

Local Seafood Movements and Seafood Sustainability in North America

A case study on a community supported fishery in Monterey,
California

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Overall, it was a love for the ocean that inspired me to write this thesis and I truly believe that community supported fisheries offer a unique and innovative tool for giving the love back to the sea, its creatures, and those who make their living at responsibly harvesting seafood.

Allison Witter

Lund, Sweden, May 2012

Abstract

Local seafood movements have recently emerged in North America with the aims of enhancing connections between fishermen and consumers, towards improved environmental, economic, and social sustainability. Community supported fisheries (CSFs), in particular, have arisen as a new business model for linking seafood producers to local markets. However, little research has been carried out on the likely impacts of such models as of yet.

The *aim* of this study is to contribute to a better understanding of how CSFs may fill gaps left behind by public regulation (fisheries policy) and private regulation (sustainable seafood initiatives) towards improved seafood sustainability. The specific steps that CSFs envision taking in order to reach their end goals is articulated, through formulation of a basic *program theory* for CSFs. Practical application of these steps, or intermediate outcomes, is measured through case study analysis of the Local Catch Monterey Bay (LCMB) CSF in California. Findings suggest that the CSF is already achieving five out of the eight intermediate outcomes. Uncertainties surrounding time frames, scale, and cause-effect linkages, however, make LCMB's subsequent potential to reach the end goals of CSF program theory unknown.

A set of key supply-side and demand-side challenges and drivers has been extracted from the case study, as well as from data gathered on other North American CSFs. In addition, important lessons for CSFs have been drawn, including the need to recognize the importance of (1) the differences between the sustainable seafood and local seafood movements, (2) specific contextual factors associated with CSFs, and (3) applying socio-economic considerations to fisheries policy and sustainable seafood initiatives. Overall, the need to further explore varying definitions of 'local' and 'sustainable', as well as the potential applicability of the CSF model internationally, remain pertinent.

Keywords: Sustainable seafood, local seafood movements, community supported fisheries (CSFs), program theory, Monterey Bay

Executive Summary

This study is about local seafood movements and community supported fisheries (CSFs) in North America. It aims to understand how these community-oriented programs may fill the gaps left behind by current public and private regulatory measures, towards improved seafood sustainability.

Introduction

Over the past few decades, different international laws and policies have evolved with the aims of addressing global declines in fish stocks and of inciting a more sustainable management of global fisheries. Despite these provisions, however, global fish stocks continue to decline at an alarming rate: at least 75% of them are currently overexploited. Overall, it has become evident that regulatory frameworks on their own have been insufficient for dealing with fisheries declines. According to the United Nations Environment Program, seafood supply chain actors must become involved in complementary action if global fish stocks are to be revitalized and an overall fisheries collapse averted (UNEP 2009). Along these lines, market measures for steering seafood production and consumption towards more sustainable behaviour have evolved (Jacquet *et al.* 2009).

Various sustainable seafood initiatives have emerged with the aim of harnessing the buying power of consumers in such a manner that may influence what gets caught and how it gets caught, via both market (i.e. sustainable seafood eco-labels and recommendation lists) and political (i.e. boycotts) mechanisms. However, it remains uncertain to what extent such consumption-oriented campaigns have been able not only to trigger significant changes in the behaviour of consumers but also in the practices of fishermen (Jacquet *et al.* 2009; Gulbrandsen 2009).

Recent growth in local seafood movements, in North America in particular, may be viewed as a new attempt at improving incentives for both responsible fishing and seafood consumption. In particular, community supported fisheries (CSFs) have emerged as a central component of such movements. CSFs are based upon the community supported agriculture (CSA) model and, although differing slightly in form and function due to varying local contexts, generally aim at preserving small, local fishing fleets via direct marketing, which reduces payments to middlemen in seafood supply chains, provides fishermen with higher up-front profits for their catch, and may allow independent fishermen to stay in business. CSFs may also help to mitigate numerous issues associated with the long and fragmented nature of global seafood supply chains. However, little research has been carried out on the likely impacts of such models as of yet.

The *aim* of this paper was to contribute to a better understanding of how CSFs may fill gaps left behind by public regulation (fisheries policy) and private regulation (sustainable seafood initiatives) towards improved seafood sustainability, by addressing the following research questions:

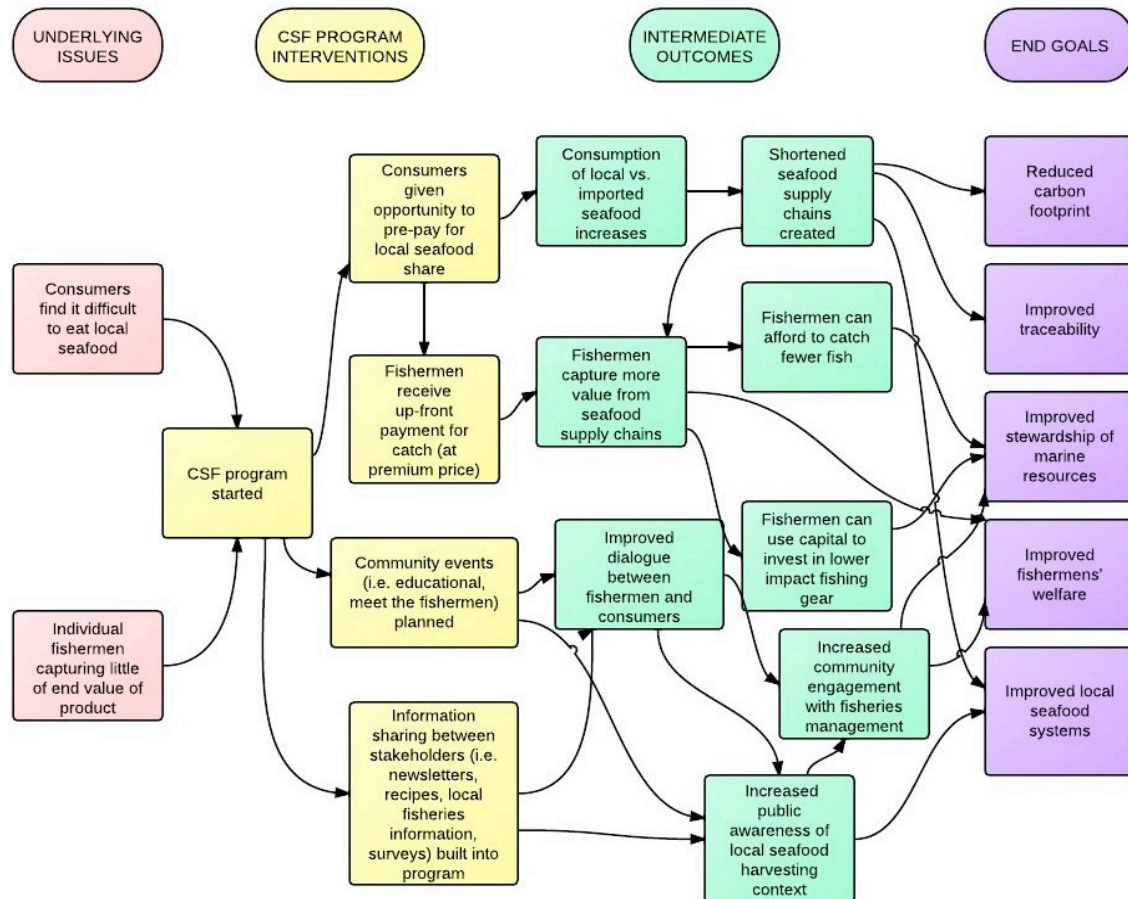
RQ1: How do local seafood movements and CSFs intend to contribute to seafood sustainability?

RQ2: How does CSF program theory compare to the practical operations of a CSF in Monterey, California?

RQ3: What are the main challenges and drivers associated with CSFs and what lessons can be drawn from them?

Methodology

CSFs across North America were surveyed in order to determine their specific reasons for establishment, program interventions, and intended outcomes as well as final goals. *Program theory* was utilized as a framework of analysis for integrating this data and building the “model, theory, or philosophy about how [CSF programs work] ... which indicates the causal relationships supposedly operating in the program[s]” (Fitz-Gibbon and Morris 1996). The following logic model for *CSF program theory* was subsequently developed:



Practical application of the steps, or intermediate outcomes, of CSF program theory was subsequently assessed through case study analysis of the Local Catch Monterey Bay (LCMB) CSF in California. Insights from other North American CSFs were also integrated in order to enhance the overall understanding of the local seafood movement phenomenon and to address the study's research questions.

Key Findings

By gathering data on the key LCMB program stakeholders (its coordinators, members, fishermen, and program intermediaries), the case study findings suggested that the CSF was already achieving five out of the eight CSF program theory *intermediate outcomes*. Achievement of the remaining three outcomes was uncertain, but still possible within the medium to longer term. Overall, it was found that there was potential to reach each of the final *end goals* of CSF program theory within the case study, although uncertainties surrounding cause-effect linkages and scale made the significance of end goal achievement unknown.

The case study suggested that full program scalability (i.e. supplying all consumers with local seafood) was not an aim of CSFs. Rather, in the short term, LCMB aims to sustain those

independent fishermen who use sustainable measures and are interested in the added value that may be reaped from connections to local community members who care about eating 'local' and 'sustainable' seafood. In the longer term, while the local seafood movement may expand in order to include more producers and consumers, numerous other measures beyond the CSF business model will be required in order to foster reaching the end goals of CSF program theory.

Additional research on North American CSFs determined a set of key supply-side *drivers* (i.e. industry consolidation, uncertain purchasing relationships, fisheries management impacts, decreasing value of fishing operations, and opportunities for product differentiation) and demand-side drivers (i.e. growth of the local food movement, repercussions of the sustainable seafood movement, weak traceability within conventional seafood supply chains, and difficulties attaining fresh fish) for the CSF phenomenon. Primary *challenges* for CSF programs were also noted and included (1) bringing fishermen on board with programs, (2) working within existing regulations, (3) managing processing requirements, (4) dealing with unpredictability of supply, (5) communicating program qualities to clients in a consistent manner, (6) managing diverse client expectations, and (7) retaining members.

Three primary *lessons* were also drawn from the research, as follows. First, it should be recognized that the sustainable seafood movement and the local seafood movement, though intertwined, are distinct in their methods, goals, and approaches. Second, the specific *context* of a place is central to the form that local seafood systems will take, making each CSF unique. Third, transfer of the triple bottom line approach utilized by CSFs to fisheries policy mechanisms and sustainable seafood initiatives could help to better address the socioeconomic concerns associated with seafood sustainability.

Reflections and Suggested Areas for Further Research

Local seafood movements and the CSF business model – though youthful at only five years old and varying context-by-context – have already demonstrated positive changes amongst the stakeholder groups that they involve. Through the creation of new markets, these programs can act to empower independent fishermen to continue operations within a tough industry and consumers to make informed seafood purchasing choices. In addition, it is possible that the potential impacts of CSF programs may extend beyond these immediate outcomes and beyond the business model itself, towards longer term and wider scale environmental benefits. By initiating conversations on seafood sustainability within specific local contexts, as well as creating markets within which all seafood species cost the same amount (or the price of weekly membership), CSFs have created a model for change that could shift how fishermen, consumers, and the broader population value seafood. This could help to maintain and promote small-scale, diversified fishing efforts, while shifting away from large-scale fishing and industrial consolidation.

For such systemic shifts to occur, research into (1) how *aggregated sustainability criteria* may be evolved in order to better apply to *disaggregated sustainability movements* and (2) the *potential international applicability of the CSF model* would both be useful, in order to maximize the *communicative* and *connective* benefits that CSFs offer. The need to further explore varying definitions of 'local' and 'sustainable' within the context of CSFs is also pertinent. Overall, it is necessary that mechanisms aiming at improving the state of fisheries – from fisheries policy to sustainable seafood initiatives – evolve so as to better incorporate *socio-economic* considerations, in order to bring about the *behavioural shifts* necessary for improving the state of the world's fisheries.

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Abbreviations

CSA	Community supported agriculture
CSF	Community supported fishery
CSS	Community supported seafood
CSSI	California Sustainable Seafood Initiative
DFO	Department of Fisheries and Oceans
EAM	External Assessment Model
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization
FMP	Fisheries Management Plan
FSSI	Fish Stock Sustainability Index

LCMB	Local Catch Monterey Bay
MLMA	Marine Life Management Act
MLPA	Marine Life Protection Act
MPA	Marine Protected Area
MSC	Marine Stewardship Council
NAMA	North Atlantic Marine Alliance
NOAA	National Oceanic and Atmospheric Administration
OPC	Ocean Protection Council
SFW	Seafood Watch
UNCLOS	United Nations Convention on the Law of the Sea
US	United States of America
USD	US dollars

1 Introduction

Over the past few decades, different international laws and policies have evolved with the aims of addressing global declines in fish stocks and of inciting a more sustainable management of global fisheries. In particular, the 1982 UN Convention on the Law of the Sea (UNCLOS) attempts to better delineate states' rights and responsibilities with regards to maritime issues, including proper fisheries management, through the establishment of Exclusive Economic Zones (EEZs). Maritime nations must determine the maximum sustainable yield of fish stocks within their EEZs (which span 200 nautical miles from the coastline) and then declare and enforce upon fishing vessels the annual total allowable catch levels for those fish stocks. These measures, in combination with additional 1995 UNCLOS rules that aim at improving fisheries regulation in the 'high seas' outside of EEZs, are meant to follow both the precautionary approach and the ecosystem approach in order to improve the sustainability of global fish resources (UN 1982).

Despite these provisions, however, global fish stocks continue to decline at an alarming rate: at least 75% of them are currently overexploited. Attempts within international law to counteract the 'tragedy of the commons' by converting common pool resources, such as fish stocks, into state property, have failed to put a stop to unsustainable practices in the production end of the seafood supply chain. For example, increases in fishing effort; utilization of damaging fishing gear; unsustainable aquaculture; and illegal, unreported, and unregulated fishing all continue despite national fisheries regulations. These production-end driving forces are compounded by a continual and steady increase in global demand for seafood, due to increasing populations, expanding incomes, and the promotion of fish as a healthy food option (UNEP 2009). Overall, it has become evident that regulatory frameworks on their own have been insufficient for dealing with fisheries declines. According to the United Nations Environment Program, seafood supply chain actors must become involved in complementary action if global fish stocks are to be revitalized and an overall fisheries collapse averted (UNEP 2009). Along these lines, market measures for steering seafood production and consumption towards more sustainable behaviour have evolved (Jacquet *et al.* 2009).

On the consumption end, different non-regulatory approaches have been exercised with the aim of harnessing the buying power of consumers in such a manner that may influence what gets caught and how it gets caught. For example, different non-governmental bodies have developed and distributed seafood sustainability ranking lists, with the Monterey Bay Aquarium's Seafood Watch (SFW) program and its recommendations as perhaps the most well established and widely recognized (DeSombre and Barkin 2011; SERG 2011). Sustainable seafood certification schemes have also emerged with the aim of informing buyers on ocean-friendly consumption choices. Along these lines, the Marine Stewardship Council (MSC) recognizes and rewards 'sustainable fishing' through its seafood eco-label, while the Aquaculture Stewardship Council intends to do the same for 'responsible aquaculture' (MSC 2012; ASC 2012). Collective action initiatives, such as boycotts and buying commitment campaigns, are also examples of consumer action aimed at shifting the behaviour of seafood supply chain actors towards more sustainable practices (DeSombre and Barkin 2011).

However, it remains uncertain to what extent such consumption-oriented campaigns have been able not only to trigger significant changes in the behaviour of consumers but also in the practices of fishermen and aquaculture operators (Jacquet *et al.* 2009; Gulbrandsen 2009). This uncertainty stems primarily from the fact that little concrete research has been undertaken in order to measure such cause-effect relationships. In addition, insofar as fishermen face a

unique set of challenges in their day-to-day operations as they attempt to remain competitive, it is also uncertain whether such demand-oriented measures even have the *capacity* to incite widespread changes in production methods (especially when the level of actual consumer pressure at the global scale is unknown) (Gaines and Costello 2011; Valdimarsson and Metzner 2011). In most cases, fish are not ‘owned’ until they are caught, and there are therefore inherent tensions between the considerations of an individual fish harvester and the collective well-being, as well as between short- and long-term thinking (Valdimarsson and Metzner 2011; Iudicello *et al.* 1999). Overall, determining how to replace strong incentives for overfishing with incentives for responsible stewardship – in a manner that avoids ineffectual ‘one size fits all’ remedies – remains a central and pertinent problem when attempting to ameliorate the global fisheries crisis (Martens *et al.* 2011). In addition, traceability concerns and the rampant ‘imposter fish’ phenomenon, whereby seafood is illegally mislabelled in order to yield higher profits, further hinder the effectiveness of such consumer-centred efforts.

In North America, recent growth in local seafood movements may be viewed as one attempt at improving incentives for both responsible fishing and seafood consumption. Insofar as it is believed that human communities’ shifts in dependence from local to distant food (including fisheries) resources has eroded understanding of local as well as global carrying capacities, such movements intend to re-connect people with local sources of seafood and the people that harvest them (Mueller and Taylor 2011; Bowen 1999). It is hoped that enhanced proximity will help fisheries to become more sustainable by allowing small-scale fishermen to remain in business; by shifting towards low-impact fishing through targeted gear investments; by encouraging consumer knowledge of (and, where necessary, pressure upon) nearby fisheries management measures; by improving traceability; and by minimizing the ‘food miles’ and subsequent carbon footprint associated with long global food supply chains (LCMB 2012; K. Selkoe, personal communication, Feb 21st, 2012).

In particular, community supported fisheries (CSFs) have emerged as a central component of such movements. Based upon the community supported agriculture (CSA) model, CSFs tend to employ consumer prepayments as a means of covering working capital costs and locking in sales volumes for fishermen. The first CSF started in 2007 in Port Clyde, Maine, in the United States (US), and there are currently around 26 CSFs in North America, many in their first or second year of operations. Though differing slightly in form and function due to varying local contexts, CSFs generally aim at preserving small, local fishing fleets via direct marketing, which reduces payments to middlemen in seafood supply chains, provides fishermen with higher up-front profits for their catch, and may allow independent fishermen to stay in business¹. Profits may also be enhanced through investments in gear improvements that minimize fuel costs, bycatch levels, and negative impacts on aquatic habitats, as well as through marketing aimed at putting a face on the fishermen who brought in the catch of the day, allowing seafood to be sold at a higher price due to its more ‘local’ and ‘sustainable’ image (Jain and Garderet 2011; Local Catch.org 2012). On a larger scale, this model can theoretically help to mitigate issues associated with the long and fragmented nature of global seafood supply chains, including the persistence of illegal, unreported, and unregulated fishing; illegal mislabelling of fish; poor traceability; ample ‘food miles’; and consumer confusion (Rogers 2011; Jacquet and Pauly 2008b; Tyedmers 2008). However, given that both local seafood movements and CSFs (in their current forms) are relatively new, it is unclear to what extent they can actually contribute to seafood sustainability.

¹ Please refer to Appendix 1 for a schematic that compares small-scale fisheries to large-scale fisheries., at the global level.

1.1 Focus problem and objectives

As already mentioned, local seafood movements and CSFs have recently emerged in North America as new and unique means of improving seafood sustainability. The *aim* of this paper is to contribute to a better understanding of how CSFs may fill gaps left behind by public regulation (fisheries policy) and private regulation (sustainable seafood initiatives) towards improved seafood sustainability, through: (a) articulation of the specific steps that CSFs envision taking in order to reach their end goals, (b) assessment of the practical application of these steps through case study analysis of a CSF in Monterey, California, and (c) extraction of the key overall drivers, challenges, and lessons of the CSF movement. As such, the overall *objectives* of the paper are as follows:

1. To outline the North American fisheries and regulatory contexts within which local seafood movements and CSF programs are being established;
2. To review background literature on the concepts and ideologies behind:
 - a. Sustainable seafood initiatives; and
 - b. Local food movements;
3. To gather data on existing local seafood movements in North America in order to conceptualize CSF program theory;
4. To carry out a detailed case study on a CSF in Monterey, California; and
5. To extract the primary challenges and drivers associated with CSFs so as to derive key lessons for CSFs and local seafood movements more broadly.

By fulfilling these objectives, the paper will address the following *research questions*:

RQ1: How do local seafood movements and CSFs intend to contribute to seafood sustainability?

RQ2: How does CSF program theory compare to the practical operations of a CSF in Monterey, California?

RQ3: What are the main challenges and drivers associated with CSFs and what lessons can be drawn from them?

1.2 Scope

The focus of this report is local seafood movements and CSFs, with a primary focus on wild marine commercial fisheries and a secondary focus on marine aquaculture operations. Rather than quantifying the impacts of such programs, the study addresses the *perceptions* of key stakeholders with regards to how they envision their programs shall contribute to seafood sustainability and other end goals. Data has been gathered from CSFs in North America with this goal in mind.

There is particular emphasis within the study on the Local Catch Monterey Bay (LCMB) CSF, which operates in Monterey and Santa Cruz counties within the state of California. There are several reasons for this choice. At the state level, California is often deemed as having ‘eco-

system based' fisheries policy measures as well as 'sustainable' fisheries (McCormick and Schuchat 2010; Ruckelhaus *et al.* 2008). At the same time, however, much of the seafood landed in California is exported, while much of the seafood consumed by California residents is imported from abroad² (NOAA 2010). As a result, local seafood movements and CSFs emerging within the state aim at reconnecting residents with 'sustainable', 'local' catch. Impending legislation such as the California Sustainable Seafood Initiative (CSSI) (to be outlined in further detail in Section 5.2.1) adds to the value of using California as a case state. More specifically, Monterey Bay has been chosen for detailed analysis because of proximity during the research period as well as a strong willingness to participate amongst key stakeholders (primarily the LCMB CSF coordinators). Additionally, Monterey Bay's substantial fishing history has contributed significantly to the region's development, yet there is presently a strong disconnection between regional seafood production and consumption. These *contextual factors* added to the richness of the primary data gathered during the case study.

Background information and tools for analysis have also been brought in from other CSFs and geographic regions. Various definitions of 'seafood sustainability' and 'local food' were integrated and considered within the study. Thus, while research has been partially scoped down to focus on one CSF in particular, insight into the business models, goals, drivers, and challenges of other CSFs is offered throughout the paper. The intended audience for this research is academics and practitioners working in the realm of sustainable seafood and local (sea)food, fishermen, and anyone potentially interested in setting up a CSF.

1.3 Reader's guide

The research study is structured as follows:

- *Chapter 2* – information on the methodology of data collection and analysis used during each phase of the research process
- *Chapter 3* – description of seafood production and consumption levels globally and in North America as well as corresponding fisheries policy measures
- *Chapter 4* – background on the concepts of 'sustainable seafood', 'local food', local seafood movements, and CSFs, as well as data on the CSFs currently operating in North America, towards the formulation of CSF program theory
- *Chapter 5* – case study on the Local Catch Monterey Bay (LCMB) CSF in Monterey, California, framed within the California seafood and fisheries policy contexts
- *Chapter 6* – analysis of the research findings, including discussion of the application of CSF program theory in the Monterey case study, the main challenges and drivers associated with CSFs more generally, and the primary lessons to be drawn from this analysis
- *Chapter 7* – answers to the research questions and specific conclusions and reflections derived from the research study, as well as suggested areas for further research

² Exact seafood trade figures for California are difficult to quantify, since imports into the US are categorized by their initial port of entry (and not necessarily their final destination), while US exports are classified by their port of exit (and could have originated from fisheries outside of the state) (DFG 2001).

2 Methodology

This chapter describes the design of the study, methods used for data collection and analysis, and possible limitations to the research.

2.1 Research design

While the research process was iterative, in that the study's structure evolved as research was carried out, the overall study design followed the general framework depicted in Figure 2-1 below.

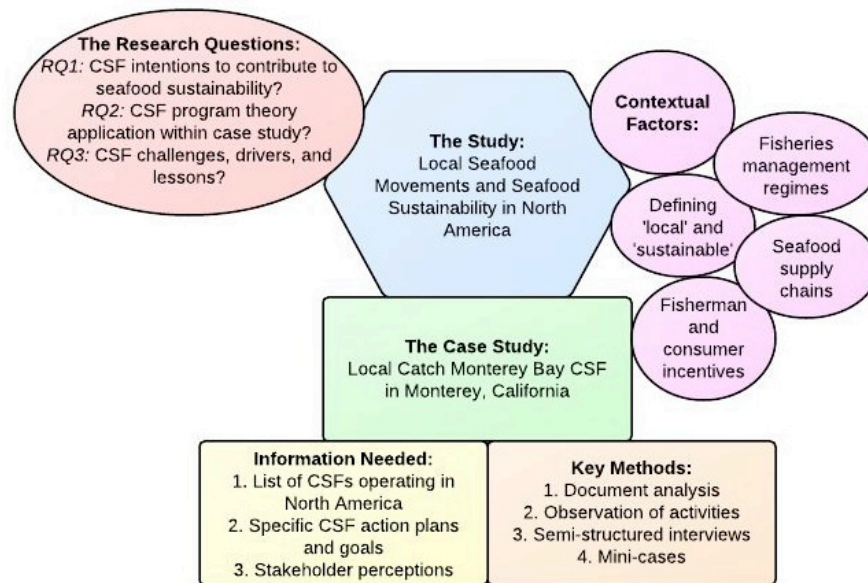


Figure 2-1 Design of the research study

Source: Adapted from Stake (2010)

The research was inductive, rather than deductive. That is, it aimed to offer insights through experience with a specific case study. The inductive approach was chosen over the deductive approach because it allowed for an open-ended and exploratory study of a subject that is very new and has not been widely researched. Real-life observations during the research period helped to inform the formulation of a general program theory for community supported fisheries (CSFs).

In addition, research was primarily qualitative, due to the interpretive, experiential, situational, and personalistic nature of the study (Stake 2010). However, some quantitative data, in particular fisheries, aquaculture, and seafood trade statistics, was gathered and utilised.

Research for the study comprised the following multi-phase process:

1. Literature on the seafood industry and fisheries policy contexts at the global level and within Canada and the US was reviewed (Chapter 3);

2. The concepts and ideologies behind sustainable seafood initiatives and local food movements were summarized (Chapter 4);
3. Data was gathered on existing CSFs in North America, in order to define CSFs and formulate CSF program theory (Chapter 4);
4. A detailed case study on the Local Catch Monterey Bay (LCMB) CSF in Monterey, California was carried out (Chapter 5); and
5. Analysis of the case study findings was carried out within the framework of CSF program theory, in order to extract the primary drivers and challenges of CSFs and to draw useful lessons for CSFs and local seafood movements more broadly (Chapter 6).

The case study method utilized in this study followed guidelines provided by Simons (2009) in order to effectively synthesize gathered data, discipline subjectivity, and draw inferences. Measures suggested by Yin (2009) were also utilized for enhancing reliability. While the LCMB case study was the most detailed within the research, cross-case analysis with other North American CSFs was also extremely useful. Internal and external validity were maximized through data triangulation and, in some instances, respondent validation.

In addition, the research aimed at fulfilling the following four criteria proposed by Lincoln and Guba (1985) for performing sound *qualitative* research: credibility, transferability, dependability, and confirmability. Appendix 2 explains each of these criteria in relation to its more traditional quantitative counterpart, as well as outlining the specific qualitative methods utilized for criteria verification.

2.2 Data collection and analysis

In Phase 1, statistical data on seafood production and consumption as well as import and export levels was gathered from American and Canadian government databases. Information from scientific journals, books, and interviews³ was gathered on fisheries management provisions at the international level and within Canada and the US, so as to describe the context within which North American local seafood movements and CSFs have evolved.

In Phase 2, data collection consisted of a literature review in which information was gathered from scientific journals, books, and relevant websites. Informal interviews played a role in developing a better understanding of the concepts of sustainable seafood and local food, and, subsequently, of how the two may fit together. Data was collected and filtered with the aims of creating a general understanding of (1) the main sustainability issues surrounding fishery and aquaculture operations as well as the varying definitions of ‘sustainable seafood’ and (2) the driving forces and ideology behind local food movements as well as different conceptions of what is meant by the term ‘local’.

In Phase 3, the aforementioned information was supplemented by data gathered on the CSFs that currently exist in North America. This first occurred through a search of relevant websites and other sources in order to create a preliminary list of North American CSFs. Second, project leaders and fishermen involved in these programs were contacted and more detailed information was garnered through email surveys and semi-structured interviews (over the phone and in person). The original list was refined after these interviews as informants

³ Please refer to Appendix 3 for a list of the interviews and other important communications (total 26) carried out during the research period.

mentioned additional movements that were not yet noted. Specific case data was useful for creating a better understanding of what is meant by ‘CSFs’ and ‘local seafood movements’. A literature review on program theory was initiated, whereby books and academic journals were consulted so as to develop a sound understanding of this framework of analysis. The abovementioned data gathered on CSFs was subsequently utilized in order to develop CSF program theory.

