

Bycatch, Community Protection, and Catch Shares in a Regional Multispecies Fishery –
Addressing the Gulf of Alaska

Christopher Oliver

A thesis
submitted in partial fulfillment of the
requirements for the degree of

Master of Marine Affairs

University of Washington
2015

Committee:
Lekelia Jenkins
David Fluharty

Program Authorized to Offer Degree:
School of Marine and Environmental Affairs

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Abstract

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Chris Oliver

Chair of the Supervisory Committee:
Assistant Professor Lekelia Jenkins
School of Marine and Environmental Affairs

Increasing amounts of Pacific halibut and Chinook salmon bycatch in the Gulf of Alaska groundfish trawl fishery, alongside other concerns like surplus harvesting capacity, have prompted the North Pacific Fishery Management Council to pursue the possibility of implementing a comprehensive catch share program for its management approach. This study aims to provide a comparative examination of the Gulf of Alaska groundfish fishery rationalization proposal with two other, extant catch share programs through the lens of formal policy analysis theory. By scrutinizing the Gulf of Alaska, Pacific Coast, and Northeast groundfish fisheries, this study seeks to identify effective strategies for addressing the issues at hand in Alaska, with a focus on bycatch and the emergent problem of fishing community stability.

It is apparent that there is relatively widespread support for catch share programs at the federal level, with emphasis on the complex problem of small-scale stakeholder concerns. A number of different strategies are identified to address these concerns and it is increasingly apparent that any successful program design must focus on the continued evolution and refinement of said strategies and the relationships between managers and stakeholders.

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LIST OF ACRONYMS

ACE: Annual Catch Entitlement
ACL: Annual Catch Limit
AFA: American Fisheries Act
AM: Accountability Measure
BSAI: Bering Sea and Aleutian Islands
CFA: Community Fishing Association
CP: Catcher-Processor
CQ: Cooperative Quota
CV: Catcher Vessel
DAS: Days-at-Sea
EFH: Essential Fish Habitat
FMP: Fishery Management Plan
FY: Fishing Year
GB: Georges Bank
GOA: Gulf of Alaska
IBQ: Individual Bycatch Quota
ICA: Incidental Catch Allowance
IFQ: Individual Fishing Quota
IPHC: International Pacific Halibut Commission
IVR: Interactive Voice Response
LAPP: Limited Access Privilege Program
LE: Limited Entry
LLP: License Limitation Program
MRA: Maximum Retainable Amount
MS: Mothership
MSA: Magnuson-Stevens Fishery Conservation and Management Act
NEFMC: New England Fishery Management Council
NMFS: National Marine Fisheries Service
NOAA: National Oceanic and Atmospheric Administration

NPFMC: North Pacific Fishery Management Council

OY: Optimum Yield

PFMC: Pacific Fishery Management Council

PSC: Potential Sector Contribution [Northeast]

PSC: Prohibited Species Catch [Gulf of Alaska]

QS: Quota Share

SNE/MA: Southern New England / Mid-Atlantic

TAC: Total Allowable Catch

TCEY: Total Constant Exploitation Yield

VMS: Vessel Monitoring System

VTR: Vessel Trip Reports

Acknowledgments

I am indebted to a great many people who have been there for me along the way. This thesis would not have been possible without the unending patience, support, and guidance of my Supervisory Committee – Lekelia Jenkins and David Fluharty. In addition, the constant encouragement of my grandparents, mother and father, brother, and many great friends has helped keep me on the path.

Thank you.

This thesis is dedicated to
First Lieutenant Benjamin Thomas Britt
United States Army Ranger

1 | INTRODUCTION

Catch share programs, wherein exclusive fishing privileges are allocated to individual persons, vessels, or other entities, have been gaining popularity as a potential management option among some fishery managers, economists, industry advocates, and environmental groups over the past several decades (Fina 2011). After a federal moratorium on new catch share programs from 1996 to 2002, they have seen renewed interest and implementation across the country (Fina 2011). Such programs are often promoted for their alleged ability to reduce overexploitation of fish stocks, end the race to fish, improve economic performance of fleets, and incentivize fishers to avoid depleted species (Kaplan 2014).

Managers in the North Pacific have experience with catch share programs dating back to 1995 and the implementation of such a plan for the halibut and sablefish fisheries (Fina 2011). Since that time, several more have been adopted. These have typically been implemented in response to derby fishing and overcapitalization (Fina 2011). Bycatch was also a significant issue in the Bering Sea nonpollock groundfish trawl fishery (Fina 2011).

The unintentional harvest, or bycatch, of non-target species when prosecuting fisheries is a serious concern in all regions where fish are caught. This problem is a pervasive one, and its troubling increase in recent years within the Gulf of Alaska groundfish trawl fishery has put significant strain on the industry and managers alike (NPFMC 2014a). Partially due to the spike in bycatch in 2010, the North Pacific Fishery Management Council is currently pursuing the possibility of instituting a catch share program for management of the fishery (NPFMC 2014a). There is substantial precedent for such an action, both in the past implementation of catch share programs for other federally managed fisheries and in the burgeoning official support for such programs on the federal level (NOAA 2011). Nonetheless, a number of hurdles remain for development of this type of management regime, not the least of which is the widespread concern over marginalization of small-scale fishery participants and communities.

1.1 | BYCATCH, COMMUNITY PROTECTION, AND CATCH SHARES

The problem of bycatch is specifically addressed in the Magnuson-Stevens Fishery Conservation and Management Act (MSA) via National Standard 9, which states that “conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch” (2006, p. 59). The question of bycatch is thus one of the most pressing concerns for fishery managers, and the goal of reducing it drives the adoption of many different management measures. Mounting bycatch levels in the Gulf of Alaska groundfish trawl fishery have indeed been a major concern for managers and fishers alike in recent years, and have contributed significantly to the current proposal to move forward to a catch share management program. Spikes in the level of Chinook salmon bycatch, including an amount in 2010 greater than twice the average amount for the 2003 – 2011 period, have caused serious concerns about the status quo management structure (NPFMC 2012). A summary of this bycatch data is presented in Appendix A. Pacific halibut has also been noted as a particular concern; bycatch of these two species, along with the prospect of lost revenue due to increasingly strict limitations, has been noted as “a concern to harvesters, processors, communities, and other stakeholders” (NPFMC 2014a, p. 1).

Use of catch shares in management regimes has slowly come to prominence over the past several decades; indeed, the most recent reauthorization of the MSA provided a number of provisions specifically designed to guide the implementation of Limited Access Privilege Programs (LAPP) in managing various elements of fisheries, as deemed appropriate by managers (16 U.S.C. 1801-1884). Because of the historic usage of such programs, and the new language in the 2006 reauthorization that serves to provide guidelines for them, these LAPPs have seen increasing use as a management tool for federally managed fisheries.

While LAPPs have come to the forefront in the fishery manager’s toolbox and in the academic literature (e.g. Clay et al. 2014, Fina 2011, Kaplan et al. 2014, NOAA 2011) due in part to the 2006 MSA reauthorization, the act itself does not prescribe specific

measures to be used in crafting such plans. Rather, the act lists a number of issues that must be addressed in the implementation of any LAPP, such as the promotion of fishery safety and conservation, the specification of program goals, the establishment of monitoring and enforcement measures, the definition of eligibility requirements, the manner in which quota will be allocated, and others (16 U.S.C. 1801-1884). The flexibility of potential LAPPs is thus preserved by the reauthorization and allows managers to tailor their programs to specific regions, taking into account the nature and history of the fishery, the various communities affected by it, and other nuances of place and social organization. As a result, such programs have seen increased use across the country; moreover, the nature of each program is unique and specific to the fishery being managed.

The application of catch share programs to multispecies complexes is a relatively new phenomenon, as evidenced by two prime examples: the Northeast Multispecies Sectors plan of 2010 and the Pacific Coast Groundfish Trawl Rationalization plan of 2011 (Kent 2012). The use of catch shares in fishery management plans (FMPs) such as these was intended to mitigate bycatch problems, among other management goals such as improved economic efficiency. The implementation of these management plans, and especially the use of catch share plans in multiple Bering Sea fisheries (Fina 2011), likely helped to inspire the current push for a catch share program to manage bycatch in the Gulf of Alaska groundfish trawl fishery.

As quickly became apparent over the course of this study, the implementation of any catch share program comes with a great deal of attendant concerns (Clay et al. 2014, Fina 2011, Kaplan et al. 2014, Thunberg and Correia 2015). This is perhaps most obvious with regard to the issue of protection of fishery dependent communities. There are serious misgivings among some stakeholders regarding the potential marginalization of individuals and communities that historically have depended on fishery resources for their livelihoods when catch share programs have been implemented. This is in part due to the difficulty managers have in trying to offset all the issues facing such communities.

Such concerns have long been echoed in the MSA, particularly in National Standard 8. The Act defines a fishery dependent community as:

...a community which is substantially **dependent on** or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community. (2006, p. 7) [emphasis added]

The Act goes on to specifically address such fishing communities and the importance of protecting them in National Standard 8, mandating that conservation and management measures “provide for [their] sustained participation” and “to the extent practicable, minimize adverse economic impacts on [them]” (2006, p. 58).

NOAA’s official catch share policy, put forth in response to the growing interest in such management approaches and intended to formalize the federal government’s support for their use, echoes these concerns (NOAA 2011). It additionally promotes a number of strategies for the effective use of catch shares in addressing them; these include improving stakeholder understanding of catch share programs, the use of Community and Regional Fishery Associations, programs to assist new entrants, limitations of transfers, the holding of some fraction of fishing privileges for annual allocation (much like the Pacific Coast adaptive management set-aside described later in this study), the use of fishing community trusts or permit banks, and others (NOAA 2011). It is important to note, however, that this policy is not intended to promote the use of catch share programs over, above, or at the exclusion of other management strategies, but to create the necessary support system for the benefit of managers who wish to pursue them.

The evidence of NOAA’s catch share policy and the MSA itself, among other documents, reveals the simultaneous desire to see catch share management programs used wherever their benefits may be maximized and a very real concern over the stability and welfare of

American fishing communities. In essence, all of the management measures, propositions, laws, and official statements surrounding this problem are concerned with the same question: can community protection issues be addressed using catch share programs? In approaching this problem, as well as the goal of bycatch reduction within the context of such programs, this study's primary questions are:

- What specific, major management actions are common to these three fisheries and where do they differ?
- How can the problems and the attendant attempts at solving them be explained in terms of policy analysis theory?
- Do these actual solutions being pursued by managers match those recommended by the theoretical framework?
- How effective is this framework in addressing these issues?

1.2 | A ROADMAP FOR ANALYSIS

This study examines three regional multispecies fishery catch share programs that have implemented or are under consideration for implementing comprehensive catch share management programs. These fisheries are the Northeast multispecies fishery and the Pacific Coast groundfish fishery, both of which are managed under such programs, as well as the Gulf of Alaska groundfish fishery. The Northeast and Pacific coast fisheries are used for comparison as they are both large, regional fisheries focused on multispecies groundfish stock complexes, much like the Gulf of Alaska. They also had significant problems with overfishing (NEFMC 2014b) and bycatch (Kaplan et al. 2014) leading up to implementation of catch share programs, making them choice analogues for the Gulf of Alaska and its proposed plan.

A brief history of each fishery is presented in Chapter Two, detailing the sequence of changes leading to the pursuit of rationalization in each case. Chapter Three establishes a theoretical construct and methodology for the examination of these fisheries from the perspective of formal policy analysis strategy. This lays the groundwork for Chapters Four and Five, which comprise an in-depth description of the key components of each

rationalization program and a cross-fishery comparison of these components, respectively. Chapter Six presents the results of this comparison, with reference to the theoretical framework established previously, and Chapter Seven provides concluding remarks on these results, the efficacy of the theoretical framework, and the relationship between fishery-dependent communities and catch share programs.

2 | THREE BRIEF HISTORIES OF REGIONAL MULTISPECIES FISHERY MANAGEMENT

This chapter presents the recent histories of the Northeast, Pacific coast, and Gulf of Alaska groundfish fisheries, with emphasis on the events leading to the pursuit of rationalization and managers' definitions of the problems facing each.

2.1 | THE NORTHEAST MULTISPECIES FISHERY

The modern management regime for the groundfish resources off the coast of New England dates to the original Groundfish Plan of 1977. This plan, enacted following the Fisheries Conservation and Management Act of 1976, established guidelines for the regulation of cod, haddock, and yellowtail flounder stocks based on annual Total Allowable Catch (TAC) levels (NEFMC 2014b). This system, based on the establishment and enforcement of hard catch limits, was soon deemed unfeasible and replaced with the Interim Groundfish Plan in 1982. This plan relied on minimum fish sizes and the regulation of trawl net mesh size in the Gulf of Maine and Georges Bank to control fishing mortality (NEFMC 2014b).

The New England Council expanded and refined the scope of groundfish management for the region in 1986 with the adoption of the Northeast Multispecies Fishery Management Plan. This plan, which replaced the Interim Groundfish Plan, specifically included management measures for cod, haddock, pollock, redfish, yellowtail flounder, winter flounder, American plaice, witch flounder, windowpane flounder, and white hake (NEFMC 1985). This list was not considered exclusive, and additional species – specifically the Atlantic halibut, Atlantic wolffish, and ocean pout – have since come under the purview of the plan (NEFMC 2014b). The initial plan established new measures and expanded upon existing regulations to promote healthy stocks, focusing especially on the protection of juvenile fish in order to encourage recruitment. Minimum sizes that would progressively increase over several years were defined for a number of species, for both the commercial and recreational fisheries (NEFMC 1985). Minimum mesh sizes, specific exemptions for some small-mesh fisheries, and extended closed areas

for haddock spawning and yellowtail flounder were also among the measures established (NEFMC 1985).

The FMP adopted in 1986 provides the overarching structure that guides and defines groundfish management off the coast of New England to this day. However, it has undergone numerous and extensive alterations since its creation, in the form of various Amendments and Framework Adjustments. These changes have sought to reflect and respond to the dynamic nature of the fisheries involved, and have included reductions in allowable days-at-sea (DAS) for some fleet sectors, year-round closures, international coordination of management with Canada, various stock rebuilding strategies, and other measures (NEFMC 2014b). These management efforts were often attempts to rein in overfishing, which had become rampant; annual groundfish catch levels over the period of 1983 – 1993 saw severe declines, and estimates of lost revenue due to overfishing in the late 80s range into the hundreds of millions of dollars annually (Hennessey and Healey 2000). These problems culminated in the emergency closure of three large fishing areas in 1994 and the indefinite extension of these closures the following year (NEFMC 2003), as well as an extensive vessel buy-back program that sought to reduce the size of the fleet in 1996 (Thunberg and Correia 2015). These problems of overcapitalization and resultant stock decline put significant strain on the industry and fishing communities.

One particularly prominent alteration came in 2003, in the form of Amendment 13. This amendment, largely in response to legal action taken by conservation organizations, was intended to foster the rebuilding of a number of stocks, primarily through further management of DAS and incentives to reduce overcapitalization (NEFMC 2003). It also put forward the idea of allowing a system of voluntary, cooperative sectors within the fishery that would each be allocated a portion of TAC, with a single specific sector proposed for the Georges Bank hook fishery (NEFMC 2003). Notably, the fishery-wide efforts to rebuild unhealthy stocks led to an underutilization of some healthy stocks; this fact, combined with the amendment's plan to further evaluate rebuilding strategies, led ultimately to Amendment 16 (NEFMC 2009). This amendment described the problems

facing the fishery at the time: “Several groundfish stocks are either overfished, have been declared overfished in the past, or are experiencing overfishing and are currently rebuilding under programs that do not meet the requirements of the M-S Act ... most stocks will not achieve levels that will support maximum sustainable yields” (NEFMC 2009, p. 60).

Amendment 16 has arguably been the most significant change to the original FMP, and it is certainly the alteration of greatest significance to this study. One of its primary features is the introduction of Annual Catch Limits (ACLs) for each stock being managed, along with attendant Accountability Measures (AMs) to ensure compliance by fishers (NEFMC 2009). These AMs were designed to become increasingly stringent over time; for Fishing Years (FYs) 2010 and 2011, any ACL overage would result in a reduction of DAS in the following year, and for FY 2012 and beyond, attainment of a stock’s ACL would result in suspension of the fishery (NEFMC 2009). Moreover, Amendment 16 greatly expanded upon the idea of sector-based management. It established 17 new sectors throughout the New England region; these sectors are self-selecting and largely self-regulated, with each sector receiving a specific TAC referred to as an Annual Catch Entitlement (ACE) (NEFMC 2009). The ACE for each sector is determined on the basis of the catch histories of the permits that join that sector (NEFMC 2009). Additionally, these sectors are exempt from a number of the AMs designed for the common pool fisheries; to ensure that sector ACEs are not exceeded, Amendment 16 also provided for a new system of at-sea and dockside catch monitoring (NEFMC 2009). At the time of initial implementation, approximately 55 percent of vessels with a limited access permit elected to join a sector (NOAA 2014).

As of 2010, the majority of landings were concentrated in a few major ports, including New Bedford, Boston, and Gloucester, with the rest spread across a great many smaller communities in a wide geographic region (Clay et al. 2014). Over the period of 2007 – 2010, overall economic performance increased, but the number of active vessels declined and concentration of revenue to top earners continued (Clay et al. 2014). A more recent analysis reveals that fleet size in 2012 represented a 69 percent reduction from its 1996

level; Maine has been the area most affected by capacity reduction, with its component of the fleet dropping by almost 80 percent in size (Thunberg and Correia 2015).

