The following individuals certify that they have read, and recommend to the Faculty of Graduate and Postdoctoral Studies for acceptance, the dissertation entitled:

Boat to fork: Seafood value chains and alternative food networks

submitted by Allison Louisa Witter in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Resource Management and Environmental Studies

Examining Committee:

Rashid Sumaila, Professor, Institute for the Oceans and Fisheries, University of British Columbia
Supervisor

Evelyn Pinkerton, Professor, Resource and Environmental Management, Simon Fraser University
Supervisory Committee Member

Chris Gaston, Associate Professor, Faculty of Forestry, University of British Columbia
University Examiner

Dianne Newell, Professor Emerita, Institute for the Oceans and Fisheries, University of British Columbia
University Examiner

Additional Supervisory Committee Members:

Grant Murray, Associate Professor, Nicholas School of the Environment, Duke University
Supervisory Committee Member

James Vercammen, Professor, Faculty of Land and Food Systems, University of British Columbia
Supervisory Committee Member
Abstract

Alternative food networks (AFNs) aim to restructure value chains to improve the ecological and socio-economic outcomes of food systems. In this thesis, I introduce the concept of seafood AFNs. Whereas existing literature has focused primarily on one type of seafood AFN – community supported fisheries (CSFs) – there is a gap in knowledge regarding the wider array of these types of enterprises. Further, there are questions related to their viability, scalability, and potential for broader impact.

This thesis begins to address these research gaps through value chain analysis of various types of seafood AFNs. Through semi-structured interviews with seafood AFN representatives from across North America, I identify five key features emphasized along their diverse value chains: supporting (i) small-scale and (ii) place-based fishing through the provision of (iii) traceable, (iv) sustainable, and (v) high-quality seafood products. I also categorize market values and less tangible values promoted by these enterprises, as well as their key barriers, which highlight structural conflicts inherent in simultaneously participating in and resisting market-based structures. Further, through analysis of interview data from seafood value chain participants in a case study region, I highlight how the diversity, flexibility, and hybridity of seafood AFNs can present both challenges and opportunities to their application in new areas.

My research also contributes to improved understanding of the market feasibility of seafood AFNs. Through a geographically stratified consumer survey, I suggest that consumers broadly prioritize seafood attributes situated at the consumption end of the value chain, such as product quality. Through Spearman two-tailed tests I also identify associations between demographic variables and certain seafood preferences. For example, younger consumers indicate higher willingness to pay for seafood features emphasized through seafood AFNs, older consumers have positive attitudes about the health benefits and convenience of seafood, and those situated in non-coastal locations perceive lower availability of local or domestic seafood. These results suggest that seafood AFNs should emphasize their high-quality product offerings and target specific consumer segments when looking to expand into new markets.
Lay summary

Similar to the land-based local food movement, alternative food networks (AFNs) for seafood aim to create positive socio-economic and environmental change. However, more information is needed about seafood AFNs and their ability to improve financial, social, and ecological sustainability within the seafood industry. In this thesis, I describe how seafood AFNs are structured, the benefits they aim to create, and the challenges they face (Chapter 3). I also explore the types of seafood AFNs that might be successful within a case study area (Chapter 4). Last, I use an online survey to determine what consumers think about the seafood products offered through seafood AFNs, and how much more they would pay for these products (Chapter 5). I expect the results of this thesis to be helpful for understanding the potential future growth and impacts of seafood AFNs.
Preface

Chapter 3 is modified from a publication in *Marine Policy*, authored by me and Joshua Stoll (JS). I led all stages of the research: conducting the interviews, analysing the results, and writing the manuscript. JS contributed to collecting data through a feedback workshop and reviewing the manuscript. The graphic design for Figure 3 was produced by Julianna Stoll.

Chapter 4 is modified from a research report authored by me, Michele Paterson (MP), and Grant Murray (GM). I led all stages of the research: conducting the interviews, analysing the results, and writing the report. MP and GM contributed to reviewing the report. This chapter is currently being prepared as a manuscript for submission to a peer reviewed journal.

Chapter 5 is authored by me and is currently being prepared as a manuscript for submission to a peer reviewed journal.

The semi-structured interviews and online questionnaire used in this research were approved by the University of British Columbia Behavioural Research Ethics Board under the following certificate numbers: H15-03400 (Chapter 3), H15-03432 (Chapter 4), and H18-01046 (Chapter 5).

Publications related to my thesis chapters are:


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1. Introduction

1.1 Context

Fish and fish products have distinct nutritional benefits (Bernstein, Oken and de Ferranti, 2019; Hicks et al., 2019), are an important source of food around the world (Smith et al., 2010; Srinivasan et al., 2010), and have become one of the most heavily traded food items globally (Gephart and Pace, 2015; Kittinger et al., 2017; FAO, 2018; Guillen et al., 2019). According to the Food and Agriculture Organization of the United Nations (FAO) State of Fisheries and Aquaculture report (2018), total global fish production and consumption both reached their highest recorded levels in 2016. Demand for seafood has been growing steadily; between 1961 and 2016, annual global growth in fish consumption was more than double population growth rates, as well as exceeding growth in terrestrial meat consumption rates. Among several drivers, international seafood trade has played a critical role in enabling growing global seafood consumption. Most countries now report some degree of seafood trade, and the total volume of fish and fish products exported globally increased by 245% between 1976 and 2016. Of the total annual production of 170.9 million tonnes\(^1\) of fish and fish products in 2016, 79.3 million tonnes were sourced from marine capture fisheries, while the remaining 91.6 million tonnes were sourced from inland capture fisheries and inland- and marine-based aquaculture (FAO, 2018).

Increased international seafood trade in sustainably managed fish stocks can provide nutritional (Hicks et al., 2019), financial (Sumaila et al., 2012), and employment (Teh and Sumaila, 2013) benefits, but certain risks have also been noted. For example, trade in fish products can support economic growth, poverty reduction, and food security by generating revenues through seafood exports, and by increasing food access through imports, yet growing reliance on international trade can also create vulnerability to global supply and price shocks, shift healthy proteins away from local consumption, and present distributional issues (Bjorndal, Child and Lem, 2014; Asche et al., 2015; Gephart and Pace, 2015; Fabinyi, 2016; Watson et al., 2016; FAO, 2018; O’Neill et al., 2018; Bevilacqua et al., 2018).

\(^1\) This figure does not include aquatic mammals, crocodiles, alligators, caimans, seaweeds, or other aquatic plants (FAO, 2018).
It has also been suggested that trade forces can drive overexploitation of fisheries resources, particularly where strong management measures are not in place\(^2\) (Smith *et al*., 2010). Overall, growing seafood demand and trade combined with inadequate fisheries governance have been linked to declines in marine ecosystems and fisheries around the world (Smith *et al*., 2010; Watson and Pauly, 2013; Watson *et al*., 2016), yet globalized seafood chains and mislabeling may mask fisheries overexploitation within the marketplace (Crona *et al*., 2016; Hu *et al*., 2018).

Much of the sustainability concern surrounding wild fisheries stems from their open-access and common-pool nature (Hardin, 1968). According to Gordon (1954), an absence of property rights in fisheries leads fishers\(^3\) to overcapitalize their boats in a competitive “race to fish”, which results in a dissipation of economic rent, and depletion of the resource (Gordon, 1954). To this point, the Gordon-Schaefer bioeconomic fisheries model illustrates how placing limits on fishing effort can lead to greater economic benefits and a larger biomass in the fishery (Dupont and Phipps, 1991). Gordon’s work is a foundation of fisheries economics, and has informed fisheries management policies, particularly in developed countries (Pinkerton and Davis, 2015). For example, quasi property rights have been introduced in some fisheries – including through individual transferable quotas (ITQs) – in order to discourage the overexploitation of fishery resources, by turning them into secure assets that may deliver long-term economic benefits to their owners (Sumaila, 2010). Overall, it is recognized that some form of governance – whether collective or

\(^2\) At the same time, it is recognized that trade measures related to seafood can serve to promote responsible fisheries (Bellmann, Tipping and Sumaila, 2016; Sumaila, Tipping and Bellmann, 2016). For example, the United States Seafood Import Monitoring Program (SIMP) was introduced in 2018 to deter “illegal, unreported and unregulated (IUU)-caught and/or misrepresented seafood from entering U.S. commerce” (National Oceanic and Atmospheric Administration, 2016). The program requires seafood importers to report key data from the point of harvest to the point of entry into the United States for thirteen fish and fish products identified to be vulnerable to IUU fishing and seafood fraud, with the goal of verifying whether seafood has been lawfully harvested or produced (National Oceanic and Atmospheric Administration, 2016). As another example, the European Union has introduced a carding system that aims to incentivize action against IUU fishing, through the issuance of yellow cards (warnings) and red cards (bans) to seafood exporting countries (Sumaila, 2019).

\(^3\) The terms ‘fisher’ and ‘harvester’ are used interchangeably within this thesis. While the focus of the research is primarily on wild capture fisheries, farmed seafood is also relevant to consider as it is of growing importance from a seafood production standpoint (FAO, 2018) and is supplied through some alternative seafood networks (LocalCatch.org, 2019b).
private – is required in order to optimize the use of fishery resources (Hanna, 2003; Haas, Edwards and Sumaila, 2016).

In addition to public governance mechanisms, market-based approaches have been developed to address sustainability challenges within the global seafood industry (Jacquet et al., 2009), including through the adaptation of seafood value chains (Sterling et al., 2015; Kittinger et al., 2017). Existing research on trends in seafood value chains has found certain similarities with agricultural value chains. For example, increasing concentration has been demonstrated in both agricultural and seafood value chains, including within individual segments (e.g., a smaller number of firms participating in harvesting, processing, or marketing) and between segments (e.g., through vertical integration) (Guillotreau, 2004; Gudmundsson, Asche and Nielsen, 2006; Haas, Edwards and Sumaila, 2016). Research has also found that there has been a decreasing share of consumer food expenditure to farmers over time, similar to literature on price transmission within seafood value chains (Gudmundsson, Asche and Nielsen, 2006; Jensen, 2006). There may also be ecological implications related to seafood harvesters participating in global value chains, particularly where they lack bargaining power with regards to ex-vessel prices, and where strong fisheries management mechanisms are not present (Fabinyi, 2016; Purcell et al., 2017; Rosales et al., 2017). Specifically, overfishing in less developed countries that supply high-value global seafood markets has been deemed a “wicked problem” within fisheries management (Jentoft and Chuenpagdee, 2009; Barclay et al., 2019).

One particular market-based mechanism for adapting seafood value chains has been the development of alternative food networks (AFNs) for seafood. Similar to agricultural AFNs, seafood AFNs aim to restructure value chains and have emerged as a reaction to some of the issues related to international trade, including environmental degradation,

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4 Value chains are defined and described further in Section 1.3.2.
5 Concentration is defined as a smaller number of firms accounting for a larger proportion of economic activity (Khemani and Shapiro, 1993).
6 As an example, through analysis of seafood value chain case studies in several developed and less developed countries, it was found that small-scale fishers consistently receive the smallest distributional economic benefit from seafood value chains, compared with processors and retailers (Bjørndal et al., 2015).
product mislabeling, and welfare issues for harvesters\textsuperscript{7} (McClenachan \textit{et al.}, 2014; Bolton \textit{et al.}, 2016). For example, it has been suggested that seafood AFNs may be more environmentally sustainable than their larger-scale, global counterparts, such as through reducing carbon footprints from boat to fork and providing new markets for abundant yet underutilized species (McClenachan \textit{et al.}, 2014). Further, insofar as smaller-scale fishing operations may struggle to maintain viability (Schuhbauer and Sumaila, 2016) – including under certain fisheries management measures, such as policies that move toward privatizing fishery resources (Palsson and Helgason, 1995; Pinkerton and Edwards, 2009; Carothers, Lew and Sepez, 2010; Olson, 2011) or favour larger vessels (Whitmarsh \textit{et al.}, 2003) – seafood AFNs may present opportunities to enhance harvesters’ financial sustainability (e.g., through premium prices) (Stoll, Dubik and Campbell, 2015; Knutson, 2017). Similarly, viability constraints for small- and mid-scale farmers (such as rising land and input costs) have been found to be a driver for seeking premium pricing via niche marketing in agricultural AFNs (Kirschenmann \textit{et al.}, 2008; Uematsu and Mishra, 2011; Mount and Smithers, 2014; Park, Mishra and Wozniak, 2014; Paul, 2019), alongside other key drivers such as growing consumer demand for local, traceable, and/or sustainable food (Adams and Salois, 2010; Nonini, 2013).

However, AFNs are typically considered to be ‘niche’ (Little, Maye and Ilbery, 2010; Oosterveer and Spaargaren, 2011; Maye, 2013; Pascual-Fernández \textit{et al.}, 2019), and there are gaps in knowledge regarding their potential for broader impact in fisheries and seafood systems. For example, while there are several types of seafood AFN (Market Your Catch, 2019), much of the existing literature has focused on one particular type of enterprise: community supported fisheries (CSFs) (Brinson, Lee and Rountree, 2011; Campbell \textit{et al.}, 2014; McClanahan \textit{et al.}, 2014; Stoll, Dubik and Campbell, 2015; Bolton \textit{et al.}, 2016; Godwin \textit{et al.}, 2017). The viability and scalability of seafood AFNs is also uncertain; for example, the premium prices that harvesters can earn through these enterprises may be

\textsuperscript{7} It is recognized that value chains with structures and/or goals similar to seafood AFNs are not entirely new; for example, harvesters in certain fishing communities may have chosen to sell a portion of their catch directly to consumers for some time (Andreatta, Nash and Martin, 2011; DesRivières, Chuenpagdee and Mather, 2017). However, this thesis aims to address the more contemporary emergence of such businesses in North America, specifically in the context of certain conditions within the fisheries and seafood sector, and in tandem with the mobilization efforts of certain community organizations (e.g., LocalCatch.org).
counteracted by the additional costs of absorbing the marketing functions of seafood value chains (Johnson, 2007), and it has been suggested that AFNs may lose their ‘alternative’ features when they scale their operations (Pratt, 2009; Mount and Smithers, 2014). Overall, the ability of AFNs to invoke positive impacts in fisheries and seafood systems is uncertain.

1.2 Thesis objectives

The goal of this thesis is to improve understanding of the potential for alternative food networks (AFNs) to advance positive outcomes in fisheries and seafood systems. The primary research questions of the thesis are:

1. How are seafood AFNs structured, and what are their potential benefits and challenges?
2. What are the challenges and opportunities associated with seafood AFNs in a rural, coastal value chain context?
3. How might consumer preferences related to specific seafood features affect the market feasibility of seafood AFNs?

1.3 Thesis structure and methodology

This thesis addresses key knowledge gaps related to seafood AFNs and their associated value chains, including: their structures, benefits, and challenges; their potential applicability within a rural, coastal case study region; consumer preferences related to their products; and their overall viability, scalability, and market feasibility. The overarching aim is to improve understanding of the potential for AFNs to advance positive outcomes in fisheries and seafood value chains.

1.3.1 Chapter overviews

Included within this thesis are an introductory chapter that introduces the thesis objectives (Chapter 1); a background chapter providing further context for the research (Chapter 2); three main research chapters (Chapters 3 to 5); and a final chapter (Chapter 6) that presents the primary conclusions and contributions of the research, as well as the main limitations and suggested areas for future research.
In **Chapter 3**, I describe the value chain structures, and perceived market values, less tangible values, and challenges of seafood AFNs. Data for this chapter was collected through semi-structured interviews with business representatives from seafood AFNs (n=20) in North America, and through a conference feedback workshop reviewing preliminary research results with stakeholders (n=114). Building upon existing research on CSFs, I highlight the number of steps, geographic ranges, different approaches, and unifying characteristics of a range of seafood AFN types. I also suggest that marketing seafood through AFNs can enable fishing enterprises to enhance their viability, through the promotion of market values along their diverse value chains. At the same time, I describe how seafood AFNs appear to resist market-based fishing systems through the promotion of broader, less tangible outcomes. I also outline common challenges along the value chains of these alternative enterprises that highlight structural conflicts related to AFNs, such as key areas along the chain where they struggle with viability, as well as issues they face in scaling their operations and impacts. This chapter contributes knowledge on the state of seafood AFNs in North America and identifies key issues they face, which are explored in further detail in Chapters 4 and 5.

In **Chapter 4**, I begin to address a research gap regarding the further applicability of seafood AFNs to rural, coastal areas, through a case study on the Marine Planning Partnership (MaPP) region in British Columbia (BC), Canada. In this region, planning processes have highlighted the need to consider new economic development opportunities that support sustainable seafood harvesting and benefits to communities within the region, yet it is unclear whether seafood AFNs represent a feasible tool for reaching such goals. Data for the chapter was collected through literature review and semi-structured interviews with participants (n=38) in the region’s seafood sector. In the chapter, I highlight opportunities and challenges for seafood AFNs – both generally, and specific types – in BC’s MaPP region. The opportunities and challenges that I identify have similarities to those categorized by broader literature on AFNs and suggest that seafood AFNs should be considered as one potential option alongside a broader suite of tools for meeting value chain objectives in the region.

Addressing questions identified in my previous chapters related to the capacity of seafood
AFNs to expand beyond niche markets and broaden their impacts, Chapter 5 explores the market feasibility of growing these enterprises. Data was collected through a survey of consumers (n=2006) in selected locations in Canada, which focused on their seafood purchasing preferences (e.g., behaviors, attitudes and opinions, and willingness to pay [WTP]) related to key seafood product features. These features included those emphasized by seafood AFNs (as identified by Chapter 3) – e.g., supporting small-scale and place-based fishing operations, through the provision of traceable, sustainable, and high-quality seafood products to customers – alongside other attributes. In this chapter I suggest that seafood purchasers prioritize product quality attributes situated at the consumption end of the value chain (such as taste, appearance, freshness, affordability, health benefits, and seafood type) over harvesting-related features (such as sustainability, production method, and benefits to harvesters). Despite some degree of WTP – especially for high-quality seafood – survey respondents did not indicate that they would pay large price premiums for the features highlighted through seafood AFNs. It is thereby suggested that these enterprises focus on emphasizing their high-quality product offerings to prospective consumers, while also developing specific targeted marketing related to their other features according to varying preferences and perceived seafood availability amongst different regions and demographic groups.

1.3.2 Value chain approach

Each of my research chapters utilizes a value chain approach. A value chain is defined as “the range of activities required to bring a product or service from conception, through the intermediary phases of production to delivery to final consumers” (Gudmundsson, Asche and Nielsen, 2006, pg. 10). For a seafood value chain, this typically consists of harvesting, processing, distribution, marketing, and consumption (Gudmundsson, Asche and Nielsen, 2006). Figure 1 summarizes the evolution of the value chain approach, as described by Bair (2005).
According to Dey et al. (2015), while a supply chain is a fundamental underlying element of a value chain, the value chain approach goes beyond a focus on profit maximization (e.g., through minimized links, bottlenecks, costs, and time to market in the chain) to also consider how mutually beneficial relationships may be established for actors along the chain. In other words, the approach considers how to maximize net revenues through a focus on adding and creating incremental value to a product at each node of the chain (Dey, Bjørndal and Lem, 2015). To this end, a key component of the value chain approach is “the recognition that consumer choices are not always price driven, [and that consumers] may be willing to pay more for a value-added product” (Dey, Bjørndal and Lem, 2015, pg. 5).

Methodological approaches to VCA can vary. For example, quantitative figures can be used to calculate the distribution of economic value along the chain (Gudmundsson, Asche and Nielsen, 2006; Bjørndal et al., 2015; Dey, Bjørndal and Lem, 2015; Sadovy de
Mitcheson et al., 2018), and qualitative data on stakeholder perceptions, power, relationships, and institutional structures related to the chain can also be assessed (Fabinyi, 2016; Hamilton-Hart and Stringer, 2016). As such, different methodological techniques are also used within this thesis, in order to address the objectives of each of my research chapters. For example, a qualitative approach was employed in Chapters 3 and 4, in which stakeholder perceptions on key value chain features were gathered through semi-structured interviews and subsequently analysed through thematic coding. In Chapter 5, a quantitative value chain approach was used, in which data was gathered from participants through a survey methodology and subsequently analysed with uni- and bi-variate statistics. The scope of the seafood value chains studied within my research chapters varied, ranging from specific value chains considered to be ‘alternative’ from across North America (Chapter 3); to seafood value chains generally in rural, coastal BC, Canada (Chapter 4); to the consumer end of seafood value chains in selected locations in Canada (Chapter 5).

### 1.3.3 Data collection

In addition to literature review, the primary data collection methods used for this thesis were semi-structured interviews (Chapters 3 and 4) and a survey questionnaire (Chapter 5). For Chapters 3 and 4, interview questions were both open- and close-ended and related to each stage of the seafood value chain (from harvesting to end markets). Insofar as semi-structured interviews are both cumulative and iterative – that is, “what the participant narrates and how that narrative unfolds inform the remaining segments of the interview” (Galletta and Cross, 2013, pg. 72) – these interviews utilized core guiding questions (see Appendices 2 and 6) but also evolved based on emergent themes. Interviews were conducted either over the phone or in person, and occasionally involved group interviews (Remenyi, 2012) with more than one respondent from the same organization. In each case, the aim was for interviews to involve both reciprocity and reflexivity (Robertson, 2000), to assist with identifying and exploring thematic patterns (Galletta and Cross, 2013). In almost all cases, interview audio was recorded and professionally transcribed\(^8\). Purposive sampling was used to identify potential interviewees, and sample sizes were determined

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\(^8\) A small number of respondents requested no audio recording during their interviews, and handwritten notes were taken as records of these interviews.
based on saturation (i.e., when no new thematic patterns were emerging from the data) (Galletta and Cross, 2013), which was facilitated by concurrent data collection and analysis. Data for Chapter 5 was collected through a survey questionnaire. The draft survey instrument was pilot tested through a ‘soft launch’ to more than 60 respondents, prior to being finalized and circulated online by a market research panel aggregator (Qualtrics). A stratified sampling approach was used to target respondents in different regions of Canada, with the minimum target sample size for each geographic stratum determined through an optimal allocation formula that considered population, variance, and cost per observation (Statistics Canada, 2010).

During data collection, I strove to follow Yin (2003)’s three principles of data collection to improve construct validity and reliability, as follows:

1. Using multiple sources of evidence, in order to triangulate, corroborate, and develop converging lines of inquiry.
2. Maintaining raw data within a database; and
3. Retaining a chain of evidence, which traces the initial questions to the collected data, analysis protocols, and final conclusions (Yin, 2003).

### 1.3.4 Data analysis

Data analysis occurred in a phased approach within this multi-method thesis. For Chapters 3 and 4, interview data was transcribed, inputted into NVivo software, coded, and arranged into a thematic framework (Ritchie and Lewis, 2003; Galletta and Cross, 2013) in order to highlight key themes at each stage of the seafood value chain. For Chapter 5, survey data was inputted and cleaned within Excel, and then analysed in SPSS version 26 through a combination of descriptive and bivariate statistics (e.g., Spearman two-tailed tests) (Statistics Canada, 2010; Pallant, 2016). Overall, data analysis was ongoing and iterative (Galletta and Cross, 2013), involving several rounds of analysis coinciding with continued data collection, which allowed me to incorporate feedback, address gaps, and pursue nascent themes.
During data analysis, I strove to follow Yin (2003)’s four principles for high quality data analysis, as follows:

1. Attending to all evidence, through exhaustive analytic strategies;
2. Addressing all major rival (alternative) interpretations;
3. Addressing the most significant aspect (in other words, ensuring that the study’s key research question has been addressed); and
4. Using one’s own prior, expert knowledge (in order to provide a breadth and depth of information that will help to ground the research) (Yin, 2003).