In Phase 4, a detailed case study on the LCMB CSF in Monterey, California was carried out, in order to better understand the program and its potential to achieve the intermediate outcomes and, eventually, end goals of CSF program theory. A heterogeneity sampling method was utilized, in which a broad and diverse range of participants from the Monterey Bay area was surveyed or interviewed, since a primary interest of the study has been to elucidate the broad spectrum of ideas surrounding CSF programs and their potential to contribute to seafood sustainability. Along these lines, snowball sampling was also used in order to reach as many possible stakeholders as possible (Trochim 2006). The key LCMB stakeholder groups elucidated by these methods are depicted in Figure 5-3; as many members as possible from each group were contacted for survey research (through both questionnaires and semi-structured interviews).

Direct observations, the gathering of written documents, and access to the LCMB program’s weekly customer surveys, email account, and online membership platform (Farmigo) also contributed to building an understanding of the CSF program, its relevant stakeholders, and their expectations. Throughout the case study, data was also gathered from books, academic journals, and local informants on the Californian and Monterey context within which this CSF is being developed. Information garnered from semi-structured interviews with other sustainable seafood and local seafood initiatives in California was utilized in order to better understand this context. The validity and reliability of this case study method was enhanced through specific design and analysis methods, such as those suggested by Yin (2009) and Simons (2009).

In Phase 5, case study findings were analysed within the framework of CSF program theory, in order to extract the primary drivers and challenges of CSFs and to draw useful lessons for local seafood movements and CSFs. Data from the previous sections was synthesized, and was subsequently supplemented and verified through further semi-structured interviews as well as review of scientific articles and other relevant literature.

2.3 Limitations

This study was potentially limited due to several factors. To begin, the initial list of CSFs may have been incomplete, as it is possible that some of the newer programs were overlooked. In addition, the selection of one particular case study (LCMB in Monterey, California) from this list (due to proximity) may have altered the study’s findings. This is because CSFs, though for the most part following a shared core business model, represent unique manifestations of certain contextual factors associated with a specific place. As such, the CSF studied in Monterey is likely to vary to some degree when compared with other North American CSFs. In addition, since the study constructed CSF program theory based on agglomerated findings from different CSFs in North America, it is possible that the theory includes certain components that some CSFs *do not* include, or that it has missed certain components that some CSFs *do* include.

The focus of the study is on North America, and California in particular, since (1) this is where the researcher was situated during the research period and (2) there appears to be an

ample concentration of local seafood movements and CSFs in these locations. However, it is possible that this particular geographic focus may have biased the study's results. For example, CSFs recently started in California operate within a different fisheries management and historical context than CSFs started up earlier in the US Northeast, giving them a slightly different form and function. In addition, the actual transferability of the study's results to other geographic locales remains to be seen.

In terms of data collection and analysis, reliance upon *interpretive* techniques within the case study method is another potential limitation to the findings of the study (Gerring 2007). In particular, findings on cause-effect relationships, such as with regards to the steps between CSF program theory's intermediate outcomes and final end goals, as well as the case study CSF's practical achievement of these steps, may have been misinterpreted. While efforts were made to participate in face-to-face interviews as much as possible, some interviews and surveys had to be carried out over email (i.e. with East Coast CSFs), adding to possibilities for misinterpretation of respondent data. In addition, it is also possible that a lack of willingness to participate in the study amongst some potential informants may have altered results to some degree.

Since this is a relatively new topic, much of the data gathered is also very new and has not yet been tested by other studies. For example, the case study method utilized in the research focused heavily on one very new CSF: Local Catch Monterey Bay (LCMB), which began operations in January 2012. While it is hoped that the gathering of such new data during the initial months of CSF establishment has been advantageous to the research (i.e. by offering insight into the primary drivers and challenges that CSFs face when becoming established), it is also possible that significant changes occurred after the termination of the research period. In addition, anticipating the results of impending regulation such as the California Sustainable Seafood Initiative (CSSI) required speculation, as actual practical impacts have yet to be realized. Overall, the richness of data and analysis in this study has been partially limited by the brevity of the research period.

3 Regulation of the seafood industry

This chapter highlights seafood production and consumption trends globally and in North America. Public regulatory measures that have been adopted in order to manage the seafood industry are also described, with a general focus on international legal frameworks and a specific focus on fisheries policies in the US and Canada.

3.1 The global seafood industry

International trade in fish products has intensified to such a level that seafood is now one of the most globalized commodities (FAO 2012; Pauly *et al.* 2002; Valdimarsson 2007; Anderson and Valderrama 2007). Seafood supply chains are becoming increasingly long, fragmented, and global in nature (Rogers 2011). Capture fisheries account for around 61% of world fish production, while aquaculture accounts for around 39% (FAOSTAT 2012). Declining wild harvests of many fish species have coincided with increasing trade of those same species, due to the rapid expansion of aquaculture operations worldwide. It is expected that “more and more of [seafood] supply is going to be concentrated in fewer and fewer species” (Anderson and Valderrama 2007). According to *The State of World Fisheries and Aquaculture* (2010), a biennial report by the FAO, it can be expected that fish consumption levels will continue to increase, both in developed and developing countries, and that expansion of aquaculture shall continue to play a central role in satisfying that demand (FAO 2010).

In 2009, 84.2% of total world fishery production was directed toward human consumption, while 15.8% was directed toward other end uses (for 2000-2009 trends see Figure 3-1). Of the portion directed toward human consumption, 46.8% was marketed fresh, 28.6% was frozen, 10.2% was cured (or preserved), and 14.4% was canned. There has been a gradual shift since 2000 away from fresh-marketed fish towards frozen and canned fish (FAOSTAT 2012). Processing types are favoured variably in different regional markets (Valdimarsson 2007).

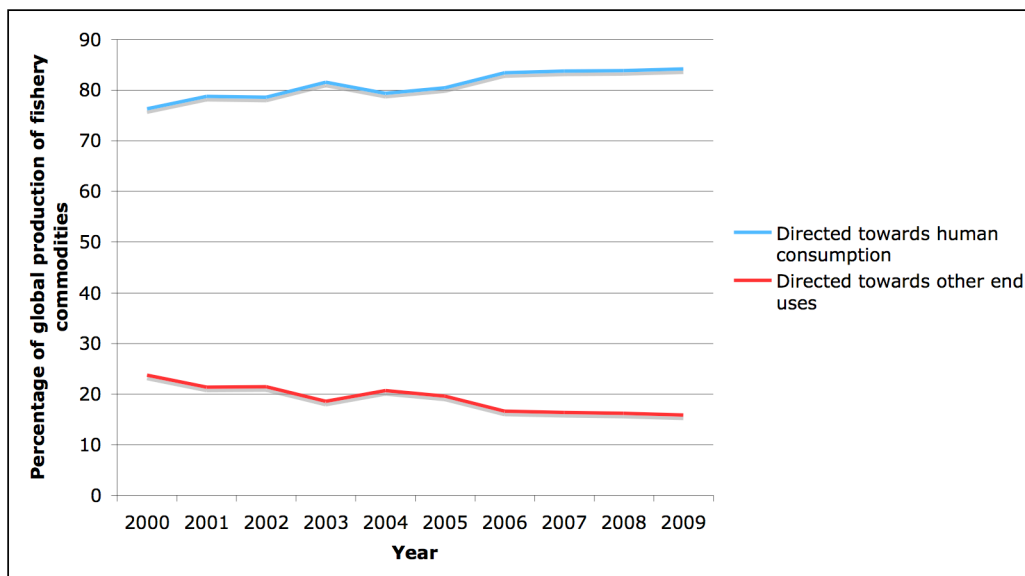


Figure 3-1 Trends in the end-uses of global fishery commodities (as a percentage of total global production) (2000-2009)

Source: Data from FAOSTAT (2012)

Fish processing is increasingly being shifted out of developed countries, with China and Thailand emerging as leaders with increased processing capacity. Not only has China become a main source of seafood to countries such as the US, but also large volumes of seafood are sent from abroad to China for processing and subsequent re-export. It can be expected that imports for actual seafood consumption will also grow markedly in China in the coming years. While the US, Japan, and the European Union are the largest net importers of seafood, the top net exporters have tended to be those that have pursued domestic aquaculture expansion (i.e. China, Norway, Thailand, Canada, Chile, and Vietnam) (Anderson and Valderrama 2007; FAO 2010).

3.2 International frameworks for fisheries regulation

Following a growing global demand for seafood, and subsequent expansion of fishing efforts, different international laws and policies have emerged with the aims of addressing global declines in fish stocks and of inciting a more sustainable management of global fisheries. The role of coastal states in conserving fish stocks in their adjacent waters was initially identified in the 1958 Convention on Fishing and Conservation of the Living Resources of the High Seas (UN 1998). This convention gave nations the right to implement “unilateral measures” for fish stock conservation in the seas off of their coastline. However, the rules laid out by this law were generally unclear and rarely implemented (UN 1998). Additionally, there was confusion surrounding the delineation between territorial seas (where coastal states had full regulatory power over fisheries) and the high seas (where no state could impose its jurisdiction upon another nation’s fishing vessel) (Oda 1983). This, combined with increasing signs of fisheries depletion, unbounded industrial fishing in open waters, increasing disputes between fishing nations, as well as other unsettled oceanic issues (i.e. pollution, deep sea mining claims, etc.), set the stage for a new, more clearly defined international marine law, in the form of the 1982 UN Convention on the Law of the Sea (UNCLOS) (UN 1998).

Several parts within UNCLOS are directly relevant to sustainable fisheries management. In particular, Part V outlines the new Exclusive Economic Zones (EEZs) established by the treaty in order to clarify the rights and obligations of states within a 200 nautical mile range expanding outward from their coastlines (UN 1982). According to UNCLOS, when a nation cannot utilize fully the fisheries resources within its EEZ, it shall make that ‘surplus’ available to fishing fleets from other nations (Pauly *et al.* 2002). Section 2 of Part VII outlines rules for “conservation and management of the living resources of the high seas” (UN 1982). Additional international agreements with relevance to sustainable fisheries management have been adopted since UNCLOS, including the 1995 United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks, the 1995 Food and Agriculture Organization (FAO) Agreement to promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, and the 1995 FAO Code of Conduct for Responsible Fisheries (UN. 1982; FAO 1995a; FAO 1995b)

Above all, UNCLOS has managed to effectively create a structured international regime for managing maritime issues, including fisheries. However, while the theoretical control and management responsibilities of fisheries are now more clearly outlined, there is little proof of improved conservation or restoration of fish stocks globally. Marine fisheries catches, as reported by fishing nations to the FAO, have hovered at around 90 million metric tons since the late 1990s, a large reduction from earlier years (FAOSTAT 2012). This reduction is not due to decreased fishing efforts, however, and is worrisome because fish stock scarcity is pushing industrial fishers into deeper (less regulated and highly sensitive) waters (Norse *et al.* 2012). At the same time, aquaculture is increasingly being implemented to supplement global seafood production and to meet growing global seafood demand (FAO 2010) (see Figure 3-2).

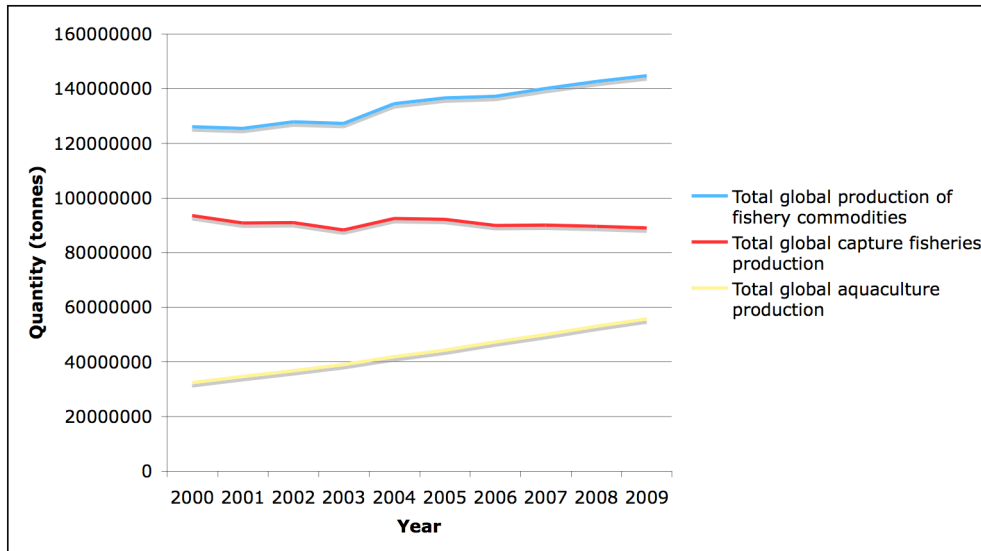


Figure 3-2 Total global production of fishery commodities by capture fisheries and aquaculture (2000-2009)

Source: Data from FAOSTAT (2012)

During the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea of June 20-24, 2011, it was noted that sustainable global fisheries management remains limited due to the failure of UNCLOS and its related policy instruments to:

1. Establish and effectively manage sufficient marine protected areas (MPAs), including high seas marine reserves;
2. Effectively put a halt to over-fishing;
3. Properly monitor and enforce fisheries where needed;
4. Stop destructive fishing practices such as bottom trawling;
5. Build capacity for sustainable fisheries in developing countries;
6. Utilize prior environmental impact assessment and strategic environmental assessment;
7. Implement the precautionary approach and the ecosystem approach; and
8. Provide for transparency in decision-making and open access to information (Pew Environment Group 2011).

Effective application of UNCLOS and its related agreements—towards a true improvement in fisheries management—is hindered by the fact that global oceans continue to be managed in a fragmented manner, with national and international regulatory bodies holding distinct yet overlapping jurisdictions and responsibilities (Pew Environment Group 2011). Generally speaking, implementation of international law within national systems tends to be “poor” and with “patchy” coverage (Anderson 2002). This compounds the practical difficulties associated with fitting private entities that roam the open seas into the current international fisheries regime.

Overall, today's international structure for oceans governance, as established by UNCLOS and its follow-up agreements, lags behind the current threats posed to the marine environment as well as lacking effective implementation (Pew Environment Group 2011). This is particularly the case with regards to the high seas, where it remains difficult to establish clear responsibilities, where monitoring and enforcement are particularly challenging, and where marine ecosystems are especially sensitive to fishing (GOBI 2010).

3.3 The North American seafood industry

The American and Canadian seafood markets are ample in terms of both production and consumption. However, while Canada is a net seafood exporter (with seafood as its top food export and the US as its most significant export market), the US is one of the world's top seafood importers (Agriculture and Agri-Food Canada 2012; FAO 2010; CASS 2007). Around 86% of the total amount of seafood consumed in the US is imported from other countries, particularly Canada, China, Thailand, Indonesia, Vietnam, and Ecuador (NOAA Fisheries 2012). In 2010, the primary products imported into the US for domestic consumption were shrimp (558,602 tonnes total), fresh and frozen salmon (221,744 tonnes total), fresh and frozen tuna (215,694 tonnes total), and canned tuna (200,653 tonnes total). In addition, some fish products of foreign origin were imported for subsequent re-export (US Department of Commerce 2010).

Another key difference between the American and Canadian seafood markets is per capita consumption level: while the average Canadian consumes around 50 pounds⁴ of seafood per year, the average American consumes only around 16.5 pounds per year (CASS 2007). Thus, while the US is the world's third largest seafood market overall, its per capita seafood consumption lags when compared with other developed nations. However, according to a 2010 Canadian government report on consumer trends in the American seafood market, these figures can be expected to increase, especially in large population centres on the East and West coasts and amongst Latino and Caribbean population groups. Overall, it is expected that seafood consumption in both the Canadian and American markets will be augmented on the one hand due to the marketing of seafood as a healthy food alternative and diminished on the other hand due to economic difficulties and reduced incomes (Agriculture and Agri-Food Canada 2010).

Illegal seafood mislabeling remains persistent in North America. "Mislabeling" refers to instances where a label does not conform to the common accepted name for a product as well as the substitution of one name for another. A study carried out in five cities across Canada by Hanner *et al.* (2011) found common cases of substitution (amongst others) to be of red snapper with tilapia; of Pacific salmon with Atlantic salmon; and of cod with pollack, haddock, hake, and rockfish. According to the authors, the main reasons for this substitution include "high demand with limited supply, high profit incentive, an increase in international trade of processed foods, and lack of regulation enforcement and implementation" (Hanner *et al.* 2011). It is assumed that inexpensive species are less frequently mislabeled through substitution than more expensive species (Hanner *et al.* 2011). Other DNA-based studies have had similar results. Marko *et al.* (2004) found that 60-94% of fish labeled as red snapper in the US was improperly labeled. Similarly, Wong and Hanner (2008) determined that 25% of various species purchased from New York City and Toronto restaurants were mislabeled, while a recent report by Warner *et al.* (2012) found that 65 out of 119 seafood samples

⁴ 1 pound = 0.45 kilograms

collected from grocery stores, restaurants, and sushi establishments in Southern California were mislabeled according to federal guidelines.

While at the national level seafood production may only account for a small portion of the Canadian and American gross domestic product, the seafood industry may still be a crucial component of the local economy in specific coastal communities. These communities are being impacted in various ways by fisheries depletion. For example, both the US and Canadian federal governments are increasingly promoting seafood production through aquaculture expansion in order to supplement diminishing capture fisheries. In Canada, for example, the annual growth rate for aquaculture has averaged around 14-15% per year, which is higher than the global annual growth rate for aquaculture. Certain forms of aquaculture can impact wild fisheries through the spread of disease and changes in genetic composition, leading to reduced survival capacity of wild populations (Ford and Myers 2008). A study by Chu *et al.* (2010) confirmed that American stakeholders are particularly concerned about this relationship between wild fisheries and aquaculture (especially when compared with stakeholders in the more pro-aquaculture nation of Norway).

3.4 Fisheries regulation in North America

Even in countries such as the US and Canada where UNCLOS application has been relatively stringent and where strong central fisheries management bodies have been formed, challenges still persist. Despite the existence of the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service in the US and the Department of Fisheries and Oceans (DFO) in Canada, fish stock crashes and fishery closures (particularly Atlantic cod in the early 1990s) have not been entirely avoided and, despite subsequent management shifts, notable portions of regulated fish stocks remain overfished. In the US, for example, 26% of federally managed stocks were overfished in 2008 (Fulton *et al.* 2011). Although this is an improvement from the 38% of US stocks that were considered overfished in the year 2000, rebuilding and maintaining healthy fish stocks remains difficult (Beddington *et al.* 2007).

According to a study carried out by Fulton *et al.* (2011), these challenges stem in part from the fact that, while fisheries management has come to focus on the *scientific* uncertainty of dealing with exploited resources, little attention has been paid to mitigating *human* uncertainty, a key challenge to the design of effective policy instruments. In other words, and as displayed in Figure 3-3, managers tend to focus on the scientific uncertainties associated with the former half of the fisheries management cycle (Steps 1-4), while less focus has been given to effectively managing the latter part of the cycle, which deals with human responses (Steps 5-7).

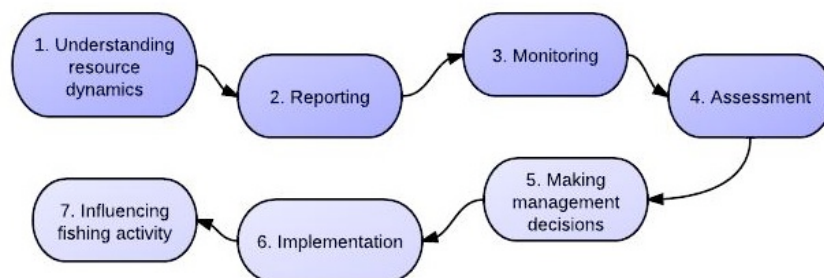


Figure 3-3 General steps of the fisheries management cycle

Source: Adapted from Fulton *et al.* (2011)

Examples of the human-related uncertainties that can influence the fisheries management process include political pressure (at Step 5), lack of regulatory control (at Step 6), and economic, social, and cultural drivers that initiate unexpected responses in resource users (at Step 7) (Fulton *et al.* 2011). Along these lines, Beddington *et al.* (2007) note that “incentive structure, institutional capacity, and participation of stakeholders are of key importance” to successful fisheries management. While stakeholder-centred approaches are being increasingly utilized within both federal and state- or provincial-level fisheries policy in both Canada and the US, it can be difficult to incorporate practical fishing knowledge into status quo fisheries science and stakeholders may still feel as though their input is not being fully integrated (Miller *et al.* 2010). Following are overviews of the American and Canadian fisheries policy contexts, as well some of the specific challenges they have faced.

3.4.1 American fisheries policy

NOAA’s National Marine Fisheries Service is the primary coordinator of fisheries management in the US, although other federal government bodies, state governments, and eight regional fisheries management councils play an important role as well. Currently around 100 federal laws steer US fisheries management (NOAA Fisheries 2012). According to Weber (2002), American fisheries policy was originally characterized by an assumption of predictability and abundance in marine wildlife populations. It was presumed that observable limits in catch levels were related to limits to fishing fleet size, rather than the amount of fish in the ocean. At the same time, “the decision to increase fishing required no justification other than market prices, but the decision to manage, in contrast, required a crisis” (Weber 2002). US fisheries policy has subsequently developed in a paradoxical fashion, whereby managers have often made efforts at conservation of specific fisheries either during or after their promotion of expansion in that same fishery.

Not until the 1990s did American fisheries policy begin to view marine wildlife populations as being characterized by scarcity and uncertainty, rather than abundance and predictability (Weber 2002). In 2003 and 2004, national panels reviewing the state of US oceans found that a more ecosystem-based approach should be taken to fisheries management, in which the factors driving human interactions with the maritime environment should be taken as central components to the management approach (POC 2003; USCOP 2004; Ruckelhaus *et al.* 2008). In 2006, the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act became the newest determinant of fisheries management practice in US federal waters. Within the act, National Standard 8 emphasizes the imperative to consider the human communities involved in fisheries during management decision-making:

“Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.” (US Department of Commerce 2007)

The act also states that fisheries management shall “prevent overfishing, while achieving, on a continuing basis, the optimum yield from each fishery” (US Department of Commerce 2007). However, determining what is meant by “optimum yield” has become more complicated in recent years, due in part to the inclusion of more diverse stakeholders within management decision-making processes (Miller *et al.* 2010). Additionally, some US fish stocks continue to experience overfishing, while others remain overfished. According to NOAA’s Fish Stock

Sustainability Index (FSSI)⁵, the overfishing status is known for 84% of stocks, while the overfished status is known for 77% of stocks. Of those FSSI stocks with a 'known' status, 20% experienced overfishing in 2011, while 24% were overfished. For the 298 non-FSSI stocks in the US, the overfishing status remains unknown for 80% of stocks and the overfished status remains unknown for 91% of stocks (NOAA Fisheries Service 2011).

Along these lines, fish stock recovery remains a priority within US fisheries management, as expressed by the Magnuson-Stevens Act through requirements for recovery plans, community based restoration programs, actions to improve the effectiveness of international fisheries management organizations, improved research, and enhanced aquaculture and hatchery programs, among other measures (US Department of Commerce 2007). According to Beddington *et al.* (2007), fisheries management systems on the West Coast have been more effective than those on the Northeast Coast at rebuilding stocks, due to the use of systems that more closely resemble individual transferable quotas, or catch share management systems. In 2006, for example, two out of the 18 New England stocks that were overfished in 1995 had recovered, while four out of the nine stocks similarly categorized by the Pacific Fisheries Management Council had recovered (Beddington *et al.* 2007).

At the same time, however, catch share management, as introduced more recently (2010) in New England by Amendment 16 of the Magnuson-Stevens Act, has also been accused of resulting in hyper-consolidation of nearby fishing fleets and amplified challenges for day boat fishermen, as well as “losses of landings, revenue and jobs, a controversial reallocation of wealth, and a failure to eliminate chronic costly overfishing and underfishing” (Gaines 2011b). Such changes and consequent challenges have been cited as primary reasons for the formation of the Cape Ann Fresh Catch CSF in 2008 in Gloucester, Massachusetts (Gaines 2011b). Overall, it remains clear that fisheries management, even in the US, is a tricky science and that it is especially difficult to satisfy the interests of the diverse stakeholders involved.

3.4.2 Canadian fisheries policy

The DFO is the primary body dealing with fisheries management in Canada. It is the mandate of the DFO to be responsible for “developing and implementing policies and programs in support of Canada’s scientific, ecological, social and economic interests in oceans and fresh waters” (DFO 2012). The main federal legislation dealing with fisheries is the Fisheries Act of 1868 (governing domestic fisheries), the Coastal Fisheries Protection Act of 1985 (managing foreign vessels in Canadian waters), the Oceans Act of 1997 (implementing UNCLOS provisions within Canada), and the Species at Risk Act of 2002 (preventing, or where possible providing recovery from, the extinction, extirpation, or endangerment of wildlife species). Aquaculture and wild fisheries are also regulated at the provincial level (Haughton *et al.* 2006). In addition, aboriginal treaties provide First Nations peoples with specific fisheries rights, such as the right to fish for Food, Social, and Ceremonial purposes (Plate *et al.* 2009).

The Canadian onshore processing and distribution industry is controlled primarily at the provincial level, and has been impacted in recent years by a growth in processing competitors, especially within China. Price intervention by provincial authorities sometimes occurs in an attempt to establish stability and predictability of raw material prices (Haughton *et al.* 2006).

⁵ NOAA’s FSSI is a performance measurement regarding the sustainability of 230 US fish stocks deemed to be important to recreational and commercial fisheries (NOAA Fisheries Service 2011).

Similar to the US, the 1990s saw reviews, and later reforms, of Canadian fisheries policy, after the collapse of Atlantic cod stocks as well as declines in other commercial fish stocks on both the Pacific and Atlantic coasts. Integrated Fisheries Management Plans, in which the DFO prepares plans for the management of specific species in collaboration with stakeholders, were introduced as new management measures. In addition, in the year 2000, Objective Based Fisheries Management was introduced, in which an ecosystem-based planning process is required for all fisheries management (Haughton *et al.* 2006). In 2007, a modernized version of the federal Fisheries Act was presented in the form of Bill C32, which officially deems Canadian fish stocks to be a common property resource that shall be managed with the ecosystem approach, the precautionary approach, conservation, and aboriginal and treaty rights in mind (Plate *et al.* 2009). These new actions are outlined specifically in the DFO's strategic plan for 2005-2010, entitled 'Our Waters, Our Future'. However, despite these apparent shifts towards a more inclusive and ecosystem- and science-based approach to fisheries management, some claim that Canadian fisheries policy lags in practical terms in the sense that it has:

1. For the most part failed to sustain healthy fish stock populations within Canadian EEZs;
2. Neglected a holistic approach by supporting (through subsidies) the use of damaging fishing gear such as bottom trawlers, bottom gillnets, and dredges;
3. Focused more on protecting Canada's coastal fisheries from foreign fishing vessels than it has on monitoring the behaviour of Canadian vessels in under-regulated open seas;
4. Failed to properly account for the by-catch of non-target species; and
5. Remained rooted in the interests of a consolidated large-scale fishing industry (EAC 2011; Grafton and Lane 1998; Fuller *et al.* 2008).

International policies are not well integrated into the practical management of specific fisheries in Canada, at both the provincial and federal levels. For example, according to a report carried out by Plate *et al.* (2009) on the BC Salmon fishery, "limit reference points and stock assessment for many conservation units are currently lacking, the fleet is too large, overcapitalized and not economically sustainable, not all First Nation fisheries are adequately protected and selective fishing practices are encouraged but not fully enforced". Like in the US, fishery and catch monitoring programs in Canada are often weak and data remains lacking for many fisheries (Plate *et al.* 2009). In addition, according to numerous critics, 2012 federal budget reforms proposed by Prime Minister Stephen Harper that aim to minimize habitat protections within the national Fisheries Act will act to further reduce the effectiveness of Canada's fisheries management measures (Perkel 2012).

Overall, fisheries policies that aim to deal with fish stock declines also inevitably impact upon fishermen and can lead to widespread frustration amongst fishing populations, and their increased alienation from fisheries managers as well as certain proponents of sustainable seafood (O. Frey, personal communication, Apr 2nd, 2012; K. Selkoe, personal communication, Feb 21st, 2012; M. Tognazzini, personal communication, Feb 20th, 2012). To this end, local seafood movements and CSFs may be seen as an attempt to bridge the concerns of various stakeholders towards more effective marine stewardship as well as the economic and social vitality of local populations.

4 CSFs and sustainability

In this chapter, background on sustainable seafood initiatives and local food movements is presented in order to better understand the ideas fuelling local seafood movements. The CSF business model is subsequently introduced, in order to envision the program theory and primary drivers and challenges of CSFs.