2.2 | THE PACIFIC COAST GROUND FISH FISHERY

The current Pacific Coast Groundfish FMP provides for the management of 86 distinct species, 62 of which are various types of rockfish. Other notable managed stocks include lingcod, Pacific cod, Pacific whiting, sablefish, and a number of flatfish species (PFMC 2014). This FMP was originally approved and implemented in 1982, replacing the previous structure of individual management by the states of Washington, Oregon, and California; it has since been amended 28 times to respond to changes in the fishery, the fish stocks, and the federal legal framework, as well as litigation that has taken place (PFMC 2014). Two relatively significant changes were effected by Amendment 4 of 1990, which updated and reorganized the FMP and created a comprehensive framework for establishing and modifying management measures, and Amendment 6 of 1992, which created a license limitation program intended to reduce overcapitalization in the fishery (PFMC 2014). Many more amendments have fine-tuned the FMP and kept it up-to-date with changes in the legal structure and the needs of the industry; some examples include requirements for the definition of essential fish habitat (EFH), more active bycatch reduction measures, and stronger stock rebuilding programs (PFMC 2014).

Despite these myriad management measures, the Pacific Coast groundfish fishery still faced a number of sustainability and efficiency problems moving into the new millennium; this was especially apparent in the high bycatch rates of a number of depleted rockfish species (Kaplan et al. 2014). Due largely to these issues, the Pacific Fishery Management Council adopted a comprehensive groundfish trawl rationalization program in 2010, in the form of Amendment 20 to the FMP (PFMC 2014). In its problem statement, the Council explained the fact that many “participants and observers view the trawl fishery as economically unsustainable under the current management regime” and its intent to “provide individual fishery participants more flexibility and more individual accountability for their impact on overfished species, other groundfish species, and possibly Pacific halibut” (2010b, p. 4).

Amendment 20 provided an Individual Fishing Quota (IFQ) system for the management of the whiting and nonwhiting groundfish shoreside trawl sector, whereby individual entities receive allocations of fishing privilege. This system allocated 90 percent of the nonwhiting groundfish quota share (QS) to harvesters while retaining the other 10 percent for use by the Council under the auspices of an adaptive management program (PFMC 2010a). It likewise allocated 80 percent of the Pacific whiting QS to harvesters and 20 percent to processors (PFMC 2010a). These initial allocations were based on historic participation in the fishery. In order to facilitate effective monitoring, requirements were put in place for 100 percent observer coverage on vessels in the shoreside trawl fleet; this represented a substantial increase for portions of the fleet, particularly the nonwhiting groundfish harvesters (PFMC 2010a). Additionally, a program for the mandatory submission of economic data was adopted.

The processed at-sea whiting fishery is divided broadly into mothership and catcher-processor (CP) categories. Those catchers participating in the mothership sector must declare each year their intent to join a voluntary co-op or to participate in the non-co-op portion of the fishery. Each co-op is then awarded a catch allocation for the year based on the sum of its member vessels' endorsement shares (which are themselves based on catch history), while the non-co-op portion receives its own allocation based likewise on the sum of participating vessels' endorsement shares (PFMC 2010a). The CP sector was allowed to maintain its status quo method of operation; that is, the formation of a single CP co-op. Amendment 20 provides that, should this co-op system fail, an IFQ system will be put in its place, with initial allocation divided equally among all CP permits (PFMC 2010a). Given the 100 percent observer coverage requirement already in place under the status quo, only minor changes to reporting protocol were implemented. One such change was a program for the mandatory submission of economic data, just as was implemented in the shoreside sector (PFMC 2010a).

2.3 | THE GULF OF ALASKA GROUND FISH FISHERY

The management plan for the groundfish stocks of the Gulf of Alaska was originally implemented in 1978 and has been subject to over 60 amendments since that time (NPFMC 2014c). The current iteration of this plan manages a large number of fish over a significant spatial area, including walleye pollock, Pacific cod, sablefish, arrowtooth flounder, and many different species of rockfish; for this purpose, it divides the Gulf of Alaska into Western, Central, and Eastern Regulatory Areas, with the Central and Eastern Regulatory Areas further subdivided (NPFMC 2014c). TACs for the various stocks are set annually and apportioned by Regulatory Area and sometimes by district; for certain species, up to two years of TACs may be established at once (NPFMC 2014c). The Western and Central Regulatory Areas are combined for the management of pollock, with annual TACs divided into seasonal allowances; 100 percent of TAC is allocated to the inshore sector. For Pacific cod, 90 percent of TAC is allocated to the inshore sector and 10 percent to the offshore sector in the Eastern Regulatory Area, while TAC is allocated to the harvest sectors (catcher vessels and CPs using trawl, pot, hook-and-line, and jig gear) in the Western and Central Regulatory Areas (NPFMC 2014c). Attainment of the TAC for a species will result in closure of the directed fishery for that species.

The management of sablefish and rockfish is handled in a somewhat different way. For sablefish, TAC is apportioned 95 percent to vessels using hook-and-line gear and 5 percent to those using trawl gear in the Eastern Regulatory Area, with 80 percent to hook-and-line gear and 20 percent to trawl gear in the Western and Central Regulatory Areas (NPFMC 2014c). Moreover, the sablefish fishery as a whole is managed using an IFQ program, put in place in 1995, which allocates quota to individual harvesters and contains provisions for the purchase of quota by eligible coastal communities (NPFMC 2014c).

The various species of rockfish in the Central Regulatory Area are likewise managed by a quota share program. This management structure has its roots in the Central Gulf of Alaska Rockfish Pilot Program, which was put in place largely in response to landing conflicts with other fisheries that damaged product quality, as well as bycatch concerns, especially bycatch of Pacific halibut (Fina 2011). The Rockfish Pilot Program allocated

quota to license holders who opted to join fishing cooperatives. It successfully cut halibut mortality to less than half of previous levels; as such, it was subsequently developed into a permanent program of management (Fina 2011). This program is built around individual QS based on catch history; holders of QS may form cooperatives of catcher vessels and/or catcher-processors, each of which receives an annual cooperative quota (CQ). Each catcher vessel cooperative must also be associated with a processor within the boundaries of the City of Kodiak (NPFMC 2014c). Allocations to cooperatives are divided into rockfish primary species (northern rockfish, Pacific ocean perch, and pelagic shelf rockfish) and rockfish secondary species (Pacific cod, rougheye rockfish, shortraker rockfish, and sablefish); these secondary species represent important incidentally harvested groundfish (NPFMC 2014c).

Despite extensive management measures, the Gulf of Alaska has in recent years been at the center of widespread concerns surrounding the bycatch of certain species: namely, Chinook salmon and Pacific halibut. Apprehension about the bycatch of Chinook salmon in the Gulf of Alaska groundfish fishery and the relative lack of control measures in place came to the fore in 2010, when it was noted that minimum Chinook salmon escapement goals for some rivers were not being met (NPFMC 2012). Moreover, the level of Chinook salmon bycatch in the Gulf of Alaska in 2010 exceeded the incidental take amount established in the Biological Opinion for Chinook salmon stocks listed under the Endangered Species Act (NPFMC 2012). A summary of recent bycatch data is provided in Appendix A. These issues ultimately led to the North Pacific Council's adoption of Amendment 93, which established separate Prohibited Species Catch (PSC) limits for the Western and Central Gulf of Alaska directed pollock fishery (NPFMC 2014a). The Council in 2013 further recommended a Chinook salmon bycatch cap for Gulf of Alaska non-pollock trawl fisheries (NPFMC 2014a).

Bycatch of Pacific halibut was likewise an increasingly troublesome problem in Gulf of Alaska fisheries around this time. Due to this fact, the Council took action in 2012 to implement a gradual reduction of Pacific halibut PSC for the Gulf of Alaska trawl and hook-and-line fisheries beginning in 2014. The resultant Amendment 95 mandates a

reduction in halibut PSC of seven percent in 2014, five percent in 2015, and three percent in 2016, for a total reduction of 15 percent (NPFMC 2014a).

Due in part to the increasing limits on PSC and the resultant strain on the industry, the Council has recently undertaken the consideration of a comprehensive alteration of the Gulf of Alaska groundfish trawl management regime. In explaining this move, the Council has described its intent to “improve stock conservation by creating vessel-level and/or cooperative-level incentives to eliminate wasteful fishing practices, provide mechanisms to control and reduce bycatch, and create accountability measures when utilizing PSC, target, and secondary species” (NPFMC 2014a, p. 3).

To this end, the Council has pursued a potential rationalization program that would include voluntary inshore and offshore co-ops, with allocations of target and secondary species as well as PSC. This issue was first broached in 2010 with respect specifically to Chinook salmon, with the acknowledgment that “in the long term, comprehensive salmon bycatch management in the GOA is needed” (NPFMC 2012). The first discussion of a Gulf of Alaska pollock fishery co-op system came two years later (NPFMC 2012). The program currently under consideration would also include a number of measures related to fishing community protection by default, along with the option for more extensive measures such as the establishment of Community Fishing Associations (NPFMC 2014b).

3 | POLICY ANALYSIS METHODOLOGY

This chapter presents an overview of the policy analysis strategies used in this study. The theoretical framework is described generally, with a discussion of its philosophical foundation and approach to deconstruction of policy problems in terms of economic theory. The specific strategy for this study is then addressed. The chapter presents the method by which the fisheries are examined such that generalized policy solutions can be recommended. It finally offers a formal statement of the problem in theoretical terms, providing a starting point for analysis.

3.1 | A THEORETICAL BASIS FOR POLICY ANALYSIS

This study utilizes the policy analysis techniques outlined by Weimer and Vining (2011) and Bardach (2012). The works of these authors represent some of the most commonly used methods in the field of policy analysis, and give researchers and professionals a powerful tool for the study of policy problems and their potential solutions. The design of modern policy analysis methodology is intended facilitate the diagnosis of any given policy problem. To that end, it first provides a framework by which one can identify a problem and define it using concrete criteria, striving always to be as objective as possible. This framework classifies problems in a number of ways, considering both the fundamental source of the policy failure and myriad possible goals for public policy in general – for example, failures may be classified as government or market failures, and policy objectives include economic efficiency, social equity, and other distributional goals (Weimer and Vining 2011).

Broadly speaking, Weimer and Vining identify four types of “traditional market failures” (2011, p. 113). These four failures are the presence of public goods, externalities, natural monopolies, and information asymmetries. Public goods are defined generally as exhibiting no rivalry in their consumption, no excludability in their use, or possessing both of these criteria. This is in contrast with private goods, which are generally understood to display rivalry in consumption (what is consumed by one cannot be consumed by another) and excludability in use (a user has control over the use of the good). Public goods are further classified according to several subtypes, generally based

upon the interactions of the criteria of rivalry and excludability, as well as the notion of congestion by high levels of demand.

Externalities are defined as any impacts of actions that affect people other than those who consented to said actions through voluntary exchange (Weimer and Vining 2011). Such impacts may be either positive or negative in nature, and can arise in either production or consumption. Negative externality effects on other individuals or groups are often the impetus behind discontent and action towards policy change.

A natural monopoly arises, according to Weimer and Vining, when “average cost declines over the relevant range of demand” (2011, p. 97). Functionally, this means that a single provider can produce the desired output at a lower cost than in any other arrangement, including competition. It is important to consider the availability of adequate or close substitutes in a market, the presence of which tends to greatly limit the inefficiency associated with a monopoly. Furthermore, industries with low barriers to entry typically show similarly low inefficiency. As such, these market characteristics can be considered as possible targets of public policy where a natural monopoly seems to be the problem.

The fourth form of market failure, information asymmetry, occurs when relevant parties have access to differing levels of information about a given good (Weimer and Vining 2011). In this framework, information as a good in and of itself is not the question of concern; that issue is considered under the previously described category of public goods. Rather, this type of market failure focuses on discrepancies in information about a specific good, typically between producer and consumer or externality generator and affected third party. The degree to which information asymmetry leads to inefficiency depends on a number of factors. One such factor is the classification of the good in question as a search good or an experience good: a search good is one about which consumers can determine the characteristics prior to purchase, while an experience good requires that the consumer first purchase it in order to determine its characteristics

(Weimer and Vining 2011). Other important factors include the heterogeneity of units of the good and the frequency of purchases by consumers.

In contrast to market failure, Weimer and Vining identify the other major source of policy problems as government failure (2011). Unlike the more or less unified approach presented with regard to market failures, however, there is not a single, comprehensive theory of government failure upon which to draw. As such, government failures are defined broadly using three different categories, each one informed by a different field (or fields) of social science: problems inherent to direct democracy, drawing on social choice theory; problems with representative systems of government, taking from various political science backgrounds; and problems with bureaucracy and the agency system, utilizing public choice theory and studies of organizational behavior (Weimer and Vining 2011).

Policy objectives beyond that of maximizing economic efficiency rely, of course, on a number of subjective value judgments. Even the value of economic efficiency is subject to differing appraisals by different individuals. Therefore, different people may often define desirable policy objectives in radically different ways. Nonetheless, Weimer and Vining describe a number of other common rationales for public policy; most people generally share these broad categories of policy objective, albeit to varying extent (2011). Examples tend to include questions of equity and fairness, the feasibility of any given policy, and the uncertainty inherent in any attempt to impose public policy.

Weimer and Vining additionally list five types of generic policy solutions that are expected to be most effective in addressing the different generalized policy problems (2011). Each of these solutions is classified by whether it should be considered a primary or secondary option, or not at all, for each problem. As an example, for a given problem type there may be one or more primary solutions. These would be the best options to use in trying to remedy the problem. There may likewise be secondary solutions, which would be considered the best course of action if the primary solutions were unavailable for some reason. Finally, there may be some general solutions that are considered

inappropriate for a given type of problem. These generalized solutions include market mechanisms, incentives, rules, nonmarket supply, and insurances and cushions (Weimer and Vining 2011).

Typically, Weimer and Vining espouse use of a matrix to summarize systematic comparison among alternative solutions according to a pre-defined set of objectives. This approach allows easy visualization of the relationships between the goals and the provisions of the policy in question. Each cell in the matrix can then be assigned a value (e.g. “good,” “fair,” “poor,” etc.) corresponding to the efficacy of the provision in question in satisfying the matching goal.

Table 1 demonstrates a graphical way of comparing problem types with solution categories. It has been adapted from an original that includes all possible problem types defined by the framework (Weimer and Vining 2011), to include only those types relevant to this study. The convention of using a P or an S denotes whether the solution is recommended as a primary or secondary approach to the corresponding problem type. Cells left blank indicate that the solution is not recommended for the corresponding problem.

Table 1 – Example Policy Analysis Matrix

	Market Mechanism	Incentives	Rules	Nonmarket Supply	Insurance and Cushions
Public Goods	S	S	S	P	
Externalities	S	P	P	S	
Equity of Opportunity		S	P		S
Equality of Outcome			S	S	P

P = Primary solution S = Secondary solution

Adapted from Weimer and Vining 2011

3.2 | AN APPROACH TO COMPARE FISHERY MANAGEMENT STRUCTURES

For the purposes of this study, the key documents enacting catch share management programs for each relevant fishery are closely analyzed. The key provisions of each program are identified, along with the rationale given, explicitly or implicitly, by the managers for each of these provisions. These “key provisions” are those that are functionally necessary either to put such a program into place or to maximize the cooperation of all constituents involved. The language of the managers is important in this process, as those measures that are heavily emphasized as necessary are likewise considered instrumental to the program.

In the same manner, the language used by managers in justifying and explaining the choice of measures is essential to the identification of the policy outcomes desired. In this way, the policy goals of each program are identified via close reading of the program documents, along with those measures put into place to further each of these goals.

In order to simplify comparison of the three fisheries, the management measures identified are grouped together in logical categories wherever possible. Development of these general categories is informed by the nature of catch share management and the general types of measures that it requires, in addition to the specific language of managers. To this end, based on review of the three catch share programs five major categories are established for purposes of this thesis: allocation and accumulation of quota, bycatch mitigation, community protection, industry flexibility, and monitoring and enforcement. Allocation and accumulation of quota deal with methods by which fishing privileges are initially awarded and whether limits are put in place to prevent their consolidation. Bycatch mitigation deals with specific measures introduced with catch share management intended to reduce bycatch. Community protection deals with those provisions centered on the concerns of stakeholders from fishery-dependent communities. Industry flexibility and monitoring and enforcement are categories that deal with how managers address effective implementation of the program. Together, these five categories are intended to distill the myriad measures in a way that makes the problem more tractable without diminishing the effectiveness of the comparison.

Thus identified, the primary policy goals and the measures associated with each can be arranged in a “policy analysis matrix” in the style of Weimer and Vining (2011). These distill the broad categories of action areas that are common to all three fisheries and compare the measures promulgated for each category. In this endeavor, commonality and divergence among the goals of the various programs are sought. This method facilitates comparison of the various programs and the measures that each uses in trying to meet the goals identified, without becoming unnecessarily or prohibitively complex. In this way, the approaches used by managers of the New England and Pacific Coast groundfish fisheries can be compared to each other and to the methods being currently pursued for management reform in the Gulf of Alaska groundfish fishery.

The aforementioned generic policy solutions are also instrumental in facilitating an understanding of what might be done to address the problem areas identified. The solutions advocated in the theoretical framework for the attainment of each goal are compared to the actions being taken by managers.

The insights gleaned through the application of these methods should facilitate a better understanding of the measures that might best be applied to the Gulf of Alaska, along with an identification of any particular problem areas and the implications for catch share management programs in general.

4 | EVALUATION OF REGIONAL CATCH SHARE PROGRAMS

The following sections present a summary of the key measures adopted or being considered in the three catch share programs. The management actions are subsequently organized into the five major categories discussed previously, which are ultimately mapped onto a “policy analysis matrix.” This approach facilitates comparison of similar goals and possible policy options for each goal across multiple fishery environments.

This chapter presents a list of the primary policy goals and attendant measures identified in each catch share program. The full examination of each program is given in Appendix B.

All information in this chapter is taken from the relevant fishery management plans (NEFMC 1985, NPFMC 2014c, PFMC 2014), their relevant amendments (NEFMC 2003, 2009, 2011, and 2014a, PFMC 2010a and 2010b), and the North Pacific Council’s Final Motion on trawl rationalization (NPFMC 2014b), except where otherwise noted.