1.3.5 On grounded theory

This thesis was influenced by grounded theory (Charmaz, 2014), insofar as the research plan was streamlined and literature review was completed on a rolling basis, after each research chapter was completed. This approach allowed for the thesis research questions to be modified as the research evolved. For example, beginning to write early in the research process, rather than after all data had been collected, allowed me to “gain insights, see relationships, and generate [further] questions for research” (Spradley, 1979, pg. 42). Further, in Chapters 3 and 4, grounded theory was applied through a theoretical sampling approach, in which interview data was coded and analysed whilst additional interview data was still being collected, in order to be able to highlight and pursue emergent leads. Further, during the analysis of interview data, I began with line-by-line coding and then progressed to more focused, “axial” coding, in which multiple themes from the initial coding were elevated to a higher level and interview data was subsequently tested against them (through “recoding”) (Charmaz, 2014).
2. Background

2.1 Global seafood industry

As noted in Chapter 1, the seafood industry has become increasingly global in recent years – connections within international trade networks for seafood products have grown (Gephart and Pace, 2015), seafood products travel further to market than they did previously (Watson et al., 2015), and almost 80% of fish and fish products are now estimated to be exposed to international trade competition (Tveterås et al., 2012). Historically, factors such as seafood perishability and distribution challenges had constrained global seafood trade (Gudmundsson, Asche and Nielsen, 2006). However, growing wealth and consumer demand for species not available locally or domestically, as well as intensified seafood production, reduced transportation costs, and improved preservation techniques, among other factors, have led to an expansion in seafood trade and an integrated global seafood market (Gudmundsson, Asche and Nielsen, 2006; Asche et al., 2015; Bellmann, Tipping and Sumaila, 2016; FAO, 2018). This has occurred within the broader context of globalization and its transformation of the world economy (FAO, 2018). Alongside projected population and income growth, it is expected that consumer demand for seafood will continue to grow globally (Gephart and Pace, 2015; Bellmann, Tipping and Sumaila, 2016; Watson et al., 2016; Guillen et al., 2019).

Global seafood trade has had varying effects on different actors. For example, net seafood importers – such as the U.S., Europe, and Japan, which in 2016 represented around 64% of the total value of world seafood imports (FAO, 2018) – have generally experienced an increase in seafood availability, improved affordability, and more product options for seafood consumers, alongside relatively lower demand and ex-vessel and sales prices for locally caught fish (Gudmundsson, Asche and Nielsen, 2006). On the other hand, net seafood exporters (such as many developing countries) have often experienced higher sales prices for their seafood within export markets, combined with increased prices and reduced availability of seafood for consumers at home (Gudmundsson, Asche and Nielsen, 2006). Generally speaking, Smith et al. (2010) suggest that “countries with undernourishment and
weak governance often serve as net exporters of seafood to well-nourished countries with strong governance” (Smith et al., 2010, pg. 784).

A range of factors affect how the costs and benefits from increased global seafood trade are distributed. For example, Fabinyi (2016) demonstrated that increased demand and rapidly expanding markets for specific seafood products in China have had varying effects on fishers in particular developing and developed countries, with institutional production contexts greatly influencing these effects (Fabinyi, 2016). Similarly, Gudmundsson et al. (2006) found that—while value is generally added through seafood supply chains via processing, distribution, and marketing—additional factors such as location, infrastructure, information flows, and market power ultimately affect the final distribution of costs and benefits from seafood trade (Gudmundsson, Asche and Nielsen, 2006). Overall, while a small number of large transnational seafood companies produce and trade a majority of seafood products (Gephart and Pace, 2015; Österblom et al., 2015), it has also been estimated that small-scale fisheries involving around 90% of the world’s fishers produce around half of the global seafood supply (Béné, 2006). However, small-scale harvesters typically garner the smallest portion of financial value from seafood trade compared with other value chain participants (Bjorndal, Child and Lem, 2014).

Growing global trade in seafood has also affected marine environments. Theoretically, international trade has the potential to reduce environmental impacts, by encouraging economic growth that provides new wealth to fund ecological protections (Gephart and Pace, 2015). At the same time, trade can also encourage resource extraction and depletion in new areas, and it has been demonstrated that increased demand and prices for seafood

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9 These patterns were identified by Smith et al. (2010) in their global study (based on FAO and World Bank data) that compared per capita seafood consumption, governance effectiveness, and undernourishment for each of the world’s nations. At the same time, they also identified certain outliers to this apparent pattern; for example, the largest net seafood exporters (e.g., China, Norway, and Chile) had neither the highest level of undernourishment nor the weakest governance effectiveness (Smith et al., 2010).

10 For example, through an FAO project comparing price transmission in seafood value chain case studies in 14 countries (Bangladesh, Cambodia, Canada, Ghana, Honduras, Iceland, Japan, Kenya, Maldives, Norway, Peru, Spain, Thailand, and Uganda), it was found that “relative to other players in the value chain, small-scale fishers and fish farmers are receiving the smallest economic benefits for their products”, whereas processors and retail markets receive higher distributional benefits due to their stronger bargaining power (Bjorndal, Child and Lem, 2014, pg. iv). This is compounded by small-scale commercial fisheries generally receiving little or no subsidies when compared to their larger-scale counterparts (Jacquet and Pauly, 2008), which may further contribute to their profitability issues.
have driven heightened resource exploitation, particularly where strong fisheries management measures are not in place (Gudmundsson, Asche and Nielsen, 2006; Brewer et al., 2012; Worm and Branch, 2012; Watson and Pauly, 2013; Gephart and Pace, 2015). While stock status varies largely between species and locations, globally the proportion of fish stocks that exist at biologically sustainable levels has been decreasing (FAO, 2018), and most of the major internationally traded fish species range between being fully exploited and depleted (United Nations Environment Program, 2009).

Fisheries sustainability issues are in large part centred at the production end of seafood supply chains, and consumer-based actions have been promoted to address these issues (Jacquet and Pauly, 2007; Richter and Klöckner, 2017; Guillen et al., 2019), yet within the global seafood industry these actions can be hindered by poor price signalling and limited feedback effects (Gephart and Pace, 2015; Crona et al., 2016) as well as traceability issues (Jacquet and Pauly, 2008; Hanner et al., 2011; Hu et al., 2018) along seafood supply chains. Along these lines, seafood certification and eco-labeling have been introduced in order to provide information on production sustainability to buyers (Cochrane, 2018; Barendse et al., 2019), and some major seafood importers have implemented regulations to enhance the traceability of their seafood imports (European Commission, 2014; National Oceanic and Atmospheric Administration, 2016). Market-based mechanisms and the governance of seafood supply chains are increasingly being considered to complement fisheries management measures and to improve seafood sustainability (Jacquet et al., 2009; United Nations Environment Program, 2009). The success of consumer-facing market measures, such as sustainable seafood certification, relies in part on consumer behavior – for example, preferences toward seafood eco-labels may be associated with individuals with a higher awareness of marine resource issues (Jaffry, 2005; Brécard et al., 2009; Salladarré et al., 2016) or those who shop for seafood in particular locations (e.g., supermarkets, rather than fish markets or local markets) (Salladarré et al., 2016). Further, some market measures – such as seafood AFNs – are currently considered to be ‘niche’ (Oosterveer and Spaargaren, 2011; Pascual-Fernández et al., 2019), and thus their potential for broader impact is unknown.
2.2 Fisheries economics and governance

There are numerous factors that affect the financial viability of fishing enterprises (Martinet and Blanchard, 2009; Gourguet et al., 2013; Morgan, 2016; Bastardie et al., 2017), and smaller-scale fisheries in particular have been found to be challenged by viability constraints (Schuhbauer and Sumaila, 2016; Schuhbauer, 2017; Salas, Barragan-Paladines and Chuenpagdee, 2019). Along these lines, it has been suggested that factors that are increasing the cost of fishing may be one driver of marketing through seafood AFNs (Tolley and Hall-Arber, 2015; Knutson, 2017), alongside the potential to attract premium prices for harvesters (Brinson, Lee and Rountree, 2011; Stoll, Dubik and Campbell, 2015) and corresponding opportunities related to growing consumer demand for local, traceable, and/or sustainable seafood (Campbell et al., 2014; McClanahan, Dissanayake and Chen, 2016). To this point, fisheries governance measures that in some instances increase fishing costs may be contextually relevant to the emergence of seafood AFNs.

For example, with the aim of addressing environmental externalities and improving economic efficiency, there has been an overarching trend in some parts of the world toward implementing fisheries policies and practices based on neoliberal theories, which emphasize market-based approaches (Carothers and Chambers, 2012; Acheson, Apollonio and Wilson, 2015; Pinkerton and Davis, 2015). The implementation of catch shares, such as individual transferable quotas (ITQs), in commercial fisheries around North America is illustrative of this pattern (Carothers and Chambers, 2012; Acheson, Apollonio and Wilson, 2015; Pinkerton and Davis, 2015). These types of management mechanisms grant resource privileges to individuals or groups, with the aim of discouraging overexploitation of fisheries by turning them into secure assets that can deliver long-term economic benefits to their owners (Costello, Gaines and Lynham, 2008; Sumaila, 2010; Arnason, 2012). In exchange for taking on a greater level of accountability through a catch share system, fishers can simultaneously gain more flexibility and security. Thus, rather than racing to catch fish as quickly as possible (Gordon, 1954), they can be strategic about when and how much they fish in a season (Sumaila, 2010). Among other potential benefits, this can allow fishers and seafood enterprises to use the market to their advantage, by pursuing high value
outlets for their products and aligning fishing effort with demand so that ex-vessel prices increase.

The abovementioned phenomenon was documented in both the British Columbia (BC) and Alaska halibut fisheries after the transition from a derby fishery to a catch share system in 1991 and 1995, respectively. With an extended fishing season and more stable supply of product entering the marketplace, new markets were developed and there was a corresponding increase in ex-vessel prices. For example, in BC, ex-vessel prices for halibut grew from CA$2.4 per pound (/lb) in 1990 to CA$3.6/lb in 1994 (Herrmann, 1996), spiking above Alaskan ex-vessel halibut prices at the time (Casey et al., 1995; Herrmann and Criddle, 2006). According to Hermann (1996), the establishment of halibut quota in BC in 1991 was responsible for additional revenues of CA$23.2 million in the fishery from 1991 to 1994, equal to an ex-vessel price increase of CA$0.55-0.77/lb/year (Herrmann, 1996). When Alaska introduced halibut quota in 1995, the price gap with BC lessened, and it is estimated that a minimum 10.5% increase in the state’s ex-vessel halibut prices per year from 1995 to 2002 was attributable to its quota system.\(^{11}\) (Matulich and Clark, 2003; Herrmann and Criddle, 2006).

Despite such financial benefits, it has been suggested that rural, coastal communities and smaller-scale fishing operations can struggle under these types of policies (Palsson and Helgason, 1995; Pinkerton and Edwards, 2009; Carothers, Lew and Sepez, 2010; Olson, 2011). To begin, the price of resource access under policies such as catch shares has been found to increase, subsequently creating barriers to entry for those with limited access to financial resources (Edwards and Pinkerton, 2020). For example, in the lobster fishery in southwestern Nova Scotia, Canada, the cost of a fishing license was approximately CA$0.25 prior to license privatization, but over CA$500,000 in the years following privatization (Barnett, Messenger and Wiber, 2016). In this case and others, small-scale operators may subsequently lease fishing access rights from quota-holders,\(^{12}\) increasing

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\(^{11}\) It is relevant to note that there are other types of fisheries management measures that may promote similar objectives. For example, Pinkerton et al. (2018) describe how harvesters receive around 75% of the wholesale value of fish, as well as voluntarily choosing different time periods to fish (and thereby diminishing the race to fish), within the Atlantic halibut fishery, which is managed without ITQs (Pinkerton et al., 2018).

\(^{12}\) In BC’s commercial halibut fishery, for example, it has been estimated that fishers pay around 70% of the value of the catch in order to lease quota. In addition, it has been found that the share of crew wages from
their operational costs (Pinkerton and Edwards, 2009; Carothers and Chambers, 2012; Barnett, Messenger and Wiber, 2016). Such expenses can be difficult for harvesters to bear, particularly as ex-vessel prices fluctuate, and are exacerbated by other effects of fisheries privatization, including private monitoring costs (Tolley, Gregory and Marten, 2015) and diminished market power (Pinkerton and Edwards, 2009; Sumaila, 2010) for harvesters.

Policy mechanisms have been implemented in certain cases that acknowledge such challenges and aim to help enhance access opportunities and viability for smaller-scale fishers and communities (Sumaila, 2010). In the US, the Magnuson-Stevens Act (2007) introduced Community Fishery Associations as entities that communities can use to hold fishing quota (Stoll and Holliday, 2014). In Alaska, the Community Development Quota (CDQ) program was established in the mid-1990s to anchor quota in remote rural communities on the Bering Sea/Aleutian Islands (Foley, Mather and Neis, 2015; Pinkerton and Langdon, 2019). In Atlantic Canada, offshore shrimp fishing licenses have been allocated to coastal communities to bolster their revenues from the fishery (Foley and Mather, 2015), and the Owner-Operator Policy and Fleet Separation Policy were implemented to support access for independent harvesters within the region’s fisheries (Davis, 2015; Foley, Mather and Neis, 2015). However, these safeguards are not necessarily standard practice and can in some instances be circumvented (Sumaila, 2010; Barnett and Eakin, 2015; Davis, 2015; Barnett, Messenger and Wiber, 2016). Further, there has been debate over these policies. On the one hand, it has been argued that they allow for a continuation of the race to fish (or ‘too many boats chasing too few fish’) and diminish the possible benefits of fisheries privatization, including flexibility, profitability, vertical integration, and industry self-governance (Fisheries Council of Canada, 1994). On the other hand, some state that these types of policies positively support coastal communities (Bennett et al., 2018) and that fisheries privatization should generally be avoided (Tolley and Hall-Arber, 2015; Donkersloot and Carothers, 2017).

There has also been debate over the connection between certain fisheries policies and market-based initiatives such as seafood AFNs. For example, some have suggested that catch value has decreased since the introduction of ITQs within the fishery (Pinkerton and Edwards, 2009).
catch shares and similar management measures have facilitated the emergence of these ‘alternative’ enterprises (Johnson, 2007; Brinson, Lee and Rountree, 2011), by providing fishers leeway to innovate. As an example, a senior fisheries manager stated the following during testimony on New England Groundfish Management in the Northeastern US:

“New England fishermen are beginning to realize new entrepreneurial opportunities under sector management. Here are three examples: (A) A group of small-boat fishermen in Rhode Island has started a new business to market their fish directly to local restaurants as ‘boat to table’. (B) Another new company helps fishermen match their supply to consumers’ demands across New England. (C) Fishermen in Port Clyde are making the most out of their catch through a Community Supported Fishery program. This program is similar to the Cape Ann Fresh Catch program started by the Gloucester Fishermen’s Wives Association and supported by NOAA Sea Grant. Customers give the fishing community financial support in advance of the season, and in turn the fishermen provide a weekly share of seafood during the harvesting season. This innovative marketing program is leading to higher quality fish and higher profits. In each case, the sector program provided fishermen with the flexibility to be entrepreneurial and innovative, and to control the destiny of their small businesses. In each case, fishermen have been freed from overly burdensome regulations, and they can fish more safely.” (Lubchenco, 2011).

It is also possible that certain fisheries policies are not facilitating new seafood marketing approaches within some fisheries so much as they are requiring them. For example, it has been suggested that management measures that allow larger boats to fish in inshore areas (Brewer, 2014), or that accelerate corporate concentration within fisheries (Knutson, 2017), are linked to lower catch volumes and market values for smaller-scale fishers, which in turn may drive them to develop new ways of earning more value for their catch (such as through seafood AFNs) (Brewer et al., 2017). Similarly, consolidation and concentration within the agricultural sector that affects the viability of small- and mid-sized farm businesses – coupled with opportunities to attract premium prices and tap into shifting consumer preferences – have been identified as drivers of land-based AFNs (Kirschenmann
et al., 2008; Adams and Salois, 2010; Uematsu and Mishra, 2011; Nonini, 2013; Park, Mishra and Wozniak, 2014; Paul, 2019).

2.3 Alternative seafood networks

As already noted, seafood AFNs have emerged as market-based mechanisms that aim to address some of the previously mentioned challenges in fisheries and seafood systems. Similar to alternative agrifood enterprises, these ‘boat to fork’ seafood businesses often define themselves through comparison with larger businesses that move seafood through longer, often global supply chains (Hinrichs, 2000; Renting, Marsden and Banks, 2003; Pratt, 2009; Marsden and Franklin, 2013; DesRivières, Chuenpagdee and Mather, 2017; Witter and Stoll, 2017), which may be associated with a smaller share of economic value paid to harvesters, connections to seafood produced under weak management regimes, traceability challenges, and poorer perceived product quality than ‘local’ food13 (Jacquet and Pauly, 2008; Pramod et al., 2014; Bjørndal et al., 2015; Stoll, Dubik and Campbell, 2015; DesRivières, Chuenpagdee and Mather, 2017; Hu et al., 2018). Further, these enterprises often strive to address financial viability concerns facing harvesters (Stoll, Dubik and Campbell, 2015), including those encountered under some fisheries management structures (Tolley and Hall-Arber, 2015).

Generally speaking, seafood AFNs aim to restructure seafood value chains in order to produce specific economic, social, and environmental benefits. Research on community supported fisheries (CSFs) – one type of seafood AFN – has described such potential benefits as including: improved prices paid to harvesters, encouragement of sustainable harvesting practices, support for local and domestic businesses, and enhanced access to product information and quality for end consumers (Brinson, Lee and Rountree, 2011; Campbell et al., 2014; McClanachan et al., 2014; Stoll, Dubik and Campbell, 2015; Bolton

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13 It should be noted that seafood companies of various sizes – and their associated value chains – are recognizing these potential issues and their impacts on social license, market access, resource sustainability, and the ability to attract price premiums. Sustainable seafood certification and traceability programs are examples of initiatives that aim to demonstrate and incentivize responsible practices, and to differentiate seafood products within the marketplace (Bailey et al., 2018; Barclay and Miller, 2018; Cochrane, 2018; Barendse et al., 2019).
et al., 2016). The existing state of knowledge on the main shared goals of CSFs is summarized in Table 1 below.

**Table 1.** Shared goals of community supported fisheries (National Sea Grant Law Center, 2012 [1]; Bolton et al., 2016 [2]; LocalCatch.org, 2019a [3]).

<table>
<thead>
<tr>
<th>Shared goal</th>
<th>Examples</th>
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| **Sustainable fisheries and food systems**      | • Developing a framework for fishers and customers to creatively steward marine resources [1]  
• Engaging fishers and community members in robust and viable local food systems [1]  
• "Eating with the ecosystem", by aligning seafood consumption to "the rhythms of nature and place" [3]  
• Encouraging community- and ecosystem-based fisheries management [3]  
• "Honoring the ocean", by using local seafood to connect and incentivize consumers “to care for marine ecosystems” [3] |
| **Improved prices paid to harvesters**           | • Ensuring fishers receive fair prices for their catch [1,3]  
• Supporting community-based fisheries, including harvesters who live and work in the communities where they fish [3]  
• Encouraging fair fisheries access for communities and future generations [3]  
• “Catch[ing] and handl[ing] with honor” through quality control and waste minimization [3]  
• Providing locally or domestically sourced seafood [2]  
• Ensuring shore-side businesses receive fair prices for seafood [3] |
| **Support for local or domestic businesses**     | • Establishing transparent/traceable chains-of-custody from boat to fork [1,2,3]  
• Simplifying/shortening seafood supply chains [2,3] |
| **Shortened and traceable supply chains**        | • Increasing access to premium local seafood [1]  
• Providing seafood product information to consumers [2]  
• Making community-based seafood “available and affordable for all communities” [3] |

As with seafood businesses more generally, there are also distinctions between different seafood AFNs based on factors such as local production context. For example, a seafood AFN’s value chain structure is influenced by a variety of factors, including fisheries management systems and shoreside infrastructure and regulations, which affect the volume, availability, and diversity of seafood products (Bolton et al., 2016). Further, as
with any business, each enterprise prioritizes its own specific goals; for example, while some seafood AFNs prioritize direct connections between harvesters and consumers, others focus on ensuring transparency regardless of the number of steps in the value chain (LocalCatch.org, 2019a). In Chapter 3 of this thesis, I explore the shared and distinguishing features of seafood AFNs and their value chains in further detail.

There are also several different types of seafood AFN, including CSFs, off-the-boat sales, fisher’s/farmer’s market sales, seafood buying clubs, online sales, retail market sales, boat-to-restaurant sales, and boat-to-institution sales, among others14 (Market Your Catch, 2019). Different business types are often used in combination with one another – for example, an enterprise may operate a CSF, as well as offering farmer’s market sales and online sales (Bolton et al., 2016; Market Your Catch, 2019). In Chapter 4 of this thesis, I explore the potential suitability of each of these seafood AFN types to a case study region (rural, coastal British Columbia, Canada), based on the area’s fisheries context and existing seafood value chain structures.

As mentioned previously, existing research on seafood AFNs has primarily focused on one business type – community supported fisheries (CSFs) – in which consumers provide upfront payments for a ‘share’ of regularly scheduled seafood deliveries (Brinson, Lee and Rountree, 2011). For example, Brinson et al. (2011), initially highlighted the potential market benefits (e.g., higher ex-vessel prices and income stabilization for fishers) and non-market benefits (e.g., increased social interactions between food producers and consumers) of CSFs. Subsequent research found that:

- CSFs may offer environmental benefits compared to industrially supplied seafood, including through lower carbon footprints, marketing of abundant but underutilized species, and incentivizing the use of less impactful fishing gear (McClenachan et al., 2014);
- There are both similarities and differences between CSFs and the community supported agriculture (CSA) model they are based upon, due to the unique natures

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14 Appendix I describes the current state of knowledge on the different types of seafood AFN, their potential benefits and challenges, and important considerations when contemplating developing each type of enterprise.
of fishing versus agricultural practices, resources, and ownership (Campbell et al., 2014);

- Fishers participating in one CSF received more revenue for their catch than they would have by selling to conventional buyers in the area, through higher ex-vessel prices, as well as end-of-year profit sharing arrangements. Such economic incentives for participating in a CSF can enhance cooperation between fishers, contribute to developing social capital, and potentially position CSFs as “institutional starters” that create conditions for “new social networks, rules, and norms” within social-ecological systems (Stoll, Dubik and Campbell, 2015, para. 45);

- CSFs are organizationally diverse (including unique program goals, local contexts, product outlets, etc.). Thus, rather than representing one specific structure or type of organization, CSFs are instead “an approach to seafood marketing used by a variety of organizations with broadly similar production philosophies centered on engaging and informing consumers around traceable, domestically sourced seafood” (Bolton et al., 2016, pg. 21); and

- Three particular features – offering a retail sales option, having a harvester as a founding member of the business, and employing social media – appear to be positively associated with the financial profitability of CSFs (Godwin et al., 2017).

Despite potential benefits, the abovementioned research has also highlighted challenges associated with CSFs, which are relevant to seafood AFNs more broadly. For example, vertically integrating to take on more value chain functions and sell seafood through a CSF requires human, physical, and financial capital that can be burdensome for a harvester or small-scale enterprise, as well as potentially threatening relationships with existing seafood buyers and adding regulatory complexities (Brinson, Lee and Rountree, 2011). It may be difficult for a CSF to attract a critical mass of consumer ‘members’ such that it can achieve and maintain profitability (Brinson, Lee and Rountree, 2011), and these customers may continue to demand popular and widely marketed species (such as salmon, tuna, and shrimp), rather than being willing to substitute for more locally available and sustainable options (Campbell et al., 2014). Along these lines, meeting customer demand for certain
species within a CSF can be difficult when a local fishery is “constrained by regulations, access to quota, licensing requirements, and the cost and time involved in switching gears” (Stoll, Dubik and Campbell, 2015, para. 18). It has also been recognized that the theoretical benefits of CSFs are not automatically realized in practice (Campbell et al., 2014), particularly as definitions of ‘local’ and ‘sustainable’ seafood can take on a wide variety of interpretations within different enterprises (Brinson, Lee and Rountree, 2011; Bolton et al., 2016). Further, it is unclear whether the ‘sustainable’ harvesting promoted within seafood AFNs can act to shift the environmental impacts of fishing more broadly (Campbell et al., 2014), and there are conflicting findings on the environmental and carbon footprints of ‘local’ or domestically sourced seafood versus imported seafood (McClenachan et al., 2014; Farmery et al., 2015).

Overall, there are gaps in knowledge related to the viability, scalability, and broader impact of seafood AFNs. Similar issues have been highlighted through research on land-based AFNs. For example, Park et al. (2014) found that while direct marketing may be able to improve a farm’s financial bottom line, this depends on the management and marketing skills of the farmer(s) involved, which affects their choice of type of business and eventual financial performance (Park, Mishra and Wozniak, 2014). On the consumer side, CSA involves a higher level of customer commitment than other food purchasing options, and thus consumers must weigh the perceived benefits and sacrifices of the CSA before committing to joining it (Chen 2013). Along these lines, Johnson et al. (2016) demonstrated that producers and consumers often desire to support the perceived sustainability benefits of AFNs, yet do not want to sacrifice the convenience of conventional food systems. They state that when AFNs ‘scale up’, in order move beyond niche markets, enhance profitability, and improve convenience for consumers, they may also lose their initial ‘alternative’ features (Johnson, Fraser and Hawkins, 2016). For example, ‘scaling up’ by tapping into more distant markets may diminish the specific locality that some consumers – such as those motivated by the 100 mile diet (Trivette, 2015; Dodds and Holmes, 2017) – may expect of AFNs.