4.1 Sustainable seafood initiatives

Market-based sustainable seafood initiatives are numerous and on the rise, especially in the major seafood markets of the US and the European Union, as well as the smaller Canadian, Australian, and New Zealand markets (Jacquet *et al.* 2009; Roheim 2007). Several certification schemes—for capture fisheries as well as aquaculture—have emerged in recent years alongside a steady and alarming decrease in wild fish stocks as well as an expansion in aquaculture operations and the risks associated with them. Such schemes include, but are not limited to, the Marine Stewardship Council (MSC), the Aquaculture Stewardship Council, Friend of the Sea, the Global Aquaculture Alliance, Certified Quality Salmon, Naturland, and GLOBALG.A.P. Please see Table 4-1 for a sample listing of such initiatives, and refer to Jacquet *et al.* (2009) and SERG (2011) for more extensive lists.

While on the one hand such schemes have received praise for helping to inform consumers about more ocean friendly seafood choices, on the other hand they have been the targets of criticism (SERG 2011; Deere 1999; Gulbrandsen 2009). Common critique includes weak sustainability criteria, poor assessment processes, lack of transparent and credible verification mechanisms, certification of flawed fisheries, neglect of under-funded fisheries and farms, inadequate public input, and favouring of large-scale consolidated operations, among others (Food and Water Watch 2010; Jacquet and Pauly 2010; K. Gordon, personal communication, May 23rd, 2012). These issues undermine not only the credibility of the seafood certification schemes in question but also the legitimacy of certification schemes as a whole. Despite such criticisms, however, it can be assumed that increasing consumer demand for sustainable seafood will make these certification schemes relevant into the coming years.

Complementary to these certification and labeling schemes are other private initiatives aimed at informing consumers on the origins of their seafood. A recently launched initiative in Canada, ThisFish, has established a programme for tracking fish from ocean to plate, with the aims of informing consumers about the origins of their seafood and connecting them to the fishermen who caught it (ThisFish 2011). Bodies such as the World Wildlife Federation and the Monterey Bay Aquarium have developed criteria and methodology for defining ‘sustainable seafood’, which they use to develop pocket guides as well as menu and product labeling in order to educate consumers and retailers on seafood choices (WWF 2011; Monterey Bay Aquarium 2012). These particular sustainability criteria are regarded as robust and often used as a baseline in scientific research and by other informational campaigns (SERG 2011; Vancouver Aquarium 2011; SeaChoice 2011).

As an example, the Monterey Bay Aquarium, through its Seafood Watch (SFW) program, deems ‘sustainable seafood’ to be that which is derived from sources, whether farmed or fished, that “can maintain or increase production into the long-term without jeopardizing the structure or function of affected ecosystems” (Monterey Bay Aquarium 2012). This overarching vision and its subsequent guiding principles inform the criteria, ranking, and evaluation method utilized by the SFW program when it decides whether a type of seafood is a best choice option (green list), a good alternative (yellow list), or to be avoided completely (red list).

Table 4-1 Sustainable seafood certification and eco-labelling schemes

Name	Type	Rewards	Geographic focus	Species coverage
Aquaculture Stewardship Council	Certification and eco-labelling	Sustainable aquaculture	Global	Various
AquaGAP	Certification	Sustainable aquaculture	Global	Various
Certified Quality Salmon	Certification and eco-labelling	Responsible rearing, responsible packing and processing, or organic salmon	Ireland, England, Scotland, and Canada	Salmon
Debio	Organic certification	Organic aquaculture	Norway	Salmonids, perch, pikeperch, cod
Dolphin Safe	Non-profit organization and eco-label	'Dolphin Safe' tuna	Global	Tuna
Friend of the Sea	Non-profit organization and certification	Sustainable seafood	Global	Various
Global Aquaculture Alliance	Trade association and certification	Responsible aquaculture	Global	Shrimp, tilapia, catfish, pangasius, salmon
GLOBALG.A.P.	Farm standard setting and certification	Responsible farming (including aquaculture)	Global	Finfish, mollusks, crustaceans
Label Rouge	Quality certification and labelling	Quality fish	France, Scotland	Various
Marine Aquarium Council	Standard setting and certification	Sustainable fisheries and aquaculture for marine aquarium species	Global	Various
Marine Stewardship Council	Certification and eco-labelling	Sustainable fisheries	Global	Various
Naturland	Organic farming association	Organic aquaculture and sustainable capture fisheries	Global	Various
Organic Ocean	Seafood supplier and eco-label	Sustainable seafood	US and Canada	Wild: Salmon, ling, halibut, albacore tuna; Aquaculture: Scallops, oysters, mussels, spot prawns

Sources: Various, including certification scheme websites, Jacquet et al. (2009), and SERG (2011)

4.1.1 Defining “sustainability”

As suggested by the growing number of relevant schemes and eco-labels, the concept of ‘sustainable seafood’ can be associated with a myriad of meanings. Different actors have their own criteria for determining what it means for fisheries or aquaculture operations to not be overly harmful to the environment. For example, for wild fisheries, SFW places more emphasis on evaluation factors for measuring the inherent vulnerability to fishing pressure, as well as the overall status, of the wild stocks being analysed than certification schemes such as the MSC or Friend of the Sea. On the other hand, these schemes have extra emphasis on the proper management of a fishery and include some additional criteria within this realm that SFW does not, such as enforcement requirements. In addition, Friend of the Sea also has additional criteria for waste management, energy management, and social accountability (MSC 2010; FOS 2010).

Buyers, then, when faced with a deluge of different eco-labels and environmental claims about the fish that they consume, may have a hard time distinguishing between the different types of ‘sustainable seafood’ on the market. Without access to the detailed assessment and verification processes utilized by each scheme, there is a strong potential that they may lump seafood products into two categories – sustainable or unsustainable – even though numerous echelons of actual impact levels exist within both categories. What may result are both consumer confusion and the equation of all ‘sustainable seafood’ as the same, despite varying levels of stringency of criteria and verification procedures between different schemes. This has the potential to undermine the efforts being made through labeling and consumer education to mitigate global fish stocks declines (SERG 2011).

In addition, it has been noted that the aggregate regional classifications of different fisheries as being green listed, yellow listed, or red listed by programs such as SFW have the potential to warp consumer perceptions, since specific fisheries managed within broader regions may be very low (or high) impact compared to the aggregated regional ranking (K. Selkoe, personal communication, Feb 21st, 2012; M. Tognazzini, personal communication, Feb 20th, 2012; Roheim 2007). That is, overarching assessments of resource health at the regional level may not be able to fully account for varying levels of resource abundance and harvesting techniques at the local level (LCMB 2012). It is thereby difficult to strike a balance between the need to develop common and transferable seafood sustainability criteria on the one hand and the need to apply those criteria at a scale that accurately depicts local contexts on the other.

4.2 Local food movements

An increasingly popular concept that aims at taking specific local contexts into account so as to minimize (or perhaps make more positive) the impacts of food production and consumption is the local food, or ‘locavore’, movement. As consumers have become increasingly distant from the sources of their food, this movement has aimed to reconnect the food that is grown to the person who eats it, primarily by fostering proximate relationships. As expressed by Michael Pollan in *The Omnivore’s Dilemma*, the rosy stories of organic farming that consumers often encounter in the grocery store aisle are usually the product of the marketing schemes of large industrialized (organic) agriculture companies, meant to make customers feel more connected to the source of their food (Pollan 2006). However, these portrayals rarely match up to reality and local food proponents thereby argue that it is important for people to really know the source of their food if they are to truly exercise informed consumer choice.

Generally speaking, by attempting to consume products that are grown near to them and in as low-impact a manner as possible, ‘locavores’ aim at minimizing the carbon footprint associated with high ‘food miles’ and heavy chemical inputs, supporting small-scale farming over globalized agribusiness, and favouring foods of a presumably higher quality and more natural constitution (Roosevelt 2006). This does not necessitate a complete abandonment of the food trade, but rather a focus on prioritizing the adaptation of local food production and markets towards a synergy with local environmental and community goals (Feenstra 1997).

In such a sense, communities are encouraged to take control of their own food economies in order to achieve improved food sovereignty (Lappe and Collins 1977). Some studies, such as Herrin and Gussow (1989), have noted that while food self-reliance in the US has diminished over time, it is possible for people to acquire more nutrients from local sources through diet changes that reflect the seasonal availability of foods. Some local food systems conceptualize enhanced urban food production as a means to not only make unused space productive and to increase the capacity of urban centres to feed themselves, but also as a way to increase the food security of poor urban population segments (Feenstra 1997).

Various methods have been utilized in order to foster such local food economies. In particular, direct marketing through farmers’ markets and the community supported agriculture (CSA) model has been favoured as a method for linking producers and consumers. While farmer’s markets do provide a space within which small growers are able to sell their goods, they also necessitate farmers to sustain full financial risks without the assurance that their goods will be purchased. In a CSA, however, consumers ‘invest’ in a farmer through an up-front payment for a season, or a share, of fresh produce. This provides the grower with necessary income and allows community members to share with growers a portion of the production-associated risks. In return, members receive a share of fresh produce at certain intervals during the harvest season. Generally speaking, these alternative marketing schemes aim at shortening food supply chains and creating relationships between producers and consumers, in such a manner that positive change may be realized within food systems. CSAs tend to aim to source from farms that utilize ‘sustainable’ methods that, when combined with the lower food miles of nearby sourcing, can theoretically minimize the environmental impacts of food production. However, each CSA holds its own set of objectives, and is influenced by a unique set of contextual factors, leading to a certain degree of variability.

Research has tended to highlight the following three components as being essential to successful local food marketing: (1) establishing a regional identity based upon products of a high quality, (2) developing cooperative marketing strategies and technical assistance, and (3) emphasizing the quality of local buyers and processors (Feenstra 1997; Lockeretz 1986; Bruhn *et al.* 1992; Thomson and Kelvin 1994; Nayga *et al.* 1995). A question that remains, then, is whether local food movements are just good marketing ploys. Or is it possible that small-scale, ‘local’ farmers actually have a natural propensity towards better environmental stewardship and social responsibility? Some say that yes, they do, or that they will be driven towards more responsible behaviour once hooked into nearby direct marketing channels and the educational and ecological expectations that are built into them.

4.2.1 Defining “local”

As with the aforementioned concept of ‘seafood sustainability’, the notion of ‘local food’ “can hold multi-faceted and sometimes contradictory meanings” (Hinrichs 2003). It can be spatially conceived as including agricultural production within a state’s (or sub-national state’s) boundaries. This may be because the state is the geographical unit from which production data is often derived, or perhaps because of marketing considerations, even though different states’

boundaries vary in their expanse and rarely coincide with specific bioregions (Herrin and Gussow 1989; Hamilton 2001; Hinrichs 2003). ‘Local food’ can be defined based on the food miles associated with a particular foodstuff (although this requires that a detailed life cycle analysis be carried out), or it may be said that a market is only ‘local’ when face-to-face interactions are possible, allowing for higher degrees of social embeddedness. Perceptions on the appropriate sourcing distances of basic versus luxury ‘local’ food items may even be variable (Hinrichs 2003).

Some simply view localization as a counterpoint to globalization, or a process that “reverses the trend of globalization by discriminating in favour of the local” (Hines 2000). At an extreme level, “defensive food system localization tends to stress the homogeneity and coherence of ‘local’, in patriotic opposition to heterogeneous and destabilizing outside forces, perhaps a global ‘other’” (Hinrichs 2003). However, it may be the case that assuming ‘local’ to be a proxy for the ‘good’ and ‘global’ for the ‘bad’ is fundamentally flawed; in the process, the value of proximity (itself difficult to specify) becomes exaggerated and a broad spectrum of social and environmental outcomes threatens to be overlooked (Hinrichs 2003). Born and Purcell (2006) warn against falling into the ‘local trap’, whereby desirable aspects such as “ecological sustainability, social justice, democracy, better nutrition, and food security, freshness, and quality” are assumed to be inherent to the local scale. Rather, it is useful to view what is ‘local’ and what is ‘global’ as fundamentally related components within an overall system; ‘glocalization’ is a term that has been used to communicate this mutualistic relationship (Dahlberg 1993; Robertson 1994; Hinrichs 2003).

In reality, different contexts help to determine how local food is defined, as well as how it is produced and consumed. Since nothing is *inherent* to any scale – local, regional, national, or global – ‘local’ may be viewed as a social construction of scale. As such, it is specific *contextual* factors that will influence the real outcomes of any food system. Along these lines, it is useful to address the *specific agendas* of those pursuing scalar food strategies, as will be done in the following sections of this study (Born and Purcell 2006; Hinrichs 2003). It is also useful to analyse whether specific local food (and seafood) movements have adopted a “local *is* sustainable” or a “local *and* sustainable” rhetoric. Is ‘localness’ the only consideration within the program’s sourcing policy? Is it a component that is considered to be necessary but not sufficient? Or is it merely one factor amongst many being considered on the path towards ‘sustainability’? Overall, so long as this definition remains loose, local food movements will have considerable leniency when using the term for marketing purposes (although they must also remain cognizant of not expanding the term too broadly so as to lose support) (Brinson *et al.* 2011).

4.3 What are local seafood movements?

The local seafood movements that are emerging in North America aim at re-connecting seafood producers and consumers in particular locations. These community-oriented movements have recently surfaced following increased global demand for seafood, industrialization of fishing operations, and the inability of public regulatory measures (i.e. international and national fisheries policies) and private regulatory measures (i.e. sustainable seafood initiatives) to deal with subsequent fish stock depletion and other negative impacts. While also aiming to contribute to seafood sustainability, local seafood movements are distinct from sustainable seafood initiatives due to their focus on the *specific local context* of a place, a concept borrowed from their on-land predecessors, local food movements. Table 4-2 compares the varying methods, goals, tools, styles, approaches, focal points, targeted behaviours, and threats addressed by sustainable seafood initiatives versus local seafood movements.

Table 4-2 Comparing sustainable seafood initiatives and local seafood movements

	Sustainable seafood initiatives	Local seafood movements
Methods	Boycotts (i.e. Take a Pass on Chilean Sea Bass), wallet cards (i.e. SFW and WWF), and certification/eco-labelling (i.e. MSC)	Direct marketing/sales to consumers/restaurants and CSFs
Goals	Minimize pressure on vulnerable fish species/stocks	Preserve local communities and small-scale fishing, improve traceability, and minimize carbon footprint
Tools	Primarily consumer-activated price signals meant to influence the behaviour of <i>fishermen</i>	Primarily grassroots marketing mechanisms meant to influence the behaviour of <i>consumers</i>
Style	Top-down (from organizations)	Bottom-up (from fishermen)
Approach	Market-based	Community-based
Focal point	The species/stock/fishery	The place (geographically bounded)
Behaviours targeted	Fishing practices	Production, processing, distribution
Threats addressed	Bycatch, overfishing, habitat destruction, and unsustainable aquaculture	Low prices for fishermen, diminished local fishing industry, lack of public awareness, and high carbon footprints/poor traceability associated with conventional supply chains

Source: Adapted from Schumann and Cook (2011)

4.4 What is a community supported fishery?

One of the primary mechanisms used by local seafood movements to reconnect seafood producers and consumers has been the community supported fishery (CSF) business model. There is no steadfast definition of a CSF, given that the concept is relatively new (the first CSF in North America began operations in 2007) and that each CSF is tailored to a specific local context, making it unique in form and function. However, it can be said that, generally speaking, CSFs have arisen in order to link fishermen to local markets, in a similar manner to that established by the previously explained CSA model.

In a CSF, consumers pay in advance for a ‘season’ of local seafood and receive a weekly (or sometimes bi-weekly) ‘share’ of that seafood in return. This can add an element of risk sharing that regular purchasing relationships from fish markets, or even directly from fishermen ‘off the dock’, do not incorporate (LocalCatch.org 2012; Brinson *et al.* 2011). Overall, despite differences, it may be assumed that CSFs share a set of core objectives, as follows:

1. To establish a transparent chain-of-custody from boat to fork;
2. To increase access to premium, locally caught seafood;
3. To ensure fishers receive a fair price for their catch that reflects the value of their work;
4. To engage fishers and community members in more robust, viable, local food systems; and
5. To provide a framework through which fishers and customers alike can creatively steward marine resources (LocalCatch.org 2012).

Each CSF provides different seafood offerings, depending upon location, catch level, season, relevant regulation, and product types offered to members (i.e. whole versus filet). Some CSFs specialize in one type of seafood, while others provide variable species depending on the ‘catch of the day’. Regular delivery schedules can be altered by unpredictable occurrences such as weather events and regulatory closures (Brinson *et al.* 2011). There is therefore a degree of unpredictability that consumers accept when they become CSF members, and when they agree to share the risks faced by fishermen.

At the time of writing this study, there appeared to be 26 CSFs operating in North America. Appendix 4 lists these CSFs, as well as where they are located, the year they were established, who operates them, and species offered. The list include those CSFs listed as partners on the LocalCatch.org and NAMA websites, CSFs noted in the Brinson *et al.* (2011) study, and CSFs uncovered during Internet searches and communication with known CSF program leaders. Crosschecking efforts were made throughout the research period in order to ensure that this list remain up-to-date and complete. However, it is possible that some CSFs on the list have recently ceased operations or that newly opened CSFs have been overlooked.

CSFs have recently received media attention and praise in North America for offering a new business model that could contribute to sustainable coastal fisheries management. Jorge (2011) calls CSFs “a creative method that fishing communities have implemented to restore and rejuvenate their local economies”. It is hoped that these new programs can provide a larger market for local fishermen, spread awareness on the many types of local fish available, and create new markets for bycatch fish by helping to shift perspectives on what is considered to be ‘trash’ (Gaines 2011a; Opar 2011). It is also claimed that the shortening of seafood supply chains, through the reduction of middlemen, can benefit buyers and sellers by simultaneously lowering prices and increasing profit margins, as well as through the mitigation of fraudulent mislabeling (Gaines 2011b; Opar 2011). CSFs may contribute to the improvement of marine stewardship by allowing fishermen to catch the most abundant seafood (rather than the seafood in highest demand) because, in many CSFs, shareholders do not determine the type of fish that they receive through their share (Cataneo 2011). As well, some CSFs aim to foster a shift towards lower impact fishing methods amongst participating fishermen (Graney 2011).

Little scientific research has been carried out on the actual, or even on the potential, impacts of CSFs as of yet. One recent study by Brinson *et al.* (2011) interviewed seven CSFs on the US East Coast in order to uncover program details, advantages, and challenges. The study found that the direct marketing methods employed by CSFs do offer potential market benefits, in particular increased revenues, to fishermen. Extra profits can be captured by shortening supply chains through the removal of middlemen such as wholesalers, processors, and supermarkets (Brinson *et al.* 2011). Whereas it is uncertain whether any price premium attained from ecolabelled seafood is transmitted from the retail level to the wholesale level and down to the fisherman level, CSF programs do tend to offer directly to fishermen premium (higher than wholesale) prices (Roheim 2007; Brinson *et al.* 2011). Other profits can be reaped through a CSF’s creation of a purchasing channel for species with lower values in traditional markets as well as protection from volatile market prices through guaranteed up-front pricing schemes. CSFs may also provide non-market benefits, especially enhanced social connections between fishermen and consumers and increased support for fishing in the community, through both in-person encounters as well as novel communication methods such as “innovative websites, newsletters, flyers, presentations at local events, filleting demos, tastings, the use of photographs of fishing vessels and fishermen, distribution of recipes, and most importantly, word-of-mouth” (Brinson *et al.* 2011). Consumers can benefit through improved access to diverse, ‘sustainable’, and ‘local’ seafood, as well as through increased dialogue with those who produce the food that they eat (Brinson *et al.* 2011).

4.5 Framework of analysis: Program theory

In order to fulfill the study’s aim and address the research questions described in Section 1.1, *program theory* has been chosen as the main framework of analysis to be utilized within the thesis. An organisation’s program theory (or its intervention theory) refers to the underlying reasons for specific program interventions (or actions), the eventual goals that such interventions set out to achieve, and the intermediate process by which those goals will be reached (Tojo 2004). In other words, it is “a model, theory, or philosophy about how the program works ... which indicates the causal relationships supposedly operating in the program” (Fitz-Gibbon and Morris 1996). Program theory can be depicted through logic models, or visual representations of the “plausible and sensible method of how a program will work under certain conditions to solve identified problems” (Renger and Titcomb 2002).

The focus while gathering data (and later analyzing it) has been on highlighting the *perceptions* of the key stakeholders within CSF programs, rather than on quantitative measurement, of the likely impacts of such programs. Both CSFs generally and the Local Catch Monterey Bay (LCMB) case in particular are relatively new and it is thereby difficult to quantify their contributions as of yet. During the case study, assessment of the extent to which the LCMB program may be meeting the *envisioned* intermediate outcomes of CSF program theory helped towards further analysis of the potential of the program to reach the CSF program theory end goals. Overall, the aim has been that analysis of CSF program theory’s intermediate outcomes within the context of a specific case study will provide insight into some of the primary *drivers* for and *challenges* faced in reaching CSF end goals, towards drawing a set of useful *lessons* for CSF programs. A three-step approach to program theory has thereby been implemented, as described in Table 4-3 below.

Table 4-3 Using program theory to address the research questions

Chapter 4: Setting up the framework of analysis	Chapter 5: Case study	Chapter 6: Analysis
Step 1: Development of an <i>underlying issues</i> logic model (Figure 4-1)	Gathering data on the LCMB CSF and the <i>perceptions</i> of its key stakeholders regarding the (potential) role of the program	Comparing the logic model to key <i>drivers</i> elucidated by the LCMB case study as well as broader CSF research (Section 6.2.1)
Step 2: Creation of the <i>CSF program theory</i> logic model (Figure 4-2)		Assessing LCMB’s achievement of the <i>intermediate outcomes</i> , or steps, of CSF program theory (Section 6.1.1)
Step 3: Preliminary description of the challenges that CSFs face in reaching their end goals (from Brinson <i>et al.</i> 2011)		Determining the key <i>challenges</i> that (1) LCMB faces in reaching CSF program theory end goals (Section 6.1.2) and (2) CSFs generally face (Section 6.2.2)

Step 1: Development of an *underlying issues* logic model

In order to envision the underlying issues that have led to the establishment of CSF programs, data was gathered on each of the CSFs listed in Appendix 4, through an email survey⁶,

⁶ Each CSF listed in Appendix 4 was emailed a basic survey requesting information on the following: (1) when the CSF was started, (2) who initiated the CSF and why, (3) what main problems the CSF hopes to deal with, and (4) what the CSFs primary goals are, and how it is hope these shall be achieved. Results were supplemented with data from other sources, since only six CSFs in total responded to the survey.

interviews, and consulting CSF websites. Figure 4-1 was subsequently constructed in order to depict the primary *drivers* for CSF programs in North America. From this figure, two key underlying issues – consumers finding it difficult to eat local seafood and individual fishermen capturing little of the end value of their product – were selected for used within the CSF program theory logic model.

In Chapter 6 (Section 6.2.1), the key drivers for CSF programs, compiled from more extensive research of the LCMB program as well as other North American CSFs, will be compared with Figure 4-1.

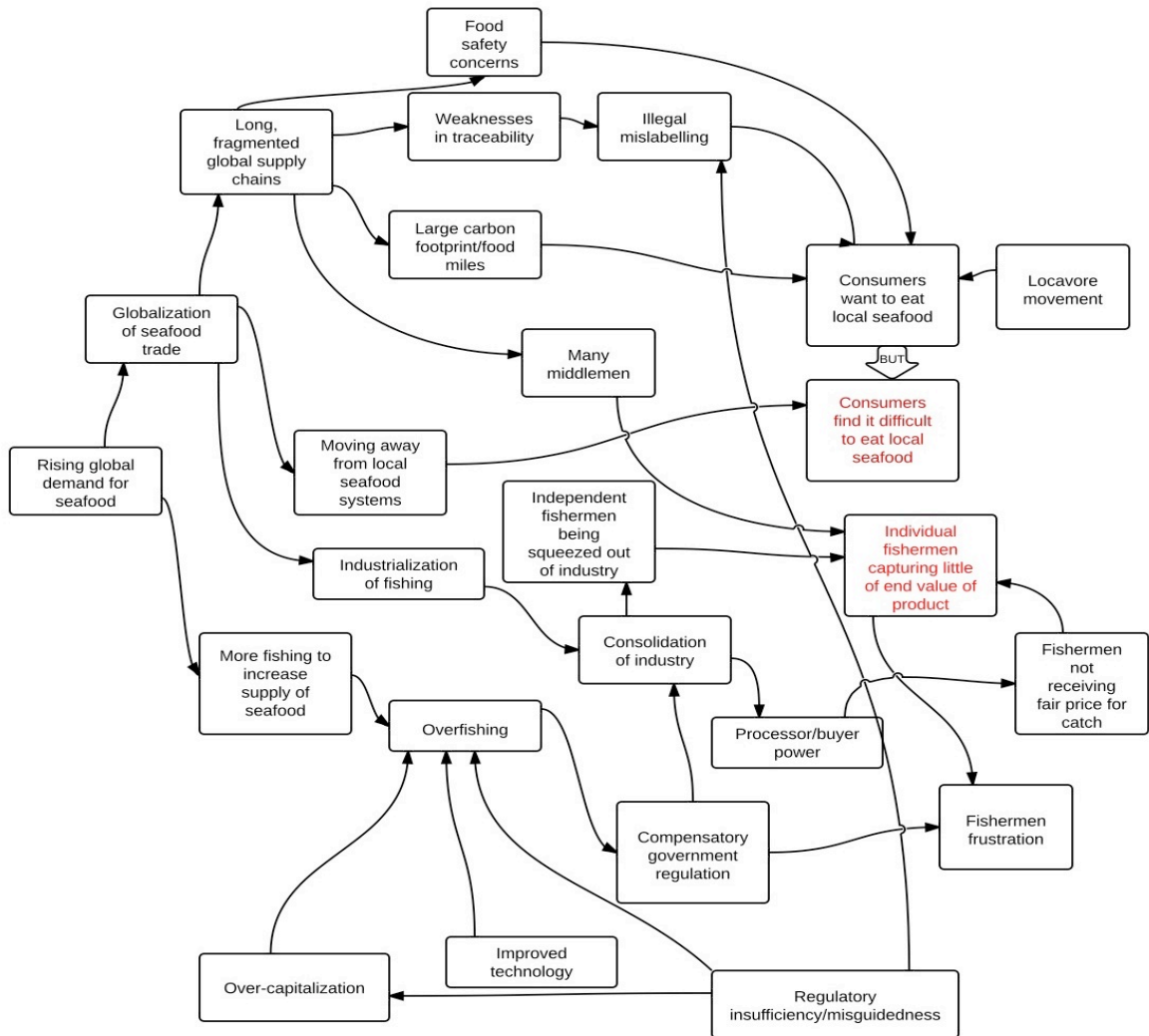


Figure 4-1 Underlying reasons for CSF program establishment

Sources: Various, including CSF websites, interviews, and survey responses

Step 2: Creation of the CSF program theory logic model

CSF program theory was developed based on the two key underlying issues of Figure 4-1 and with data gathered from the aforementioned email survey, interviews, and consulting of CSF websites (see Appendix 5 for specific findings on each of the North American CSFs). Figure

4-2 was subsequently developed as a means of highlighting the specific steps that CSFs intend to take towards attaining their eventual end goals. It should be noted that each of the components within the logic model does not necessarily factor into every CSF, while at the same time other components may be included in specific CSFs that are not included in this general model.

In Chapter 6 (Section 6.1.1), achievement of these *intermediate outcomes*, or steps, of CSF program theory within the LCMB case study will be addressed, through qualitative assessment of the perceptions of the key LCMB stakeholders regarding the program and its potential impacts.

