aids in tracking specific patterns of human well-being connected to implementation and performance of the catch share programs and policies.

The introduction of transferable quota was expected by managers to change the context for and the type of decisions vessel owners make in the fishery (NMFS 2011). Participating fishermen are required to make new business decision to operate in this fishery, particularly in trading, purchasing, and leasing quota for target and bycatch species. Understanding the new business decisions fishermen make and their motivation aids in understanding resulting job satisfaction. Framed another way, this thesis explores how fishermen adjusted their behavior to catch shares

and what attributes of job satisfaction, if any, have changed as a result of ITQ policy and new decisions in the PCGF.

This thesis is designed to address the intersection of between social science and fishery management policy. This thesis will first provide an overview of the ITQ application, and the ecological, economic and social effects of the policy in fisheries. Next I will describe the structure of job satisfaction in fisheries. By describing social impacts of ITQs, I will set the stage for an overview of attributes and component levels of job satisfaction in fisheries. This section will be central in informing the subsequent results and discussion. After describing social effects of ITQs and the nature of job satisfaction in fisheries in general, I describe the key elements of the ITQ system used in the PCGF, and propose why aspects of the policy design may affect job satisfaction. I then pose major questions regarding effects of the West Coast Groundfish Trawl Catch Share Program to guide the dialogue. I will then describe the methods I used to approach, and answer questions. I will provide the technical definition of job satisfaction in fisheries and the framework I used to evaluate satisfaction in the PCGF. I include a description of the interview questions and procedure used to collect qualitative data on fisheries job satisfaction. I will describe my procedure for analyzing interview results utilizing the satisfaction framework. Results will first provide an overview of new business decisions resulting from ITQs, and a description of job satisfaction patterns connected to decisions and vessel role. I follow the results with a discussion of implications for future job satisfaction in the PCGF under ITQs. I present possible explanations as to why certain drivers caused patterns of job satisfaction to emerge. I conclude by describing potential candidate indicators attributes for future studies of job satisfaction in the WCGTF.

CHAPTER 2: Literature Review of ITQ Program Effects

ITQs are both a popular and effective management tool, but have received criticism for some social outcomes resulting from their application. It may be of value to some readers to provide an overview of current range of perspectives from by science, industry and policy makers. It is not a goal of this thesis to argue in favor of, or against ITQs as a fishery management tool, but add new information to the overall dialogue. In this chapter I review some of the management outcomes of Individual Transferable Quota programs. There are fairly dramatic changes that can occur to a fishery after ITQs are implemented. ITQs were initially designed as a management tool to help match harvest capacity to the scale of ecological production. ITQs accomplish this by essentially removing competition between fishers, allocating “a piece of the pie” to each fishing permit owner. This is just one example of how fishing as occupation is rewritten by catch share management. This Chapter provides a background on how ITQs can reorganize work related activities that may be central to an individual's happiness in pursuing their livelihood.

Catch Share Programs

The term “catch share,” or Individual Fishing Quota (IFQ), refers broadly to a set of fisheries management strategies that can allocate a percentage of total allowable catch to individual fishermen, cooperatives or communities. Each entity allocated shares is responsible for harvesting within the limits defined by its quota, and ceasing fishing activity once the threshold is reached (NOAA 2010, 2015). Catch share systems differ from other management styles (days-at-sea, gear restrictions, spatial restrictions) that may rely on a total fleet wide quota, incentivizing harvesters to compete previously with each other for share of the catch. In a catch

share system, individual shares can be harvested at the harvester's discretion. Avoiding the negative biological and economic outcomes of a "race to fish" is one of the main goals stated in the national catch share policy (NOAA 2010). Simply stated, catch share systems are designed to match the level of fishing effort in a fishery to amount of available fish stocks (volume of catch per quota share holder) using tradable shares to achieve an economically efficient equilibrium (Acheson, Apollonio and Wilson 2015). The process of reducing harvest capacity to match target catch limits by various mechanisms is also known as "rationalization".

Individual Transferable Quotas are one style of catch share management system, wherein units of quota are transferable between permit holders. The element of transferability is a key component of this system thought to aid improving economic performance within a commercial fishery (NOAA 2010, Turriss 2010). Transfer through trade, sale, or lease, allows fishermen to match fishing effort to vessel activity and harvest capacity, harvesting quota at lower operating cost and providing a valuable asset and mode of compensation should they choose to exit the fishery (NOAA 2010). Transferability of quota units between vessels allows fine-tuning of harvest activity to stay within Total Allowable Catch (TAC) for the fishery. For example, a vessel may not be able to fish all target species quota allocated in a given season for various reasons (weather, breakdown, safety). Rather than lose the opportunity to fish this quota, the quota may be temporarily leased or sold to another fishing operation that can harvest the fish. Similarly, if a vessel did not receive an allocation of a particular species quota sufficient to fish it economically, the vessel owner may be able to acquire desired quota units from another entity in possession of quota surplus to its individual needs (Turriss 2010). Additionally, should a vessel incidentally exceed its quota of a given bycatch species quota units can be transferred from other vessels in possession of bycatch quota shares surplus to its needs. The option to transfer unused bycatch

quota allows vessels in need to remain active without foregoing remaining target species quota (Costello, Gaines, and Lynham 2008, NOAA 2010, Turriss 2010).

Effects of Program Implementation

Understanding effects of catch shares on fisheries is essential because of their wide application and popularity among many fishery managers and industry members. Based on apparent positive ecological and economic outcomes associated with their application, the US has a National Catch Share policy that encourages managers, with stakeholder support, to include ITQ based management alternatives in fisheries management plans (Abbot 2010, NOAA 2010, NMFS 2011, PFMC 2016a). This national policy explicitly recognizes that catch share systems may not be appropriate for all fisheries.

Catch shares program objectives are stated in the National Catch Share Policy, to meet conservation requirements, improve economic efficiency and flexibility, reduce excess harvest capacity, and improve safety at sea by eliminating derby style fishing conditions (NOAA 2010). Most catch shares are considered successful in observing quota limits and achieving the stated goals, especially in reducing fishing overcapacity (Brinson and Thunberg 2013). By reducing pressure on fishermen to catch as much as they can in the shortest time possible, harvesters are afforded time to avoid areas of high bycatch, improve product quality, and avoid inclement weather (Abbot 2010)?. Fishermen have more time to seek out cleaner fishing grounds and are held accountable for the quantity of bycatch, helping to achieve conservation goals (Brinson and Thunberg 2013). One study suggests design elements of ITQs can aid in preventing ecological collapse of fish stocks (Costello, Gaines and Lynham 2008). Additionally, other studies have found a correlation between transferability of quota and fish stock biomass closer to, and slightly

above target levels than stocks with non-transferable quota (Melnychuk 2016). These results are encouraging. However there can be significant variability between regional biomass and stock assessments of different fisheries ecosystems (Costello, Gaines and Lynham. 2008). Dramatic ecological benefits may have more to do with good management and science in general than specifically ITQs (Costello, Gaines and Lynham 2008). Either way, the observed correlation between ITQs and positive ecological outcomes has helped generate support for application among science, industry and policy makers.

Social effects of Catch Shares

The social outcomes of catch share applications are mixed, depending on the community in which they are applied. An increasingly large body of literature investigates patterns in social changes connected to ITQ implementation. Research suggests that leasing allows inactive fishermen to retain their quota shares and profit from harvest of their quota, without incurring the physical and financial risk inherent in commercial fishing (Turris 2010, Szymkowiak and Himes-Cornell 2015). On one hand the opportunity to lease out quota is seen as a potential boon, providing historic fisheries with a sort of pension should they exit. On the other hand this practice has in some cases lead to the emergence of a class of absentee owners that exclusively lease their quota from season-to-season without actively fishing themselves (Pinkerton and Edwards 2009, Turris 2010, Szymkowiak and Felthoven 2016). Some policy makers and industry members believe this is an unfair arrangement for active fishermen, who are exposing themselves to the risks of fishing. Personal risk and reward are considered by some fishermen to be part of the hard work that characterizes fishing (Carothers 2015). Fishermen who work hard and expose themselves and their equipment to dangerous conditions must pay a considerable portion of their revenue (30%-70% depending on the fishery) to cover the cost of quota leasing

fees, which may profit inactive fishermen who now avoid taking such risks (Pinkerton and Edwards 2009, Turris 2010, Szymkowiak and Felthoven 2016 Carothers 2015, Russell et al. 2014). Leasing quota is nevertheless optional and can, in theory, be avoided if the vessel owner does not want to lease from absentee owners. Additionally, the market-based nature of quota trading does permit leeway for negotiating more favorable outcomes between quota owners and lessees.

There are mixed views on how quota leasing impacts new entrants to the fishery. On one hand the cost of purchasing quota may exceed the financial ability of many new entrants, but on the other hand leasing quota provides an opportunity for those without the ability to purchase quota yet to get a start in the fishery they otherwise would not have. However, some research indicates fishermen are of the opinion that leasing quota is a further barrier to new entrants, as the accumulated cost of lease fees exerts downward pressure on crew wages and thus limits the upward mobility of crew to one day achieve vessel ownership (Pinkerton and Edwards 2009, Carothers 2015). This can (only) happen if there are not other bidders for the quota or markets are thin (Weimer and Vining 2015).

Other researchers have noted the increasingly “business-like” nature of operating in an ITQ fishery. Historically, many owner-operators were able to work their way from the deck to wheelhouse, so to speak, starting their career in fisheries as a deckhand and over several years or decades acquired enough capital and experience to purchase and captain their own vessel. The added dimension of increased need for business savvy and financial ability to not only purchase a boat and permits, but also quota, is seen by many in the industry as a major barrier to upward mobility for crew on the path to vessel ownership (Pinkerton and Edwards 2009, Szymkowiak

and Himes-Cornell 2015). Conversely, leasing may be the path to ownership, and part of a temporary arrangement, much as leasing a car, or paying off a property mortgage (Turris 2010).

Due to concern that independent owner operators and crew be dependent on absentee owners for quota, there is growing support in some fisheries for policy restricting quota ownership to vessels with “owner on-board” (Pinkerton and Edwards 2009). The social effects of absentee ownership, or “tenant fishing” are receiving growing attention, but because of the variability of social systems surrounding different commercial fisheries, details for drivers and impacts require continued investigation. The IFQ designs of the Alaska halibut, and sablefish IFQ program take this fact into account with an owner-on-board provisions, or active participation measures (Szymkowiak and Himes-Cornell 2015) The PCGF fishery management plan has a brief section outlining provisional and discretionary “owner-on-board” requirements, regulations for applying this rule have not yet been finalized however. The section in its entirety is as follows:

“In order to preserve the social and historic characteristics and practices in the fishery or to encourage the flow of fishery benefits to fishing communities, on the Council’s recommendation, as it deems appropriate and consistent with the goals of the groundfish FMP and National Standards, NMFS may require permit owners to be on-board a vessel during fishing operations.” (PFMC 2016a)

Because of the variability in fishing communities and complex nature of relationships with the marine environment, understanding the breadth of potential social impacts from ITQ implementation will take time and further studies. Program policy needs to be tailored to the fishery and communities in which they are applied (the specific features of the West Coast

Groundfish Catch Share Program are described in Chapter 4, of this thesis.) In the next chapter, I will describe the structure of job satisfaction as a factor within the social components of fisheries ecosystems, particularly as it is and influenced by the application of management policy like ITQs.