At the same time, Born and Purcell (2006) caution against “the local trap”, in which it is assumed that ‘local’ food options are by nature preferable over ‘conventional’ ones. They
state that there is nothing inherently good or bad about any scale of food system, and that the move toward ‘localizing’ food systems emerged out of a resistance to the hegemonic, corporate, capitalist global food system (and not to the global scale, per se). The localization of food systems therefore represents a strategy with an array of possible outcomes. Along these lines, Born and Purcell suggest that it is important to consider that scale is socially constructed, and to subsequently assess the context, actors, and agendas of those promoting and empowered by a particular type of food system. They also remind that local food sectors must usually establish vertical and horizontal links – or networks – that transcend the ‘local’ scale in order to succeed, and therefore suggest studying AFNs rather than any particular scale of food system (Born and Purcell, 2006). In Chapter 5 of this thesis, I explore the potential market feasibility of further expansion of seafood AFNs through a consumer survey of seafood purchasing behaviors, attitudes and opinions, and willingness to pay (WTP).
3. Structures, benefits, and challenges of alternative seafood networks

3.1 Introduction

There has been a recent proliferation of alternative food networks (AFNs) for seafood, which connect harvesters to consumers by way of partnering with or bypassing seafood processors and intermediary distributors, in North America. As noted previously, while taking various forms, these enterprises generally aim to shorten or streamline seafood value chains in order to promote a host of economic, environmental, and social outcomes (Brinson, Lee and Rountree, 2011; Campbell et al., 2014; McClenachan et al., 2014; Stoll, Dubik and Campbell, 2015; Bolton et al., 2016). To an extent, the proliferation of seafood AFNs is linked to consumers’ increasing appetite for local, sustainable, healthy, traceable, and ethical sources of seafood, following reports of human rights violations (Marschke and Vandergeest, 2016), contaminated seafood (Love et al., 2011), and mislabeling and seafood fraud (Jacquet & Pauly 2008) along commodity-scale or ‘conventional’ supply chains. In addition, it is likely that important trends within fisheries are compelling harvesters to take risks and experiment with new approaches to distributing and marketing seafood (Stoll, Dubik and Campbell, 2015).

The purpose of this chapter is to explore the diverse structures, values, and challenges of seafood AFNs. Much of the existing literature has focused on the ecological (McClenachan et al., 2014) and socioeconomic (Brinson, Lee and Rountree, 2011) effects of one form of seafood AFN: community supported fisheries (CSFs). For example, Stoll et al. (2015) document the price premiums achieved by fishers within a CSF in the southeastern United States (US) and present a model for how such programs could produce different types of social capital (Stoll, Dubik and Campbell, 2015). However, further documentation of the other values generated by different types of seafood AFN is warranted, given that these enterprises are highly diverse (Bolton et al., 2016).

In this chapter, both market values and less tangible values15 are categorized as they accrue

15 The value of an entity can be understood as its “relative worth, merit, or importance” (Dictionary.com, 2020). Here, market values are understood as financial benefits for which monetary values can be directly assigned. While less tangible values may also be associated with financial benefits, these benefits are less direct and may not be the primary drivers of said values.
along alternative seafood value chains, as are the challenges faced by these enterprises. In presenting these data, the chapter explores how these new seafood businesses represent a means by which fishers are both adapting to and resisting neoliberal fisheries systems, so as to continue to operate within these systems at the same time as promoting alternative, less tangible outcomes. Overall, this chapter aims to present a broader view that builds upon existing literature through utilization of a value chain approach and through examination of multiple types of seafood AFN, as a means to begin investigating the drivers of these nascent enterprises.

3.2 Methods

The specific research questions for Chapter 3 are:

1. What value chain structures are employed by seafood AFNs?
2. Which values do stakeholders perceive are produced through these enterprises, and at which stage(s) of the value chain?
3. What are the key challenges that these enterprises face?

The results for this chapter were derived from qualitative value chain mapping and analysis of seafood AFNs, conducted over a six-month period in conjunction with the 2016 Local Seafood Summit held in Norfolk, Virginia, US. This conference was convened by LocalCatch.org,16 a network of fishers and community leaders engaged with seafood AFNs. The conference brought together international representatives who are actively engaged in CSFs and other forms of seafood AFN. For the research, qualitative data on the value chain structures and perceived values and challenges of a range of seafood AFNs from across North America were gathered, through semi-structured interviews and a plenary workshop during the Local Seafood Summit. It should be noted that it was beyond the scope of this research chapter to gather additional data that would verify the statements made by participants about seafood AFNs. Rather, the aim was to identify themes in the

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16 LocalCatch.org is one of the key organizations that is striving to “advance the movement of [CSFs] and like-minded community-based seafood operations” (LocalCatch.org, 2019a) – or seafood AFNs – in North America. It has convened three Local Seafood Summits (in 2012, 2016, and 2019), which represent the main gathering place for seafood AFNs that are part of this “local seafood movement” (LocalCatch.org, 2016b).
perceptions of seafood AFN operators and the wider Local Catch Network about these types of enterprises.

### 3.2.1 Semi-structured interviews

Prior to the Local Seafood Summit, semi-structured interviews were conducted with 30 representatives of 20 seafood AFNs (see Table 2). Interviewees were recruited from the conference’s pre-registered attendee list. From the list of over one hundred conference participants, the 38 participants that worked directly with a seafood AFN were invited to participate in an interview, of which eight did not respond or could not participate due to scheduling constraints.

#### Table 2. Interviews by alternative seafood network type, location, and role of interviewee(s)

<table>
<thead>
<tr>
<th>Type of enterprise</th>
<th>Location (US state or Canadian province)</th>
<th>Role of interviewee(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community supported fishery (CSF): Consumers pre-pay for a share of seafood</strong></td>
<td>Alaska / Illinois</td>
<td>Vice President / Fisher / Owner, and Fisher / Owner</td>
</tr>
<tr>
<td></td>
<td>Oregon</td>
<td>Executive Director, Program Manager, Marketing Manager / Fisher, and Program Manager</td>
</tr>
<tr>
<td></td>
<td>Ohio*</td>
<td>President</td>
</tr>
<tr>
<td></td>
<td>Alaska</td>
<td>Project Manager</td>
</tr>
<tr>
<td></td>
<td>New Hampshire</td>
<td>General Manager, and Fisher</td>
</tr>
<tr>
<td></td>
<td>North Carolina</td>
<td>Coordinator, and Fisher / Owner</td>
</tr>
<tr>
<td></td>
<td>South Carolina</td>
<td>Manager / Owner</td>
</tr>
<tr>
<td></td>
<td>California</td>
<td>CEO / Owner</td>
</tr>
<tr>
<td></td>
<td>British Columbia</td>
<td>Managing Director, and Director of Operations</td>
</tr>
<tr>
<td></td>
<td>Alaska / Washington</td>
<td>Fisher / Owner, and Fisher / Owner</td>
</tr>
</tbody>
</table>

17 Given the broad participation of seafood AFNs who are part of the LocalCatch.org network in the Local Seafood Summit, the conference’s pre-registered attendee list was considered to represent an appropriate sample frame, as it consisted of a large portion of the study population (i.e., emergent seafood AFNs in North America).

18 At the time of being interviewed, 16 enterprises were already in operation, while four (‘*’) were in the process of being launched.
### Type of enterprise

<table>
<thead>
<tr>
<th>Location (US state or Canadian province)</th>
<th>Role of interviewee(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct sales:</strong> Fishers sell their seafood to consumers, without pre-sales</td>
<td></td>
</tr>
<tr>
<td>New Hampshire / Maine</td>
<td>Fisher / Owner, and Fisher / Owner</td>
</tr>
<tr>
<td>British Columbia / Yukon</td>
<td>Fisher / Owner</td>
</tr>
<tr>
<td>Oregon*</td>
<td>Vice President of Operations / Owner</td>
</tr>
<tr>
<td>Alaska / Vermont</td>
<td>Fisher / Owner</td>
</tr>
<tr>
<td>Alaska / Washington*</td>
<td>Fisher / Owner</td>
</tr>
<tr>
<td><strong>Retail market:</strong> Seafood sales at a brick-and-mortar shop</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>Program Manager</td>
</tr>
<tr>
<td>Michigan</td>
<td>Owner</td>
</tr>
<tr>
<td><strong>Other:</strong> Seafood unloader/aggregator, seafood club, and fisher’s cooperative</td>
<td></td>
</tr>
<tr>
<td>Massachusetts</td>
<td>Chief Executive Officer, and Seafood Program Manager</td>
</tr>
<tr>
<td>Maine</td>
<td>Fisher / Co-Owner</td>
</tr>
<tr>
<td>Oregon*</td>
<td>Owner</td>
</tr>
</tbody>
</table>

During January and February of 2016, I conducted 24 interviews with the above-mentioned participants. All interviews were semi-structured – based on a questionnaire that included both close- and open-ended questions (see Appendix 2), while also allowing for additional topics to be raised and discussed (Galletta and Cross, 2013). Interviews were conducted via phone or Skype software (n=23) or in person (n=1); in some cases, multiple representatives from the same enterprise were interviewed, either simultaneously or during separate interviews. The roles of the interviewees varied, as did the types of seafood AFN that they represented. Two enterprises were based in Canada and the remaining 18 were situated in different regions of the US.

Interviews were transcribed and arranged into a thematic framework (Ritchie and Lewis, 2003), focusing on the values and challenges that participants perceived were being produced by their respective enterprises. The preliminary findings from this analysis (see

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19 Specifically, four interviews involved more than one participant and four enterprises were engaged in more than one interview. Responses from each interview were recorded and analysed together, for a total of 24 interview transcripts.
Appendix 3) were depicted as a draft ‘value map’ showing the common themes described by interviewees at each phase of the value chain (see Appendix 4).

### 3.2.2 Feedback workshop

During the Local Seafood Summit, the draft value map was presented to 114 participants during a 1.5-hour plenary session, with the aim of generating discussion and feedback on the preliminary findings. To facilitate this process, participants were divided into groups of 10 to 12 and given 18 by 24 inch copies of the map. In groups, participants were asked to respond to a set of questions about the structure and content of the information presented on the maps. By the end of the workshop, each of the maps had been marked with specific feedback and comments from the workshop participants. Following the conference, these comments were compiled and thematically coded.

### 3.2.3 Value chain approach

The research process was guided by the value chain approach (USAID, 2016), described in Chapter 1. This chapter developed a unique value chain approach based on the research objectives. The focus was on gathering qualitative data from interview and workshop participants on the structures and perceived values and challenges of different alternative seafood value chains. Rather than examining one specific value chain, themes from multiple chains were integrated in order to assess their similarities and differences. The research process was iterative and collaborative: while the initial aim was to gather information on the tangible market values generated along alternative seafood value chains, research participants consistently emphasized the central importance of less tangible values to these enterprises. These additional values were incorporated within the research in order to explore the meaning of this strong participant focus on the less tangible values of seafood AFNs.

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20 This included those who had previously been interviewed, and whose responses had been analysed and compiled for the feedback workshop.
3.3 Results

In this section, the differences and commonalities in the structures of the alternative seafood value chains that were interviewed are highlighted. The market values that participants identified along these chains are then described, as are the less tangible values. These perceived values are also depicted in Figure 3. Last, common perceived challenges to the success of these enterprises are summarized.

3.3.1 Value chain structures

The research highlighted the unique structures of different alternative seafood value chains. This follows on the work of Bolton et al. (2016), which describes the organizational diversity of one form of seafood AFN: community supported fisheries (CSFs) (Bolton et al., 2016). Of the enterprises already in operation at the time of research (n=16), the number of steps in their chains of custody from boat to fork ranged from three to 12. For example, the shortest chains purchased seafood from fishers and provided it fresh, whole, and direct to customers at the dock (see Figure 2a), while the longer chains engaged with primary and secondary processing, cold storage, and several modes of transportation in order to move seafood from the fishing grounds to consumers in different states or provinces (see Figure 2b).

The geographic range of these value chains also varied: 38% (n=6) were contained within one state or province, while the other 62% (n=10) spanned two or more states or provinces. Thus, while these enterprises are commonly referred to as “direct marketing” or “local seafood” businesses (Stoll, Dubik and Campbell, 2015), these terms carry variable meanings in practice. Regarding this point, interviewees consistently emphasized the importance of keeping track of the origins of their enterprise’s seafood, more so than minimizing the distance or number of steps along their chains.
Figure 2. Two examples of alternative seafood value chains, with one enterprise selling fresh, whole seafood off the dock where the fish was landed, and the other selling frozen, processed seafood in a different state or province than where it was landed.

The enterprises also demonstrated diverse approaches at the different stages of their value chains (see Table 3). For example, the number of fishing boats that each enterprise worked with ranged from one boat to over 1000 boats,\(^{21}\) and consumers were reached through a variety of sales channels, including online sales, retail market sales, farmer’s markets, boat-to-restaurant and boat-to-institution initiatives, and CSF and CSA programs.

Table 3. Examples of the diverse approaches of alternative seafood networks along their value chains\(^ {22} \).

<table>
<thead>
<tr>
<th>Value chain stage</th>
<th>Category</th>
<th>Examples of program diversity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fishing</strong></td>
<td>Number of suppliers (n=16)</td>
<td>Five or less boats: 38% (n=6)</td>
</tr>
<tr>
<td><strong>Purchasing</strong></td>
<td>Directness of purchases (n=16)</td>
<td>Always purchase directly from fishers: 44% (n=7)</td>
</tr>
</tbody>
</table>

\(^{21}\) The largest enterprise was an outlier in terms of its scale. However, it had similarities with the other enterprises in the sample, for example, through its provision of improved ex-vessel prices (e.g., via pre-payments) and stable markets (e.g., for underutilized species) to local fishers, and through its guarantee of seafood traceability to consumers.

\(^{22}\) While the figures in Table 3 cannot be specifically extrapolated, they represent a clear trend of diversity in the structures of different alternative seafood value chains.
At the same time, the enterprises shared a set of common features (see Table 4). This finding is consistent with the results of Bolton et al. (2016), which identify a set of unifying characteristics amongst a diverse group of CSFs (Bolton et al., 2016). Table 4 includes the key features of seafood AFNs that were highlighted through this research, as well as the assorted descriptions that participants provided for each of these features.
Table 4. Key features of alternative seafood networks\textsuperscript{23}.

<table>
<thead>
<tr>
<th>Key feature</th>
<th>Assorted descriptions</th>
<th>Response rate (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Small-scale</strong></td>
<td>Fishing family</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Small boat</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Independent fisher</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Gear type</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Low volume</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Small fleet</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Day boat</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Community-based</td>
<td>2</td>
</tr>
<tr>
<td><strong>Place-based</strong></td>
<td>Fishing within one state/province</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Fishing by those residing and landing fish in a specific community</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Fishing within a larger region (i.e., Northeast, Pacific Northwest)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Fishing within one country (i.e., Canada, US)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Traceable</strong></td>
<td>Streamlined chain of custody</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Fishing story</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Fisher-consumer connections</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Labeling with fisher/boat identification</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Traceability technology</td>
<td>1</td>
</tr>
<tr>
<td><strong>Sustainable</strong></td>
<td>Fishing method/gear type</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Well-managed</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Trust/reputation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Wild-caught</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Follows sustainability guidelines</td>
<td>3</td>
</tr>
<tr>
<td><strong>High quality</strong></td>
<td>High standard</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Fresh</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Superior to other options</td>
<td>7</td>
</tr>
</tbody>
</table>

\textsuperscript{23} Representatives from the seafood AFNs included in the sample (n=20) had multiple ways of describing these key features, which are not mutually exclusive, and often explained interconnections between the features. The response rate for each of the assorted descriptions is included in Table 4. These key features bear some resemblance to characteristics of CSFs previously identified in the academic (e.g., Bolton \textit{et al.}, 2016) and grey (e.g., National Sea Grant Law Center, 2012) literature.
<table>
<thead>
<tr>
<th>Key feature</th>
<th>Assorted descriptions</th>
<th>Response rate (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling technique</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Quality control along value chain</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Processing technique</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Gear type</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Flash frozen</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

The shared features of these enterprises along their diverse value chains begin to highlight key drivers of marketing seafood through AFNs. For example, many interviewees explained that their enterprises had been started in order to support small-scale fishers in specific regions who were struggling to maintain financial viability. Ex-vessel price fluctuations were mentioned as a key challenge in this regard, particularly where fishers are also facing increased expenses, such as high costs of leasing fishing quota\(^\text{24}\). Similarly, several participants also noted that ongoing fleet consolidation was a key threat to their region’s small-scale fishers, and a motivation for launching their programs. There was also a consistent focus on creating alternative marketing methods that would establish price rewards for sustainable fishing and high-quality catch, which some respondents suggested are lacking within larger-scale supply chains, by linking fishers and consumers via traceable products. Overall, seafood AFNs appear to be striving to support features that they perceive to be missing within larger supply chains and/or threatened by certain policy impacts.

3.3.2 Market values

Market values were identified by participants at each stage of alternative seafood value chains. These values are summarized in Figure 3, along with the less tangible values that

\(^{24}\) An example of this is from the Northeastern US in 2012, when the average cost to lease cod quota for George’s Bank West was US$2.48/lb, yet the average ex-vessel price for cod was US$1.08/lb at the time (Tolley and Hall-Arber, 2015). Brewer (2013) suggests that seafood AFNs have emerged in this particular region as a means of enhancing viability within such situations (Brewer, 2013).
participants highlighted (for further description of these less tangible values, see Section 3.3.3).

![Diagram showing market values and less tangible values identified by participants along alternative seafood value chains.](image)

**Figure 3.** Market values and less tangible values identified by participants along alternative seafood value chains.

### 3.3.2.1 Fishing

Multiple market values of seafood AFNs for fishers were noted. Interviewees from nearly all of the existing enterprises (n=15) stated that they pay higher and more stable ex-vessel prices to fishers than comparable dock prices. Respondents from the four soon-to-be launched enterprises emphasized the same intention. Such price incentives are a strong driver for fishers to market their catch through AFNs, particularly because ex-vessel prices in seafood markets can fluctuate widely (Dahl and Oglend, 2014; Asche, Dahl and Steen, 2015). Participants also highlighted the increased market and income stability that seafood AFNs can provide to fishers. For example, in a CSF, customers purchase set volumes, or ‘shares’, of the catch in advance of the fishing season, assuring fishers that they will have a market for their catch when returning to the dock. These pre-payments also help to stabilize fishing income between seasons. In addition, each enterprise in the sample aims

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25 In Figure 3, black circles denote market values and white circles denote less tangible values.
to source only premium quality seafood from fishers. Respondents suggested that in larger chains, seafood of various qualities can be valued equally and mixed within the same processing, distribution, and marketing channels, whereas marketing through seafood AFNs allows fishers to reap financial benefits by differentiating themselves. Regarding this point, one interviewee stated:

“It’s really beautiful fish, and when you put it next to other fish in the case, whether it be farmed or even other wild fish that’s been run through a machine to be filleted, it just looks terrible, but my fish is superior quality and what people have learned to expect from me… [M]ost seafood here is procured from major distributors and from huge supply chains for which the quality control has long since passed by, and so there’s no accountability, no story; you just don’t know what you’re getting.”

Fishers can also benefit from seafood AFNs via new markets for ‘underutilized’ species, which are often locally abundant but without a strong or consistent existing market. As one CSF owner stated, “we have unique markets that allow us to purchase certain species that [fishers] may not otherwise be able to sell.” Examples from the interviews included pink salmon in British Columbia, invasive green crab in Maine, and sand dabs in California. There is also potential for fishers engaged in seafood AFNs to benefit from participation in organizational structures such as co-operative ownership that offer end-of-year profit sharing.

3.3.2.2 Processing, cold storage, and distribution

Rather than simply ‘cutting out the middleman’ (Saulny, 2008), seafood AFNs can also provide market values to the seafood processing, cold storage, and distribution sectors. This finding is consistent with Stoll et al. (2015), which explains that the benefits of a North Carolina-based CSF have been shared by multiple sectors in the region, including seafood processing and distribution businesses (Stoll, Dubik and Campbell, 2015). The majority (n=13) of the existing enterprises in the sample process all or some of their seafood, thereby contributing to some level of employment within the processing sector. In addition, 54% (n=7) of those enterprises subcontract all or some of their processing to existing facilities, which can be major employers in seafood-producing regions (Foley and
Mather, 2015). Some have also worked to build or enhance processing capacity for small-scale fishers in their communities, aiming to improve regional seafood infrastructures. In a similar fashion, seafood AFNs can also support employment and infrastructure in cold storage and distribution, through both in-house operations and external partnerships. This can be important in coastal areas of North America that lack accessible processing, cold storage, and distribution facilities because they are either geared toward larger-scale, vertically-integrated seafood companies or not present due to outsourcing to other regions (Carothers and Chambers, 2012; Barnett, Messenger and Wiber, 2016; Knutson, 2017).

3.3.2.3 Coordination

Coordination of seafood AFNs is necessary (Johnson, 2007; National Sea Grant Law Center, 2012) and can generate market values. For example, employment is supported through the hiring of coordination staff in 81% (n=13) of the existing enterprises in the sample. In addition, participants stated that seafood AFNs support employment through subcontracting of services (e.g., accounting, design, web development) to other local businesses. A unique approach to purchasing and sales also helps to generate value. In 69% (n=11) of the enterprises in the sample, customers provide pre-payments for seafood, allowing them to share in the risks of fishing and value chain logistics. Most of these pre-payments occur through CSF memberships. The number of members in the CSFs interviewed ranged from less than 50 to over 1500 individuals per enterprise. As already mentioned, pre-payments can be transmitted to fishers to help pay for fishing quota, fuel, gear, and other expenses before fishing occurs. While larger seafood companies can also provide such pre-season advances to fishers (Barnett, Messenger and Wiber, 2016), participants in this research stated that their agreements are based on fair purchasing negotiations rather than an asymmetrical buyer-seller power dynamic that has been documented within the North American seafood industry (Pinkerton and Edwards, 2009; Barnett, Messenger and Wiber, 2016).

3.3.2.4 End markets

Consumers can also derive market values from seafood AFNs. In particular, these enterprises focus on improving market access to high-quality, place-based, sustainable, and
traceable seafood. In both coastal and inland areas of North America, seafood with these combined features may be difficult to access through ‘conventional’ supply chains (Bolton et al., 2016). Participants also explained that seafood AFNs can streamline value chains in a way that not only allows them to provide fair prices to fishers, but also to charge fair prices to consumers. While what is meant by a ‘fair’ price inevitably varies between enterprises, most interviewees stated that their products cost less than the most closely comparable ‘premium’ seafood products available from larger retailers nearby.

3.3.3 Less tangible values

In addition to the more tangible market values of seafood AFNs, participants frequently noted the central importance of less tangible values (see Figure 3).

3.3.3.1 Fishing

Fishers explained that it is rewarding to be recognized for their work by the customers they are connected to via seafood AFNs. As one interviewee noted:

“The intrinsic value of something like a CSF or direct sale model is that people are getting the opportunity to interact with representatives from the fishery and actually know your fisherman, know your supply, and that’s the value to me, of doing what we do… Every farmer’s market I get someone who comes up to me and thanks me for what I do, and that’s pretty cool, not a lot of people get that with their line of work.”

These increased chances for interaction also provide fishers with opportunities to both educate and advocate on local fisheries issues. One fisher explained:

“I’d like to use the CSF as an opportunity to educate the public and consumers of seafood about better ways to manage fisheries, so that we can feed more people and be less wasteful… And hopefully we can get some of them participating, making comments to the fisheries management council, asking them to manage these quotas, so we don’t have multiple closures and excessive discards.”
Social networks among fishers can also be enhanced through seafood AFNs, helping to foster collaboration toward reaching common goals. As an example, participants noted the potential for fishers to work together to pool various species and products in order to meet market demand for seafood variety. At the same time, fishers also described the increased independence they had gained by selling their catch on their own terms through seafood AFNs. Several aimed to extend alternative value chains into new and untapped markets, so that they and other fishers could continue to shift catch volumes away from ‘conventional’ chains.

### 3.3.3.2 Processing, cold storage, and distribution

Seafood AFNs also focus on promoting less tangible values along the rest of the value chain. In particular, they strive to maintain traceability from boat to fork, including during processing, cold storage, and distribution, and appear to be aided in doing so by their simplified value chains. Conversely, seafood fraud and mislabeling is prevalent along larger-scale seafood supply chains in North America and globally (Jacquet and Pauly, 2008; Wong and Hanner, 2008; Hanner et al., 2011; Marko, Nance and Guynn, 2011; Warner, 2013).