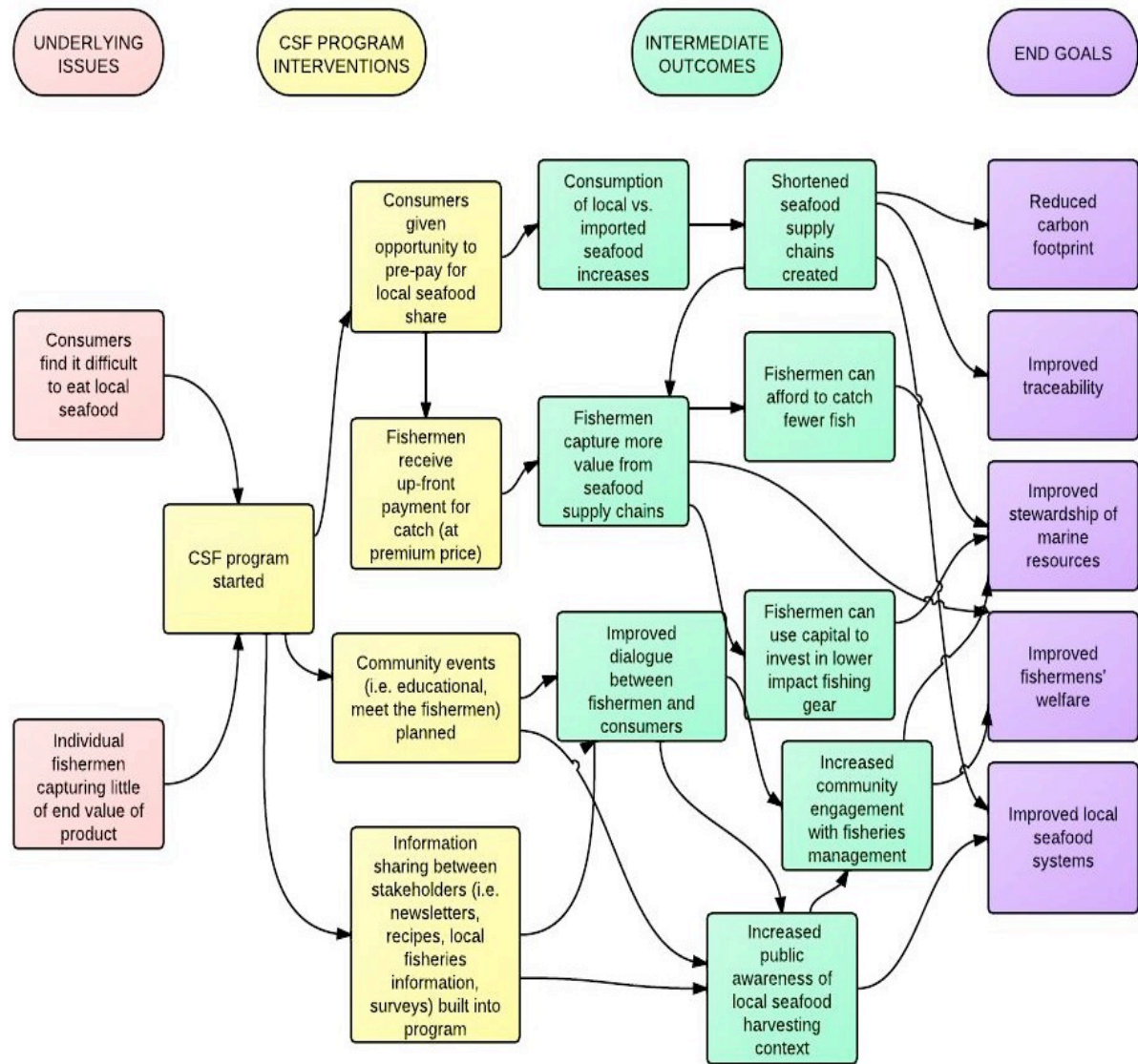


Figure 4-2 CSF program theory

Sources: Various, including CSF websites, interviews, and survey responses

Step 3: Preliminary description of challenges CSFs face in reaching their end goals

According to Brinson *et al.* (2011), the main *challenges* to CSFs include dealing with high start-up costs (although many CSFs receive start-up grants from external organizations), setting up

an alternative business model while at the same time maintaining traditional market relationships, navigating possible regulatory challenges such as obtaining dealer licenses, and attracting enough shareholders to achieve profitability.

In Chapter 6, practical analysis will focus on the key challenges (1) that LCMB faces in reaching the end goals of CSF program theory (Section 6.1.2) and (2) that CSFs generally face (Section 6.2.2). Data from both the case study and broader CSF research will be incorporated into this analysis, in order to contribute to the knowledge already established by the Brinson *et al.* (2011) study.

5 Case study: Monterey, California

This chapter describes seafood production and consumption in the state of California, as well as corresponding fisheries policy measures. Overviews of sustainable seafood initiatives and local seafood movements emerging in the state are provided in order to better understand the fishing context in Monterey Bay and the CSF case study on Local Catch Monterey Bay (see Section 1.2 for explanation of why this particular case was selected).

5.1 Seafood in California

In 2010, total commercial fish landings into California equaled 438,527,860 pounds (DFG 2010a). This is a sharp decline from historic peak landing levels of around 1,300,000,000 pounds (600,000 metric tons) per year during the 1930s and 1940s (CFF 2010; Mason 2005). The vast majority (99.9%) of landings in California originate from California waters, while 99,280 pounds come from waters north of the state, 36,648 pounds from waters south of the state, and 376,302 pounds from “unknown/other” waters (DFG 2010a). Figure 5-1 depicts the 2010 California fish landings (for species with poundage levels greater than five million pounds).

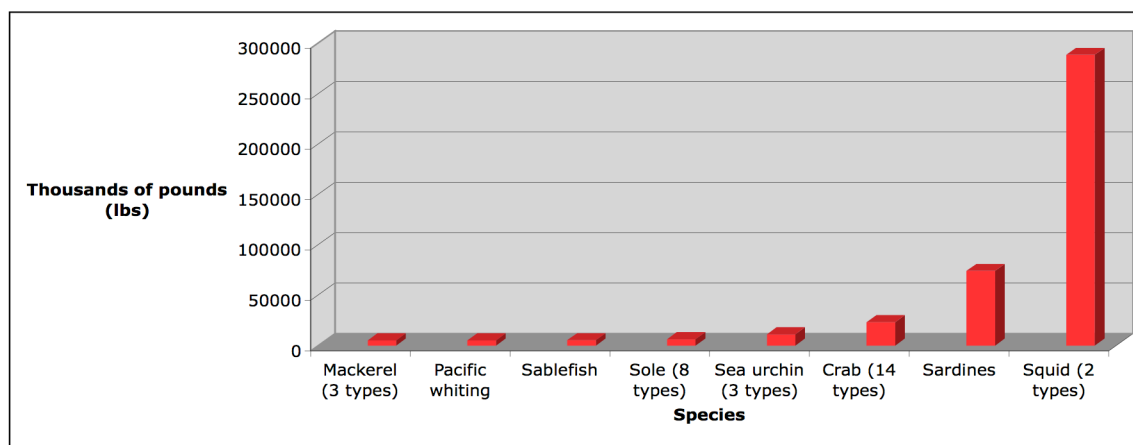


Figure 5-1 California landings of fish, crustacean, echinoderm, and mollusk species (with poundage greater than five million pounds) (2010)

Source: Data from DFG (2010a)

As indicated by the figure above, squid and sardines have dominated recent California fish landings. Figure 5-2 highlights the landing levels of these two species as a proportion of total landings, with squid (including both the jumbo and market variations) accounting for 65.79%, sardines accounting for 16.92%, and all other fish, crustacean, echinoderm, mollusk, plant, and worm species accounting for 17.29% (DFG 2010a). Appendix 6 provides a complete species list (225 total) for 2010 California fish landings.

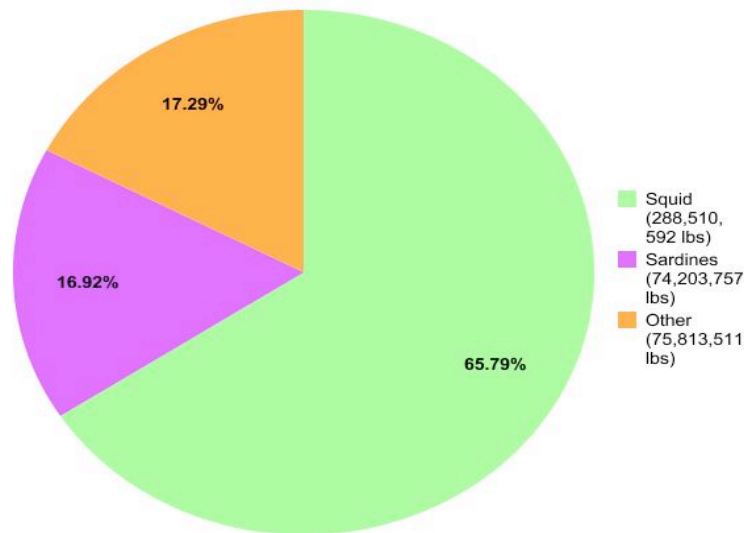


Figure 5-2 Squid and sardine landings as a proportion of total California landings (2010)

Source: Data from DFG (2010a)

The main buyer centres for coastal pelagic species, such as squid and sardines, landed on the West Coast are in the California cities of Los Angeles, Santa Barbara, Ventura, and Monterey. For the most part, these coastal pelagic species are exported abroad. For example, market squid is exported primarily to China, the United Kingdom, Japan, and Spain, while sardines are exported mostly to Japan (for human consumption and use as bait in longline fisheries) and Australia (for use as feed in bluefin tuna farms) (PFMC 2011). Overall, demand for the majority of California's seafood is not currently within the state, nor within the country, but overseas (Benjamin 2010).

The total value of California commercial fisheries landings in 2010 was 79,105,314 US dollars (USD) (CFF 2010). The state has experienced declines over the years (especially since 2007) in the aggregate value of its commercial fisheries, due to lower landing volumes of high-value species such as finfish and increasing landing volumes of low-value species such as squid and other coastal pelagic species (McGinnis 2011). At the same time, decreasing overall value has been augmented to some extent by an increase in landings of invertebrates into California (CFF 2010). For example, Dungeness crab, which contributed 5% to the total volume of California's commercial fish landings in 2010, contributed 23% to total commercial fisheries landings value that same year. Similarly, California lobster had a 0.2% share in volume but a 6% share in value. On the other hand, market squid (not including jumbo squid, which is caught in much lower volumes) had a 66% share in total volume but a 41% share in total value in 2010 (DFG 2010b). Overall, it should be noted that the above figures would be altered significantly if valuation methods beyond basic commodity pricing were utilized in order to place a total value on the marine species landed into California ports each year (Kildow *et al.* 2009; MEA 2003).

Fishing ports are dispersed somewhat evenly along the California coastline. Some are very urban (i.e. San Diego and Los Angeles), while others are more rural (i.e. Morro Bay, Bodega Bay, and Crescent City). While involvement in commercial fishing varies at each port, the industry is on the decline statewide, evidenced in part by a decline in the number of commercial fishing permits and licenses (except Commercial Passenger Fishing Vessel licenses) issued by the state government each year since 1998 (CFF 2010). At the same time,

there is still a huge amount of seafood that travels through certain California ports (especially San Diego and Los Angeles), insofar as most of the product landed in the state is exported and most of the seafood consumed by California residents is imported from abroad. These imports of cheap seafood (including California-landed product that has been sent abroad for inexpensive processing) create competition and additional challenges for California seafood producers attempting to stay in the industry, as well as concerns amongst some seafood consumers regarding illegal mislabeling and the safety and sustainability of imported seafood products (McGinnis 2011; Benjamin 2010; Mutz and Liquornik 2011).

5.2 Dealing with seafood issues in California

Three main approaches to dealing with issues associated with seafood production and consumption have evolved within the state of California: fisheries policy, sustainable seafood initiatives, and local seafood movements.

5.2.1 Public regulation: Fisheries policy

California's Marine Life Management Act (MLMA) of 1999 provides overall mandates and guidance on fisheries policy within the state. It requires that all state fisheries be managed under Fishery Management Plans (FMPs). Currently, FMPs exist for herring, sea urchin, white seabass, abalone, the nearshore fishery, and squid (DFG 2012b). Wherever there is no relevant California FMP, management is governed by the State Legislature, the California Fish and Game Commission, the California Department of Fish and Game, the Pacific Fisheries Management Council, or the National Marine Fisheries Service (usually through federal FMPs). Jurisdictional overlap often occurs between the governance roles of these separate bodies (CFF 2010).

According to Ruckelhaus *et al.* (2008), the MLMA represents an ecosystem-based approach to the management of marine wildlife within the state's waters. For example, the act prioritizes (1) conservation of entire systems, (2) attention to the non-consumptive values of marine resources, (3) sustainability of fisheries, (4) habitat conservation, (5) fish stock restoration, (6) reduction in bycatch, and (7) attention to the long-term interests of, and impacts of fisheries management measures on, fishing communities⁷. FMPs must take these objectives into account (DFG 2012b). Additionally, under the Marine Life Protection Act (MLPA), a series of marine protected areas (MPAs) have been set up along the California coast, following a series of stakeholder consultation processes (Ruckelhaus *et al.* 2008).

To build upon the MLMA and MLPA, the California State Legislature passed the California Ocean Protection Act in 2004, under which an Ocean Protection Council (OPC) was established. Meant to operate according to a set of six key principles (see Appendix 7), the OPC has established a five-year strategic plan (2006-2011) that discusses explicitly (amongst other notions) the need for ecosystem-based management of marine resources in California waters (Laird *et al.* 2012). However, despite positive management measures expressed 'on paper' at the state level, the practical difficulties of real-life management must be kept in mind. For example, some California coastal fisheries (such as groundfish) are regulated at the federal level and have been accused of mismanagement, while other state-regulated fisheries that are seen as being 'well-managed' continue to experience difficulties due to broader environmental and oceanic issues. Therefore, despite aiming at ecosystem-based management, California has

⁷ According to NOAA (2007) there are 50 fishing communities (or "communities significantly involved in commercial fisheries in the marine environment") in California.

not always been able to address these external forces (N. Benjamin, personal communication, April 11th, 2012; Grader 2011).

Another point of controversy regarding California fisheries management is the California Sustainable Seafood Initiative (CSSI). Under Assembly Bill 1217 (2009), the OPC is required to develop and implement a voluntary seafood promotion program for California fisheries. The aim of the legislation is “to encourage California fisheries to seek certification in accordance with internationally-accepted standards for sustainability and to promote the purchase and consumption of certified sustainable California seafood” (State of California 2010; McCormick and Schuchat 2010). Such certification would require California fisheries to meet each of the following standards:

1. Marine Stewardship Council (MSC) fishery certification for sustainable seafood;
2. Achievement of higher-than-MSC performance standards with respect to two indicators (stock status and by-catch of endangered, threatened, and protected species);
3. Additional independent scientific review; and
4. Additional traceability factors (OPC 2011).

According to proponents of the legislation, fisheries management measures in California have been “at the forefront of new sustainable approaches that could inform national and international efforts” (McCormick and Schuchat 2010). As such, a distinguishing state eco-label could benefit California fisheries at the same time as further incentivizing sustainable fishing practices through added value (via premium prices) and access to new markets (McCormick and Schuchat 2010). It has also been hoped that CSSI marketing measures could act to shift California’s seafood market by creating more demand for California seafood within state borders, although it is not yet clear which specific methods would be utilized for this to occur (Anderson 2010; N. Benjamin, personal communication, April 11th, 2012).

However, although the OPC adopted a protocol for adoption of the CSSI on December 16th, 2011 (OPC 2011), controversy and uncertainty surrounding its actual implementation persist. A petition signed by members of the OPC Advisory Panel as well as additional community stakeholders on the same day as CSSI protocol adoption provides numerous opinions on why the current protocol “will not further the protection of California’s marine resources ... recognize current examples of effective conservation ... support important communities that depend on ocean resources ... [or] promote the responsible consumption of locally sourced seafood” (OPC Advisory Panel 2011). In particular, the use of MSC criteria as a baseline for certification is stated as a flawed measure that will damage fishermen and fishing communities, enact unnecessary costs and red tape, and funnel funds out of the state and to an international organization, all in such a manner that does not actually foster the promotion of California ‘sustainable’ seafood (N. Benjamin, personal communication, April 11th, 2012; OPC Advisory Panel 2011). As stated by one advisory panel member, the CSSI’s development of “an added layer of regulations that few California fisheries could voluntarily meet, does not help small, local, fishermen” (OPC Advisory Panel 2011). Another member recommended the use of CSFs, Trace and Trust (a traceability program), and other alternative marketing measures as lower cost, more effective methods for promoting California seafood (OPC Advisory Panel 2011).

5.2.2 Private regulation: Sustainable seafood initiatives

Public interest in California regarding the state of the oceans has grown in recent years, following widespread acknowledgment of the issues surrounding marine mismanagement as well as seafood sustainability. The emergence of large and popular aquariums in major ports throughout the state has fuelled this interest while creating a new form of economic activity in areas that were once dominated by the fishing industry. With a primary goal of these aquariums being to inspire conservation of marine environments, programs aimed at promoting sustainable seafood amongst consumers have become a major focus of outreach. Table 5-1 lists California's main aquariums and their corresponding sustainable seafood programs.

Table 5-1 California aquariums and their sustainable seafood programs

Aquarium	Location	Year opened	Sustainable seafood program	Year started
Monterey Bay Aquarium	Monterey, CA	1984	Seafood Watch	1999
Aquarium of the Bay	San Francisco, CA	1996	San Francisco Seafood Watch Alliance	2009
Aquarium of the Pacific	Long Beach, CA	1998	Seafood for the Future	2009
Ty Warner Sea Center	Santa Barbara, CA	2005	Santa Barbara Sustainable Seafood Program	2008

Sources: Various, including aquarium websites

The primary methods utilized by these programs include partnerships with different supply chain actors, consumer outreach and education, special events, and seafood recommendation lists. Seafood Watch (SFW) is one of the most well established sustainable seafood programs and has influenced the evolution of numerous other programs, including those listed in Table 5-1. It has become a leader in the generation of seafood recommendations and, to a certain degree, dominates the discourse on sustainable seafood (both in North America and elsewhere).

At any given time, SFW has a maximum of 100 of its fisheries reports live and available for public viewing. Multiple reports exist for certain types of fish, such as for salmon (six reports) and shrimp (13 reports), based on different species types, locations, and harvesting methods. Each report has an expiration date and requires periodic updating, more frequently for species (such as salmon) that require stock status updates and less frequently for species (such as mussels) that do not. SFW must thereby prioritize which species it shall assess, and does so based on three primary criteria. First, prioritizing species with an *importance to the US market* ensures that the seafood products being ranked and included in wallet guides are those that are consumed in large volumes (i.e. salmon and shrimp). Second, *importance to strategic business partners* refers to the species that large partner retailers such as Whole Foods have requested for assessment. Third, *importance to conservation partners* refers to species being prioritized by other bodies involved in sustainable seafood promotion, including 'celebrity chefs' who may request that certain 'trendy' fish be submitted for assessment (E. Hudson, personal communication, April 19th, 2012).

While SFW reports and wallet guides tend to guide public dialogue on sustainable seafood, other important bodies generate their own sets of seafood sustainability reports as well. For example, the National Oceanic and Atmospheric Administration's (NOAA) FishWatch

program produces scientific profiles for popular seafood harvested and farmed in the US. Rather than creating a ranking system for seafood types, the FishWatch program “provides easy-to-understand science-based facts to help consumers make smart sustainable seafood choices” (FishWatch 2012). During the research period, actors involved in California’s fishing industry tended to be wary of the SFW program while expressing higher levels of trust towards the FishWatch program (M. Tognazzini, personal communication, February 20th, 2012; S. Scheiblaue, personal communication, April 9th, 2012).

5.2.3 A new approach: Local seafood movements

In addition to the aforementioned fisheries policy and sustainable seafood initiatives mentioned above, local seafood movements have recently emerged in California as a means of improving the state of its fishing industry. Different groups have initiated these movements, which aim primarily at promoting fish caught by California fishermen amongst California consumers. In particular, fishermen’s associations within the state have been involved in launching campaigns that promote California seafood as a sustainable option that, when purchased locally, can help to support local economies.

For example, the Alliance of Communities for Sustainable Fisheries has launched the Faces of California Fishing website⁸, which provides information on California fisheries practices and management, which fishermen catch which species, locations of ports and vendors, which species are in season, seafood preparation advice, etcetera. A primary rationale provided for this website, besides improving the livelihoods of California fishermen, is that “over 85% of the seafood we consume in the US is imported...farming practices in other countries often use pesticides, antibiotics and hormones that are illegal in the US ... [and] only 2% of seafood imports are inspected by the [Food and Drug Administration]” (The Faces of California Fishing 2012). One of the key features of the website that aims to establish practical connections between fishermen and consumers is an online, port-specific fish marketplace. This marketplace has the potential to directly link citizens to fishermen and their catch of the day, but has thus far been slow to take off. This is probably because the marketplace represents a new and technological method of fish sales with which fishermen are unfamiliar, and it is likely that practical success stories would be necessary for mass fisherman buy-in to the program to occur (S. Scheiblaue, personal communication, April 9th, 2012).

Another fishermen’s association involved in promoting California seafood in local markets is the Pacific Coast Federation of Fishermen’s Associations, through its Institute for Fisheries Resources. According to Zeke Grader, executive director of the federation, three aspects that are critical for the maintenance of fisheries are: (1) fish stock preservation through habitat protection, (2) fisheries access, and (3) the existence of *market channels for the catch of the day*. Regarding the latter, it is important for local fishermen to connect to consumers not only to foster seafood sales but also in order to facilitate understanding of a shared “commonality of interests” (Seafood Choices Alliance 2012). As such, the Institute for Fisheries Resources has created, through its Local and Sustainable Seafood Program, a database that aims at connecting California seafood consumers to nearby commercial fishermen. Information on species seasonal availability and local fish sales off the boat, at farmer’s markets, and in

⁸ Funds for creation of the Faces of California Fishing website were provided by the Central California Joint Cable/Fisheries Liaison Committee, which was established by two telecommunications companies (AT&T and Verizon) in order to provide compensation to trawl fishermen negatively impacted by the laying of underwater fiberoptic cables near California’s Central Coast. The Committee has provided funds for numerous fishing projects, including SLO Fresh Catch, a CSF in San Luis Obispo, California.

specific restaurants is provided for the California areas of Fort Bragg, Humboldt Bay, Los Angeles, Monterey Bay, Morro Bay, North Bay, San Diego, San Francisco Bay, and Santa Barbara. The main goals of the program are to encourage transactions that allow California citizens to “support local fishing communities, find out more information about how and where the seafood was harvested, and reimburse the fishermen more accurately for their costs” (IFR 2012).

In addition to the local seafood programs initiated by fishermen’s associations are the CSFs that have recently begun operations in California. For the most part, community members who are not directly involved in the fishing industry have initiated these programs. As a result, figuring out how to involve fishermen within the CSFs has been challenging in several cases, especially where the ‘outsiders’ initiating a CSF do not have established seafood purchasing relationships or track records.

The CSFs that were known to the researcher to exist in the state of California at the time of writing were SLO Fresh Catch, SirenSeaSA, Half Moon Bay CSF, and Local Catch Monterey Bay (LCMB) (please see Appendix 4 and Appendix 5 for more information on these CSFs). In addition, two CSFs that were known to be planning operations that would start after the end of the research period were the Santa Barbara CSF (in Santa Barbara, CA) and the Fair Share CSF (in Oakland, CA) (K. Selkoe, personal communication, February 22nd, 2012; J. Lattif, personal communication, April 10th, 2012).

As already mentioned, LCMB has been selected for more detailed description and analysis within the research study. The remainder of Chapter 5 will thereby describe the fishing history and current context in Monterey Bay, as well as specific LCMB program details and stakeholder perceptions. Case study findings will be analysed and further discussed within Chapter 6.

5.3 Fishing in Monterey Bay, California

Both the human and natural environments of Monterey Bay have been deeply shaped by commercial fishing. While Native American populations fished the waters of the bay for many years, they had done so primarily for subsistence and direct trading purposes, and it was not until immigrants from southern Europe and East Asia began to arrive in the area from the 1850s onwards that fishing became truly commercialized. As a body of water rich in marine species, Monterey Bay offered immigrant fishermen from countries such as Italy, Portugal, China, and Japan an abundance of natural resources that could be turned into saleable commodities (Chiang 2008). What followed was the development of a large-scale, industrialized fishing industry in the area, with a concentration of landings and large-scale processing occurring in the city of Monterey, at the southern end of the bay.

In his novel *Cannery Row*, John Steinbeck famously described Monterey’s Cannery Row – a main centre of the sardine industry, especially during the Great Depression – as having been “a poem, a stink, a grating noise, a quality of light, a tone, a habit, a nostalgia, a dream” (Steinbeck 1945). His words evoke the concentration of activities occurring in the area during the boom years of the industry. However, the district’s fishing industry changed greatly alongside the crash of Monterey’s sardine fishery during the 1940s. Table 5-2 highlights the key events and phases of Monterey’s commercial fishing history.

Table 5-2 Monterey commercial fishing history timeline

Date	Event
1851	The first Chinese inhabitants settle in a fishing village at Point Lobos, just south of the bay, helping to establish Monterey as one of California's most successful fishing ports. Several other immigrant populations settle in the area around the same time, contributing to the fast growth of the fishing industry.
1906	The Chinese fishing settlement at Point Lobos is destroyed by fire.
1908	Monterey's first major cannery opens.
1914-1918	The canning industry booms during World War I due to high demand for canned sardines.
1928	Purse seine fishing vessels arrive in Monterey, greatly increasing the harvesting efficiency of the local fishing fleet.
1920s-30s	Reduction fisheries thrive in Monterey during the Great Depression, as sardines are converted to fertilizer in great quantities.
1939-1945	During WWII, Monterey is known as "the sardine capital of the world".
1940s	Monterey Bay sardine fisheries start to decline and eventually crash.
1950s-60s	Tourism takes over at Cannery Row.
1984	The Monterey Bay Aquarium opens at the old site of the Hovden Cannery on Cannery Row.
1992	The Monterey Bay National Marine Sanctuary is erected.

Source: NOAA (2007), Chiang (2008)

Nowadays, of the 50 California fishing communities identified by NOAA, the following six are situated in Monterey Bay: Marina, Monterey, Moss Landing, Pebble Beach, Santa Cruz, and Seaside (NOAA 2007). While commercial fishing still occurs in the area, the industry has changed significantly from its original form, as has the bay's natural environment. As stated by Palumbi and Sotka in their book *The Death and Life of Monterey Bay* (2011), the bay that had "suffered an industrial blight" and was once highly polluted is now "so beautiful, so full of wildlife and suffused with the clean tang of the sea". There are several reasons for this. To begin, the death of the fish canning industry in Monterey meant that fish innards were no longer being dumped into the bay. It also meant that much of the catch being landed in the bay would have to be sent elsewhere for processing. A decreased volume and value of fish landings created a shift in economic development priorities in the area, in particular towards the development of the tourism industry (Palumbi and Sotka 2011; Chiang 2008). This shift in focus and priority, in combination with more strict fisheries management measures at both the federal and state levels, has pushed the commercial fishing industry from the forefront towards the periphery of economic activity in the area.

In addition, the establishment in 1992 of the Monterey Bay National Marine Sanctuary, a 6,094 square mile⁹ federal marine protected area (MPA) offshore of California's Central Coast, has led to increased attention and study of the ecological impacts of fishing in the area (NOAA 2011). Overall, Monterey is now exemplary of the disconnection between local production and consumption of seafood that is prevalent in the rest of the state and the nation. While much of the allure of Monterey to tourists is its fishing history and perceived abundance of seafood, it is most likely that visitors dining on Monterey's historic fishing pier are consuming fish imported from abroad, rather than the local 'catch of the day'.

One indicator of the abovementioned shifts in the area's fishing industry is a gradual decline in the size of its fishing fleet. According to Monterey's Harbormaster, whereas there were 154

⁹ 1 square mile = 2.59 square kilometres

commercially licensed fishing boats (50 of them full-time) in the port of Monterey in 1995, there are now 74 (20 of them full-time). In addition to general reasons for the industry's decline (mentioned above), a specific major cause has been the depression of the state's salmon fisheries during the past 15 years (S. Scheiblaue, personal communication, April 9th, 2012). Overall, the area has seen a shift from more diversified fishing operations towards consolidation and a focus on the capture of high-volume, low-value species: in 2010, the top three fish landings (in terms of poundage) into the Monterey area were Market squid (42,914,950 pounds), Pacific sardine (9,491,675 pounds), and Northern anchovy (1,505,528 pounds) (DFG 2010c). It can be assumed that these coastal pelagic species that dominate Monterey landings (Market squid alone contributed 77% in terms of poundage to Monterey's total landings in 2010) are primarily destined for foreign markets, as they are throughout the rest of the state (DFG 2010c; PFMC 2011).

5.4 CSF case study: Local Catch Monterey Bay

In January 2012, Alan Lovewell and Oren Frey, two graduates of the International Environmental Policy Master's program at the Monterey Institute of International Studies, initiated operations of a CSF for the Monterey Bay area, called Local Catch Monterey Bay (LCMB). Apart from a community supported seafood (CSS) program in Santa Cruz owned by H&H Fresh Fish, LCMB is the first CSF to start operations in Monterey Bay and its surrounding communities. According to the LCMB website, the program aims to:

1. Reconnect consumers with local sources of seafood, for enhanced freshness, food safety, and assurance of sustainable fishing methods;
2. Reduce the carbon footprint of seafood consumption by averting the "current complex model of global seafood distribution";
3. Create new markets for independent fishermen suppliers, while at the same time allowing consumers to invest in their community and nearby ecosystems;
4. Facilitate movement towards a "locavore" lifestyle amongst customers; and
5. Shift demand to local fisheries in such a manner that local actors become empowered to manage marine resources more responsibly (LCMB 2012).