CHAPTER 3: Job Satisfaction in Fisheries

Job satisfaction in fisheries has been studied rigorously by a relatively small, but dedicated group of social scientists. This chapter is intended to familiarize the reader with the work so far accomplished toward understanding the structure of satisfaction people experience in the occupation of fishing. The satisfaction obtained from commercial fishing as an occupation is comparable to that of recreational fishing (Pollnac et al. 2011). What other occupation is as similar to recreational fishing as commercial fishing? Though the scale of activity may differ between recreational fishing and industrialized fishing, there are still attributes of the activities people find enjoyable. Being on the water, working outdoors, the thrill of the hunt, and adventure can be experienced on recreational and commercial operations. Speaking from personal experience as a former groundfish observer, working at sea provided a notable level of satisfaction not found in other land-based jobs. I have spent time working on recreational and commercial fishing vessels, and have felt and observed in others, the same forms and expressions of enjoyment in both contexts. Commercial fishing may be unique among occupations with regard to the type of enjoyment it provides. In turn, the individuals who work in fisheries may themselves display unique personality traits that allow them to enjoy commercial fishing. This chapter describes the nature of satisfaction and the individual needs it fulfills. The description this section provides will aid the reader to assess how fishermen derive enjoyment from working in the WCGTF and the influence of catch shares on this enjoyment.

Fisheries Job Satisfaction

Job satisfaction has been included in several frameworks as a component of human well-being and ecosystem health. Satisfaction (or happiness) is derived from being involved in activities one enjoys. (Pollnac et al. 2011, Breslow et al. 2013) . Job satisfaction (JS) is the happiness one derives from the work activity in which one they engage. Because one spends a significant portion of time carrying out “work” activities, an individual’s overall happiness

would in turn be affected by their job (Pollnac and Poggie 1988). If most individuals within the same community are engaged in the same work activity, such as logging, mining or fishing, overall community well-being would in turn be affected by the quality of work available (Pollnac et al. 2006, Breslow et al. 2013). Job satisfaction is connected to both individual attributes, such as mental, physical health and longevity, and social problems like family violence, absenteeism and job performance (Fig. 1) (Apostle, Kasdan and Hanson 1985, Pollnac and Poggie 1988, Pollnac et al. 2006). For commercial fishing, towns with few alternative occupations, the relative significance of fishing job satisfaction becomes greater. Pollnac and Poggie (1988) suggest policy that displaces fishers in a fishery dependent community without appropriate alternative occupation could cause the community to become dysfunctional.

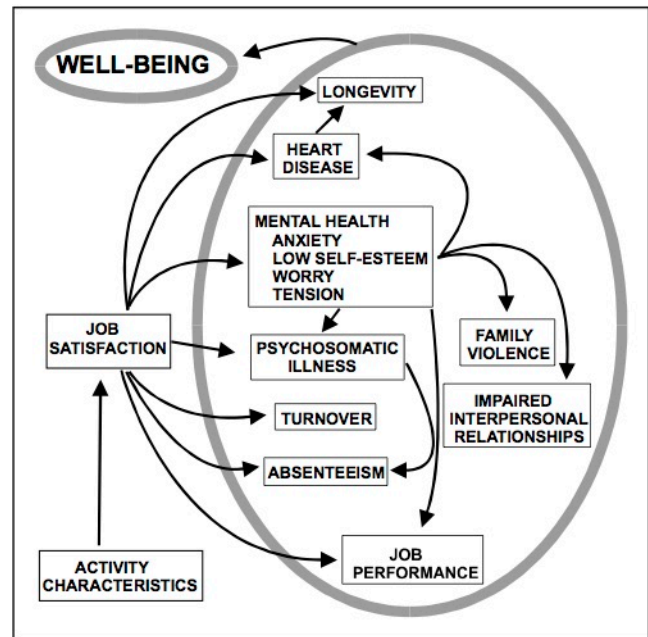


Figure 1. "Impacts of Job Satisfaction on Human Well -Being" (Pollnac et al. 2006)

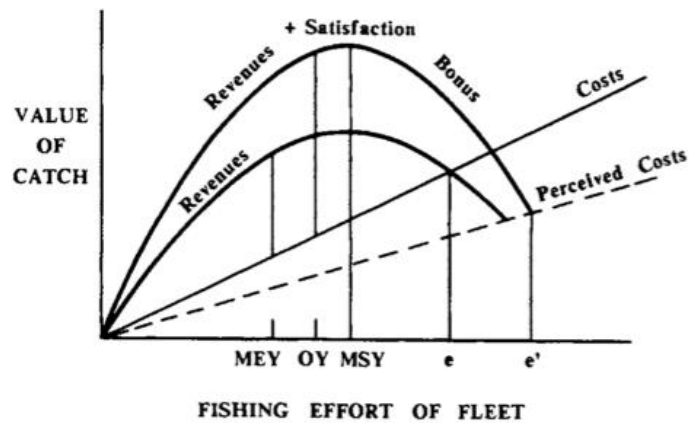


Figure 2. Economic vs Socioeconomic models of fishery management objectives (Gatewood and McCay 1990).

Some researchers suggest including job satisfaction in traditional models of fisheries bio-economic equilibrium (Gatewood and McCay 1990). The model suggests that unless fisheries are regulated in some way to control for competition (i.e., by setting individual quota) fisheries resources will be harvested at suboptimal level. When

considering that fishing provides substantial non-economic compensation, a “Maximum Satisfaction Bonus Yield” should be considered along with the maximum sustainable yield and maximum economic yield, because rewards to fishing take both monetary and nonmonetary forms (Gatewood and McCay 1990). Figure 2 presents a transposition of economic versus socioeconomic models of fishery management objectives, with the bottom curve representing monetary vessel revenue, and the upper curve reflecting job satisfaction, or essentially non-monetary rewards (Gatewood and McCay 1990). These authors place the “satisfaction bonus” revenue curve over the economic revenue curve as a way of representing the value fishermen place on non-monetary rewards from fishing. These are the same rewards other authors indicate fishermen will continue to pursue even when fish stocks collapse, and the occupation fails to provide a substantial means of monetary income. (Gatewood and McCay 1990, Pollnac and Poggie 2006, Pollnac et al. 2012)

Fishermen generally like their work, including being on the water and the non-monetary rewards of adventure and challenge provided by fishing, and these same qualities also explain why many

people enjoy recreational fishing (Pollnac et al. 2006). Attachment to fellow workers and community, a sense of personal control and opportunity to work on the water are frequently non-monetary rewards offered by commercial fishing as an occupation (Gatewood and McCay 1990, Binkley 1995). Other nonmonetary rewards cited by fishermen include the thrill of the hunt, the challenge of pitting skill against nature, and the overall sense of adventure to be found working at sea (Pollnac et al. 2006). Aspects of fishing associated with being on the water, are a major source of “non-economic remuneration” or “satisfaction bonus,” which aid in keeping fishermen on the sea (Gatewood and McCay 1990, Binkley 1995, Pollnac 2006).

Job satisfaction is negatively influenced by a number of factors. Dangerous and dirty working conditions, physical and mental fatigue, long working hours and periods of time away from home can decrease job satisfaction. Additionally, the more complex and stratified the work organization, the lower the job satisfaction as well. For example, a vessel with a larger crew would experience a greater disparity in satisfaction between captains, and officers, and that of the deck crew or processor as a result of the greater disconnection between those making decisions and those performing unsavory work roles (Binkley 1995). In turn, social problems associated with job dissatisfaction can impact community structure, solidarity and level of compliance with fishery regulations (Apostle et al. 1985, Pollnac and Poggie 1988, Gatewood and McCay 1990, Binkley 1995, Pollnac et al. 2001, Pollnac et al. 2006).

Regulations influencing fishing activity, like limits on gear, days at sea, and quota, have potential impacts on job satisfaction, ranging from positive to negative (Gatewood and McCay 1990, Binkley 1995, Pollnac and Pollnac et al. 2011). Regulatory policies that neglect the fact that fishermen really like their jobs, and presume fishermen pursue the occupation only for its

monetary rewards, may run the risk of not meeting policy goals (Gatewood and McCay 1990).

A vessel buy-back program in the northeast with the desired goal of reducing fleet size by at least 10% instead unintentionally resulted in less than 4% exiting, with many fishermen buying new boats with the compensation received from the buy-back (Pollnac, Pomeroy and Harkes 2001, Pollnac and Poggie 2006). The result of this program helped to underline how much fishermen value the non-monetary rewards received from commercial fishing. Despite decreasing catch rates, and declining income, fishermen sought to continue working on the water.

Studies have been conducted to determine what alternative occupations fishermen would find appealing should they exit the fishery. It has been found that fishermen perceive very few alternative occupations outside of fishing, such as logging or fire fighting, to provide a similar “satisfaction bonus” despite providing equivalent income (Pollnac et al. 2001, Pollnac and Poggie 2006). Research on job satisfaction among fisheries in industrialized countries indicates fishermen in general receive many types of satisfaction from their job, and resist changes that reduce this “satisfaction bonus” (Pollnac et al. 2001). This work aligns with personality traits found in fishermen of being adventurous, active, aggressive and courageous, which adapt them to the dangers and risks of commercial fishing (Pollnac and Poggie 1988, 2006, Binkley 1995). In this way there are aspects of fishing that attract and retain individuals displaying certain characteristics that would find fishing appealing, and allow these individuals to thrive in a challenging work environment like commercial fishing (Pollnac et al 2006).

Relatively few studies have sought to capture the changes in job satisfaction that occur in a fishery after ITQ implementation (Pollnac and Poggie 2006, Carothers 2015). Fishermen of the

South Eastern Alaska halibut ITQ fishery were found to have changes in job satisfaction connected to quota ownership. The general pattern demonstrated was those fishers with quota experienced increased job satisfaction over those without (Pollnac and Poggie 2006). A particular pattern [of relevance to the WCGTF relates to perceived barriers to upward mobility resulting from costs associated with quota leasing. When cost of quota ownership in the Alaska Halibut IFQ fishery was felt to become prohibitively expensive, many younger fishermen lost hope of ever acquiring enough capital to enter the fishery, affecting both individual attributes of job satisfaction and attributes tied to community (Pollnac and Poggie 2006).

A Framework for Understanding Fisheries Job Satisfaction

Job satisfaction is a complex variable influencing human well-being, which is in turn composed of an array of attributes. Researchers have worked for years to develop a framework that sufficiently describes the attributes of job satisfaction in fisheries. These attributes may positively, or negatively contribute to satisfaction, and include phenomena like “amount of earnings” or “being on the water.” These attributes fulfill different human needs ranging from basic physical safety and security, to complex individual identity. To understand the structure of job satisfaction in the WCGTF, it is necessary to describe the framework that has been refined over the last 30 years.