4.1 | NORTHEAST MULTISPECIES GROUND FISH FISHERY

While the language of Amendment 16 gives myriad justifications for the measures adopted, a number of broad policy goals can be identified. These goals are to:

- Prevent overfishing
- Maximize the effectiveness of monitoring and reporting
- Foster industry flexibility and cooperation
- Maximize the effectiveness and flexibility of management
- Assure equitable allocation of fishery resources
- Ensure that individual fishery components will not be penalized for the actions of other components
- Build resilience into the fishery to account for uncertainty

The first goal listed, that of preventing overfishing, is perhaps the most immediately obvious, due both to the nature of fishery management in general and many of the specific measures implemented by Amendment 16. These measures include:

- Allocation of hard TACs to sectors
- Allocation of all groundfish stocks
- Extensive liberties for the transfer of ACE within and between sectors
- A system for penalizing ACE overages of one year via ACE reductions in the subsequent year, including potential additional liabilities
- A system for penalizing sectors with multiple years of ACE overages, including possible permanent reduction of share or dissolution of the sector
- Rules for penalizing vessels that leave a sector following an overage by that sector
- The retention of select measures from the common pool fishery for those vessels in sectors

Following naturally from the goal of preventing overfishing is the goal of maximizing the effectiveness of monitoring and reporting systems. This goal is especially important for a management scheme based largely on hard TACs and the potential transfer of ACE at any time during the fishing year. Measures that are intended to directly foster this goal include:

- Extensive requirements for the submission of sector operations plans
- Implementation of four broad reporting areas
- Implementation of a dockside monitoring program
- Implementation of an additional observer program
- Requirements for the submission of annual sector reports

Important to this management program is the cooperation of the industry itself, and the ability of the industry to remain flexible and prosecute the fishery in a profitable manner. To that end, the following measures were deemed important:

- A large degree of freedom in the formation of sectors

- The ability for a vessel to hold both a multispecies permit and a scallop permit simultaneously
- The potential for sectors without ACE overages to be granted a temporary increase in share when stock levels increase
- Specific exemptions for sector vessels from measures regulating the common pool fishery

In addition to fostering industry flexibility, the flexibility and efficacy of the management program itself is an important consideration. In order to maximize scientific accuracy in management and allow adaptability in the face of uncertainty, the following measures were adopted:

- Implementation of the aforementioned monitoring and observer programs
- The withholding of 20% of ACE for the first 61 days of each fishing year

Because the management system adopted by Amendment 16 involves allocations of catch shares to various components of the fishery, establishing a fair and equitable means of distributing these allocations was a crucial element to its success. As such, the following measures strive to ensure such fair distribution of PSC:

- Use of catch history from a period (FY 1996 through FY 2006) intended to both reflect recent fishery participation and account for recent management changes
- Use of live weight measurements in evaluating catch history so as achieve consistency across all fishery components
- Use of Amendment 13 provisions for the evaluation of catch history for those vessels that committed to Amendment 13 sectors

The division of the fishery into a common pool and a sector component, broadly speaking, necessitates provisions to prevent these components from adversely impacting one another. The following measures seek to ensure this goal is met:

- Distinctions between individual sectors and between the sector and common pool components of the fishery, such that overfishing by one component will not affect the ability of other components to harvest their TACs

- Additional specific provisions to achieve the same ends in the U.S./Canada fishing area

Finally, attempts were made to build resiliency into the fishery in order to protect against future uncertainty. The following measure was explicitly identified as existing for this reason, in addition to other justifications:

- Freezing of catch history following adoption of Amendment 16

Naturally, many of the policy measures identified above cannot be restricted exclusively to one goal, and some degree of overlap does occur. The measures are sorted into specific goals for ease of presentation, but it is important to note that some measures may apply to more than one policy goal.

4.2 | PACIFIC COAST GROUND FISH FISHERY

Because of the natural commonality among fishery management plans and their objectives, many of the goals identified in the Northeast Multispecies Fishery Management Plan are apparent in the Pacific Coast Groundfish Fishery Management Plan. Because of this fact, and in order to facilitate comparison, many of the policy goals listed here are identical to those previously described. The addition of goals relating to bycatch management and monopoly prevention is a result of the Pacific Council's great attention to these issues. The resultant list of policy goals includes:

- Prevent overfishing
- Maximize the effectiveness of monitoring and reporting
- Foster industry flexibility and cooperation
- Maximize the effectiveness and flexibility of management
- Assure equitable allocation of fishery resources
- Build resilience into the fishery to account for uncertainty
- Prevent bycatch of sensitive species, especially Chinook salmon and Pacific halibut

- Prevent single entities from accumulating excessive control over quota and harvesting/processing capacity

Again, the prevention of overfishing is of central importance to the fishery management plan. Relevant measures include:

- Use of quota based on hard TACs
- The “recent history” requirement for shoreside whiting processors
- Specific allocations for overfished species
- Prohibition of the selling or transfer of permits with an associated outstanding overage

A number of measures are put in place to maximize the efficacy of monitoring and reporting. These include:

- The requirement for 100 percent observer coverage for all sectors
- The requirement for 100 percent shoreside monitoring for the shoreside trawl sector
- Requirements for the submission of economic data
- Requirements for the submission of annual co-op reports

In the interest of granting the industry sufficient flexibility to make this management scheme feasible, the following provisions are described:

- A great deal of liberty in transferring quota among vessels and co-ops
- The ability to carry a limited amount of surplus quota from one year to the next in the shoreside trawl fishery
- The ability to cover an overage in one year using quota from the subsequent year
- The use of voluntary co-ops in the at-sea whiting fishery

In order to facilitate effective management of the fishery, the following measures are put in place:

- The implementation of the aforementioned monitoring programs
- The implementation of a cost recovery program

The following measures are intended to ensure an equitable allocation of fishery resources:

- Initial allocations based on catch and processing history for the shoreside trawl and whiting mothership sectors
- Provisions for equal distribution of IFQ for the whiting CP sector should an IFQ program be needed

As the Council seeks to maximize the resilience of this system in the face of future changes or needs, the following measure was adopted:

- The 10 percent of shoreside nonwhiting quota set aside for adaptive management purposes

The Pacific Coast Groundfish Fishery Management Plan pays special attention to bycatch of sensitive species. This is in part due to the risk of unintentional catch of Chinook salmon and Pacific halibut. As such, the following specific measures are used:

- Maintenance of several status quo provisions for the bycatch of Chinook salmon in the at-sea whiting fishery
- An IBQ system for bycatch of Pacific halibut for all sectors

The Pacific Council also chose to implement several provisions to prevent excess accumulation of quota or other forms of control over the fishery. These include:

- Detailed quota accumulation limits for the shoreside trawl and at-sea mothership sectors
- Similar limits on harvesting and processing capacity for the same sectors
- The specific omission of any grandfather clause allowing for over-accumulation in the shoreside trawl fishery and the choice to instead use required divestment procedures

4.3 | GULF OF ALASKA GROUND FISH TRAWL FISHERY

Due to its nature as an ongoing process, the crafting of a comprehensive rationalization program for the Gulf of Alaska groundfish trawl fishery is in a state of constant flux. Numerous iterations of the plan, as well as inputs from affected parties, have been considered. These come in the form of discussion papers prepared by the North Pacific Council (NPFMC 2012 and 2014a), reports from inter-organizational workshops (NPFMC 2014d), comments submitted by members of the public, and other varied materials.

As a result of these efforts, the Council initiated a Final Motion in October of 2014 (NPFMC 2014b) for analysis of several management programs, including maintenance of the status quo, adoption of a stand-alone trawl rationalization program, and adoption of a trawl rationalization program with additional measures for fishing community stability. The main goals and measures outlined in these programs are addressed below.

Once again, analysis of the proposed program reveals many of the same goals as are evident in the Northeast Multispecies FMP and the Pacific Coast Groundfish FMP. This comes as no surprise. Scrutiny of the proposed rationalization program does, however, bring to light a particular emphasis on some of these goals. The most obviously central issues facing the North Pacific Council seem to be those of reducing bycatch and ensuring community stability and participation. As mentioned above, the question of community impacts has featured prominently in discussions of any proposed change in the management scheme. Likewise, the problem of bycatch has been key and is indeed one of the main driving forces behind the current move towards rationalization.

In light of the aforementioned concerns, the following policy goals are identified in the proposed rationalization program:

- Prevent overfishing
- Maximize the effectiveness of monitoring and reporting
- Foster industry flexibility and cooperation
- Maximize the effectiveness and flexibility of management

- Assure equitable allocation of fishery resources
- Prevent bycatch of sensitive species, especially Chinook salmon and Pacific halibut
- Ensure continued fishing community stability and participation
- Prevent single entities from accumulating excessive control over quota and harvesting/processing capacity

As with all management programs, one of the central goals must be the prevention of overfishing. The following measures address this goal more or less directly:

- The arrangement of the fishery into inshore and offshore sectors under a system of quota-based management
- The various options for defining target and secondary species, as well as the associated option to use MRAs for the management of secondary species
- The two options listed for pollock quota seasonal apportionments

Effective monitoring and reporting is crucial to any management plan, and the following measures are intended to address this fact:

- The requirement for 100 percent observer coverage for all trawl vessels
- The requirement that all co-ops submit annual reports
- Under the CFA alternative, the requirement that a CFA must provide annual reports
- Under the adaptive management program alternative, the requirement that any entity receiving adaptive management quota submit an associated annual report

The goal of facilitating industry flexibility, participation, and cooperation is an important one for managers to consider. The following measures seek to address this issue:

- The allowance for unused Rockfish Program PSC to roll over to co-ops
- A great deal of liberty in transferring quota between co-ops
- The ability for co-ops to carry out post-delivery transfers
- The ability to transfer quota from a CP co-op to a CV co-op

- The ability for a CV trawl license that targets cod to use pot gear without a pot endorsement, and the associated provision that PSC taken with pot gear will not count towards a PSC limit or allocation
- Under the adaptive management alternative, the provision that any unallocated adaptive management quota would pass through to the annual co-op allocations

In the interest of making management effective and practical, the following measures are put forward:

- The aforementioned monitoring provisions, such as the observer program and required reporting
- The cost recovery program that is to be implemented should rationalization move forward
- Arguably, the entire alternative for the establishment of an adaptive management program could be seen as furthering this goal

The equitable allocation of fishery resources is an issue of great importance, and as such a number of measures are intended to ensure fairness in the implementation of a rationalization program. These include:

- Three separate options for the time period to use for target and secondary species allocations
- Three separate options for the time period to use for Western Gulf and West Yakutat area rockfish sector allocations
- Arguably, the measures put forward to prevent excess accumulation also apply to the idea of fairness in the distribution of fishery resources

Bycatch being a problem of central concern in the Gulf of Alaska in recent years, a number of the measures outlined in this program are meant to reduce its levels in the fishery. These include:

- Two options for Chinook salmon PSC allocations to the CV sector for pollock trawl landings, one of which being maintenance of the status quo and one being a 25 percent reduction

- Three options for Pacific halibut PSC allocations to both sectors, one being maintenance of the status quo and two being reductions of different amounts
- Three options for the time period to use for apportionment of Pacific halibut PSC between the CV and CP sectors
- Prohibition on the permanent severance of PSC from a license
- The ability, described above, for a CV trawl license that targets Pacific cod to use pot gear without a pot endorsement, is also meant to alleviate bycatch issues
- The associated provision that PSC taken with pot gear will not count towards a PSC limit or allocation is also meant to alleviate bycatch issues
- The provision that the limited access components of the fishery will be apportioned PSC with a specified percentage reduction, for which three options are given

As is true of bycatch prevention, the issue of fishing community stability and participation has become extremely important during the process of rationalization (NPFMC 2014a, 2014b, and 2014d). Many of the provisions listed in the proposed program, as well as much of Alternative 3 described above, exist to address the concerns surrounding this issue. These include:

- The option to give a processor control of 10 to 40 percent of the PSC allocated to an inshore co-op
- The requirement that co-op formation be guided by historical landing patterns, with two options for the time period to use
- The option to require the signature of the community in which a processor is located for the formation of an inshore co-op
- The option for a processor to be in more than one co-op
- The option to prevent the sale of and target species severances from CV licenses in the first two years of the program
- The regionalization of target species quota based on historical landing patterns, with two options for the time period to use and an additional option for a port of landing requirement for Kodiak

- The requirement for active participation in order to be eligible for a CV license, with an option to exempt communities from said requirement
- The option to put up to 25 percent of the fees from the aforementioned cost recovery program towards a loan program to facilitate new entrants to the fishery
- Essentially the entire CFA option under Alternative 3
- Arguably, the adaptive management option under Alternative 3
- Arguably, the measures intended to prevent monopolization of fishery elements

Finally, a number of measures are included with the intention of preventing excessive accumulation of quota or other forms of control over the fishery. As mentioned above, these measures also serve the goals of fairness and community stability. They include:

- Two options for a limit on the percentage of CP quota that a single entity may own
- Three options for a limit on the percentage of individual target species CV quota that a single entity may own, with a grandfather clause
- Three options for a limit on the percentage of individual target species CV quota that may be harvested by a single vessel
- Three options for a limit on the percentage of individual target species CV quota that may be received or processed by a single processor, with a grandfather clause

4.4 | FISHERY-DEPENDENT COMMUNITY CONCERNS

It is worth noting, in light of the extensive options given to address community stability and related issues, the great concern over the potential social and economic impacts of a rationalization program on Gulf of Alaska fishing communities. A good deal of public comment on the proposed program has centered on this issue, with commentary both in favor and opposed to the use of mechanisms such as CFAs.

Additionally, the North Pacific Council held a workshop on CFAs in 2014, with participants representing both the New England and Pacific Coast fisheries. This

workshop facilitated the discussion of concerns and strategies related to the use of CFAs, as well as a comparison of the different regions in question (NPFMC 2014d).

Some major concerns that were explored included the restructuring of the fishery and the price of quota (NPFMC 2014d). It was noted that ITQ programs often favor economies of scale, and this fact fuels concerns that groundfish landings may be concentrated in a few large operations. Some participants at the workshop also expect that the market price for Gulf of Alaska quota will be significantly higher than is seen in other regions, further excluding low-volume fisheries operations (NPFMC 2014d).

In contrast to these concerns, however, it was noted that there is already a relatively small number of port communities that play a role in the Gulf of Alaska groundfish fishery (NPFMC 2014d). That is to say, there are not many low-volume ports with a tenuous grasp on participation in the fishery. Because of this fact, some are less concerned with the potential for consolidation. Additionally, there is the simple fact that any preemptive measures must be based on conjecture; this fact might discourage managers from taking far-reaching actions early in the implementation process.

5 | A COMPARISON OF THE THREE MULTISPECIES FISHERY CATCH SHARE PROGRAMS

The following sections comprise a comparative analysis of the major actions taken (or being considered in the case of the Gulf of Alaska) by the relevant Fishery Management Councils in the implementation of their catch share programs. These actions are categorized broadly by the concerns that they are intended to address – concerns derived from the identification of policy goals in the previous chapter. As a thorough review of every goal and attendant measure presented by each FMP would be prohibitive and unnecessarily complicated, this chapter strives to present the major actions in a logical and orderly fashion, while paying particular attention to those provisions most relevant to bycatch and community stability issues.

All information in this chapter is taken from the relevant fishery management plans (NEFMC 1985, NPFMC 2014c, PFMC 2014), their amendments (NEFMC 2003, 2009, 2011, and 2014a, PFMC 2010a and 2010b), and the North Pacific Council’s Final Motion on trawl rationalization (NPFMC 2014b), except where otherwise noted.

5.1 | COMPARISON OF FISHERY PROGRAM ELEMENTS

Table 2 has been constructed to summarize the three fisheries and their similarities and differences in addressing their common themes.