Overall, the above goals fit within a CSF business model, which LCMB believes may offer "a solution to the impending collapse of many of the world's fisheries" (LCMB 2012). In this case study, data was gathered on the practical operating details of the CSF as well as on the perceptions of its key stakeholders.

5.4.1 Program specifics

Program planning for LCMB became official in March 2011 with the finalization of an initial feasibility assessment and business plan. Marketing began in August 2011, with membership sign-up opening in November 2011 and LCMB's first delivery on January 17th, 2012. Table 5-3 outlines the number of members, date, specific seafood species and quantity, and seafood source and location for each weekly seafood delivery during the research period.

Table 5-3 LCMB weekly seafood sourcing data

Week	Number of members	Date	Species	Quantity	Seafood source	Sourcing location
1	136	Jan 17, 2012	Dungeness Crab	594 lbs	John Hulliger	Moss Landing
2	148	Jan 24, 2012	Herring	450 lbs	Ernie Koepff	San Francisco
3	160	Jan 31, 2012	Yellowtail and Vermilion Rockfish	560 lbs	“Scott” and “Ollie”	Santa Cruz
4	163	Feb 7, 2012	Oysters	300 dozen (3600)	Tomales Bay Oyster Company	Tomales Bay, Marin County
5	153	Feb 14, 2012	Black Cod	525.5 lbs	Stan Bruno	Santa Cruz
6	158	Feb 21, 2012	Dungeness Crab	688 lbs	Chris Zajac and John Hulliger	Santa Cruz and Moss Landing
7	164	Feb 28, 2012	Chilipepper Rockfish	645 lbs	“Scott” and “Ollie”	Santa Cruz
8	171	Mar 6, 2012	Black Cod	654 lbs	Stan Bruno	Santa Cruz
9	156	Mar 13, 2012	Abalone	536 pieces	Monterey Bay Abalone Co. and American Abalone Farms	Monterey and Davenport
10	N/A	Mar 20, 2012	NO SEAFOOD	N/A	N/A	N/A
11	192	Mar 27, 2012	Dungeness Crab	730 lbs	Brett Shaw	Santa Cruz
12	201	April 3, 2012	Dungeness Crab	810 lbs	Ken Miller	Santa Cruz
13	205	April 10, 2012	Oysters	350 dozen (4200)	Tomales Bay Oyster Company	Tomales Bay, Marin County
14	210	April 17, 2012	Black Cod	820 lbs	Stan Bruno	Santa Cruz
15	213	April 24, 2012	Sand dabs	648 lbs	Greg Young, - “Scott” and “Ollie”-	Santa Cruz
16	N/A	May 1, 2012	NO SEAFOOD	N/A	N/A	N/A
17	220	May 8, 2012	Salmon	550 lbs	Stan Bruno, “Scott”, Jerry Foster, Tim Obert	Santa Cruz and Moss Landing
18	240	May 15, 2012	Salmon	546 lbs	Stan Bruno, Jim Elsea, Jim Cunningham	Santa Cruz and Moss Landing
19	246	May 22, 2012	Salmon	540 lbs	Stan Bruno, Christian Zajac, Jerry Foster	Santa Cruz and Moss Landing

Source: LCMB (2012)

On the supply side, seafood for the program is purchased by LCMB through a licensed seafood processor named Greg Young (who also operates a seafood restaurant in Scotts Valley, just north of Monterey Bay), since the processing of fish into fillets for re-sale requires specific tags from the California Department of Fish and Game (DFG 2012a). LCMB is thereby currently reliant on their seafood buyer for their seafood sourcing, not only formally for his status as a licensed fish processor but also informally for his established connections to fishermen in the area (A. Lovewell and O. Frey, personal communication, April 12th, 2012). At the same time, even though the program coordinators must officially purchase through this seafood buyer, they still strive to cultivate direct interactions with seafood producers wherever possible.

On the demand side, CSF members pre-pay for their weekly seafood shares, which are delivered to designated pick-up locations every Tuesday (seafood supply permitting). The price of a share is 20 USD per week for a regular portion (around 1 to 1.5 pounds of fish, or 2 to 3 servings) or 40 USD per week for a family portion (around 2.5 to 3 pounds of fish, or 4 to 6 servings). Members may choose the fillet option or the whole fish option, for which there is no price difference. As of April 12th, 2012, only 14 out of 220 members were signed up for the family share option and the LCMB owners were considering options for how to incentivize people to purchase this larger share option (A. Lovewell and O. Frey, personal communication, April 12th, 2012). Membership is managed by Farmigo, a website that aims to connect North Americans with local sources of food and that provides software for local food programs such as CSAs and CSFs to manage subscriptions and payments (Farmigo 2012). Members' accounts are automatically deducted each week (unless they ask to put a hold on payments) and automatically topped up when they reach zero (unless a member requests subscription cancellation).

There are few legal rules or regulations that apply specifically to LCMB's CSF operations. With regards to seafood sourcing, it is the assumption of the program operators that both the fishermen and processor they work with are complying with all necessary laws. Regarding public health regulation, LCMB faces two different permitting processes due to its operation in two separate counties. In Santa Cruz County, LCMB requires a mobile food vendor permit (the same as is required for food trucks) in order to operate. This permit costs around 180 USD to purchase and requires a one-time inspection. In Monterey County, no public health permit is needed because LCMB is considered to be delivering, but not handling, the fish that they sell. Rather, handling occurs at the licensed processor's permitted restaurant in Santa Cruz and seafood is only provided to LCMB once it has been processed and bagged (A. Lovewell and O. Frey, personal communication, April 12th, 2012).

5.4.2 Stakeholder responses to survey research

In order to better understand this CSF and its potential to achieve the intermediate outcomes and, eventually, end goals of CSF program theory, data was gathered from a wide range of stakeholders involved, or potentially involved, with the program (see Figure 5-3).

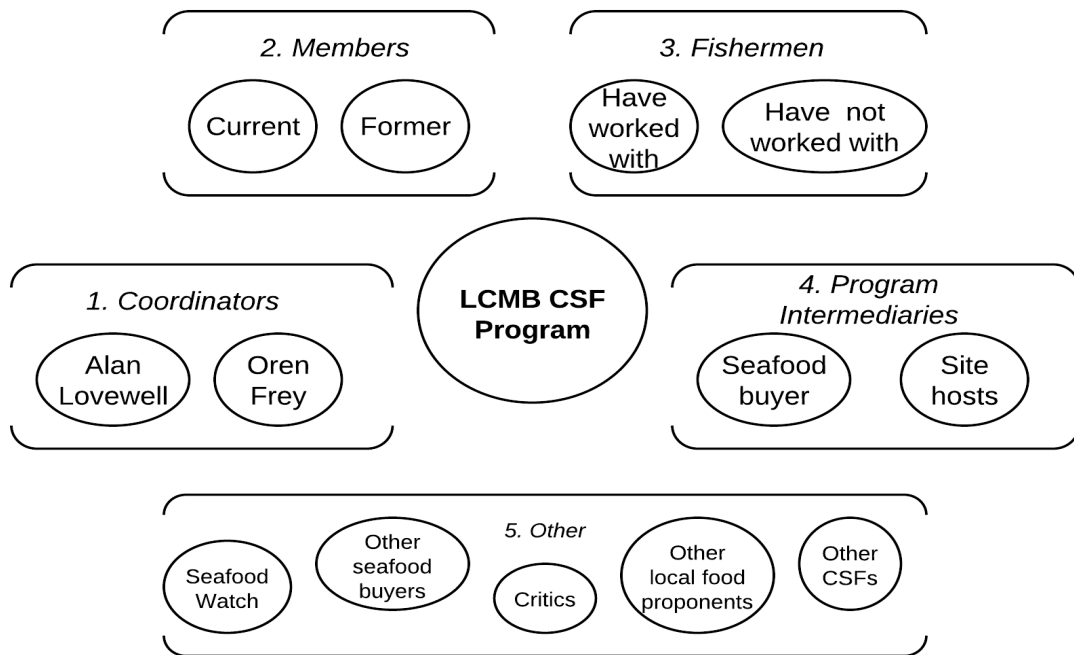


Figure 5-3 LCMB stakeholder map

The following sections provide specific data gathered from the LCMB coordinators, members, fishermen, and program intermediaries (stakeholder groups 1-4). General information regarding the fifth stakeholder group is also provided throughout the study, though not within any designated section.

1. Coordinators

Data on the two LCMB coordinators was gathered through varied interactions over a three-month period, including participation in business meetings, seafood deliveries, and interviews of the company, as well as contact via email. LCMB is set up as a limited liability company, based upon a generic operations agreement between the two owners. Most of the CSF's operations are based upon informal agreements with other stakeholders, including the processor, his restaurant, participating fishermen, and site hosts. Members must sign a membership policy agreement when they sign up for the program (A. Lovewell and O. Frey, personal communication, April 12th, 2012).

LCMB was started with a loan of 22,000 USD, of which 17,000 USD was used to pay for the program's 'fishmobile', or delivery truck. The aim is to pay off this main debt by the end of 2012. Other primary expenses for the company include payments to their licensed seafood buyer/processor, membership software (Farmigo), and gasoline for deliveries. At the time of writing, the program was not yet profitable for the coordinators, who relied on sources of income separate from LCMB. It is envisioned that the business will be self-sustaining in two to three years and that this would entail having a fisherman's association set up to determine who supplies the CSF with fish each week as well as enough income generated by the program to pay one full-time coordinator to run all other aspects of the program (O. Frey, personal communication, April 3rd, 2012).

The coordinators set up the LCMB program in Monterey Bay in order to increase access to local seafood, educate people about the marine environment, enhance recognition for

fishermen, decrease conflict between resource managers and producers, and support those fishermen in the area who use sustainable methods (O. Frey, personal communication, April 3rd, 2012). The 'local' seafood for the program comes from Monterey Bay, especially the ports of Monterey, Moss Landing, and Santa Cruz, as often as such sourcing is possible. In the case that seafood landed in Monterey Bay is not available, the coordinators look to other sources on California's Central Coast (O. Frey, personal communication, April 3rd, 2012). During the research period, seafood was sourced from these further locations on the following four occasions: herring from San Francisco on January 24th, oysters from Tomales Bay on February 7th and April 10th, and abalone from Davenport on March 13th. The CSF alternates between higher and lower cost species so as to establish an average cost being paid for seafood that allows the program to pay its expenses at the selling price of 20 USD per share (O. Frey, personal communication, January 20th, 2012).

The 'sustainability' of the seafood provided by the program is addressed in two major ways by the coordinators. On the one hand, Seafood Watch (SFW) rankings are considered and seafood on the green or yellow lists is favoured. On the other hand, the coordinators recognize that SFW ratings are "overarching classifications of the fishery and health of the resource at the regional level" and that, when fishing resources are addressed at a more local scale, they may be "more sustainable or less sustainable depending on the resource abundance and fishing techniques employed in that area" (LCMB 2012). For example, the sablefish sourced for the program is caught with hook and line in the Monterey Bay National Marine Sanctuary, in what is considered to be an abundant resource area and with methods that create very low bycatch of rockfish. Thus, although SFW places sablefish from the region on its yellow list due to concerns over the impacts of bottom trawling and rockfish bycatch, the LCMB coordinators consider the sablefish that it sources from a specific local fishery to be both sustainable and worthy of being green listed. Overall, the coordinators assume that Monterey Bay is "responsibly managed, highly productive and fished by many fishermen practicing sustainable fishing techniques" (LCMB 2012).

Given that the start of the research period coincided with the start-up of LCMB seafood deliveries in January 2012, it was possible to observe the challenges encountered by the coordinators on a weekly basis as well as the dynamic evolution of the program during its early stages. A consistent challenge faced by the coordinators was the management of uncertainty relating to seafood sourcing. Whereas a seasonal seafood guide written by the coordinators and posted on the LCMB website before deliveries started alludes to an abundance of various species during different seasons, in reality the tricky logistics of sourcing such seafood on a weekly basis highlight the inherent unpredictability of the harvesting of ocean resources and embody the structural disconnect between local seafood production and consumption in Monterey Bay.

The weekly delivery of seafood was skipped on two occasions during the research period due to difficulties securing supply. For example, May 1st, 2012 was the first day of the 2012 commercial salmon season, meaning that most Monterey Bay fishermen had been preparing for the opening of the fishery and not fishing for other species. As such, while an effort was made by LCMB affiliated fishermen to catch enough fish to supply the CSF that same day, in the end there was not enough salmon caught during the morning to deliver seafood to members later in the afternoon (LCMB 2012).

Balancing seafood availability with the different components of member expectations is another key challenge that the coordinators have faced. For example, during the week of April 3rd, 2012, the program was presented (through its seafood buyer) with the option to source trawled halibut from Half Moon Bay, due to a lack of available supply that week in Monterey

Bay. However, not only can halibut be caught with hook and line by fishermen from Monterey Bay, but the Half Moon Bay product would also have to be purchased several days in advance by LCMB's buyer through an additional buyer and then frozen. As a result, the coordinators chose to provide members with the more 'sustainable' Monterey Bay caught Dungeness crab for the second week in a row, prioritizing sustainability concerns over the desire for more seafood variation often expressed by members in LCMB's weekly member surveys. Overall, these and other sourcing challenges are illustrative of the difficulty that the coordinators have had in bringing some local fishermen onboard, particularly in Monterey, in order to establish a more steady stream of seafood supply.

On the consumption end, the coordinators were able to use existing local food channels, such as CSAs, as well as personal and professional contacts within the marine conservation world to reach out to potential members. Marketing has been achieved primarily through opportunities for free publicity as well as via one paid advertisement in *Edible Monterey Bay* magazine. According to the coordinators, the Monterey Bay consumer market is ripe for a CSF due to several factors. First, the Bay represents a prominent geographical fixture in people's lives. The resulting marine lifestyle and ocean view, combined with common knowledge of the area's fishing history, generate an association of seafood with the area and a sentiment that seafood should be a part of local diets. Second, the area is home to an active local food movement as well as farmer's market culture. Third, a concentration of monetary wealth in the area suggests a market where people would be willing to pay a premium price for local, sustainably caught seafood (O. Frey, personal communication, April 3rd, 2012).

2. Members

LCMB began its operations on January 17th, 2012 with 136 members. Despite some membership cancellations, the program's overall number of members has grown steadily throughout the research period. As of May 22nd, 2012, the program had 246 members. On a weekly basis, members are asked by the coordinators to complete an online survey in order to gauge satisfaction levels, better understand members' expectations, and foster a dynamic evolution of the program. Appendix 8 outlines the different questions posed to members in these weekly surveys. Data on current LCMB members was gathered via these weekly surveys, as well as from emails and online participation on the program's website¹⁰.

In the first three of the weekly surveys, members were asked (on a scale of 1 to 10) how interested they were in learning more about the local fishing industry. Responses indicated a strong interest amongst those members who responded, with an average of 8.83/10 on January 17th, 2012, 8.71/10 on January 24th, 2012, and 8.81/10 on January 31st, 2012¹¹. The following email from one member illustrates the particular interest of some customers in learning more about their weekly catch:

“Where are all the fishermen, who are they, where are their boats physically located and where are they catching the crab? How much are the fishermen being paid for the product? How much goes to the processor, and distributor? Who, specifically, is the middleman? Where are they located? What facilities and processing oversight is there? For example, who prepared the crab and where? Who will be filleting the fish? How much are they being paid? [H]ow is buying product from LCMB any better or fresher than buying the same product at a local farmer's market or off the wharf? [W]hat is the full product flow and the corresponding money flow?” (Anonymous, January 20th, 2012)

¹⁰ Access to the LCMB member surveys and responses during the research period was fostered by (1) contribution to weekly question formulation and (2) compilation of weekly survey results.

¹¹ The survey response rates were 80% for January 17th, 66% for January 24th, and 52% for January 31st.

In response to both the abovementioned survey results and such specific demands, weekly surveys since Feb 14th, 2012 have asked members if they have questions or comments for the fishermen who have provided that week’s catch. Coordinators gather these questions and relay them to the fishermen, whose subsequent responses are communicated in the LCMB weekly newsletter and on the LCMB website. In addition, the coordinators also film video profiles of program fishermen, which are shared with members on a weekly basis. Although these are indirect forms of contact, they still represent increased interaction between certain local seafood producers and consumers compared with previous levels. In addition, another aim of the program is to facilitate face-to-face dialogue through community events, such as a potluck for all interested stakeholders that was held on May 24th, 2012.

On March 6th, 2012¹², members were asked (1) what their goals were when joining LCMB and (2) if those goals were being met. Figure 5-4 ranks the main themes elucidated within the responses to question (1), based on the number of times each theme was mentioned.

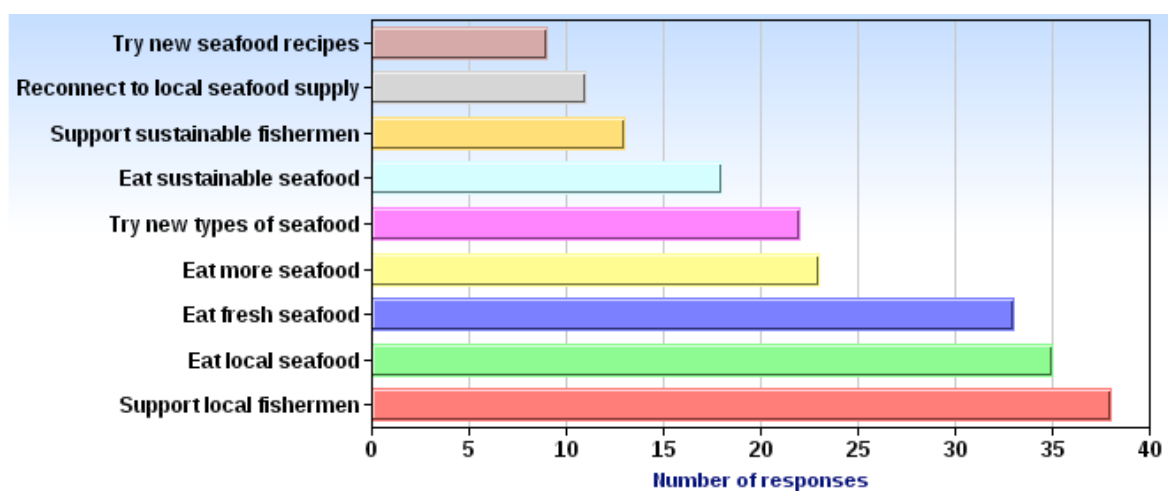


Figure 5-4 Members’ main reasons for joining LCMB

In addition to the above responses, some members noted their goals for joining the program as being to increase the convenience of seafood purchasing, to eat healthy seafood, to support the new CSF business model, to decrease their carbon footprint, and to buy seafood at a reduced rate, although each of these themes was mentioned less than five times. In response to question (2), members on average ranked their satisfaction regarding LCMB meeting their program goals at a level of 9.46/10.

Different LCMB members hold different perceptions and expectations on what is meant by ‘local’, with regards to the seafood being provided by the program. In a survey carried out on April 3rd, 2012, 52 members¹³ responded to the question “what does it mean to you for seafood to be considered ‘local?’” Most answers referenced seafood that had been (1) caught or landed in a specific geographic location (with responses ranging from Monterey Bay to the entire western US coastline) or (2) at a specific distance from the point of consumption (with responses ranging from 40 miles¹⁴ to 150 miles away). The second most noted characteristic of ‘localness’ was seafood that had been caught by ‘local’ fishermen, presumably those who land

¹² The survey response rate for March 6th, 2012 was 46%.

¹³ The survey response rate for April 3rd, 2012 was 26%.

¹⁴ 1 mile = 1.61 kilometres

their fish in Monterey Bay ports such as Monterey, Moss Landing, or Santa Cruz and who live ‘in the community’. Some respondents added additional caveats to the above definitions of local seafood, including that it must be processed in the community, and/or caught by small or family-run fishing operations, and/or have a minimal carbon footprint due to low shipping distance, and/or be fresh and not frozen. While some respondents also *added* notions of ‘seafood sustainability’ to the aforementioned descriptions of ‘localness’, others used responsible fishing as a *stand-alone requirement* for defining local seafood. This hints at the conflicting notions of ‘local *is* sustainable’ versus ‘local *and* sustainable’ that CSFs must deal with, as demonstrated by the following excerpt from a member describing what ‘local’ seafood means to her:

“I would say within a ~100 mile radius of coastline, but would also be happy if sometimes required to go further abroad (maybe up to Pacific NW) in search of truly sustainable options for the fisheries targeted. As long as I am satisfied that the fishery itself (species + fishing method + regulations) is sustainable, I would be less strict on how truly geographically local the source. Realistically, we all buy products that aren’t local (especially most of the seafood that people buy!), so particularly for fisheries I would argue the sustainability of the fishery itself is far more important than concerns over shipping...”
(Anonymous, April 3rd, 2012)

Several fishermen with boats licensed in Monterey (and other parts of California) do participate in North Pacific fisheries, adding to the complicated nature of defining what ‘local’ seafood really means (NOAA 2007). Overall, LCMB has to strike a careful balance each week between the ‘local’ and the ‘sustainable’ aspects of the seafood products that it provides, amidst diverse member definitions as well as preferences.

Data on LCMB members was also acquired via subscription cancellation emails in order to better understand the perspectives of former program members who had chosen to discontinue their membership. The primary reason cited for cancellation was value, with a cost of 20 USD per share seen as too expensive for some households. One former member noted the following:

“I like what you’re doing, think you’ve done a marvelous job ... and love the concept, but it’s just too expensive for us. Perhaps that’s the true cost of sustainable seafood—I hope not and that many more subscribers and better managed fisheries will combine to make sustainable, wild-caught seafood available to the 99 percenters too one day.” (Anonymous, Feb 13th, 2012)

Other primary reasons cited for ceasing LCMB membership included convenience factors (i.e. a rigid seafood delivery schedule, distant pick-up points, etc), lifestyle factors (i.e. traveling frequently, becoming vegetarian, not cooking seafood often, supply uncertainty, etc), and health factors (i.e. illness, shellfish allergy, pregnancy, etc).

3. Fishermen

The LCMB program has worked with increasing numbers of fishermen (and other seafood providers such as aquaculture operators) as it has become more established in the community. During the research period, data on fishermen was gathered primarily via interviews, both over the phone and in person, although these were somewhat difficult to arrange due to fishermen’s unpredictable schedules. Since the fishing industry is both unstable and highly complex, gathering data on fishing communities can be almost as difficult as gathering data on fish stocks since “both populations are highly mobile and exist in a complex and constantly-changing universe” (PFMC 2012). The Magnuson-Stevens Act describes fishing communities as being “...substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, [including] fishing vessel owners,

operators, and crew and United States fish processors that are based in such communit[ies]” (US Department of Commerce 2007). Other definitions exist as well and, according to the Pacific Fishery Management Council, “however you define fishing communities, it can be said that they are composed of diverse, independent people who do not fit easily into neat categories and who rarely, if ever, present themselves as a homogeneous group” (PFMC 2012). The following section presents data gathered on the Monterey Bay ‘fishing community’, towards addressing the study’s research questions.

LCMB (through its processor) offers fishermen an up-front premium price (around 0.25 USD to 0.50 USD per pound higher than market price) for their catch. If the coordinators manage to broaden the scope of the program in order to supply nearby restaurants with local catch (as they hope to), the program’s buying capacity will increase and more fishermen will be able to sell greater volumes of their seafood at a premium price (O. Frey and A. Lovewell, personal communication, February 29th, 2012). However, despite these potential benefits, it has been difficult for LCMB to bring some local fishermen on board with their CSF program. There are several likely reasons for this. First, buyer-seller relationships are deeply ingrained in the fishing industry in Monterey Bay. For some fishermen, allegiance to large, established buyers such as the Monterey Fish Company in Monterey and SeaHarvest in Moss Landing is strong, creating a reluctance to sell fish to smaller-scale purchasers who are new to the seafood industry. One salmon fisherman who has not yet worked with LCMB said that, although he does not have an exclusive purchasing agreement with the Monterey Fish Company, he is reluctant to work with anyone else due to the payment and consistency problems he has had with other buyers in the past (A. Anderson, personal communication, March 8th, 2012). This deep-rootedness of buyer-seller relationships is also demonstrated within the LCMB program itself, insofar as the coordinators have had to rely primarily upon the network previously established by their processor in order to access local seafood.

Second, the set quantity of fish being purchased each week by LCMB (which is based on the current number of members and specific species yields¹⁵) sets constraints that limit the number of fishermen that can join the program. For example, some small-scale fishermen targeting certain species do not catch enough fish in a week to supply the program’s needs, adding to coordination efforts if their catch is to be purchased and combined with the catch of other fishermen. On the other hand, it is possible that some larger-scale fishermen may prefer knowing that they can offload all of their catch to one large buyer when they come into port, rather than designating a small portion of their catch to a smaller CSF program. Ironically, the success of an expanded LCMB program with greater buying power and the capacity to supply local restaurants will rely upon prior commitments by seafood suppliers, including those who are currently reluctant to sell to LCMB in small volumes.

Third, the uncertainty inherent to the fishing industry makes it difficult for LCMB to ‘lock-in’ any seafood supply. This is not only with regards to fluctuations in the ‘catch of the day’ due to variable ocean and weather dynamics, but is also due to the costs that fishermen face on a daily basis, which in turn shape their operations. For example, most fishers experience high overhead costs (i.e. paying off their boats, renting dock space, etc), making it more difficult for them to take risks such as selling to a new and unestablished small-scale purchaser. High fuel prices are becoming increasingly influential and can motivate Monterey Bay fishermen to offload their catch in external ports, due to the fuel intensity of refrigeration and transport via boat (K. Fosmark, personal communication, March 8th, 2012). In addition, some fishermen have requested that LCMB create an official seafood-buying guide for the program so as to

¹⁵ The ‘yield’ of a specific fish or shellfish species refers to the portion of its total weight that is edible. For example, the yield for most salmon species is 62% for edible flesh, or around 50% for a skinless fillet (FAO 1989).

ease demand-side uncertainties (R. Farquhar, personal communication, March 9th, 2012). Overall, the LCMB program must balance this insecurity of seafood supply on the one hand with the consumer desire to know what the weekly catch will be on the other.

Through their purchases, the LCMB coordinators support those fishermen that they believe are operating in a ‘sustainable’ manner. This sustainability consideration goes beyond the SFW regional rankings associated with each type of catch to also include situation-specific informal assessment of the target species and gear utilized by each local fisherman. Table 5-4 highlights the species targeted and gear utilized by the fishermen that LCMB has worked with, as well as the official SFW ranking for each type of catch.

Table 5-4 Fishermen and fishing methods supported by the LCMB program

Name	Species targeted	Gear used	SFW ranking
American Abalone Farms	Abalone	Aquaculture	Best Choice
Brett Shaw	Dungeness Crab	Traps	Best Choice
Chris Zajac	Dungeness Crab	Traps	Best Choice
	Salmon	Trolling	Good Alternative
Ernie Koepff	Herring	Seine net	No Ranking
Greg Young	Sand dabs	Hook and line	No Ranking
Jerry Foster	Salmon	Trolling	Good Alternative
Jim Cunningham	Salmon	Trolling	Good Alternative
Jim Elsea	Salmon	Trolling	Good Alternative
John Hulliger	Dungeness crab	Traps	Best Choice
Ken Miller	Dungeness Crab	Traps	Best Choice
Monterey Bay Abalone Co.	Abalone	Aquaculture	Best Choice
“Scott” and “Ollie”	Yellowtail and Vermilion Rockfish	Hook and line	Good Alternative
	Chilipepper Rockfish	Hook and line	Good Alternative
	Sand dabs	Hook and line	No Ranking
	Salmon	Trolling	Good Alternative
Stan Bruno	Black cod	Bottom longline	Good Alternative
	Salmon	Trolling	Good Alternative
Tim Obert	Salmon	Trolling	Good Alternative
Tomales Bay Oyster Company	Oysters	Aquaculture (raised in pens)	Best Choice

Source: LCMB (2012)

Overall, according to the program coordinators, most of the fishermen that the program has worked with thus far “just see [LCMB] as another buyer willing to pay more”, and it will be interesting to see whether or not this perception expands over time (A.Lovewell, personal communication, May 4th, 2012).

4. Program intermediaries

LCMB relies upon two types of program intermediaries—(1) a seafood buyer/licensed fish processor and (2) several site hosts—in order to acquire seafood from fishermen and deliver it to members. The licensed processor purchases fish from producers for LCMB each week, unless a seafood product that does not need processing, such as abalone, is being offered. While the program coordinators are involved in the decision-making process during purchasing, they cannot legally purchase fish themselves without the proper California Department of Fish and Game processor's license (DFG 2012a). The processor then fillets the fish, bags it, and sells it to the program at the same cost he bought it for, charging 1 USD per share as processing fees (O. Frey, personal communication, January 20th, 2012). Any surplus fish that is not required for LCMB is kept for use at the processor's own restaurant (A. Lovewell and O. Frey, personal communication, April 12th, 2012).