A grounded theory approach was originally applied by Pollnac and Poggie (1988) to understand what fishermen like about their job, and those attributes they like the least. Open-ended interviews were used to determine those aspects of their job that fishermen liked the most or the least (Apostle 1985, Pollnac and Poggie 1988). The attributes were narrowed and scored using

principal component analysis to determine the weight of a given indicator attribute. The indicator scores were ranked and categorized according to the overall contribution of that attribute to three factors of job satisfaction related to Maslow's hierarchy of needs. Other authors (Gatewood and McCay 1990, Binkley 1995) have adapted these indicators and three tiered "needs factor" framework. In hierarchical order, the components of job satisfaction are "safety and security" (basic needs) connected to physical and mental stress, amount and predictability of earnings, and job safety. "Place and control" at the middle needs level, connected to social and community attributes, as well as organizational structure of work. High level needs, otherwise known as "self-actualization" relate to individual fulfillment, are connected to challenge and adventure, personal identity as a fisherman, and the opportunity to work on the water. A Venn Diagram (Fig. 3) presents all 36 unique indicator attributes used in case studies of fisheries job satisfaction. Attributes are included under component factors to which they were assigned by researchers. In some cases, an attribute was included under different component factors between studies, placement of indicators between factor circles is meant to reflect this (Apostle, 1985, Pollnac and Poggie 1988, Gatewood and McCay 1990, Binkley 1995, Pollnac and Poggie 2006).

Figure 3. Three Major Components of Fishery Job Satisfaction, and associated indicator attributes consolidated across studies. (Apostle, 1985, Pollnac and Poggie 1988, Gatewood and McCay 1990, Binkley 1995, Pollnac and Poggie 2006)



Structure of Job Satisfaction in the North American Groundfish Fishery

Studies of Job satisfaction in fisheries have covered a broad range of fisheries types around the world. These have included: Southeast Asia, the Caribbean, South America, Africa, Canada and the United States. The basic structure of job satisfaction was found to be similar across all fisheries studies, regardless of geography or scale (Pollnac, Pomeroy and Harkes 2001,

Monnereau et al. 2010, Pollnac et al. 2011). Studies of job satisfaction in North American trawl fisheries were particularly helpful for informing this thesis, as the PCGF is similar in scale and capitalization. The fisheries examined target mixed groundfish, predominantly using a bottom to midwater trawl gear, but can include fixed gear (PFMC 2016a). In terms of similarity to the PCGF (gear type, target species and scale of industrialization), the studies most relevant for informing this thesis were those conducted in New England (in the towns of Point Judith, Rhode Island, New Bedford, Massachusetts, Bristol, Maine), New Jersey (Point Pleasant Beach, Barnegat Light, Atlantic City, Wild- wood, Cape May, and Port Norris) , Southeast Alaska (towns of Petersburg and Craig) and unspecified towns Nova Scotia, (Pollnac and Poggie 1988, 2006, Gatewood and McCay 1990, Binkley 1995) .

Safety and Security: Basic Needs

Whether the activity of fishing satisfies an individual in the basic needs category is dependent on a number of factors in addition to vessel role. Crew members tend to experience high satisfaction related to basic needs. This may be a reflection of their role, in that income from fishing may be a higher priority to vessel roles that offer lower levels of responsibility (Pollnac and Poggie 1988, 2006). Owner and skipper status can manifest a strong negative relationship with safety and security attributes. These roles are more critically linked to incomes with respect to the capital they have invested or for which they are responsible. Owner-operators and skippers are additionally responsible for many of the basic needs of the crew (Pollnac and Poggie 1988). Interestingly, a study on the town of Point Judith published in 2011 found a change in captains who demonstrated higher satisfaction in this category than for other roles. Other authors found no significant difference between captains, skippers and crew in this area (Gatewood and McCay 1990). Increased industrialization can negatively affect satisfaction in this category for all roles,

but crew in particular feel more negatively, as a result of faster paced work, or loud and dangerous machinery (Binkley 1995). Compared to other component levels of satisfaction, all roles express the least amount of satisfaction in the basic needs category as a result of unpredictability of earnings (Pollnac and Poggie 2006).

Place and Control: Middle Needs

The middle levels of job satisfaction attributes are the most variable between communities, and tend to be the lowest scoring items. There tends to be a great difference in satisfaction between captains and crew related to this component level. Captains, skippers and owners generally experience higher satisfaction in “place and control” because of their role in determining vessel operations (Pollnac and Poggie 1988, 2006). Crew manifest lower satisfaction related to “place and control”, because they are characteristically less in control of the situation than skippers or owner operators. This negative relationship increases with crew to captain ratio, level of industrialization, vessel size, and distance from shore it operates (Pollnac and Poggie 1988, Gatewood and McCay 1990, Binkley 1995). Additionally, because crew are the ones performing more physically stressful deck work (de-icing, sorting and bleeding catch), but unlike captains and skippers, less so in setting the work schedule, crew may be less satisfied. All roles are less satisfied with being away from family and friends, and the performance of state and federal officials (Pollnac and Poggie, 1988, Gatewood and McCay 1990, Binkley 1995). “Community in which you live” tends to rank high across all roles, but strength of community relationship compared to other job satisfaction attributes varies depending on community (Pollnac and Poggie 1988, Binkley 1995). Communities with low job satisfaction may have high community attachment if fishing provides an economic means to stay tied to kin and community, whereas

other fisheries seem to have poor community ties, but high job satisfaction (Pollnac and Poggie 1988, Pollnac et al. 2011).

Self Actualization: High Needs

Items related to “self actualization” provide the most important aspects of job satisfaction for fishermen (Apostle 1985, Pollnac and Poggie 1988, Gatewood and McCay 1990, Binkley 1995, Pollnac and Poggie 2006, Pollnac et al. 2011). Two quotes help to capture the importance of self actualization attributes to the overall job satisfaction of fishermen:

“Not the money that is important, it’s the job, fishers define themselves by their job. If they couldn’t fish they wouldn’t be themselves, they’d have no identity.”-Petersburg, AK, fisherman” (Pollnac and Poggie 2006)

“come and fish in Craig for adventure. In fishing, adventure is the only thing left. No money in it, but it is still fun!”-Craig, AK, fisherman” (Pollnac and Poggie 2006)

For all roles, early entry and having a father who was a fisherman was found to be positively correlated with satisfaction on High needs level, “early socialization and reduced chances for comparison with other jobs probably play a significant role in enhancing satisfaction with respect to the items on this factor” (Pollnac and poggie 1988). Self actualization positively correlated with captain or skipper status. (Pollnac and Poggie 1988). Captains may also enjoy the “head game” of fishing, taking particular pride in the challenge of pitting skill against nature (Gatewood and McCay 1990). Several authors (Pollnac and Poggie, Gatewood and McCay, Binkley) indicate decreased satisfaction among crew compared to captains and mates, especially in the ever important “self actualization” component of fisheries job satisfaction. Both crew and

captains/skippers find working outdoors the most rewarding item, and additionally enjoy the “challenge” and “adventure” of fishing (Gatewood and McCay 1990). Over-exposure to particularly harsh or dangerous environments, combined with low levels of mechanization, can contribute to decreased satisfaction related to “being on the water” (Pollnac and Poggie 1988).

“Opportunity to be your own boss”

Several indicators appear to overlap between components of job satisfaction. In studies of fishery job satisfaction, responses reflecting “opportunity to be your own boss” were considered weighing toward both middle needs and high level needs factors. Most notably, “opportunity to be your own boss” was included as an attribute of both middle level “place and control” components, and high level “self actualization.” In some studies the attribute is situated in the “place and control” middle needs based on the score weighing more strongly toward this component level (Pollnac and Poggie 1988, Gatewood and McCay 1990, Binkley 1995, Pollnac and Poggie 2006). Apostle (1985) includes “opportunity” under the self-actualization related sub-component “independence”. In other studies “opportunity to be your own boss” closely weighs second highest on “self-actualization” component after “place and control” reinforcing the division of the attribute between the two needs levels (Pollnac and Poggie 1988, 2006). More recently, the attribute is found to be among the three most statistically significant drivers of fisheries job satisfaction in the middle needs level (Pollnac et al. 2011) The fact that this attribute weighs significantly toward two component levels of job satisfaction is important to recognize, because as described in Chapter 2, one of the major changes to fisheries satisfaction perceived to occur in an ITQ fishery is the opportunity to be one’s own boss.

Despite the complex nature of job satisfaction in fisheries, there is a surprising amount of similarity in satisfaction structure between fishing communities around the world. As we move into the next chapter, describing the organizational structure of the PCGF, themes in potential job satisfaction may become apparent. Despite differences in culture, harvesting techniques, and management style, we may find predictable patterns of satisfaction arise in the WCGTF as a result of regulatory drivers. A methodological approach to understanding the structure of satisfaction in the WCGTF is covered in Chapter 5.

CHAPTER 4: Background Description of the WCGTF

This chapter provides background on the Pacific Coast Groundfish Fishery; describing the vessels, target species, harvesting methods, and management history. Because the WCGTF Catch Share Program was implemented with goals to avoid or adapt to negative social outcomes observed in other ITQ fisheries, it is worth describing some of these policy aspects and setting up research questions that will aim to answer how successfully the program has achieved its goals. The previous chapter on job satisfaction provides the background to allow themes and potential impacts to enjoyment to become apparent to the reader. With the pieces set on the board we can move into exploring how job satisfaction in the WCGTF has changed with the Catch Share Program.

Nature of the Fishery

In 2014, the fourth year of the catch share program, 102 catcher vessels, nine catcher-processors, five motherships, and 16 shore-based processor vessels participated in the WCGTF catch share program (Steiner et al. 2016(a), 2016(b), Guldin 2016 Warlick 2016). There are presently over 90 groundfish species within the PCGF FMP, 64 of which alone are rockfish, and another 12 flatfish, including Pacific halibut. In addition, six species of shark and skate species, as well as six “roundfish” species are managed under the same FMP. The roundfish include some of the most vital species to the fishery, Pacific cod, sablefish, and Pacific whiting. Of the 90 target and bycatch species, 66 are managed with individual transferable quota.. In 2014, of the 282,503 metric tons of all groundfish caught in the PCGF across both catcher and catcher-processors sectors, Pacific whiting accounted for 264,803 or 93.7% of the total catch volume, of which in turn 103,203 metric tons were captured by the nine participating catcher processors comprising

the Pacific Whiting Cooperative. The whiting sector also includes the catch processor and at-sea mothership sub-sectors to which catcher trawlers deliver when operating offshore (Brinson and Thunberg 2013, NOAA 2015, Guldin 2016, Warlick 2016). The remaining 17,700 metric tons represented “non-whiting” groundfish catch and the other 65 quota species, this is harvest almost exclusively by shore-based catcher trawler vessels (Steiner et al. 2016(a), Warlick et al. 2016). There is overlap between sectors, with many vessels in the trawl catch sector participating in both whiting and non-whiting as well as other fisheries, including Dungeness crab, shrimp and Alaskan Groundfish. (PMFC 2010, Russell et al. 2014, Steiner et al. 2016 (a)).