Table 2 – Summary of Themes Across Catch Share Programs

	Northeast Multispecies Fishery	Pacific Coast Groundfish Fishery	Proposed Gulf of Alaska Catch Share Program
Allocation/Accumulation Controls	<ul style="list-style-type: none"> - Allocation of a collective hard TAC - Allocation based on catch history (live weight) - No limit on percentage of total TAC allocated to a given sector - No limits on accumulation (may change) 	<ul style="list-style-type: none"> - Allocations to permits and processors for shoreside whiting - Allocations to permits and adaptive management program for shoreside nonwhiting - Allocations based on equal division and catch history - Shoreside sector limits on quota share by area and stock, with no grandfather clause - Mothership sector limits on allocation, harvest, and processing 	<ul style="list-style-type: none"> - Allocations to inshore and offshore sector - Allocations based on catch history - Offshore sector limit on target species quota - Inshore sector limits on target species quota (with a grandfather clause), harvest, and processing (with a grandfather clause)
Bycatch Mitigation	<ul style="list-style-type: none"> - Status quo measures including some area and rolling closures, gear restrictions, and permitting requirements - Trip reporting requirements 	<ul style="list-style-type: none"> - Status quo measures including closures, gear restrictions, and effort restrictions - Gear prohibitions - Possible full retention program - Use of halibut IBQ for all sectors - Use of Chinook cap and rockfish allocations for at-sea whiting sectors 	<ul style="list-style-type: none"> - Use of PSC for halibut and Chinook, with several options for varying levels of limitation - Prohibition on permanent severance of PSC from associated license

Table 2 (continued)

	Northeast Multispecies Fishery	Pacific Coast Groundfish Fishery	Proposed Gulf of Alaska Catch Share Program
Community Protection	<ul style="list-style-type: none"> - No specific measures initially - Amendment 17 adopted in 2011 to define NOAA-sponsored, state-operated permit banks 	<ul style="list-style-type: none"> - 20% of shoreside whiting component allocation to processors - 10% of shoreside nonwhiting component allocation reserved for adaptive management program 	<ul style="list-style-type: none"> - Inshore sector co-ops formed around a processor - Option to allow a processor to join more than one co-op - Option to require community signature for co-op formation - Option to grant a processor control of 10% to 40% of its co-op's PSC - Accumulation limits listed above - Regionalization of target species quota - Option for a port of landing requirement for Kodiak - Active participation requirement for CV licenses - Option to exempt communities from said requirement - Option to prohibit sales or severances for CV licenses for first two years of the program - Alternative 3 available, which would allocate 5% to 15% of CV quota to either a CFA system or an adaptive management program
Industry Flexibility	<ul style="list-style-type: none"> - No limits on accumulation (may change) - ACE transfers - ACE transfers from one year may be processed through the first two weeks of the subsequent year - Up to 10% of surplus ACE may be carried over into the next year - A vessel may possess both a multispecies and a scallop permit 	<ul style="list-style-type: none"> - Quota transfers - Up to 10% of surplus quota may be carried over into the next year - Up to 10% of quota from the subsequent year may be used to cover a deficit in a given year - Whiting mothership quota may be transferred as long as processor obligations are met - Exceptions may be made to said obligations by mutual agreement 	<ul style="list-style-type: none"> - Quota transfers - Quota transfers from CP sector to inshore sector - A trawl CV license targeting cod fishable using pot gear - PSC taken with pot gear does not accrue to a PSC limit or co-op PSC allocation

Table 2 (continued)

	Northeast Multispecies Fishery	Pacific Coast Groundfish Fishery	Proposed Gulf of Alaska Catch Share Program
Monitoring and Enforcement	<ul style="list-style-type: none"> - Provisions for penalizing members in the event that they leave a sector or the sector disbands following an overage - Sectors are jointly liable for violations pertaining to ACE overages, legal-size discards, and misreporting of catch - Dockside and at-sea monitoring in addition to NMFS Observer Program - Mandatory declaration of fishing areas and submission of VTR reports - Mandatory submission of annual reports 	<ul style="list-style-type: none"> - 100% observer coverage - 100% shoreside monitoring - VMS-based electronic logbooks - Mandatory landing declarations - Targeted and random audits for the at-sea whiting sectors - Mandatory submission of annual reports 	<ul style="list-style-type: none"> - 100% observer coverage - Mandatory submission of annual reports - If Alternative 3 is adopted, mandatory annual reports for any CFA or any entity receiving adaptive management quota

5.2 | ALLOCATION AND ACCUMULATION OF QUOTA

Under the Northeast Multispecies FMP, each sector receives a hard TAC allocation for all regulated groundfish species except for halibut, ocean pout, windowpane flounder, Atlantic wolffish, and SNE/MA winter flounder. This allocation is given as a collective whole that includes all relevant stocks, and requests for specific stock allocations are not permitted.

Allocations are given based on the total PSC of all vessels participating in a sector in a given year. A vessel's PSC is calculated on the basis of live weight landed, not counting discards, over the time period from 1996 to 2006; this PSC is permanent once assigned.

There is no limit on the share of a stock's TAC that can be allocated to a sector. Moreover, there are no other accumulation limits built into the original rationalization program; the New England Council is currently, however, considering implementation of

Amendment 18 to the FMP. This amendment could introduce, among other measures, accumulation limits for quota share.

Under the Pacific Coast Groundfish FMP, the fishery is divided into a shoreside trawl sector and two whiting at-sea sectors. Within the shoreside trawl sector, allocations are split between whiting and nonwhiting components. For the whiting component, 80 percent of quota is issued to fishing permits and 20 percent is issued to processors. For the nonwhiting component, 90 percent of quota is issued to fishing permits and 10 percent is reserved by the Pacific Council under the auspices of an adaptive management program.

Allocations to processors are based on landings history over the period from 1998 to 2004, dropping the two worst years. Allocations to permits are based on two principles: that of equal division and that of catch history. That is, quota share associated with retired permits is equally divided amongst qualifying permits, and the remaining quota share is distributed on the basis of catch history. The time period used for nonwhiting species is from 1994 to 2003, dropping the three worst years. For whiting, the period is the same, dropping the two worst years.

For the whiting mothership sector, allocations are given to co-ops and to the non-co-op component as a whole. Catch history for each vessel is calculated using the same method as for whiting vessels in the shoreside sector.

Many accumulation limits are in place to control the concentration of quota share to permits and processors in the shoreside sector. These are further divided for various areas and species / species groups. No grandfather clause exists to allow excess accumulation for those entities whose historic participation in the fishery would otherwise allow it. There is instead a four-year adjustment period, by the end of which all excess quota must be divested.

There are likewise a number of accumulation limits in place for the whiting mothership sector. The following rules apply to this sector: no entity may own CV(MS) permits for which the total allocation exceeds 20 percent, no vessel may catch more than 30 percent of the mothership sector's whiting allocation, and no entity may process more than 45 percent of the mothership sector's whiting allocation. It is worth noting that these are rather high limits.

For the Gulf of Alaska proposed rationalization program, a number of target and secondary species are being considered for allocations between an inshore and an offshore sector. These include Pacific cod, pollock, sablefish, and a number of rockfish species. Allocations for Pacific cod and pollock would be given to the inshore sector, with the offshore sector managed using MRAs. Allocations would be based on vessel catch history, with several time periods being considered for use in the calculation.

A limit on accumulation of target species quota for the offshore sector would be included, tentatively set at either 30 or 40 percent. Likewise, a number of accumulation limits are being considered for the inshore sector. These include a limit on target species quota (with a grandfather clause), a limit on the amount of target species quota that can be harvested by a single vessel, and a limit on the amount of target species quota that can be received or processed by a single processor (with a grandfather clause).

5.3 | BYCATCH LIMITATION

The catch share program implemented under Amendment 16 to the Northeast Multispecies FMP does not add extensive bycatch prevention measures to the extant regulations; instead it is relying primarily on the mechanisms of the quota system and the rules that already existed under the status quo regime. A number of these status quo regulations are specifically retained for vessels in the sector program, including some rolling and year-round closures, permitting requirements, and gear restrictions. In addition to these provisions, Amendment 16 requires a detailed system of trip reporting for all vessels.

Like the New England Council, the Pacific Council retains many of the key bycatch mitigation measures already in place in the FMP. These include gear restrictions, time and area closures, and effort restrictions. It is emphasized in the rationalization program that these existing measures can and will be modified or expanded if need dictates. Likewise, the possibility for the adoption of full retention programs is also outlined.

Several blanket prohibitions of specific gear types are also enacted for the Pacific coast fishery, particularly for some types of bottom-tending gear and set nets in specific areas.

For a number of overfished rockfish species commonly caught in the whiting fishery, allocations are implemented for the entire fishery (that is, all three sectors combined). The distribution of these allocations among individual whiting sectors is done pro rata relative to the sectors' whiting allocations.

The Pacific coast rationalization program established an IBQ system for the management of Pacific halibut bycatch. IBQ is issued to each vessel on the basis of a bycatch rate applied to the target species quota share that vessel receives.

Calculation of the IBQ available to cover trawl bycatch is based on the TCEY for legal sized halibut established by the IPHC. The allocation was initially set at the lesser of 15 percent of the TCEY or 130,000 pounds, with the cap decreasing to 100,000 pounds as of 2015. The expected legal sized halibut mortality is expanded into a round weight using the conversion calculation established by the IPHC (PFMC 2014). Finally, 10 mt are subtracted to cover the at-sea whiting sectors, with the remainder issued as IBQ to the shoreside sector.

The at-sea whiting sectors are also subject to some specific regulations for bycatch and overfished species. These include allocations for widow rockfish that are dependent on the status of the stock (that is, whether it is rebuilding or rebuilt) and status quo hard caps on Chinook salmon total bycatch and bycatch rate.

The Gulf of Alaska rationalization program would make use of PSC allocations for Pacific halibut and Chinook salmon. Pacific halibut PSC would be allocated to both the CV and CP sectors pro rata relative to trawl landings. Several options for the amount of PSC are listed for consideration, including the status quo amount (1,515 fish) and two levels of reduction (1,364 and 1,288) (NPFMC 2014b). There are likewise several options listed for the time period to use in determining the PSC apportionment between the two sectors.

Chinook salmon PSC would be allocated to the CV sector pro rata relative to pollock trawl landings, and to both sectors pro rata relative to non-pollock trawl landings. For CV sector pollock-based allocations, two options are given for the amount of PSC: the status quo amount (25,000 fish) or a 25 percent reduction (NPFMC 2014b). For non-pollock-based allocations, the guidelines of Amendment 97 are used.

5.4 | COMMUNITY PROTECTION

The original provisions of Amendment 16 to the Northeast Multispecies FMP do not include any specific measures to directly promote community stability. Nonetheless, the question of social and economic impacts of rationalization on fishing communities was seen as important; to that end, NOAA in 2010 provided federal grant awards totaling nearly \$6 million to the states of Maine, New Hampshire, Massachusetts, and Rhode Island for the purpose of establishing permit banks. These permit banks were intended to be collections of limited access permits held by the state and used to provide associated fishing privileges to sectors.

Because such permit banks are not defined or recognized in Amendment 16, and because the only entities allocated and authorized to transfer ACE are sectors, this program met with significant administrative burdens. A permit bank thus had to either join an existing sector or form a new sector to operate, creating difficulties and redundant administrative requirements for such banks; this fact, and other legal concerns surrounding the joint and several liability provisions for sectors, caused notable challenges to the operation of these permit banks.

In order to address these problems, the New England Council adopted Amendment 17 to the Northeast Multispecies FMP in 2011. This amendment establishes the concept of a NOAA-sponsored, state-operated permit bank as a separate entity from fishing sectors. Under the amendment, these permit banks are created as partnerships between NOAA and a state or states, using federal grant funds to acquire limited access permits. Such a bank will be allocated ACE and may transfer said ACE to sectors and/or DAS to individual vessels.

The stated goals of Amendment 17 include:

- Provide options for fishers with little access to capital
- Help fishers improve operating efficiency
- Maintain small-boat enterprises
- Preserve continued and stable access to fishery resources for local fishers from small fishing communities

The catch share program put in place for the Pacific coast groundfish fishery includes provisions that directly or indirectly support the goal of ensuring community stability and participation. These measures are principally found in the allocation scheme for the shoreside sector.

For the whiting component of the shoreside sector, 20 percent of the available quota is issued to eligible processors. In order to qualify for such an allocation, a processor must demonstrate its “recent history” in fishery participation, defined as “1 mt or more of deliveries from whiting trips in each of any two years from 1998 – 2004.” Allocation is then based on landings history.

For the nonwhiting component of the shoreside sector, 10 percent of the available quota is reserved by the Council for use in an adaptive management program. This quota is intended to be available for use in addressing issues surrounding community stability,

processor stability, conservation, facilitation of new entrants to the fishery, and any other unintended or unforeseen consequences of the IFQ program.

The rationalization program currently under consideration for the Gulf of Alaska lists a number of tentative measures intended to address fishing community concerns. Many of these measures are related to the formation and structuring of the proposed inshore co-ops, as well as limiting the accumulation of fishery control within this sector.

Furthermore, a separate alternative is given to augment the proposed program with additional community protection measures, including the use of CFAs or an adaptive management program.

Inshore co-ops would be initially formed around a number of fishing vessels and a related processor. This structure would be based on historical landing patterns. There are also options being considered that would allow a processor to be in more than one co-op, and that would require the signature of the community in which a processor is located for co-op formation. Furthermore, an option is being considered to grant each processor control over a percentage of its co-op's annual PSC allocation, with possible amounts ranging from 10 to 40 percent.

The various accumulation limits being considered for the inshore sector, as described above, are also intended to help bolster community stability and participation.

Target species quota would be regionalized under the proposed program, to either the Western Gulf or Central Gulf / West Yakutat region, based on historical delivery patterns. In addition to these broad regionalization stipulations, there is an option to require that quota historically landed in Kodiak be given a port of landing requirement to be delivered to Kodiak.

Furthermore, the proposed program would institute an "active participation" requirement for the purchase of a GOA trawl CV license or catch history, with an option to exempt communities from said requirement.

Finally, Alternative 3 presented in the North Pacific Council's Final Motion would effectively implement the catch share program as outlined in Alternative 2, but with additional community protection or general resilience measures. This alternative presents the option of adding either a CFA system or an adaptive management program similar to the program used by the Pacific Council.

The CFA system, if adopted, would receive an allocation of 5 to 15 percent of the total available quota for all species allocated to CVs. The CFA component would comprise communities with a high likelihood of being impacted by the adoption of a rationalization program. The adaptive management program, if adopted, would likewise set aside 5 to 15 percent of the quota for all species allocated to CVs. This quota would be distributed by the North Pacific Council, in similar fashion to the intent of the adaptive management program used on the Pacific coast.

5.5 | INDUSTRY FLEXIBILITY

The current lack of accumulation controls in the Northeast multispecies fishery can arguably be seen as a measure to maximize the industry's ability to control and shape the fishery to suit its needs. As mentioned above, however, this situation may change in the near future.

Sectors in the Northeast multispecies fishery are afforded a great deal of flexibility in terms of their ability to transact transfers of ACE. Such transactions may occur at any time during the fishing year, with all or part of a sector's ACE being transferred. Transfers of ACE from one year may also be processed through the first two weeks of the subsequent year; this measure is meant to provide a sector with ample opportunity to secure extra ACE should it experience an overage. Sectors are free to seek monetary or other compensation in exchange for said transfers. Additionally, a sector may carry up to 10 percent of unused ACE from one year forward into the subsequent year.

A vessel may, under Amendment 16, possess both a limited access multispecies permit and a limited access scallop permit simultaneously. This allows diversification of a fishing portfolio and thus enhances economic opportunities.

Within the shoreside trawl sector of the Pacific coast groundfish fishery, quota shares and quota pounds may be transferred between vessels. A vessel with a surplus of quota pounds in a given year may also transfer up to 10 percent of said quota pounds for each species to the subsequent year. This mechanism can also work “in reverse” for any vessel with a deficit in a given year; that is, it may cover its deficit using up to 10 percent of its quota pounds from the following year, provided they are transferred within 30 days of their issuance.

Allocations to a co-op within the whiting mothership sector may be freely transferred among its members. Such allocations may also be transferred between co-ops with NMFS approval, as long as all obligations to processors are met. Exceptions may be made to these obligations by mutual agreement between the CV(MS) permit owner and the associated mothership.

Under the proposed Gulf of Alaska rationalization program, allocations to an inshore sector co-op would be managed internally by the co-op. Transfers between co-ops would also be permitted. Additionally, post-delivery transfers would be allowed, provided they are completed before December 31st of each year.

In the same manner, allocations to CP sector co-ops would be transferable within the sector. Furthermore, annual CP co-op allocations may be transferred to inshore co-ops. This process is to be strictly “one-way,” with transfers from the inshore to the CP sector prohibited.

In the long term, licenses are to be transferable and severable from their associated target species allocations. Such permanent severances do not include PSC allocations. It

should be noted, however, that an option is under consideration to prohibit such sales and severances for CV licenses in the first two years of the program.

Under this program, a trawl CV license that targets Pacific cod would be fishable using pot gear without the need for a pot endorsement. Any PSC taken with pot gear would not accrue to a PSC limit or co-op PSC allocation.

5.6 | MONITORING AND ENFORCEMENT

Sectors in the Northeast multispecies fishery are responsible for specifying, in their operations plans and contracts, all rules to ensure FMP compliance and relevant penalties for infractions. Sectors may be held jointly liable for violations of operations plan elements pertaining to ACE overages, discard of legal-sized fish, and misreporting of catch. Additionally, members can be penalized for leaving a sector following a year in which the sector experienced an ACE overage. In the event that a sector disbands entirely following an overage, provisions are included to ensure that individual permit holders are held accountable via responsibility for an equal share of the overage.

Amendment 16 requires a program of random dockside monitoring and an observer or at-sea monitor program, in addition to the NMFS Observer Program. Vessels must also make declarations of their intended fishing areas and use VTR serial numbers to report their trip locations and subsequent sales of fish, as well as submit annual reports on their operations and economic information.

The Pacific coast catch share program outlined an extensive monitoring system. For the shoreside trawl sector, provisions include a requirement for 100 percent coverage for at-sea observers and 100 percent coverage for shoreside off-loading. Cameras may also be used to augment at-sea monitoring. Vessels and processors must submit various economic data, including VMS-based electronic logbooks and landing declaration reports.

For the at-sea whiting sectors, the status quo requirement for 100 percent observer coverage was maintained. Cameras may be used in place of observers for some of this coverage. These sectors are also subject to a program of mandatory economic data submission, including both targeted and random audits. Co-ops must furthermore submit annual reports on their operations and economic information for the year.

The proposed Gulf of Alaska rationalization program would require 100 percent observer coverage for all trawl vessels, as well as annual co-op reports. Should it be implemented with a CFA or adaptive management provision, annual reports will also be required of any CFAs or entities receiving adaptive management quota allocations.

6 | RESULTS

This chapter analyzes the commonalities between the three fisheries in the light of the policy analysis methodology of Weimer and Vining (2011), with an emphasis on the measures being pursued for the Gulf of Alaska rationalization program. It then compares the measures taken in the fisheries to the theoretical solutions presented for the relevant policy problems.

6.1 | STATING THE PROBLEM IN THEORETICAL TERMS

Fisheries represent a classic example of a public good. The determination of this classification is based primarily on the examination of two qualities that exemplify private goods: rivalry in consumption and excludability in ownership and use (Weimer and Vining 2011). One must ask whether or not the good in question exhibits these qualities. Fish do indeed display rivalry in consumption; any fish harvested by one individual cannot be harvested by another. However, there is no way for one individual to exclude a given fish in the ocean from being harvested by another individual, at least under traditional management regimes. Therefore, the good displays nonexcludability. Importantly, Weimer and Vining point out that the problem of nonexcludability often arises from institutional features rather than from the inherent nature of the good in question (2011). This point becomes relevant when alternative management structures – such as catch share programs – are considered.