### 3.3.3.3 Coordination

Recognizing that traceability is a primary advantage of their approach, coordinators of these enterprises focus on highlighting this transparency to their clientele. Seafood AFN coordinators also focus on educational outcomes, with an overarching aim of influencing seafood tastes toward more sustainable choices over the longer term. For example, enterprises may share information on local underutilized species through CSF membership newsletters, or through direct sales to restaurants. Education is also facilitated through other direct connections to seafood consumers, such as via boat-to-school initiatives. As one interviewee stated:

> “If we can change the procurement behavior of these school districts, we can really change the way in which food is produced… There’s an opportunity to take by-catch… and turn that into an [individual quick frozen] product that can be sold to
school districts as an affordable sustainable protein that gets them away from what we all know is pretty standard [fish sticks] … [We’re] putting something on the trays of these students that’s representative of the values and ideals about what the CSF movement seems to represent, which is, you know, knowing your fisherman, shortening the supply chain, [and] greater literacy about working waterfronts.”

Those who coordinate seafood AFNs also often strive to advocate for small-scale fishers and fishing communities through speaking events and participation in fisheries management consultations. In addition, most of the enterprises in the sample noted making contributions to research on fishing issues and/or providing seafood or monetary donations to food banks, low-income families, or fundraising initiatives.

### 3.3.3.4 End markets

Finally, consumers can also derive less tangible values from seafood AFNs. A common saying associated with these programs is “know your fisherman” (LocalCatch.org, 2016a). As such, customers are able to access information about their seafood that may be lost in larger-scale supply chains, including harvester, boat, gear type, harvest location, and target stock sustainability. In the interviews completed for this chapter, 63% (n=10) of the existing enterprises stated that they provide this type of information to consumers via product labelling. This type of information may also be shared through websites and email lists, or at the point of sale, and often includes stories about a particular seafood item, harvester, or fishing family. Thus, seafood AFNs aim to provide accountability to their end markets, which may be of interest to consumers concerned with stories of labor injustices, overfishing, and mislabeled seafood in the seafood industry (Warner, 2013; Urbina, 2016). In addition, many of the enterprises strove to build community and provide opportunities for consumers to learn more about fisheries and seafood through cooking workshops, recipe sharing, equipment rentals, and other activities.

### 3.3.4 Challenges

In addition to the perceived values mentioned above, participants highlighted several challenges to seafood AFNs along the value chain. Generally speaking, fishing can be
unpredictable (Kasperski and Holland, 2013). While some seafood AFNs can help to an extent by stabilizing prices, markets, and incomes, it was suggested that fisheries policies that increase access costs and fleet consolidation remain a persistent threat to small-scale fishers. Along these lines, one CSF owner explained:

“We still feel quite powerless when it comes to how we influence policy. At the beginning of this business, one of the main ideas was to get more involved with policy making as it relates to creating more access for small-boat fishermen [but] I still feel stumped about how we address some of these issues that are really critical in the sense that these guys are really struggling, not necessarily to make more money, but to have access to the fish that gives them a job in the first place. I can pay these guys as much as I want, but if they can’t go out there and catch fish, my value proposition is completely negated.”

Similarly, another participant stated, “if the boats go away, all of these models cannot exist.” Participants noted additional regulatory challenges to seafood AFNs along the value chain, including health and safety permitting procedures associated with processing, cold storage, distribution, and marketing, which were perceived to be more suited to larger-scale, established operations and difficult to navigate for smaller emerging businesses.

The logistics and infrastructure of seafood AFNs can also present barriers to success, including through capital expenditures incurred during the start-up phase, as well as via ongoing operating costs. To begin, it can be time consuming for fishers to assume new roles and to coordinate moving fish beyond the dock to end markets. Even after hiring designated coordination staff or forming distribution partnerships, seafood AFN operators must still absorb the risks of value chain logistics. As one interviewee stated, “as soon as fish hits the dock, the clock is ticking, and it’s a liability until it’s sold.” While some participants suggested that building an inventory of frozen products helps to mitigate risks associated with fresh and perishable seafood, an interviewee who aims to launch a seafood AFN explained the difficulty of initially financing a frozen inventory, and as an established business owner stated: “if you don’t sell it, it’s still yours.” Lack of access to shoreside infrastructure can also present a significant challenge. Fishers who choose to market their
catch on their own will likely have difficulty accessing facilities and services owned by established companies along the value chain, including unloading, ice supply, processing, cold storage, and distribution (see also Knutson, 2017). Where access to infrastructure is possible, or new facilities can be developed, additional costs to the seafood AFN must be considered. Participants suggested that community partnerships and the enhanced financial stability for harvesters that can be fostered through AFNs can be helpful in this regard.

While striving to create alternatives, the enterprises in the sample continue to interact with ‘conventional’ seafood chains. In some cases, they purchase from larger buyers or processors rather than directly from fishers, making it challenging to ensure improved ex-vessel prices or traceability. Seafood AFNs must also contend with cheaper imported products. As one participant stated, “how do you compete with seafood that doesn’t have the same values?” To this point, education on the costs of fishing sustainably in a regulated environment, and the value of providing a fair price to fishers for high quality and traceable products, is of central importance to the marketing approaches of these businesses. However, structural constraints remain as seafood AFNs attempt to grow into markets dominated by larger seafood purveyors. For example, when expanding their sales into institutional markets, such as schools and hospitals, seafood AFNs may need to navigate existing food service structures that focus on heating pre-made meals versus cooking fresh seafood.

Overall, these enterprises aim to create alternatives to large-scale seafood supply chains, yet they often face business challenges due to their smaller-scale operations. The majority of the existing businesses in the sample (88%, n=14) purchase only a portion of the volume caught by the fishers they work with, who in turn continue to sell the rest of their catch via more ‘conventional’ channels. These lower volumes can be a hindrance when working with external infrastructure that is accustomed to dealing in higher volumes and also suggest the limited market share that many of these enterprises currently hold. In addition, it can be challenging for seafood AFNs to optimize pricing in a way that is ‘fair’ to both fishers and consumers, at the same time as being able to hire sufficient coordination staff and pay for processing, cold storage, and distribution expenses. To address this, a primary focus of the 2016 Local Seafood Summit was on working with seafood AFNs to develop the business
skills required to maintain financial viability. At the time of this research, only one of the enterprises in the sample had been in operation for more than eight years, and 55% (n=11) had been in operation for four years or less. Many of these enterprises were thus still transitioning from the start-up phase of their operations, meaning it could take time to develop streamlined seafood businesses with suitable divisions of labour capable of managing growth and encouraging efficiency while also maintaining ‘alternative’ values.

3.4 Discussion

The seafood AFNs studied in this chapter had various forms yet shared similar features (see Table 4). For example, regardless of the number of boats they worked with, or whether they purchased directly from fishers, each enterprise focused on engaging with small-scale, place-based, and ‘sustainable’ fishing operations. Similarly, while each enterprise had a unique distribution chain from boat to fork, representing different processing, cold storage, and distribution requirements, all emphasized traceability along their value chains. In addition, despite selling to diverse end markets at varied distances from the fishing grounds, all of the enterprises emphasized providing high-quality seafood to their clientele. This finding extends the work of Bolton et al. (2016) – which identifies both unifying and divergent characteristics of CSFs (Bolton et al., 2016) – by highlighting the common features and diverse forms of a broader group of seafood AFN types. It also suggests a ‘unity in diversity’ amongst the enterprises that are part of the LocalCatch.org network and that were brought together at the Local Seafood Summit, similar to the unification of diverse land-based AFNs under the transnational food sovereignty movement (Desmarais and Wittman, 2014). At the same time, it is recognized that these key features are not exclusive to seafood AFNs, and that some ‘conventional’ seafood supply chains are also adopting some of these features (Sterling et al., 2015; Bailey et al., 2018; Barclay and Miller, 2018; Cochrane, 2018; Barendse et al., 2019).

Seafood AFNs can generate both tangible market values and less tangible values. To start, market values that enhance the potential for fishers to participate in existing fisheries systems appear to be important drivers of these enterprises (see Figure 3). As stated by Knutson (2017), “already embedded in a fishery dominated by a corporate model, small
boat fishermen proceed to a direct marketing model out of economic necessity” (Knutson, 2017, pg. 128). As demonstrated through previous research (Brinson, Lee and Rountree, 2011; Stoll, Dubik and Campbell, 2015), and as emphasized by participants in this research, seafood AFNs aim to offer higher and more stable ex-vessel prices to fishers. Specific price premiums vary based on factors such as species type and regional context. Stoll et al. (2015) documented price premiums that were on average 33% above market prices in a CSF in North Carolina, US (Stoll, Dubik and Campbell, 2015), and further research comparing premiums in different seafood AFNs across regions would be useful. Participants in this research also stated that seafood AFNs can increase fishing revenues by enhancing market and income stability, shifting high quality products from conventional to niche markets, developing new markets for abundant but underutilized species, and providing opportunities for profit-sharing through co-operative ownership.

These market advantages can help fishers continue operating within challenging policy contexts. For example, where policy measures (e.g., catch shares) have increased the cost of fisheries access (Pinkerton and Edwards, 2009) – especially for small-scale fishers (Pinkerton, 2015; Tolley and Hall-Arber, 2015) – seafood AFNs have the potential to offer increased financial stability in a context of heightened expenses. In addition, in what is viewed as a ‘grey ing’ industry with high costs and barriers to new entrants (Carothers, 2015), seafood AFNs could potentially generate financial opportunities that inspire and enable younger generations to view fishing as a viable occupation and to enter the industry. Researchers have highlighted the management importance of ensuring that fishers capture adequate financial value from their catch (Holm, Hersoug and Rånes, 2000; Pinkerton, 2003; Asche, Dahl and Steen, 2015), and there are instances where policy measures have been implemented to this end (Pinkerton and Weinstein, 1995; Weinstein, 1999; Holm, Hersoug and Rånes, 2000; Makino and Matsuda, 2005; Foley, Mather and Neis, 2015; Pinkerton, 2015). However, fisheries management structures generally lack such provisions, and may have the opposite effect for small-scale fishers (Palsson and Helgason, 1995; Pinkerton and Edwards, 2009; Carothers, Lew and Sepez, 2010; Olson, 2011; Tolley and Hall-Arber, 2015; Barnett, Messenger and Wiber, 2016). Seafood AFNs appear to be striving to help fill this gap by modifying seafood chains and helping fishers capture more financial value from their work.
Importantly, seafood AFNs do not simply ‘cut out the middleman’ (Saulny, 2008); rather, they can also generate market values along the value chain (see Figure 3). For instance, representatives of the enterprises included in this research noted that they support local employment and infrastructure by working with existing processing, distribution, and cold storage facilities, and/or by encouraging development of further capacity in these areas. By coordinating multiple aspects of the seafood value chain, seafood AFNs “become the middleman” (Johnson, 2007, pg. 1), while also maintaining a unique approach to seafood buying and sales. Whereas fisheries policies such as fleet rationalization have been documented to increase the market power of buyers and decrease the bargaining power of fishers selling their catch (Pinkerton, 2015), seafood AFNs aim to engender ‘fair’ price negotiations to ensure fishing costs are covered. This, in addition to the potential for fish pre-sales to be translated into pre-payments to fishers, can help seafood AFNs partially shift the risk of food production from fishing to other stages of the chain (e.g., end markets) (Brinson, Lee and Rountree, 2011), similar to land-based AFNs such as CSA (Campbell et al., 2014).

In return, consumers who purchase from seafood AFNs may receive improved market access to high-quality, place-based, sustainable, and traceable seafood. Most interviewees stated that the price of this improved seafood access was fair for their customers, often stating that their products were more affordable than any closely comparable ‘premium’ seafood products sold at larger retail outlets. This begins to suggest a more equitable distribution of value along alternative seafood chains compared to larger-scale chains. However, agricultural research has described affordability issues associated with land-based AFNs that make them inaccessible to lower-income consumers (Guthman, Morris and Allen, 2006; Andreatta, Rhyne and Dery, 2008). While some recent literature has documented the price premiums that consumers are willing to pay for local and sustainable seafood (McClenachan, Dissanayake and Chen, 2016), further research is required to compare the actual prices and accessibility of such products in alternative versus larger markets, as well as to calculate value distributions along alternative seafood value chains.

The creation of less tangible values is also important to seafood AFNs. For example, participants consistently emphasized values in the realms of traceability, education,
advocacy, community building, and independence, at different stages of alternative seafood value chains (see Figure 3). Similar values have been highlighted in previous literature on CSFs (Brinson, Lee and Rountree, 2011; Campbell et al., 2014; McClenachan et al., 2014; Stoll, Dubik and Campbell, 2015; Bolton et al., 2016). According to Knutson (2017), “beyond financial survival, social goals drive direct marketing fishing businesses…[since] attaining these goals has become increasingly difficult in the corporate model…” (Knutson, 2017, pg. 129). This research supports this statement, demonstrating that seafood AFNs constitute a form of social enterprise, by striving to generate market values that support a broader range of benefits (Desa, 2010). It is possible that the social capital fostered by these enterprises could spur wider benefits to society. For example, Stoll et al. (2015) refer to CSFs as “institutional starters”, which have the potential to enhance the resilience of social-ecological systems through the production of social capital (Stoll, Dubik and Campbell, 2015). The education of consumers through seafood AFNs could also represent a benefit that accrues to society more broadly (Behrman and Nevzer, 1997).

The less tangible values promoted by seafood AFNs could also represent an act of resistance against existing fisheries structures, such as those predicated on market-based principles. Resistance to neoliberalism through the creation of ‘alternatives’ has already been suggested in research on land-based food initiatives (Hinrichs, 2000; Renting, Marsden and Banks, 2003; Pratt, 2009; Marsden and Franklin, 2013). For example, Pratt (2009) explains how modern organic farming was “born out of a movement attempting to realize an alternative set of values in relation to both industrialized food chains and capitalist organization” (Pratt, 2009, pg. 166). This set of values – in the realms of health, the environment, and social and economic relations – emerged in opposition to various perceived negative effects of large-scale agricultural practices (Pratt, 2009). Similarly, seafood AFNs aim to promote a set of values that can be lost within larger-scale seafood supply chains, such as product traceability and independence from large corporations.

More broadly, social enterprises have been documented to work against existing institutional frameworks to give birth to new norms and structures (Mair and Martí, 2004; Cohen and Winn, 2007; Dean and McMullen, 2007; Desa, 2010). Dean and McMullen (2007) present an example of an American organic dairy farm that simultaneously educated
consumers about problems with conventional milk processes and lobbied policy makers to establish organic labeling standards, in order to increase market and policy support for organic dairy production (Dean and McMullen, 2007). As this chapter demonstrates, seafood AFNs also aim to shift existing market and policy structures through education and advocacy. Along these lines, Tolley & Hall-Arber (2015) document how communities of fishers and their local market supporters (including CSF members, hospital buyers, and student food activists, among others) in the northeastern US helped influence fishery policymakers to prioritize addressing issues around fleet consolidation in the area’s groundfishery (Tolley and Hall-Arber, 2015). Overall, the movement toward ‘alternatives’ in the seafood industry bears resemblance to the food sovereignty movement, which represents a “transnational community of resistance” engaged in “a collective struggle to define alternatives to the globalization of a neoliberal, highly capitalized, corporate-led model of agricultural development” (Desmarais and Wittman, 2014, pgs. 1155 and 1157).

At the same time, seafood AFNs remain tied to neoliberal structures through fisher participation in existing policy systems, and through the provision of community-oriented services via market-driven approaches. In agriculture, researchers have noted that, while AFNs oppose neoliberalism abstractly, they also recreate it through their actions (Guthman, 2008; Alkon and Mares, 2012). Similarly, Tolley & Hall-Arber (2015) note that while the move toward a “social economy” is a reaction against neoliberalism, it also represents a “hybrid” incorporating aspects of the market, government, and civil society. Regarding this point, they state that groups promoting “alternatives” in fisheries and the seafood sector have recognized that “not all the solutions … are wholly separate from the existing (neoliberal) market” (Tolley and Hall-Arber, 2015, pg. 403). This fits with St. Martin’s (2007) finding on the potential for alternative fishing economies that coexist with larger markets (St Martin, 2007), as well as Gibson-Graham’s (2008) broader conceptualization of diverse economies (Gibson-Graham, 2008). This also aligns with a wider trend toward hybrid organizations that pursue social goals at the same time as relying on commercial income to continue operating (Battilana et al., 2012). Similarly, seafood AFNs and their value chains operate at a complicated interface of resisting and creating alternatives to existing economic and policy structures, at the same time as participating in them.
There are structural constraints that arise from this ‘participation and resistance’. As Battilana et al. (2012) explain, “hybrid organizational models can be a fountain of innovation ... [b]ut they also face distinct challenges that may prevent them from thriving” (Battilana et al., 2012, pg. 51). Such constraints have also been documented within land-based AFNs (Renting, Marsden and Banks, 2003; Pratt, 2009; Tregear, 2011; Alkon and Mares, 2012; Galt, 2013; Johnson, Fraser and Hawkins, 2016). As Marsden and Franklin (2013) explain, “the actors in these [networks] negotiate the state of ‘permanent tension’ which is likely to characterise the dialectic relations between dominant markets and their institutions and alternative social movements” (Marsden and Franklin, 2013, pg. 638). Similarly, for the seafood AFNs interviewed here, challenges arise while simultaneously engaging with and creating alternatives to conventional seafood systems. For example, regulatory barriers to small-scale fishers, such as cost of fisheries access, remain persistent despite improvements in fishing revenues through seafood AFNs. Costs associated with coordinating logistics along value chains and accessing or building seafood infrastructures can also be challenging. Thus, despite aiming to create ‘alternatives’ that focus on less tangible values, these enterprises must still be able to function within existing market-based systems. In addition, seafood AFNs often face barriers while interacting with larger-scale chains, and their own market share (and scale of impact) may be currently limited.

Along these lines, with many seafood AFNs still in their infancy, a focus of the 2016 Local Seafood Summit was on enhancing the viability and impact of these enterprises as they expand. However, some researchers have suggested that when alternative food businesses scale up their operations, they also risk losing the qualities that make them ‘alternative’ to begin with (Beckie, Kennedy and Wittman, 2012; Mount, 2012; Johnson, Fraser and Hawkins, 2016). The expansion of organic agriculture has been presented as an example of this process (Guthman, 2004). As Pratt (2009) explains, “as the demand for these alternative foodstuffs [grew], partly as a backlash against industrialized agriculture, the bulk of production was taken over by capitalist companies with their efficiencies of scale and marketing, which also subtly transformed the original objectives of this innovation” (Pratt, 2009, pg. 160).

To this end, another major focus of the 2016 Local Seafood Summit was on developing a
set of core values for seafood AFNs to maintain as they expand (LocalCatch.org, 2016b, 2019a). Generally speaking, social entrepreneurs tend to be guided by specific sets of values and principles (Grenier, 2010). In describing the ‘unity in diversity’ of land-based AFNs focused on promoting food sovereignty, Wald and Hill (2016) state that “the current corporate food regime is being [scrutinized] and challenged by a diversity of alternative food networks that, although far from being homogenous, are based on a particular set of ethics” (Wald and Hill, 2016, pg. 211). It is possible that the core values developed through the LocalCatch.org network will similarly establish building blocks for maintaining the unique market values and less tangible values of a diverse group of alternative seafood value chains as they expand to overcome their challenges and increase their impact.

3.5 Conclusion

This chapter focused on seafood AFNs and the market benefits and less tangible benefits they can provide to small-scale fishers and communities in North America. To date, limited attention has been given to the interplay between these enterprises and the broader fisheries context within which they are emerging. As observed here, it is likely that many of these enterprises are being driven in part by the need to develop ‘alternatives’ to deal with the effects of certain fisheries policies and broader market forces. Not only do these new forms of seafood distribution and marketing aim to generate market values, but they also strive to support broader and less tangible values. This chapter suggests that these enterprises enable fishers to participate within existing market and policy structures, at the same time as resisting these structures and the market-based principles on which they are based. This simultaneous ‘participation and resistance’ presents structural challenges that warrant further exploration as seafood AFNs across North America continue to mature, evolve, and scale their impact.
4. Exploring the potential for alternative seafood networks in rural, coastal British Columbia

4.1 Introduction

As noted in Chapters 1 and 2, the expansion of global trade in seafood has had varying effects on marine environments and coastal communities (Gudmundsson, Asche and Nielsen, 2006; United Nations Environment Program, 2009; Fabinyi, Dressler and Pido, 2016). As such, policy makers are interested in how seafood value chains may be restructured to improve environmental and socio-economic outcomes (European Commission, 2014; National Oceanic and Atmospheric Administration, 2016; Standing Committee on Fisheries and Oceans, 2019). This could include, but is not limited to, regulations to improve traceability along seafood value chains, strategies for increasing price transmission to small-scale fishers to improve livelihoods and reduce harvesting pressure, and infrastructure improvements to enhance value addition (Bjørndal et al., 2015; Hu et al., 2018; Sadovy de Mitcheson et al., 2018).

A common goal identified in policy and planning processes in coastal British Columbia (BC), Canada, and particularly in rural areas, has been to develop new opportunities along seafood value chains, with the aim of improving environmental and socio-economic outcomes in the region’s fisheries and seafood systems (Gislason, Lam and Mohan, 1996; Pacific Salmon Revitalization Plan Review Panel, 1996; Province of BC, 1997; Gislason, Lam and Battle, 1998; West Coast Aquatic, 2012; Robinson Consulting and Associates Ltd., 2013; Wild Salmon Advisory Council, 2019). Specifically, the Marine Planning Partnership (MaPP) – an initiative of the Province of BC and 16 First Nations that has worked with stakeholders from various marine sectors – has developed and is implementing strategic marine use plans for BC’s North Pacific Coast. Among other objectives, these strategic plans include goals related to adapting the region’s seafood value chains in order to improve socio-economic and ecological outcomes within the four MaPP sub-regions: Haida Gwaii, North Coast, Central Coast, and North Vancouver Island (see Appendix 5) (Marine Planning Partnership Initiative, 2015a, 2015d, 2015b, 2015c). For example, the strategic plans highlight the goal of adding value to seafood harvested within
the region, such as through local processing and sales, traceability labeling, sustainability certification, and other actions. Overall, the MaPP process has highlighted the need to consider new economic development opportunities that support sustainable harvesting and benefits to communities along the region’s seafood value chains.

Alternative food networks (AFNs) can present new opportunities along seafood value chains in varying contexts (see Chapter 3). As described previously, a value chain is defined as “the range of activities required to bring a product or service from conception, through the intermediary phases of production to delivery to final consumers” (Gudmundsson, Asche and Nielsen, 2006, pg. 10). For a seafood value chain, this typically consists of harvesting, processing, distribution, marketing, and consumption (Gudmundsson, Asche and Nielsen, 2006). Similar to land-based AFNs (Forssell and Lankoski, 2015), seafood AFNs have various forms but generally aim to restructure value chains in order to connect food producers with consumers, and to advance an array of positive socio-economic and environmental outcomes.

Past research and Chapter 3 of this thesis have highlighted potential market and environmental benefits of such businesses, such as higher ex-vessel prices and income stabilization for harvesters, improved seafood access and traceability for consumers, reduced carbon footprints through streamlined distribution networks, and new marketing channels for abundant yet underutilized species (Brinson, Lee and Rountree, 2011; Campbell et al., 2014; McClanachan et al., 2014; Stoll, Dubik and Campbell, 2015; Bolton et al., 2016; Witter and Stoll, 2017). These potential benefits may help to explain the recent and ongoing expansion of seafood AFNs around North America (see, for example, LocalCatch.org), as well as ongoing media attention to them (Safina and Cirino, 2016; Aubrey, 2017; Gajanan, 2017; McLaughlin and Hermiston, 2018; Sevier, 2018; Holloway, 2019). At the same time, each seafood AFN is unique based on its local context (Bolton et al., 2016; Witter and Stoll, 2017), and several types of these enterprises have been identified, including community supported fisheries (CSFs), off-the-boat sales, fisher’s/farmer’s market sales, seafood buying clubs, online sales, retail market sales, boat-to-restaurant sales, and boat-to-institution sales (see Appendix 1).
Further, seafood AFNs face a unique set of challenges, including viability and scalability concerns with similarities to land-based AFNs (Brinson, Lee and Rountree, 2011; Mount, 2012; Galt, 2013; Galt et al., 2015; Bolton et al., 2016; Johnson, Fraser and Hawkins, 2016; Godwin et al., 2017; Witter and Stoll, 2017; Paul, 2019), as identified in Sections 2.3 and 3.3.4 of this thesis. While it has been suggested that seafood AFNs have growth potential, the focus for possible expansion is often on markets in urban, coastal population centres (McClenachan et al., 2014; Talley, Warde and Venuti, 2016; Hennig, 2017). In addition, residents in rural, coastal areas may already have access to local seafood (Loring, Gerlach and Harrison, 2013; Lowitt, 2013), and supply-side trends and regulatory and infrastructure issues have been identified as potential barriers to establishing seafood AFNs in some locations (Johnson, 2007; Talley, Warde and Venuti, 2016). Similar to many rural, coastal areas in North America, communities in BC’s MaPP region have long depended on seafood for income and food yet are challenged by socio-economic and ecological changes in fisheries (Pinkerton et al., 2014; Marushka et al., 2019; Stephenson et al., 2019). While seafood AFNs have been put forward as a potential option for adapting fisheries and seafood systems, the ability of these types of enterprises to expand their reach and impact is generally unknown, and there is a lack of information on their potential to help advance certain strategic goals in rural, coastal BC.

