

**Community Supported Fisheries: Establishing New Markets
in a Limited Resource Industry**

a Thesis

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Abstract

Current conditions in the fishing industry are threatening fishing livelihoods and the communities that rely on them. The overfishing that has reduced fish stocks and the regulations enacted to better conserve what fish stocks remain have made it difficult for small fishing operations to maintain fishing livelihoods. Small fishing operations are further disadvantaged by concentration in the industry which makes it difficult to remain competitive in the traditional market place dominated by large, industrial fishing operations.

In response to these conditions, alternative markets called Community Supported Fisheries, have emerged as a way of maintaining fishing livelihoods. Although it is still early in their development, Community Supported Fisheries (CSFs) hold much potential. Case studies on three New England CSFs indicate that they may be able to provide local economic benefits, such as paying fishermen a better price per pound for their fish and supporting the local economy through partnerships. CSFs may also be able to provide conservation benefits such as reducing fishing pressure on overfished species by creating a stronger market for underutilized species. Collaboration and strong monitoring and evaluation plans are needed to help CSFs become a viable alternative market that supports small fishing operations and local fishing communities.

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CHAPTER 1

INTRODUCTION

In the last 150 years fishing has expanded from an industry composed of traditional, small producers, to an industry dominated by large industrial fishing fleets. This shift has had many effects that may be considered positive. For example, industrial fishing in the U.S. has allowed consumers to benefit from lower prices due to economies of scale, and it has improved consumer access to fish products.

On the other hand, this shift has also had negative effects on fisheries' resources and fishing communities. Industrial fishing has been criticized for causing over-exploitation of fishery resources and consolidating economic gain. Advanced fishing technology has allowed the fishing industry to catch more of the world's fish stocks in less time, and with less effort, leading to overfishing of many of the world's fish stocks. Overfishing has necessitated intensive fisheries management policies that polarize marine fisheries stakeholders, create elaborate and complex fishing regulations that are costly and difficult to comply with, and cause volatility in the marketplace. These regulations often favor large commercial fishing fleets and processing businesses, making it difficult for small, local fishermen to maintain their fishing livelihoods.

In the midst of the tumultuous state of the world's fisheries, alternative markets for fisheries have begun to emerge. One of these alternative markets,

called Community Supported Fisheries (CSFs), is characterized by consumers and fishermen forming partnerships in which consumers pre-purchase shares of a fisherman's catch. These CSFs are modeled on Community Supported Agriculture, or CSAs, which began in the 1970s in response to concerns about the safety and health of industrial food production. While literature on CSAs can provide some guidance and support for CSFs, fishing is vastly different than producing and marketing food through farming. For example, whereas farming involves crops that are cultivated months prior to harvest and then bringing them to market, fish is harvested from wild stocks and fresh fish is often brought to market the same day. This has important implications for how the community supported market model operates in the fishing industry. A new body of research specific to community supported markets for fisheries is crucial to their development.

The research presented in this paper will contribute to the field of study on CSFs by producing case studies on three CSFs operating in New England, and providing an analysis of these CSFs in the context of the many challenges the fishing industry faces. An extensive literature review on the state of the world's fisheries provides the context in which CSFs are operating. The case studies include primary data collected from a questionnaire and a brief interview. The written questionnaire provides basic operational data for each CSF, including the types of shares offered, the share prices, the species offered in shares, and how they distribute their shares. The interview provides information on the primary

goals for each CSF, and what motivates fishermen to participate in a CSF. These data are presented for each individual CSF, and then discussed collectively. The potential for CSFs to achieve additional social, environmental or economic benefits is also analyzed in the context of the current state of the world's fisheries. This analysis along with the discussion on CSF data results is used to generate suggestions for next steps that CSFs can take to develop the market.

CHAPTER 2

EXAMINING THE STATE OF THE WORLD'S FISHERIES

Introduction

In the early 1900s agriculture was industrialized, increasing agricultural production and making it more efficient (Mazoyer & Roudart, 2006). Fisheries were also industrialized in the 1900s, but aquaculture, or farming of fish, didn't become a significant source of production until the 1970s.

Aquaculture is an increasingly important means of fisheries production, and the Food and Agriculture Organization (FAO) expects that aquaculture will outpace production from wild capture fisheries in the year 2012 (FAO Fisheries and Aquaculture Department, 2010). However, growth in fisheries production through aquaculture has mostly been from production of freshwater species of fish (see Table 1). Wild fish stocks remain the primary resource for marine fisheries production (see Figure 1).

Industrialization of the fishing industry, along with an increase in demand has exerted unsustainable fishing pressure on wild marine fish stocks, and many have been overfished. This has led to a complex regulatory and market structure that makes it difficult to maintain a fishing livelihood.

Table 1
World Fisheries Production in Thousands of Tons

Capture Production	1950	2009	Growth
Marine Fish	14,087	65,263	51,176
Freshwater Fish	1,745	8,907	7,162
Crustaceans	713	5,878	5,165
Molluscs	1,425	6,560	5,135
Diadromous Fish	711	1,906	1,195
Miscellaneous	19	405	386
Plant	521	905	384
Total Capture	19,221	89,824	70,603
Aquaculture Production	1950	2009	Growth
Freshwater Fish	251	30,635	30,384
Plant	35	17,343	17,308
Molluscs	281	13,527	13,246
Crustaceans	2	5,305	5,303
Diadromous Fish	67	3,533	3,466
Marine Fish	3	1,949	1,946
Miscellaneous	0	731	731
Total Aquaculture	639	73,023	72,384

Source: Data adapted from FAO's Fishery Statistical Collection. FAO, 2012.

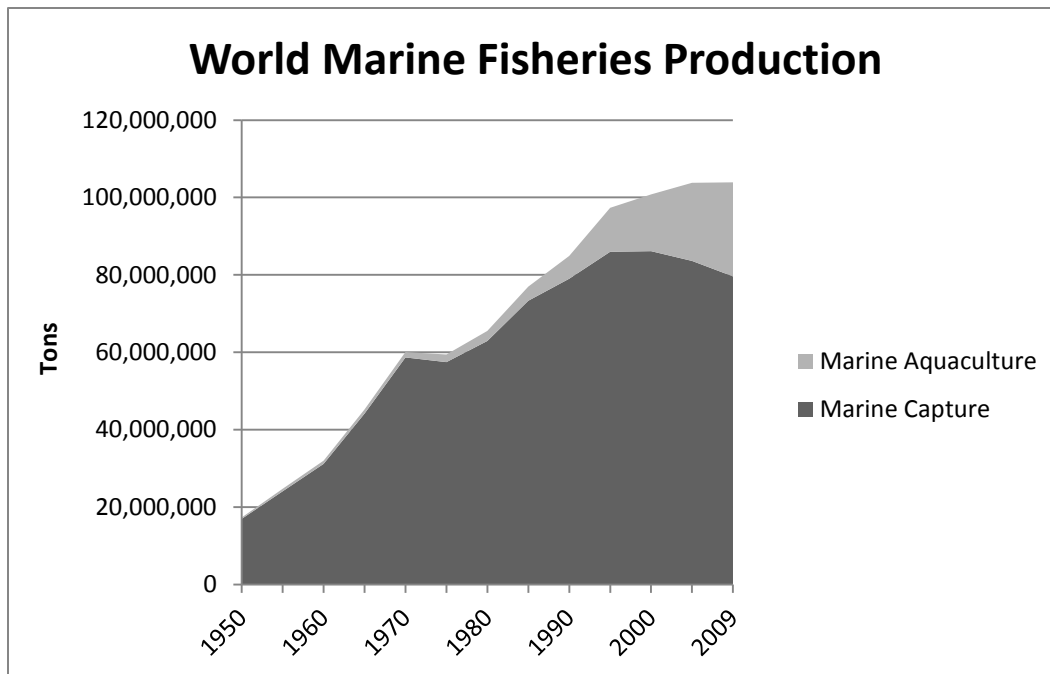


Figure 1. World marine fisheries production from 1950 to 2009, including marine fish, crustaceans, molluscs and diadromous fish.

Source: Data was collected from the FAO Fishery Statistical Collection. FAO, 2012.

Fisheries Definition

Defining a fishery is a bit like taxonomy. The hierarchy starts with broad categories, and can become more specific based on the variables of the fishing activity. In broad terms a fishery is defined as “the sum of all fishing activity on a given resource” (FAO, 1997). Although they are called fisheries, the “given resource” can be any aquatic organism, from fish, to scallops and other shellfish, or seaweed.

At the most basic level, fisheries can be described as either freshwater fisheries or marine fisheries. Lines are also drawn along production methods, separating fisheries into capture or aquaculture. Capture fisheries can also be

more precisely defined in terms of the target species being fished, the type of gear used to catch them, and the geographic area in which they are caught (Smith, 2012). For example, there is a North Atlantic shrimp trawl fishery as well as a Gulf of Mexico shrimp trawl fishery, the North Pacific longline halibut fishery, and the Atlantic Menhaden purse seine fishery.

The FAO also classifies fisheries as one of two categories: industrial or small scale/artisanal. This relates to the size and complexity of the equipment used to fish, and ownership of the fishing operation. *Industrial fisheries* are defined by the FAO as those that require large capital investments and are owned by large commercial companies. The vessels are equipped with mechanized gear and advanced technologies. This allows them to more efficiently locate and harvest fish, and to achieve a high catch-to-effort ratio (Smith, 2012). Industrial fisheries are able to fish year round in offshore waters¹ and can make multi-day trips, docking and marketing their catch in ports all over the world (Squires, 1987).

Small scale and artisanal fisheries are defined by the FAO as those that require relatively little capital investment and are individually or family owned. This type of fishery typically harvests fish from smaller vessels that are less than 24 meters. The vessels use minimal mechanization or advanced technology and are more labor intensive (Smith, 2012). Small scale and artisanal fisheries

¹ Offshore waters are defined as those that are more than 200 miles from the coast.

typically make day trips within inshore waters, and trips can be cut short by unfavorable weather (Squires, 1987).

The vast majority of the world's fisheries are considered to be small scale or artisanal (FAO Fisheries and Aquaculture Department, 2010). Approximately 86% of the world's motorized vessels are less than 12 meters long, and these small vessels represent the majority of the fishing fleet in every country. Less than two percent of the world's motorized vessels are more than 24 meters and thus considered to be industrial. In North America the share of industrialized vessels represents a greater, but still very small percent of its national fleet, at around four percent² (FAO Fisheries and Aquaculture Department, 2010).

It is important to point out that although they are not classified as "industrial" fisheries, even small vessels, especially in developed countries like the United States, engage in some level of industrialization, often by using some mechanization or advanced technologies that allow small vessels to be more efficient in catching fish. For the purpose of describing the changes the fishing

² FAO provided this figure based on direct reporting from individual countries in 2009, however they did not provide the raw data or the source of the data. Most estimates of the size of the U.S. fishing fleet are derived from the United States Coast Guard, which estimated the U.S. fleet at 78,903 in 2008. This would mean that the number of vessels greater than 24 meters is around 3,196. However the USCG's data have many known reporting errors. Individual vessels are registered by state and then reported to the USCG, however each state registers vessels in different ways and some states have not provided reports.

industry has experienced in the last 100 years, the term “industrialization” as it relates to fisheries will refer to the advanced technologies used on fishing vessels, regardless of the size of the vessel, as well as the advanced technologies used for processing and transporting fish once they have been landed.

Industrialization and Overfishing

Up until the turn of the 20th century, the New England fishing fleet was characterized by schooners that were powered only by wind, and used only baited long lines to catch fish. Catches were limited simply by the time it took to sail out and locate fish stocks, manually bait lines, haul them back in, unload the catch, and re-set the fishing lines. The lack of refrigeration also meant that most of the catch was salted for preservation while at sea, limiting how the catch could be sold and consumed (Murawski, 2005).

The industrialization of wild fisheries at the turn of the 20th century introduced steel hulled steam powered trawlers that could travel further in less time (Santos, 2002). They utilized large nets that could be mechanically set and scooped up everything in their path. Advances in refrigeration and processing also opened up new markets, both in terms of the variety of fish products available and wider geographic distribution.

The industrialization of fishing has had some positive impacts in the fishing industry. Advanced technologies in both capture and aquaculture fisheries have increased the overall supply of fish, growing total world fisheries

production from just under 20 million tons in 1950 to over 162 million tons in 2010 (see Figure 2). While aquaculture accounts for the majority of growth in the world's fish supply, wild capture has remained the primary source of production for marine fisheries, and still accounts for about half of all fisheries production (FAO, 2012) (see Figure 3). In 1950 world marine capture fisheries accounted for 16 million tons, translating to 85% of total fisheries production. By 2008 marine capture fisheries production reached 78 million tons and still accounted for about 50% of all fisheries production (see Figure 3).