These qualities alone are not enough to cause inefficiency problems; one can imagine a situation of low demand and high supply, where an individual's harvesting of fish has no impact on any other individual's ability to harvest. At higher levels of exploitation, however, the good becomes congested; that is, the marginal social cost of consumption exceeds the marginal private cost (Weimer and Vining 2011). A good that displays this combination of qualities is considered to be an open access or common property resource, depending on any limitations to exploitation (such as those within a limited access fishery program).

Such a situation leads to economically inefficient overconsumption, overcapitalization, and underinvestment in preservation, as individuals respond to marginal private cost rather than to (the considerably higher) marginal social cost (Weimer and Vining 2011). These problems are all common in the three fisheries examined in this thesis where they are exemplified by excessive mortality levels and stock declines, fleet overcapitalization, and high bycatch levels.

This is an important point, as the fundamental problem represented by the fishery is that of public goods. According to the theoretical model, the primary solution to public goods issues is some form of nonmarket supply, while secondary solutions include market mechanisms, incentives, and rules. The use of catch shares represents the imposition of a market mechanism. This point is addressed more fully later.

While congestion itself contributes to the problems associated with open access resources, it is often thought of as being an externality. It may also be useful to think of the problem of bycatch as an externality problem, in that it is a secondary result of the harvest of target species. As with open access resources, externalities often arise as a result of attenuated property rights, such as an incomplete right of exclusive use (Weimer and Vining 2011). This is typically the case in traditional fishery management structures, as mentioned above. Importantly, in the case of small numbers of participants, the allocation of property rights is expected to lead to a privately negotiated outcome that is economically efficient (Coase 1960). This observation is clearly relevant to the pursuit of catch share management policies.

A third major issue that appears during the process of crafting a catch share policy is the question of potential adverse impacts on fishing dependent communities; this issue is referred to in this study simply as community protection. The categories of market failure and government failure do not readily encompass community protection as a problem to be addressed. Instead, the goal of protecting these communities is best understood as a distributional goal beyond the simple goal of economic efficiency,

specifically with regard to the concepts of equity of opportunity and equality of outcome (Weimer and Vining 2011).

Table 3 maps the problem areas identified onto the matrix presented earlier. This demonstrates visually which problems fall where according to the theoretical framework. The matrix is revisited later in this thesis, when the actions of managers are likewise mapped onto it.

Table 3 – Policy Analysis Matrix with Relevant Problems Identified

	Market Mechanism	Incentives	Rules	Nonmarket Supply	Insurance and Cushions
Public Goods (Fisheries)	S	S	S	P	
Externalities (Exploitation and Bycatch)	S	P	P	S	
Equity of Opportunity (Community)		S	P		S
Equality of Outcome (Community)			S	S	P

P = Primary Solution S = Secondary solution

Adapted from Weimer and Vining 2011

Distilling the major problem areas currently facing Alaska fishery managers into the generic categories of public goods, externalities, equity of opportunity, and equality of outcomes allows this study to assess what measures should, in theory, best address said problems. While this approach does place the issue into a highly generalized framework, it provides an excellent approach to begin to understand potential policy solutions and how they fit into the current management paradigm. This approach works equally well to diagnose why difficulties arise if the problem solutions do not match the diagnosis of the problems.

Within the theoretical framework, generic policy solutions are recommended for each type of policy problem. These solutions are further ranked according to whether they should be viewed as primary or secondary solutions for each problem (Weimer and

Vining 2011). **According to this model, the primary solution to public goods issues is some form of nonmarket supply, while secondary solutions include market mechanisms, incentives, and rules.** A graphical representation of this and other solutions is presented in Table 4 below. The implementation of a catch share program generally, with allocations of fishing privileges (and sometimes with guidelines for accumulation), constitutes the imposition of a market mechanism. Specifically, this approach takes the form of facilitation of a market that was previously absent or incomplete, by means of the allocation of existing goods (Weimer and Vining 2011). Importantly, one of the potential hazards associated with this approach is its distributional effect on the system, particularly in the form of windfall gains and losses. This can lead to rent seeking on the part of participants; that is, individuals or entities may expend resources on political activity in an effort to increase their allocations (Weimer and Vining 2011). This reveals some serious pitfalls with the system of negotiated initial allocations of fishing privileges. Managers typically seek to address this problem via limits on accumulation of quota or other forms of control. Additionally, the complex system of civil laws governing the operation of any catch share system constitutes an imposition of rules designed to mitigate public goods issues, as well as externality problems, as detailed below.

As mentioned earlier in this study, the problem of congestion is one of the primary contributing factors to inefficiency related to public goods. Congestion is typically thought of as an externality problem, and is treated as such here. Likewise, the excessive bycatch that has been observed in the Gulf of Alaska groundfish trawl fishery is best thought of in terms of externalities. **The primary solutions recommended for externality problems are incentives and rules, while secondary solutions include market mechanisms and nonmarket supply (Weimer and Vining 2011).** The issue of congestion is largely addressed by the same allocation of property rights discussed above. This implementation of a market mechanism is also used to combat the bycatch externality, along with various rules in the form of status quo mitigation measures and the significant penalties imposed for infractions. Specifically, these rules best fit the description of quantity regulation policies; indeed, such policies are recommended in the

case of negative externalities and public goods issues (Weimer and Vining 2011). In fact, policies such as tradable permits are specifically described to “combine some of the advantages of quantity control with those of more market-like mechanisms” (Weimer and Vining 2011, p. 242). Some of the potential problems with such policies include rent seeking, as described above, and the difficulty in monitoring for noncompliance (Weimer and Vining 2011). The rules in question also take the form of civil laws intended to diminish the externalities.

The distributional concerns involved can be more specifically described as desires for equity of opportunity and equality of outcome. These two issues have differing sets of recommended solutions. **For the former, the primary solution is the use of rules, while secondary solutions include incentives and insurance/cushions. For the latter, insurance/cushions are the primary solution, with rules and nonmarket supply listed as secondary (Weimer and Vining 2011).** Once again, the very nature of the proposed rationalization program entails a market mechanism. Additional community protection measures being pursued in the Gulf of Alaska constitute forms of rules, cushions, and (arguably) nonmarket supply. The rules in question most appropriately fit the description of civil laws, as has been mentioned in previous sections. That a complicated program of rationalization would rely heavily on civil laws is no surprise, and such laws can be optimized to meet various policy goals, including addressing public goods and externalities as described above, as well as working towards equality of opportunity (Weimer and Vining 2011). Cushions would be provided in the form of transition assistance and, arguably, grants. Transition assistance is exemplified by the ways that small-scale, multi-generation, and new participants in the fishery would receive various forms of facilitation. This kind of assistance does constitute a cushion, although it is not optimized to address the distributional issues in question, at least according to theory (Weimer and Vining 2011). It also presents the potential hazard of inequity in availability. Finally, it is arguable whether the government supply of quota to specific communities or organizations constitutes some form of grant or direct nonmarket supply. Both of these policy approaches are intended to address distributional concerns, either in ensuring equality of outcomes (in the former) or equity in distribution (in the latter). This

study leans toward an interpretation favoring the former, as this policy more resembles a grant within the context of a market-based system, rather than a direct government supply of the good in question. In this case, the potential theoretical hazards to be aware of include a reduction in work effort and dependency on the grants.

The questions of industry flexibility and monitoring/enforcement needs may more aptly be considered problems that arise from implementation of a rationalization policy, rather than inherent problems to be addressed by said policy. Nonetheless, they may be understood in theoretical terms as the use of market mechanisms, the imposition of specific civil laws, and direct government oversight.

6.2 | A COMPARISON OF THEORY AND PRACTICE

The various policy problems and the corresponding solutions being pursued by managers are summarized in Table 4, which has been adapted from Weimer and Vining (2011, p. 261). This table lists the primary (P) and secondary (S) solutions recommended for each type of policy problem. The specific solutions identified above have been highlighted in green. This approach facilitates comparison of the actions taken by managers and the actions supported by policy analysis theory.

The specific problem types and solution categories that have been identified are mapped onto the matrix. As illustrated by the green highlighting, the solution sets pursued by managers in all three fisheries are market mechanisms and various rules. Additionally, managers in the Gulf of Alaska are proactively investigating the potential use of insurance and cushions.

As indicated by the Table 4 notation, managers have utilized a mix of (theoretically) effective and less effective policies. The market mechanism itself only ranks as a secondary solution for two of the four problems. Two of the problems – public goods and equality of outcomes – are not addressed by primary solutions in the Northeast and Pacific coast fisheries. However, it is only the public goods issue that is left without a primary solution in the Gulf of Alaska. It is worth noting that this is not surprising, as the

only primary solution listed – nonmarket supply – is nigh inconceivable in the case of an American fishery resource. Because of this fact, and expectations that market mechanisms can also dramatically alleviate public goods problems, the author asserts that it is unreasonable to consider the lack of a nonmarket supply mechanism to be a failure on the part of managers.

Table 4 – Mapping Management Approaches According to Theory

	Market Mechanism (Catch Shares)	Incentives	Rules (Civil Laws, Quantity Regulation)	Nonmarket Supply	Insurance and Cushions (Transition Assistance, Grants)
Public Goods (Fisheries)	S	S	S	P	
Externalities (Exploitation and Bycatch)	S	P	P	S	
Equity of Opportunity (Community)		S	P		S
Equality of Outcomes (Community)			S	S	P

Green = Shared in all three cases Blue = Seen in Gulf of Alaska only

P = Primary solution S = Secondary solution

Adapted from Weimer and Vining 2011

7 | CONCLUSIONS

This chapter presents the conclusions drawn from the analysis, including a retrospective assessment of the methodology employed and commentary on bycatch and community protection measures with respect to catch share management.

7.1 | GENERALIZATIONS

While the move towards catch shares in the Gulf of Alaska was largely spurred on by increasing bycatch levels, it has quickly become apparent that concerns related to fishing community stability are of central importance in the crafting of any such rationalization program. This fact is made most obvious by Table 2, which reveals the immense number of community protection measures being considered by the North Pacific Council. These concerns are also reflected in two of the four generic policy problem categories used to assess management approaches, making clear the fact that they play a very significant role in the policy design process.

In terms of these generalized problem and solution categories, Table 4 reveals (in terms of the theory) a mix of appropriate policy and lack thereof. Again, the term “appropriate” is used in this context strictly with reference to the formal theory earlier described, and it must be understood as such. Potential problems with this methodology are addressed below.

In addressing the problem of public goods, managers seem to pursue a couple of solutions that would be considered “secondary” in the policy analysis theory. The most significant of these represented by catch share programs generally is the idea of implementation of some market mechanism. While theory would direct managers first to the solution of providing nonmarket supply, the idea of such a thing in the context of fisheries resources is rather difficult to imagine.

The problem of externalities is best solved using rules and incentives, according to the theory, and managers have largely pursued the former in their attempts to reduce bycatch. The market mechanism of the catch share program itself also works to alleviate concerns

with bycatch and congestion of the resource where timely and practical transfers of bycatch quota are possible. As mentioned earlier in this paper, the allocation of property rights is expected to alleviate externality problems, particularly when small numbers of participants are involved. Additionally, the type of rule that is heavily relied upon for bycatch mitigation – that is, quantity regulation – is expected to combine benefits of both market mechanisms and stricter limitations on behavior. Thus the conclusion that these catch share programs should effectively rein in bycatch and other overexploitation issues.

Rules are likewise the primary solution recommended for problems dealing with equity of opportunity, and these seem to be one of the principal tools used by managers for such problems. These rules take the form of various allocation schemes designed to ensure the fairness of the process for all participants. It is worth noting, however, that the awarding of initial allocations is itself a negotiated process in fishery management councils. The potential hazard of rent seeking mentioned earlier comes into play here, as it is quite possible – and likely – that individual participants will seek to maximize their initial allocations. In this way, the very rules intended to promote equitable participation are threatened with subversion unless managers proceed with clear and transparent analysis of participation decisions. It may not always be obvious when a given rule is flawed or biased, until after the fact of adoption unless it is subject to public scrutiny.

A quick glance at Table 4 reveals that managers have seemed to favor heavily the solution categories of market mechanisms and rules for multispecies fishery management. The problem of equality of outcomes is, in fact, the only one where managers have adopted an approach, at least partially, which favors the use of cushions. This aligns with theory, which describes the category of “insurance and cushions” as the primary solution to problems of this nature. Again, however, a caveat must be noted: the particular types of cushions being used – transitional assistance and grants – are not the types identified in the theory as being optimal for this type of problem. While such solutions may indeed help to alleviate concerns with equality, they may not be the best approach to doing so, at least according to theory, which instead tends to recommend the

use of subsidized insurance over transitional assistance in such cases as this (Weimer and Vining 2011).

7.2 | ASSESSING THE METHODOLOGY

At the conclusion of any study, it is appropriate to look back upon the methods used and make a determination as to their efficacy in addressing the problem at hand. The policy analysis strategies used in this study have clearly provided a solid framework with which to examine the fisheries in question. This methodology allows a very complex problem to be viewed in terms of its fundamental characteristics, which then facilitates the application of generalized strategies. Its ability to reduce a problem to its prime components and address each part separately is its great strength, and it has allowed this study to compare the actual actions of managers with the generic approaches that it recommends. This gives valuable insight into whether a particular measure is likely to succeed or not, and allows an understanding of why this is the case.

Its strength in generalizing is, perhaps paradoxically, also its greatest weakness. The fact that it takes so general an approach makes caution necessary in interpreting findings. In addition to its generic approach, it also breaks problems down into a defined set of categories, typically relating to economic efficiency in one way or another. While it does address issues such as distributional concerns, it has limited efficacy in such matters that are less immediately tangible in economic terms. To list only a few areas relating to fishing community issues, this policy analysis methodology would have difficulty interpreting matters such as cultural values, sense of place, sense of personal worth and dignity, and others. As such, it can only take the researcher so far. Of course, no methodology is perfect; it is in knowing the limits of theory that the researcher can take an informed view of the matter at hand.

7.3 | COMMUNITY PROTECTION AND CATCH SHARES

As mentioned already, the question of community protection seems to be at the very forefront of rationalization efforts for the Gulf of Alaska. It likewise appears to have

been problematic for managers of other fisheries; this is made evident by the many adjustments that have been made or are ongoing following rationalization, be it the clarification of permit bank operations and potential accumulation limits in the Northeast fishery or the uncertainty surrounding adaptive management quota use in the Pacific Coast fishery.

The theory used in this study makes it clear that, while many attendant measures may be used to alleviate distributional concerns, the fundamental nature of catch share programs as market-based mechanisms is not conducive to the ideas of equitability or equality except as a negotiated outcome. If this is true, it means that measures beyond allocations of quota will be necessary to address distributional issues. Managers will have to carefully balance the efficiency gains predicted for a market mechanism and the distributional gains (and potential efficiency losses) associated with other mechanisms. A cursory look at catch share programs in practice suggests that this is indeed the case.

NOAA and Congress have made clear by now their support for catch share programs in general wherever managers feel that they might be effectively utilized. While not a directive to move towards adoption of such programs, these official and legal policies are clearly made to facilitate these programs where deemed appropriate. The question of community stability is an extremely serious one, and in NOAA's official catch share policy especially there are a number of recommendations intended to bolster community participation in fisheries via catch shares.

It may be worth noting here that the North Pacific Council did, in 2004, adopt a specific Community Quota Entity Program for the Gulf of Alaska halibut and sablefish fisheries (69 Federal Register 84). This program allows eligible communities to form non-profit quota entities, which may then purchase and hold quota share for lease to, and use by, community residents. This represents another approach to community protection that has not been fully explored in the Gulf of Alaska trawl rationalization program, and is one of many examples of the North Pacific Council's experience in dealing with fishery-dependent communities, both within the context of catch share programs and otherwise.

It should be noted, with regard this Community Quota Entity Program, that success in meeting goals has been limited. This is not unlike some of the issues seen in the Northeast and Pacific coast fisheries after rationalization, e.g. problems with implementing permit banks and allocating adaptive management quota. Both of these programs have likewise met with some frustration, illustrating the fact that community protection has been a stumbling block in the implementation of catch share programs.

The federal government is, by its own account, fully ready to support the development of catch share programs where managers deem them appropriate; importantly, this includes the development of community protection measures. The North Pacific Council already has experience with such programs, and other councils have followed suit, providing many lessons along the way. While theory indicates that catch share programs may not be optimized for ensuring community stability in and of themselves, there are myriad attendant measures available to managers to augment these programs and assist fishery-dependent communities. Theory by itself, furthermore, is never perfect; it is improved with each discovery and learning experience along the way. It remains to be seen if long-term goals for reduction of bycatch and other exploitation problems can be met, and especially whether or not the question of fishery-dependent communities can be transformed from a stumbling block to a success story.

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Appendix A – Supplemental Data

Table 1 Chinook salmon bycatch in the Western GOA (WG) and Central GOA (CG) trawl fisheries, by regulatory area and aggregated target fishery, 2003 to 2011.

Regulatory area and target fishery	2003	2004	2005	2006	2007	2008	2009	2010	2011 *through 10/29/11	Average 2003- 2011
Western GOA										
Pollock	738	2,327	5,951	4,529	3,359	2,116	441	31,761	5,079	6,256
Flatfish	1,907	1,755	1,616	150	85	125		984	15	737
Pacific Cod	215	95		201	200	108	10		336	129
Rockfish					19	49	107	292	225	77
WG TOTAL	2,860	4,176	7,567	4,880	3,663	2,398	558	33,037	5,655	7,199
Central GOA										
Pollock	3,557	10,655	21,429	11,138	31,647	8,014	2,215	12,300	10,379	12,371
Flatfish	5,003	1,046	1,237	1,759	2,569	2,679	3,780	6,766	4,212	3,228
Pacific Cod	2,952	813	41	687	424	328	101	435	900	742
Rockfish	801	885	450	263	2,007	1,908	1,159	1,236	847	1,062
CG TOTAL	12,313	13,398	23,157	13,847	36,647	12,929	7,256	20,737	16,338	17,402
Grand Total	15,172	17,575	30,724	18,727	40,310	15,327	7,813	53,774	21,993	24,602

Source: NOAA catch accounting.