Along these lines, the primary goal of this chapter is to characterize opportunities and challenges along MaPP region seafood value chains that could affect the potential for seafood AFNs – both generally, and specific types – in the region. This information may be useful to policy makers and marine stakeholders generally, and specifically to those working toward implementation of the MaPP regional and sub-regional strategic plans.

4.2 Methods

4.2.1 Research area

The research focused on the MaPP region in BC, which has four sub-regions: North Vancouver Island, Central Coast, North Coast, and Haida Gwaii (see Figure 4). The stages of the region’s seafood value chains that were explored during the research were (1)
harvesting,\textsuperscript{26} (2) processing, (3) distribution (including cold storage), and (4) end markets\textsuperscript{27}.

\textbf{Figure 4.} Map of research area (Marine Planning Partnership Initiative, 2016).

In BC as a whole, commercial fisheries contributed 182,900 tonnes worth CA$410.2 million in landed value in 2017 (Province of BC, 2018). In addition to recreational and food, social, and ceremonial (FSC) fisheries, several species are harvested commercially and/or landed in the MaPP region, including (but not limited to) salmon (e.g., Chinook, chum, coho, pink, and sockeye); herring (e.g., roe, spawn on kelp); groundfish (e.g., halibut, rockfish, sablefish); tuna (e.g., albacore); and shellfish (e.g., crab, prawn, geoduck, sea urchin, sea cucumber). Various vessel and gear types are used within commercial fisheries in the region, including troll, seine, gillnet, trawl, hook and line, trap, and dive

\textsuperscript{26} At the harvesting stage, the main focus was on marine capture fisheries.

\textsuperscript{27} It was beyond the scope of this particular chapter to test consumer preferences related to MaPP region seafood value chains, and the results of a relevant seafood consumer survey are presented in Chapter 5.
fisheries. Communities where seafood is landed and/or processed in the MaPP region include Prince Rupert and Port Edward (North Coast), Massett and Skidegate (Haida Gwaii), Bella Bella and Bella Coola (Central Coast), and Port Hardy and Campbell River (North Vancouver Island), among others (Marine Planning Partnership Initiative, 2015c, 2015a, 2015b, 2015d; Province of BC, 2018).

4.2.2 Data collection and analysis

Data were gathered through semi-structured interviews during spring 2016 with 38 participants in BC who were either located in the MaPP region, or had expertise related to the region’s fisheries and seafood sector. Interview participants were identified through purposive sampling, and included seafood harvesters, processors, and retailers; restaurant owners; local and First Nations government representatives and staff; non-governmental organizations; and academics. I travelled to three of the four MaPP sub-regions to complete in-person interviews. In total, in-person interviews were completed with 11 North Coast participants, 11 Haida Gwaii participants, and 6 North Vancouver Island participants. Phone interviews were completed with the remaining 10 participants. While in-person interviews with Central Coast participants were not completed due to logistical constraints, insights on Central Coast seafood value chains were gathered through phone interviews and in-person interviews with participants in the other MaPP regions.

This chapter used a qualitative approach to understanding the value chain (Fabinyi, 2016; Hamilton-Hart and Stringer, 2016). Interviewee perceptions related to the MaPP region’s seafood value chains were gathered, with a focus on possible challenges and opportunities for seafood AFNs at different stages of the chain. This interview data was subsequently transcribed and coded in NVivo, according to a thematic framework highlighting possible opportunities and challenges for seafood AFNs in the region. Subsequently, I compared these perceived value chain opportunities and challenges with the state of knowledge on different types of seafood AFN (see Appendix 1), in order to envisage how the MaPP

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28 The guiding questions for this chapter’s semi-structured interviews are outlined in Appendix 6.
region’s rural value chain context might affect the suitability of each type of enterprise to the area.

4.3 Results

4.3.1 Value chain opportunities and challenges

Participants noted several opportunities and challenges along MaPP region seafood value chains that could affect the general potential for seafood AFNs in the region (see Table 5). These perceived opportunities and challenges are explained in further detail below.

Table 5. Perceived opportunities and challenges along MaPP region seafood value chains that could affect the potential for alternative seafood networks in the region.

<table>
<thead>
<tr>
<th>Stage of value chain</th>
<th>Opportunities</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Harvesting</strong></td>
<td>Quota and license support</td>
<td>Allocation and competition for fish stocks</td>
</tr>
<tr>
<td></td>
<td>Community management initiatives</td>
<td>Barriers to entry</td>
</tr>
<tr>
<td></td>
<td>Programs for enhancing First Nations participation</td>
<td>Viability concerns</td>
</tr>
<tr>
<td></td>
<td>New production possibilities</td>
<td>Diminished and aging fleet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ex-vessel sales location</td>
</tr>
<tr>
<td><strong>Processing</strong></td>
<td>Existing facilities</td>
<td>Diminished infrastructure</td>
</tr>
<tr>
<td></td>
<td>Custom processing</td>
<td>Viability concerns</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>Custom offloading and shipping</td>
<td>Inaccessible distribution networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited access to cold storage</td>
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<tr>
<td></td>
<td></td>
<td>Geographic context</td>
</tr>
<tr>
<td><strong>End markets</strong></td>
<td>Existing branding and traceability programs</td>
<td>Local market limitations</td>
</tr>
<tr>
<td></td>
<td>Tapping into local markets</td>
<td>Structural constraints</td>
</tr>
<tr>
<td></td>
<td>Expandable external markets</td>
<td></td>
</tr>
</tbody>
</table>

4.1.1.1 Harvesting

Respondents mentioned several opportunities that could enhance community member participation in seafood harvesting in the region. This could not only provide a foundation
for seafood AFNs further down the value chain, but is also a key goal of seafood AFNs themselves. Along these lines, participants noted different forms of quota and license support, such as license banks, which entail collective ownership of fishing licenses and/or quota with the aim of meeting the specific objectives of the founding entity. As one interviewee described:

“Fishermen – when they go out in the water, go out on the boat, with their expenses, with their lives – you know, they’re putting themselves on the line. So this access [support] is a way to help them into the supply chain, [to] share the risk of that.”

Respondents also highlighted community management initiatives that aim to increase local control over fisheries governance and might have the potential to enhance local opportunities for harvest. Specific programs for encouraging First Nations participation in the region’s commercial fisheries were noted, such as capacity building initiatives aimed at enhancing commercial fishing skills and knowledge amongst younger generations of Indigenous peoples, and DFO’s Pacific Integrated Commercial Fisheries Initiative (PICFI) that intends to increase opportunities for First Nations within BC’s commercial fisheries. New production possibilities – such as shellfish and marine plant aquaculture – were also described.

On the other hand, participants outlined challenges limiting community member participation in MaPP region seafood harvesting. Interviewees highlighted how allocation and competition for fish stocks – several of which are diminished compared to previous years and face ongoing abundance uncertainties – constrain commercial fishing opportunities in the region. In addition to fisheries resources being allocated according to conservation objectives and between commercial, recreational, and FSC fisheries,

29 In BC, for example, the Pacific Coast Fishermen’s Conservation Company (PCFCC) formed a license bank with the aim of enhancing access to groundfish quota for its harvester members (Edwards and Edwards, 2017).

30 Through PICFI, commercial fishing license eligibilities and quotas have been reallocated to First Nations, and commercial fishing enterprises (CFEs) have been established to facilitate access to these licenses and quota and to support fisheries business development and capacity building opportunities. There are currently 96 First Nations participating in 25 CFEs in BC (Fisheries and Oceans Canada, 2019b, 2019c; Pacific CFE Hub, 2019); for example, six Nations (Metlakatla, Gitxaala, Gitga’at, Kitselas, Kitsumkalum, and Haisla) participate in the North Coast-Skeena CFE, while A-Tlegay Fisheries LP is comprised of five member Nations (We Wai Kai, Wei Wai Kum, K’ómoks, Tlowitsis, and Kwiakah) (Pacific CFE Hub, 2019).
respondents described a trend toward the concentration of MaPP region fisheries access outside of the region. Respondents also noted barriers to entry into the region’s fisheries, including high costs of purchasing and leasing fishing access, and of owning and maintaining vessels. As one participant explained:

“The heyday has gone through, diminished the supply, and the value of licenses and boats has gone up – so it’s impossible to get in[to the fishery].”

These existing barriers could make the added costs of absorbing additional value chain functions (such as marketing) through AFNs prohibitive to harvesters. Viability concerns in the region’s fisheries were also explained, including unstable revenues due to shortened fishing seasons, fluctuating catch volumes, and uncertain ex-vessel prices, alongside increasing fishing costs. Such uncertainty over seafood supply and demand, as well as perishability concerns, present additional uncertainties for harvesters marketing their own catch. It was also explained how choosing an ex-vessel sales location – or the first point of sale for fish into the seafood value chain (Swartz, Sumaila and Watson, 2013) – can present barriers to selling fish locally, as some landing points can offer higher prices and more services to harvesters than others. For example, fishers harvesting in waters near Haida Gwaii may choose to sell their catch across the Hecate Strait in Prince Rupert, and vessels from southern BC may fish in MaPP sub-regions and then return to urban, coastal BC to sell their catch. Overall, respondents described a diminished fishing fleet and aging harvester population, leading to what some called a ‘lost generation’ of commercial fishers in the region. As one interviewee stated:

“[Fishing has] a long cultural tradition [here]...[however] it’s died up because young people can’t get into the fishery and their parents or grandparents are telling them not to go in because of the heart that comes with this job, unfortunately.”

This could be presenting additional barriers to seafood AFNs in the region, insofar as younger harvesters – who may wish to develop new types of fishing businesses – face substantial obstacles to entry in many BC commercial fisheries.
4.1.1.2 Processing

Respondents highlighted processing-related opportunities for seafood AFNs in the region, including the presence of existing facilities within each of the sub-regions. It was noted that some of these facilities, and processing plants in other parts of BC, offer custom processing options for commercial fishers who wish to retain ownership of their catch for independent sales, such as through AFNs.

Several challenges related to seafood processing in the region were also noted. Respondents highlighted a general trend toward diminished processing infrastructure in the region, explaining that seafood caught there is often processed elsewhere, such as in BC’s Lower Mainland where facilities may have easier access to services, labour, and/or external markets. Labour related concerns for processing facilities in the region were also explained. On the one hand, one seafood business owner stated:

“Experienced [fish] cutters – that’s the [main] challenge … I talk a lot with other [processors on the coast] and to find qualified people, that’s very hard.”

On the other hand, respondents also noted the loss of jobs associated with recent closures of processing facilities, such as a salmon cannery closure on BC’s North Coast that resulted in fish being sent overseas for canning, and associated local job losses. Overall, respondents described a processing sector constrained by viability concerns, including raw material uncertainties, labour complexities, tight margins, and fluctuating wholesale values. This could pose challenges in the region to seafood AFN types that require some degree of processing.

4.1.1.3 Distribution

Interviewees noted opportunities for seafood AFNs – most of which require some form of transportation and cold storage infrastructure – at this stage of the region’s value chains. Specifically, custom offloading and shipping options within and from the region were described. For example, some seafood companies offer custom offloading at their unloading docks, and fishers and seafood companies may be able to distribute their product through shipping carriers such as FedEx or Purolator.
However, participants also noted challenges to transporting and storing MaPP seafood products, which could affect the potential for establishing seafood AFNs in the area. It was explained that existing distribution networks and services (e.g., offloading, ice provision, cold storage, and trucking) are often inaccessible to individual harvesters. In particular, respondents emphasized limited access to cold storage in the region. As a harvester in one of the sub-regions noted, the area’s lack of accessible cold storage is “the biggest issue we’ve got,” yet there are “not enough economic drivers” to change the situation. Overall, it was noted that the region’s remote and rural geography presents distinct barriers to seafood distribution. Respondents emphasized the limited transportation options from the area and how costs of distribution incentivize shipping larger versus smaller volumes such as through seafood AFNs.

### 4.3.1.4 End markets

Respondents described opportunities for MaPP region seafood AFNs at the end market phase of the value chain. Existing branding and traceability programs were noted, including sustainability labeling, tracking software, local food labeling, and government support programming for BC food producers, which seafood AFNs could use to promote their products. One interviewee stated:

> “Traceability is the new thing coming in ... So when I get fish off the boats, it will have a [data log] and ... anybody [can] see how old the fish is ... Right from when it’s caught, to off the boat, to being cut, to in the freezer ... and [consumers] can tell the difference.”

In terms of strengthening or finding new ‘alternative’ markets for the region’s seafood products, potential opportunities at both the local and more distant scale were noted. For example, it was noted that some harvesters had already found flexibility within buying arrangements with seafood buyers and were selling a portion of their catch to nearby consumers, such as through off-the-boat sales or direct sales to local retailers or restaurants. Some participants also suggested additional untapped local markets such as supplying summer tourists, restaurants, sport fishing lodges, and residents who desire improved access to local seafood. As one respondent described:
“I definitely think there’s a market… I [recently attended a community event and there was a] large outpouring [saying] we need access to more local fish. We don’t know how to get it, [and] we’d be interested in figuring out something to address that.”

Possibilities to expand external markets for the region’s seafood were also noted, such as within BC’s Lower Mainland (the province’s most populated area) or Interior region (which is inland and may experience lower access to BC seafood).

At the same time, participants highlighted challenges with relevance to seafood AFNs in the region. Some described perceived barriers, such as local market limitations, explaining that residents in the region already have access to local seafood (such as through sport fishing, FSC fishing, and/or a gift/barter economy), and that the sub-region’s populations seemed too small for market expansion. Structural constraints with seafood AFNs were also described. For example, it was explained that existing value chain structures currently channel seafood to markets outside of the region and involve close ties (often contractual) between harvesters and seafood companies, which presents challenges to selling catch through alternative channels. As one fisher stated:

“For those of us who live outside of the Lower Mainland, we don’t have a population base in which to sell our fish privately, so you are constrained by the companies. If you don’t sell to them, you don’t get ice from them. Ice is an extremely important issue with regards to how the fishery is conducted. And, a lot of boats are finding themselves unable to get ice in places, because they don’t fish for that company.”

Other potential structural constraints to establishing new marketing channels through AFNs were also described, including regulations that make off-the-boat sales illegal or cumbersome, and broader forces affecting seafood pricing. Some noted that previous attempts at establishing seafood AFNs in the region had failed, because the additional costs of marketing were too high for harvesters to bear, and because only a portion of total harvest volumes could be sold through the new channels.
### 4.3.2 Implications for different types of alternative seafood network

The general opportunities and challenges along MaPP region seafood value chains noted above provide some insight into the possible suitability of specific types of seafood AFN to the region. These specific implications of the value chain perceptions highlighted in the previous section are described in Table 6 below.

**Table 6.** Possible suitability of different types of alternative seafood network in the MaPP region\(^{31}\).

<table>
<thead>
<tr>
<th>Type of alternative seafood network</th>
<th>Possible suitability within the MaPP region</th>
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| **Off-the-boat sales:** Fishers sell their catch to customers from their boats, at a dock or other landing point. | **Opportunities:** Fishers already sell their catch through off-the-boat sales in some parts of the MaPP region. This can be a straightforward option because seafood can be sold when it is available, fresh and whole, and straight from the boat. This is a flexible form of alternative marketing – helpful within a context of limited and uncertain fishing opportunities – and minimizes processing, cold storage, and distribution needs – relevant to the MaPP region, where such infrastructure can be difficult or costly to access. Fishers with freezer boats can bring their MaPP-caught seafood to sell at docks in larger cities such as Vancouver, in order to access broader markets.  
**Challenges:** Participants noted regulations that encumber off-the-boat sales in some sub-regions. These regulatory barriers require further exploration; however, even where such sales are permitted in the region, the volume of seafood that fishers could sell off their boats is likely limited, especially in more remote areas with small populations. Fishers in the MaPP region may also be reluctant to jeopardize relationships with seafood buyers in order to pursue off-the-boat sales, as they may still rely on those buyers for ice provision and to buy the remainder of their catch, especially where independent cold storage is unavailable. |
| **Fisher’s or farmer’s market sales:** Fishers sell their catch to customers at a fisher’s or farmer’s market. Sales space at the market is obtained for a specific day and time, and fees, insurance, time | **Opportunities:** Some fishers and seafood businesses already sell seafood at farmer’s markets in parts of the MaPP region. Such markets can provide an avenue for connecting directly with consumers interested in local food in the sub-regions. These sales can work particularly well for frozen, canned, and smoked products with longer shelf lives. There is also potential for MaPP-region seafood to be sold at farmer’s markets in inland cities with larger populations but less seafood access. |

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\(^{31}\) See Appendix 1 for more information on the seafood AFN types mentioned in Table 6.
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<tr>
<th>Type of alternative seafood network</th>
<th>Possible suitability within the MaPP region</th>
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<td>commitments, and other details vary, depending on the market.</td>
<td>Challenges: Some barriers to farmer’s market sales in the MaPP region are similar to those for off-the-boat sales (e.g., regulatory obstacles to direct sales, low sales volumes). In addition, some parts of the MaPP region do not have a farmer’s market. Where farmer’s markets do exist, there are constraints – such as the size and frequency of the market, and the number of fishers allowed to sell there – that might not align with the needs of fishers. These sales could also be difficult for those without access to processing and cold storage, who would therefore be unable to keep an inventory of products with longer shelf lives.</td>
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<tr>
<td>Community supported fishery (CSF): Based on the community supported agriculture (CSA) model. Consumers pre-pay for a subscription, or ‘share’, of seafood, often in advance of the harvesting season. CSF structures vary, including different subscription costs and share arrangements.</td>
<td>Opportunities: There are already CSFs that sell MaPP region seafood, although many of their fishers and consumer ‘members’ are based outside of the region. Some MaPP-region fishers may already partake in informal pre-sales to local networks as well, similar to a CSF structure. This type of enterprise can offer price and demand stability, which could partially help in addressing some of the viability concerns in MaPP region fisheries. It can also offer flexibility in terms of the species provided through the CSF share and offer opportunities to educate about local fisheries contexts, which could help to create markets for abundant and/or underutilized species and be useful alongside fishing uncertainties in the region. Some participants seemed interested in the development of MaPP region CSFs that could act as social enterprises contributing to both community building and providing support to local fishers. It should be noted that there are examples of Alaskan fishers selling their catch through CSFs to members in distant United States markets, which could provide potential models for the MaPP region to consider. Challenges: CSF logistics require time, money, and labour to establish and coordinate. A minimum volume of seafood must be sold to support these costs, and thus a certain number of members must also be secured. It seems unlikely that local populations in individual MaPP communities could support such membership, especially where residents may already have seafood access and when CSF products would be sold at a premium price. At the same time, to establish a supply to fill member shares, multiple fishing operations may need to be involved with the CSF. However, the number of fishers in the MaPP region interested in participating in a new CSF is unknown. Even with a critical mass of fishers and members, lack of accessibility to shoreside infrastructure in the MaPP region could present a strong barrier to CSF operations.</td>
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<tr>
<td>Seafood buying clubs: A group of customers places periodic bulk seafood</td>
<td>Opportunities: Seafood buying clubs could offer an alternative marketing mechanism for moving larger volumes of seafood from the MaPP region. There is potential for less frequent deliveries with</td>
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### Type of alternative seafood network

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<td>orders with a fisher (or a group of fishers), and subsequently distributes the seafood they receive amongst themselves.</td>
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<td>these bulk orders, compared to some other enterprise types, possibly providing time and cost savings to fishers. Responsibility for certain parts of the value chain, such as seafood processing and distribution to individual customers, could be assumed by the buying club, which would be helpful within the MaPP context of difficult-to-access or costly shoreside infrastructure.</td>
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**Challenges:** Establishing seafood buying clubs, especially in distant markets, would take time. The volume of each club order could also be uncertain, creating a risk for MaPP region fishers diverting ex-vessel sales from existing buyers to pursue this new potential market. In addition, bulk club sales may yield lower price premiums than alternative marketing to individuals, and so MaPP fishers could potentially receive little improvement in ex-vessel prices through a seafood buying club compared to current sales, particularly for high-value species. It could also be difficult or costly to access necessary packaging and shipping in the region, and – if the buying club cannot take care of processing and cold storage – there will be additional challenges, given limitations related to shoreside infrastructure in parts of the MaPP region.

### Online sales

**Opportunities:** Seafood is marketed over the internet, orders and payments are completed electronically rather than in person, and seafood is typically shipped to customers. There are businesses already selling their premium seafood from the MaPP region via online sales and offering ‘alternative’ features to clients, such as traceability and connections to seafood harvesters. This sales mechanism is convenient to many consumers and allows MaPP-produced seafood to reach consumers in distant markets.

**Challenges:** Online sales typically deal in processed products (e.g., canned fish, smoked fish, jerky, frozen fillets), which have a longer shelf life and can be held in an inventory. Existing companies in the MaPP region that sell their products online may privately own the processing and cold storage facilities required to prepare and store their products. Additional online sales from the MaPP region would require an enterprise to have access to such infrastructure, which appears challenging within the region. It could also be difficult or costly to access necessary packaging and shipping in the region. This high cost of distribution, plus the value-added nature of most online products, would increase retail costs associated with online seafood sales, further narrowing these sales into niche markets.

### Retail market sales

**Opportunities:** Seafood is sold at a grocery store or seafood shop. Sales may be managed by a small-scale seafood business, rather than orders with a fisher (or a group of fishers), and subsequently distributes the seafood they receive amongst themselves. Products from the MaPP region with ‘alternative’ features – such as traceability and sustainability - are already sold to retail markets, both in and outside the region. Such sales could be scaled up – through bulk orders and access to multiple consumers – while also offering time savings to producers, as the
<table>
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<th>Type of alternative seafood network</th>
<th>Possible suitability within the MaPP region</th>
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<td>than the fishers themselves.</td>
<td>retailer takes care of the final sales. For consumers, these sales can provide convenient access to premium seafood products.</td>
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**Challenges:** Seafood volumes that can be sold through retail markets in the MaPP region are likely limited, due to small populations. In some sub-regions, there is already a seafood shop that is tapping into the local market. For new seafood enterprises to reach retail markets outside the MaPP region, improved access to processing, cold storage, and distribution would likely be required. Partnerships with external retailers may also require a certain supply volume, which could be difficult to fulfill alongside limited fishing opportunities and/or a diminishing number of harvesters in the region. Pricing for retail market sales must also be considered, as the extra value chain stage could lead to lower prices paid to the harvester and/or higher prices paid by the consumer.

### Boat-to-restaurant sales:
Fishers sell their catch directly to restaurants, sometimes through pre-sales for a share of seafood (similar to the CSF model).

**Opportunities:** Fishers and seafood businesses from the MaPP region already sell directly to restaurants within and outside the region. Partnerships with restaurants and chefs have the potential to highlight MaPP sub-regional fishing contexts, and to introduce new species to consumers. There may be potential to expand sales of MaPP region seafood products into more restaurants in larger cities.

**Challenges:** Restaurants in the MaPP region may not wish to source locally-caught seafood, due to higher prices and supply uncertainties (compared to sourcing from larger, globally connected supply chains). The need to meet a bottom line may also lead to lower prices paid by restaurants for local seafood – even when sales are direct – compared with direct sales to individuals. In addition, MaPP region fishers would likely need to connect with numerous restaurants in order to sell their entire catch, and such partnerships would require time and coordination to arrange, particularly with distant restaurants. At the same time, supply commitments to restaurants could be difficult to fulfill due to fishing uncertainties in the MaPP region. Distribution to restaurants outside of the MaPP sub-regions (e.g., in Vancouver) could also be logistically difficult.