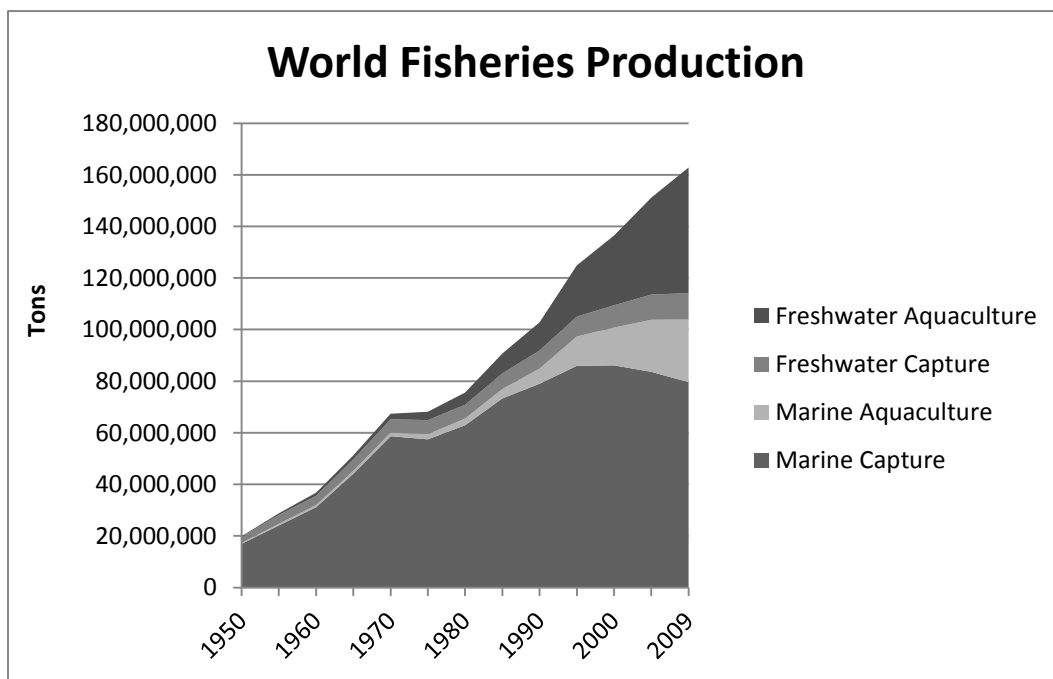


Figure 2. World fisheries production of freshwater and marine species from wild capture and aquaculture. Source: Data was adapted from the FAO Fishery Statistical Collection. FAO,2012.

U.S. marine capture fisheries have also followed this trend, increasing from 2.5 million tons in 1950 to its peak in 1987 at 5.6 million tons. Since 1987 production has decreased slightly reaching 4.3 million tons in 2010 (FAO, 2012) (see Figure 4).

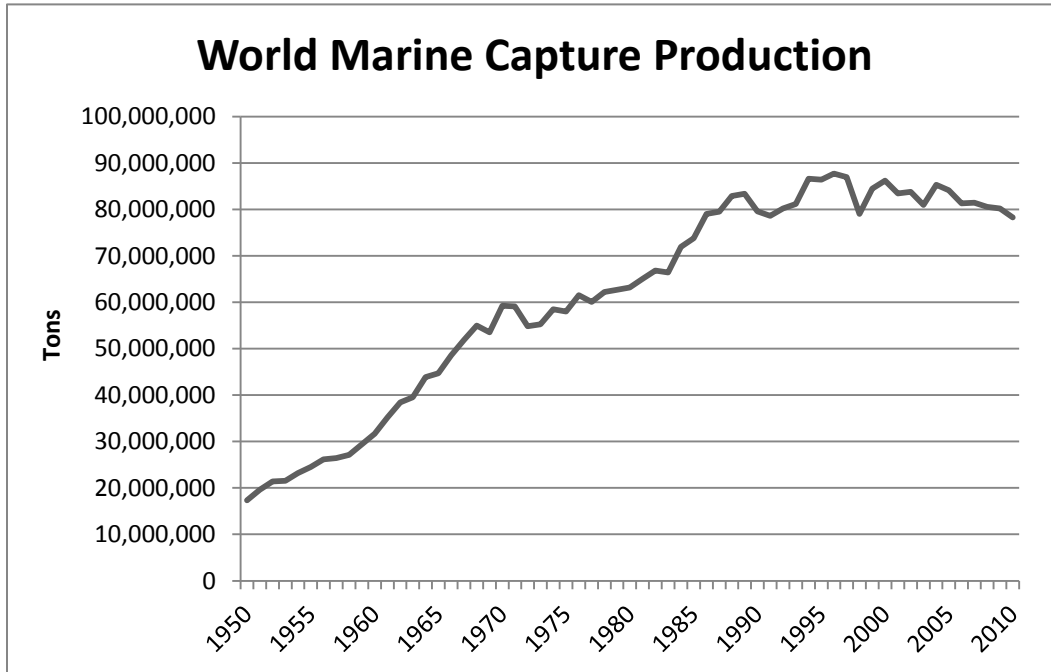


Figure 3. Growth in world marine capture fisheries production from 1950 to 2010.
 Source: Data was adapted from the FAO Fishery Statistical Collection. FAO,2012.

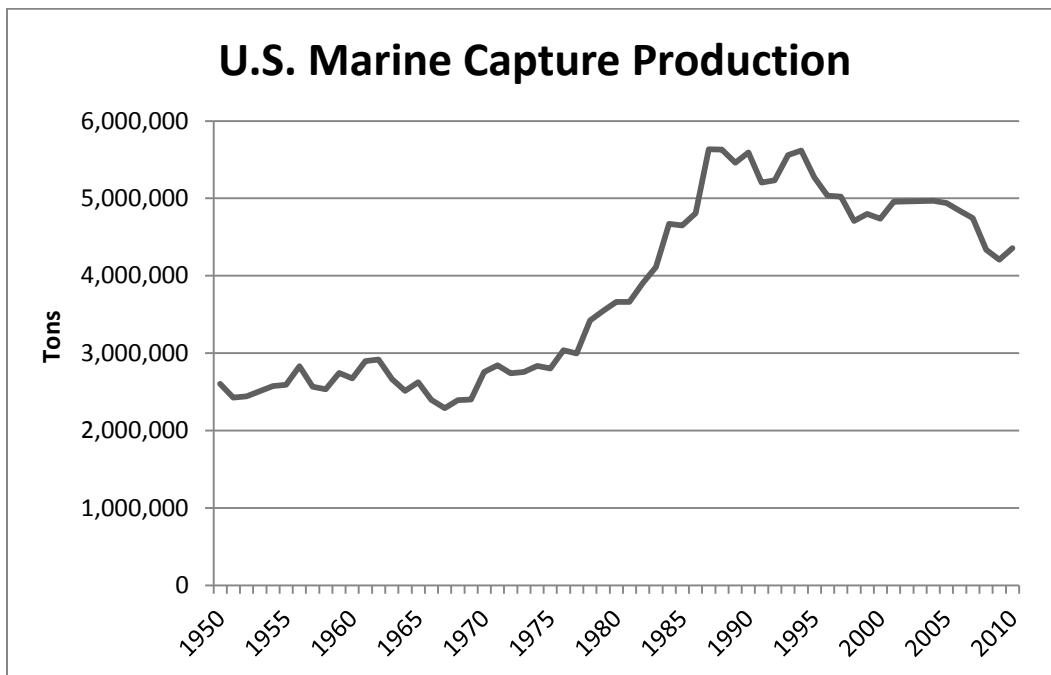


Figure 4. Growth in U.S. marine capture fisheries production from 1950 to 2010.
 Source: Data was adapted from the FAO Fishery Statistical Collection. FAO,2012.

As production has increased, fish has also become an increasingly important part of human nutrition. Approximately one billion people worldwide rely on fish for their primary source of animal protein. In 2007 fish accounted for up to 16.5 percent of the world population's intake of animal proteins (World Health Organization, 2012). These numbers likely do not account for those who fish for sustenance, as those catches are often not reported (FAO Fisheries and Aquaculture Department, 2010). Advanced processing of fish has also reduced waste from spoilage. The use of mechanical separation of fish parts has allowed for their use in secondary fisheries products such as fish meal and fish oil (Bechtel, 2003).

Increased production has also contributed to national economies, producing a great amount of wealth. In the U.S., growth in the value of fisheries has increased dramatically since the 1970s, increasing from just under \$680 million in the 1970s³ to over \$4 billion by 2010⁴ (National Marine Fisheries Service, 2010; FAO , 2010). The U.S. is now one of the top five exporters in the world in terms of value (FAO , 2010).

Diversification of the industry has also provided job growth in fishery-related jobs. In 1980 it was estimated that 16.7 million people worldwide were directly employed in capture fisheries or aquaculture. By 2008 the number of

³ This value has been adjusted for inflation using the Consumer Price Index Inflation Calculator from the Bureau of Labor Statistics.

⁴ This value excludes "non-edible products".

people directly employed had increased 167% to 44.9 million people. It is also estimated that for every one person employed directly in fisheries or aquaculture, three jobs in secondary activities are created, bringing the estimated total number of jobs in the fishing industry to 180 million (FAO Fisheries and Aquaculture Department, 2010).

However, industrialization in the fishing industry has also had negative impacts. The wealth created from industrialized fisheries tends to be concentrated at the top of the industry. Although jobs are created in secondary industries, most of these jobs tend to pay low wages and both fishermen and fishery workers generally receive little of the wealth created by fisheries activity. The 2010 annual median wage for fishermen in the U.S. was \$25,590 (Bureau of Labor Statistics, 2010). The national median wage in 2010 was only slightly higher at \$26,363, however the national average wage in 2010 was nearly \$40,000 (Khim, 2011). The jobs created on fishing vessels and in processing facilities can also have poor working conditions. Even with mechanized equipment the work is strenuous and becomes dangerous when environmental conditions are poor; i.e. freezing temperatures, storms and fog. Industrialization has also required greater capital investments to remain competitive in the market, limiting participation to those who are able to make the investment. Those able to make the investment are often companies with access to large amounts of capital, rather than independent fishermen.

The increased supply that industrialized fisheries have produced does not necessarily translate to better access or improved nutrition for those who need it most. While developing countries have increased their share of world fish consumption from 45% in 1973 to 69% in 1997, most of this increase is in China where there is a strong, culturally driven appetite for fish and a growing middle class that is able to afford it. The price of fish has also increased relative to other food items due to increased demand, making fresh fish products a luxury item (Delgado et al., 2003)

While waste in the processing of fishery products has decreased, waste in the harvesting has increased through discard of *bycatch*– non-target species that the fisherman did not want to catch, either because there is no market for them, the market value is low, or regulations prohibit the landing of them (Davis, 2002). Bycatch species are often immediately thrown back overboard, but mortality can be high.

Of all the negative impacts associated with industrialized fishing, the most predominant, threatening and undeniable one is the overfishing of fish stocks. Demand for fish continues to increase, and while aquaculture provides an increasing percentage of the total fish supply, unsustainable fishing pressure on wild-capture marine resources remains a critical problem. Since the industrialization of fisheries, many wild fish stocks have been fished to the point of collapse.

In 2008, 28% of the world's fish stocks monitored by the FAO were overexploited, three percent were depleted, and one percent was recovering. About half of the stocks were already fully exploited with current catches at or close to their maximum sustainable yield. Only 15% were either moderately exploited or underexploited, the lowest percentage this group has achieved since the 1970s (FAO Fisheries and Aquaculture Department, 2010).

In the North Atlantic, the National Marine Fisheries Service monitors 40 stocks of fish. Of these, about one third are either overfished or are being overfished. Another 20 percent of these stocks are recovering from depletion (National Marine Fisheries Service, 2011).

In 1938 Edward Ackerman published an article in which he noted that "as soon as a good market appeared for any form of life in the sea it was pursued relentlessly until its scarcity made protection imperative, or fishing [for it] no longer profitable." (Ackerman, 1938). Ackerman was referring to the North Atlantic Ocean's already overfished whales, salmon, halibut, lobsters, herring, and shad. He also observed that once fishing for a particular species was no longer profitable, fishing pressure often just switched to another species.

His theory has since been validated over and over again, and not only with North Atlantic groundfish. The time period between the 1940s and 1970s saw sequential resource depletion of groundfish (Hennemuth & Rockwell, 1987) including haddock, ocean perch (Northeast Fisheries Science Center, 2011),

stripped bass (Hoss et al., 1999), flounder, silver hake, red hake, mackerel, cod (Murawski, 2005) and squid (Anderson, 1998). As the harvest of these species declined in the 1980s, fishing effort shifted to monkfish, white hake, spiny dogfish, shrimp, and various species of skate. Between 1980 and 2000 landings of monkfish, mackerel, squid, and skates all increased (Sutinen & Upton, 2000) while the wild populations of these species decreased (Murawski, 2005).

While industrialization may explain the physical ability to overfish, there are two economic theories that help to explain the motivation to overfish. In his 1954 publication, Scott Gordon argues that because fishery resources are common property, rather than private, the fishermen had no rights to it in the future. Thus, fishery resources left untouched are not valued by fishermen. Instead, fishermen compete to harvest today what will simply be harvested tomorrow by someone else if the fishermen were to leave it in the ocean (Gordon, 1954). In Garrett Hardin's 1968 publication, "The Tragedy of the Commons," Hardin argues that each resource user will seek to maximize his own gain since the benefits of maximizing production are concentrated to the resource user, while any negative externality from maximizing production is dispersed among all users. This conclusion is reached by each resource user and each resource user maximizes their production until the resource can no longer produce benefits to anyone (Hardin, 1968). Both theories state that open access resources eventually lead to market failure. Overfishing of the ocean commons

has necessitated regulation by fisheries managers in order to limit access and prevent overfishing and market failure.

Regulation of Domestic Fisheries

Fishing in the North Atlantic was a largely unregulated industry until it became apparent that the lack of regulation was leading to the decline of many fish stocks. Beginning in earnest in the 1950s, regulation of the fishing industry has been marked by numerous revisions, increasing complexity, and heated debate. Regulations now govern every step in the supply chain, including the harvesting, selling and processing of fish.

Between 1950 and 1976 fisheries in the Northwest Atlantic were regulated by the International Commission for the Northwest Atlantic Fisheries (ICNAF). Regulations were essentially negotiated by the countries whose fleets fished in the Northwest Atlantic (Anderson, 1998). Regulations were not only difficult to negotiate between so many countries, they were also difficult to enforce.