PCGF Management History

Throughout the years, management of the Pacific Coast Groundfish Fishery has fluctuated to meet changing ecological and economic situations. The first Fishery Management Plan (FMP) for the West Coast groundfish trawl sector was developed following the 1976 Fishery Conservation and Management Act (FCMA) now known as the Magnuson-Stevens Act (MSFCMRA 2006). The FCMA established a 200 nautical mile exclusive fishery management zone, granting the US management authority over domestic and foreign fishing vessels in Washington, Oregon, and California fishing grounds (PFMC 2013, 2016). A dedicated FMP was created to manage fishing activity of foreign fleets and gradual transition to domestic fleets, undergoing revisions and amendments over the decades. FMP Amendment 20 introduced a catch share style of management to the fishery in 2011. (Fisheries Off West Coast States; (October 2010). 50 CFR § 660. 15 CFR § 902) Vessels in the PCGF target multiple species near and offshore primarily with trawl and long-line gear. The target and bycatch species within the fishery are diverse and numerous, contributing to the complexity of managing this fishery (Holland and Norman 2015).

Prior to implementation of the catch share program, a fleet wide quota system managed the groundfish trawl sector, otherwise known as Total Allowable Catch (TAC). This fleet level catch limit was combined with individual trip limits, seasonal closures, and gear and area restrictions (PFMC, and NMFS 2010 Brinson and Thunberg 2013). Bycatch, the incidental capture of non-target species living in areas where harvest activity takes place, has been a long-standing issue in this fishery. Because groundfish live in a diverse association with the sea floor and the water column, and because trawl gear tends to have a low degree of selectivity in targeting specific species within a mixed assemblage, rates of bycatch can be high in the PCGF. Seeking cleaner fishing grounds, areas of high target species abundance with low presence of non-target species, is often a time consuming endeavor for fishing operations. In a TAC managed fishery, where each vessel is individually responsible for harvesting as much of the total allowable catch as possible, there is low incentive to spend time searching for cleaner grounds when every pound of fish caught by another vessel is one less available for your own. In this way, a “race to fish” or “derby style” fishery can be created (NOAA 2010). This race to fish causes investment in fish catching technologies and fishing power that only exacerbate the race (Weimer and Vining 2015).

In the WCGFT, several stocks of rockfish species dwindled and halibut bycatch increased. Therefore management measures became increasingly restrictive to prevent overfishing of both target and bycatch species. Concern grew over the economic viability of the non-whiting trawl fishery as a result of regulatory inflexibility and individual accountability concerning bycatch (PFMC 2010, Brinson and Thunberg 2013). In 2003, a permit and vessel buy-back program was introduced in an effort to reduce fishing capacity and pressure on the ecosystem, but did little to

alleviate the biological, economic and social concerns, which the PCGF considered economically unsustainable (PFMC.2010).

Design of Catch Share Program

In November of 2008, a trawl rationalization program for the PCGF was proposed as a means of rebuilding overfished bycatch species, by allowing individual vessel accountability and flexibility in dealing with bycatch (PFMC 2010, PFMC 2013). The proposed policy outlined the following objectives:

- “1) Provide a mechanism for total catch accounting;*
- 2) Provide for a viable, profitable, and efficient groundfish fishery;*
- 3) Promote practices that reduce bycatch, discard mortality, and minimize ecological impacts;*
- 4) Increase operational flexibility;*
Minimize adverse effects from an IFQ program on fishing communities and other fisheries to the extent practicable;
- 5) Promote measurable economic and employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry;*
- 6) Provide quality product for the consumer;*
- 7) Increase safety in the fishery” PFMC 2010.*

The National Marine Fisheries Service approved the trawl rationalization program in October of 2010 (Fisheries Off West Coast States; (October 2010). 50 CFR § 660. 15 CFR § 902) In 2011, the West Coast Groundfish Trawl Catch Share program was implemented, introducing an ITQ style system for the two industry sectors, i.e., shore-based trawl fleet, and cooperative quota

sharing programs for at-sea mothership and catcher/processor trawl fleets (Fisheries Off West Coast States (December 2010) 50 CFR § 660.). The whiting sector also includes the catch processor and at-sea mothership sub-sectors to which catcher trawlers deliver when operating offshore (Brinson and Thunberg 2013, NOAA 2015).

The WCGCSP includes quota for both target and bycatch species, with the goal of holding fishermen accountable for deliberate and incidental catch. This means all fish harvested are deducted from individual quota including those target and bycatch fish that are discarded.

The catch share program also includes a requirement for 100% at-sea and dockside observer monitoring paid for by the quota holder/vessel. This is an increase from 30% coverage prior to the policy. The rationale behind this change was to match individual vessel monitoring with new individual accountability of catch shares. Management shifted from fleet-wide to individual vessel focus (PFMC 2010). When fishing in the PCGF, vessels now must carry an onboard observer for any fishing trip in order to account for every haul. This design is also intended to support new bycatch discard requirements, which mandate all quota species are counted against quota holdings, regardless of whether the fish is landed shore side or discarded at-sea (Fisheries Off West Coast States; (October 2010). 50 CFR § 660. Holland and Norman 2015)

Upon implementation of the WCGCSP, NOAA Fisheries issued 138 quota share permits and initial allocation of quota to trawl permit owners. This number of participants was expected to further decrease as vessels exited the fishery (NMFS 2011, Brinson and Thunberg 2013, Russell et al. 2014). Allocation of initial quota shares was based on historical catch and participation. Permit holders with a longer history of high participation, catch volume and sound harvest

practices received larger shares than permit holders with less or infrequent participation.

(Fisheries Off West Coast States 2015. 50 CFR § 660; Towne 2015) Additionally, the Council put in place accumulation limits to prevent over-consolidation and to “disperse fishery benefits” (Towne 2015)

The catch share program also included an Adaptive Management Quota program, where 10% of all quota allocations were held in reserve at the introduction of the program. The intent of the Council was to apply this quota toward one or more adaptive program objectives: community stability, processor stability, facilitating new entrants, conservation, or responding to any other unintended outcomes of ITQ implementation (Towne 2015). The reasoning behind this strategy stems from recognition that ITQ implementation has brought unexpected economic and social outcomes in other fisheries.

The intent was to set aside some quota as an insurance policy for later allocation, and hopefully adapt to any unanticipated outcomes (Brinson and Thunberg 2013, Town 2015). This approach to quota allocation has not been applied in any other fishery to date, however and adaptive management “package” has yet to be developed, and quota has not been assigned to address any unintended consequences. Instead, current reserve quota is distributed to permit owners in addition to the quota they own (Brinson and Thunberg 2013, Towne 2015, PFMC 2016b).

Acknowledging concerns regarding absentee ownership, the 2016 PCGF fishery management plan has a brief section outlining provisional and discretionary “owner-on-board” requirements,

regulations for applying this rule have not yet been finalized however. The section in its entirety is as follows:

“In order to preserve the social and historic characteristics and practices in the fishery or to encourage the flow of fishery benefits to fishing communities, on the Council’s recommendation, as it deems appropriate and consistent with the goals of the groundfish FMP and National Standards, NMFS may require permit owners to be on-board a vessel during fishing operations.” (PFMC 2016)

Recognizing the economic dynamics of the PCGF would change with the catch share program, an Economic Data Collection (EDC) program was included to monitor changes in the fishery. Data are annually collected from industry members and used to evaluate whether the goals of the program are being met (NMFS 2010, NOAA 2015, Steiner et al. 2016.(a))

To understand social changes that have occurred as a result of ITQ implementation, the PCGF Social Survey was developed. The PCGF Social Survey is carried out with the intention of informing policies related to the WCGTF Catch Share Program. At its most basic, the purpose of the Social Survey is to track changes in the social structure of the fishery using voluntary surveys and interviews with members of the industry (NMFS 2010). The Social Survey is conducted by researchers from the NOAA Northwest Fisheries Science Center, aimed at collecting social data from a broad range of participants in the fishery including active captains, crew and owners, processors, spouses, and supporting industry members such as ship suppliers and net makers. Social Survey team members canvassed members of industry to determine their willingness to participate in the study. The full interview is conducted in person using a detailed survey containing both structured survey and open-ended interview elements.

How Do Catch Shares Change Job Satisfaction?

Fishing permit owners have the option to sell their valuable quota and exit the fishery, or seek more quota from other participants willing to trade or sell. By incentivizing the least efficient harvesters in a fishery to exit, ITQs reduce overcapitalization and lead to the consolidation of quota with an ever smaller number of fishers capable of harvesting quota with greater economic efficiency. Post catch share implementation, there was, indeed, a reduction in fleet capacity in the WCGTF as some permit owners chose to sell their quota and exit (Russell et al 2014). An effect on employment with this implementation was a reduction in the number of available jobs (due to fewer boats) but a longer, more stable working season without derby style fishing for the remaining vessels and crew members (Abbot 2010, Brinson and Thunberg 2013, Turris 2010). Upon rationalization, for most participants in the PCGF, buying, selling, and trading quota was a completely new activity (Holland and Norman 2015). Changes to the timing of harvest activities and resulting income, number of participating vessels, and new activities like quota trading have all altered the characterization of commercial fishing as occupation in the PCGF. As described in Chapter 3, changes to job activity can have a concomitant effect on job satisfaction and well-being.

The PCGF Social Survey was implemented with the intent of monitoring such changes in the social dynamics of the fishery. The survey seeks to collect data on a wide range of social variables across a variety of roles within the industry. The survey asks fishermen how they perceive their subjective job satisfaction, or how do they rate their satisfaction on a 1 to 4 scale. The *structure* of job satisfaction however is unclear. Attributes contributing to this subjective score, and the role they play in determining overall satisfaction are not directly investigated.

Some themes and potential drivers of job satisfaction have been revealed by the survey. The survey found that crew and captains are typically negatively affected by leasing trawl quota and relationships between crew and vessel owners may become more negative should the owner decide to lease quota (Russell et al. 2014). As few studies have sought to focus on the effects of ITQs on job satisfaction in fisheries (Pollnac and Poggie 2006, Carothers 2015) there is much to learn from current patterns in satisfaction among active participants of the PCGF. To understand the current structure of job satisfaction among WCGFT participants, and potential catch share policy based drivers of JS, I will address two major research questions:

Major Research questions

1. What changes in business decision-making have arisen with ITQ implementation?

Elements of the WCGCSP may alter attributes of job satisfaction, but fishermen may, in turn, develop new business strategies to cope with changes. New drivers may, for example, be economic incentives provided by the ITQ system, with varying outcomes for job satisfaction depending on the business choices fishermen make. These choices could take the form of when and how to fish, acquiring or divesting quota, hiring extra crew, or reducing crew size. We cannot clearly trace patterns of job satisfaction until a pattern in occupational activities can be determined.

2. What patterns in job satisfaction have resulted from ITQ policy and related choices?

A distinguishing characteristic of WCGCSP is the option to lease quota. Are there any observable effects on job satisfaction connected to the policy and practice of quota leasing in this fishery? This thesis will seek to understand the role quota leasing plays in determining individual job satisfaction. Beyond quota leasing, this thesis will draw connections between attribute elements in job satisfaction and other policy elements of the WCGCSP.

CHAPTER 5: Methods for Evaluating Fisheries Job Satisfaction

To answer the major questions posed by this thesis, my goal was to use an approach similar to earlier work aimed at studying job satisfaction in fisheries. Studies over the last 30 years have largely used the same three-tiered Maslovian framework, and interviews with fishers, for understanding fisheries job satisfaction. In the same way these studies have successfully built off one another, this thesis intends to similarly add to understanding of fisheries job satisfaction. By using the same three-tiered framework, we can compare results of interviews in perspective with findings from other fisheries. The definition I will use for fisheries job satisfaction is, “the happiness one derives from being employed in commercial fisheries” based on Pollnac and Poggie (2006).