The other main LCMB program intermediaries are the site hosts who serve as a drop-off/pick-up point for seafood deliveries. As of May 22nd, 2012, LCMB had 15 site hosts in Santa Cruz and Monterey counties. Appendix 9 lists the locations of these site hosts, which are primarily educational/research institutions or private businesses. While site hosts do not charge LCMB for their services and therefore are not directly linked to the money channeled through the program's supply chain, they are nonetheless a necessary actor in the functioning of the CSF. In addition, some site hosts have noted the benefits that they derive from having program members visit them once a week for seafood pick-up. One business in particular (Eco Carmel, a store providing household items for "green living and natural health" in Carmel-by-the-Sea) bought an additional business license in order to be able to have food on its premises, due to the perceived advantages of LCMB program affiliation (A. Lovewell and O. Frey, personal communication, April 12th, 2012). Other sites have helped out by storing seafood coolers between delivery days, which the coordinators see as a good sign of 'buy in' to the program (O.Frey, personal communication, April 3rd, 2012). In addition, two prospective members (one in Ben Lomond and one in Boulder Creek) signed up friends and neighbours for the LCMB program, as well as offering their houses as drop-off points, so that LCMB seafood could be delivered to their areas.

6 Analysis and Discussion of Findings

This chapter tests the CSF drivers, program theory, and challenges envisioned in Chapter 4. In particular, analysis of the LCMB program helps to assess practical achievement of the intermediate outcomes (and potential to reach the end goals) of CSF program theory, while a broader analysis aims to derive the actual drivers and challenges of, and consequent lessons for, CSF programs.

6.1 Case study analysis

6.1.1 Accomplishing the intermediate outcomes of CSF program theory

Data for assessing the accomplishment of CSF intermediate outcomes within the LCMB program was gathered primarily from the program’s main stakeholders and was summarized as the key case study findings within Chapter 5. Figure 6-1 demonstrates which stakeholder responses were central to addressing each of the intermediate outcomes.

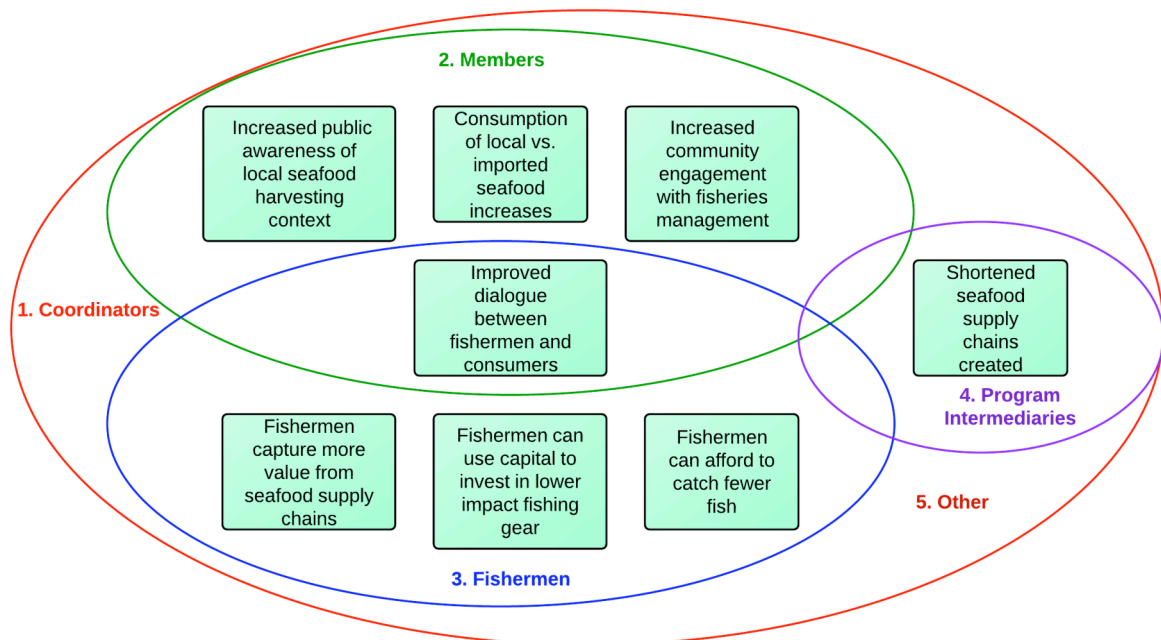


Figure 6-1 CSF intermediate outcomes and the relevant LCMB stakeholders

The following discussion aims at analyzing the findings from each stakeholder group towards a better understanding of LCMB’s intermediate outcome achievement potential.

1. Coordinators

The LCMB program was established by the coordinators in order to increase access to local seafood, educate people about the marine environment, enhance recognition for fishermen, decrease conflict between resource managers and producers, and support those fishermen in the area who use sustainable methods (O. Frey, personal communication, April 3rd, 2012). As such, the program’s overall focus is on achieving outcomes similar to those outlined in CSF program theory, with the least amount of emphasis on *fishermen catching fewer fish* and *fishermen using up-front capital to invest in lower impact fishing gear*. According to the coordinators, the latter

outcome, in order to be feasible, would require some sort of central program fund for gear improvements, with a fishermen's association in charge of allocating payments¹⁶. However, it would likely be very difficult for the coordinators (as outsiders to the fishing community) to convince fishermen to change their fishing methods in the short term, with any possible gear changes likely to be viewed over the longer term. In addition, the current small scale of purchases (in terms of both volume and total payments) from this CSF would presumably make it difficult to enact wide-ranging changes in fishing behaviour (O. Frey, personal communication, April 3rd, 2012). Moreso, the program and its coordinators aim at supporting those small-scale independent fishermen who already use lower impact fishing practices (A. Lovewell, personal communication, April 18th, 2012).

While the coordinators *intend* for LCMB to instigate shifts that could lead to the intermediate outcomes and eventual end goals expressed in CSF program theory, the *scale* of such shifts are presently limited by several factors. First, the coordinators see the current capacity of the program as being around 250 members. Although they have not officially set this as a limit (currently membership levels have only been capped at especially popular pick up locations), it remains to be seen the extent to which increased consumption of local seafood amongst this small proportion of the population of Monterey Bay (total population 667,339) will initiate more widespread shifts towards local seafood consumption. The coordinators have noted that the current pricing of LCMB membership (20 USD per share, or approximately one to 1.5 pounds of fish) is a likely barrier to establishing a broad reach for the program, especially amongst lower income groups. As such, while the CSF aims at recruiting clientele who understand and are willing to pay more for the added value of locally produced sustainable seafood, this at the same time limits membership to those who can *afford* to see this added value. Overall, it will be interesting to see how the fishermen buy-in and structural market shifts required for the program to expand to supplying local seafood to restaurants may be achieved and how such expansion might impact upon the scale of achievement of the program's intermediate outcomes and overarching end goals.

2. Members

During the research period, weekly surveys were carried out with the LCMB members. As noted in Chapter 5, these surveys not only highlighted high levels of interest amongst members in learning more about the local fishing industry but also served as a communication point for members wishing to pose questions to the fishermen who provided their weekly share. According to this data as well as general observations of the program over the research period, there has been *improved dialogue between fishermen and consumers* since the start of the program. Via this increasing contact, fostered by the educational and communication tools implemented by the LCMB coordinators, there has also been an *increased public awareness of the local seafood-harvesting context*, at least amongst the program's members. It is hoped that this may instigate *increased community engagement with fisheries management* as well, although this seems to be a medium to longer-term outcome.

It is also interesting to note how members' expectations for the LCMB program, communicated during a survey on March 6th, 2012, align with CSF program theory. For example, the member goal *to eat more local seafood* corresponds to the program intermediate outcome of *increased consumption of local vs. imported seafood*. Of those 35 respondents who noted

¹⁶ Core Sound Seafood, a CSF in North Carolina, is an example of a program using a 'dollar for every share' assistance fund that aims at raising money for reinvestment in the fishing community, upgrading damaged fishing gear, etc. (Core Sound Seafood 2012).

that they had joined the program in order to eat local seafood, a 9.59 out of 10 average satisfaction rate was measured. On the one hand, this suggests a strong achievement of this specific intermediate outcome. On the other hand, however, it does not indicate (1) what 'local' explicitly means (since LCMB members hold varying perceptions on the definition of local seafood) nor (2) the impacts on other seafood purchasing behaviour or (3) the scale of such increased local seafood consumption.

For example, in a survey on May 15th, 2012¹⁷, members were asked whether or not they supplement their LCMB share with seafood from other sources. Of the 68 members who responded, 28% said that they never acquired seafood from elsewhere. The remaining 72% noted that they occasionally purchased seafood from grocery stores (i.e. New Leaf, Whole Foods, Trader Joes, Costco), wholesalers (i.e. Sea Harvest), and local fish or farmer's markets. Some noted that they sometimes caught fish themselves. Thus, although consumption of local seafood may have increased amongst members, it is difficult to know to what extent seafood purchasing behaviour has been altered overall. In addition, even if all members had completely shifted their spending to LCMB seafood, the scale of impact of such behavioural changes amongst a group of 246 people consuming no more than 1000 pounds of seafood per week on the broader seafood market remains unclear.

3. Fishermen

As already indicated through data collection on LCMB members, there has been *improved dialogue between fishermen and consumers* since the start up of the CSF program. This is evidenced by the weekly question and response interchange between LCMB fishermen and members, which has been facilitated by the coordinators. This increased contact serves different purposes for different actors. For example, a Santa Cruz fisherman who is one of LCMB's main suppliers noted that while he does not necessarily feel more "connected" to consumers (since he self-describes as "not much of a people person"), he at the same time now knows who is consuming his catch for the very first time in his 33 year fishing career (S. Bruno, personal communication, April 18th, 2012). It will be interesting to see how LCMB's goal of building community through increased stakeholder dialogue will progress, particularly from the unique perspectives of the program coordinators, members, and fishermen.

The study also found that *fishermen capturing more value from seafood supply chains* has been achieved, since LCMB (through its seafood buyer) pays fishermen a premium (above market) price for their fish. In addition, the program acts to facilitate direct sales to the nearby community as well as providing free marketing towards the creation of value-added products. However, the scale of this outcome remains uncertain during the program's early stages and will be affected by whether or not LCMB expands its purchasing volume by supplying a larger membership and/or local restaurants.

Regarding the ability of LCMB to incite behavioural changes so that *fishermen catch fewer fish* and *fishermen use capital to invest in lower impact fishing gear*, it appears to be too early for such outcomes to occur, if at all. Most fishermen working with the program simply see LCMB as another buyer who happens to pay them more (A.Lovewell, personal communication, May 4th, 2012). In addition, an aim of LCMB is to support those fishermen that are already deemed to utilize sustainable fishing operations. As such, it is questionable whether or not the program has the potential (or even aims) to instigate further fishing changes, such as reducing catch levels or investing in new fishing gear, amongst the fishermen it works with.

¹⁷ The survey response rate for May 15th, 2012 was 30%.

4. Program intermediaries

Seafood supply chains are becoming increasingly long, fragmented, and global in nature (Rogers 2011). Figure 6-2 provides a general depiction of a conventional seafood supply chain.

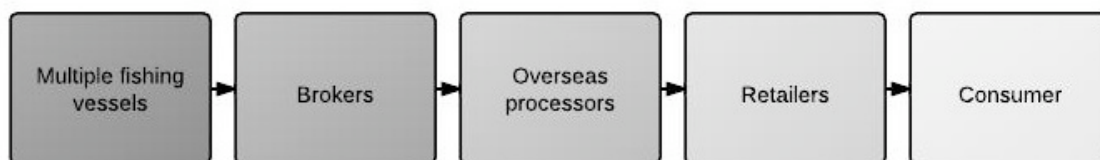


Figure 6-2 A typical conventional seafood supply chain

Source: Adapted from Rogers (2011)

On the other hand, the LCMB program has two main program intermediaries: its licensed processor and each of its site hosts. The licensed processor is paid 1 USD per share in processing fees, while the site hosts receive no share in the monetary value from the seafood supply chain (although some do perceive positive economic spin-off effects via their participation in the program). Therefore, LCMB has created a *shortened seafood supply chain* (see Figure 6-3), in accordance with the corresponding intermediate outcome of CSF program theory. This is in terms of both (1) the number of actors in the supply chain and (2) the distance covered by the supply chain.



Figure 6-3 The LCMB supply chain

In addition, an aim of the program is to establish its own processing facilities, which would eliminate LCMB's only middleman (its licensed processor), hence shortening the supply chain further. This will take ample capital investment, coordination, and a strong buy-in of fishermen to the program, making the maximal expression of this intermediate outcome possibly achievable in the medium term.

Summary

Table 6-1 below summarizes the overall potential of the LCMB program to reach each of the intermediate outcomes of CSF program theory, as well as the likely time frame for such achievement potential, according to the results discussed above.

Table 6-1 LCMB case study: Achievement potential and time scale of intermediate outcomes

Intermediate outcome	Stakeholders assessed	Achievement potential based on stakeholder assessment	Likely time frame for achievement
Increased consumption of local versus imported seafood	Coordinators Members	High	Short term
Increased value captured by fishermen from seafood supply chains	Coordinators Fishermen	High	Short term
Improved dialogue between fishermen and consumers	Coordinators Members Fishermen	High	Short to medium term
Shortened seafood supply chains	Coordinators Program intermediaries	High	Short to medium term
Increased public awareness of local seafood harvesting context	Coordinators Members	High	Short to medium term
Increased community engagement with fisheries management	Coordinators Members	Uncertain	Medium to long term
Fishermen catching fewer fish	Coordinators Fishermen	Uncertain	Long term
Fishermen using up-front capital to invest in lower impact fishing gear	Coordinators Fishermen	Uncertain	Long term

6.1.2 Reaching the end goals of CSF program theory

According to CSF program theory (see Figure 4-2), the end goals of CSF programs are (1) to reduce carbon footprint, (2) to improve traceability in seafood supply chains, (3) to improve stewardship of marine resources, (4) to improve fishermen's welfare, and (5) to improve local seafood systems. These end goals align with the aims expressed by the LCMB program coordinators. Clearly, whether or not LCMB is achieving CSF program theory's *intermediate outcomes* will influence the degree to which these *end goals* are reachable. For example, the uncertainty of the program's potential contribution to *fishermen catching fewer fish*, *fishermen using up-front capital to invest in lower impact fishing gear*, and *increased community engagement with fisheries management* also makes the program's contribution to the end goal of *improved stewardship of marine resources* uncertain as well, since this is the main end goal that these intermediate outcomes seek to influence.

At the same time, however, it was found that other factors apart from simple causal linkages influence whether or not LCMB can or will contribute to CSF program theory's end goals. In other words, it is overly simplistic to assume that "if you (do not) achieve this step then you (will not) achieve the next step". For example, despite the fact that the three aforementioned intermediate outcomes meant to lead to the *improved stewardship of marine resources* are currently *not* being fulfilled by the LCMB program, it is still possible for LCMB to influence marine

resource stewardship through its support of small-scale, independent fishermen using methods that are *already* deemed to be sustainable within the “well-managed” Monterey Bay (LCMB 2012). As illustrated in Table 5-4, the fishermen and specific fishing methods that LCMB has thus far supported through premium price purchases are operating at either SFW green or yellow ranking levels (and sometimes possibly higher – i.e. green rather than an official yellow – due to specific local contextual factors). It is hoped that by facilitating a reconnection of fishermen to their place (i.e. local markets and consumers) that the LCMB program may preserve those methods that are already deemed to foster responsible marine stewardship. The aim is to prevent independent fishermen from being silently squeezed out of the industry by large-scale industrial fishing operations. Additionally, while the abovementioned three intermediate outcomes are not *presently* being met, it is possible that they may be achievable over longer time periods and that this shall contribute to *further* marine stewardship in the area.

However, even if LCMB were achieving each of CSF program theory’s intermediate outcomes (and eventually, its end goals), a key consideration that remains is the actual *size* or *scale* of such impacts. At present, LCMB has unofficially capped membership at around 250 members, meaning that in order to reach the broader Monterey Bay population in a similar way, numerous other CSF programs would likely be needed. The only other somewhat similar program in the Monterey Bay area, H&H Seafood’s community supported seafood (CSS) program¹⁸, views LCMB as a competitor for local seafood supply (H. Rhodes, personal communication, May 23rd, 2012). As such, the possibility of establishing numerous other CSFs within the area remains uncertain.

Table 6-2 outlines each of the intermediate outcomes according to (1) the size of the LCMB program, (2) the broader potential Monterey Bay market (including Monterey county and Santa Cruz county), and (3) possible concerns surrounding scaling up in order to maximize end goal achievement. As indicated by the table, different challenges and uncertainties make the degree to which LCMB (and other CSF programs) may grow to reach the broader Monterey Bay area (in order to increase the scale of impact of CSF program theory’s end goals) unclear. For example, the overall scale of the program’s impacts on *reduced carbon footprint* and *improved traceability* remain uncertain since the potential influence of the program on the conventional seafood supply chains that feed most consumers in the area remains uncertain as well.

Additionally, due to the varying priorities of local seafood programs and sustainable seafood programs, imported ‘green list’ items are often promoted over local ‘yellow list’ or ‘red list’ items. As such, this promotion of certain imported goods as more sustainable options will likely ensure that traceability problems, which create issues such as the ‘imposter fish’ phenomenon, will persist within the local and broader American seafood markets.

¹⁸ The H&H CSS had around 100 members as of May 23rd, 2012. The program emphasizes sustainability first, and locality second, meaning that imports from Hawaii and Alaska are often used to supplement local catch and that the primary focus of the program is to provide sustainable seafood to members, rather than to support local fishermen (H. Rhodes, personal communication, May 23rd, 2012).

Table 6-2 LCMB case study: Current size, maximum size, and scalability concerns regarding associated end goals

Intermediate outcome	Current size	Maximum/potential size	Scalability concerns regarding associated end goals
Increased consumption of local versus imported seafood	246 members*	667,339 people	<p>1. <i>Reduced carbon footprint</i></p> <ul style="list-style-type: none"> -Low contribution of transportation to seafood’s overall carbon footprint - Impacts on conventional seafood supply chains unknown <p>2. <i>Improved traceability</i></p> <ul style="list-style-type: none"> -Impacts on conventional seafood supply chains unlikely (including SFW-endorsed seafood that is imported) <p>5. <i>Improved local seafood systems</i></p> <ul style="list-style-type: none"> -Possibility to remain a niche market for affluent, ‘conscious’ consumers -Quantity of locally-landed seafood that is divertible to broader local populations unknown
Increased value captured by fishermen from seafood supply chains	13 fishermen	49 fishermen**	<p>3. <i>Improved stewardship of marine resources</i></p> <ul style="list-style-type: none"> -Link between income increase and behavioural change unknown <p>4. <i>Improved fishermen’s’ welfare</i></p> <ul style="list-style-type: none"> -Scale of income effects resulting from LCMB premium price unknown
Improved dialogue between fishermen and consumers	246 members 13 fishermen	667,339 people 49 fishermen	<p>3. <i>Improved stewardship of marine resources</i></p> <ul style="list-style-type: none"> -Conversion of education/communication to measurable action/practical results unknown <p>4. <i>Improved fishermen’s’ welfare</i></p> <ul style="list-style-type: none"> -Conversion of education/communication to measurable action/practical results unknown <p>5. <i>Improved local seafood systems</i></p> <ul style="list-style-type: none"> -Interest of broader population/non-LCMB fishermen in diverting locally-landed seafood to local consumption unknown
Shortened seafood supply chains	LCMB supply chain (246 members + 1 seafood processor + 13 fishermen)	All seafood supply chains in Monterey and Santa Cruz counties	<p>1. <i>Reduced carbon footprint</i></p> <ul style="list-style-type: none"> -Impacts on conventional seafood supply chains unknown -Low contribution of transportation to seafood’s overall carbon footprint <p>2. <i>Improved traceability</i></p> <ul style="list-style-type: none"> -Impacts on conventional seafood supply chains unlikely (including SFW-endorsed seafood that is imported) <p>5. <i>Improved local seafood systems</i></p> <ul style="list-style-type: none"> -Quantity of locally-landed seafood that is divertible to broader local populations unknown
Increased public awareness of local seafood harvesting	246 members	667,339 people	<p>3. <i>Improved stewardship of marine resources</i></p> <ul style="list-style-type: none"> -Conversion of education/communication to measurable action/practical results unknown

context			-Diffusion of information to scale that fosters positive changes uncertain 4. <i>Improved fishermen's' welfare</i> -Conversion of education/communication to measurable action/practical results unknown 5. <i>Improved local seafood systems</i> -Interest of broader population in local seafood unknown
Increased community engagement with fisheries management	Unknown	667,339 people	3. <i>Improved stewardship of marine resources</i> -Conversion of education/communication to measurable action/practical results unknown 4. <i>Improved fishermen's' welfare</i> -Conversion of education/communication to measurable action/practical results unknown
Fishermen catching fewer fish	Currently 0 fishermen	49 fishermen	3. <i>Improved stewardship of marine resources</i> -Behavioural change amongst both LCMB and non-LCMB fishermen uncertain
Fishermen using up-front capital to invest in lower impact fishing gear	Currently 0 fishermen	49 fishermen	3. <i>Improved stewardship of marine resources</i> -Behavioural change amongst both LCMB and non-LCMB fishermen uncertain

* In addition to LCMB's current 246 members, household members who also consume the LCMB seafood share plus other friends/family/colleagues might be added to the current membership size in certain cases.

** This number is based on the LCMB program coordinators' knowledge of the local fishing industry. It is therefore possible that there are more than 49 commercial fishermen in Monterey Bay.

In addition, according to several assessments on the carbon footprint of different types of seafood (see Appendix 10 for more information on these studies), shipping tends *not* to be the leading cause of the climate impacts associated with seafood products. While climate impacts do vary depending on context, the highest negative contribution often stems from *fishing vessel operations*, particularly within conventional, large-scale fisheries (KRAV 2010; Tan and Culaba 2009; Winther *et al.* 2009; Guttormsdóttir 2009; Thrane 2006). A study by KRAV (2010) found this to be primarily due to the fact that conventional fishing vessels have higher engine running times due to the targeting of less sustainable fish stocks (lower abundance), usually employ certain damaging refrigerants, and often use highly energy intensive fishing methods such as trawling. The *processing* of fish in locations that use electricity associated with high climate impacts (i.e. coal power in China) also contributes significantly to carbon footprint. According to the study, climate impacts from transportation were only significant when transport distances were “very long” (i.e. from Europe to China and back) and/or when diesel-powered freezers were used (KRAV 2010).

According to Tyedmyers (2008), transportation rarely constitutes the largest contribution to the carbon footprint of seafood, and transport *mode* tends to be more important than total *miles* (i.e. long-distance shipping can have a much lower footprint than short-haul flights). Improving the yields of fisheries (by targeting sustainable stocks) and reducing direct fuel inputs through energy and gear improvements can “easily offset shipping emissions”. Regarding aquaculture operations, it is also important to consider the carbon emissions of a product's *feed*, as this can contribute significantly to the overall carbon footprint of the end product, even when it is not traveling far for consumption (Tyedmyers 2008). Overall, these studies indicate that, while transport does contribute to the carbon footprint of seafood, an explicit focus on “food miles” is incomplete. At the same time, one CSF noted that “while we ... cannot significantly alter the amount of fuel needed to catch and land a fish, we *can* reduce

the amount of fuel that is spent getting the fish to market – by marketing our catch locally, instead of selling it to wholesalers who ship it to other states and countries” (The Local Catch Inc 2012).

Other challenges regarding the maximization of CSF end goals by reaching broader populations relate primarily to the uncertainty of cause-effect linkages. For example, can increased income amongst fishermen (the scale of which remains uncertain) incite any degree of behavioural change (i.e. improvement of fishing methods)? Similarly, will increased information on seafood harvesting issues amongst consumers translate into practical action towards improved fisheries management? Overall it is uncertain (1) whether significant behavioural changes will occur amongst current LCMB members and fishermen as a result of the program and (2) whether ample interest exists amongst the broader population (both consumers and producers) that could facilitate expansion of local seafood movements towards maximized end goal fulfillment.

What is perhaps more certain is the following: the emphasis of LCMB is not on promoting full scalability from a demand perspective. In other words, the goal is not to supply each and every Monterey Bay (or California, or US) resident with local seafood through a CSF, as this would be unfeasible (at least in the short term). Rather, the aim is that new business models such as CSFs may act to support local, smaller-scale seafood harvesters in such a way that they are able to compete with larger corporate fishing enterprises (Benjamin 2010). As one LCMB member noted with regards to her reasons for participating in the program:

“Normally I have boycotted commercially caught seafood altogether. My ... belief is that there are no truly sustainable fisheries, for many complicated reasons from biological to socio-cultural and economic. So, I made it a personal goal to only eat seafood caught by myself, family or friends. Obviously, this severely restricts my personal seafood intake. I do this for my moral benefit, and also to make a statement to those who surround me and a segue to discuss the issue. But, clearly me not eating seafood personally doesn't do much to solve the problem of demand in the short or long term. I joined the CSF to support people who are at least trying to change the way things are done and get more information to the consumer. People will not stop eating seafood until there is no more left to eat, but perhaps we can change the game like has happened somewhat with agriculture. For now CSFs are on the fringe, but perhaps we can make it the norm. I joined because it's better than the status quo and I want the concept to succeed, but it still won't be enough to save our fisheries.” (Anonymous, March 6th, 2012)

In the short term, then, LCMB may help to sustain those independent fishermen that use sustainable measures and are interested in the added value that may be garnered through enhanced connections to local community members who care about eating ‘local’ and ‘sustainable’ food. In the longer term, while the local seafood movement may expand in order to include more producers and consumers (the number of which remains to be seen), numerous other measures will be required in order to manage high demand for seafood products and to foster responsible marine stewardship. Hopefully, though, CSFs will continue to act as a viable business model that may form a contributing piece of the overall ‘sustainable seafood’ puzzle.

6.2 Broader CSF analysis

LCMB is but one example in an ever-growing group of CSFs in North America. Here, specific data gathered during the case study as well as from other CSFs (through surveys, semi-structured interviews, and general observations) has been analysed in order to envision the primary drivers of CSFs, as well as the main challenges that they tend to face. These challenges

and drivers have been divided into either supply side or demand side contributory factors. Understanding these facets aids in comprehending the main lessons to be drawn from the broader local seafood movement phenomenon occurring in North America.

6.2.1 Primary drivers

Supply side

The following specific phenomena surrounding *seafood supply* have driven the initiation of CSF programs in North America:

- *Industry consolidation:* Most of the CSFs addressed by the study began operations in order to protect small-scale fishermen who were being edged out of the fishing industry by larger players. Independent fishermen who tend to have diversified operations (i.e. are able to fish different species) and function on smaller day-boats find it increasingly difficult to compete with large-scale, commercial, and specialized fishing operations. One fisherman in BC noted that he started his CSF after witnessing around 70% of his friends (also independent fishermen) get squeezed out of the BC fishing industry over a 20 year period (G. Johnston, personal communication, March 28th, 2012). CSFs offer enhanced economic security to small-scale fishermen in various ways, such as through up-front payments/investment, guaranteed markets, free marketing of a differentiated product, and premium prices.
- *Uncertain purchasing relationships:* According to the FAO, as fishing communities have shifted away from supplying regional markets towards more export-oriented approaches, they have become increasingly dependent on the price structures of external commodity markets, making smaller-scale fishermen more vulnerable to price fluctuations (McGoodwin 2001). Fishermen may leave the dock believing that a certain price per pound is what they will receive for their catch and that they will be able to cover their operating expenses, only to return from sea to find that the price has dropped. Large seafood buyers often have the power, particularly when there is an oversupply of fish, to greatly reduce their purchasing price or to refuse purchase entirely. CSFs, through seasonal subscriptions, can allow fishermen to know that they will receive a fair payment for their catch before leaving the dock (S. Strobel, personal communication, February 13th, 2012).
- *Fisheries policy impacts:* Although most fisheries management in North America aims at being eco-system based, decisions often neglect to incorporate consideration of the human dimensions of fishing (Hall-Arber *et al.* 2009). For example, permits allocated through the catch share system implemented by the New England Fishery Management Council in 2010 have led to “extremely high costs to access the rights to fish, concentration of access into the hands of a few, barriers for new entrants, and disproportionate negative impacts on small-scale independent fishermen” (NAMA 2012b; True 2012). However, as stated by Fulton and Adelman (2003): “fisheries management is 10% biological resource management and 90% people management”. As such, qualitative data is useful for depicting the context within which a specific fishery operates, providing an essential base for interpreting the biological and economic data more commonly used within fisheries management decisions. CSFs aim at increasing public awareness of the unique challenges that fishermen face such that fisheries regulation may eventually be improved for all involved.