In 1973 the ICNAF tried to set fishing quotas for each country, but by 1976 it became apparent that Northwest Atlantic fish stocks simply could not sustain the number of fishing fleets that were fishing them. In response to this, the U.S. announced its decision to extend its Exclusive Economic Zone (EEZ) to 200 miles from shore (Anderson, 1998). This announcement coincided with the U.S. Congress enacting the Magnuson Fishery Conservation and Management

Act of 1976 (the Magnuson Act). The Act put in place a domestic regulatory system to eliminate foreign fishing fleets and develop sustainable domestic fisheries (Hoss et al., 1999). Under the Magnuson Act, the National Marine Fisheries Service (NMFS), a division of the National Oceanic and Atmospheric Administration, became the authority responsible for managing fishing activity in waters in the EEZ. The Magnuson Act also established eight Regional Fisheries Management Councils that were tasked with creating Fishery Management Plans and regulating fishing activity within their sub-jurisdiction.

In the early years of management under the Magnuson Act, the new regulatory bodies failed to retain any lessons learned from the previous 20-40 years of overfishing. Seeing the new EEZ as an opportunity to buttress a diminished domestic fishing industry, government loan programs subsidized new, more modern fishing vessels. The domestic fishing fleets expanded rapidly and fishing effort doubled between 1976 and 1984 (Murawski, 2005).

The Magnuson Act has been reauthorized twice, and remains the primary law for regulating fisheries. Each reauthorization has introduced adjustments to the act, including more stringent rules for controlling overfishing, mandates for reducing bycatch, requirements to describe and protect essential fish habitats, and the requirement that Regional Fisheries Management Councils set annual catch limits for each species they manage (Spalding & Dalzell, 2009).

As the regulatory structure has evolved, it has become increasingly complex. The NMFS now regulates 230 different species of fish or shellfish, each with a specific set of regulations. At a very minimum, anyone who wishes to fish commercially must carry a state issued license allowing them to fish. The licenses are specific to a particular species or group of species, and the regulations for harvesting that species can be as simple as a minimum mesh size, or they can be as complicated as how much can be landed in a specific time frame, using a specific type of gear.

In order to meet the NMFS's mandate to protect and conserve fish stocks regulations are frequently adjusted based on the most current scientific data available. However, stakeholders who are able to influence regulations do not always agree on the scientific data or how it is interpreted in order to develop regulations. For example, in its 2010 report the New England Fisheries Management Council considered American Plaice to be an underutilized⁵ species (New England Fisheries Management Council, 2010). Meanwhile, the Monterey Bay Aquarium's Seafood Watch program listed American Plaice as a species to avoid eating due to concerns of overfishing (Monterey Bay Aquarium, 2012). The Environmental Defense Fund weighed in with its own conclusion, and claimed that new sector management had reduced discards and made the

⁵ An underutilized species is a species for which the amount landed is less than what the quota would allow.

fishery more sustainable, although not necessarily underutilized (Environmental Defense Fund, EDF, 2011). All three of these organizations have a slightly different agenda, and therefore prioritize conservation goals, economic goals and social goals in fisheries regulations differently.

Sutinen and Upton (2000) characterize the debate over fisheries management policies as being between “shortsighted” and long term stakeholders. They argue that political actors who face short re-election cycles have little incentive to prioritize long term, conservation outcomes in fisheries management policies. They tend to pander to a fishing constituency that, given their economic dependence on the industry, is more concerned with short term fisheries production. A tendency for shortsightedness in fishermen is also cultivated by the fact that the resources they rely on are a common good, and they have no guarantee of a claim to any conservation benefits that are accrued in the long term.

Stakeholders that favor the long term tend to be environmental interest groups and government bureaucrats who have little, if any, direct stake in the short term utilization of fishery resources. Thus, they tend to favor short term sacrifice for long term sustainability (Sutinen & Upton, 2000).

This conflict in fisheries management has been a frequent topic in the media and in academic literature (see for example, BBC News, 2002; Botsford, Castilla, & Peterson, 1997; Okey, 2003; The Washington Post Editorial Board,

2012). More recently, the debate has become complicated by the fact that regulatory measures, such as catch shares, may conserve fish stocks, but do so at the expense of social justice. Catch share policies have been criticized for favoring large commercial fishing companies, placing small operators at a disadvantage and further consolidating the local fishing industry (Meridian Institute, 2012). So while the fisheries may be sustainable in terms of conserving fish stocks, they lack social justice. The Northwest Atlantic Marine Alliance has tried to bring attention to this issue with their slogan, “Who Fishes Matters” (Northwest Atlantic Marine Alliance, 2012).

Beyond regulations for the harvesting of fish, there are also regulations that govern the sale and processing of fish. Anyone who wishes to sell fish on retail markets must have a dealer permit that is specific to the kind of sales activity they are engaged in. For example a “Retail Boat Seafood Dealer” permit allows the permit holder to sell lobster or whole fish only, from his or her vessel only. They must also have a commercial fishing license for the species being sold (Massachusetts Division of Marine Fisheries, Department of Fish and Game, 2012).

Only licensed Wholesale Seafood Dealers are allowed to process fish, which includes heading, gutting, filleting or packaging of fish (U.S. Food and Drug Administration, 1999). These permit holders must comply with the Food and Drug Administration’s Hazardous Analysis and Critical Control Point (HACCP)

system for processing fish. First introduced to the U.S. in 1994 specifically for seafood processing, HACCP is a system of verifiable controls and it is quickly becoming the international standard for food safety.

The U.S. seafood processing industry is highly concentrated with 50 of the largest processing companies accounting for 70% of revenues from processing (First Research, 2012). For these large seafood processors the cost of implementing HACCP is relatively little compared to the total costs associated with a processing operation. However, implementation of HACCP exhibits economies of scale, making it prohibitively expensive for smaller processors dealing in smaller volumes. The requirement of a costly HACCP system can limit the entry of smaller processors into the industry, and push existing small processors out, leading to further concentration in the processing industry (Unnevehr & Jensen, 1999). This discourages fishermen from vertically integrating into the market in order to benefit from the economic gain created from processing and retail sales.

Market Volatility

Fish is now one of the most highly traded commodities, with over 40% of world fish production entering the international market. This is more than the trade of food staples such as wheat (20%) and rice (5%) (Swartz et al., 2010). Trade statistics indicate that the flow of trade is generally *out* of developing countries and *into* developed countries (Swartz et al., 2010). The globalized

market, in conjunction with stock declines and complex regulations have helped create a highly volatile market place into which fishermen enter when they land their catch.

In New England, market transactions for fresh fish begin when individual fishing vessels off load at one of the hundreds of docks along the New England coast. In theory fishermen can choose to land their catch at whichever dock they choose and sell it to whichever buyer they choose at that dock. In reality, fishermen are limited by their location, market demand and the availability of market information.

Historically, dock side fish prices were strongly influenced by the Boston and New Bedford auction houses (Kaplan, 2000). Although fishermen could sell to any one of the hundreds of buyers, the price was negotiated based on the prevailing prices at these two auction houses. In negotiations, fishermen and buyers both had imperfect information with which to negotiate. Fish prices could fluctuate quickly, and neither had up-to-date information on current market prices.

Today, access to market information and prices is more readily available to fishermen thanks to wireless communications. However, fishermen still deal with price fluctuations and uncertainty in the market place as the price they get per pound of fish is influenced by a great number of factors. For example, fishing policies that use overall quotas to limit catch without controls to limit

effort over time can result in a lower market price. Policies like this create a gold rush, where each fisherman tries to catch as much as they can of that species as quickly as possible, before the quota is reached. This behavior floods the market with that species, driving the price of it down. On the other hand, low catch limits or a limited number of fishing days allowed reduces the availability of the fish, which drives the price up. However, the amount of that species a fisherman can catch and bring to market is also limited, reducing his income from fishing activity even when the price is high. At the extreme, fisheries are sometimes simply closed off for an entire season, leaving fishermen unable to secure income from fishing unless they are able to shift their fishing effort to another geographic area or species. World fisheries production also impacts the price fishermen can get, as cheaper imports and aquaculture products bring the market price down. Fishermen have few competitive market outlets for the fish they catch, and are generally considered price takers (Jacob et al., 2011).

Relying on fish and fish products for their livelihoods makes fishermen highly susceptible to fluctuations in the market price for fish. They can experience boom and bust cycles linked to the market price of fish, which creates instability and uncertainty in their livelihoods. The current state of the fishing industry, shaped by overfished stocks, regulatory battles, and volatile markets, ultimately has adverse impacts on entire communities of fishermen and fishing industry workers. New England has a strong maritime history, and many coastal communities developed around fishing and fishing related activities. The

current state of the industry presents a major challenge to the resilience of these fishing communities both in terms of their economic viability and cultural identity.

Resource-Dependent Communities

Resource exploitation, such as the harvest of fish, tends to evolve in a way that creates communities that are dependent on the resource and vulnerable to changes in its availability and market. The extraction of natural resources provides economic activity that drives the development of the community, and creates links between the primary activity of extraction and secondary activities such as processing and support services (Jacob et al., 2011). Thus the community grows in a way that makes it intimately tied to the resource.

As the market for the resource grows and demand increases new technology improves the efficiency of extraction and processing. Competition also increases as the resource is extracted by other stakeholders and as substitution products are introduced to the market. This causes the price of the raw resource to decline over time, which often leads to increased extraction to compensate for the smaller profit margins. Larger commercial operations can compensate for lower prices by investing in improved efficiency. They can also invest in vertical integration of their operations, allowing them to profit from the manufacturing or service sector associated with the resource extraction. However, smaller resource extraction businesses, families and communities that

were built up around the resource are hard hit by low prices and depleted resource availability (Jacob et al., 2011). They have limited mobility to move out of the industry, and continued participation in the industry is made especially difficult by regulations to manage resource extraction.

The fishing industry in the U.S. is a prime example of this pattern of resource extraction. The U.S. has a strong maritime history with many coastal communities that developed around fishing and are still dependent on fishing activities. The current state of the fishing industry exhibits many elements of resource exploitation, including low prices paid to fishermen and overexploitation, presenting a major challenge to the resilience of fishing communities.

Fishing communities are passionate about their fishing livelihoods, and they are finding creative new ways to maintain fishing livelihoods despite the environmental, regulatory and market conditions that make it difficult to do so. One of these creative solutions is to develop an alternative to the traditional market for fish. Alternative markets can provide market outlets for fishermen that are not as susceptible to the volatility of the traditional market place, and may be able to provide additional environmental and social benefits.

Community Supported Markets

Community supported markets are just one of many alternative markets. Others include farmers' markets, road-side stands, "pick your own" farms, fair

trade and direct internet orders. CSAs were introduced in the U.S. in the 1980s and there are now well over 2,000 farms in the U.S. using this type of alternative market for their produce. Most of what we know about community supported markets has been learned from studying CSAs.

Research indicates that these CSAs provide economic benefits including the distribution of risk between the farmer and shareholder. There are two types of risk to consider: market risks, such as price, demand, and competition, and production risks, such as pests and weather (LeRoux et al., 2010). In the traditional market consumers may already share some market risk in relation to demand and price, however they are somewhat insulated from these market risks, as they can simply choose to not participate in the market.

Farmers on the other hand face both production risks and market risks and are not well insulated from either (LeRoux et al., 2010). When farmers invest in growing a crop at the beginning of a season, they have no way of knowing what their yield will be, or what price they will get for their crop on the market. Regardless, they have little choice but to sell what they have at whatever price they can get at the time of harvest.⁶ In CSA markets the shareholders take on some of the production risk associated with farming by pre-purchasing a share of the farmer's produce at a set price, regardless of regular market prices at the time of harvest (Hinrichs, 2000). In a study of small

⁶ This is especially true for fresh products that are perishable.

vegetable and fruit producers in NY, CSA markets presented the lowest risk to farmers compared to wholesale markets and farmers' markets (LeRoux et al., 2010).

It is important to briefly explore the difference between lower risk and a higher market price. Many producers cite expectations of higher profit margins as an advantage of using an alternative market (Kambara & Shelly, 2002), however this is not always the reality in a CSA. Producers selling direct to consumers through a CSA may charge a higher price for their produce, but this does not always translate directly into higher profit margins. Marketing through a CSA can increase marketing and sales costs, compared to selling in the wholesale market. Costs associated with administration of multiple CSA accounts, rather than a single wholesale account, can also be higher (Hardesty, 2009; LeRoux, 2010)

Additional benefits of CSAs include land stewardship and resource conservation, reduced environmental impacts associated with food production, distribution and consumption, building a stronger local economy, and building social capital (DeMuth, 1993). CSAs readily market these benefits, and thus the CSA model has become synonymous with terms such as sustainable, organic and local agriculture.

While Community Supported Fisheries have been modeled on CSAs and share a similar title, marine capture fisheries are vastly different than farming,

and fishing poses unique challenges to operating a community supported market. For example, farmers plant and cultivate crops for harvest while fishermen rely on the natural availability of wild stocks. Also, compared to farming, capture fisheries are a much more regulated industry. Fishermen are told exactly how much fish they can catch, where they can catch it, and how they can catch it, and these rules often change at the last minute.

Other aspects are also likely to differ due to differences in production methods and regulatory controls. If CSFs are to be as successful as their farming counterparts it will be imperative to understand CSFs as their own food production system and market. It cannot be assumed that they can or should operate in the same way that CSAs do, or that they can or should provide the same benefits as CSAs. Goals and objectives of CSFs need to be well defined, and operations need to be evaluated in the context of those goals and objectives. Understanding these elements can help CSFs strengthen their business models and increase support for CSFs.