Systematically Asking Interview Questions

I chose to use semi-structured interviews (Fontana and Frey 2004, Rabionet 2011) and a grounded theory based approach (Strauss and Corbin 1994) for understanding the current structure of job satisfaction in the WCGTF. This approach offered flexibility for investigating job satisfaction in the fishery by not only building understanding toward whether quota leasing specifically impacts satisfaction, but also elucidated the importance of other catch share program drivers of job satisfaction that became apparent during interviews (Strauss and Corbin 1994, Rabionet 2011). In this thesis, the pre-existing themes “ITQ policy changes social components of fisheries” and “social components of fisheries are connected to job satisfaction” are used as a theoretical foundation to build a theory of specific patterns of changes to job satisfaction as respondent describe their current satisfaction. This change in regulations is known to affect social aspects of fisheries, and can be reasonably connected to attributes of job satisfaction.

Some studies reduce the number of indicator attributes used evaluation framework to the nine of top statistical significance across all fisheries examined (Pollnac, et al 2011). However, for the purpose of my thesis, I retained all 17 base indicator attributes used by Pollnac et al. (2011) and allowed interviews to reveal which of those attributes contributed to job satisfaction in the WCGTF. In the course of conducting my own interviews, I examined which attributes were most affected by policy changes among members of the WCGTF. I refer to the three component levels of fisheries job satisfaction as safety and security/basic needs, place and control/ middle needs, and self-actualization/ high level needs to assess my findings.

Semi Structured Interviews and Survey

Semi structured interviews (Fontana and Frey 2004) were selected for this study because the method allowed me to elicit responses centered around the topic of job satisfaction” and its relationship to design elements of the WCGCSP (Rabionet 2011). A fully structured survey may preclude the opportunity for dialogue between fishermen that may be helpful in revealing more specific individual patterns of satisfaction (Fontana and Frey 2004,). An entirely open ended interview was unnecessary, because I sought first to understand whether quota leasing affects job satisfaction. Interview questions centered on the quota leasing patterns of vessels fishermen own, operate, or crew, and how they feel their job satisfaction has been affected by the program. Once questions regarding quota leasing were addressed, I asked what aspects of the catch shares program they believed most benefited, or detracted from their satisfaction. Questions related to how the respondent felt their activity in the fishery, or plans for the future that have changed were intended to reveal new business choices under an IFQ system that may be connected to job

satisfaction in the WCGTF. The semi-structured survey used in this research is included in **Appendix 1.**

Conducting Interviews

Semi-structured interviews were conducted in cooperation with the PCGF Social Survey (Russel et al. 2014). I acted as a second interviewer during interviews for the Social Survey, specifically those with active fishermen: independent owner-operators, skippers, and crew. The team member would lead the interview, and once questions regarding job satisfaction and leasing were broached, I asked questions from my semi-structured survey. Fitting my questions in with relevant sections of the Social Survey process allowed the dialogue to develop more organically.

Ten semi-structured interviews were conducted with active fishermen in the West Coast Groundfish Trawl Catch Share Program. The target sample size was at least 20, but due to limits on time, funding, and availability of interviewees, only ten could be completed. Interviews were conducted in Seattle, Washington and in Astoria and Newport, both in Oregon. The respondents were predominantly vessel operator, crew and vessel owner/managers. Interviews lasted from 15 minutes to two hours depending on the respondent. To ensure anonymity for respondents, no names of individuals, vessels they work on, or other identifying monikers are included in results. Audio from interviews was recorded electronically by PCGF Social Survey team members present. Audio transcripts and interview notes were shared only between myself and team members with whom I collaborated. In this thesis, individuals are identified by the order in which they were interviewed and the town of residence thus “Astoria 1” refers to the first interview performed in Astoria, Oregon.

Analyzing Interviews

I narrowed down the importance of key job satisfaction indicator attributes by reviewing interview results/notes and assigning them to bins representing indicator attributes. Once interviews were completed, they were re-numbered based on where respondents indicated a pattern in job satisfaction. The interview number was included with the corresponding indicator attribute under the appropriate satisfaction component level. Responses were further categorized as to whether the pattern in job satisfaction was positive or negative. Responses where the interviewee indicated “no change” in, or maintained, were coded according to whether the attribute in question positively or negatively contributed to satisfaction in general for the component level. For instance, a response “no change in safety” would be coded as a “negative” satisfaction pattern for the “safety” attribute, as the PCGF has experienced difficulty with vessel safety prior to catch share implementation. Another example is, if a respondent indicated no change in satisfaction connected to “working on the water” the response pattern would be coded as “positive” as this attribute is known to positively influence job satisfaction in other fisheries based on the model of commercial fisheries job satisfaction comparing to the general framework of fisheries job satisfaction used in Pollnac et al. 2011 and discussed in Chapter 3.

CHAPTER 6: Results of Research and Interviews on Job Satisfaction in the WCGTF

In this chapter I describe the results of interviews and the patterns in fisheries job satisfaction they reflect. I provide a complete table of interview results organized by individual and across all three needs levels of the fisheries job satisfaction framework. For each individual interviewed, specific attributes of job satisfaction described are included. The goal of this organization is to provide a map of individual satisfaction, which illustrates some of the variation in drivers of enjoyment for people employed in fisheries. Where possible, I have tried to include specific drivers of individual satisfaction connected to policy elements of the catch share program. Some drivers of satisfaction are based on individual choices, and ITQs have provided new options to participants in the fishery. Because the choices fishermen make as a result of policy do not always conform to expectations, it is important to identify how individuals are acclimating to the new structure of their occupation. When an Independent Owner Operator chooses to lease more quota, they may in turn affect not only personal satisfaction, but the satisfaction of crew members. Understanding new patterns of relating to work activity will help in describing why certain patterns in satisfaction have appeared.

Beyond individual analyses, my goal was to organize patterns of satisfaction according to vessel role. This is in line with earlier findings from other fisheries presented in Chapter 3, wherein satisfaction was influenced by role and largely consistent between fisheries. I have organized patterns of individual satisfaction by the role the respondent performed. I differentiate between common patterns of satisfaction for deck crew and captains (owner operators or hired skippers) as a result of their differing responsibilities and position.

Of the 50 catcher vessels currently operating out of Astoria and Newport, interviews captured trends in job satisfaction for operators and crew of 15 different vessels. One interview with a vessel co-owner provided insight into three catcher-processor vessels from Seattle focused primarily in the Pacific whiting sector of the WCGFT. Three interviewees were Independent Owner Operators (IOO); three worked as Hired Skippers; two were crewmen, and one a vessel co-owner. This pattern of interviewees is similar to the coverage in the EDC survey, where it was found 37% of the time catcher vessels were owner operated in 2014 and in 31% of the time owner operated in 2016 (Steiner et al. 2015, Steiner et al. 2016(a)). Between 2012 and 2014, the average number of crew employed on catcher vessel was 2.4 members (Steiner et al. 2015, Steiner et al. 2016(a))

Fishermen indicated effects of rationalization with changes in job satisfaction connected to all three levels of job satisfaction factors. Vessel owner-operators, captains, and crew appeared to experience differences in job satisfaction. Several general patterns in job satisfaction emerged: fees from “Quota Leasing” and “Observers” most negatively affect overall job satisfaction at present. The non-whiting sector is challenging in which to manage quota, with multiple quota allocations for 66 different target and bycatch species. Acquiring the adequate ratio of target to necessary bycatch species is often difficult. Interviews confirmed that acquiring and managing a diverse portfolio of species quota is an ongoing challenge that was not present before the introduction of the WCGCSP.

When asked to rate job satisfaction on a Likert scale, PCGF Social Survey respondents rated it “good” and more often “excellent” on a four point Likert scale. The results of the 2012 social survey demonstrated that most participants feel their current overall job satisfaction levels are

either “good” to “excellent” (Russell et al. 2014). This is interesting in light of the dissatisfaction expressed in my semi-structured interviews. Results of interviews are presented in Table 1, which refers to the indicators attributes of job satisfaction described by the interviewee as being affected by implementation of catch shares. Where applicable, crew are also included if the interviewee described job satisfaction for that role. Town or city is indicated with interview number to illustrate whether differences in individual satisfaction could be traced to the community in which the respondent lives. When available I have included direct quotes from respondents describing factors influencing job satisfaction attributes. A caveat to note is all interview results represent subjective, individual descriptions of job satisfaction and associated drivers. Personal income data (amount of earnings and predictability) were not made available to, nor asked of respondents in the course of interviews.

Table 1. Analysis of Job Satisfaction among WCGTF interviews

+ :Positive contribution to job satisfaction factor

- :Negative association to job satisfaction factor

+/-: Mixed contribution to job satisfaction factor

IOO: Independent Owner-Operator

Skipper: Hired Operator, vessel owned independently, not by processor.

POHSO: Processor Owned Hired Skipper Operated, vessel owned by processor.

Crew: Vessel crew, not owner or skipper

Interview # and Community	Basic “Safety and Security”	Middle “Place and Control”	High “Self Actualization”
#1 Astoria	IOO: <i>-Mental Pressure: “Acquiring quota” “Avoid constraining” species +Peace of Mind: “We get the quota for species we need to keep fishing”</i> Crew: <i>-Predictability of Earnings -Mental Pressure</i>	IOO: <i>-Opportunity to be your own boss -Community in which you live: “absentee owners”</i> Crew: <i>-Opportunity to be your own boss</i>	IOO: N/A Crew: N/A
2 Astoria (Only New Entrant)	IOO: <i>+Your earnings +Predictability of Earnings: “Consistently made more money -Mental pressure -Safety: “Observers”</i>	IOO: <i>-Opportunity to be your own boss: “Leasing 100% quota”</i> Crew: N/A	IOO: <i>+Doing Something Worthwhile +Challenge: ”Jumped on horse and chose to ride” -Adventure: “High anxiety has taken fun out of fishing”</i>

	Crew: <i>+Predictability of Earnings: “More Regular Work”</i>		Crew: N/A
3 Astoria	POHSO: <i>-Mental pressure: “Avoiding constraining species”</i> <i>+Safety :“can avoid rough weather”</i> Crew: <i>-Your earnings: “Lease fees”</i>	POHSO: <i>- Opportunity to be your own boss</i> <i>- Ability to come and go as you please: “Work for processor now”</i> Crew: N/A	POHSO: <i>+Challenge of job.</i> <i>+Feeling you are doing something worthwhile: “More fish keeps me happy”</i> Crew: N/A
4 Astoria	POHSO: <i>- Mental pressure: “Avoiding constraining species”</i> Crew: <i>-Your earnings: “Lease fees”</i>	POHSO: <i>- Opportunity to be your own boss</i> <i>- Ability to come and go as you please: “Work for processor now”</i> Crew: N/A	POHSO: <i>+Overall excellent job satisfaction</i> Crew: N/A
5 Astoria	Crew: <i>- Your earnings</i> <i>+Predictability of earnings</i> <i>-Mental pressure</i>	Crew: <i>- Community in which you live</i> <i>-Opportunity to be your own boss</i>	Crew: <i>-Feeling you are doing something worthwhile: ”Leasing takes the fun out of being a fisherman”</i> <i>“No strong future”</i> <i>-Performance of agency</i>
6 Astoria	IOO: <i>+/- Your earnings</i> <i>+\\-Predictability of earnings: “Increased observer fees, but Increased fish revenue”</i>	IOO: <i>-Community in which you live: “Processor is the devil”</i> <i>-Opportunity to be own boss</i>	IOO: <i>-Feeling you are doing something worthwhile</i> <i>-Performance of agency</i>