- *Decreasing value of fishing operations:* Increasing overhead and operational costs of fishing, coupled with uncertain purchasing relationships, decreasing seafood wholesale prices, and market competition with cheap seafood imports, have decreased the value that fishermen receive for their catch. CSFs, through direct payments at a premium price, can allow small-scale fishermen to reap fair profits and continue their operations.
- *Opportunities for product differentiation:* In the face of ecological degradation and fish stock collapses, fishermen who operate in a more ‘sustainable’ fashion than large-scale industrial operations have desired a way to differentiate their product amongst buyers (S. Strobel, personal communication, February 13th, 2012). This is not only in terms of domestic competition, but also foreign operations that operate at reduced costs due to lower regulatory requirements (Child 2011). CSFs provide the opportunity to avert conventional buying channels and access (or help create) ‘conscious’ markets, within which consumers are willing to pay more for the added value of sustainable and local seafood.

Demand side

At the same time, certain *seafood demand* factors have driven the creation of CSFs, as follows:

- *Growth of the local food movement:* The notion of becoming a ‘locavore’ has become increasingly popular in North America and has expanded demand for ‘local’ foods (including seafood) amongst certain consumer segments. This local food movement has been fuelled by various concepts, including that of carbon footprints and the high ‘food miles’ associated with some products. Based upon and often utilizing the local food marketing channels already established by CSAs (their agricultural counterparts), CSFs have risen up in order to serve this demand.
- *Repercussions of the sustainable seafood movement:* The growing sustainable seafood movement has increased consciousness amongst North American consumers regarding the potential impacts of their seafood purchasing behaviour and created heightened demand for products that are deemed and verified to be ‘sustainable’. At the same time, the consequent proliferation of numerous certification, eco-labelling, and education bodies that intend to distinguish and communicate to consumers which seafood is ‘sustainable’ has also led to consumer confusion, due to inconsistent assessment approaches and subsequent contradictory advice (Benjamin 2010). In addition, sustainable seafood criteria (such as those utilized by SFW) tend to neglect socioeconomic factors such as community sustainability. CSF programs have arisen to fill this void through the provision of sustainable *local* seafood and direct connections to seafood producers.
- *Weak traceability within conventional seafood supply chains:* The length and fragmented global nature of most seafood supply chains, coupled with weak labeling regulations, has led to poor traceability surrounding much of the fish purchased in North American grocery stores and restaurants. It has become difficult for consumers to know whether the fish they are eating is truly safe, sustainable, or even a certain species, due to illegal mislabeling and the rampant ‘imposter fish’ phenomenon. By shortening and localizing seafood supply chains, CSFs act to reassure consumers on the source and characteristics of their food.
- *Difficulties attaining fresh fish:* Even in coastal areas of North America where there are strong fishing histories and present-day operations, it can be difficult for consumers to

acquire the fresh fish that they desire. As illustrated within the case study, most of the seafood landed in Monterey Bay is exported while most of the seafood consumed has been imported from abroad (either caught in foreign waters or caught in the US and sent abroad for processing). CSFs aim at reconnecting the fish landed in a place to that place and its consumers.

Summary

For the most part, the abovementioned drivers correspond to the underlying issues envisioned in Figure 4-1. However, two additional drivers were elucidated by the research. On the supply side, it was found that business entrepreneurship – in particular the perception of opportunities for product differentiation – has served as a driver for the CSF business model. On the demand side, not only increased awareness but also certain *negative* repercussions associated with the sustainable seafood movement have been found to contribute to the growth of the local seafood movement.

6.2.2 Primary challenges

Supply side

Through assessment of North American CSFs, it was found that the following challenges regarding *seafood supply* prevail:

- *Bringing fishermen on board:* While less of an issue in supply-driven CSFs (initiated by fishermen), CSFs started by outsiders to the fishing community can find it particularly difficult to enter tight-knit fishing networks, establish buying relationships, and have fishermen divert their catch to new and unknown supply chains (K. Gordon, personal communication, May 22nd, 2012). This challenge is especially pronounced when fishermen are more attached to conventional supply chains and/or involved in larger-scale fishing operations. Monterey Bay provides a case-in-point for this phenomenon: high-volumes of lower-price-per-pound fish are landed (primarily for export) in the ports of Monterey and Moss Landing, while lower-volumes of higher-price-per-pound fish (mostly bound for local and regional restaurants) are emphasized in Santa Cruz (Santa Cruz County 2012). As a result, the LCMB program has found it easier to source its seafood from Santa Cruz fishermen than it has from Moss Landing or Monterey fishermen (see Table 5-3).
- *Working within existing regulations:* Government requirements can add to the challenges surrounding setting up and maintaining a CSF. In California, for example, the Department of Fish and Game requires anyone purchasing seafood for re-sale to obtain specific processing permits. As such, additional intermediaries (licensed processors) are often required between coordinators and fishermen in order for a CSF to exist, even though an aim of CSFs is to eliminate middlemen. In addition, different aspects of CSF operations are often controlled at different levels of government. In Canada, for example, fishing is federally controlled, while vending is managed at the provincial and local levels, making for somewhat complicated permit application procedures (S. Strobel, personal communication, February 13th, 2012). Overall, since CSFs constitute a very new business model, it is often uncertain which exact regulatory rules shall apply to them.
- *Managing processing requirements:* It can be difficult for CSFs to process the fish that they provide, since local facilities are often non-existent or controlled by major fish buyers.

Although some programs are able to build their own facilities, barriers such as complicated regulations and high costs of equipment can make this difficult (B. Short, personal communication, March 26th, 2012). LCMB has been fortunate enough to connect with a generous restaurateur who is eager to help the CSF cause and who offers them cheap processing, which has been essential to the start-up of the CSF program.

- *Dealing with unpredictability of supply:* Factors such as unpredictable weather and environmental conditions make fishing an uncertain profession. CSFs must constantly deal with unexpected changes in the availability of different fish species, making sourcing specific quantities of seafood for their program members on specific days of the week a potential challenge.
- *Communicating program qualities to clients in a consistent manner:* Local seafood movements aim to contribute to improved seafood sustainability. However, as they function at very particular and context-specific local scales, it can be difficult to validate their sustainability claims through attachment to accepted aggregate sustainability (such as SFW) rankings. In other words, the agglomerated assessments of numerous fishery vessels' operations within a region do not necessarily account for individual outliers within that fishery. Finding a specific sustainable seafood ranking system that may verify consistently the sustainability of a CSF's catch can be difficult to impossible to achieve.

Demand side

At the same time, the primary challenges regarding *seafood demand* and CSFs are as follows:

- *Managing diverse client expectations:* In any business, it is likely that different clients will have different expectations surrounding the service or product that they are purchasing. This challenge is amplified within CSFs, which constitute new and unestablished business models, thereby making consumer expectations even more diverse. Members may have varied ideas of what is meant by 'local' or 'sustainable', and some will desire seafood variety while others will prefer specific seafood species to others. Attempting to fulfill customer needs, especially in a program where the product has been paid for ahead of time, becomes increasingly complicated where the source and type of the daily catch is often uncertain.
- *Retaining members:* Even though CSFs are community programs that emphasize a triple bottom line approach, they are at their core business enterprises that must continuously market themselves in order to retain members and bring new customers on board. In the case of LCMB, members tended to discontinue their subscriptions due to a perceived high cost per share, which is meant to encapsulate both the true cost and added value associated with sourcing sustainable, local seafood. Even when a CSF appears to have reached a maximum capacity, it still deals with constant turnover within its pool of members, making continual program marketing necessary. It remains to be seen whether this dynamism constitutes a weeding out process in which a body of extremely committed members will eventually prevail, or whether constant membership turnover will remain a challenge.

Summary

The challenges noted by the research study generally corresponded with those explained within the Brinson *et al.* (2011) paper. Additional challenges noted within the analysis related to dealing with key program stakeholders (i.e. bringing fishermen on board, communicating program qualities to clients in a consistent manner, and managing diverse client expectations) as well as tricky logistics (i.e. managing sparse processing opportunities as well as an unpredictable seafood supply).

6.3 Lessons

Certain key lessons for CSFs have been extracted from the abovementioned data and are explained below. These lessons should be useful to consider as the local seafood movement continues to evolve in North America, and perhaps also in other parts of the world.

Recognizing the differences between the ‘sustainable seafood’ and ‘local seafood’ movements

Though local seafood movements and CSFs most always emphasize the superior ‘sustainability’ of the seafood products that they offer, this quality tends to be framed differently than it is by the broader sustainable seafood movement. As noted within Table 4-2, sustainable seafood initiatives have relied upon information campaigns and eco-labels aimed at shifting demand in such a way that *the behaviour of fishermen* is eventually influenced. However, little is known as to how much of a shift this has actually incited on a global scale. On the other hand, local seafood movements have tended to originate from within specific fishing communities themselves and thereby aim at influencing *the behaviour of consumers* in such a manner that small-scale fishermen who operate responsibly may stay in business.

There is also a focus in some instances on using the CSF business model to encourage *behavioural changes in fishermen* (i.e. sustainability improvements at the vessel level). CSFs have the potential to foster positive behavioural change by creating markets that will embrace whatever fishermen have caught with premium price payments, thereby emphasizing (1) that fishermen do not need to capture maximum volumes in order to make a living and (2) that there is value in maintaining the capacity to catch a diverse range of species. By allowing fishermen to remain versatile and to target those species that are abundant, rather than those that are in high demand, CSFs can help to shift away from the damaging trends of high-volume and highly specialized industrial fishing. This is counter to the effects of certain sustainable seafood initiatives, such as the Seafood Watch rankings, which (by flagging certain species as being red, yellow, or green) may essentially create an over-demand for green species and lead to their decimation and shift down to the yellow or red lists (N. Dorry, personal communication, May 25th, 2012).

Therefore, while the local seafood movement is in many ways a merging of the sustainable seafood and local food movements, it is important that it does not become watered down by the shortfalls of either movement. The California Sustainable Seafood Initiative (CSSI) provides an interesting example in this regard, since it aims at creating an eco-label that flags seafood that has been (1) landed in a specific place (California) and (2) caught sustainably (confirmed via certification). On the one hand, this initiative would appear to embody the local seafood movement, through its merging of focus on both *place* and *fishing method*. However, what may be lost in the process is the important *contextual analysis* that the local (sea)food movement is meant to embody. According to DeLind (2011), “commerce and those who control it increasingly set the popular limits for what is and what isn’t reasonably local...

[we are in] danger of losing sight of the particular – particular ecologies and the relationships that their populations (humans and others) create over time with each other and their places”. As such, attention should be paid to whether or not the CSSI is helping or hindering the overarching goals of the local seafood movement through its broad classifications of ‘local’ as Californian and ‘sustainable’ as generic MSC criteria.

Similarly, it is important to recognize that specific forces are pushing certain sustainable seafood bodies to the forefront. For example, SFW has been known to exert its influence on other sustainable seafood initiatives that are seen to be diverging from its recommendations, with the aims of ‘speaking with one voice’ (K. Selkoe, personal communication, Feb 21st, 2012). While consistency is important (especially in the face of growing consumer confusion over sustainable seafood) and while SFW is a strong leader due to its robust scientific criteria and assessment processes as well as vast reach to consumer groups, such consolidation of the authority of knowledge poses another threat to contextual analysis. This phenomenon is similar to the situation observed by DeLind (2011) with regards to the local food movement:

“In the rush to win advocates and confront the existing agrifood system, many non-profits, whether foundations, institutional associations, or research entities, are vying for resources (information as well as funding) and authority... Such an orientation not only selects for quantitative data, but it superimposes a set of externally derived “best practices” ... on unique social spaces, codifying operations and outcomes.” (DeLind 2011)

At the same time, consumers should be wary of the assumption that local *is* sustainable, that some sort of automatic process makes consumption of food closer to home better for the planet. The following statement by one local seafood proponent is an echo to sentiments communicated by the movement more broadly: “... community-based fishermen are the best stewards of our oceans and we as consumers would be best served to trust and support them... Their livelihood depends on healthy oceans” (Flash 2012). While this may be true in many cases, it is crucial to remain mindful that eating local does not automatically equate to eating more sustainably. As such, what could be useful is “a reframing of the sustainable seafood movement at the local level [so as to] target the goal of sustaining fish stocks in new ways that are absent from a global sustainable seafood movement” (Schumann and Cook 2011). Overall, setting benchmarks for sustainability, whether contextual or based upon leading sustainable seafood ratings, will remain a key challenge for CSFs.

Emphasising contextuality

Rather than aiming at serving the entire US population’s *demand* for seafood with locally caught products, the local seafood movement, and CSFs in particular, aim at creating markets ample enough for local fishermen to receive fair compensation for their *supply* of seafood, whatever the quantity may be. As such, and in accordance with some of the key tenets of the local food movement, the specific *context* of a place is central to the form that local seafood systems will take. CSFs are subsequently quite diverse in their characteristics; each program is unique and built upon a unique combination of qualities. Table 6-3 highlights specific questions and qualities that can aid in the contextual analysis of CSFs.

Table 6-3 Questions for the contextual analysis of CSFs

Main question	Sub questions	Variable qualities
Why?	Why is the CSF being started? What are the aims of the CSF?	Different economic, social, and environmental problems/goals
Who?	Who is initiating the CSF?	Supply-driven (i.e. fishing family, fishing cooperatives) vs. demand-driven ('outsiders' to the fishing industry)
	Who are the intended stakeholders of the operation?	Different fishermen, consumers, etc.
What?	What type of fishing community/industry is it?	Methods used, type of fish caught, history, specific concerns, seafood buyers, processing facilities
	What type of seafood market exists (or has potential) in the area?	Urban vs. rural, distance of production from consumption, income levels, consumer perceptions and reasons for joining
	What will the CSF look like?	Scale of operations (number of members, number of pick-up sites, number of fishermen, pricing, etc), methods, goals, up front investments or purchase-by-purchase payments
How?	How will the CSF be started?	Initial investments, relevant regulations (processing, vending, fisheries management, health and safety), facilities (processing, delivery)
When?	What is the time frame for CSF?	Initial market research, program launching, reaching critical mass of producers/consumers, achieving goals
	Which 'seasons' does the CSF operate within?	Year long vs. defined/separate
Where?	Which areas does the CSF realistically aim to serve?	Geographic areas of production and consumption

As one LCMB member stated, for seafood to be 'local' it must be "tied to the local ecosystem or economy (fleet, boatyard, etc)", further emphasizing the contextuality of such programs (Anonymous, personal communication, April 3rd, 2012). At the same time, however, it is inevitable that CSFs may be established in ways that suit certain aspects of the local context more so than others. For example, one Louisiana CSF was set up by the operators of a farmer's market in order to boost business earnings during a period of high demand for fish (Lent). However, this coincided with a time of year where seafood supply in the area is very low. Local fishermen have subsequently expressed frustration with the CSF, saying that it would serve them better to be set up during periods of high catch and low prices, so as to provide fishers with another outlet for their catch (K. Brandhurst, personal communication, March 30th, 2012). This variation between supply-driven versus demand-driven CSFs was a common theme noted during the research.

Shifting towards a triple bottom line approach to sustainable seafood

The triple bottom line approach to business – which incorporates environmental, social, and economic considerations into operations – was introduced by John Elkington in the 1990s

and soon became a primary rhetorical tool in the move towards improved corporate responsibility (Elkington 1997). CSFs (i.e. LCMB 2012, Walking Fish 2012, Off the Hook 2012, etc.) have tended to emphasize this triple bottom line approach within their business operations, insofar as both public regulation (fisheries policy) and private regulation (sustainable seafood initiatives) have thus far tended to emphasize the environmental facets of seafood sustainability, while neglecting to factor in important social and economic considerations.

For example, and as already mentioned, a main driver for CSF programs has been the lack of attention paid to human actors during the fisheries management process. Not only fishermen but also interested outsiders have seen this as a reason for establishing CSFs. The LCMB coordinators, for example, stated that a key reason for starting the program stemmed from the tendency within fisheries management (as well as public perceptions) to view fishermen as the root of the *problem* rather than a necessary actor in implementing *solutions* for dealing with marine degradation (A. Lovewell, personal communication, April 18th, 2012). In California, although reforms to the state's fisheries policy (through the passage of the Marine Life Management Act in 1998 and Marine Life Protection Act in 1999) emphasized a shift towards eco-system based management, "a lack of social science information" has hindered this shift (Hall-Arber *et al.* 2009).

In order for fisheries management to be successful it must incorporate sound understanding of the *reasons why people fish*. Throughout the research period, high levels of distrust of fisheries managers amongst fishermen were noted. While resistance to stricter marine management and conservation measures is a likely cause of these sentiments, it is still important to take note of the repeated statements that fisheries managers (1) can be disconnected from specific local fishing realities and (2) often implement rules that do no more than add to the high production expenses of fishing operations (M. Tognazzini, personal communication, February 20th, 2012; S. Bruno, personal communication, April 18th, 2012). As Miller and Van Maanen stated (1979), "boats don't fish, people do", and it is thereby important to consider (and adapt management to) the set of human desires that drive fishing, including the need to make a living and preserve a way of life amongst fishermen as well as the broader demand for seafood products amongst the general population.

Along these lines, as demand for seafood in North America will likely continue to increase, it is essential that fisheries management measures do not disadvantage both producers and consumers by (1) favouring large-scale operations over small-scale operations and (2) creating an advantage for cheap imported seafood in US markets. Overall, CSFs aim at implementing a triple bottom line approach to conservation, in recognition of the fact that environmental protection is closely bound to the well-being of people and their communities; fishermen must be *engaged* and not *alienated* in order for effective fisheries management mechanisms to be implemented.

At the same time, however, even when fishermen are engaged towards the development of sustainable fishing communities, what about consumers? The study's findings suggest that CSFs do not initially reach lower income populations who are unable to pay a premium price for the added value of local and sustainable seafood. A key question to keep in mind is how healthy, sustainable, and local seafood can be provided to non-affluent populations, both in the North America and in other parts of the world. As stated by Smith *et al.* (1998), "poverty channels expenditure towards short term saving, at the expense of long-term losses and poor environmental product performance". The cheap frozen seafood available to poorer (or less conscious) populations at grocery stores has a string of embedded impacts, which affect not

only the environment but other low-income populations (i.e. artisanal fishers) in the country of export as well.

Over the longer term, local seafood movements may have the potential to reach broader consumption groups in an indirect manner. In New England, there have recently been instances of institutional purchasers (such as healthcare facilities) looking to shift the way that they purchase seafood – away from a focus solely on green listed or eco-labelled seafood towards an approach that favours regional purchasing. Overall, one of the main contributions of CSFs has been to change the dialogue surrounding what ‘seafood sustainability’ means, first within membership groups and eventually amongst broader populations (N. Dorry, personal communication, May 25th, 2012).

7 Conclusions

This chapter summarizes the primary findings of the study, as well as providing final reflections and suggestions for further research.

7.1 Summary of findings

The *aim* of the research study was to provide insight into how community supported fisheries (CSFs) might fill gaps left behind by fisheries policy and sustainable seafood initiatives towards improving seafood sustainability. First, a logic model depicting the main reasons assumed to lead to CSF program formulation was developed (Figure 4-1). It was found that this model corresponded to practical data gathered on CSFs, and a set of key supply and demand side *drivers* for CSFs was subsequently derived (see Table 7-1). The findings confirmed that community-oriented local seafood movements have arisen primarily because of the inability of both public and private regulatory measures to mitigate fish stock depletion and the other negative impacts associated with increasing global demand for seafood and the consequent industrialization of fishing operations.

Table 7-1 Main drivers of CSF programs in North America

	Supply side	Demand side
Drivers	<ul style="list-style-type: none"> -Industry consolidation -Uncertain purchasing relationships -Fisheries policy impacts -Decreasing value of fishing operations -Opportunities for product differentiation 	<ul style="list-style-type: none"> -Growth of the local food movement -Repercussions of the sustainable seafood movement -Weak traceability within conventional seafood supply chains -Difficulties attaining fresh fish

Through development of *CSF program theory* (Figure 4-2), the study built upon the aforementioned drivers in order to envision the specific interventions that CSF programs intend to implement in order to reach certain *intermediate outcomes* and, eventually, *end goals*. Qualitative assessment of the Local Catch Monterey Bay (LCMB) CSF program determined that five out of the eight intermediate outcomes were likely being fulfilled within the practical case (see Table 6-1). The three outcomes not presently being achieved related to influencing the behaviours of key stakeholders (fishermen and members) over a longer time period. It was found that the basic causal linkages stemming from the (lack of) achievement of specific intermediate outcomes were not the only factors that would influence whether LCMB achieved the end goals of CSF program theory, and that additional facets such as *context* and *scale* as well as a set of key *challenges* (see Table 7-2) would influence end goal achievement.

Table 7-2 Main challenges to CSF programs in North America

	Supply side	Demand side
Challenges	<ul style="list-style-type: none"> -Bringing fishermen on board -Working within existing regulations -Managing processing requirements -Dealing with unpredictability of seafood supply -Communicating program qualities to consumers in a consistent manner 	<ul style="list-style-type: none"> -Managing diverse client expectations -Retaining members

Three key *lessons* for CSFs and local seafood movements were derived from the study. First, while both aim at improving seafood sustainability, the sustainable seafood movement and the local seafood movement are *distinct* and should be recognized as such. Second, while it was found that most North American CSFs adhered to the general framework developed in Figure 4-2, the specific *context* of a place is central to the form that local seafood systems take, making each CSF somewhat unique (see Table 6-3). As such, different contexts determine how local (sea)food is defined, as well as how it is produced and consumed. Third, shifting towards a *triple bottom line* approach, not only within CSFs but also within fisheries policy and sustainable seafood initiatives, would be useful for improving seafood sustainability through incorporation of both environmental *and* human considerations.

7.2 Reflections

Local seafood movements, by focusing on enhancing connections between fishermen and consumers, represent an innovative means of improving seafood sustainability through the fostering of healthy communities that support healthy oceans. The CSF business model in particular – though youthful at only five years old and varying context-by-context – has already helped to influence positive change amongst the stakeholder groups that it involves. By creating new seafood markets, and re-establishing connections of seafood to its place, CSF programs have empowered both producers and consumers. Fishermen, on the one hand, by receiving fair prices for their catch as well as community support and appreciation for their labour, have been bolstered within a tough and competitive industry and can find it easier to operate independently. On the other hand, consumers have experienced an improved capacity to make informed choices about the source of their seafood and to view directly the impacts (environmental, social, and economic) of their purchases, all while enjoying fresh and delicious seafood.

However, the potential impacts of CSF programs may extend beyond these immediate outcomes and beyond the business model itself. By sparking conversations on seafood sustainability within specific local contexts, CSFs have created a *model for change* that could lead to several novel shifts¹⁹. First, by providing markets for diverse species based on seasonality and abundance, and by supporting diversified fishing practices, CSFs can *change the way that fishermen think* and potentially counteract the global trend towards specialized industrial fishing operations that target large volumes of a single species. They can also help fishermen to break out of the non-beneficial relationships that they often hold with conventional seafood buyers. Second, by initiating dialogue on the seafood harvesting contexts of specific places, as well as through the creation of local seafood systems within which specific fisheries and fishing practices can be monitored closely and seafood supply chains can become fully traceable, CSFs can *change the way that consumers think* about seafood sustainability. The intention is not to neglect the science behind sustainable seafood programs, but rather to initiate an inclusion of the human dimensions of fishing into sustainable seafood considerations, such that positive behavioural shifts become both rewardable and measurable

Such paradigm shifts amongst consumers and producers – first those directly involved in CSFs and eventually those within broader populations – have the potential to initiate a crucial rethinking of the *value of seafood*. By creating markets within which each seafood species costs the same price (or the price of weekly membership), CSFs can help to shift perceptions on

¹⁹ The ideas in this paragraph are based on an interview of Niaz Dorry, director of the North Atlantic Marine Alliance (NAMA), on May 25th, 2012.

“high-value” vs. “low-value” species and perhaps contribute to implementing valuation methods for marine animals and environments that go beyond basic commodity pricing.

During the study it became clear that such broad systemic shifts could be facilitated by further research into two main topics. First, attention to how *aggregated sustainability criteria* may be evolved in order to encapsulate *disaggregated sustainability movements* could help to determine new ways of legitimizing the sustainability claims being made by local seafood movements, especially in populations beyond their current program participants. Just as fisheries scientists are re-evaluating the ecological scale at which assessments of different *fish populations* are most relevant (GMRI 2009)—ranging from broad-scale to finer-scale, from coarse assessment to separate unit assessment (Clark 2009)—so too is research into the varying possible scales at which *fishing populations* may be assessed extremely pertinent as well²⁰. Second, it would be fruitful to assess the *potential international applicability of the CSF model*. Insofar as a massive ramping up of individual CSF programs is unlikely (due to issues of affordability amongst broader populations as well as concerns surrounding a watering down of program objectives and capacity), and since one of the primary strengths of CSFs is the potential to initiate systemic shifts through *conversation* and *connection*, it would be useful to see how similar programs could be set up in other parts of the world in order to build a global CSF network.

The study has thereby found that the potential impacts of CSF programs go beyond their capacity to source local seafood and provide it to a small number of members. However, while CSFs do present themselves as viable business models that could contribute in meaningful ways to dealing with the conundrums of ever-growing seafood demand and unsustainable fishing practices, it is unlikely that they will be effective on their own in working towards seafood sustainability. It is therefore necessary that all of the mechanisms that aim at improving the state of fisheries – especially the fisheries policy mechanisms and sustainable seafood initiatives that CSFs have aimed to supplement – evolve in such a manner that *socio-economic* considerations are better incorporated, if the human *behavioural shifts* necessary to improving the state of world fisheries are to occur in a meaningful way. Overall, the need to further explore varying definitions of ‘local’ and ‘sustainable’ within the context of CSFs will remain pertinent as the business model expands throughout North America, and perhaps elsewhere.

²⁰ An External Assessment Model (EAM) currently being piloted by Seafood Watch (SFW) has the potential to (1) offer localized seafood rankings for specific fishing operations that exhibit higher performance than SFW regional ranking averages and (2) strengthen the communication of the ‘sustainable’ qualities of certain CSF seafood options. Appendix 11 provides more information on the EAM process and its potential relationship to local seafood movements.