CHAPTER 3

RESEARCH PURPOSE

Introduction

The research undertaken here seeks to gain a better understanding of how CSFs operate, what their goals and objectives are, what additional benefits they may be able to provide, and what motivates fishermen to participate in a CSF. The two research questions it seeks to answer are as follows.

Research question 1.

What are the goals CSFs aim to achieve, and what basic operations are being used to achieve them?

Research question 2.

What is the primary motivation for fishermen to participate in a CSF?

Examining the Goals and Operations of CSFs

CSFs are a relatively new market for fish and there is a very limited understanding of how these markets operate, what goals and objectives they aim to achieve, or what additional benefits they may be providing. Examining CSFs' operations and identifying their goals and objectives provides important information that can be analyzed and used to develop CSF markets and address any aspects of their operations that may be preventing them from achieving their goals.

There may also be potential for CSFs to provide environmental, social or economic benefits in addition to their goals and objectives. If there are positive externalities of CSF operations, they can be capitalized to build the market and appeal to more consumers. Any additional social, environmental or economic benefits provided by CSF markets may also be of interest to other fishery stakeholders and policymakers. If positive externalities of CSFs complement the goals defined by policymakers and other stakeholders, it may incentivize them to support the growth of CSF markets.

Understanding Fishermen's Motivation to Participate in CSFs

Many of the decisions fishermen make in relation to catching fish and marketing their catch are governed by regulations. However some decisions, especially marketing decisions, may be influenced by their values. Knowing what fishermen value in relation to their fishing activity provides some insight into how they make fishing decisions, especially when economic, social and environmental outcomes are at odds with one another. Understanding these values can help to understand CSF markets and what role they might play in the fishing industry.

Fishermen are often categorized by the physical elements of their fishing activity: the gear they fish with, the size of their boat, the location where they fish, or the species they target. There is little research that attempts to categorize their values related to fishing. One study attempts to categorize

Finnish fishermen by their values, based on the adaptive strategies they chose in response to changing conditions in the fishing industry (Salmi, Salmi, & Moilanen, 1999). The study identified three main categories of fishermen. Hobbyist fishermen held occupations outside of fishing, had low economic dependence on their fishing activity, and could easily adapt to changing conditions by fishing more or less when it made sense to do so. Consumer oriented fishermen considered processing and marketing to be a normal part of their fishing livelihood, and were comfortable with market based adaptive strategies. Fishing-oriented fishermen had a high dependency on fishing and sold their catch to wholesalers or processors. These fishermen placed high value on the independence that fishing provides and were not as likely to adopt market strategies to cope with changes in the industry. The article argues that flexibility in fisheries programs that accounts for these different values would provide more appealing management options for fishermen, and improved management outcomes.

Research that has categorized farmers' values also provides validation that the effort to do so for fishermen could prove useful in developing fisheries policies and programs. Multiple studies have categorized farmers' values into economic, conservation and lifestyle values (Mayberry, Crase, & Gullifer, 2005; Greiner, Louisa, & Miller, 2009). Farmers who are motivated by conservation and lifestyle values have higher adoption rates of conservation practices than farmers who are motivated by financial and economic values. Since best

management practices for conservation are based on biological and ecosystem principles, and do not generally consider socio-economic factors, these practices are likely to be adopted only by farmers who have strong conservation and lifestyle values. Farmers with financial and economic motivations will require financial incentives to adopt best management practices for conservation (Greiner, Louisa, & Miller, 2009).

CHAPTER 4

RESEARCH METHODOLOGY

Introduction

The original research plan was designed to use an evaluation approach in order to answer the two research questions. Evaluation uses both quantitative and qualitative methods of social science research to create a systematic approach to assessing a programs operations and outcomes. Evaluation that focuses on how the program operates and who it serves is often called a process evaluation, while evaluation that focuses on what the program accomplishes and the impact of the program is often called outcome, or impact evaluation. The research questions posed here are indicative of a process evaluation as they seek to provide a more detailed picture of CSFs by clarifying what their day to day operations are, and what the goals and objectives are. The original plan included the first 3 Tiers of the Five-Tiered Approach to evaluation, first described by Francine Jacobs in 1988 (Jacobs & Kapuscik, 2000). These three tiers are process oriented, and fit the goals of the research.

However, due to a low rate of participation by CSFs, the evaluation approach was substituted with a case study approach. An evaluation is intended to document what happened in a program; in this case, the CSF market model was the program. It would not have been possible to make any generalized or conclusive statements about community supported markets for fisheries with so

few participating CSFs. Case studies are a more appropriate research approach when working with a small sample of a larger population, as they generalize to theory, rather than to population. The case study approach can provide in depth information on three individual CSFs, rather than generalized information on CSFs as a whole. A case study approach was also appropriate to use as they are also one research tool that can be used in a process evaluation. The rich data generated by intensely studying three CSFs out of a larger pool of CSFs can inform and contribute to a more comprehensive evaluation.

The change from an evaluation approach to a case study approach did not impact the kind of data collected for this research. Case studies are often one component of a process evaluation, thus the data collection tools remained the same. The change did impact how the data was analyzed, the discussion, and the suggestions made.

Case Studies

Case studies are often used when the research questions require an extensive, “in-depth” description of the phenomenon being studied. They retain the holistic characterization of the complex interactions that impact the subject being studied (Yin, 2009). Attempting to understand how and why CSFs operate requires such in depth descriptions. Basic operations and logistics of CSFs need to be explored, as do the complex economic, regulatory and social structures that influence their operations. Case studies are also a preferred method when

the subject being studied is current, as opposed to historic, and behaviors related to the subject cannot be manipulated, as would be needed for an experiment (Yin, 2009). Community Supported models are certainly current, having only been around since the 1970s, and the behaviors of the CSF are not being manipulated for this research.

The emphasis that case studies place on qualitative data is appropriate in this situation, given that the goal of the research is to better understand CSFs operations, and what their goals and objectives are (Weiss, 1997). The quantitative data collected in this study, such as the number of shares each CSF has sold or the number of fishermen participating in the CSF, is intended to support qualitative findings and emphasize patterns and operations that should be further explored, rather than provide exact measurements used for statistical analysis or conclusions about the impact of CSFs.

Data Collection Instruments

A written questionnaire and a set of interview questions were designed to collect both basic operational data, as well as explicit constructs of interest related to participation in CSFs (see Appendix A for the basic research plan). The questionnaire captured quantitative data and open ended responses on basic operations and productivity, such as how many shares the CSF sold and where shares are distributed. Some questions were asked in a way that provided some standardization for the information being collected. For example, respondents

were asked to fill out tables with pre-defined categories, such as the number of shares sold in each season (see Appendix B). Other questions were open ended to provide room for responses that could not be reasonably pre-defined, such as when each CSF's season begins and ends.

The interview questions were designed to gather detailed qualitative information about the organization of the CSF, as well as information about the fishermen's motivation to participate in a CSF, their environmental values, and their behaviors in relation to fishing. The interview allowed for the opportunity to elicit open responses that were further explored by follow up questions (see Appendix C).

Collecting this data from every fisherman who participates in a CSF was beyond the capacity of this research. Instead, one "point person" from each CSF was identified and asked to fill out the questionnaire and answer interview questions on behalf of their entire CSF. It was assumed that this point person would have had enough interaction with other fishermen who participate in the CSF to provide generalized information on what motivates the fishermen in their CSF to participate. This assumption mostly applied to the interview, in which the answers to many questions were qualitative and based on opinion. This point person was asked to provide responses on behalf of the CSF as a whole, rather than answer for himself. For example, when asked what the primary motivation

was for fishermen to participate in a CSF, the point person was asked to represent the CSF fishermen with whom he or she works.

Participant Recruitment

Potential CSFs for this research were identified using Northwest Atlantic Marine Alliance's (NAMA) web site for locating CSFs.⁷ Each CSF listed on the website has a link to the CSF's website if one exists, some basic descriptive information about the CSF, and general contact information. Sean Sullivan, who was the Development, Marketing and Outreach Associate for NAMA at the time, was able to help identify and provide contact information for one person from each CSF that might be able to act as the point person. The potential point person for all 12 New England CSFs listed on NAMA's website as of September of 2011 received either a call or an e-mail asking for their participation in this research. They were also asked to identify another contact in the CSF if they were not in fact able to act as the point person. Recruitment was limited to CSFs operating in New England in order to eliminate variances in CSF operations that could simply be attributed to differences in regional fisheries regulations.

Of the 12 CSFs listed on NAMA's website, three CSFs chose to participate. The point person from each of the three CSFs was asked to fill out the written questionnaire and answer questions in a 30 minute interview.

⁷ For more information, see <http://www.localcatch.org/about.html>.

Data Analysis

A variety of analytical strategies are used to report the data collected from the questionnaires and interviews and to provide analysis. These include factoring responses into components to provide a basic description of each of the participating CSFs and comparing CSFs to identify commonalities and differences.

Quantitative and qualitative data for each CSF was collated where necessary and then factored into categories that are central to both the CSFs operations and to the constructs of interest that the research aimed to explore. These categories include Organization, Shares, Distribution and Marketing and Environmental Perspectives. These categories are reported for each CSF in order to retain a holistic view of each CSF. This provides a basic description of each CSF's operations and the general constructs of interest that influence their operations and their goals and objectives. The data are then analyzed in the context of the challenges the fishing industry faces in order to explore the ways in which CSFs may be able to provide additional environmental, social and economic benefits. The case study results and the discussion were then used to develop suggestions for next steps to develop CSF markets.

CHAPTER 5

RESULTS

Cape Ann Fresh Catch⁸

Organization

Cape Ann Fresh Catch began its CSF market in June 2009, out of Gloucester MA. The North Atlantic Marine Alliance and the Gloucester Fisherman's Wives Association, both non-profits in the Gloucester area, were also interested in beginning a CSF but did not have the capital to invest in creating their own infrastructure for the landing, processing and distribution of fish in a vertically integrated business model. Instead of trying to raise the capital investment needed to build the infrastructure, Cape Ann Fresh Catch (CAFC) partnered with Gloucester based companies with existing infrastructure and capacity for purchasing and processing fish.

To supply the fish needed to fill its shares, CAFC purchases fish from Ocean Crest Seafood. Every week, CAFC tells Ocean Crest Seafood how much fish is needed to fill its shares and Ocean Crest purchases enough fish from

⁸ The information in this section was obtained from a questionnaire and a personal interview with Steve Tousignant on January 4th, 2012, unless otherwise noted. Tousignant is the Operations Manager for Cape Ann Fresh Catch.

fishing boats to fill the shares based on a yield factor⁹ for each species of fish. Ocean Crest buys fish consistently from about 16 boats, but in any given season it will purchase fish from up to 36 boats. All of the 36 boats also sell fish to other traditional markets, such as fish brokers and auction houses. When CAFC first began operations it offered shares of whole fish only. In May of 2010 CAFC was able to offer filleted fish as a share option due to the partnership it entered into with Turner Seafood. After Ocean Crest purchases the fish for the CSF, the fish are sent to Turner Seafood which then processes the fish for the CSF. Turner Seafood also provides a truck for the delivery of the shares. These partnerships allow CAFC to focus on administration of the CSF, including order management, share delivery, customer service, and marketing, rather than on supply and processing.

By partnering with local business to operate the CSF, CAFC aims to achieve outcomes that will benefit the local economy, build social capital, and reduce the environmental impact of food distribution. Because CAFC has partnered with local businesses in Gloucester, rather than vertically integrating operations into one organization, it hopes to distribute jobs and revenues generated from the CSF among the partnering businesses. It also pays fishermen more for their catch than the regular market, increasing the fishermen's income per pound of fish landed. CAFC also aims to reduce the carbon footprint. In

⁹ A yield factor is a number that is used to calculate the weight of edible yield from a species of fish after it has been processed to extract just the meat.

addition to reduced carbon footprint from local distribution, CAFC believes that boats selling their catch through a CSF will not have to travel as much to catch the species with the highest price, or to land their fish where they can get the highest price. This may reduce fuel costs and the carbon footprint associated with catching the fish.

Operating the CSF through partnerships, CAFC has little direct interaction with the fishermen and cannot say with certainty what it is that motivates fishermen to participate in the CSF. Tousignant believes it is likely that fishermen's primary motivating factor in selling to a CSF market is simply that they are able to receive a better price for their catch. He also believes that many fishermen recognized other benefits of CSFs, such as keeping jobs and food local, and reducing the resource use and expenditures associated with food distribution. However, none of these other benefits impact the fishermen as directly as the higher market prices they receive by selling to the CSF market, and likely do not factor into their decision to participate in a CSF.

Shares

The types of shares offered by CAFC have changed dramatically over the course of its first 5 seasons of operation (see Table 2). The CSF began simply, offering only two share types in the first two seasons: a weekly single share consisting of 4-6 pounds of whole fish, and a weekly double share consisting of 8-12 pounds of whole fish. In its 3rd season, it added four additional share types

to the two it already offered. These shares included weekly double or single shares of shrimp only, or weekly double or single shares that alternated between shrimp one week and whole fish the next.

Up until its 4th season, in May of 2010, all fish provided in the shares was whole. Starting in its 4th season CAFC's partnership with Turner Seafood allowed it to offer two new share types with fillets of fish. In this season it also eliminated all double shares and the alternating shrimp and fish shares. In its 6th season, September of 2010, it added two bi-weekly shares to the three weekly shares it had been offering for the previous two seasons. These five share types have remained consistent to the present, its 9th season. In the future CAFC would like to align shares seasons with celestial seasons.