	Crew: N/A	Crew: N/A	Crew: N/A
7 Newport	Crew: + <i>Predictability of Earnings</i> + <i>Time away from home</i> : “more predictable” + <i>Safety</i> : “pick weather windows”	Crew: - <i>Opportunity to be own boss</i> : “barriers to ownership, but I don’t think it’s unattainable”	Crew: +Overall excellent job satisfaction: “we’re pretty happy here” + <i>Feeling you are doing something worthwhile</i> : “Couldn’t see myself doing anything other than fishing”
8 Seattle	Owner: N/A Crew: + <i>Predictability of earnings</i> : “more stable jobs, but fewer”	Owner: - <i>Community in which you live</i> : “absentee quota owners” Crew: - <i>Opportunity to be your own boss</i> : “hard to go from deck to wheelhouse”	Owner: - <i>Feeling you are doing something worthwhile</i> : “loss of relationship with trade that is fishing” Crew: - <i>Feeling you are doing something worthwhile</i> : “Hard to see a future”
9 Newport	POHSO: - <i>Safety</i> : “No real change in safety” - <i>Your earnings</i> : ”increased costs of operating” + <i>Predictability of earnings</i> : “Very stable job” Crew: - <i>Predictability of earnings</i> : “Don’t know what they’ll make” - <i>Your earnings</i>	POHSO: - <i>Opportunity to be your own boss</i> . - <i>Community in which you live</i> : “leasing from absentee owners” Crew: - <i>Community in which you live</i> . - <i>Come and go as you please</i> : “processors are less flexible” - <i>Opportunity to be your own boss</i>	POHSO: - <i>Feeling you are doing something worthwhile</i> Crew: - <i>Feeling you are doing something worthwhile</i>

10 Newport	Hired Skipper: + <i>Predictability of earnings:</i> “Increased job stability, and no change in earnings” - <i>Safety:</i> “No change” - <i>Mental pressure of job</i> ”avoiding bycatch” Crew: N/A	Hired Skipper: + <i>Come and go as you please:</i> “no change, can still come and go” Crew: N/A	Hired Skipper: + <i>Feeling you are doing something worthwhile</i> Crew: N/A
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Interview Results: Business Decisions

“What changes in business decision making have arisen with ITQ implementation?”

After rationalization, permit holders were given quota allocations based on historic participation. This meant for some vessel owners, the quota allocated was felt to be inadequate to keep the operation viable. For some this meant selling, and exiting out of the fishery. For those still active this meant making some new choices. Active fishers and owners have developed new business strategies to cope with the changes to job satisfaction that result from fees, or in turn may experience changes in job satisfaction as a result of new business strategies. First, some IOOs subsidize crew earnings to compensate for income lost to fees (Interview 1). Conversely, some IOOs indicate they must subtract from crew earnings to cover the cost of increased fees from observers and quota leasing (Interview 2, 6, 8). Second, some previously IOO status fishermen sold their vessels, permits, and quota allocations to local seafood processing companies, for whom they now work as captains.

Predictability of Earnings

Despite the increased costs of operation through observer and leasing fees, vessel owners are finding ways to utilize increased profit to maintain crew wages to levels prior to implementation. Six out of ten WCGCSP participants interviewed (Interview 1, 3, 4, 5, 6, 9) described decreased crew shares and amount of earnings resulting from increased leasing and observer fees. The increased costs of operation are cited as decreasing crew wages from 10% crew share to about 5.5% (Russell et al. 2014, Steiner 2016 (a)). Increased observer coverage, from 30% to 100%, under the catch-share program is a compounding factor with quota leasing fees (Russell et al. 2014, Steiner et al. 2016(a)). These factors (decreased crew shares and increased observer coverage) together significantly add to the fixed and variable costs of operation.

However, in one interview the vessel owner demonstrated he was willing to subtract from his own personal revenue (Interview 1) by re-allocating share of earnings to increase and improve crew wages. A vessel owner from Astoria explained how he practices this strategy. He lessens fees by subtracting them from his pay so his crew share wages are more consistent with those pre-rationalization. This personal reallocation keeps fees predictable, when weather or boat maintenance prevents the crew from fishing. Often *“they don’t know how much they’ll get paid until they get paid”* (Interview 1). A hired skipper from Newport provided similar indication that predictability of crew earnings has decreased on his vessel (Interview 9). In the pre-rationalization fishery, crew members were accustomed to the pattern of payment associated with the derby style approach to fishing, despite the “bonanza or bust” conditions in the PCGF. Vessel owner reducing their personal pay appears to be a one set of individual business decisions made as a result of the ITQ policy. Owners who choose to subsidize their crew pay (rather than subtract lease and observer fees) may not be able to offer crew prior knowledge to what they will

be paid in a given season. This impacts safety and security/basic needs factors of job satisfaction (“predictability of earnings”), which some interviews indicate are an area of concern directly related to the policy and quota leasing (Interview 2, 9).

Note that in direct contradiction some respondents, six of those interviewed indicate crew earnings have become more stable and predictable thanks to quota leasing. With more fish available and quota to secure access to these fish, respondents indicated that though earnings per trip may decrease, overall there are more stable fishing days per year with higher pay overall (Interview 2, 6, 7, 8, 9, 10). This indicates that the pattern of earnings may become more predictable in the WCGCSP as time progresses, and distribution of earnings among crew becomes more of a standard practice.

The economic performance of the WCGTF corroborates with the stories told by most interview respondents. Costs of fishing have increased (variable and fixed, leasing fees and observer costs for example), so to have average net revenues from increased catch availability. Captain and crew earnings have both increased since catch-share implementation. The 2012 EDC catcher vessel survey found crew earnings increased slightly from \$53k to \$55.5k and the average captain earnings rise from \$73k to \$90.5k. From 2012 to 2014 variable cost net revenue increased slightly from \$28.0 to \$28.3 million, and average total cost net revenue has increased \$7 million to \$13 million (Steiner 2015, 2016(a)). Though costs of operation per individual vessel have increased, so too has the average revenue per vessel compared to the pre-rationalization fishery. This information fits with mixed responses regarding “predictability of earnings” and “amount of earnings.” “Predictability of earnings” changed in the short term over

the last five years under the WCGCSP, but as patterns of earnings become more familiar, effects to job satisfaction may again change, or be less negatively perceived.

Transfer of vessel ownership to processing company

Several fishermen interviewed indicated they chose to sell their vessel to the nearby processing company and continue on as hired captains. The reasons for sales to processors varied. Mainly the vessel owner(s) either felt their operation could not remain profitable post rationalization or were avoiding further financial risk by remaining in the fishery (Interview 3, 4, 9). Although no longer independent owner-operators, they have found a means of retaining employment operating vessels in the fishery. These active fishermen appear to be willing to trade away certain elements of satisfaction. Processor employed skippers have traded some components of job satisfaction to secure others, principally the lost opportunity to be one's own boss, and decreased earnings (Interview 3, 4, 9). In this way these former IOOs transition to hired skippers which itself is not a practice unique to the post-rationalization fishery (Interview 9). Hired skipper may refer to any vessel operator hired to captain a vessel of which they are not the owner, including one that may be part timer owner operated. Those hired skippers working exclusively for a processing company on vessels also owned by a processing company may be referred to as "Processor Owned, Hired Skipper Operated" (POHSO). The distinction is important because POHSOs may experience difference in job satisfaction connected to their employment arrangement not encountered by hired skippers employed by independent owners. For the purpose of this thesis, two sub-categories were not treated or sampled differently, but labeled separately in case any distinctions in job satisfaction became apparent.

WCGTF Catch Share Program Job Satisfaction Drivers

“What patterns in job satisfaction have resulted from ITQ policy and related choices?”

Quota leasing may be a factor affecting certain items of job satisfaction in the catch share.

Effects of quota leasing on job satisfaction are variable depending on quantity of quota owned and leased by the vessel, whether the vessel is independently owned or owned by a processing company. Effects of quota ownership and leasing are also variable by vessel role. The factors and attributes influenced by quota leasing are: within safety and security/basic needs

“predictability of earnings”, “amount of earnings”, and “mental pressure”; , place and control /middle needs “Opportunity to be your own boss”, “community in which you live”; and self-actualization/high level needs. These indicators are all referenced in interviews as being affected by leasing quota to varying degrees (Tables 2, 3, and 4). On vessels where crew do not have leasing fees removed from pay, crew may not experience altered job satisfaction the same way as an owner-operator.

Effects of quota leasing seem to relate to self-actualization (high level needs) and, place and control (middle needs) job satisfaction components. Active members of the fishery indicated leasing from other owners reduces the fun experienced as fishermen in that the fish caught and therefore money that is made “doesn't feel like your own” (Interview 2, 7). Three respondents specifically expressed views that absentee quota owners who obtain profit without risk reduces the connection to individual identity as fishermen. (Interview 1, 8, 9). At this point no solid evidence demonstrates absentee ownership strongly impacts job satisfaction more than other factors. There is however some suggestion that absentee quota ownership and leasing a majority of quota reduces job satisfaction for some individuals. This aligns with findings of the PCGF Social Survey, which describe crew and captains as being negatively affected by leasing trawl

quota (Russell et al. 2014). No respondent indicated they specifically leased quota from an absentee owner with complete certainty.

Observer requirement policy was revealed to be another factor affecting job satisfaction - a factor discovered in the course of conducting interviews. Aspects of the observer policy affecting job satisfaction stem from two factors: the increase in fees associated with increased in observer coverage requirements (30%, to 100% at-sea), and a perceived decrease in safety as a result of having a less experienced individual working on deck who would not be as aware of vessel safety issues as compared to experienced crew members. The effects to job satisfaction that result from both quota leasing and on board observers are experienced differentially between vessel roles. The job satisfaction patterns particular to each vessel role are provided in detail hereafter..

WCGTF Patterns of Job Satisfaction

Respondent's descriptions of job satisfaction are categorized by the subjective "positive" or "negative" contribution toward a specific indicator attribute and component tier. The purpose of Tables 1, 2, and 3 is to illustrate instances of an individual respondent describing how an attribute of job satisfaction is perceived to be impacted by the catch share program. Each table is a frequency table for number of respondents indicating how a particular JS attribute is subjectively influenced by changes in occupational activity.