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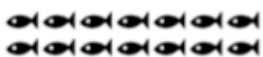

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Appendix 1 – Comparing large-scale and small-scale fisheries

FISHERY BENEFITS	LARGE SCALE 	SMALL SCALE 
Subsidies	\$\$\$\$\$ 25-27 billion	\$ 5-7 billion
Number of fishers employed	 about 1/2 million	 over 12 million
Annual catch for human consumption	 about 30 million t	 same: about 30 million t
Annual catch reduced to fishmeal and oils	 35 million t	 Almost none
Annual fuel oil consumption	 about 37 million t	 about 5 million t
Catch per tonne of fuel consumed	 1-2 t	 4-8 t
Fish and other sealife discarded at sea	 8-20 million tonnes	 Very little

**Note: All figures within the schematic are global approximations.*

Source: Jacquet and Pauly (2008a)

Appendix 2 – Criteria for quantitative vs. qualitative research

Traditional criteria for <i>quantitative</i> research	Alternative criteria for <i>qualitative</i> research	Corresponding <i>qualitative</i> research methods
Internal validity: <i>Strength of inferences regarding cause-effect relationships</i>	Credibility: <i>Confidence in the 'truth' of the findings from the point of view of the informants</i>	Prolonged engagement, persistent observation, triangulation, peer debriefing, negative case analysis, referential adequacy, member-checking
External validity: <i>Generalizability of the findings</i>	Transferability: <i>Demonstrating that the findings have applicability in other contexts</i>	Thick description
Reliability: <i>Repeatability of the research experiment</i>	Dependability: <i>Demonstrating that the findings are consistent through description of the context within which they were derived</i>	Inquiry audit
Objectivity <i>Findings that are free of personal bias, emotional involvement, etc.</i>	Confirmability: <i>A degree of neutrality; findings that are shaped by the respondents and not researcher bias, motivation, or interest</i>	Confirmability audit, audit trail, triangulation, reflexivity

Sources: Lincoln and Guba (1985), Trochim (2006), RWJF (2008)

Appendix 3 – List of interviews and other communications

Name	Occupation/organization	Date	Type of communication
Sonia Strobel	Skipper Otto's CSF	Feb 13	Interview
Mark Tognazzini	Morro Bay fisherman	Feb 20	Interview
Margie Hurd	SLO Fresh Catch	Feb 20	Interview
Kim Selkoe	Santa Barbara Sustainable Seafood Program	Feb 22	Interview
Oren Frey	Local Catch Monterey Bay	Multiple	Various
Alan Lovewell	Local Catch Monterey Bay	Multiple	Various
Andy Anderson	Monterey fisherman	March 8	Phone interview
Kathy Fosmark	Moss Landing fisherman's wife	March 8	Phone interview
Tom Hart	Monterey fisherman	March 9	Phone interview
Ron Farquhar	Monterey fisherman	March 9	Phone interview
Barbara Meister	Seafood Watch	March 20	Email (to Local Catch Monterey Bay)
Beth Short	Alaskans Own CSF	March 26	Email
Guy Johnston	Michelle Rose CSF	March 28	Email
Kay Brandhurst	Crescent City Supported Fisheries	March 30	Email
Steve Scheiblauber	Monterey Harbormaster	April 9	Interview
Jessica Lattif	FairShareSF	April 10	Interview (of Local Catch Monterey Bay)
Natasha Benjamin	Institute for Fisheries Resources (former)	April 11	Phone interview
Tom Pickerell	Seafood Watch	April 11	Email
Nicole Benincasa	Virginia SeaGrant	April 12	Interview (of Local Catch Monterey Bay)
Jack Kittinger	Center for Ocean Solutions	April 12	Phone interview
Stan Bruno	Santa Cruz fisherman	April 18	Interview
Erin Hudson	Seafood Watch	April 19	Phone interview
Kim Gordon	Center for Ocean Solutions	May 23	Phone interview
Heidi Rhodes	H&H Seafood	May 23	Phone interview
Joshua Stoll	National Oceanic and Atmospheric Administration	May 24	Phone interview
Niaz Dorry	North Atlantic Marine Alliance	May 25	Phone interview

Appendix 4 – List of North American CSFs

Key details CSF	Location	Year established	Organizers/Partners	Species
Abundant Seafood	Charleston, South Carolina	2009	Fisherman	Grouper, triggerfish, snapper, etc
Alaskan's Own	Sitka and Juneau, Alaska	2010	Alaska Longline Fishermen's Association	Sablefish, halibut, rockfish, salmon
Cape Ann Fresh Catch	Gloucester, Massachusetts	2009	North Atlantic Marine Alliance (NAMA), Gloucester Fishermen's Wives Association, MIT Sea Grant, Turner's Seafood	Groundfish
Cape Cod Weir Harvest	Chatham, Massachusetts	2010	NAMA	Squid, mackerel, scup, butterfish
Catch of the Season CSF	Anchorage, Alaska	2011	Alaska Marine Conservation Council	Crab
Core Sound Seafood	Chapel Hill/Raleigh, North Carolina	2010	Fishermen	Various
Community Fish	Stonington and Mount Desert Island, Maine	2009	Penobscot East Resource Center	Shrimp, groundfish
Crescent City Supported Fisheries	New Orleans, Louisiana	2011	Crescent City Farmer's Market	Sea bream, shrimp, crab
Cville CSF	Charlottesville, VA	2010	University of Virginia architecture students	Rainbow trout, catfish, shrimp, hybrid striped bass (all freshwater aquacultured)
Eastman's Local Catch	Seabrook, New Hampshire	2009	NAMA	Groundfish
Linda Kate Lobster Coop	Falmouth, Maine	2009	NAMA	Lobster
Local Catch Monterey Bay	Monterey, California	2012	Monterey Institute of International Studies graduates	Various
Off the Hook	Digby/Halifax, Nova Scotia	2010	Fisherman's cooperative, Ecology Action Center, Nova Scotia Dept. of Fisheries	Groundfish
Maple Ridge Farm and Fishery	Yarmouth/Portland, Maine	2010	NAMA, fishing family	Lobster, scallops

Michelle Rose CSF	Cowichan Bay, British Columbia	2011	Fisherman	Salmon
Ocean State Fresh	Newport, Rhode Island	2011	Community member	Bass, oysters, mackerel, scup, mussels, squid, lobster, cod, quahogs, herring, bluefish, scallops, monkfish, whiting
Port Clyde Fresh Catch	Port Clyde, Maine	2007	Island Institute, Midcoast Fishermen's Association	Shrimp, groundfish
Santa Barbara CSF	Santa Barbara, California	June 2012 (pilot)	Aquarium sustainable seafood program, University of California at Santa Barbara	Various
SirenSeaSA	San Francisco, California	2011	North Coast Fisheries Inc. employee	Various
Skipper Otto's CSF	Vancouver, BC	2009	Fishing family	Salmon
SLO Fresh Catch	San Luis Obispo, California	2010	Community member, local fisherman	Various
The Local Catch Inc.	Narragansett, Rhode Island	2011	Local fisherman	Various
Thimble Island Oyster Co.	Thimble Islands, Connecticut	2011	Miya's Sushi Restaurant, Thimble Island Oyster Co.	Oyster
Virginia Natural Fish Company	Williamsburg, Virginia	2011	Virginia Aqua-Farmers Network, Virginia Natural Fish Company	Catfish, rainbow trout, hybrid striped bass, prawns (all freshwater aquacultured)
Walking Fish	Durham and Raleigh, North Carolina	2009	Duke University, NC Sea Grant, Carteret Catch	Mixed finfish, shellfish
Yankee Fishermen's Cooperative	Seabrook Harbor, New Hampshire	2009	NH Sea Grant	Shrimp, groundfish

Sources: Various, including CSF websites, LocalCatch.org (2012), Brinson et al. (2011), NAMA (2012a)

Appendix 5 – North American CSF program details

Key details CSF	Data gathering method	Reasons for establishment	Program interventions/ business model	Intended outcomes	Final goals
Abundant Seafood	News articles	Distant seafood processing facilities Misguided fisheries management	CSF business model Local distributor and restaurant supplier	Make more money through fewer fish by showing people added value of sustainable seafood Receive premium price for pole-caught fish Educate members on the future of fish and its true value Eliminate the middle man — namely large-scale seafood distribution centers	Keep business afloat Improve seafood sustainability through the provision of ‘trash’ fish
Alaskan’s Own	Survey	Alaska harvested and processed seafood rarely makes it into local supply chains To raise money for the Alaska Longline Fishermen’s Association’s Fishery Conservation Network	Supply fish to existing local seafood processors, then to consumers via CSF	Gradually increase CSF membership subscriptions each year Expand to other cities in Alaska	Continue raising conservation funds Ensure access for local citizens to Southeast Alaska seafood
Cape Ann Fresh Catch	Survey/ Website	To find a more just, fair, and sustainable balance between seafood consumers, individual fishing boats and crews, local shoreside-operations, and Mother Nature	CSF up-front payments	Help fishermen get a better price for their catch Strengthen the local economy Directly reconnect people to the ocean by building an honest and fair relationship between fishermen and shoreside operations, the members who help sponsor them, and the oceans	Rejuvenate one of America’s original small businesses (fishing) Reduce carbon footprint
Cape Cod Weir Harvest	Website	Provide locally caught fresh fish that is sustainably caught	CSF business model	Weir fishing techniques	Support traditional ‘craft’ fishery Support economic viability of local

					fishermen
Catch of the Season CSF	Website	Bottom trawling near Kodiak island damages seafloor habitat, the Tanner crab population, and the fishermen that depend on them	CSF pilot program (in conjunction with limits to bottom trawling) ‘Story of your catch’ provided with each share	Financial support and empowerment for local Tanner crab fishermen Continue to utilize selective fishing practices that minimize waste and impacts on sensitive marine habitats	Foster protection of the Tanner crab habitat Sustain the Tanner crab fishery, an important part of a diverse fishing portfolio for many small-boat, independent fishermen Directly support ocean conservation
Core Sound Seafood	Website	Fishermen are increasingly leaving their life on the water as global markets, community economic loss, rising fuel prices and decreasing buying prices threaten their livelihood	Weekly CSF share system Weekly email detailing who caught fish and how, stories from the coast, suggested recipes and policy issues related to small-scale fisheries. ‘Dollar for every share’ towards Assistance Fund	Connect the fishermen of Down East Carteret County, North Carolina to a viable, local market Provide a market and a fair price to these fishermen and their families	Maintain North Carolina fishermen as key resource in state’s diverse agricultural offerings Sustain small scale fisheries that protect and support marine eco-systems, livelihoods and the larger health of communities
Community Fish	Website	The decline of substantial fish stocks, the disappearance of a once vibrant infrastructure to bring fish and seafood to market, and consumers who are hungry for fresh premium local fish	CSF shares	Fishermen engage with local communities Support use of hooks, a sustainable and intentionally inefficient fishing practice intended to protect local stocks while cutting down on bycatch Help consumers invest in well-being of eastern Maine’s fishing communities	Long term building of groundfishery Create local markets that will support marine habitat conservation, drive economic development in eastern Maine, and provide fresh, top-quality seafood to local customers
Crescent City Supported Fisheries	Survey	High demand for seafood during Lent	CSF program set up during Lenten season	?	Improve sales at a failing Thursday market
Cville CSF	Website	Unsustainable global fishing and consequent damaging aquaculture practices	CSF model	Establish a connection between consumers and small-scale aquaculturalists Support small-scale farming Limit the travel distance of food	Improve traceability Improve food safety Build community

				from farm to plate	
Eastman's Local Catch	Website	<p>Disconnections between local consumers and products</p> <p>General public unaware of issues encountered by fishing industry</p> <p>Increased regulations, fuel prices, and costs to put the fish on a dock creating a need to increase the price directly offered to fishermen</p>	CSF share system	<p>Provide local consumers with fresh catch</p> <p>Educate consumers about high quality seafood and local fishing industry</p> <p>Provide fishermen with better return for their catch</p>	<p>Sustain local industry</p> <p>Build community</p>
Linda Kate Lobster Coop	News articles	Global collapse of lobster prices, together with high bait and fuel costs, has capsized the economics of Maine's signature coastal industry	<p>CSF model</p> <p>Member participation in fishing operations</p>	Bypass dealers and fish markets	Protect fishermen's livelihoods
Local Catch Monterey Bay	Interview/ Observation/ Website	<p>Environmental, social, and economic issues surrounding global fisheries</p> <p>Disconnection between consumers and producers in well-managed Monterey Bay</p>	<p>CSF model</p> <p>Weekly surveys, newsletters, recipes, etc</p> <p>Meet the fishermen events</p>	<p>Provide fishermen with fair price for catch</p> <p>Increase consumer awareness of local fishermen and marine environment</p>	<p>Increase access to local seafood</p> <p>Enhance recognition for fishermen</p> <p>Decrease conflict between resource managers and producers</p> <p>Support those fishermen in the area who use sustainable methods</p>
Off the Hook	Website	To connect a co-operative of small-scale, groundfish bottom hook and line fishermen from the Bay of Fundy to subscribing customers in and around Halifax	Direct marketing through CSF: Subscribers pay at beginning of summer season for weekly shares of co-op's catch of fresh whole haddock and hake	<p>Remove middlemen removed from supply chain</p> <p>Give fishermen a fair price for their catch</p> <p>Allow consumers to share risks with fishermen</p> <p>Renew connections between consumers and local fishing communities and the ocean</p>	<p>More family income, more market choices, increased ownership and livelihood control (for small-scale fishers)</p> <p>Access to fresh, local, traceable, high quality fish (for consumers)</p> <p>Support financially "fishers who believe in sustainable</p>

					fishing practices and are working for the future of their communities?"
Maple Ridge Farm and Fishery	Survey/ Website	Supply wide range of farm products in conjunction with family's CSA	CSF shares	Preserve operations of small fishing / farming family through up front payments during off season	Support small-scale, sustainable fishing practices
Michelle Rose CSF	Survey	70% of the founder's independent fishermen friends forced out of the industry over past 20 years Uncertain purchasing relationships	Sell locally through CSF (rather than solely to company/shipping abroad)	Connect fishing community to community as a whole Know in advance exactly how much fish has been sold	Allow small boat fishermen to continue to operate Reduce carbon footprint of catch Avoid excess catch that can't be sold Achieve triple bottom line Make fishing more sustainable Attract young fishermen to expand CSFs into BC Garner community support for dealing with broader environmental issues in BC such as oil pipelines, fish farming, etc
Ocean State Fresh	Survey	No CSF yet in Rhode Island Rhode Island's commercial fishing fleet shrinking	CSF program	Connect consumers directly to seafood harvested by RI fishermen Increase CSF membership gradually Start independently processing Sign up restaurants for CSF	Support Rhode Island's fishing fleet
Port Clyde Fresh Catch	Website	Fishermen not receiving enough value for their catch Declining East Coast fisheries Poor fisheries management	CSF prepayments (within North America's first CSF)	Provide fishermen with fair price for their catch Use traditional fishing methods	Maintain the last fleet of groundfishermen between Portland, Maine and the Canadian border Support seafood harvest via environmentally sustainable fishing methods that reduce by-catch, habitat impact and fossil-

					<p>fuel consumption.</p> <p>Preserve fishing heritage/community and resources they depend on.</p> <p>Offer 100% supply chain traceability</p>
Santa Barbara CSF	Interview	<p>Need to increase sales and market options for local fishermen</p> <p>Side project while attempting larger-scale development of local processing plant</p>	CSF pilot program (June 2012)	Connect local consumers to local sources of seafood	Support local fishermen and fishing practices
SirenSeaSA	Website	Founder exposed to local seafood through employment at local fish processing plant	CSF model	Connect local consumers to local seafood	Encourage young fishermen to choose sustainable fishing methods
Skipper Otto's CSF	Interview	Fishing family using sustainable methods (gillnetting) facing competitiveness concerns within BC fishing industry	CSF prepayments	Provide fair price for catch, ahead of the start of the season	Help to keep independent fishermen afloat in a competitive industry
SLO Fresh Catch	Interview	Founder thought East Coast idea would be interesting on the West Coast and sought out local fisherman as partner/supplier	CSF share system	Re-connect consumers with fresh local catch	<p>Create a viable business</p> <p>Foster seasonal eating and locavore movement</p>
The Local Catch Inc.	Website	Low wholesale seafood prices and rising fuel costs make it harder to make a living on the water, especially for local day boat fishermen	<p>CSF share program</p> <p>Refrigeration and processing facilities</p> <p>Plus direct sales to restaurants and farmer's markets</p>	<p>Consumers get to know fishermen and hold them personally accountable</p> <p>Fisherman can invest in boat repairs and gear improvements at beginning of season due to up front payments</p>	<p>Help local commercial fishermen stay in business</p> <p>Reduce the carbon footprint of seafood</p> <p>Provide high quality seafood to local consumers</p> <p>Improve seafood sustainability</p>
Thimble Island Oyster Co.	Website	Desire to promote sustainable	Annual CSF fee towards farm's operating costs	Risk and benefit sharing between growers and	Help restore shoreline via keystone species

		ocean-based farming in an era of wild fish stock decimation	Involvement in various environmental research initiatives	consumers Rotational seaweed/shellfish farming system Invasive species cooking and gardening	production (improve water quality, provide habitat, etc) Support local ocean farmers who use sustainable methods
Virginia Natural Fish Company	Website	Markets needed for aquaculture operations being started in old tobacco fields	CSF shares Plus sales at farmer's market, online, to restaurants, etc	Connect consumers directly to local fish farmers Provide guaranteed market for local fish farms Pool resources for production and marketing	Promote sustainable aquaculture Support small farm businesses Reduce 'food miles'
Walking Fish	Interview / Website	Increased regulation, aging infrastructure, reduced fish stocks, and competition with global markets Consequent threats to the region's social and cultural character as well as independence, control, and capacity as stewards of coastal waters	CSF prepayment for share of fish Website/members' forum Educational events and lectures Carbon offsets for transportation	Link rural coastal fishermen to inland urban consumers Create long-term, regionally appropriate markets for fresh, local, low-impact seafood Foster triple bottom line approach	Increase viability of traditional coastal communities by fostering economic opportunities that support natural resource-based livelihoods Cultivate healthy community ties within and between North Carolina's rural and urban sectors Encourage an ethic of ecological stewardship that results in creative, community-based approaches to conservation Reduce carbon footprint
Yankee Fishermen's Cooperative	Website	Help independent fishermen survive at a time when changes to fishing regulations are being made by the federal government (i.e. catch share system)	Direct sales through CSF Build co-op's own processing facility	Re-connect local consumers and producers of seafood	Support local fishing community Maintain sustainably harvested seafood

Sources: Various, including CSF websites, news articles, interviews, and survey responses

Appendix 6 – Commercial fish species landed in California (2010)

Fishes		
Anchovy, northern	Rockfish, group slope	Surfperch, unspecified
Barracuda, California	Rockfish, group small	Surfperch, walleye
Bass, barred sand	Rockfish, honeycomb	Swordfish
Bass, giant sea	Rockfish, kelp	Thornyhead, longspine
Bass, kelp	Rockfish, olive	Thornyhead, shortspine.
Bass, spotted sand	Rockfish, pinkrose	Thornyheads
Blacksmith	Rockfish, quillback	Trawled fish, unspecified
Bonito, Pacific	Rockfish, redbanded	Triggerfish
Butterfish (Pacific pompano)	Rockfish, rosethorn	Tuna, albacore
Cabazon	Rockfish, rosy	Tuna, bigeye
Carp	Rockfish, shortbelly	Tuna, bluefin
Corvina, shortfin	Rockfish, speckled	Tuna, skipjack
Croaker, unspecified	Rockfish, splitnose	Tuna, unspecified
Croaker, white	Rockfish, squarespot	Tuna, yellowfin
Dolphin (fish)	Rockfish, starry	Turbot, hornyhead
Eel, California moray	Rockfish, treefish.	Turbot
Eel, monkeyface (prickleback)	Rockfish, unspecified	Wahoo
Escolar	Rockfish, vermilion	Whitefish, ocean
Fish, unspecified	Rockfish, widow	Whiting, Pacific
Flounder, arrowtooth	Rockfish, yelloweye	Wrasse, rock
Flounder, starry	Rockfish, yellowtail	Yellowtail
Flounder, unspecified	Sablefish	Crustaceans
Goby, yellowfin	Salmon, Chinook	Barnacle
Greenling, kelp	Salmon, Roe (Chinook, Coho)	Crab, Dungeness
Grenadier	Salmon, coho	Crab, armed box
Guitarfish, shovelnose	Sanddab, Pacific	Crab, box
Hagfishes	Sanddab, speckled	Crab, brown rock
Halfmoon	Sanddab	Crab, claws
Halibut, California	Sardine, Pacific.	Crab, hermit
Halibut, Pacific	Sargo	Crab, king.
Herring, Pacific – roe	Scorpionfish, California	Crab, pelagic red
Jacksmelt	Sculpin, staghorn	Crab, red rock
Kelpfishes	Seabass, white	Crab, rock unspecified
Lingcod	Seaperch, striped	Crab, spider.
Lizardfish, California	Seniorita	Crab, spider/sheep claws
Louvar	Shad, threadfin	Crab, tanner
Mackerel, Pacific	Shark, Pacific angel	Crab, yellow rock
Mackerel, jack	Shark, bigeye thresher	Crayfish, red swamp
	Shark, blue	Crayfish, unspecified

Mackerel, unspecified	Shark, brown smoothhound	Crustacean, unspecified
Midshipman, plainfin	Shark, gray smoothhound	Lobster, California spiny
Oilfish	Shark, horn	Prawn, ridgeback
Opah	Shark, leopard	Prawn, spot
Opaleye	Shark, pelagic thresher	Shrimp, bay
Pomfret, Pacific	Shark, salmon	Shrimp, coonstriped
Queenfish	Shark, sevengill	Shrimp, ghost
Ratfish, spotted	Shark, shortfin mako	Shrimp, mantis
Ray, Pacific electric	Shark, sixgill	Shrimp, ocean (pink)
Ray, bat	Shark, soupfin	Shrimp, unspecified
Ray, unspecified	Shark, spiny dogfish	Echinoderms
Rockfish, China	Shark, thresher	Bryozoan
Rockfish, Pacific ocean perch	Shark, unspecified	Sand dollar
Rockfish, aurora	Shark, white	Sea cucumber, giant red
Rockfish, bank	Sheephead, California	Sea cucumber, unspecified
Rockfish, black-and-yellow	Skate, big	Sea cucumber, warty
Rockfish, blac	Skate, longnose	Sea stars
Rockfish, blackgill	Skate, thornback	Sea urchin, purple
Rockfish, blue	Skate, unspecified	Sea urchin, red
Rockfish, bocaccio	Smelt, night	Sea urchin, white
Rockfish, brown	Smelt, surf	Mollusks
Rockfish, calico	Smelts, true	Limpet, keyhole
Rockfish, canary	Sole, Dover	Limpet, unspecified
Rockfish, chilipepper	Sole, English	Mollusk, unspecified
Rockfish, copper	Sole, fantail	Octopus, unspecified
Rockfish, cowcod	Sole, petrale	Sea hare
Rockfish, darkblotched	Sole, rex	Sea slug
Rockfish, flag	Sole, rock	Snail, sea
Rockfish, gopher	Sole, sand	Snail, top
Rockfish, grass	Sole, unspecified	Squid, jumbo
Rockfish, greenblotched	Stingray	Squid, market.
Rockfish, greenspotted	Sunfish, ocean	Whelk, Kellet's
Rockfish, greenstriped	Surfperch, barred	Plants
Rockfish, group bolina	Surfperch, black	Kelp
Rockfish, group gopher	Surfperch, pile	Worms
Rockfish, group nearshore	Surfperch, rainbow	Flatworm, marine
Rockfish, group red	Surfperch, redtail	Invertebrate Unspecified
Rockfish, group rosefish	Surfperch, rubberlip	Jellyfish
Rockfish, group shelf	Surfperch, shiner	Sea pansy

Source: DFG (2010a)

Appendix 7 – Guiding principles of California’s Ocean Protection Council

1. Recognizing the interconnectedness of the land and the sea, supporting sustainable uses of the coast, and ensuring the health of ecosystems.
2. Improving the protection, conservation, restoration, and management of coastal and ocean ecosystems through enhanced scientific understanding, including monitoring and data gathering.
3. Recognizing the “precautionary principle”: where the possibility of serious harm exists, lack of scientific certainty should not preclude action to prevent the harm.
4. Identifying the most effective and efficient use of public funds by identifying funding gaps and creating new and innovative processes for achieving success.
5. Making aesthetic, educational, and recreational uses of the coast and ocean a priority.
6. Involving the public in all aspects of OPC processes through public meetings, workshops, public conferences, and other symposia..

Source: State of California (2010)

Appendix 8 – LCMB member survey questions

Survey question	Date of question
Did you enjoy this week's seafood offering? (Scale of 1-10)	Each week since January 17 th , 2012
Did we provide you with enough seafood in this week's share? (Scale of 1-10)	Each week since January 17 th , 2012
Any questions/comments for LCMB?	Each week since January 17 th , 2012
Any questions/comments for [insert name], the fisherman who caught this week's local seafood offering?	Each week since February 14 th , 2012
Did you find the recipes we provided on our website helpful? (Scale of 1-10)	-January 17 th , 24 th , and 31 st 2012
Did you find the video newsletter helpful? (Scale of 1-10)	January 17 th , 24 th , and 31 st 2012
How interested are you in learning about the local fishing industry? (Scale of 1-10)	January 17 th , 24 th , and 31 st 2012
How often would you like to be able to purchase the following in an online marketplace? <ul style="list-style-type: none"> • Tomales Bay oysters • Fresh abalone (farmed) • Smoked local salmon • Smoked black cod • Oyster shucking knife • Fillet knife • Cedar plank (for grilling fish) • Rubber mallet for cracking crabs • Fish scaler 	February 21 st , 2012
What were your goals when joining LCMB? Are these goals being met? (Scale of 1-10)	March 6 th , 2012
What does it mean for you for seafood to be considered 'local'?	April 3 rd , 2012
How much money does your household usually spend on food per week?	April 3 rd , 2012
Do you have any ideas about how LCMB and similar local food initiatives can reach more people?	April 3 rd , 2012
Which of the following would you most be interested in attending? <ul style="list-style-type: none"> • A Local Catch "pop up" seafood dinner at a restaurant • A "meet the fishermen" potluck, with other members, fishermen, and music • A fishing boat "open house" in one of the harbors • A seafood cooking demonstration with a well-known local chef • A filleting "clinic" • A "seafood throwdown" where chefs are given a surprise Local Catch and must prepare it with limited time 	April 17 th , 2012
Do you supplement your LCMB with other seafood purchases? If so, from where?	May 15 th , 2012

Appendix 9 – LCMB site hosts

Site host	Location
Member	Boulder Creek
Member	Ben Lomond
Sandabs Seafood and Wine Bar	Scotts Valley
The Food Bin	Westside Santa Cruz
Santa Cruz Mountain Brewery	Westside Santa Cruz
Point Market	Pleasure Point
Cabrillo College	Aptos
MBARI	Moss Landing
Zeph's One Stop	Salinas
CSUMB	Seaside/Marina
Sweet Elena's Bakery	Sand City
Monterey Institute of International Studies	Monterey
Pacific Grove Adult School	Pacific Grove
Eco Carmel	Carmel
Lokal Restaurant	Carmel Valley

Source: LCMB (2012)

Appendix 10 – Reports on the carbon footprint of fisheries

Study	Date published	Author(s)	Method	Key factors in energy consumption/carbon footprint
Emissions of greenhouse gases from a 400 g pack of cod: A comparison of KRAV-approved cod and average cod	2010	KRAV	Life cycle assessment	<ol style="list-style-type: none"> 1. Fishery fleet fuel consumption 2. Refrigerants 3. Processing 4. Transportation over “very long” distances
Estimating the carbon footprint of tuna fisheries	2009	Tan and Culaba	Input-output analysis	<ol style="list-style-type: none"> 1. Fishery fleet fuel consumption 2. Processing 3. Air transportation
Carbon footprint and energy use of Norwegian seafood products	2009	Winther <i>et al.</i>	Life cycle assessment	<ol style="list-style-type: none"> 1. Fishery fleet fuel consumption and refrigerants emissions 2. Processing 3. Product form (fresh product requires air transport mode)
Life cycle assessment on Icelandic cod product based on two different fishing methods	2009	Guttormsdóttir	Life cycle assessment	<ol style="list-style-type: none"> 1. Fishing fleet fuel consumption 2. Processing 3. Truck transport
LCA of Danish fish products	2006	Thrane	Life cycle assessment	<ol style="list-style-type: none"> 1. Fishing fleet fuel consumption

Appendix 11 – The Seafood Watch External Assessment Model

As of April 2012, the Monterey Bay Aquarium was piloting an External Assessment Model (EAM) for its Seafood Watch (SFW) program. The EAM pilot was initiated after frequent requests for SFW assessments of smaller scale fisheries and species had to be rejected because they were not on the SFW priority list. Recognizing that it is useful to reward those seafood harvesters who demonstrate better than average performance, SFW has designed the EAM as a mechanism for expanding assessment capacity through the externalization of the three key SFW seafood assessment steps: writing, internal criteria review, and external peer review. Once a draft report is created, it is to be presented to SFW for a final review before being made public. During the pilot, different third parties (i.e. aquaculture companies, NGOs, the Department of Natural Resources, etc.) that have expressed interest in SFW assessment of certain non-priority species will be given the opportunity to test the EAM. As of May 2012, the pilot was still in its early stages, with completion of the pilot expected to occur at the end of 2012 and official EAM implementation (if approved) occurring at the start of 2013 (E.Hudson, personal communication, April 19th, 2012).

At present, SFW has no official position on CSFs or local seafood movements (T. Pickerell, personal communication, April 11th, 2012). However, some unofficial endorsement of the Local Catch Monterey Bay (LCMB) program by Aquarium staff has occurred. On March 20th, 2012, a memo was sent to all Monterey Bay Aquarium employees and volunteers, inviting recipients to “consider participating in a new and innovative approach to support the conservation of the ocean and the sustainability of our Monterey Bay fishing community” and stating that LCMB provides “an ideal opportunity for us to economically reward fishermen for their conservation efforts” (B. Meister, personal communication, March 20th, 2012). On April 13th, 2012, Mike Sutton (vice president of the Monterey Bay Aquarium) endorsed LCMB during a TED talk held in Monterey at TEDxMonterey. In both cases, however, support for LCMB explicitly hinged upon LCMB’s use of SFW rankings as a determinant for the seafood that it delivers. This presents a dilemma insofar as some of the fish provided by LCMB is believed to be more sustainable than the official SFW rankings for certain regional fisheries may dictate.

The EAM process therefore (1) has the potential to offer localized seafood rankings for specific fishing operations that exhibit higher performance than SFW regional ranking averages and (2) could be useful for strengthening the communication of the ‘sustainable’ qualities of certain CSF seafood options. Further research into EAM and its potential relationship with local seafood movements would be useful, especially if the following questions are addressed:

- Do costs associated with the EAM process alter its accessibility to certain third parties?
- Which scales can this framework be utilized at? Will assessments of specific vessels be feasible or will the SFW process remain optimized at the regional level?
- What is the potential that the use of third party assessment will water down or discredit the EAM ranking system?

- How relevant are present SFW criteria to CSFs, insofar as factors such as socioeconomic/community impacts, 'localness', and transportation are not measured? Do CSFs view the EAM as potentially helpful for reaching their end goals, and why?
- How might implementation of the California Sustainable Seafood Initiative act to help or hinder assessment of the nuance between specific fisheries?