Table 2
Types of Shares offered by Cape Ann Fresh Catch

	2009		2010				2011		
	August	September	Winter	May	August	September	Spring	Summer	Fall
Weekly double share whole fish	✓	✓	✓	x	x	x	x	x	x
Weekly single share whole fish	✓	✓	✓	✓	✓	✓	✓	✓	✓
Weekly double share shrimp	x	x	✓	x	x	x	x	x	x
Weekly single share shrimp	x	x	✓	x	x	x	x	x	x
Weekly double share alternating fish & shrimp	x	x	✓	x	x	x	x	x	x
Weekly single share alternating fish & shrimp	x	x	✓	x	x	x	x	x	x
Weekly single share fillets	x	x	x	✓	✓	✓	✓	✓	✓
Weekly single share alternating whole fish & fillets	x	x	x	✓	✓	✓	✓	✓	✓
Biweekly single share whole fish	x	x	x	x	x	✓	✓	✓	✓
Biweekly single share fillets	x	x	x	x	x	✓	✓	✓	✓

Source: Data was adapted from Cape Ann Fresh Catch seasonal contracts provided by Steve Tousignant. Tousignant, 2012.

In the first six seasons of operations, shareholders would purchase a share for a defined number of weeks. The number of weeks per season varied greatly depending on the season and the year. In the spring of 2011, CAFC began offering a pro-rated buy in to any season and shareholders could purchase shares by the week, for however many weeks they wanted.

CAFC charges members a “species equal” price for the shares, despite daily fluctuations in auction prices. This means that shareholders pay a set price per pound of fish regardless of the species, and regardless of the regular market price for the species. This conveys the idea that “all fish are created equal”. CAFC also sets this species equal price of the shares at a rate that, on average, allows CAFC to give fishermen “slightly more” (Tousignant,2012) money per pound than what they would receive in the traditional market.¹⁰ With the money collected from shares, CAFC pays Ocean Crest a set base rate per pound, regardless of the type of fish. Ocean Crest tracks how much fish is purchased from each boat and pays each boat a bonus at the end of the season based on the weight and an average daily price calculation for the catch that was purchased by Ocean Crest.

In its first year the prices for shares varied somewhat between seasons. Many of these share types were eventually discontinued. The weekly, single

¹⁰ The price of the shares is also set to cover the cost CAFC must pay for processing, distribution and administration of CSF shares.

share of whole fish is the only share type that has been offered consistently since CAFC began operations. The price of this share was increased once in the 3rd season, from an average of \$3.10 per pound to \$4.16 per pound, and has remained consistent since then. The price per pound for the other four share types currently offered has also remained consistent since CAFC started offering them. Shares of fish fillets are \$12 per pound, and alternating shares (whole one week, fillet the next) averages \$7.33 per pound. Prices of shares that include whole fish are averaged since the weight of whole fish in each share may vary between four and six pounds to account for the yield factor of different species of fish. This reflects the fact that the yield of fillets from a whole fish, and thus the price paid per pound, varies depending on the species, the size of the fish, and the skill of whoever is filleting.

Through the CSF model, Cape Ann Fresh Catch is able to market species of fish that it considers to be underutilized. By broadening the spectrum of fish that are brought to market, CAFC believes it can minimize the pressure of fishing on any one species. CAFC finds that consumers most often think of cod, haddock and yellowtail flounder when they purchase fish. While CAFC does offer those species in its shares, it also fills shares with a variety of other fish, such as scup, lemon sole, dabs, redfish, monkfish, bluefish, striped bass and grey sole. CAFC does not have records for how much of each species was brought to the CSF market during each season. However, records of the number of days each of these species was landed and used in shares from February 2011 to January of

2012 provides some illustration of the diversity of species used in CAFC's shares (see Figure 5).

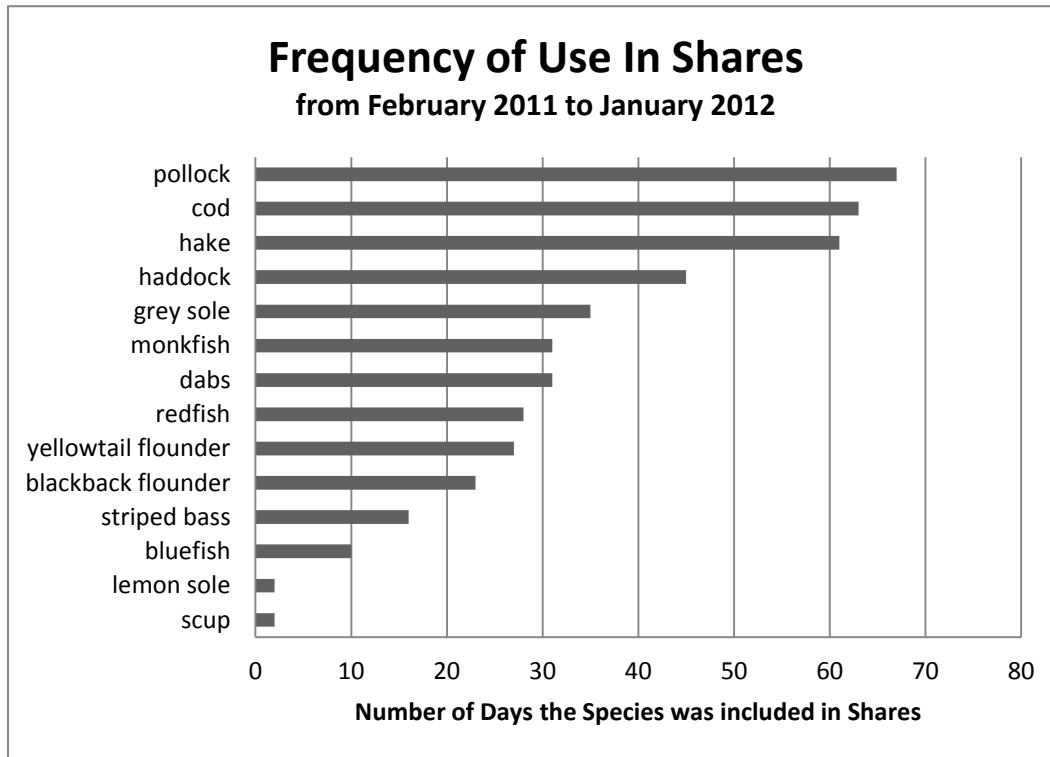


Figure 5: Frequency of Species Use in Cape Ann Fresh Catch CSF Shares.
Source: Data was adapted from the Cape Ann Fresh Catch delivery calendar. Cape Ann Fresh Catch, 2012.

CAFC did not have records for how many of each share type was sold in each season since it began operations. Steve Tousignant estimated that in the winter 2011 season CAFC had 511 shareholders. For the spring 2012 season it sold approximately 760 shares. CAFC believes it still has room to grow its shareholder base, and would ideally like to bring another 1,000 pounds per week to market. This would translate to approximately another 240 shareholders.

Distribution and Marketing

In its first three seasons, CAFC delivered to the same nine locations each season. In May 2010, its 4th season, it expanded delivery locations to include five more locations. Over the next five seasons, another eight delivery locations were added, and only two were discontinued. CAFC makes deliveries to at least two locations every day of the week (with the exception of Sunday). Thursday is the busiest delivery day, with six different delivery locations. In general, all of its delivery locations are within the Interstate 495 belt.

CAFC hired a part time staff to work on marketing and communications for the CSF. While funding does not exist to run a large, traditional advertising campaign, CAFC has made use of alternative marketing tools. It has a presence in social media outlets, such as Facebook, and a blog on its website. It uses these outlets mostly to raise awareness, provide education, and to keep shareholders updated. It also tries to have a presence at local food events like the Boston Local Food Festival by participating in cooking demonstrations and providing information and education about the CSF. It has advertised in Edible Boston, a free, local magazine that supports the local food movement.

Due to the novelty of CSFs, CAFC has also benefited from coverage in news, magazine, and TV outlets. CAFC has been written about often in small newspapers with local distribution like the Gloucester Times, but it has also received some national coverage in the Wall St. Journal and Bon Appetite

magazine (see for example Bon Appetit, 2012; Gaines, 2011; Leschin-Hoar, 2009). CAFC is also being featured in a BBC T.V. series about the state of England's fisheries. In the series, CAFC is highlighted as a potential solution to rebuild economically viable fishing communities while creating a market that values conservation of fish stocks.

CAFC has tried to make some headway in selling wholesale to restaurants. From CAFC's perspective, restaurants would be a good potential market as they purchase large volumes of fish and have good storage capacity. However, restaurants traditionally pay a set daily-price based upon the particular auction price of the seafood they purchase that day. The "species equal" pricing that CAFC uses for its business model "makes it more challenging to position ourselves for wholesale seafood purchases by restaurants" (Tousignant).

CAFC has used a select group of tools to help manage its membership and deliveries. Tousignant created a series of linked spreadsheets with Microsoft excel to manage and track orders throughout the chain of partners it works with. Filemaker software has also been a useful tool to organize administrative paperwork. It uses a public calendar, embedded in its website, to display the schedule of share deliveries, and what species of fish is in the share on any given day.

Survey Monkey has also been used by CAFC to survey shareholders and inform the growth of the CSF. Preliminary results from the survey responses

indicate that most people join a CSF for two main reasons: the quality and freshness of the fish (96% of respondents), and the desire to support the local fishing economy (91 % of respondents). The majority of shareholders heard about CAFC either through a friend (50.7% of respondents) or through a newspaper or magazine (40.5% of respondents), and most would recommend CAFC to a friend (91% of respondents) (Survey Monkey, 2011).

Additional planning, organizational and marketing tools would be useful to the CSF. CAFC was interested in a product called Farmigo that provides a network for consumers and producers and software for account management. It has been used by CSAs in California to manage their business, but CAFC found that it was not cost effective.

Environmental Perspectives

Tousignant often hears fishermen comment that environmentalists paint a picture of fishermen going out to “pillage the sea”, when in fact that is “the last thing fishermen would want to see happen” (Tousignant, 2012). Among fishermen, there is a widespread understanding that fishing livelihoods depend on conservation measures to ensure the sustainability of the resource and the livelihoods that depend on it. Overfishing does not occur in a bubble, driven by fishermen alone. Rather it is also driven by markets that create demand for a specific fish that leads to overfishing of that species, and by regulations that create perverse incentives to overfish.

Many fishermen have expressed an interest in saving fuel, and trying technologies and methods of fishing that would allow them to fish more effectively. These actions could be advantageous to the fishermen in terms of cost and time savings, but they may also reduce the environmental impact of fishing. However, because the industry is so strictly regulated, fishermen have very little flexibility to change their fishing behavior in a way that might achieve time and cost savings, or reduce the environmental impact of fishing.

The Local Catch¹¹

Organization

The Local Catch, located in Narragansett, RI, operates much like any other fish wholesaler. It is a privately owned business, owned by Rich Cook and operated by a small staff of fishermen. Cook, a fisherman of 30 plus years, made a personal investment upfront to build a processing facility and a distribution system for share delivery. The Local Catch also uses other market outlets, selling direct to restaurants, at farmers' markets and to other wholesalers. The CSF has only operated for one season in the summer of 2011, from June to August, and was a very small portion of its overall business in that season.

¹¹ The information in this section was obtained from a questionnaire and a personal interview with Sarah Schumann on October 28th, 2011, unless otherwise noted. Schumann is Assistant Director at The Local Catch.

Fish for the CSF shares are supplied primarily by the fishing activity of Cook and his assistant Sarah Schumann, however it also purchases fish from about 12 other boats operating from Point Judith in Rhode Island. At this early stage, the CSF also purchases from a wholesaler if it is unable to supply what is needed to fill the CSF shares. The Local Catch hopes to move away from purchasing from a wholesaler, but needs to get more fishermen involved in order to do so.

Rich Cook's primary goal in beginning the CSF was to generate another source of income. Promoting and operating the business has also provided the opportunity to develop new skills, and discover new talents; for example, in addition to being a good fisherman, Cook has discovered that he also excels at sales and public speaking. While these skills are advantageous, creating another market outlet for fish to generate income is still the primary motivation for the CSF.

The Local Catch also provides a better price to the fishermen from whom it purchases fish. Doing so is loosely part of its mission, but mostly it is necessary. The Local Catch often only needs to purchase a portion of fishermen's catch, and fishermen must then sell the rest of their catch in the traditional market. Selling to two different markets can be an extra hassle that the fishermen will not undertake unless there is an incentive to do so. The higher price that Local Catch will pay makes it worthwhile for the fishermen to

sell to the CSF in addition to having to sell the rest of their catch in the traditional market.

Because the fish that come through Local Catch go into the general inventory used to fill all of its orders, and not just shares from CSFs, fishermen that sell to Local Catch are not necessarily active participants in the CSF. The participating fishermen's primary motivation to sell to Local Catch is the higher price they can receive for their catch compared to the traditional market. Their participation typically ends with the sale of their catch to the CSF and they have little participation in the operation of the CSF. Opportunities exist for the fishermen to go to the farmers' markets and make deliveries for an hourly wage paid by The Local Catch, however they have not chosen to participate in this way. The Local Catch believes that having the fishermen in a place where they interact with customers would help business, and would be a draw for customers.

One possible disincentive to participating in this way is that the hourly wage is not worth fishermen's while. Local Catch can only pay \$10-\$15 an hour for delivering shares and staffing the farmers' markets. Another speculation from Schumann is that fishermen may find it demeaning or uncomfortable to be involved with the sale and marketing aspects of the CSF.