Adapted from NPFMC 2012.

Table 2. Control and vessel limits.

Species Category	Vessel Limit (Applies to all QP in a Vessel Account, Used and Unused)	Vessel Unused QP Limit	QS Control Lim
Nonwhiting Groundfish Species	3.2%		2.7%
Lingcod - coastwide	3.8%		2.5%
Pacific Cod	20.0%		12.0%
Pacific whiting (shoreside)	15.0%		10.0%
Pacific whiting (mothership)	30.0%		20.0%
Sablefish			
N. of 36° (Monterey north)	4.5%		3.0%
S. of 36° (Conception area)	15.0%		10.0%
PACIFIC OCEAN PERCH	6.0%	4.0%	4.0%
WIDOW ROCKFISH *	8.5%	5.1%	5.1%
CANARY ROCKFISH	10.0%	4.4%	4.4%
Chilipepper Rockfish	15.0%		10.0%
BOCACCI	15.4%	13.2%	13.2%
Splitnose Rockfish	15.0%		10.0%
Yellowtail Rockfish	7.5%		5.0%
Shortspine Thornyhead			
N. of 34°27'	9.0%		6.0%
S. of 34°27'	9.0%		6.0%
Longspine Thornyhead			
N. of 34°27'	9.0%		6.0%
COWCOD	17.7%	17.7%	17.7%
DARKBLOTCHED	6.8%	4.5%	4.5%
YELLOWEYE	11.4%	5.7%	5.7%
Minor Rockfish North			
Shelf Species	7.5%		5.0%
Slope Species	7.5%		5.0%
Minor Rockfish South			
Shelf Species	13.5%		9.0%
Slope Species	9.0%		6.0%
Dover sole	3.9%		2.6%
English Sole	7.5%		5.0%
Petrale Sole	4.5%		3.0%
Arrowtooth Flounder	20.0%		10.0%
Starry Flounder	20.0%		10.0%
Other Flatfish	15.0%		10.0%
Pacific Halibut	14.4%	5.4%	5.4%

* If widow rockfish is rebuilt before initial allocation of QS, the vessel limit will be set at 1.5 times the control limit.

Adapted from PFMC 2010a.

Appendix B – Full Examination of Catch Share Programs

The following sections present a comprehensive examination of the three catch share programs. They draw on the official rationales given for measures that are advanced, which are typically found alongside these measures within a management plan document. These rationales are distinct from the problem statement that guides the document as a whole.

All information is taken from the relevant fishery management plans (NEFMC 1985, NPFMC 2014c, PFMC 2014), their relevant amendments (NEFMC 2003, 2009, 2011, and 2014a, PFMC 2010a and 2010b), and the North Pacific Council’s Final Motion on trawl rationalization (NPFMC 2014b), except where otherwise noted.

NORTHEAST MULTISPECIES GROUND FISH FISHERY

In this section, the major elements of the Northeast sector program are described. The format largely follows from that of the original management documents. This approach maintains the logical order of presentation of the various measures as used by the New England Council and facilitates the grouping of these measures into categories as described earlier in this paper. Where an explanation is made for a given provision, it is based upon the explicit rationale given in the original documents.

Sector Formation

Sectors are to be self-selecting, with no requirements that members share common characteristics such as gear type or vessel size. This decision is intended to foster a large degree of flexibility in sector formation.

Vessels that do not wish to participate in a sector are free to fish in the open access fishery.

Sector participation is limited to those vessels holding a limited access multispecies permit. The minimum size for formation of a sector is three persons, none of whom have an ownership interest in the other two. These individuals must draw up a legally binding plan of operations and a proposal for the formation of a sector, both of which must be signed by all members and submitted to the Regional Administrator. This measure is intended to maximize the information available to the Council on the reporting, monitoring, and general fishery participation of sectors and their members.

Sector Allocations and Mortality Controls

Sectors are allocated a hard TAC of all regulated groundfish stocks except for Atlantic halibut, ocean pout, windowpane flounder, Atlantic wolffish, and SNE/MA winter flounder. These stocks are excluded due to their relatively small TACs and the limited catch histories associated with them. The Council determined that allocations of these stocks would excessively complicate the administration and monitoring of sector operations, and thus opted to discourage the targeting of them. The decision to allocate all other groundfish stocks to a sector, rather than allow requests for specific stock allocations, is intended to eliminate the situation where effort control modifications are used to facilitate the targeting of non-allocated stocks.

There is no limit on the share of a stock's TAC that can be allocated to a sector. TAC allocation is based on the catch history of each permit participating in the sector in a given year. This total share may be adjusted due to penalties for exceeding an earlier year's TAC or other violations of the management plan. This total share for each stock is multiplied by the available catch for that stock to give the Annual Catch Entitlement (ACE) for the sector. This ACE is the total weight that may be harvested via landings and discards. The ACE applies to all catches of the relevant stock, whether during directed groundfish fishing trips or other trips, unless the stock is an element of another ACL. Provisions for monitoring catch, preventing overages of ACE, or acquiring ACE transfers in the event of an overage must be specified by a sector's plan of operations.

Amendment 16 provides for the transfer of ACE between sectors and (in a limited capacity) from one year to the next. A sector may carry up to 10 percent of unused ACE from one fishing year forward into the next. Sectors may also engage in transfers of ACE at any time during the fishing year. Such transfers are viewed as private business transactions and have relatively few restrictions placed on them. All or part of a sector's ACE may be transferred, and a sector may seek monetary or other compensation in exchange for a transfer of ACE. Additionally, transfers of ACE from one year may take place through the first two weeks of the subsequent fishing year. All such transfers between sectors must be approved by NMFS. These measures are intended to grant a large deal of flexibility to sectors, including the ability to acquire ACE to cover any unintentional target species or bycatch overages.

In addition, 20 percent of each ACE will be withheld by NMFS for the first 61 days of the fishing year. This measure is to allow the processing of any end-of-year ACE transfers and to assess the need for any ACE reductions due to previous year overages.

For the determination of allocations, the vessel catch history used is referred to as potential sector contribution (PSC). This PSC, once calculated for a permit, is permanent. When the portion of a permit's PSC that is based on landings is calculated, landed weight will be converted to live weight. This ensures that PSC measurements are consistent with sector allocations, which are measured in live weight. It also facilitates consistent evaluation of different products, such as dressed vs. whole fish.

The PSC for each permit is calculated based on that permit's landings history in the NMFS commercial dealer database from FY 1996 through FY 2006. The landings for each stock are summed over the time period and divided by the total landings by permits eligible to join sectors over the same period. Discards are not counted when calculating permit history. This plan for PSC calculation is intended to reflect current participation in the fishery while allowing flexibility for any regulatory changes and their impacts on vessels.

For those permits that committed to the GB Cod Hook Gear Sector or Fixed Gear Sector under Amendment 13, calculation of GB cod PSC will be carried out under the provisions of Amendment 13; that is, PSC will be based on landings of GB cod from FY 1996 to FY 2001. Only those permits that committed to one of these two sectors as of March 1, 2008 will be eligible for this provision. This is intended to prevent those vessels that made investment decisions based on Amendment 13 from being disadvantaged by an altered system of allocation.

Specific attention is also paid to those stocks that are managed under the terms of the U.S./Canada Resource Management Understanding. Fishery components (i.e. individual sectors and vessels in the common pool fishery) will be allowed to continue harvesting in their areas, provided they have available allocation, even if overages by other components result in the overall area quota being exceeded. This measure is intended to prevent the common pool and sector vessels in the U.S./Canada area from adversely impacting one another.

Monitoring and Enforcement Provisions

As suggested above, any ACE overage in a given year will result in a corresponding reduction in ACE for the following year. Additional measures account for the situations where a sector has an overage in one year and one or more vessels leave the sector the following year, or the sector completely disbands following an overage. For the former scenario, any penalties on departing sector members are to be specified in the sector operations plan and contract. For the latter scenario, individual permit holders are held responsible, with each permit responsible for an equal share of the overage, specified in harvest amount if the permit joins a new sector or in DAS if it opts to participate in the open access fishery. These provisions exist to ensure appropriate penalties for any ACE overages.

While end-of-year ACE transfers may be used to account for any overages during the fishing year, it is still considered a crucial responsibility of sectors to halt fishing when the threat of an ACE overage becomes apparent. Thus, repeated ACE overages may be

considered evidence of inadequate sector monitoring or operations plan adherence, and the Council reserves the right to impose penalties in such a case, even if ACE transfers are completed which negate the ACE overage in question.

Enforcement of a sector operations plan is the responsibility of the relevant sector, with the sector itself further subject to NMFS enforcement actions for violations of any regulations pertaining to sectors. If a sector opts to eject a member, it must notify NMFS, and said member will be barred from participating in the groundfish fishery for the remainder of the fishing year.

Sectors may be held jointly liable for violations of operations plan elements pertaining to ACE overages, discard of legal-sized fish, and misreporting of catch.

As mentioned previously, any overage of ACE will result in a corresponding reduction of ACE for the subsequent year. Furthermore, the sector, each vessel, and each operator/owner may be charged jointly and severally for civil penalties and permit sanctions. If a sector exceeds its TAC in more than one fishing year, its share may be permanently reduced or its authorization to operate may be withdrawn.

NMFS will evaluate catch levels at the end of each fishing year using IVR, VMS, and other available information. In addition to this, sector operations plans must include detailed information concerning how landings will be monitored, reported, and enforced in accordance with a number of guidelines. Sectors must:

- Land all legal-sized fish from stocks for which they receive allocation
- Comply with any other rules concerning broad reporting areas established by Amendment 16
- Make weekly reports to NMFS on all landings and discards by sector vessels
- Develop and implement a third-party weighmaster/dockside monitoring system that is satisfactory to NMFS
- List specific ports where members will land fish, including specific exceptions (e.g. for adverse weather or other safety considerations)

The industry is responsible for the development and costs of a program, including an observer program, which satisfies all promulgated rules.

In FY 2010 and FY 2011, sectors must meet all reporting requirements, including any associated with NMFS Observer Program coverage. Furthermore, a dockside monitoring program will be implemented for the verification of landings. The required coverage for this program is set at random dockside monitoring of 50% of trips in each sector for FY 2010, and random dockside monitoring of 20% of trips in each sector for all subsequent years.

In FY 2012 and beyond, an industry-funded observer or at-sea monitor program and the use of electronic at-sea monitoring must be implemented. This industry-funded program does not replace the NMFS Observer Program. Coverage levels for this program must meet the coefficient of variation in the Standardized Bycatch Reporting Methodology and will be set by NMFS. Less than 100% coverage will be required.

The observer/monitor program will allow actual discard rates for sectors to be assessed. This is intended to allow the Council to use these rates, rather than applying assumed discard rates, in evaluating yearly catch by a sector. This measure is meant to both improve management of the stocks and incentivize industry participation in the program.

The Council provides an extensive list of criteria for potential monitoring/reporting service providers and requires that each provider gain approval from NMFS based upon these criteria. Potential providers must demonstrate their ability to adequately meet the needs of the industry based on management measures in place, their lack of any conflicts of interest with industry or other involved groups, and their financial and legal good standing, among other qualities.

In addition to all other standards put in place, each sector must also submit an annual report to NMFS and the Council within 60 days of the end of each fishing year. This

report must extensively cover all fishing activity by the sector, including harvest levels of all species, which vessels fished for regulated groundfish, the number of vessels that fished for other species, the ports where regulated groundfish were landed, and the method used to estimate discards. Vessel-specific information may be left anonymous when it might otherwise violate protection of confidentiality.

Additional Management Measures

Amendment 16 includes language intended to clarify the distinctions and interactions between sector and common pool vessels. As long as a sector does not exceed its hard TAC for a given fishing year, it will not face any reduction in its allocation of TAC in the next year even if other sectors or vessels in the common pool fishery cause an overage of their own TACs. Should stock levels decline, a sector's share will not be changed, provided it has operated within its own TAC limits. Additionally, if stock levels increase and a sector stays within its quota limit while others do not, it will receive a temporary increase in share equal to the amount by which other sectors exceeded their quotas.

There are some management measures for the common pool multispecies fishery that will also apply to vessels in sectors. These measures are:

- Year round closed areas
- Permitting restrictions (such as for vessel upgrades)
- Gear restrictions designed to minimize adverse environmental impacts (such as restrictions on roller gear)
- Reporting requirements (excluding DAS reporting)

There are likewise several measures for the multispecies fishery from which all sector vessels are exempt. These are:

- Trip limits for allocated stocks
- Seasonal closures (excluding rolling closures)
- DAS restrictions
- Requirement for the use of a six and a half inch cod-end when using trawl gear on Georges Bank sectors (a six inch mesh cod-end is required instead)

- Gulf of Maine rolling closures (except for some specifically identified ones)

In addition to the specific reporting requirements laid out for sectors, four broad reporting areas will also be established for all vessels, both in sectors and in the common pool fishery. Vessels must make a declaration of the areas in which they will be fishing on every trip before leaving for said trip. Vessels fishing in multiple areas must make daily catch reports to NMFS. Moreover, all vessels must use VTR serial numbers to identify the area(s) in which they will fish. They must then use the same VTR serial number to link the subsequent sale(s) of fish to the corresponding trip. These provisions are meant to improve the timeliness of catch reporting, due to its great importance in a management scheme based on ACLs and sector TACs.

Under Amendment 16, a vessel may possess both a limited access multispecies permit and a limited access scallop permit simultaneously. This is a reversal of previous policy. For the purposes of calculating multispecies sector PSC, only catch history associated with the limited access multispecies permit will be considered. These provisions are intended to increase industry flexibility in conducting fishing operations.

The implementation of Amendment 16 effectively “freezes” the accumulation of catch history for the groundfish fishery; that is, no component of the fishery will accrue catch history as a result of fishing activity that takes place after adoption of the amendment. This measure is considered highly important for the facilitation of ACE transfers within and between sectors. It is also intended to offset any adverse impacts in the event that newly adopted AMs affect different components of the fishery unequally.

Policy Goals Identified and Relevant Management Measures

While the language of Amendment 16 gives myriad justifications for the measures adopted, a number of broad policy goals can be identified. These goals are to:

- Prevent overfishing
- Maximize the effectiveness of monitoring and reporting
- Foster industry flexibility and cooperation

- Maximize the effectiveness and flexibility of management
- Assure equitable allocation of fishery resources
- Ensure that individual fishery components will not be penalized for the actions of other components
- Build resilience into the fishery to account for uncertainty

The first goal listed, that of preventing overfishing, is perhaps the most immediately obvious, due both to the nature of fishery management in general and many of the specific measures implemented by Amendment 16. These measures include:

- Allocation of hard TACs to sectors
- Allocation of all groundfish stocks
- Extensive liberties for the transfer of ACE within and between sectors
- A system for penalizing ACE overages of one year via ACE reductions in the subsequent year, including potential additional liabilities
- A system for penalizing sectors with multiple years of ACE overages, including possible permanent reduction of share or dissolution of the sector
- Rules for penalizing vessels that leave a sector following an overage by that sector
- The retention of select measures from the common pool fishery for those vessels in sectors

Following naturally from the goal of preventing overfishing is the goal of maximizing the effectiveness of monitoring and reporting systems. This goal is especially important for a management scheme based largely on hard TACs and the potential transfer of ACE at any time during the fishing year. Measures that are intended to directly foster this goal include:

- Extensive requirements for the submission of sector operations plans
- Implementation of four broad reporting areas
- Implementation of a dockside monitoring program
- Implementation of an additional observer program

- Requirements for the submission of annual sector reports

Important to this management program is the cooperation of the industry itself, and the ability of the industry to remain flexible and prosecute the fishery in a profitable manner.

To that end, the following measures were deemed important:

- A large degree of freedom in the formation of sectors
- The ability for a vessel to hold both a multispecies permit and a scallop permit simultaneously
- The potential for sectors without ACE overages to be granted a temporary increase in share when stock levels increase
- Specific exemptions for sector vessels from measures regulating the common pool fishery

In addition to fostering industry flexibility, the flexibility and efficacy of the management program itself is an important consideration. In order to maximize scientific accuracy in management and allow adaptability in the face of uncertainty, the following measures were adopted:

- Implementation of the aforementioned monitor and observer programs
- The withholding of 20% of ACE for the first 61 days of each fishing year

Because the management system adopted by Amendment 16 involves allocations of catch shares to various components of the fishery, establishing a fair and equitable means of distributing these allocations was a crucial element to its success. As such, the following measures strive to ensure such fair distribution of PSC:

- Use of catch history from a period (FY 1996 through FY 2006) intended to both reflect recent fishery participation and account for recent management changes
- Use of live weight measurements in evaluating catch history so as achieve consistency across all fishery components
- Use of Amendment 13 provisions for the evaluation of catch history for those vessels that committed to Amendment 13 sectors

The division of the fishery into a common pool and a sector component, broadly speaking, necessitates provisions to prevent these components from adversely impacting one another. The following measures seek to ensure this goal is met:

- Distinctions between individual sectors and between the sector and common pool components of the fishery, such that overfishing by one component will not affect the ability of other components to harvest their TACs
- Additional specific provisions to achieve the same ends in the U.S./Canada fishing area

Finally, attempts were made to build resiliency into the fishery in order to protect against future uncertainty. The following measure was explicitly identified as existing for this reason, in addition to other justifications:

- Freezing of catch history following adoption of Amendment 16

Naturally, many of the policy measures identified above cannot be restricted exclusively to one goal, and some degree of overlap does occur. The measures are sorted into specific goals for ease of presentation, but it is important to note that some measures may apply to more than one policy goal.

PACIFIC COAST GROUND FISH FISHERY

In the Pacific Fishery Management Council's rationalization effort, the groundfish trawl fishery is divided into three broad sectors: the Shoreside Trawl Sector, the Whiting Mothership Trawl Sector, and the Whiting Catcher Processor Sector. Each of these sectors is allocated quota in one way or another, and restrictions are placed on deliveries by sectors: quota for the shoreside sector may not be delivered to at-sea processors, while quota for the mothership or CP sectors may not be delivered shoreside.