It is important to note that in all Tables the number of respondents indicating "negatively" affected attributes of job satisfaction exceed those indicating positive effects for the 10 participants interviewed. Though this may seem to indicate a net negative effect on job

satisfaction, it should be kept in mind that all participants indicated at least “good” overall job satisfaction during the 2016 PCGF Social Survey interview. Fishermen who indicated that they had experienced significant negative impacts to job satisfaction as a result of the WCGCSP, also responded they experience overall “good” to “excellent” job satisfaction on the PCGF Social Survey. Key elements of “self-actualization” are maintained, which among studies of job satisfaction, contribute most to overall satisfaction. The three attributes Pollnac found to most significantly (with the highest R^2) contribute to self-actualization were “adventure”, “challenge”, and “opportunity to be your own boss” (Pollnac et al. 2011) Key elements of self actualization , “adventure” and challenge, are conserved and potentially enhanced in catch share programs. As long as fishermen are still able to “be out on the water” their job satisfaction can remain “good” to “excellent” despite factors detracting from place and control/middle needs and safety and security/basic needs. However, the fact that ITQ policy apparently detracts from the perceived “opportunity to be your own boss” may be a significant blow to one of the most valuable self-actualization components of overall job satisfaction from fisheries occupation.

This is not a definitive description of present job satisfaction among active participants in the PCGF, but may reflect representative perspectives of fishermen from Seattle, Washington, and Newport and Astoria, Oregon.

Table. 2 Perceived Effects of Catch Share Program on Job Satisfaction among Crew.

Numbers in Table cells refer to individual interview where respondent indicated job satisfaction was felt to be affected in response to ITQ introduction.

	Positive	Negative
Safety and Security Interview(s) #	<i>“Predictability of Earnings”</i> #2, #5, #7 <i>“Your earnings.”</i> #7, #8 <i>“Safety”</i> #7	<i>“Predictability of Earnings”</i> #1, #9 <i>“Your earnings.”</i> #3, #4, #5, #9 <i>“Mental Pressure”</i> #1, #5
Total Count	6	8
Place and Control Interview(s) #	<i>No reported positive changes for crew in “place and control”</i>	<i>“Opportunity to be own boss”</i> #1, #5, #7, #8, #9 <i>“Community in which you live”</i> #5, #9 <i>“Come and go as you please”</i> #9
Total Count	0	4
Self-Actualization Interview(s) #	<i>“Adventure”</i> #7 <i>“Feeling you are doing something worthwhile”</i> #7	<i>“Adventure”</i> #5, <i>“Feeling you are doing something worthwhile”</i> #5, #8, #9 <i>“Performance of agency”</i> #5
Total Count	2	5

Most commonly reported changes in job satisfaction among crew related to change in predictability and amount of earnings. The most common pattern was that crew wages have

decreased as a result of increased cost of leasing and observer fees. Predictability of earnings varied, with some indicating they had become more predictable and reliable as a result of quota. The quota itself makes income more predictable, but leasing fees reduce the amount earned. Crew earnings and predictability seemed to be dependent on who and how they were employed. Some vessels owners were able to give their crews a better idea than others of what they would be paid at the end of a fishing trip or season.

Among respondents, the most uniformly described negative pattern in crew job satisfaction was related to the attribute “opportunity to be your own boss”, (contributing to both self-actualization and place and control). All interviewees indicated the structure of the quota system has dramatically reduced the opportunity for crew to work up from the deck to wheelhouse in a manner consistent with historic practices. The need to acquire and lease quota is viewed by most as being too cost prohibitive for any new entrants or owner operators.

This pattern in turn seems to impact higher level self-actualization attributes, especially the feeling of doing something worthwhile. Perceived barriers to new entrants and working up from the deck three interviewees indicated difficult to see a future in the fishery (Interview 5, 8, 9) diminishing the sense that remaining in the fishery will be rewarding in the long term. Among the three categories of vessel role interviewed, crewmen were described as experiencing the lowest satisfaction related to self-actualization. In the WCGTF younger crewmen seem to prioritize pursuing items more closely related to basic needs rather than high level self-actualization (Interview 1, 2, 8, 9).

Table. 3 Perceived Effects of Catch Share Program on Job Satisfaction among IOOs.

	Positive	Negative
Safety and Security Interview(s) #	<i>“Your earnings”</i> #2 <i>“Predictability of Earnings”</i> #2 <i>“Peace of Mind”</i> #1	<i>“Your earnings”</i> #2 <i>“Predictability of Earnings”</i> #2 <i>“Mental Pressure”</i> #1, #2 <i>“Safety”</i> #2
Total Count	3	5
Place and Control Interview(s) #	<i>No reported positive changes for IOOs in “place and control”</i>	<i>“Opportunity to be your own boss”</i> #1, #2, #6, #8 <i>“Community in which you live”</i> #1, #6, #8
Total Count	0	5
“Self-Actualization” Interview(s) #	<i>“Doing Something Worthwhile”</i> #2 <i>“Challenge”</i> #2	<i>“Adventure”</i> #2 <i>“Doing Something Worthwhile”</i> #6, #8 <i>“Performance of agency”</i> #6
Total Count	2	3

Independent Owner Operators indicated increased mental pressure connected to leasing quota.

Acquiring quota and leasing quota were described as adding an extra dimension to managing vessel operations. This role was only recently added to the list of responsibilities for IOOs in the PCGF. One IOO had recently retired from full time vessel operation and was relying more

heavily on hired skippers. This was in part due to the need to manage the business aspect of his operation, which now included balancing quota portfolios. (Interviews 1, 2)

Additionally, IOOs interviewed indicated they felt needing to build a quota portfolio, through buying and leasing, is too cost-prohibitive for many new entrants (Interviews 1, 6, 8) Several of these same respondents also indicated the consolidation of quota by processing companies and absentee owners is harmful to community identity, and subsequently the individual satisfaction derived from attachment to community.

Only one IOO interviewed indicated he was experiencing high levels of satisfaction related to self-actualization. This may be related to the fact that he was also the only new entrant into the fishery. The barriers to entry perceived by other members of the fishery were also noted by this respondent, but he considered them challenges to be overcome among others in the fishery: “*I chose to jump on this horse and ride it... I want this responsibility*” (Interview 2). This attitude may reflect a work environment particularly suited to provide challenges that enhance this individual’s sense of self-actualization.

Table. 4 Perceived Effects of Catch Share Program on Job Satisfaction among Hired/POHSO Skippers.

	Positive	Negative
Safety and Security Interview(s) #	<i>“Predictability of Earnings”</i> #3, #4, #9, #10 <i>“Safety”</i> #3	<i>“Your earnings”</i> #3, #4, #9 <i>“Mental Pressure”</i> #3, #4, #10
Total Count	5	6
Place and Control Interview(s) #	<i>“No reported positive changes for Hired Skippers in “place and control”</i>	<i>“Opportunity to be your own boss”</i> #3, #4, # 9 <i>“Community in which you live”</i> #9 <i>“Ability to come and go as you please”</i> #3, #4
Total Count	0	6
“Self-Actualization” Interview(s) #	<i>“Doing Something Worthwhile”</i> #3, #4, #9 <i>“Challenge of the Job”</i> #3, #4	<i>“Doing Something Worthwhile”</i> #9
Total Count	5	1

On one hand if the basic “safety and security” scale, hired skippers indicate they perceive their jobs to be much more stable and predictable than they were previously. On the other hand they described their overall pay, at least on a trip-to-trip basis, to be decreased as a result of leasing and observer fees.

Most mental stress felt by hired skippers was described as stemming from the need to avoid constraining “choke” bycatch species. Mental pressure from avoiding choke species is felt similarly among IOOs. However the stress experienced by IOOs as a result of needing to constantly seek out additional bycatch *quota* is felt less strongly among hired skippers. Among hired skippers, the vessel and quota owner is described as being mostly responsible for the acquisition of quota, especially those employed by processors. Two POHSO respondents indicated avoiding bycatch to be their primary concern and source of stress when engaged in fishing activity over leasing quota and fees “*without leasing, we’d be out of business. Lease fees aren’t on my mind when I’m out fishing*” (Interview 3) Hired skippers interviewed describe decreased satisfaction related to middle level items concerning “opportunity to be your own boss” and “ability to come and go as you please” especially for those individuals who sold their boats to processing companies by whom they are now employed as skippers (POHSO).

CHAPTER 7: Discussion

In this chapter I discuss some of the broader implications of the satisfaction patterns and drivers found among respondents. Because the structure of job satisfaction has been found to be so similar among fisheries studied, we may be able to infer how certain drivers affect satisfaction at the vessel role level.

Observer Policy as a Driver of Job Satisfaction

The most indirect effect of observers on job satisfaction is the increased cost of monitoring. Results of the PGFC Economic Data Collection program show average annual observer cost increased from \$5,000 to \$14,700, between 2012 and 2014 (Steiner et al. 2015, 2016 (a)). In 2009, two years prior to catch share implementation, annual observer cost hovered around \$1000 annually (Steiner et al. 2016 (a)) This increase is a result of several factors, the most straightforward is an increase in observer coverage requirements under Amendment 20. Coverage requirements rose from 30% to 100% at sea monitoring. Observers are deployed for a maximum of 90 days at sea, or to a maximum of four different vessels, whichever comes first, prior to requiring debriefing. Under 30% coverage requirements, a single observer could be shared between up to four vessels for the duration of employment. Under 100% coverage requirement, an individual observer is likely to be assigned to a single vessel for the majority of deployment. Because 100% monitoring requires more personnel to achieve, more observers must be deployed to the same fishery. Travel expenses to deploy the observer from briefing to the vessel, as well as food costs once aboard, are covered by the owner of the vessel. Where once up

to four vessels could help cover the travel and boarding cost of single observer, now an observer is usually the financial responsibility of one vessel.

While overall observer policy impacts income related attributes at the basic needs level, individual observers were also cited as a source of decreased physical safety. Captains and crew interact differently with observers as necessitated by the role of the observer on board. Observer's responsibilities are spread between sampling catch on deck with crew, and coordinating collection of trip and haul data in the wheelhouse with skippers or owner operators. This dynamic potentially affects satisfaction attributes in the middle level place and control component. By requiring an outsider and fisheries agency representative aboard their vessel, fishermen may feel a degree of independence is lost. Fishermen may feel a sense of compromised place and control being required to carry an agency representative aboard their vessel during all fishing trips. One respondent (Interview 5) indicated his vessel had 17 different individuals in less than a year; many of whom he felt were dangerously inexperienced to be working at sea.

Although all respondents generally shared the same sentiment that “most observers are good people”, several also felt the 100% monitoring policy indicates a level of distrust by managing agencies (Interview 5, 6). This sentiment was echoed by industry members at the 2016 PCGF Quota Workshop (PFMC 2016b). This fact may further comprise attributes of satisfaction at higher levels of self-actualization connected to the independence associated with fishing as an occupation. Because vessel relationships with observers are one of the most changed since rationalization (Russell et al. 2014), satisfaction connected to observer policy may be an

especially raw subject presently. Members of the WCGTF may feel more comfortable with constant observer presence over time as the practice becomes more routine.