Shares

The Local Catch has only operated the CSF for one season, from June to August of 2011. In this first season it offered weekly whole shares or weekly half shares of fillets, or an equivalent value of lobster or shellfish. Whole shares were \$720 for 12 weeks and included 4-4.5 pounds of fillets per week (or equivalent dollar value of shellfish). Half shares were \$360 for 12 weeks and included 2-2.5 pounds of fillets per week (or equivalent dollar value of shellfish).

The weight of each share is given as a range since the price is still loosely based on traditional market prices, and therefore the amount of fish in a share is also a function of traditional market prices. For example the value of a whole share is expected to be worth \$60 per week. In one week the share may be filled mostly with a fish that has a lower value in the traditional market. In this case Local Catch will put more weight of that fish in the share to bring the value of the share up to \$60. However, in another week the share may be filled mostly with a fish that has a higher value. In this case it will take a lesser weight of that fish for the share to reach the \$60 value. The Local Catch also makes an effort to provide a variety of fish, and to have each share include both a finfish and shellfish. Thus, the content of each weeks share is based on a combination of factors including weight, market value, variety from week to week, and availability.

The Local Catch did not keep records of the amount of each species by weight that was distributed in its shares. However the records that were kept indicate that the most frequent species in shares were scallops, swordfish, striped bass, fluke, and lobster. The Local Catch supplied nine half shares and one full share in its first season.

Distribution and Marketing

In its first season, Local Catch distributed shares of the CSF to four locations where shareholders could come pick up their shares; Westport, CT on Thursdays, and Bristol, North Kingston, and Pawtucket RI on Saturdays. All four of these pick-up locations are farmers' markets where Local Catch also sells its fish to general customers.

In its first year Local Catch did very little marketing of its CSF. The CSF was advertised on its website and at the Farm Fresh Rhode Island CSA fair held in RI. Most of its focus and effort has been on growing the business through farmers' markets and restaurant sales. NAMA's toolkit for CSFs was the primary tool it used to design and implement the CSF.

Environmental Perspectives

The contamination of coastal waters and its impact on the ecosystem concerns The Local Catch more than the impact of fishing activity. Schumann is most concerned about pollutants from coastal runoff, discharge and sewage emptying out into Narragansett Bay, and thinks the problem is getting worse.

Rich also has major concerns about the lobster fishery, and thinks the problem is pollution, not overfishing.

However, The Local Catch's primary concern is the regulations for fishing. According to Schumann, the general consensus among fishermen is that there always seems to be fish available, but they aren't allowed to catch them. By the time the season has opened the fish have either migrated by, or it is not the right time to try to catch them. "The striped bass and sea bass right now, you can swim on them, but can't take them" (Schumann, 2011).

Regulations have also sometimes forced them to fish in a way that makes little sense to them, economically or environmentally. Schumann described the fluke fishery as an example. Permits for fluke must be carried by each vessel that is fishing for fluke. The permit limits the amount of fluke a vessel can catch to 100 pounds per day.¹² This prevents multiple fishermen from working together on one boat in order to save time and fuel costs. For example, The Local Catch had three fishermen on one boat and each had obtained a permit for fluke to be used on their own vessel. However, since the permit allows only 100 pounds per vessel, and not per permit, the fishermen were not able to combine their efforts to take one boat out to catch the limits allowed by the permit.

¹² This particular permit and its rules apply only to a certain mesh size being used by the fishermen. If a fisherman is using a different mesh size, different regulations apply.

Instead, the fishermen had to make three separate trips to catch the same amount of fluke. This was seen as waste of time and fuel.

Maple Ridge Farm and Fishery¹³

Organization

Maple Ridge Farm and Fishery is a small operation, run by a husband and wife in Sabattus, Maine. Jeremy Ames dredges for scallops and harvests lobster to fill the CSF shares and Tracy Ames manages the business from their home in Sabattus. The shellfish that Maple Ridge Farm and Fishery harvests and sells requires little infrastructure compared to the sale of processed fish. The part of scallops that is most often marketed is the abductor muscle, which is shucked, or cut away from inside the shell. However shucking is not considered “processing” of the product, so the sale of the abductor muscle does not require HACPP controls. The CSF does still need to carry permits for harvesting both lobster and scallops, as well as permit to be able to sell its products. Maple Ridge Farm and Fishery also grows produce and operates a CSA in addition to its CSF.

Getting a better price for its scallops was Maple Ridge Farm and Fishery’s primary motivation for beginning the CSF. The CSF allows it to get a consistently good price, even when the traditional market price for scallops falls. For

¹³ The information in this section was obtained from a questionnaire and a personal interview with Tracy Ames on October 21st, 2011, unless otherwise noted. Ames and her husband are the owners of Maple Ridge Farm and Fishery.

example, when the Canadian scallop season opens and overlaps with the New England scallop season, the market is flooded with scallops and the local price of scallops falls. If Maple Ridge Farm and Fishery was selling its scallops in the traditional market only, the lower price it would get would leave a gap in its expected revenue that would be difficult to fill. It also uses the CSF to help grow its customer base for the products in its CSA shares, such as honey, maple syrup, perennial plants, and cut flowers.

Shares

In the two seasons it has operated the CSF, Maple Ridge Farm and Fishery has offered seafood through a bi-weekly share of shellfish only and a bi-weekly share of shellfish and vegetables. Both shares provide approximately 10 pounds per bi-weekly delivery of either scallops or lobster. The biweekly share of shellfish only is \$90 per week, and shareholders can purchase a share for any number of weeks they would like, purchasing shares in increments of \$90. In its first season of offering shares through the CSF, it sold three vegetable and shellfish shares, and no shellfish only shares. In the CSF's second season, sales grew to six vegetable and shellfish shares and one shellfish only share.

Distribution and Marketing

Shares are offered for a total of 26 weeks. Scallops are available in the winter, from January to March, and lobsters are available in the summer and fall, from March to October. The scallops are easiest to transport. Lobsters are more

difficult to distribute over longer distances, and Maple Ridge Farm and Fishery is considering eliminating lobsters from their CSF share offerings. Shares are delivered to two locations; Cumberland, Maine and Androscoggin, Maine. Delivery times are scheduled with each individual shareholder to accommodate inclement weather and the perishable nature of the shellfish.

Most of the marketing for the CSF shares has been through the internet. Maple Ridge Farm and Fishery posted its CSF business on the NAMA website, although it does not think it received any shareholders this way. It has also tapped into a network of 500 families through a yahoo group site. However, most of its business has come from word of mouth. It has also received some exposure from participating in winters farmers' markets.

Environmental Perspectives

Maple Ridge Farm and Fishery feels that marine resources would be much worse off if it were not for fishermen. It feels that fishermen do what they can within their fishing activity to protect and sustain the resource while still making a living. Dragging for scallops was a concern of Tracy's at one point. Diving for scallops is considered to be the least environmentally damaging method for harvesting scallops, however this method is uncommon. Less than one percent of scallops are collected by diving. Most scallops are harvested by dragging with nets. When Tracy helped to pull up the nets during one trip she became less concerned. In addition to scallops, the nets tend to be filled mostly

with rocks. This makes it appear to Tracy as though dredging for scallops does not disturb other marine life. Any bycatch found in the nets is immediately thrown back overboard.

Some regulations have required Maple Ridge Farm and Fishery to fish differently than it would in the absence of those regulations. Lobster traps now require sinking rope rather than floating rope, to prevent entanglement of Right Whales. If not for the regulation the CSF probably would not have switched to sinking rope for several reasons. According to Tracy, right whales are not sighted very often in the areas they set their lobster traps, making the sinking rope unnecessary. Also, replacing the floating ropes with sinking ropes was a burdensome expense. Buyback programs do exist for floating rope and other fishing gear, however for the Ameses the expense, in terms of both money and time to make the trip to trade in their floating rope, was not worth the money they would have received from the buyback program.

Regulations have imposed other expenses and inconveniences on the Ameses. When the minimum ring size for nets used to dredge for scallops changes, they must purchase new nets that comply, a costly expense. Also, the scallop season has typically run from November to April, but is becoming shorter and shorter every year, often being shortened at the last minute. The scallop season is also at an inconvenient time of the year for Maple Ridge Farm and

Fishery as it overlaps with its maple syrup production, another product it produces on its farm.

Summary

The three case studies presented here provide detailed and nuanced insight into the three CSFs. The case study results may be a valuable source of information to individual CSFs as they develop and analyze their own operations and goals. This information, while insightful on its own, also begins to paint a picture of CSFs that can be expanded upon with additional case studies or more in depth research. For example, the three case studies reveal three separate business models that are being used to operate CSFs. They also reveal similarities between all three CSFs, such as the focus on economic benefits (see Table 3). This kind of information provides a base from which further research can be designed. For example, it would be useful for fisheries managers to know if CSFs do in fact shift fishing pressure away from overfished species by using underutilized species.

Table 3
Summary of Key Data from CSF Case Studies

	Cape Ann Fresh Catch	The Local Catch	Maple Ridge Farm and Fishery
Year started	2009	2011	2009
Location	Gloucester, MA	Narragansett, RI	Sabattus, ME
Organization	Non-profit with partnerships for purchasing and processing fish.	Privately owned with facilities for processing fish.	Privately owned in conjunction with a farm. Shellfish doesn't require processing.
# of boats participating	up to 36	up to 12	1
Types of shares	5 types Weekly whole fish Weekly filleted fish Weekly alternating Bi-weekly whole Bi-weekly filleted	2 types Whole fish and shellfish Filleted fish and shellfish	2 types Shellfish only Shellfish and vegetables
Price structure	Shareholder fee is a species equal price, paid upfront. Fishermen receive slightly more than wholesale market price.	Shareholder fee is based on retail market prices, paid upfront. Fishermen receive slightly more than wholesale market price.	Shareholder fee is based on retail market price, paid upfront. Fisherman receives all of shareholder fee.
Shareholders	750	10	8
# of pick up locations	20	4	2
Goals	Support the local economy. Build social capital. Use underutilized species. Reduce carbon footprint.	Secure an additional source of income.	Secure better price to fisherman for scallops.
Use of other markets	None	Farmers' markets, direct to restaurants, wholesale	Winter farmers' markets

CHAPTER 6

DISCUSSION

Introduction

In the following sections, the information presented in the case studies on each CSF is analyzed and discussed in the context of the two research questions, as well as in the context of the fishing industry as described in Chapter Two. This discussion provides the basis for the suggestions for CSF development made in Chapter Seven.

Defining Primary Goals

The case studies indicate that *the specific goals and objectives of CSF's are not the same across the three different CSFs, nor are the goals of the CSF always the same as the goals of the fishermen who participate in the CSF*. The goals and objectives of each CSF vary in relation to the CSF's business model and by whom the CSF is operated. For example, at first glance it would seem that the primary goal of all three CSFs studied here is to secure a higher price per pound of fish for the fishermen who catch it. All three CSFs do claim to pay a higher price than what the fishermen would receive for their catch in traditional wholesale markets, and all three posit that the higher price is the primary motivation for the fishermen who participate in their CSFs. However securing a higher price per pound of fish for the fishermen is not necessarily the CSF's

primary goal. Both CAFC and The Local Catch pay fishermen a higher price because it incentivizes fishermen to sell to the CSF rather than to the traditional wholesale market. For CAFC and The Local Catch, the higher price paid to fishermen is an objective, an intermediate step that moves them towards meeting their primary goals.

The primary goal of CAFC is to support the local fishing community and in doing so meet the “triple bottom line” (Tousignant, 2012). Giving fishermen a higher price ensures that CAFC can purchase enough fish to fill its shares. However, giving fishermen a higher price is also an objective that works towards their goals of supporting the local fishing community. For The Local Catch, the primary goal is to diversify and generate additional income for the owner of the Local Catch and its staff (Schumann, 2011). The shares sold by The Local Catch provide this additional income, and in order to fill the shares it pays fishermen a higher price per pound, thus meeting both the CSF’s goal and the fishermen’s goals. For these two CSFs, the goal of the fishermen and the goal of the CSF are both economic and are both met, however there is a subtle but important difference in the economic goal of the CSF and the economic goal of fishermen.

The Maple Ridge Farm and Fishery CSF has a primary goal that is the same as the primary goal of the participating fisherman’s: secure a higher price for the scallops they harvest (Ames, 2011). This is attributable to the simple fact that the CSF is run by the same single fisherman who supplies the CSF, and his

wife. Thus the fisherman's goal to get a better price is naturally the same goal for the CSF.

Additional Benefits

In addition to the economic benefits, all three CSFs mentioned potential social and environmental benefits of CSF markets. However, only CAFC has included social and environmental benefits in its overall goal. CAFC believes its CSF achieves social benefits by building stronger connections between consumers, fishermen, and other people invested in fishing communities (Tousignant, 2012). These connections help to build social capital. This is no surprise considering that this benefit is often cited in other types of alternative markets, most notably CSAs. While CSFs may provide better opportunities for social connection than the regular retail or wholesale market, the opportunities for these social connections are still limited. Shareholders are not able to participate in fishing activity as fishing boats can be dangerous and shareholder participation would be too great a liability for the fishermen. Also, many of the fishermen who sell to a CSF do not actually participate in the marketing aspects of the CSF, thus there is often no direct interaction between the fishermen and the shareholders.

There are two main environmental goals articulated by CAFC: marketing of underutilized species and greenhouse gas savings from reduced food miles. Underutilized species are those that are regulated, but the total allowable catch

quotas¹⁴ are often not met. Quotas may not be met for several reasons, such as a lack of consumer demand for the species or a low market value which acts as a disincentive to land it. CAFC is able to create a demand for these underutilized species by charging shareholders a species equal price and including underutilized species in their shares.