A provision was included, such that fees up to a maximum of three percent of ex-vessel value may be imposed upon the industry to cover program costs. Subsequently, NMFS issued a final rule outlining the adopted calculation method and resultant fees to be assessed for each sector for the 2014 fishing year. The fee percentage for each sector is

to be three percent or the result of the direct program costs divided by the total ex-vessel value multiplied by 100, whichever is lower. Direct program costs are defined as the incremental costs directly related to management, data collection, and enforcement as a result of the rationalization program. This calculation gives a fee percentage of three percent for the shoreside sector, 2.4 percent for the whiting mothership sector, and 1.1 percent for the whiting CP sector (78 Federal Register 238). This ruling has, however, been challenged via legal action, at least as it pertains to the whiting CP sector (W.D.W. 2014).

Shoreside Trawl Sector

The Shoreside Trawl Sector will include both whiting and nonwhiting groundfish trawl vessels delivering to shoreside processors. Vessels using nontrawl gear will also be included in this sector. It will additionally include an allocation for the whiting processors. Allocations will be in the form of IFQs for vessel permits and corresponding quota for processors. Each year, a number of quota pounds will be assigned to each permit or processor based on the amount of quota share held. Additionally, bycatch of Pacific halibut will be managed via the use of individual bycatch quota (IBQ).

Quota Allocation

For whiting, 80 percent of quota will be issued to fishing permits and 20 percent will be issued to processors. For nonwhiting groundfish species, 90 percent of quota will be issued to permits, with the remaining 10 percent reserved by the Council for the purposes of adaptive management.

This provision for adaptive management is intended to address issues surrounding community stability, processor stability, conservation, facilitation of new entrants to the fishery, and any other unintended or unforeseen consequences of implementing the IFQ program. During the first two years of the program, the method to be used in distributing these adaptive management quota pounds in the subsequent three years will be established. Relevant issues identified for consideration include: the decision making and organizational structure, methods for determining community and processor eligibility,

methods for allocations, the division of quota pounds between states, and whether to allow multi-year commitment of quota pounds to a given project.

For whiting processor allocations, landings history will be used based on landings receipts that name the processor in question. Landing history may be reassigned to an entity not listed on a given landing receipt if all parties agree or an agency appeals process is undertaken. This measure is intended to ensure accurate allocations based on processing history.

Additionally, “recent history” is required for a whiting processor to be eligible to receive quota share. This is defined as “1 mt or more of deliveries from whiting trips in each of any two years from 1998 – 2004.” This requirement is not imposed upon permits seeking quota share.

Allocation of quota share to whiting processors will be based on landings history for the period of 1998 – 2004, dropping the two worst years.

The allocation of quota share to permits will be carried out based upon the principles of equal division and catch history. The provision for equal division is intended to address the quota share associated with the history of permits retired in the 2003 LE trawl vessel buyback program. This quota share, except that for incidentally caught overfished species other than canary rockfish, will be equally divided among all qualifying permits.

The remaining quota share will be allocated based on permit catch history. For nonwhiting groundfish species, allocation will be based on the period of 1994 – 2003, dropping the three worst years. For overfished species taken incidentally in this component of the fishery, quota share will be calculated by applying the fleet average bycatch rates to each permit’s depth and area distribution and target species allocations. These fleet average bycatch rates will be estimated using data from the West Coast Observer Program for the period of 2003 – 2006. Each permit’s quota share will be

distributed spatially based on the permit's logbook information for 2003 – 2006, or using fleet wide averages if relevant logbooks are not available.

For whiting, allocation will be based on the period of 1994 – 2003, dropping the two worst years. For bycatch within this component of the fishery, whiting history will be used as a proxy; that is, allocation will be pro rata based on the whiting allocation.

Accumulation limits apply to the amount of quota share that a permit or processor can hold. These limits are further subdivided by area and species / species group. Control limits are also put in place to limit the amount of quota share that an individual may “control” via the direct receiving of quota share plus direct or indirect ownership interest in other parties that receive quota share. These limits are summarized in Appendix A.

There is no grandfather clause to allow accumulation of quota above the aforementioned limits. There is, however, an adjustment period allowed for those whose catch history would otherwise allow them to receive excess quota share. This excess quota will be initially allocated and may be used through year four of the IFQ program. It must, however, be transferred to other eligible parties by the end of year four. Any excess quota share that is not transferred by this time will be revoked without compensation and redistributed to the remainder of eligible quota share holders in proportion to their quota share holdings.

Quota Transfers and Mortality Controls

Quota shares and quota pounds will be transferable and all such transfers must be registered with NMFS. It is required that all quota pounds be transferred to a vessel account each year; this provision is intended to encourage availability of all quota pounds for use by the fleet. There are no penalties specified for a failure to meet this requirement, however. Quota pounds must be transferred in whole pound units.

Any vessel with a surplus of quota pounds at the end of a fishing year may transfer that surplus to the following year, within the constraints of a determined carryover limit. This

limit is set at 10 percent of the vessel's quota pounds for each species in that year. This carryover amount will be subject to reduction in the case of a decline in OY, with the reduction being proportional to the reduction in OY.

Any vessel with a deficit of quota pounds in one year will be able to cover said deficit using quota pounds from the following year, provided that the amount of quota pounds required is within the aforementioned carryover limit and the necessary quota pounds are transferred within 30 days of their issuance.

If a vessel experiences an overage of quota pounds that cannot be or is not covered, it will be prohibited from any fishing that falls within the scope of the IFQ program. This prohibition will remain in place until the vessel can cover the overage, using quota pounds from the following year(s) if necessary. If coverage of the overage is attained outside of the specified time limit, the vessel may still be cited for a program violation. The limited entry permit for any vessel with an outstanding overage may not be sold or transferred until the deficit is covered.

Monitoring and Enforcement Provisions

It is the Council's intent that all catch, including discards, be monitored, documented, and matched against a permit's available quota pounds. This is, of course, of vital importance to such a management system. There will, therefore, be a requirement for at-sea observers at 100 percent coverage. Cameras may also be used to augment this observer program. Additionally, there will be 100 percent shoreside monitoring during off-loading; for the purposes of controlling costs associated with this measure, limited landing hours may be put in place. These provisions represent a substantial increase in monitoring levels for much of the fleet compared to the previous status quo, particularly nonwhiting shoreside vessels.

Discarding of fish is generally allowed; all discards must be covered by available quota pounds. For nonwhiting vessels and whiting vessels sorting at sea, discarding of IBQ species is required, while discarding of IFQ and nongroundfish species is allowed.

Whiting maximized retention vessels are the exception to the general rule, with all discards prohibited.

Various economic data must be submitted by vessels and processors in addition to the monitoring requirements outlined above. Vessels must keep and submit VMS-based electronic logbooks and make landing declaration reports. Processors must make electronic landing reports and production reports.

Bycatch Mitigation

Many of the Council's efforts towards the control of bycatch in the groundfish fishery rely on measures already in place, such as gear restrictions, time and area closures, and effort restrictions, and an emphasis on the potential to expand or modify these existing provisions as need dictates. The development of full retention programs is also outlined as a possibility.

Prohibitions of specific gear types are also outlined for a few cases. These cases include the prohibition of set nets north of 38 degrees N latitude, the prohibition of bottom trawl gear with a footrope larger than 8 inches in diameter shoreward of the 100 fathom depth contour line, and the prohibition of bottom trawl gear with a footrope larger than 19 inches in diameter, dredge gear, and beam trawl gear.

For some overfished species commonly caught in the whiting fishery, initial allocation is carried out for the entire fishery (that is, for the shoreside trawl and the two at-sea sectors combined). This includes darkblotched rockfish and Pacific Ocean perch. The allocation for darkblotched rockfish is to be 9 percent of the total trawl allocation, or 25 mt, whichever is greater. For Pacific Ocean perch, it is to be 17 percent of the total trawl allocation, or 30 mt, whichever is greater. The distribution of these allocations to individual whiting sectors will be done pro rata relative to the sectors' whiting allocations.

An IBQ system to cover the bycatch of Pacific halibut will be established. Halibut IBQ mortality is to be estimated on an individual vessel basis, and this IBQ will be issued to each vessel on the basis of a bycatch rate applied to the target species quota share that vessel receives. Area-specific bycatch rates may be used for this allocation, but the IBQ itself will not be subdivided spatially.

Allocation of Pacific halibut quota is based on the Area 2A total constant exploitation yield (TCEY) for legal sized halibut set by the International Pacific Halibut Commission (IPHC). For 2012 through 2014, 15 percent of the TCEY or 130,000 pounds, whichever is less, will be subtracted from the TCEY to account for expected trawl bycatch mortality. The cap will be decreased to 100,000 pounds beginning in 2015. The bycatch allocation percentage can be adjusted up or down from 15 percent via the biennial specifications and management measures process, but the cap on total poundage can only be altered by an amendment to the fishery management plan.

For determining the trawl bycatch mortality limit, the expected legal sized halibut mortality will be expanded into a round weight, including legal and sublegal sized fish, using the conversion rates established by the IPHC.

After this conversion, 10 mt are subtracted to cover the at-sea whiting sectors (discussed below) and the remainder is issued as IBQ to vessels participating in the shoreside trawl IFQ program.

Whiting Mothership Trawl and Catcher Processor (At-Sea) Sectors

The at-sea whiting fishery is divided into two sectors, one for motherships and their associated trawl vessels and one for CP vessels. Both sectors are managed using voluntary co-op systems.

Allocations and Mortality Controls

Catcher vessel permits must be endorsed for deliveries to motherships (known as a CV(MS) endorsement) if the vessel is to participate in the mothership sector.

Motherships themselves will be issued MS permits. CP permits must likewise be endorsed for participation in the CP sector.

Vessels endorsed for the mothership sector will choose each year to participate in either the co-op or the nonco-op fishery. In addition, any other groundfish trawl permitted vessel may participate in the co-op fishery. Co-ops will be obligated to deliver to specific mothership processors, according to contractual agreements made before the start of each fishing year. A vessel with a mothership endorsement for a given year may not engage in the processing of whiting during that year. Likewise, a mothership that also operates as a CP vessel may not operate as both in the same year.

The minimum number of CV(MS) permits necessary to form a co-op will be set at 20 percent of all CV(MS) permits. Each co-op must draw up a co-op participation agreement for registration with NMFS. This agreement must meet a number of criteria, including requirements for a list of all vessels and permit holders, catch monitoring plans, enforcement and penalty provisions, measures for bycatch mitigation, and the furnishing of annual reports to the Council and NMFS.

In order to qualify for a CV(MS) endorsement, a vessel must have made a total of over 500 mt of whiting deliveries to motherships over the period of 1994 through 2003. For the determination of catch history for each CV(MS) endorsement, the period of 1994 through 2003 will also be used, dropping the two worst years.

For a mothership to qualify for an MS permit, it must have processed at least 1,000 mt of whiting in each of any two years during the period of 1997 through 2003.

These catch history calculations will be used to allocate quota to both the co-op and nonco-op components of the whiting mothership sector.

Limits are placed on the accumulation of CV(MS) permits, catcher vessel usage, and processing: no entity may own CV(MS) permits for which the total allocation exceeds 20

percent, no vessel may catch more than 30 percent of the mothership sector's whiting allocation, and no entity may process more than 45 percent of the mothership sector's whiting allocation.

The allocations received by a co-op each year based on the catch histories of its members may be transferred freely among those members. Additionally, allocations may be transferred from one co-op to another with NMFS approval, as long as all obligations to processors are met. Exceptions may be made to these obligations, however, by mutual agreement between the CV(MS) permit owner and the associated mothership.

For the CP sector, the status quo arrangement of a single co-op will be maintained. To be eligible for a CP endorsement, a permit must have harvested and processed in the whiting CP sector at any time during the period from 1997 through 2003.

There will be no allocation of catch or catch history among permits unless the existing CP co-op fails for any reason. Should this happen, the co-op system will be replaced with an IFQ program; the initial distribution of quota in such a case will be an equal division among all CP endorsed permits.

Monitoring and Enforcement Provisions

The status quo requirement for 100 percent observer coverage for all components of the at-sea whiting fishery will be maintained. The option to use cameras in place of observers for some of this coverage is made available, but this is to be determined on a case-by-case basis, if at all.

There will be a program for the mandatory submission of economic data, including costs, revenue, ownership, and employment information, for all harvesters and processors in the trawl industry. This program will also include both targeted and random audits.

Bycatch Mitigation

The method of allocation for widow rockfish to the at-sea whiting sectors will depend upon the stock status of the species. If the stock is rebuilding, the allocation will be 52 percent of the total trawl allocation. If the stock is considered rebuilt, the allocation will be 10 percent of the total trawl allocation, or 500 mt, whichever is greater. If the stock is overfished at the time of initial allocation but is later declared rebuilt, the latter allocation scheme automatically kicks in at the time of said declaration. The distribution of this allocation to individual sectors will be done pro rata relative to the sectors' whiting allocations.

Measures already in place for the management of Chinook salmon bycatch will be maintained. These include the 11,000 Chinook threshold, the 0.05 rate threshold, and the triggered 100 fathom closure provision.

The method for calculating the amount of Pacific halibut quota available to the groundfish fishery as a whole is discussed above. As described, 10 mt is set aside from the result of this calculation to cover the at-sea whiting fishery.

Policy Goals Identified and Relevant Management Measures

Because of the natural commonality among fishery management plans and their objectives, many of the goals identified in the Northeast Multispecies Fishery Management Plan are apparent in the Pacific Coast Groundfish Fishery Management Plan. Because of this fact, and in order to facilitate comparison, many of the policy goals listed here are identical to those previously described. The addition of goals relating to bycatch management and monopoly prevention is a result of the Pacific Council's great attention to these issues. The resultant list of policy goals includes:

- Prevent overfishing
- Maximize the effectiveness of monitoring and reporting
- Foster industry flexibility and cooperation
- Maximize the effectiveness and flexibility of management
- Assure equitable allocation of fishery resources

- Build resilience into the fishery to account for uncertainty
- Prevent bycatch of sensitive species, especially Chinook salmon and Pacific halibut
- Prevent single entities from accumulating excessive control over quota and harvesting/processing capacity

Again, the prevention of overfishing is of central importance to the fishery management plan. Relevant measures include:

- Use of quota based on hard TACs
- The “recent history” requirement for shoreside whiting processors
- Specific allocations for overfished species
- Prohibition of the selling or transfer of permits with an associated outstanding overage

A number of measures are put in place to maximize the efficacy of monitoring and reporting. These include:

- The requirement for 100 percent observer coverage for all sectors
- The requirement for 100 percent shoreside monitoring for the shoreside trawl sector
- Requirements for the submission of economic data
- Requirements for the submission of annual co-op reports

In the interest of granting the industry sufficient flexibility to make this management scheme feasible, the following provisions are described:

- A great deal of liberty in transferring quota among vessels and co-ops
- The ability to carry a limited amount of surplus quota from one year to the next in the shoreside trawl fishery
- The ability to cover an overage in one year using quota from the subsequent year
- The use of voluntary co-ops in the at-sea whiting fishery

In order to facilitate effective management of the fishery, the following measures are put in place:

- The implementation of the aforementioned monitoring programs
- The implementation of a cost recovery program

The following measures are intended to ensure an equitable allocation of fishery resources:

- Initial allocations based on catch and processing history for the shoreside trawl and whiting mothership sectors
- Provisions for equal distribution of IFQ for the whiting CP sector should an IFQ program be needed

As the Council seeks to maximize the resilience of this system in the face of future changes or needs, the following measure was adopted:

- The 10 percent of shoreside nonwhiting quota set aside for adaptive management purposes

The Pacific Coast Groundfish Fishery Management Plan pays special attention to bycatch of sensitive species. This is in part due to the risk of unintentional catch of Chinook salmon and Pacific halibut. As such, the following specific measures are used:

- Maintenance of several status quo provisions for the bycatch of Chinook salmon in the at-sea whiting fishery
- An IBQ system for bycatch of Pacific halibut for all sectors

The Pacific Council also chose to implement several provisions to prevent excess accumulation of quota or other forms of control over the fishery. These include:

- Detailed quota accumulation limits for the shoreside trawl and at-sea mothership sectors
- Similar limits on harvesting and processing capacity for the same sectors

- The specific omission of any grandfather clause allowing for over-accumulation in the shoreside trawl fishery and the choice to instead use required divestment procedures

GULF OF ALASKA GROUND FISH TRAWL FISHERY

Due to its nature as an ongoing process, the crafting of a comprehensive rationalization program for the Gulf of Alaska groundfish trawl fishery is in a state of constant flux. Numerous iterations of the plan, as well as inputs from affected parties, have been considered. These come in the form of discussion papers prepared by the North Pacific Council (NPFMC 2012 and 2014a), reports from inter-organizational workshops (NPFMC 2014d), comments submitted by members of the public, and other varied materials.

As a result of these efforts, the Council initiated a Final Motion in October of 2014 (NPFMC 2014b) for analysis of several management programs, including maintenance of the status quo, adoption of a stand-alone trawl rationalization program, and adoption of a trawl rationalization program with additional measures for fishing community stability. The main goals and measures outlined in these rationalization programs are addressed below.

Proposed Trawl Bycatch Rationalization Program for the Western Gulf, Central Gulf, and West Yakutat Areas

Alternative 2 outlined in the Council's Final Motion would divide the trawl fishery of the relevant areas into an inshore and an offshore sector, both managed using a system of voluntary co-ops. It is worth noting that the inshore sector is distinct from the State waters fishery, which does not fall under the purview of this program. According to this plan, 100 percent observer coverage would be required for all trawl vessels. Full retention of allocated target species would also be required.