Satisfaction Change with Independent Owner Operator and Hired Skipper Status

Employment as a hired skipper, by a processing company or independently, appears to help support basic needs factors related to mental pressure and peace of mind. The mental pressure experienced by hired skippers differs from that of IOOs. Because the vessel owner is additionally responsible for acquiring quota, the added mental pressure to obtain quota as an independent owner-operator is less a factor among hired skippers. Hired skippers, particularly POHSO status, benefit from the centralized decision making of a large firm capable of harnessing disparate market information to reduce risk from uncertainty associated with a mixed species fishery (Holland and Norman 2015). The mental pressure experienced by hired skippers and POHSO status fishermen from avoiding bycatch may be related to new bycatch full-retention measures in some sectors for some prohibited species. Prior to WCGCSP implementation, vessels were permitted to sort catch and discard unwanted bycatch. Managers opted for retention requirements in the PFMC FMP under Amendment 20, making it necessary for vessels to keep incidentally caught fish they would otherwise discard. The motivation for this regulation was to reduce bycatch through encouraging vessels to target cleaner fishing grounds (PFMC 2013). By requiring vessels to retain bycatch on board observers, dock-side observers and processing plants are more easily able to account for bycatch and meet quota limits than would be possible if all bycatch were discarded. The policy may be a source of mental stress for operators in light of a “lightning strike” trawl tow that occurred in February of 2016. A PCGF non-whiting trawl vessel incidentally harvested 47,000 pounds of canary rockfish, an entire school of prohibited species. In one haul, this vessel exceeded the total canary bycatch quota allocated to it for three years

(Chambers 2016). In light of this event, vessel operators interviewed expressed fear that a similar event may occur on their watch. While hired skippers are not required to focus as heavily on quota acquisition, they must be vigilant about not exceeding bycatch quota limits. In this case, quota acquisition (trading, and leasing) is primarily the responsibility of the vessel owner. Independent owner-operators, on the other hand, must simultaneously manage vessel operations to stay within quota limits and acquire sufficient quota. A side effect of this situation may be the “hoarding” of by-catch species quota by permit owners, as a result of risk uncertainty. In the same way that POHSO status fishermen are able to avoid some risk and uncertainty with the aid of the vessel owner, or process, IOOs may feel the need to hedge against this risk. As a result, the cost of some quota species has been driven up, with a substantial unused portion of quota held in reserve by individuals (Holland and Norman 2015)

Crew on Processor Owned, Hired Skipper Operated Vessels

Operators who have sold their vessel to a processor by which they are now employed may experience a compromise in job satisfaction because they are now an employee of a large company and have an official boss, whereas before (rationalization and sale of vessel) they were technically answerable to no-one as IOOs. Unlike a plant worker, POHSO status skippers retain the autonomy of driving their vessels and are trusted to fish at their own discretion in the company's interest. This arrangement reduces self-actualization, and place and control attributes, but improves long-term safety and security.” In a catch share managed fishery those operators who are employed, contracted, formally and informally partnered with a seafood processor may be advantaged over those still active IOOs.

A captain working for a processor would have less autonomy in selecting his deck crew and in managing them. This in turn would probably be more restrictive for the crew on board, as they would need to comply with the employment policy and protocol of the processor like pre-employment drug and background screen and in the case of some processor workers abstain from alcohol and drugs for the duration of employment (Trident Seafoods 2016). Working for an independent owner-operator may be more appealing to some crew than working for a processor. Crew working for IOOs may sacrifice some aspects of satisfaction related to predictability of earnings, but in-turn gain increased satisfaction related place and control and self-actualization.

Crew positions with processing companies may be more stable and predictable (thus leading to an increase in satisfaction within the basic needs factor, the control and self actualization components may be diminished as there is less autonomy and independence in working for a large processing company as opposed to an independent owner operator who may be more flexible with worker requirements (working hours, time off, substance and drug policies).

“Processing workers low score on place and control component probably reflects lack of control, being an employee in a large, relatively impersonal company, and supervision of a boss- a great contrast to autonomous fishers” (Pollnac and Poggie 2006, p. 335-336). This statement refers to processing workers in the facility itself, but something might be said for those vessel operators and crew under employment of processing companies As far as working for a processor, the more industrialized a fishery the more negatively impacted job satisfaction of crew members:

“dissatisfaction could be traced to the increased pace of the work schedule, the loss of independence, the lengthening of time at sea, and the erosion of community solidarity” (Binkley 1995, p. 75). Processors, essentially representing highly industrialized, organizationally stratified employers offer stable employment for crew, but provide less of independence valued in fishing

occupation. Processors companies experiencing economic difficulty (for example due to lower catch landings volume or value) are incentivized to cut costs through varying labor, namely the number of plant workers employed in a given season. Vessel operators and crew are much *less* replaceable than plant workers as deck crew may be considered more skilled than processor plant workers. As a result, employment with processors provides improved job security for vessel operators and crew. This is contingent upon the continued and persistent presence of processors (specifically facilities) in a fishing community. A processor leaving town would create an issue for the community by reducing the number of available jobs, but maybe less so for vessel operators if they are able to live in one community but can deliver to a nearby processor. Crew members from vessels operating out of Newport frequently live in the nearby town of Toledo (Interview 9).

There may be changes to the attribute “opportunity to be your own boss” as a result of fishing quota influencing place and control, and self-actualization. Most stable employment opportunities in the PCGF seem to be through processing companies (Interview 3, 4, 9) (Pollnac and Poggie 2006). Opportunities “to be your own boss” seem to be decreasing, but may become all the more highly valued, hence the frustration and pressure felt by IOOs still active in the fishery. Some active fishermen appear to be willing to trade certain elements of satisfaction to remain employed in commercial fishing. Processor employed skippers have traded some components of job satisfaction to secure others, principally the lost opportunity to be your own boss, and decreased earnings (Interview 3, 4, 9).

In the WCGTF, for vessel owners “to be your own boss” means the opportunity to remain independent operators, and for crew this attribute would be the opportunity to work up from the

deck, so to speak, and obtain independent operator ownership. Opportunity to be your own boss, depends on the personal goals and values of individual and may not be as important for all WCGTF participants. It is important to note the weight of the attribute “opportunity to be your own boss” on both place and control and self-actualization. Regardless of which factor the attribute is placed, it is worth noting the uniform indication between respondents that the switch to catch shares has negatively impacted this attribute among participants, operator and crew alike.

Opportunities to “be your own boss” seem to be decreasing in the WCGTF. Though the autonomy may be more highly valued, independent owner operators still active in the fishery have expressed frustration regarding the challenge of acquiring sufficient quota from season to season to meet target species, and more importantly, constraining bycatch species.

CHAPTER 8: Conclusion and Recommendations

Potential Candidate Indicator Attributes of Job Satisfaction in the PCGF

Foundational studies of job satisfaction began by asking what fishermen like and dislike about their occupation (Pollnac and Poggie 1988). Key attributes were narrowed and selected by weight on job satisfaction the most, both positively and negatively. Observers and quota leasing appear to be two major aspects of the WCGCSP weighing strongly on job satisfaction. These items were not activity characteristics of fishing occupations in the periods of time featured in these early works. More recent studies have begun to incorporate these drivers, but there is still much to learn. Similar attributes related to management have been used in earlier studies; “performance of government officials” (Apostle 1985, Pollnac and Poggie 1988, Binkley 1995). Interview results demonstrate the presence of an observer onboard (or at least the coercive nature of the policy combined with cost) seems to affect job satisfaction, but has not been assessed in other fisheries. There maybe some grounds for including “quota leasing” as an indicator attribute of job satisfaction. The degree to which a vessel leases quota, and the relationship with the owner of that quota appears to correspond to affects to job satisfaction in the middle to high needs level. At the very least this could be a candidate indicator potentially useful for measuring job satisfaction in this fishery, particularly in the context of a catch shares program. Even if not providing candidate indicators, the variables of quota leasing and observer-on-board seem to be factors influencing job satisfaction. Both attributes have direct, observable economic effects on groundfish harvesters, but also less tangible effects to subjective well-being, especially job satisfaction. Further ground-truthing is necessary to determine the quantitative ‘weight’ of these drivers alongside other recognized attributes of job satisfaction in the WCGTF.

Maintaining Self Actualization

In some ways the WCGCSP does help to retain components of job satisfaction. This thesis found that short-term reductions or a rearranging of relative importance of indicators are a result of the catch share program. Overall, job satisfaction seems to be restructured from its past state. By providing a stable role within the fishery, remaining active fishers can maintain key aspects of job satisfaction related to self-actualization. The most significantly impactful factor to overall job satisfaction in the WCGTF as a result of ITQ introduction seems to be decreased opportunity to be your own boss. One of the most highly valued non-economic sources of compensation in the fishery is felt to have become unattainable for many crew and new entrants. The need and cost of acquiring quota is felt to be overly prohibitive for many individuals once hopeful of achieving Independent Owner Operator Status.

Closing Thoughts

The game has changed in many ways. Fishermen have increasingly been required to adopt and adapt to a growing number of fisheries regulations and policy. Staying abreast of those changes and choosing actions has made fishing a more complex process and added an additional dimension of complexity to the fishery ecosystem in which fishermen function. The pragmatic reality of the situation is that fisheries ecosystems may be capable of supporting only a limited number of jobs with a secure and reliable monetary return for those employed. ITQ systems may help to match fishing effort to an appropriate level for the fisheries ecosystem in which they are applied. Unfortunately for some, this also decreases employment opportunities, as well as satisfaction from fishing for those who exited. Although the number of vessels active in the WCGFT has been reduced, those fishers who remain active experience long -term benefits to job

satisfaction, specifically where “being on the water” is concerned. Increased fish stocks in the WCGTF ensure fishermen who stayed continue to experience being out on the water, and other attributes contributing to the identity and psychological need to fish.

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Appendix 1: Semi-Structured Interview Survey

Interview #
Date
Location
Notes:

Semi-structured interview questions on quota ownership within Pacific Coast Groundfish Fishery

Some are questions adapted from PCGF Social Survey 2015/2016 Ver.3 potentially useful for establishing relationship between vessel crew and quota owner

What roles/responsibilities do you hold on your vessel?

Vessel Owner
Co-Vessel Owner
Captain/Operator
Mate
Fishing Crew (Deck Boss, Deck Hand)
Vessel Crew Other (Engineer, Asst. Engineer)

Do you or have you in the past worked onboard a vessel that leases all or the majority of its quota?

Why do you or your vessel lease quota?

Do you fish on a vessel/ leased from a quota share holder?

From where/whom do you or your vessel lease its quota?

How does the owner of the quota leased by your vessel typically participate in the fishery?

Do you or your vessel prefer to lease quota from a particular owner and if so why?

How are you paid for your work on board leased-quota vessels?

Per Trip

Percentage of value of catch

Days at sea

Other

Do you work on multiple vessels? If so is there a difference in the way quota is obtained/leased? (i.e. Does one vessel lease the majority of quota, and the other does not?)

Does the way in which you are paid for your work differ on leased-quota vessels than those that do not?

What benefits to Job Satisfaction, if any, do you feel you receive from working leased quota/ quota owner not on-board?

What costs to Job Satisfaction, if any, do you feel are associated with working leased quota/ quota owner not on-board?

Did you participate in the fishery prior to the introduction of Catch Shares? If so has leasing quota made you change how you participate in the fishery?

Have you considered changing how you participate in the fishery in the future as a result of working leased quota?

On PCGFSS Response to B10 *"How would you rate the following items in your role in the commercial fishing industry? Item "Job-Satisfaction"*

Poor Fair Good Excellent

Additional interview Notes