Using a species equal price also provides an opportunity for the CSF market to shift the way fish is valued in the market place. When consumers pay the same price per pound of fish regardless of the species and regardless of the regular market price it conveys the message that the time, effort and expense incurred by fishermen to catch the fish are the same regardless of the species being targeted.

However, the ability of CAFC to include underutilized species in their shares and shift how fish is valued also depends on the supply of underutilized species. Rather than paying fishermen a species equal price for fish, CAFC pays fishermen a price that is slightly higher than the wholesale market price. Thus, there is still a strong incentive for fishermen to land the highest valued species rather than underutilized species. This may limit the ability of CAFC to include underutilized species due to lack of supply.

¹⁴ Total allowable catch regulations dictate how much of a species may be caught within a given time frame.

By not extending the species equal price structure to fishermen, CAFC may be missing an opportunity for the CSF market to also shift the way fish is harvested. When fishermen receive the same price per pound for their fish, regardless of the species or the wholesale market price, they are no longer incentivized to focus their fishing pressure on the most highly valued species. If fishermen were able to rely on a stable price for the fish they land regardless of the species, they may not need to intensify their fishing effort to make up for income lost when wholesale market prices for their catch are lower than they expected.

CAFC also asserts that marketing fish through the CSF reduces food miles, thus reducing the greenhouse gas (GHG) emissions associated with shipping fish through traditional market channels. The GHG emissions saved by marketing fish locally through a CSF may be significant considering the import/export trends in fish markets. Most fish products consumed in the U.S. are imported, and domestically caught fish can end up being shipped internationally for processing, only to end up being sold and shipped back to the U.S. (Love, 2010). Although reducing food miles for the purpose of GHG reductions may not be of much interest to those concerned about fisheries management, it would certainly be a way to gain support for CSFs from consumers, environmentalists and policy makers who are concerned about the impact of GHG emissions on the environment.

The environmental benefits that CAFC recognizes are benefits that occur during the marketing and distribution of the fish. There may be additional opportunities for CSFs to capitalize on environmental benefits related to the harvest of fish, for example the use of specific gear that minimizes impact on marine ecosystems. However, strict regulations may also prevent fishermen from using innovative fishing strategies that are easy to adopt and reduce environmental impact. For example, The Local Catch described a regulation that they feel limits their ability to be more fuel efficient in their fishing efforts. According to the Local Catch, if three different fishermen, each with a permit to catch 100 pounds of fluke per day, want to legally land their limit of fluke, they must either fish on separate boats or make three separate trips in one boat, rather than combine their effort to catch their collective 300 pound limit from one trip.

The concept of shared risk, a concept that is central in Community Supported Agriculture, did not seem to play a very central role in CSFs. The concept of shared risk was not mentioned in the interviews, and it is unclear how market and production risks factor into the relationships between fishermen, CSF operators, and CSF shareholders. In both CAFC and The Local Catch, it appears that the risk is not distributed evenly between the fishermen, the shareholders, and the CSF.

In these models, where CSFs purchase fish from fishermen in order to fill its shares, it seems as though the CSF assumes most of the risk while fishermen and shareholders take on very little if any risk. Operating as a “middle man” of sorts, the CSF secures a set price from their shareholder, and must supply an amount of fish to that shareholder at a later point in time. In order to supply the shares the CSF must compete with market prices at the time the share needs to be filled if they want to incentivize fishermen to sell to them, and secure the fish needed to fill shares.

For example, if CAFC set the price of the share assuming an average cost of \$2.75 per pound of fish, but the average auction price is consistently \$3 per pound, CAFC has to pay fishermen more than what they received from shareholders in order to exceed the auction prices and incentivize fishermen to sell to the CSF market. Although not explicitly mentioned as an assumption of both market and production risks, CAFC did mention that it can take a hit to its bottom line if auction prices in the traditional market are higher than the average base cost it charges per pound for shares.

Summary of Key Findings

The primary goals of CSFs and the fishermen who participate in them revolve around the economic benefits that CSFs can provide, such as a higher price paid to fishermen or a larger share of the market for fish. However, the specific economic goals of fishermen and CSFs may not always be the same.

Cape Ann Fresh Catch also posits that CSFs can provide additional environmental and social benefit, such as reducing the fishing pressure on overfished species, building social networks, and reducing environmental impacts of the fishing industry. However these additional benefits can be limited by the lack of species equal pricing structure, the dangerous nature of the fishing industry, and the strict regulations that govern when, where and how fish can be caught.

The concept of shared risk is central in other community supported market models, but is not specifically mentioned as being important in the operations of any of the three CSFs studied here. The absence of shared risk, along with the lack of species equal pricing paid to fishermen, may be a missed opportunity for CSFs to foster a shift in the market valuation of fish.

Limitations of Analysis

This analysis is limited primarily by the amount and types of data available. While each of the three CSFs that chose to participate represents a different organizational model for CSFs, they are still a very small sampling of CSFs. The case studies likely do not represent all of the organizational models and operations used by other CSFs. Detailed data on each individual CSF was also limited, as CSFs have not focused their attention on keeping records for the purpose of monitoring their operations. For example, it would be helpful to know just how much more money per pound of fish CSFs were able to give fishermen, as this likely impacts the viability of the CSF.

The analysis also faces some limitation due to the research design.

Selection bias may exist since the three CSFs self-selected into participation. This introduces the possibility that the participating CSFs may have some similarity that caused them to participate and that this similarity is not representative of other CSFs.

Also, the methodology used to gather information on fishermen's values and motivations in relation to their participation in the CSF did not work well in CSFs where fishermen did not actively participate in the CSF outside of selling their catch to it. The methodology, in which a point person from the CSF was asked to answer on behalf of fishermen, assumed that the CSF was operated either by one fisherman, or a group of tightly knit fishermen. This is not always the case in CSF operations. For CSFs in which the fishermen's participation was limited to selling their catch to the CSF, the point person from each CSF who was interviewed was only able to provide an educated guess as to what motivates fishermen to participate in a CSF.

CHAPTER 7

NEXT STEPS AND FINAL THOUGHTS

Introduction

The benefits that CSFs have the potential to provide can be better capitalized if CSFs can grow to account for a larger share of the market for fish. To achieve this, CSFs need to collaboratively develop their business models and operations in a way that gives them a competitive edge in a volatile market that will often be limited by efforts to conserve fish stocks. The following six suggested next steps are intended to foster the development of CSFs and give them a competitive edge in light of the regulatory goals to conserve fish stocks.

Workshops and Conferences

The local fishing community already involved in CSF markets and those interested in participating in a CSF market need opportunities to meet and discuss concerns, best practices and lessons learned. The first ever conference of CSF fishermen was held on June 2, 2012(Dory, 2012). The conference should be held annually, with smaller, regional meetings held more frequently. Discussions should focus on issues like pricing of shares, opportunities for shared risk, working with partners, marketing CSFs, collecting operational data for monitoring and evaluation, outreach to the public, and engaging with policy makers.

CSF owners and stakeholders may also find it useful to attend conferences and workshops on entrepreneurship and small business development. For example the University of Pennsylvania's renowned Wharton School holds an annual conference for entrepreneurship (Wharton Entrepreneurship Conference, 2012) and the Massachusetts Small Business Development Center Network holds workshops and provides business development resources for small businesses (Massachusetts Small Business Development Center Network, 2012).

Monitoring and Evaluation

As CSFs develop it will be useful and important for CSFs to develop a simple monitoring and evaluation plan for their business. CSFs should work with an evaluation consultant to develop a simple logical framework, a step by step hypothesis of how their operations will work to achieve their goals. An evaluation consultant can also help CSFs to identify indicators and create a system for collecting data that can be integrated into their current business operations. This would allow CSFs to measure their progress at each step and identify any barriers to achieving their goals. For example, none of the CSFs were able to provide information on just how much more they can pay fishermen per pound. Since CSFs believe that paying fishermen a higher price per pound is essential to securing the fish for their shares, it would be immensely helpful for CSFs to know just how much more they pay fishermen. Knowing this

would give CSFs information that they can use to encourage more fishermen to participate, and advertise the benefits of their business models to consumers.

Secondary data, like traditional market prices that may be needed to calculate how much more CSFs pay fishermen per pound, may be more difficult and time consuming to collect. Forging partnerships with non-profits or NGOs that track this kind of information may ease the burden of collecting this kind of data.

Monitoring and evaluation plans will also help CSFs measure and validate their overall success in meeting their goals and providing additional benefits. If CSFs can provide evidence that CSFs support policy goals as well, they may be able to garner more political support for CSFs. For example, National Standard 8 requires that management plans identify and consider the socio-economic impacts of management plans on fisheries-dependent communities. If CSFs can demonstrate that they have a positive impact on fisheries-dependent communities, management plans for fisheries may be designed to favor CSF markets. Demonstration of positive impacts can also be useful for securing grant funding or small business loans.

As small businesses, CSFs may have difficulty securing funding for an evaluation. If funding for an evaluation consultant is not available, CSFs may want to partner with local colleges or universities. Professors interested in any one of a wide range of topics, from small business development, to fisheries, to

community development, may be able to secure grant funding to complete an evaluation. This strategy worked well for Frontline SMS, a software company that worked with students from Tufts University Fletcher School to design and implement an evaluation of its software. To appeal to an evaluation team at a higher education institution, CSFs may want to work collectively, proposing an evaluation project as a group, rather than each CSF soliciting evaluation work individually.

Expansion of CSF Markets

If CSFs are in fact able to secure a better price for fishermen and achieve other social and environmental benefits it would be advantageous to grow the market for CSFs so that these benefits can be better realized. The ability for a CSF to achieve its goals and provide additional benefits is currently limited in part by the scale of the CSF market and the volume of fish marketed by CSFs. New CSFs continue to enter the market, but their numbers are still small, and some CSFs struggle to get enough shareholders to make the business viable.

All three CSFs indicated that the volume of fish brought to market through the CSF was smaller than they would have liked. The Local Catch and Maple Ridge Farm and Fishery noted that the volume brought to market was also a small portion of their overall business, and the other market outlets they used were more lucrative. At the time of their interviews, both The Local Catch and Maple Ridge Farm and Fishery were considering ending their CSFs because

their volume was not enough to make the benefits of the CSF shares worth the added effort (Ames, 2011; Schumann, 2011).

The Local Catch has questioned the added value of operating a CSF in addition to its farmers' markets stands. It currently uses its farmers' markets stands as its CSF pick up points, and its CSF shareholders are people that were already customers at its farmer's market stands. Operating the CSF has simply caused its existing customer base to change how they purchase, rather than allow the CSF to grow its customer base as a whole. While the CSF does guarantee that shareholders purchase 12 weeks' worth of fish, it is not clear that this is more than what shareholders would have bought normally, in both value and volume. Also, The Local Catch incentivized participation in the CSF by offering an extra \$5 worth of fish in each share, and this may have offset any benefit the CSF provided by guaranteeing the purchase of 12 weeks' worth of fish. The Local Catch did not mention if there was a significant benefit to securing payment in advance through the CSF, rather than at the time of purchase at the farmers' markets.

The Local Catch does not currently have the resources to add new pick up locations, and thus does not expect to reach new consumers who don't already go to the farmers' markets (Schumann, 2011). The Maple Ridge Farm and Fishery also has so few shareholders that its profit margins are too small to warrant the added effort of the CSF. Selling scallops through the CSF as opposed

to the traditional market only brings in an additional \$1,000 during the scallop season (Ames, 2011).

Even when taken collectively, the overall volume of fish that CSFs currently sell is extremely small compared to the overall volume of fish sold in the traditional market. CSFs may be able to provide some benefit to a small portion of the local fishing community, however the current volume would not be sufficient to provide substantial benefits to everyone involved in the local fishing community. Of the CSFs studied here, Cape Ann Fresh Catch (CAFC) moves the largest amount of fish through its CSF. CAFC would like to grow the CSF to the point where it would be moving about 6,000 pounds of whole fish through the CSF market per week (Tousignant, 2012). If CAFC continues to purchase from 36 different boats, and we assume it can pay \$.50 more per pound, this would approximately equal an additional \$4,300 per year for the boat. This additional money may still need to be split between multiple fishermen working on one boat. If split between two fishermen, the additional \$2,150 per year would represent an 8.5% increase from the 2010 annual median wage for fishermen. However, if the volume brought to the CSF market by CAFC were divided among the some 2,000 boats registered in MA, rather than just the 36 boats CAFC currently purchases from, the economic benefits would become negligible.

To fully realize the benefits of CSFs the market needs to grow. Existing CSFs will need to expand their shareholder base, and new CSFs will need to build their own shareholder base in geographic areas that are not yet served by an existing CSF.

Using established alternative markets is an important tool that can help grow the market for CSFs. The visibility provided at farmers' markets can be an effective way of getting not only the name of a particular CSF out there, but also the general idea of CSF markets. The Local Catch provides an example of this, as its CSF customers were mostly people who started buying fish at farmers' markets. If CSFs choose to provide a financial incentive, as The Local Catch did, they should remember that the lower profits received when providing a financial incentive to purchase a CSF share may be offset by the ability to sell all fish species at an equal price, and the stable income generated when a shareholder pays upfront.

Appealing to a wider audience is also an important aspect of growing the number of shareholders. CAFC learned this early on when its shareholders requested that filleted fish also be offered in the shares, instead of whole fish shares only. Being able to provide a variety of fish from week to week may also help attract more shareholders. The Local Catch noted that this was a concern when appealing to consumers, and considered suspending the CSF shares

through the winter because it didn't think shareholders would be satisfied if their shares were filled with "all cod all winter long" (Schumann, 2011).