### Boat-to-institution sales:
Seafood is sold (typically in large volumes) to food service providers that supply universities, schools, hospitals, and other institutions. Seafood is subsequently prepared and sold at the institution.

**Opportunities:** It is unknown whether MaPP-region seafood is sold directly to any local or regional institutions, although this appears to be a potentially expandable market for the region’s seafood, particularly in the context of the BC government’s current FeedBC mandate, which aims to “increase the use of B.C.-grown and processed foods in hospitals, schools, and other government facilities” (Province of BC, 2019b). Institutions can represent a stable market, and sales can occur in larger volumes than other
### Type of alternative seafood network

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<td>forms of alternative seafood marketing, potentially allowing MaPP region fishers to sell a large portion or all of their catch.</td>
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**Challenges:** There would certainly be requirements to access MaPP region shoreside infrastructure for institutional sales. Establishing contracts with institutions – especially outside of the MaPP sub-regions, and where food service providers are already tied to established seafood companies – would also require time and coordination. This could add an extra stage to the seafood value chain between fishers and institutional buyers (e.g., a coordinator or broker), which could cut into the potentially slim price premiums earned by fishers for bulk institutional sales.

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### 4.4 Discussion

This chapter has highlighted a series of challenges along seafood value chains in rural, coastal BC that could affect the potential for seafood AFNs in the region. Barriers to entry and viability concerns were noted as challenges to local participation in fisheries in the MaPP region, as was the area’s diminished fishing fleet and aging harvester population. Such trends have been generally recognized within BC’s fisheries sector for several years (Canadian Council of Professional Fish Harvesters, 2018; Edwards and Pinkerton, 2020), have a variety of causes (Haas, Edwards and Sumaila, 2016), and could make the added costs and commitments of developing and operating seafood AFNs difficult for harvesters to bear. However, trends vary between fisheries (Province of BC, 2018; Fisheries and Oceans Canada, 2019a). For example, costs of entry (e.g., license, quota, and vessel costs) differ across commercial fisheries (Gibson and Sumaila, 2017), and labor issues may be less pronounced in fisheries with stronger economic performance (Gislason, 2013; Gibson and Sumaila, 2017). Viability concerns within diminished shoreside infrastructure in the region – as well as access issues for harvesters – were also identified through the research as potential barriers to seafood AFNs, which typically rely on some degree of shoreside infrastructure. Along these lines, existing research has demonstrated how a higher share of seafood is processed in urban, coastal BC (e.g., the Lower Mainland), compared to the share of seafood landed there. In 2016, for example, 47% of the halibut caught in BC was
landed on the North Coast (within the MaPP region), versus 19% of the halibut that was processed (GSGislason & Associates Ltd., 2017). This research has also highlighted questions as to the level of market demand for seafood provided via ‘alternative’ enterprises within and outside the MaPP region. Overall, rural, coastal BC’s remote geographic context presents challenges to seafood AFNs all along the value chain, with harvesters and companies having to weigh the costs and benefits of landing, processing, and/or selling seafood adjacent to where it was caught, versus more distant sales.

At the same time, there are seafood AFNs already operating in the region, and this chapter has identified potential opportunities for the expansion of these types of enterprises in the area. For example, there are programs at various stages of the value chain that aim to enhance local capacity and participation in the seafood sector, whether it be at the harvesting, processing, or end market phases (e.g., BC Young Fishermen’s Network, 2019; Pacific CFE Hub, 2019; Province of BC, 2019). In terms of viability, BC seafood companies are already securing throughput and diversifying by processing multiple species, from several sources (e.g., commercial, recreational, farmed, and/or imported raw material), and for different product lines and markets. A similar approach of diversifying supply, product options, and markets – including through regional clustering (Beckie, Kennedy and Wittman, 2012) or cooperative arrangements (Galt et al., 2015) – can help to enhance the viability of AFNs. For example, an existing CSF in Vancouver, BC, that sources seafood from the MaPP region has worked with producers and marketing outlets to expand its enterprise from one to 30 harvester suppliers, from 2 to 42 types of products sold, and from 1 to 45 sales locations, over 11 years, while continuing to adhere to the core values of seafood AFNs (S. Strobel, personal communication, January 6, 2020). In addition, participants noted potential opportunities for linking seafood AFNs to new production possibilities in the region, such as shellfish aquaculture. Despite some production risks, such as the effects of changing ocean conditions (e.g., ocean acidification, rising water temperatures) (Holden et al., 2019), sourcing from sustainable farming operations can also help improve certainty of supply for seafood AFNs (Jodice et al., 2018). Similar to research on Canada’s East Coast (DesRivières, Chuenpagdee and Mather, 2017), this chapter also found that while some rural, coastal community members already have access to local seafood through informal networks, there may be untapped local demand
for more formalized seafood access, such as through seafood AFNs. This has been suggested through recent reports focused on the MaPP region (Vachon and Bendickson, 2017; Ahmed, 2018); however, testing this potential local market demand, as well as the demand for ‘alternative’ seafood products in more distant markets, was beyond the scope of this chapter and is explored further in Chapter 5.

The abovementioned challenges and opportunities offer some insight into which types of seafood AFNs may be appropriate to BC’s MaPP region (see Table 6). For example, barriers to accessing shoreside infrastructure such as processing and cold storage in much of the region present constraints for seafood AFNs selling seafood through farmer’s markets, online sales, and other channels typically requiring an inventory of frozen, canned, and/or other product forms with longer shelf lives than fresh products. At the same time, while business types such as off-the-boat sales can facilitate fresh seafood sales, the MaPP region’s rural context and small population may limit the consumer base in the area and make purchase volumes uncertain. In addition, existing regulations may present barriers to these types of sales for harvesters in some locations (Ahmed, 2018). It has been found that the success of seafood AFNs can be enhanced by combining different business types and supplying multiple markets (Galt et al., 2015; Bolton et al., 2016; Godwin et al., 2017). Similarly, selling various species through the selected business type(s) can help to counterbalance uncertain fishing seasons and catch volumes, especially for those seafood AFN types requiring larger volumes or more frequent shipments (e.g., boat-to-institution or boat-to-restaurant sales). Overall, each fishery and MaPP sub-region is likely to present unique options and constraints for different types of seafood AFNs.

Further, the diversity, flexibility, and hybridity of AFNs (Mount, 2012) – including those that market seafood – are important to consider within the rural, coastal BC context. To begin, AFNs are associated with “a variety of distribution and/or production practices” beyond their theoretical descriptions, and with varying impacts (Forssell and Lankoski, 2015, pg. 63). As Bolton et al. (2016) explain, “local ecologies, pre-existing supply chain dynamics, histories, politics and personal priorities all work together to shape the forms that [these enterprises] take” (Bolton et al., 2016, pg. 29). These diverse organizational structures subsequently affect the specific benefits that a seafood AFN can provide (Bolton
et al., 2016). This diversity therefore provides opportunities for seafood AFNs to be tailored specifically to rural, coastal BC, through addressing specific regional and sub-regional objectives as well as value chain contexts.

Along these lines, there is also a degree of flexibility associated with marketing seafood through AFNs. For example, the meaning of ‘local’ seafood has different interpretations within different seafood AFNs (see Chapter 3) (Witter and Stoll, 2017), including but not limited to customer proximity to the harvester, or to where seafood is caught or landed; distance travelled by seafood in the value chain; a fishery’s management boundary; and/or the relationship between harvesters and consumers (LocalCatch.org, 2019a). Further, existing research has suggested that ‘local’ has a broader definition in seafood AFNs than in agricultural AFNs (DesRivières, Chuenpagdee and Mather, 2017) and that these types of enterprises commonly source domestic seafood, rather than sharing a stricter, more proximate definition (Bolton et al., 2016). This could provide flexibility to MaPP region seafood AFNs seeking connections to consumers in more distant markets.

In addition, while ‘alternative’ value chains are born of resistance to ‘conventional’ value chains, in reality the distinction between the two is blurry and these enterprises typically take on ‘hybridized’ forms (Watts, Ilbery and Maye, 2005; Holloway et al., 2007; Andrée et al., 2010; Mount, 2012; Forssell and Lankoski, 2015; DesRivières, Chuenpagdee and Mather, 2017). Seafood companies of various sizes are recognizing issues that seafood AFNs aim to address – and their impact on social license, market access, resource sustainability, and the ability to attract price premiums – and are implementing strategies (such as sustainable seafood certification and traceability programs) that aim to demonstrate and incentivize responsible practices, and to differentiate seafood products in the marketplace (Bailey et al., 2018; Barclay and Miller, 2018; Cochrane, 2018; Barendse et al., 2019). The common objectives of seafood value chains of varying sizes, as well as opportunities for seafood AFNs that can be gained by tapping into economies of scale – such as through diversifying supply, increasing processing throughput, and tapping into existing processing, distribution, and marketing infrastructures (Abatekassa and Peterson, 2011; Mount and Smithers, 2014) – suggest that this hybridity is important to keep in mind.
within the MaPP region seafood value chain context, which includes uncertain catch levels, shortened fishing seasons, and diminished shoreside infrastructure.

Overall, the diversity, flexibility, and hybridity of seafood AFNs also raise questions as to their distinguishing factors when compared with ‘conventional’ food enterprises (Mount, 2012; Mount and Smithers, 2014). To this end – and in the context of concerns over co-optation and some companies falsely portraying their seafood as ‘local’ and/or ‘sustainable’ (North Atlantic Marine Alliance, 2017; McDowell, Mason and Mendoza, 2018) – LocalCatch.org (a network of seafood AFNs) has established a set of core values for its member organizations to strive towards (LocalCatch.org, 2019a), which could be referred to by existing or nascent seafood AFNs in the MaPP region.

Based on the research results, it appears that seafood AFNs could help to address certain strategic goals related to improving seafood systems in rural, coastal BC, but only in combination with other tools to address fundamental pillars of ecological, social, and economic sustainability in the region’s fisheries and seafood sector. First, an aging workforce in rural industries such as commercial fisheries, and in rural (including coastal) areas in general, has been documented in BC and other parts of Canada (Fisheries and Oceans Canada, 2012; DesRivières, Chuenpagdee and Mather, 2017; Canadian Council of Professional Fish Harvesters, 2018). Among various drivers, business viability issues have been identified as a key barrier to attracting new labor supply to fishing enterprises (Gislason, 2013; Bjorndal, Child and Lem, 2014; Ecotrust Canada and T. Buck Suzuki Environmental Foundation, 2014; Canadian Council of Professional Fish Harvesters, 2018). While opportunities such as potential price premiums earned through seafood AFNs could help attract new entrants to seafood harvesting, it has been suggested that policy work related to fisheries access, how benefits flow from the sector to individuals and communities, and new financing mechanisms may be needed as well (Standing Committee on Fisheries and Oceans, 2019). In addition, education and capacity building are key pillars – important not only for labor renewal in fish harvesting, but also for shaping consumer seafood demand (Galt et al., 2015; DesRivières, Chuenpagdee and Mather, 2017; Jodice et al., 2018; O’Hara and McClenachan, 2019).
Further, with multiple ecological sustainability challenges facing aquatic life in BC (Rice et al., 2018; Grant, Macdonald and Winston, 2019; Reidy, 2019), effective fisheries management supported by robust stock assessment, habitat protection and restoration, monitoring, and other crucial activities remains fundamental to the sustainability of BC fisheries. Recognizing that “the convergence of environmental degradation and climate change will likely increase conflicts over access to scarce [marine] resources” in Canada (Bennett et al., 2018, pg. 190), exploring diversification options remains an important pillar for rural, coastal communities that have been dependent on fisheries (Himes-Cornell and Hoelting, 2015) in BC. As an example, new aquaculture opportunities such as seaweed and bivalve farming have been promoted in BC and elsewhere as having the potential to produce seafood responsibly, while providing jobs and economic benefits to rural, coastal communities; yet, these opportunities themselves face issues related to social license, environmental impacts, and market effects, among other concerns (Hand and Marcus, 2004; D’Anna and Murray, 2015; Shamshak and King, 2015; Ryan et al., 2017; Flaherty et al., 2018; State of Alaska, 2018; Holden et al., 2019). Overall, with the MaPP strategic plans and other collaborative planning initiatives as a guide, it is crucial to continue to consider key objectives within the region’s food systems, and how different value chain structures, as well as a broader suite of tools, may help to address or weaken those objectives (Forssell and Lankoski, 2015; DesRivières, Chuenpagdee and Mather, 2017).

4.5 Conclusion

Similar to land-based AFNs, seafood AFNs aim to restructure value chains in order to improve the ecological and socio-economic outcomes of food systems. Recognizing goals for improving outcomes in fisheries and seafood value chains in rural, coastal BC, Canada that were outlined through the MaPP initiative and other processes – and noting the literature gap related to the applicability of seafood AFNs to this region – this chapter has highlighted challenges and opportunities related to seafood AFNs (both generally, and specific types) along seafood value chains in BC’s MaPP region.

The research highlighted the diversity of potential forms of seafood AFNs, based on local contexts and objectives, which provides flexibility to those considering developing such
enterprises. The results also suggest that while some types of seafood AFNs may have applicability within rural, coastal BC, it is also crucial to remember the ‘hybridity’ of these enterprises and that other tools are also required for reaching specific planning objectives within the region. In addition, the specific opportunities and challenges for seafood AFNs in the region are likely to vary from one sub-region to the next, and between fisheries, which are managed under different management structures and with unique ecological complexities. Overall, it is rare for any one type of seafood AFN to be utilized successfully in isolation.

Despite the challenges highlighted through the research, several types of seafood AFNs do already occur within, or have connections to, BC’s MaPP region. One key question raised by this research is whether there is untapped market demand for more BC seafood products focused on ‘alternative’ features, such as those highlighted by Chapter 3 (e.g., supporting small-scale and place-based fishing operations, through the provision of traceable, sustainable, and high-quality seafood products to customers). To this end, Chapter 5 assesses consumer preferences related to such features – both in BC and more distant markets – in order to contribute to a better understanding of the market feasibility of further expansion of these types of enterprises in BC and elsewhere.
5. Consumer preferences related to ‘alternative’ seafood products

5.1 Introduction

There has been a recent proliferation of alternative food networks (AFNs) for seafood around North America (LocalCatch.org, 2019b), as well as ongoing media attention to their potential benefits (Safina and Cirino, 2016; Aubrey, 2017; Gajanan, 2017; McLaughlin and Hermiston, 2018; Sevier, 2018; Holloway, 2019). As noted in previous chapters, existing research has documented potential ecological and socio-economic benefits associated with these types of businesses, while also highlighting their structural constraints (Brinson, Lee and Rountree, 2011; Campbell et al., 2014; McClenachan et al., 2014; Bolton et al., 2016; Witter and Stoll, 2017; Witter, Patterson and Murray, 2017). For example, seafood AFNs often struggle with financial viability (Godwin et al., 2017), with harvesters facing several constraints as they integrate additional value chain functions (e.g., processing, distribution, cold storage, and marketing) into their operations (Johnson, 2007; Knapp and Reeve, 2008; Brinson, Lee and Rountree, 2011; National Sea Grant Law Center, 2012; Knutson, 2017; Witter and Stoll, 2017). The scalability of these enterprises beyond niche markets is also questionable, as they tend to be small-scale operations, and thus their potential for broader market reach is uncertain. To this point, seafood AFNs interviewed for Chapter 3 described how they can only purchase a portion of fishers’ total seafood catch, due to their small consumer bases (Witter and Stoll, 2017), while some fishers interviewed for Chapter 4 noted their reluctance to jeopardize relationships with established buyers in order to sell a portion of their catch to seafood AFNs (Witter, Patterson and Murray, 2017). Overall, despite some benefits, the potential for wider impacts of seafood AFNs is unknown.

Broader literature has also highlighted questions with relevance to the viability and scalability of seafood AFNs. For example, research on land-based AFNs has found that their premium food prices do not necessarily cover business costs (Polimeni et al., 2006; Brown and Miller, 2008; Tregear, 2011; Galt, 2013; Johnson, Fraser and Hawkins, 2016), and that their local food offerings are often inaccessible to lower-income consumers (Guthman, Morris and Allen, 2006; Andreatta, Rhyne and Dery, 2008; Alkon and Mares,
While some research has shown that consumers are willing to pay price premiums for local and sustainable seafood (McClenachan, Dissanayake and Chen, 2016), other analysis has highlighted how seafood consumers largely prioritize sensory qualities (such as taste, smell, and appearance) and price considerations above other product factors (Murray, Wolff and Patterson, 2017). Overall, there is a gap in knowledge related to consumer demand and willingness to pay (WTP) for features emphasized by seafood AFNs – e.g., supporting small-scale and place-based fishing operations, through the provision of traceable, sustainable, and high-quality seafood products to customers (see Chapter 3).

More broadly, multiple studies have explored the effects of different attributes on consumer seafood preferences (e.g., Wessells, Johnston and Donath, 1999; Myrland et al., 2000; Johnston and Roheim, 2006; Brunsø et al., 2009; Sveinsdóttir et al., 2009; Olsen, Tuu and Grunert, 2017). Such attributes include, but are not limited to, the geographic origin (Fonner and Sylvia, 2015; Zander and Feucht, 2018), production method (Davidson et al., 2012; Roheim, Sudhakaran and Durham, 2012), product form (Debucquet et al., 2012; Vanhonacker, Pieniak and Verbeke, 2013), sustainability labeling (Uchida et al., 2014; Zhou, Hu and Huang, 2016), and quality features (e.g., taste, smell, appearance) (Birch, Lawley and Hamblin, 2012; Cardoso et al., 2013) of seafood, as well as the demographic characteristics of consumers (Olsen, 2003; Jahns et al., 2014). In a literature review of 49 studies on consumer seafood preferences, Carlucci et al. (2015) found that key factors affecting seafood consumption (both as drivers and barriers) include: sensory factors, health beliefs, fish eating habits, convenience, ease of preparation, pricing, and product availability (Carlucci et al., 2015).

Research results regarding consumer seafood preferences have been mixed. Examples of this variation include different findings related to: preferences towards wild versus farmed fish (Drake et al., 2006; Roheim, Sudhakaran and Durham, 2012), level of WTP for specific product attributes (Nguyen et al., 2015; Zander and Feucht, 2018), and demographic associations with seafood preferences (Olsen, 2003; Salladarré et al., 2016), among others. Heterogeneity between studies (such as varying objectives, attribute definitions, species and product types, methodologies, sampling methods, and target consumers) is one cause of varied findings across the literature (Carlucci et al., 2015).
Varying geographic locations, levels of economic development, and food traditions also lead to different seafood consumption patterns in different parts of the world (Jensen, 2006; FAO, 2010). Further, it is complex trade-offs and relationships between product attributes – as well as broader dynamics within the seafood industry – that will ultimately shape each consumer’s unique seafood preferences (Scholderer and Trondsen, 2008).

This chapter is based on a survey of consumer seafood preferences that focused on the five product features emphasized by seafood AFNs, alongside additional important features highlighted through existing seafood marketing research (see Table 7). Given that seafood preferences can vary across space, survey data was gathered from geographic locations with different characteristics – e.g., small, medium, or large sized, and close to or distant from the coast (see Table 8) – in order to highlight opportunities and challenges for seafood AFNs within varying types of markets. In addition, existing seafood marketing research has investigated underlying relationships between demographic variables – such as gender, age, income, and education level – and consumer preferences. This survey also gathered demographic information from respondents (see Table 9) in order to test associations with certain response variables (see Section 5.3.2).

The aim of the research is to assess the market feasibility of seafood AFNs, particularly as communities and organizations in different locations consider new options for adapting seafood value chains (Talley and Batnitzky, 2014; Dolmage, Macfarlane and Alley, 2016; Kittinger et al., 2017; Ahmed, 2018). The chapter’s research questions are:

1. What are Canadian consumers’ reported behaviors related to seafood purchasing?
2. What are Canadian consumers’ attitudes and opinions regarding different seafood features, including those emphasized by seafood AFNs?
3. What is the willingness to pay of Canadian consumers in relation to these seafood features?

32 See Chapter 3 for further discussion of the key features emphasized by seafood AFNs.
33 While information on respondent gender was gathered within the survey, and is summarized in Table 9, this non-ordinal variable was not included within the Spearman tests for association outlined in Section 5.3.2. The ‘demographic’ variables that were included in these tests were: age, education, income, location size, and coastal proximity.
34 A market feasibility study can be described as “[determining] whether enough demand exists to make the [proposed] venture successful” (Research & Marketing Strategies Inc., 2012).
4. What (if any) associations are there between consumer demographics and the abovementioned preferences?

Overall, it is hoped that this research provides insights into the potential scalability of seafood AFNs. More specifically, a geographic focus of the research is on a province on Canada’s west coast – British Columbia (BC) – where there have been diverse efforts to optimize the value of the province’s seafood production (Province of BC, 2018), at the same time as a goal of enhancing benefits of sustainable seafood production for communities (O’Donnell et al., 2013; Pacific CFE Hub, 2019; Standing Committee on Fisheries and Oceans, 2019; Wild Salmon Advisory Council, 2019). Some have suggested that seafood AFNs offer an avenue to reaching objectives around community food security and local economic development (Food Secure Canada, 2011; Vachon and Bendickson, 2017; Ahmed, 2018). However, the broader potential for the expansion of these types of enterprises remains uncertain (e.g., see Chapter 4) and is a key focus of this chapter.

5.2 Methods

5.2.1 Survey questionnaire

For this chapter, I use a survey methodology to examine consumer preferences (including reported purchasing behaviors, attitudes and opinions, and WTP\(^{35}\)) in selected locations in Canada as they relate to specific seafood products and features. Within the survey questionnaire (available in Appendix 7), seafood was defined as any edible aquatic life (from marine or fresh water), including fish (e.g., salmon, cod, tuna, trout), molluscs (e.g., clams, oysters, octopus), crustaceans (e.g., shrimp, crab, lobster), echinoderms (e.g., sea cucumber, sea urchins), and edible sea plants (e.g., seaweed), among others. It was

\(^{35}\) There are a variety of methods for measuring WTP for seafood product features, such as choice experiments combined with diverse statistical modeling techniques (Davidson et al., 2012; Fonner and Sylvia, 2015; Nguyen et al., 2015; McClenachan, Dissanayake and Chen, 2016; Salladarré et al., 2016). Similar to several existing studies (e.g., Xu et al., 2012; Arthur, Wiseman and Cheng, 2015; Zander and Feucht, 2018), this chapter gathered WTP data from participants by asking them to choose from a list of seven categories (ranging from “0% more” to “51% or more”) to indicate how much more they would be willing to pay for certain product features (see Appendix 7). WTP data was subsequently analysed through descriptive statistics, as well as Spearman analyses to test for associations with demographic variables.
explained in the questionnaire that this definition includes fresh, frozen, canned, smoked, pre-prepared, and all other product forms.

The goal of the survey was to gather data to better understand potential market demand for seafood products supplied through seafood AFNs in Canada. The questionnaire tested for preferences related to an assortment of seafood features, including those highlighted by seafood AFNs, and some feature wording was modified for the questionnaire in order to improve clarity for respondents (see Table 7). Definitions of features were not provided, leaving interpretation of meaning up to respondents. It is recognized that this may have affected the research results, especially for those features with particularly complex and varying meanings. For example, conceptualizations of ‘sustainability’ – both generally (Moore et al., 2017) and in relation to seafood (Bailey et al., 2018) – are multifaceted and are likely to hold different meanings for some respondents.

Table 7. Seafood features included within questionnaire.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Questionnaire wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative</td>
<td></td>
</tr>
<tr>
<td>Small-scale</td>
<td>Economic benefits to harvesters and their communities</td>
</tr>
<tr>
<td>Place-based</td>
<td>Local or domestic origin</td>
</tr>
<tr>
<td>Traceable</td>
<td>Accurate information about seafood product</td>
</tr>
<tr>
<td>Sustainable</td>
<td>Sustainability</td>
</tr>
<tr>
<td>High quality</td>
<td>Taste, appearance, and/or freshness</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Convenience</td>
<td>Convenience of meal preparation</td>
</tr>
<tr>
<td>Health</td>
<td>Health benefits</td>
</tr>
<tr>
<td>Production</td>
<td>Preferred production method (wild or farmed)</td>
</tr>
<tr>
<td>Price</td>
<td>Affordability</td>
</tr>
</tbody>
</table>

Further, it is recognized that modifying the questionnaire wording to improve clarity for respondents and enhance data quality (Statistics Canada, 2010) may have slightly altered the original meanings of some of the seafood product features being assessed. However, these features already have a variety of possible interpretations (Carlucci et al., 2015), including amongst seafood AFNs (see Table 4). This begins to highlight not only the complexity of understanding consumer food preferences (Scholderer and Trondsen, 2008), including across regions (Jensen, 2006; FAO, 2010), but also the heterogeneity of different seafood marketing research approaches (Carlucci et al., 2015).
The structure of the questionnaire aligned with this chapter’s research questions (see Figure 5). Following screening questions and inquiries into respondents’ reported seafood purchasing behaviors (RQ1), the questionnaire gathered data from respondents on their attitudes and opinions related to different seafood features (RQ2), their WTP for these seafood features (RQ3), and their demographics (RQ4). Prior to being distributed, the survey instrument was pilot tested online with more than 60 respondents, and subsequently revised as needed.