The inshore sector would be comprised of shoreside processors and catcher vessels with a permit endorsed for GOA trawl. This includes CV permits and CP permits that did not

process catch onboard during the qualifying years selected for initial allocation. The offshore sector would be comprised of those vessels affected by the North Pacific Council's Amendment 80, which established allocations of several species and facilitated the formation of harvesting co-ops in the Bering Sea and Aleutian Islands (BSAI) region. Allocations will be based on trawl landings that were processed onboard during the qualifying years.

The species to be allocated will be divided into target and secondary species. There are two options for target species: Option 1 consists of pollock (areas 610, 620, 630, and 640) and Pacific cod (Western Gulf and West Yakutat areas) while Option 2 consists of a number of rockfish species (Western Gulf and Central Gulf areas). These options are not mutually exclusive. Secondary species under consideration include an option for sablefish, an option for several rockfish species, and an option to manage these species with maximum retainable amounts (MRAs) rather than co-op allocations.

The inshore sector would receive allocations of pollock and Pacific cod TACs, while the offshore sector would receive an incidental catch allowance (ICA) for said species and be managed using MRAs. Two options are outlined: Option 1 would revise the GOA pollock apportionments to 30 percent (A), 30 percent (B), 20 percent (C), and 20 percent (D) while Option 2 would modify the pollock fishery to two seasons with a 60 percent / 40 percent split.

For other target species and secondary species, sector allocations would be based on catch history. Three options are listed for the time period to be used: 2008 through 2012, 2007 through 2012, or 2003 through 2012.

Additionally, three options are listed for Western Gulf and West Yakutat rockfish sector allocations: Option 1 would use Amendment 80 sideboards, Option 2 would allocate to the CP sector only and use MRAs for the CV sector, and Option 3 would allocate 2 to 5 percent of Western Gulf rockfish to the CV sector with any unharvested rockfish being reallocated to the CP sector after a certain date.

Two options are given for allocation of Chinook salmon PSC to the CV sector, pro rata relative to pollock trawl landings: Option 1 would maintain the status quo of 25,000 while Option 2 would be a 25 percent reduction to 18,750. Chinook salmon PSC allocated to the CV and CP sectors pro rata relative to non-pollock trawl landings are based on Amendment 97.

Three options are given for Pacific halibut PSC, to be allocated to the CV and CP sectors pro rata relative to trawl landings: Option 1 would maintain the status quo of 1,515 with a 15 percent reduction, Option 2 would be 1,364 with a 10 percent reduction phased in over two years, and Option 3 would be 1,288 with a 15 percent reduction phased in over three years.

Additionally, three options are listed for the time period to be used in determining Pacific halibut PSC apportionment between the CV and CP sectors. These periods are the same as those listed above for allocations of specific target and secondary species (2008 through 2012, 2007 through 2012, and 2003 through 2012).

There is also a provision for the transfer of any Rockfish Program PSC that would roll over for use in other fisheries, such that it may be transferred to GOA rationalization program co-ops.

For the voluntary inshore co-ops, an option is included to grant each processor control over a certain percentage of annual PSC within a co-op. The percentage could be anywhere from 10 to 40 percent of PSC. If this option is adopted, a provision is included such that this PSC would be unavailable for use by any vessel owned by the processor (defined as a vessel with more than 10 percent ownership by a processor).

Participants in the inshore sector would be permitted to join a co-op or fish in a limited-access fishery with sector-level, non-transferable allocations of target species and PSC.

For the first two years of the program (or optionally for the first two years of a harvester's participation in a co-op), co-op formation would be based on the historical landings of the harvester to a processor. There are two options for the time period to be used: Option 1 would be the same years used for target species allocations while Option 2 would be the period from 2011 through 2012, or the two most recent qualifying years that the harvester fished.

For the formation of such an inshore co-op, a contract must be drawn up and signed by the processor and a certain percentage of license holders eligible for the co-op. The three options given for this minimum percentage are: 33 percent, 51 percent, and 80 percent. Additionally, an option is included to require the signature of the community in which the processor is located. A license with no qualifying landings would be permitted to join a co-op, but it would not count towards the formation threshold. An option is also included that would allow a processor to be in more than one co-op.

The co-op contract must include details on a number of specific issues, including co-op rules and bylaws, an annual fishing plan, monitoring and enforcement strategies, and provisions whereby a harvester or processor may exit the co-op after the initial two-year period. In addition, each co-op must submit an annual report to NMFS and the Council.

Each co-op shall internally manage its allocations. Inter-co-op transfers of quota may be arranged, and post-delivery transfers of annual allocations will also be permitted. All such post-delivery transfers must be completed by December 31st.

As with the inshore sector, participants in the CP sector may choose to join a co-op or operate in a limited-access fishery. Two options are listed for minimum membership necessary to form a co-op: Option 1 would be at least 2 separate entities (using the 10 percent individual and collective rule) while Option 2 would be a specified minimum number of eligible LLP licenses (optionally, from 2 to 4) with associated catch history.

The contract for a CP sector co-op must include the same elements as those required for inshore co-op contracts, the co-op must file similar annual reports, and transfers of allocations are permitted, including post-delivery transfers, with the same stipulations as affect the inshore sector.

In addition to transfers within a sector, annual CP co-op allocations may be transferred to inshore co-ops. Inshore co-op allocations may not, however, be transferred to a CP co-op. In the long term, licenses are transferable and target species allocations may be severed from them. PSC allocations may not be permanently severed. An option is, however, given to prohibit such sales and severances for CV licenses in the first two years of the program.

A provision is included to prevent accumulation of allocated targeted species CP co-op quota. Two options are given for the limit on quota ownership by a single person: Option 1 would be 30 percent while Option 2 would be 40 percent.

A number of measures are put forward to govern the inshore sector in the interest of fishery-dependent community stability. These include various options for limiting consolidation in the fishery. Option 1 is a percentage limit on individual target species CV co-op quota for any one person, with a grandfather clause for harvesters that initially exceed the chosen limit. The possible limits are 3 percent, 5 percent, and 7 percent. Option 2 is a percentage limit on the amount of individual target species quota that can be harvested by a single vessel, with possible limits of 3 percent, 10 percent, and 15 percent. Option 3 is a percentage limit on the amount of individual target species that a single processor may receive or process, likewise with a grandfather clause. The possible limits are 10 percent, 20 percent, and 30 percent.

In addition to these accumulation limits, target species quota would be regionalized (Western Gulf or Central Gulf / West Yakutat), i.e. it must be landed in the designated region based on historical delivery patterns. Three options are given: Option 1 would use the time period used for target species allocations, Option 2 would use the time period of

2011 through 2012, and Option 3 would require that quota historically landed in Kodiak be given a port of landing requirement to be delivered to Kodiak, with other quota being regionalized.

There is also an active participation requirement for the purchase of a GOA trawl CV license or catch history. Two options are given: Option 1 would require either a certain minimum percentage of ownership of a trawl vessel (optionally from 20 to 30 percent) or participation as a captain or crewmember in the GOA groundfish trawl fishery for 150 days for a certain minimum number of fishing trips (optionally 1, 2, or 4) in the most recent two years. Option 2 would allow communities to be exempt from the specifications listed in Option 1.

A trawl CV license that targets Pacific cod may be fished with pot gear without the need for a pot endorsement. PSC taken with pot gear will not accrue to a PSC limit or co-op PSC allocation.

For the CV and CP limited-access (that is, non-co-op) fisheries, PSC will be apportioned pro rata relative to groundfish catch histories with a reduction of a certain percentage. The options for this reduction are 10 percent, 20 percent, and 30 percent.

Most sideboards that currently apply to the GOA will be removed for species allocated under this rationalization program. These sideboards entail various limits initially put in place to rein in encroachment of vessels from one fishery into others, such as vessels under the American Fisheries Act (AFA) and Gulf of Alaska Rockfish Program.

A cost recovery program would also be implemented, with fees up to a maximum of 3 percent of the ex-vessel value from landings of species allocated under the rationalization program. Up to 25 percent of these fees may be put towards a loan program to facilitate new entrants to the fishery, the structure of which is yet to be defined.

Proposed Trawl Bycatch Rationalization Program with Additional Community/Resilience Measures

Alternative 3 listed in the Council's Final Motion would effectively implement the same program outlined in Alternative 2, with additional measures in place to bolster community stability and/or fishery resilience in general. There are two options listed for these additional measures; the two are mutually exclusive.

Option 1: Community Fishing Associations (CFAs)

This option lists two suboptions for the creation of a CFA system for the CV sector under the rationalization program. Option 1 would create one CFA for the Gulf of Alaska while Option 2 would create two CFAs, one for the Western Gulf area and one for the Central Gulf area.

The CFA system would receive an allocation of 5 to 15 percent of quota for all species allocated to CVs, to be determined if this alternative is pursued further.

To be eligible for participation in the CFA, a community must be located in the Western Gulf, Central Gulf, or West Yakutat area. It must furthermore consist of residents who conduct commercial fishing, processing, or other fishery-support businesses that have a high likelihood of being impacted by the adoption of a rationalization program. These criteria are not defined further at this time.

The CFA will be required to provide a community sustainability plan which includes the following elements:

- Description of a board of directors and associated governance structure
- Methodology for the allocation of quota
- Goals and objectives, along with strategies for achieving them
- Strategies for meeting the specific goals of active community participation and promoting new entry and inter-generational transfer of quota
- Description of how the CFA will address the social and economic needs of communities

The CFA will also be required to provide an annual report to the Council and communities.

Several clarifications are given concerning quota allocated to the CFA system. The CFA will operate under the co-op system of the main rationalization program, and any CFA quota leased must be accessed through a co-op. The CFA quota will be subject to all of the rules and regulations that govern other quota under the program. Notably, however, CFA quota cannot be sold. There is also an option given to exempt CFA quota from port of landing requirements, should these be adopted.

The CFA option of the Final Motion also lists some explicit goals that it is meant to address. These include:

- Provide for the sustained participation of fishing communities
- Minimize adverse economic impacts on said communities
- Assist entry-level and small vessel owner-operators, captains, and crew, as well as fishing communities

Option 2: Adaptive Management Program

This option would set aside 5 to 15 percent of quota for all species allocated to CVs for use by the Council, for the purposes of adaptive management. The exact percentage will be determined if the Council chooses to pursue this option.

Should this option be adopted, the Council will develop a method for the allocation of this adaptive management quota. Such a method will include a definition of the criteria for eligibility, an application process, and a regulatory process for the actual allocation. This will also include a methodology for selecting recipients of quota. There will be no limit on the amount of quota that could be allocated to a given entity (up to the set-aside amount), and any unallocated quota will pass through to the annual co-op allocations. Any entity that receives adaptive management quota will be required to submit an annual report detailing its use and associated outcomes.

Again, a number of goals for this program are explicitly outlined. These goals are organized as two suboptions, which are not mutually exclusive. The first is the same set of goals as listed for a CFA program. The second lists the following additional goals:

- Community stability
- Processor stability
- Captain and crew entry and advancement
- Conservation
- To address any unforeseen outcomes of the rationalization program

It is worth noting that community-related goals seem to greatly outweigh conservation concerns in this list.

Fishery-Dependent Community Concerns

It is worth noting, in light of the extensive options given to address community stability and related issues, the great concern over the potential social and economic impacts of a rationalization program on Gulf of Alaska fishing communities. A good deal of public comment on the proposed program has centered on this issue, with commentary both in favor and opposed to the use of mechanisms such as CFAs.

Additionally, the North Pacific Council held a workshop on CFAs in 2014, with participants representing both the New England and Pacific Coast fisheries. This workshop facilitated the discussion of concerns and strategies related to the use of CFAs, as well as a comparison of the different regions in question (NPFMC 2014d).

Some major concerns that were explored included the restructuring of the fishery and the price of quota (NPFMC 2014d). It was noted that ITQ programs often favor economies of scale, and this fact fuels concerns that groundfish landings may be concentrated in a few large operations. Some participants at the workshop also expect that the market price for Gulf of Alaska quota will be significantly higher than is seen in other regions, further excluding low-volume fisheries operations (NPFMC 2014d).

In contrast to these concerns, however, it was noted that there is already a relatively small number of port communities that play a role in the Gulf of Alaska groundfish fishery (NPFMC 2014d). That is to say, there are not many low-volume ports with a tenuous grasp on participation in the fishery. Because of this fact, some are less concerned with the potential for consolidation. Additionally, there is the simple fact that any preemptive measures must be based on conjecture; this fact might discourage managers from taking far-reaching actions early in the implementation process.

Policy Goals Identified and Relevant Management Measures

Once again, analysis of the proposed program reveals many of the same goals as are evident in the Northeast Multispecies FMP and the Pacific Coast Groundfish FMP. This comes as no surprise. Scrutiny of the proposed rationalization program does, however, bring to light a particular emphasis on some of these goals. The most obviously central issues facing the North Pacific Council seem to be those of reducing bycatch and ensuring community stability and participation. As mentioned above, the question of community impacts has featured prominently in discussions of any proposed change in the management scheme. Likewise, the problem of bycatch has been key and is indeed one of the main driving forces behind the current move towards rationalization.

In light of the aforementioned concerns, the following policy goals are identified in the proposed rationalization program:

- Prevent overfishing
- Maximize the effectiveness of monitoring and reporting
- Foster industry flexibility and cooperation
- Maximize the effectiveness and flexibility of management
- Assure equitable allocation of fishery resources
- Prevent bycatch of sensitive species, especially Chinook salmon and Pacific halibut
- Ensure continued fishing community stability and participation

- Prevent single entities from accumulating excessive control over quota and harvesting/processing capacity

As with all management programs, one of the central goals must be the prevention of overfishing. The following measures address this goal more or less directly:

- The arrangement of the fishery into inshore and offshore sectors under a system of quota-based management
- The various options for defining target and secondary species, as well as the associated option to use MRAs for the management of secondary species
- The two options listed for pollock quota seasonal apportionments

Effective monitoring and reporting is crucial to any management plan, and the following measures are intended to address this fact:

- The requirement for 100 percent observer coverage for all trawl vessels
- The requirement that all co-ops submit annual reports
- Under the CFA alternative, the requirement that a CFA must provide annual reports
- Under the adaptive management program alternative, the requirement that any entity receiving adaptive management quota submit an associated annual report

The goal of facilitating industry flexibility, participation, and cooperation is an important one for managers to consider. The following measures seek to address this issue:

- The allowance for unused Rockfish Program PSC to roll over to co-ops
- A great deal of liberty in transferring quota between co-ops
- The ability for co-ops to carry out post-delivery transfers
- The ability to transfer quota from a CP co-op to a CV co-op
- The ability for a CV trawl license that targets cod to use pot gear without a pot endorsement, and the associated provision that PSC taken with pot gear will not count towards a PSC limit or allocation
- Under the adaptive management alternative, the provision that any unallocated adaptive management quota would pass through to the annual co-op allocations

In the interest of making management effective and practical, the following measures are put forward:

- The aforementioned monitoring provisions, such as the observer program and required reporting
- The cost recovery program that is to be implemented should rationalization move forward
- Arguably, the entire alternative for the establishment of an adaptive management program could be seen as furthering this goal

The equitable allocation of fishery resources is an issue of great importance, and as such a number of measures are intended to ensure fairness in the implementation of a rationalization program. These include:

- Three separate options for the time period to use for target and secondary species allocations
- Three separate options for the time period to use for Western Gulf and West Yakutat area rockfish sector allocations
- Arguably, the measures put forward to prevent excess accumulation also apply to the idea of fairness in the distribution of fishery resources

Bycatch being a problem of central concern in the Gulf of Alaska in recent years, a number of the measures outlined in this program are meant to reduce its levels in the fishery. These include:

- Two options for Chinook salmon PSC allocations to the CV sector for pollock trawl landings, one of which being maintenance of the status quo and one being a 25 percent reduction
- Three options for Pacific halibut PSC allocations to both sectors, one being maintenance of the status quo and two being reductions of different amounts
- Three options for the time period to use for apportionment of Pacific halibut PSC between the CV and CP sectors
- Prohibition on the permanent severance of PSC from a license

- The ability, described above, for a CV trawl license that targets Pacific cod to use pot gear without a pot endorsement, is also meant to alleviate bycatch issues
- The associated provision that PSC taken with pot gear will not count towards a PSC limit or allocation is also meant to alleviate bycatch issues
- The provision that the limited access components of the fishery will be apportioned PSC with a specified percentage reduction, for which three options are given

As is true of bycatch prevention, the issue of fishing community stability and participation has become extremely important during the process of rationalization (NPFMC 2014a, 2014b, and 2014d). Many of the provisions listed in the proposed program, as well as much of Alternative 3 described above, exist to address the concerns surrounding this issue. These include:

- The option to give a processor control of 10 to 40 percent of the PSC allocated to an inshore co-op
- The requirement that co-op formation be guided by historical landing patterns, with two options for the time period to use
- The option to require the signature of the community in which a processor is located for the formation of an inshore co-op
- The option for a processor to be in more than one co-op
- The option to prevent the sale of and target species severances from CV licenses in the first two years of the program
- The regionalization of target species quota based on historical landing patterns, with two options for the time period to use and an additional option for a port of landing requirement for Kodiak
- The requirement for active participation in order to be eligible for a CV license, with an option to exempt communities from said requirement
- The option to put up to 25 percent of the fees from the aforementioned cost recovery program towards a loan program to facilitate new entrants to the fishery
- Essentially the entire CFA option under Alternative 3
- Arguably, the adaptive management option under Alternative 3

- Arguably, the measures intended to prevent monopolization of fishery elements

Finally, a number of measures are included with the intention of preventing excessive accumulation of quota or other forms of control over the fishery. As mentioned above, these measures also serve the goals of fairness and community stability. They include:

- Two options for a limit on the percentage of CP quota that a single entity may own
- Three options for a limit on the percentage of individual target species CV quota that a single entity may own, with a grandfather clause
- Three options for a limit on the percentage of individual target species CV quota that may be harvested by a single vessel
- Three options for a limit on the percentage of individual target species CV quota that may be received or processed by a single processor, with a grandfather clause