Including value added fish products, like smoked or marinated fish, and non-fish products in their shares may also attract new shareholders. Many CSAs partner with other local producers to provide a "shopping basket" type share that includes locally produced honey, cheeses, meats etc. The added convenience of getting a variety of products from one share, versus having to buy multiple shares from different producers may be appealing to consumers. Tapping into this concept has been especially easy for Maple Ridge Farm and Fishery, as it also grows produce which can easily be added to shares of shellfish. Although Maple Ridge Farm and Fishery is questioning the financial gain provided from the shellfish shares, it maintains that offering shellfish shares draws consumers in and helps it to sell its other products as well.

Partnerships

Providing the share options and variety that would attract more shareholders can present a challenge for CSFs. Acquiring the facilities and permits to process fish for fillets or process it for added value products can be prohibitively expensive and time consuming for individual fishermen. Also fishing gear is designed to be selective, and fishermen tend to use just one type of fishing gear, which makes supplying a variety of fish species difficult for one fisherman. For example, Maple Ridge Farm and Fishery has a scallop dredger and lobster traps, and thus cannot catch and cannot offer anything but scallops

or lobsters in its shares. Negotiating partnerships with existing processors and fishermen who fish for different species can help to address these challenges. By partnering with Turner Seafoods, CAFC is able to take advantage of facilities and permits already acquired by Turner Seafoods, as well as the economies of scale that Turner has established. Also, by purchasing from many different fishermen, CAFC can ensure a variety of fish for its shares. The Local Catch invested in its own processing facility, but still engages in partnerships with fishermen to ensure the variety in its shares.

Partnerships with buyers, processors or distributors may have their advantages, however they also come at a cost. If partnering with processors, the additional profit margins gained through the CSF are split between more players. CAFC asserts that partnerships are a benefit since the economic gains are distributed throughout the fishing community, however it needs to be ensured that the economic benefits of CSFs are not spread so thin that they are no longer worth the effort for any of the partners, especially the fishermen.

Partnerships and collaboration between fishermen may also be necessary to grow the overall number of CSFs in the market. CAFC and The Local Catch both expressed that most fishermen do not want to be involved in the business and marketing aspects of the CSF. They want to fish, and are happy to get the better price from selling through a CSF, but they either do not want to or don't have time to be involved in the other aspects of running a CSF. The question

then becomes, who will initiate and operate more CSFs to support a market shift towards CSFs? While not all fishermen will want to be involved in the business end of a CSF, there are likely some fishermen who do have the skill set and the interest to operate a CSF. According to the study of Finnish fishermen, “consumer oriented” fishermen consider the processing and marketing of the catch a normal part of their fishing livelihood, while “fishing oriented” fishermen were not as likely to cater to or participate in market activity. It would be useful to survey local fishermen to identify those who are “consumer oriented” and those who are “fishing oriented”, and encourage them to form partnerships for the purpose of running and supplying fish for a CSF.

Identifying “fishing oriented” fishermen may also be necessary to secure the supply for an expansion of CSF markets. Despite CSF shares being a small portion of its overall business, The Local Catch still had to purchase fish from wholesalers, rather than directly from fishermen in order to fill its shares. This indicates that there are not enough fishermen willing to participate in CSF markets to support The Local Catch, never mind an expansion in CSF markets. A survey of local fishermen would help CSFs identify fishermen who might be interested in participating in a CSF, build the right incentives to attract those fishermen, and “pitch” participation in a CSF in a way that appeals to each those fishermen’s values.

CSF Expansion by Way of Market Shift

Despite the potential benefits, it is difficult to talk about growth in any kind of market for fish considering the history of overfishing and ongoing concerns about fish stocks. Growth in CSF markets needs to be carefully planned and promoted in a way that does not place additional demand on ocean resources. To reap any potential benefits that CSFs can provide without further depleting fish stocks, the market for fish needs to shift to CSF markets, rather than expand as a whole. Regulations and quotas need to be respected and enforced, and fishermen must not use growth in CSF markets as impetus to lobby for higher fishing quotas or more lax regulations.

Assuming that current quotas and regulations are in fact sufficient to maintain viable fish populations, one of the most effective things CSFs are positioned to do is provide a market outlet for underutilized species and species without a strong market that would otherwise have been discarded or gone unsold. Of the 279 days in which CAFC delivered shares between February of 2011 and January of 2012, species considered to be underutilized accounted for a little over 20% of the delivery days. These species included Redfish, American Plaice (aka dabs) and Haddock. Species considered to be overfished are also included in CAFC shares. Three overfished species, Cod, Pollock and Hake, accounted for 43% of the delivery days.

It is important to remember that any CSF's ability to use underutilized fish or fish without a strong market is limited by consumer demand. If CSFs were

immediately to begin filling shares with only underutilized or less desirable species it may cause current shareholders to become dissatisfied or discourage potential new shareholders, putting the success of the CSF at risk.

Additionally, a fast and furious marketing campaign for underutilized species may simply lead to overfishing of those species. The fishing industry is notorious for building a market for a species, then fishing that species to depletion, regardless of whether or not regulations are in place. The Patagonia Toothfish is one of the most notorious examples of this. Re-named the Chilean Sea Bass to appeal to consumers, the market for the species experienced a spike in demand and price, leading to overfishing of the species despite regulations (Greenberg, 2005; Sovacool & Siman-Sovacool, 2007).

More recently, the Virginia Marine Products Board¹⁵ is attempting to manage an overabundance of cownose rays by creating a commercial market for them. Chefs have created new dishes like ray marsala and Korean ray soup and cownose ray has been featured at seafood expositions (Hutt, 2009). The species has also received a new market name, the Chesapeake ray, the same marketing strategy used for the Patagonia toothfish. While the effort to create a market for cow nose ray pushes on, there is still no scientific evidence for how many cow nose rays migrate to the Chesapeake Bay each year (Virginia Institute of

¹⁵ The Virginia Marine Products Board is an industry board created by the Virginia Department of Agriculture and Consumer Services.

Marine Science, 2012). Thus, there is little evidence, other than anecdotal, on which to base a fishing quota for the species, and no regulation on the cow nose fishery exists yet (American Elasmobranch Society, 2010). In addition cow nose rays are a slow growing long lived species, not reaching reproductive maturity until around eight years, and producing only one offspring at a time after an 11 month gestation period. This makes them highly susceptible to overfishing. CSFs should not be associated with this kind of aggressive marketing and fishing behavior that results in overfishing.

The potential for the expansion of CSF markets to result in overfishing of an underutilized species is, in theory, limited simply by the regulations placed on commercial species. However, not all species are regulated and even regulated fisheries have been overfished. The process of approving new fishing regulations is slow and overfishing continues in the time between when the problem is recognized and regulations are enacted and enforced. Despite regulations, species often continue to be overfished simply because the high value and demand promises a high return for fishermen.

The species equal price structure of CSFs could help prevent overfishing of underutilized species, since one fish would not be more valuable than another and fishermen fishing for CSFs would fish for what is available and abundant, rather than for whichever species fetches the highest price at the time. However, as mentioned earlier, the species equal price would need to be passed

onto the fishermen to remove the incentive to land only the highest valued species.

The benefit that CSFs can provide by reducing fishing pressure on overfished species could be negated if the demand for an underutilized species causes that species to become overfished, or if it successfully increases the political pressure to increase fishing quotas. Thus, the markets for underutilized species should be built slowly, with a focus on spreading fishing pressure among a variety of available species, rather than shifting from one species to the next as they are overfished in succession. The goal of marketing underutilized species should be to prevent the boom and bust cycle that can occur when species are aggressively marketed and regulations cannot keep up.

Social Equity

Creating a niche market for locally, wild caught fish, while maintaining strict regulations on fishing can have the effect of increasing the price of fresh, locally caught fish. Given this, CSF markets should develop in a way that provides consumers of all income levels equal access to fresh, local fish. The United States Department of Agriculture's Supplemental Nutrition Assistance Program (SNAP), administered locally by each state, provides food assistance to eligible participants. By applying for SNAP license CSFs can ensure that local, wild caught fish remains accessible to low income populations. It would also ensure that public money for the SNAP program is used to support local fishermen. The benefits of participating in the program may be augmented by

local food programs as well. For example, the Boston Bounty Bucks program provides dollar to dollar matching on the use of SNAP benefits at farmers' markets. This means that a SNAP participant can purchase and receive \$20 worth of fish, the CSF would provide and be paid for \$20 worth of fish, but the SNAP participant would only be debited \$10 since the Bounty Bucks Program is providing the match dollar for dollar. If CSFs participated in this program in addition to being SNAP licensed, it would create an incentive for SNAP participants to purchase fish from the CSFs.

Final Thoughts

The state of the world's fisheries is grim; demand for fish is high and continues to grow, many of the world's fish stocks are already overfished, the industry and its profits are being concentrated into the hands of large, industrial producers, and the communities that rely on fisheries related income are struggling to maintain their livelihoods. In this context CSFs are emerging as a potential strategy to provide economic support to fishing communities, make fishing livelihoods more viable, create local connections in the community, and improve the conservation status of fish stocks by spreading fishing pressure across more species.

However, CSFs are still in the very early stages of development and any benefits they provide will be limited by their small market share. CSFs will need to establish a business model that can compete with traditional markets, while

still providing those additional benefits. Monitoring and evaluation plans, partnerships, frequent sharing of best practices, and participation in food assistance programs can help CSFs tailor their businesses to meet their goals while capitalizing the social, economic and environmental benefits of CSF markets.

Appendix A. Research Grid

Research Question	Constructs of Interest	Data Collection Strategies
Question 1: What is the primary motivation for fishermen to participate in a CSF?	Fishermen's' motivation to join CSF <i>Sense of community</i> <i>Better income</i> <i>Less risk</i> <i>Environmental values</i>	CSF interview
	Fishermen's' goals of joining a CSF <i>Build relationship with consumer</i> <i>Increase income</i> <i>Protect/conserve fish resources</i>	CSF interview
	Environmental Awareness <i>Environmental conditions that impact fishing</i> <i>Fishing impact on the environment</i> <i>Environmental values of CSF fishermen</i> <i>Barriers to more sustainable fishing methods</i>	CSF interview Literature Review
Question 2: What are the basic operational structures and business models being used by CSFs?	Markets for fish <i>CSF</i> <i>Farmers' markets</i> <i>wholesaler</i>	CSF interview CSF questionnaire
	Fishing Methods <i>Fishing behavior or methods change</i>	CSF interview CSF questionnaire
	Shares <i>Types and price of shares offered</i> <i>Number of each share type sold</i> <i>Number of shareholders</i> <i>Number of participating fishermen and boats</i> <i>Organization of fishing activity</i> <i>Share distribution locations</i> <i>Share distribution frequency</i>	CSF website CSF questionnaire Marketing material

Appendix B. Questionnaire

Please provide as much of the following information as you can about your CSF market.

(In all questions that ask for information by year, Year 1 should be the first year that your CSF began selling shares)

1. What types of shares does the CSF offer, and how many of each has been sold since the CSF began?

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Type of Share (i.e. whole/fillet fish, fish and shellfish, weight)	# sold	# sold	# sold	# sold	# sold	# sold	# sold	# sold

2. What was the price of each type of share?

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Type of Share (i.e. whole/fillet fish, fish and shellfish, weight)	# sold	# sold	# sold	# sold	# sold	# sold	# sold	# sold

3. Where do you distribute shares? (please indicate if and when distribution locations were added since the CSF began)

4. How frequently are shares distributed?

5. When does the season for the CSF begin and end?

6. How many pounds of fish were brought to the CSF market each year?

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Total lbs of fish/shellfish								

7. Please list the top 5 species of fish by weight that were included in your shares.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Type of fish/shellfish	lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs

Please provide as much of the following information as you can about the inputs used by the CSF.

8. In total, how many fishermen currently participate in the CSF?

9. How many boats are fishing for the CSF?

Type of Boat(i.e. trawler, seiner, line)	# of Boats

Please provide as much detail as possible about fishing and work activities that fishermen participate in outside of the CSF.

10. How many fishermen who participate in this CSF also use another market to sell their catch?

11. What other markets do the CSF fishermen use to sell their fish?

12. How many fishermen in the CSF have a second job other than fishing that provides a source of income?

Appendix C. Interview Questions

Logistics

1. How does the CSF coordinate fishing activity of its fishermen to assure that shares are filled and there is fairness among the participating fishers?
Prompt: Does everyone have to catch a certain amount? Or a certain type?
2. How is the price of the share determined?
3. Does the CSF model allow fishermen to fish differently than they would if they were selling on the regular market?

Motivation to Join a CSF

4. What is the primary motivation for fisherman in this CSF to participate?
Prompt: To connect with their community? Because they believe in buying local?
5. What conditions in the fishing industry have motivated them to participate in the CSF?
Prompt: Regulatory complexity? Environmental degradation? Market volatility?
6. What personal goals does participating in a CSF help the fisherman achieve?
7. What goals does the CSF as a whole have?
8. Do fishermen recognize other benefits to participating in a CSF?

Environmental Values

9. What concerns to fisherman have about the marine ecosystem in which they fish and the impact it has on their fishing activity?
Follow up: How do these concerns influence their fishing activity? How does the CSF allow them to address/cope with those concerns?
10. What concerns do the fishermen have about the impact of fishing on the marine ecosystem?
Follow Up: How do these concerns influence their fishing activity? How does the CSF allow them to address/cope with those concerns?
11. What would you do differently in terms of your fishing efforts if there were no barriers?

Marketing

12. What marketing tools have been used to grow the customer base of the CSF?
13. What resources have you used to help guide the growth of the CSF?

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