![Questionnaire schematic](image)

**Figure 5.** Questionnaire schematic.

### 5.2.2 Data collection

A stratified sampling approach was used to generate a geographically diverse sample representing multiple consumer markets across Canada (see Table 8). Sample locations were selected to represent a range of possible markets for seafood with ‘alternative’ features originating from BC, Canada. While seafood AFNs fit within the broader ‘local’
food movement (Campbell et al., 2014), definitions of ‘local’ seafood can be broad and diverse and may focus on connecting harvesters to consumers through traceability and transparency, rather than being restricted to a particular proximate distance from production to consumption (Witter and Stoll, 2017). Along these lines – and with the goal of considering market demand that affects the scalability of seafood AFNs – this chapter’s stratified sample includes an array of locations that are of varying size and varying distance to the coast (or the point of seafood harvest/production). Sample locations with populations of less than 150,000 inhabitants were considered to be small, locations with populations of 150,000 to two million inhabitants were considered to be medium-sized, and locations with populations greater than two million inhabitants were considered to be large. Further, locations situated 100 kilometres (km) or less from the coast were considered to be coastal, while those situated more than 100 km from the coast were considered to be non-coastal.

Table 8. Sample locations.

<table>
<thead>
<tr>
<th>Province(s)</th>
<th>Location(s)</th>
<th>Category</th>
<th>Sample (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>Metro Vancouver</td>
<td>Large, coastal</td>
<td>451</td>
</tr>
<tr>
<td>British Columbia</td>
<td>Capital Regional District, Nanaimo Regional District</td>
<td>Medium, coastal</td>
<td>132</td>
</tr>
<tr>
<td>British Columbia</td>
<td>Comox Valley Regional District, Strathcona Regional District, Cowichan Valley Regional District, Alberni-Clayoquot Regional District, Mount Waddington Regional District, Powell River Regional District, Skeena-Queen Charlotte Regional District, Central Coast Regional District</td>
<td>Small, coastal</td>
<td>50</td>
</tr>
<tr>
<td>British Columbia</td>
<td>Kelowna, Kamloops, Prince George, Fort St. John</td>
<td>Small, non-coastal</td>
<td>148</td>
</tr>
<tr>
<td>Alberta, Saskatchewan, Manitoba</td>
<td>Calgary, Saskatoon, Winnipeg, Edmonton, Regina</td>
<td>Medium, non-coastal</td>
<td>742</td>
</tr>
</tbody>
</table>

37 As an example, one seafood AFN based in Vancouver, BC has expanded its business to serve several of the markets across Canada that are included in Table 8 (Skipper Otto, 2019a).
<table>
<thead>
<tr>
<th>Province(s)</th>
<th>Location(s)</th>
<th>Category (location size, coastal proximity)</th>
<th>Sample (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ontario</strong></td>
<td>Toronto</td>
<td>Large, non-coastal</td>
<td>483</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>2006</td>
</tr>
</tbody>
</table>

Specifically, the following optimal allocation formula (Statistics Canada, 2010) was used to calculate the minimum sample size for each of the six stratum locations, where $N = \text{population}$, $v = \text{variance}$, and $c = \text{cost per observation}^{38}$:

$$n_i = \frac{N_i s_i}{\sqrt{c_i}} \times 1000$$

The survey was administered online between April 10 and May 16, 2019 by Qualtrics, an aggregator of market research panels. Potential respondents were randomly selected by panel operators from the pool of panel members who were highly likely to qualify for the survey (i.e., they resided in the targeted locations). These potential respondents were recruited through email invitations, which did not include specific survey details in order to reduce selection bias. Consent was attained through existing agreements between panel organizers and participants, and through a consent statement at the beginning of the survey questionnaire. Through survey branching, responses were gathered from three categories of individuals: those who currently purchase seafood, those who do not currently purchase (but do consume) seafood, and those who neither purchase nor consume seafood (see Figure 5).

Data quality was enhanced through several measures. Respondent locations were validated through IP addresses and screening questions within the questionnaire, and duplicate

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38 For each stratum, population ($N$) was informed by 2016 census data from Statistics Canada, cost per observation ($c$) was estimated by the survey delivery company (Qualtrics), and estimated variance ($v$) was extrapolated from research results from a comparative survey (Murray, Wolff and Patterson, 2017).
responses were averted through deduplication technology. A ‘speeding’ restriction was also incorporated: responses from seafood purchasers (for whom the questionnaire was most extensive) who spent less than 35% of the estimated response time completing the survey were not recorded. Of the total recorded responses (n=2183), some responses (n=179) were excluded from analysis due to survey non-completion, incorrect locations, inconsistent or nonsensical answers, and/or ‘straight lining’ across questions (Statistics Canada, 2010; Qualtrics, 2019). Within the final dataset (n=2006), the target sample size (as calculated through the optimal allocation formula) was met or exceeded within each stratum.

Demographic information was also gathered from survey respondents (see Table 9). However, targeted sampling for specific demographic categories (other than respondent location, as described above) did not occur.

Table 9. Respondent demographics.

<table>
<thead>
<tr>
<th></th>
<th>Survey (% of sample)</th>
<th>Canada (% of population)³⁹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>59.3</td>
<td>50.9</td>
</tr>
<tr>
<td>Male</td>
<td>39.7</td>
<td>49.1</td>
</tr>
<tr>
<td>Trans</td>
<td>0.4</td>
<td>Not available</td>
</tr>
<tr>
<td>Other</td>
<td>0.2</td>
<td>Not available</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>0.3</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 or younger</td>
<td>2.0</td>
<td>22.4</td>
</tr>
<tr>
<td>20-29</td>
<td>14.2</td>
<td>12.9</td>
</tr>
<tr>
<td>30-39</td>
<td>19.3</td>
<td>13.1</td>
</tr>
<tr>
<td>40-49</td>
<td>15.7</td>
<td>13.1</td>
</tr>
<tr>
<td>50-59</td>
<td>18.8</td>
<td>15.1</td>
</tr>
<tr>
<td>60-69</td>
<td>18.8</td>
<td>12.1</td>
</tr>
<tr>
<td>70 and older</td>
<td>11.2</td>
<td>11.3</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>19.1</td>
<td>44.8</td>
</tr>
<tr>
<td>College or technical school</td>
<td>28.8</td>
<td>29.2</td>
</tr>
<tr>
<td>Some university or undergraduate degree</td>
<td>34.5</td>
<td>18.3</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>17.6</td>
<td>7.7</td>
</tr>
<tr>
<td><strong>Household income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>11.0</td>
<td>9.7</td>
</tr>
</tbody>
</table>

³⁹ Demographic information for the Canadian population was taken from 2016 national census data (Statistics Canada, 2019).
<table>
<thead>
<tr>
<th>Income Range</th>
<th>Survey (% of sample)</th>
<th>Canada (% of population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,000-$39,999</td>
<td>18.2</td>
<td>16.7</td>
</tr>
<tr>
<td>$40,000-$59,999</td>
<td>19.1</td>
<td>16.1</td>
</tr>
<tr>
<td>$60,000-$79,999</td>
<td>14.6</td>
<td>13.7</td>
</tr>
<tr>
<td>$80,000-$99,999</td>
<td>15.1</td>
<td>11.2</td>
</tr>
<tr>
<td>More than $100,000</td>
<td>22.0</td>
<td>32.4</td>
</tr>
</tbody>
</table>

5.2.3 Data analysis

Following data cleaning (described in the previous section), survey responses were analyzed in SPSS version 26. Descriptive statistics were performed for the chapter’s main research areas (i.e., seafood purchasing behaviors, attitudes and opinions, and WTP). Survey data was not weighted for demographic representation during analysis. Spearman two-tailed tests were performed to test associations between ordinal response variables and demographic variables (including age, income, education, location size, and coastal proximity). To do so, ‘string’ ordinal variables were recoded numerically in an ascending order matching their rank order. For example, for the demographic variable ‘coastal proximity’, locations greater than 100 km from the coast were coded as ‘1’ and those less than or equal to 100 km from the coast were coded as ‘2’. For one ordinal response variable – ‘availability of seafood features’ – a response category (“not sure”) was excluded from Spearman analysis because it did not fit the ordered ranking for that variable. As per Cohen (1988), correlation effect size was considered to be small at $r = 0.1$, medium at $r = 0.3$, and large at $r = 0.5$ (Cohen, 1988). Results of the uni- and bi-variate analyses are reported in the following section.

5.3 Results

5.3.1 Preferences

5.3.1.1 Behaviors

The survey recorded respondents’ seafood purchasing behaviors. Within the sample (n=2006), the majority of respondents (86%) reported having purchased seafood for consumption within their household during the last year. Of these household seafood purchasers (n=1732), almost all (97%) stated that they purchase seafood at a grocery store,
while fewer purchased it from seafood shops or fish markets (29%), bought seafood online (2%), or purchased it from other outlets (4%) such as farmer’s markets, direct sales, meal subscription services, or other types of stores (e.g., convenience, ethnic, drug, meat, discount, department, wholesale). Household seafood purchasers bought seafood products in a variety of forms, with the largest number (80%) stating that they bought seafood frozen, while some reported buying it fresh (70%) or canned (69%), and fewer reported purchasing smoked (30%), pre-prepared (8%), or other product forms (1%), such as cooked, dried, candied, or salted seafood.

The remainder of respondents reported purchasing seafood only within restaurants or other food service establishments (but not for consumption within their households) (3%), consuming unpurchased seafood (e.g., that they or a family member or friend had caught) within their households (1%), or not purchasing or consuming seafood at all (9%). Within the latter category of respondents (n=180), several reasons for not consuming seafood were provided, including disliking the taste (57%), expensive pricing (23%), health reasons (22%), environmental impacts (19%), inconvenient preparation (11%), lack of availability (5%), and “other” reasons (25%) such as vegetarian or vegan diets, ethical concerns, allergies, and difficulty accessing fresh seafood.

Respondents highlighted a variety of seafood species that they purchase or consume, with salmon, tuna, and shrimp/prawn frequently purchased or consumed by the largest number of respondents (see Figure 6). Within the “other” seafood category, respondents described a wide variety of additional seafood species that they purchase or consume, including freshwater fish such as trout, perch, walleye, pickerel, and goldeneye; marine fish such as arctic char, sablefish, hake, pollock, haddock, rockfish, anchovy, smelt, eel, shark, snowfish, jacks, sole, sea bass, sea bream, saury, mackerel, pompano, mahi mahi, swordfish, grouper, catfish, snapper, and milkfish; invertebrates such as squid, octopus,

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40 This figure refers to those respondents who only purchase seafood in restaurants or food service establishments. It is recognized that a portion of those respondents (86%) who reported purchasing seafood for consumption in their households likely purchase seafood at restaurants as well. However, this was not a focus of the survey.
jellyfish, sea cucumber, sea urchin, sea snail, mussel, scallop, abalone, conch, and crayfish; and other seafood such as fish roe, seaweed, and processed seafood products (e.g., surimi).

The largest number of respondents were occasional seafood purchasers (47%), slightly fewer were frequent seafood purchasers (43%), and the remainder had not purchased seafood within the last year (10%). Amongst those who purchased seafood (n=1800), the majority (58%) stated that they were sometimes willing to substitute their preferred seafood for other types, while fewer stated that they were rarely (21%), always (13%), or never (8%) willing to do so.

5.3.1.2 Attitudes and opinions

Seafood purchasers within the sample (n=1800) were also asked about their attitudes and opinions related to seafood products. For example, they were asked about their level of agreement with a series of statements related to seafood (see Figure 7).

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41 Respondents were considered to be frequent seafood purchasers if they stated that they typically purchased at least one type of seafood two to three times per month or more frequently.
Some patterns emerged from the data, particularly when viewed from a value chain perspective. To begin, there was a degree of ambiguity at the harvesting end of the seafood value chain. Specifically, the majority of respondents neither agreed nor disagreed that smaller-scale seafood production is more sustainable than larger-scale production (Figure 7, #1), or that seafood harvesters in Canada are paid fairly (Figure 7, #3). In addition, while
very few respondents disagreed\textsuperscript{42} with preferring wild over farmed seafood, several also stated that they neither agreed nor disagreed with having this preference (Figure 7, #2).

Issues surrounding boat to fork traceability were also highlighted. For example, less than half of respondents agreed that information is typically available about the geographic origin of seafood products (Figure 7, #7), that it is easy to access seafood products from Canada (Figure 7, #8) or their local region (Figure 7, #9), and that it is easy to know whether or not a seafood product is sustainable (Figure 7, #5). Along these lines, more than 70\% of respondents agreed that official certification programs are important for proving the sustainability of a seafood product (Figure 7, #4). Further, just over half of respondents stated that information is typically available about which seafood species they are purchasing (Figure 7, #6).

At the consumption end of the value chain, the largest number of respondents disagreed with the statement that seafood is affordable (Figure 7, #11), yet many found seafood easy to prepare (Figure 7, #12). Many also stated that high quality seafood is readily available where they live (Figure 7, #10). Respondents also emphasized the importance of specific seafood product attributes. For example, more than 70\% said that species type is the most important factor to them when making seafood consumption decisions (Figure 7, #13), and preferred fresh over frozen seafood (Figure 7, #14). Despite widespread agreement that seafood is a healthy food choice (Figure 7, #15), more than half of the respondents also noted concerns over possible food safety issues associated with seafood (Figure 7, #16).

In addition to the abovementioned agreement statements, respondents were asked about the level of importance of nine specific product features (outlined in Table 7) when they purchase seafood (see Figure 8).

\textsuperscript{42} In describing the results outlined in Figure 7, agreement with a statement is interpreted to include both the “strongly agree” and “somewhat agree” response categories, while disagreement with a statement is interpreted to include both the “somewhat disagree” and “strongly disagree” response categories.
In a separate question, respondents were asked to rank these features in terms of importance. On average, this ranking of features followed the same pattern as the levels of importance highlighted in Figure 8. To begin, the largest number of respondents stated that taste, appearance, and/or freshness was the most important feature amongst the options provided (32%), followed by affordability (20%), accurate product information (17%), and health benefits (14%). Fewer respondents stated that sustainability (5%), preferred production method (wild or farmed) (5%), local or domestic origin (4%), convenience of meal preparation (3%), or economic benefits to harvesters and their communities (1%) was the most important seafood product feature. Other than the small number of respondents ranking convenience as most important to them, the abovementioned results suggest a prioritization of consumer-facing seafood features – or those that customers interact with directly – above features related to the harvesting end of the value chain. In addition, almost all respondents (97%) stated that their top ranked features were important for all types of seafood, rather than for specific species.

Respondents were also asked about the availability of the abovementioned product features where they purchase seafood (see Figure 9).
The largest number of respondents indicated poor or fair availability of affordable seafood. Seafood features with good or excellent perceived availability were more so associated with the consumption end of the seafood value chain (e.g., health benefits; taste, appearance, and/or freshness; and convenience of meal preparation), while uncertainty around availability (indicated by the response “not sure”) was more so linked to features associated with seafood harvesting (e.g., economic benefits to harvesters and their communities; sustainability; preferred production method; and local or domestic origin). Overall, when asked to rank their level of satisfaction (on a scale of 1 to 10) with seafood availability where they currently shop, respondents noted decent levels of satisfaction, with similar responses amongst household seafood purchasers (av = 7.0, s.d. = 1.9) and those who only purchased seafood at restaurants (av = 6.9, s.d. = 2.1).

### 5.3.1.3 Willingness to pay

The survey assessed willingness to pay (WTP) for the product features highlighted in Figures 8 and 9 among the sample’s seafood purchasers (n=1800) (see Figure 10).

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43 Respondents were not asked about their willingness to pay for ‘affordable’ seafood, and this feature is therefore excluded from Figure 10.
Willingness to pay for seafood features. 

Taste, appearance, and/or freshness had the highest WTP, whereas the majority of respondents were not willing to pay more for accurate product information or convenience of meal preparation. Interestingly, despite many respondents previously indicating importance of the assessed features, the largest number of responses for each feature (other than taste, appearance, and/or freshness) fell under the category of ‘not willing to pay more’ (“0% more”). Of those respondents indicating WTP for at least one feature (n=1511), almost all (95%) stated this was relevant for all types of seafood, rather than for specific species.

5.3.2 Demographic relationships with preferences

Through Spearman two-tailed tests, relationships between demographic variables and some of the abovementioned seafood purchasing preferences were assessed. The selection of response variables for this Spearman analysis followed two steps. First, those response variables with ordinal response categories were selected for analysis, while those with nominal response categories were excluded. Second, for the response variables measuring the importance, perceived availability, and WTP of specific product features (see Figures 8-10), only the five key features highlighted through seafood AFNs (see Table 7) were selected for Spearman analysis.
Statistically significant associations were observed between demographic variables and some of the assessed response variables (see Tables 10 and 11). However, correlations with at least a small effect size ($r = 0.1$) (Cohen, 1988) were observed between fewer variables, and are described below.

**Table 10.** Spearman correlation coefficients ($r$) for respondent seafood purchasing preferences and demographic variables.

<table>
<thead>
<tr>
<th>Preference</th>
<th>Demographic variable</th>
<th>Age</th>
<th>Education</th>
<th>Income</th>
<th>Location size</th>
<th>Coastal proximity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase frequency</td>
<td>Age</td>
<td>-.080**</td>
<td>.129**</td>
<td>.183**</td>
<td>.152**</td>
<td>.047*</td>
</tr>
<tr>
<td>Willingness to substitute</td>
<td>Age</td>
<td>-.186**</td>
<td>.116**</td>
<td>.111**</td>
<td>.101**</td>
<td>.049*</td>
</tr>
<tr>
<td>Level of importance of alternative features</td>
<td>Demographic variable</td>
<td>Age</td>
<td>Education</td>
<td>Income</td>
<td>Location size</td>
<td>Coastal proximity</td>
</tr>
<tr>
<td>Accurate product information</td>
<td>Age</td>
<td>.004</td>
<td>.000</td>
<td>.012</td>
<td>.074**</td>
<td>.073**</td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td>Age</td>
<td>.039</td>
<td>-.016</td>
<td>-.007</td>
<td>.028</td>
<td>.104**</td>
</tr>
<tr>
<td>Benefits to harvesters</td>
<td>Age</td>
<td>.026</td>
<td>-.040</td>
<td>-.013</td>
<td>.012</td>
<td>.061**</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Age</td>
<td>.021</td>
<td>-.002</td>
<td>.037</td>
<td>-.015</td>
<td>.050*</td>
</tr>
<tr>
<td>Taste, appearance, freshness</td>
<td>Age</td>
<td>.115**</td>
<td>-.039</td>
<td>.048*</td>
<td>-.013</td>
<td>.007</td>
</tr>
<tr>
<td>Perceived availability of alternative features</td>
<td>Demographic variable</td>
<td>Age</td>
<td>Education</td>
<td>Income</td>
<td>Location size</td>
<td>Coastal proximity</td>
</tr>
<tr>
<td>Accurate product information</td>
<td>Age</td>
<td>-.101**</td>
<td>-.014</td>
<td>.022</td>
<td>.022</td>
<td>.054*</td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td>Age</td>
<td>-.020</td>
<td>.005</td>
<td>.045</td>
<td>.041</td>
<td>.147**</td>
</tr>
<tr>
<td>Benefits to harvesters</td>
<td>Age</td>
<td>-.137**</td>
<td>-.004</td>
<td>.028</td>
<td>.074**</td>
<td>.079**</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Age</td>
<td>-.099**</td>
<td>-.031</td>
<td>.005</td>
<td>.020</td>
<td>.019</td>
</tr>
<tr>
<td>Taste, appearance, freshness</td>
<td>Age</td>
<td>.021</td>
<td>-.013</td>
<td>.029</td>
<td>.066**</td>
<td>.082**</td>
</tr>
<tr>
<td>Level of WTP for alternative features</td>
<td>Demographic variable</td>
<td>Age</td>
<td>Education</td>
<td>Income</td>
<td>Location size</td>
<td>Coastal proximity</td>
</tr>
<tr>
<td>Accurate product information</td>
<td>Age</td>
<td>-.194**</td>
<td>.026</td>
<td>-.053*</td>
<td>.034</td>
<td>-.001</td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td>Age</td>
<td>-.174**</td>
<td>.037</td>
<td>.017</td>
<td>.010</td>
<td>.046</td>
</tr>
<tr>
<td>Benefits to harvesters</td>
<td>Age</td>
<td>-.160**</td>
<td>.026</td>
<td>-.022</td>
<td>.033</td>
<td>.000</td>
</tr>
</tbody>
</table>
Respondent age yielded more correlations with seafood purchasing preferences than other demographic variables. To begin, age was found to be positively correlated with the level of importance ascribed to the taste, appearance, and/or freshness of seafood products \((r = .115**)\) (Table 10), and with the perception that high quality seafood is readily available where respondents purchase seafood \((r = .106**)\) (Table 11, #10). There were also positive correlations between respondent age and the perception that seafood is healthy \((r = .160**)\) (Table 11, #15) and easy to prepare \((r = .188**)\) (Table 11, #12). On the other hand, respondent age was negatively correlated with: willingness to substitute between seafood products \((r = -.186**)\) (Table 10); perceived availability of accurate seafood product information \((r = -.101**)\) (Table 10), seafood that provides economic benefits to harvesters and communities \((r = -.137**)\) (Table 10), and/or local seafood products \((r = -.101**)\) (Table 11, #9); ease of knowing whether seafood is sustainable \((r = -.113**)\) (Table 11, #5); and believing that small-scale seafood production is more sustainable than large-scale production \((r = -.151**)\) (Table 11, #1). Further, there was a negative correlation between age and WTP for alternative features, both in terms of the number of alternative features for which a respondent was willing to pay more \((r = -.168**)\) (Table 10) and specific levels of WTP for each alternative feature\(^{44}\).

\(^{44}\) Specifically, age was negatively correlated with WTP for accurate product information \((r = -.194**)\), local or domestic origin \((r = -.174**)\), benefits to harvesters and their communities \((r = -.160**)\), sustainability \((r= -.188**)\), and taste, appearance, and/or freshness \((r = -.188**)\) (see Table 10).
Correlations were also observed between other demographic variables and seafood purchasing preferences. For example, there were positive correlations between seafood purchase frequency (Table 10) and education \((r = .129**)\), income \((r = .183**)\), and location size \((r = .152**)\). Whereas willingness to substitute between seafood products (Table 10) was negatively correlated with age \((r = -.186**)\), it was positively correlated with education \((r = .116**)\), income \((r = .111**)\), and location size \((r = .101**)\). Further, there were positive correlations between the perceived availability of high-quality seafood (Table 11, #10) and both location size \((r = .173**)\) and living in proximity to the coast \((r = .242**)\). There were also positive correlations between living in proximity to the coast and the perceived availability \((r = .147**)\)\(^{45}\) and importance \((r = .104**)\) of local or domestic seafood products (Table 10). Coastal proximity was also positively correlated with preferring wild caught over farmed seafood \((r = .156**)\) (Table 11, #2).

**Table 11.** Spearman correlation coefficients \((r)\) for respondent statements related to seafood products and demographic variables.

<table>
<thead>
<tr>
<th>Statements related to seafood products</th>
<th>Demographic variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>My perception is that smaller-scale seafood production is more sustainable than larger scale production</td>
<td>Age (-.151**)</td>
</tr>
<tr>
<td></td>
<td>Education (.085**)</td>
</tr>
<tr>
<td></td>
<td>Income (.035)</td>
</tr>
<tr>
<td></td>
<td>Location size (.052*)</td>
</tr>
<tr>
<td></td>
<td>Coastal proximity (.069**)</td>
</tr>
<tr>
<td>I prefer wild-caught seafood over farmed seafood</td>
<td>Age (.085**)</td>
</tr>
<tr>
<td></td>
<td>Education (-.020)</td>
</tr>
<tr>
<td></td>
<td>Income (.032)</td>
</tr>
<tr>
<td></td>
<td>Location size (-.016)</td>
</tr>
<tr>
<td></td>
<td>Coastal proximity (.156**)</td>
</tr>
<tr>
<td>Individual fishers and producers in Canada are paid fairly for the seafood they harvest</td>
<td>Age (-.095**)</td>
</tr>
<tr>
<td></td>
<td>Education (.015)</td>
</tr>
<tr>
<td></td>
<td>Income (.036)</td>
</tr>
<tr>
<td></td>
<td>Location size (.076**)</td>
</tr>
<tr>
<td></td>
<td>Coastal proximity (.057*)</td>
</tr>
<tr>
<td>Seafood should have official certification (e.g., Marine Stewardship Council) to prove that it is sustainable</td>
<td>Age (-.052*)</td>
</tr>
<tr>
<td></td>
<td>Education (.024)</td>
</tr>
<tr>
<td></td>
<td>Income (.025)</td>
</tr>
<tr>
<td></td>
<td>Location size (.057*)</td>
</tr>
<tr>
<td></td>
<td>Coastal proximity (.048*)</td>
</tr>
<tr>
<td>It is easy to know whether or not a seafood product is sustainable</td>
<td>Age (-.113**)</td>
</tr>
<tr>
<td></td>
<td>Education (-.048*)</td>
</tr>
<tr>
<td></td>
<td>Income (.005)</td>
</tr>
<tr>
<td></td>
<td>Location size (.014)</td>
</tr>
<tr>
<td></td>
<td>Coastal proximity (-.009)</td>
</tr>
<tr>
<td>Information is typically available about which seafood species I am purchasing</td>
<td>Age (-.040)</td>
</tr>
<tr>
<td></td>
<td>Education (-.016)</td>
</tr>
<tr>
<td></td>
<td>Income (.009)</td>
</tr>
<tr>
<td></td>
<td>Location size (.047*)</td>
</tr>
<tr>
<td></td>
<td>Coastal proximity (.058*)</td>
</tr>
</tbody>
</table>

\(^{45}\) Similarly, living close to the coast was positively correlated with the following agreement statements: “I find it easy to access seafood products from Canada” \((r = .108**)\) (Table 11, #8) and “I find it easy to access seafood products from my local region” \((r = .257**)\) (Table 11, #9).
### Statements related to seafood products

<table>
<thead>
<tr>
<th>Statements related to seafood products</th>
<th>Demographic variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Information is typically available about the geographic origin of a seafood product</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I find it easy to access seafood products from Canada</td>
<td></td>
</tr>
<tr>
<td>9. I find it easy to access seafood products from my local region</td>
<td></td>
</tr>
<tr>
<td>10. High quality seafood is readily available where I live</td>
<td></td>
</tr>
<tr>
<td>11. Seafood is affordable</td>
<td></td>
</tr>
<tr>
<td>12. Seafood is easy to prepare</td>
<td></td>
</tr>
<tr>
<td>13. Type of seafood (e.g., species) is the most important factor to me when choosing what seafood to eat</td>
<td></td>
</tr>
<tr>
<td>14. I prefer fresh seafood over frozen seafood</td>
<td></td>
</tr>
<tr>
<td>15. Seafood is a healthy food choice</td>
<td></td>
</tr>
<tr>
<td>16. I’m concerned with possible food safety issues and/or health risks associated with seafood</td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

### Discussion

This chapter explored seafood purchasing behaviors amongst consumers in Canada. Across each survey stratum – including coastal and non-coastal areas, and small, medium, and large sized cities – most respondents reported purchasing seafood for their household within the last year; however, specific purchase volumes and values were not measured within the survey. There were positive correlations between seafood consumption frequency and demographic variables – for example, respondents with higher income, higher education, and/or living in larger locations were associated with more frequent seafood consumption (see Table 10). There is some overlap between these results and findings from previous research. For example, through a survey of consumers in the United
States, Jahns et al. (2014) found that those with higher incomes and education levels were more likely to consume seafood (Jahns et al., 2014). Overall, however, there is a lack of consensus on the relationship between seafood purchasing behaviours and consumer demographics (Carlucci et al., 2015; Salladarré et al., 2016; Ratliff, 2017), with patterns varying widely by location (Jensen, 2006). For example, while this research did not find a correlation of a notable effect size between seafood purchase frequency and proximity to the coast, other studies have suggested that habitual or traditional seafood consumption (Vanhonacker, Pieniak and Verbeke, 2013), such as in areas near to the coast (Verbeke and Vackier, 2005; Bemrah et al., 2008; Cardoso et al., 2013; Cisneros-Montemayor et al., 2016), can result in more frequent seafood consumption.

The survey also explored Canadian seafood purchasers’ attitudes and opinions and WTP regarding different seafood features, and consumer-facing features – or those that customers interact with directly – were found to be particularly important to respondents. For example, taste, appearance, and freshness46 ranked with the highest importance for seafood purchasers, and had the highest WTP, aligning with existing research that has found these to be important attributes and key drivers of seafood consumption (Birch, Lawley and Hamblin, 2012; Carlucci et al., 2015; Olsen, Tuu and Grunert, 2017). At the same time, among those respondents who reported not consuming seafood, disliking its taste was found to be the most commonly cited reason; this has also been highlighted as a key barrier to seafood consumption within existing literature (Carlucci et al., 2015).

Another important attribute for respondents was seafood species (see Figure 7, #13). The broader literature has also found this to be a key attribute for consumers, with species type sometimes taking precedence over other features, such as eco labels (Wessells, Johnston

46 Within a separate question, more than 70% of respondents also stated that they prefer fresh over frozen seafood (see Figure 7, #14). Existing literature has highlighted how specific preferences for fresh seafood may relate to higher perceived quality as well as difficulty using sensory cues (e.g., smell) to assess product quality in prepacked seafood (Carlucci et al., 2015; Olsen, Tuu and Grunert, 2017), or frozen seafood (Claret et al., 2012; Cardoso et al., 2013). On the other hand, frozen fish may be selected by consumers due to its convenience, availability, and lower price (Carlucci et al., 2015). While some seafood AFNs focus on providing fresh fish to customers, others have expanded to providing frozen, smoked, and/or canned products, in order to improve stability of supply and offer more choices to their customers (see Chapter 3). Some have also focused on educating consumers on how seafood that is not ‘fresh’ can still be of superior quality, such as through flash freezing at sea to produce ‘sushi grade’ seafood (Skipper Otto, 2016, 2019b; Rasor, 2017).
and Donath, 1999; Johnston and Roheim, 2006) and local origin (Witkin, Dissanayake and McClenachan, 2015), during purchasing decisions. Within this survey, the top species that were reported to be purchased were salmon, tuna, and shrimp/prawn, in alignment with previous assessments of the top consumed species in North America (which are in large part imported) (Fisheries and Oceans Canada, 2018; National Fisheries Institute, 2018). At the same time, respondents reported consuming other species as well (see page 82). It has been suggested that consumer seafood preferences in North America may be diversifying beyond staple species (National Fisheries Institute, 2018) and that those who have previously purchased less familiar, or ‘underutilized’, species may be more willing to purchase these types of species in the future (Witkin, Dissanayake and McClenachan, 2015). Along these lines, most respondents in this research stated that they are willing to substitute their preferred seafood for other types when their preferred type is unavailable. This willingness to substitute was positively correlated with education, income, and location size, and negatively correlated with age. Promoting species diversity that is aligned with seasonal and geographic abundance patterns, and shifting consumption towards ‘underutilized’ or lesser known species, are goals of many seafood AFNs (McClenachan et al., 2014; Witter and Stoll, 2017).

Seafood pricing and affordability were also highlighted as important features within the survey. Seafood purchasers placed a high importance on affordable seafood (see Figure 8), yet many stated that it only has poor or fair availability where they currently shop (see Figure 9). Expensive pricing was also the second most frequently cited reason for not consuming seafood within the survey. While some existing research has also found price perceptions to be a key barrier to seafood consumption, the extent to which this actually affects overall consumption levels is unclear (Birch and Lawley, 2012; Birch, Lawley and Hamblin, 2012; Carlucci et al., 2015) and income effects on attitudes towards seafood affordability are uncertain. For example, this chapter did not find a correlation of notable effect size between respondent income and perceptions of seafood affordability, and existing research has found that consumers who expect to pay lower prices for seafood may actually be those with higher food budgets (Hennig, 2017). This chapter also did not find strong positive correlations between income and WTP for ‘alternative’ seafood features. At the same time, prices for seafood can vary widely (Carlucci et al., 2015; Crona et al.,
Convenience of seafood preparation was another consumer-facing attribute emphasized through the survey. Many respondents found seafood easy to prepare (see Figure 7, #12), and noted good or excellent availability of convenient seafood products where they shop (see Figure 9). At the same time, the largest number of respondents noted that they were not willing to pay more for this particular feature (see Figure 10). Further, inconvenient preparation was infrequently mentioned as a reason for not consuming seafood. Similar to this survey (see Figure 8 and Table 11, #12), previous research has found that convenience attributes are of moderate importance to seafood purchasers when compared with the top ranked attributes of quality and value for money (Olsen, Tuu and Grunert, 2017), but the perceived inconvenience of seafood preparation is higher amongst younger groups (Myrland et al., 2000; Olsen, 2003; Brunsø et al., 2009; Sveinsdóttir et al., 2009; Altintzoglou et al., 2010; Birch and Lawley, 2012; Neale et al., 2012). While not measured within this survey, existing research has also found that some species and product forms – such as frozen and canned seafood – are generally considered more convenient to prepare (Carlucci et al., 2015). This higher perceived convenience of certain seafood products could be useful for seafood AFNs to highlight within their marketing mix – particularly to younger consumers – as they look to expand their customer bases.

Health factors related to seafood were also highlighted within the survey. In line with findings from existing research (Verbeke et al., 2005; Pieniak et al., 2008; Carlucci et al., 2015), survey respondents appeared to simultaneously perceive health benefits and health risks associated with seafood. To begin – and similar to findings on the importance of seafood health benefits within previous studies on consumer behaviour (Olsen, 2004; Brunsø et al., 2009; Vanhonacker, Pieniak and Verbeke, 2013) – almost all respondents stated that seafood is a healthy food choice (see Figure 7, #15), and that this is an important consideration in their purchasing decisions (see Figure 8). However, respondents’ WTP for this feature was moderate (see Figure 10), and healthy seafood options were generally considered to have good or excellent availability where respondents currently shop (see Figure 9). This may be due to health benefits being perceived as an intrinsic quality of
seafood, particularly following information campaigns and dietary recommendations focused on the healthiness of seafood (Jahns et al., 2014; Carlucci et al., 2015; Love et al., 2017). At the same time, respondents also noted concerns with possible food safety issues or health risks associated with seafood (See Figure 7, #16). Health reasons were also the third most commonly cited reason for not consuming seafood. Consumer perceptions of seafood health risks can present both opportunities and challenges to seafood AFNs as they work to differentiate their products within the marketplace. On the one hand, WTP has been found to be higher for seafood products that amplify consumer trust where food safety concerns are prevalent (such as for eco-labelled seafood in China) (Xu et al., 2012). On the other hand, it has been found that imported seafood may be favored over local products where misconceptions around health risks are present (such as for local shellfish species in the United Kingdom) (Boase et al., 2019).

Respondents also ranked accurate product information – or tracing seafood attributes such as species, origin, and production method along the value chain from harvest to consumer – as important to them (see Figure 8), yet the majority were not willing to pay more for this feature (see Figure 10). At the same time, they also highlighted issues with boat to fork traceability, including moderate availability of seafood product information related to geographic origin, species, and sustainability (see Figure 7). To this point, there have been ongoing reports of persistent seafood mislabeling and the presence of ‘imposter fish’ within the marketplace in several countries (Marko et al., 2004; Jacquet and Pauly, 2008; Logan et al., 2008; Fox et al., 2018). It has been suggested that further regulation is required to deal with this issue (Hu et al., 2018), yet in the meantime seafood AFNs are carving a niche by offering traceable products to consumers, such as through “knowing your fishermen” (LocalCatch.org, 2016a). However, these traceability offerings tend to be less formalized than other options available within the marketplace, such as eco-labelled seafood (Barendse et al., 2019). Relatedly – and similar to previous survey data suggesting consumer preferences toward independent verification of seafood sustainability claims

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47 It is unclear the extent to which these health barriers to seafood consumption expressed by respondents are connected to pre-existing allergies, or choices to pursue vegan or vegetarian diets, versus broader perceived food safety risks associated with seafood.
(Marine Stewardship Council, 2016) – many survey respondents stated that official certification is important for proving seafood sustainability (see Figure 7, #4).

There was less priority given to features at the harvesting end of seafood value chains. For example, few respondents ranked features related to seafood harvesting as most important to them (see page 86). However, WTP for such features – e.g., local or domestic origin, preferred production method, sustainability, and economic benefits to harvesters and their communities – was moderate (see Figure 10). Some ambiguity in attitudes and opinions related to seafood harvesting was also observed: several respondents neither agreed nor disagreed with statements related to seafood sustainability, different production methods, and economic benefits for seafood harvesters (see Figure 7) and were not sure about the availability of these features (see Figure 9). This may be expected to some degree, insofar as “attributes related to a [seafood] product’s production are often impossible for the individual consumer to assess” (Wessells, Johnston and Donath, 1999, pg. 1084).

In contrast to these findings, existing research has suggested strong consumer preferences toward harvest-related seafood features (Carlucci et al., 2015). For example, domestic seafood production has been found to be a preferred attribute to imported products in some studies (Jaffry, 2005; Davidson et al., 2012; Claret et al., 2014). In particular, consumers have been found to have high WTP for seafood labelling denoting local origin (Ropicki, Larkin and Adams, 2010; McClenachan, Dissanayake and Chen, 2016). WTP for sustainable seafood has also been evidenced in several studies (Johnston et al., 2001; Roheim, Asche and Santos, 2011; Xu et al., 2012; McClenachan, Dissanayake and Chen, 2016; Salladarré et al., 2016; Zander and Feucht, 2018), as have preferences toward specific seafood production methods (e.g., wild caught or farmed) (Drake et al., 2006; O’Dierne et al., 2006; Honkanen and Olsen, 2009; Vanhonacker et al., 2011; Davidson et al., 2012; Roheim, Sudhakaran and Durham, 2012; Cardoso et al., 2013; Nguyen et al., 2015; Zhou, Hu and Huang, 2016). However, consumer ranking of different product attributes, as well as perceived coupling between attributes (Johnston and Roheim, 2006; 48)

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48 For example, in some studies, local seafood labelling has also been found to have higher relative importance to consumers than other product attributes (e.g., sustainability, health benefits) (Rudd, Pelletier and Tyedmers, 2011; Witkin, Dissanayake and McClenachan, 2015), with such preferences demonstrated not only in niche markets (Fonner and Sylvia, 2015), but also more broadly (Brécard et al., 2009; Claret et
Brécard et al., 2009; Murray, Wolff and Patterson, 2017), can follow diverse patterns. For example, preferences for different seafood production methods (e.g., wild or farmed) may be connected to perceptions of higher environmental sustainability (Honkanen and Olsen, 2009; Vanhonacker et al., 2011; Claret et al., 2012, 2014; Davidson et al., 2012; Cardoso et al., 2013; Zhou, Hu and Huang, 2016), while preferences toward local or domestic seafood may be related to perceived connections with social sustainability (McClenachan, Dissanayake and Chen, 2016; Zander and Feucht, 2018), better taste or freshness (McClenachan, Dissanayake and Chen, 2016; Zander and Feucht, 2018), or stronger regulatory regimes49 (Zander and Feucht, 2018). Seafood AFNs may wish to consider these perceived correlations between different seafood product attributes when choosing how to emphasize their key features during marketing.

In this survey, there were associations observed between certain demographic variables and harvesting-related preferences, which may provide insight into how seafood AFNs could specifically target marketing of their harvest-related attributes to different groups. For example, in alignment with some existing research (e.g., Cardoso et al., 2013), coastal survey respondents were found to be associated with preferring wild-caught over farmed seafood (see Table 11, #2). In addition, coastal respondents ascribed higher importance to local or domestic seafood than inland respondents (see Table 10). While the majority of respondents did not find it easy to access this type of seafood (see Figure 7, #9), those living closer to the BC coast perceived better access (see Table 11, #9). Whereas such enhanced availability of local seafood for coastal dwellers might be expected (Bose and Brown, 2000; Myrland et al., 2000; Welch et al., 2002; McManus et al., 2012), there have also been reports of access difficulties in some coastal locations (both rural and urban), which is motivating exploration of the potential for seafood AFNs in such regions (Lowitt, 2013; Talley, Warde and Venuti, 2016; DesRivières, Chuenpagdee and Mather, 2017; Ahmed, 2018). Existing research has also demonstrated differing levels of WTP for seafood’s geographic origin between locations (Witkin, Dissanayake and McClenachan, al., 2012). Other studies have found preferences towards wild over farmed seafood to not rank as highly when compared with preferences for other seafood product features (Claret et al., 2012; Carlucci et al., 2015). 49 Ethnocentrism and familiarity have also been identified as drivers of consumer preferences towards local or domestic seafood (Brécard et al., 2009; Claret et al., 2012).
2015; Zander and Feucht, 2018), however this survey did not find such associations for the location categories assessed (see Table 10).

This chapter offers several insights into the market feasibility of seafood AFNs. First, harvest-oriented seafood attributes had moderate WTP within this consumer survey but were not ranked highly in terms of importance when compared with consumer-facing features such as taste, appearance, and freshness. It is therefore suggested that seafood AFNs prominently highlight their high-quality seafood offerings within their marketing mix. This relates to Murray et al.’s (2017) recommendation to keep consumers’ highly ranked seafood features – such as sensory and health attributes – in mind when looking to influence consumer behaviour towards objectives such as sustainable seafood purchasing (Murray, Wolff and Patterson, 2017).

Second, regional and demographic differences exhibited through this research suggest potential areas for targeted marketing for seafood AFNs. To begin, consumers with higher educations and incomes and those living in larger cities were found to purchase seafood more often and have higher willingness to substitute between seafood species. Wealthy and educated consumers have been found to be regular participants in AFNs (Nonini, 2013; Vassalos, Gao and Zhang, 2016; Galt et al., 2017), and larger locations are often targeted by seafood AFNs due to their market size (Knutson, 2017). These demographic groups will likely continue to represent important target markets for seafood AFNs. Further, interesting associations between coastal proximity and seafood preferences emerged from the survey results. Those living further from the coast (e.g., further from where marine seafood is harvested) perceived lower availability of seafood that is high quality and of local or domestic origin, suggesting market opportunities in inland markets for AFNs to provide seafood highlighting product origin and quality. Last, associations between consumer age and seafood preferences were also noted. Younger consumers were found to have higher WTP for ‘alternative’ seafood features, as well as indicating higher willingness to substitute between species, suggesting they could be an important market for growing seafood AFNs. At the same time, older consumers exhibited positive attitudes towards seafood – being more likely to perceive it to be healthy and easy to prepare – and emphasized the importance of seafood taste, appearance, and freshness, while also
indicating some uncertainties related to the harvesting end of seafood value chains. This could present opportunities for seafood AFNs to underscore their high quality and traceable product offerings for older market segments.

Third, targeted education and outreach efforts related to the issues that seafood AFNs aim to mitigate could help to increase consumer participation in these enterprises, as some studies have suggested that previous exposure to sustainable seafood heightens perceived importance of and WTP for this feature (Taufique et al., 2014; McClanachan, Dissanayake and Chen, 2016). Along these lines, Campbell et al. (2014) found that participants in a seafood AFN were driven by their desire not only to access high quality seafood, but also to access products that are locally harvested and help local fishing communities (Campbell et al., 2014). An interesting area for future research is the extent to which pre-exposure to fishing issues (versus primarily a desire for high quality seafood) drives consumers to join AFNs, compared to the extent to which knowledge of (and preferences for) certain seafood features are amplified through participation in the AFN itself. Overall, consumer seafood preferences are complex, and should remain a key area of consideration for growing seafood AFNs.

5.5 Conclusion

This chapter examined seafood purchasing behaviors, attitudes and opinions, and WTP for different seafood features – including those emphasized through seafood AFNs – in selected locations across Canada. The overarching aim was to explore market feasibility related to seafood AFNs, with a specific focus on enterprises based in British Columbia, Canada. The research suggests that seafood purchasers prioritize product quality attributes situated at the consumption end of the value chain, such as taste, appearance, freshness, affordability, health benefits, and seafood type. At the same time, there were issues noted with seafood product traceability, and lower priority ascribed to harvesting-related features such as sustainability, production method, and fair compensation to harvesters. Despite some degree of WTP – especially for high quality seafood – high levels of WTP were not

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50 For example, older groups perceived lower availability of local seafood and seafood that benefits harvesters and communities and found it more difficult to know whether a seafood product is sustainable (see Tables 10 and 11).
observed for the other four features highlighted through seafood AFNs. This suggests that the scalability of seafood AFNs may depend on the feasibility of offering high quality ‘alternative’ seafood products at an affordable price point, and/or continuing to tap into niche markets. Further, the results suggest that different consumer segments interact differently with the key features highlighted through seafood AFNs. For example, inland respondents perceived lower availability of local or domestic seafood, while younger respondents had higher WTP for ‘alternative’ seafood features. Such distinctions provide insight into possible growth pathways for seafood AFNs aiming to market traceable, sustainable, and high-quality seafood products that support small-scale and place-based harvesting operations.
6. Conclusion

The primary aim of this thesis is to improve understanding of the potential for alternative food networks (AFNs) to advance positive outcomes in fisheries and seafood systems, specifically through exploration of their viability and scalability. I have addressed this question through value chain analysis (VCA) in varying contexts, including the examination of specific value chains considered to be ‘alternative’ from across North America (Chapter 3); seafood value chains generally within a rural, coastal area (Chapter 4); and the consumer end of seafood value chains in Canada (Chapter 5). I introduce the thesis by describing contextual factors – such as global seafood trade, and fisheries economics and governance – with relevance to understanding the emergence of seafood AFNs. I then present my research objectives, chapter overviews, and the methods used within the thesis. This is followed by a background chapter that further describes the current state of knowledge and key research gaps related to these types of enterprises. I address my first research question by presenting the value chain structures, perceived market values and less tangible values, and challenges of seafood AFNs. Next, I highlight the potential suitability of seafood AFNs – both generally, and specific types – within a case study region. Finally, I address questions identified in my previous chapters related to the capacity of seafood AFNs to expand beyond niche markets through a survey of seafood consumers. In this concluding chapter, I (1) describe how my research results have addressed the initial research questions I posed; (2) outline the significance and contribution of this research, given current research gaps related to seafood AFNs; and (3) discuss the main limitations of the research, as well as suggested areas for future research.

6.1 How are alternative seafood networks structured, and what are their potential benefits and challenges?

Seafood AFNs have been described as having the potential to advance socio-economic and environmental sustainability, yet existing research has primarily focused on one specific type of enterprise – community supported fisheries (CSFs) (Brinson, Lee and Rountree, 2011; Campbell et al., 2014; McClenachan et al., 2014; Stoll, Dubik and Campbell, 2015; Bolton et al., 2016; Godwin et al., 2017). Through VCA of various types of seafood AFNs
across North America, I have presented a broader view and found that seafood AFNs have diverse value chain structures, yet commonly focus on promoting five key features. In particular, they aim to support (i) small-scale and (ii) place-based fishing operations, through the provision of (iii) traceable, (iv) sustainable, and (v) high-quality seafood products to customers. At the same time, I found that the key features highlighted within Chapter 3 have varying interpretations between seafood AFNs, providing flexibility to these diverse enterprises to adapt to specific value chain contexts. For example, the shared ‘place-based’ nature of seafood AFNs does not entail a specific boat to fork distance or a common definition of ‘local’ seafood. Similarly, while seafood AFNs emphasize their ‘small-scale’ nature, this can have a range of meanings – such as family fisheries, fleet or boat size, and/or catch volumes – as with the meaning of small-scale fisheries more generally (Gibson and Sumaila, 2017).

The results in this chapter suggest that seafood AFNs intend to promote specific market values along seafood value chains, at the same time as promoting broader, less tangible outcomes (see Figure 3). These intended outcomes overlap with findings from existing research on the intended benefits of CSFs (Brinson, Lee and Rountree, 2011; Campbell et al., 2014; McClenachan et al., 2014; Stoll, Dubik and Campbell, 2015; Bolton et al., 2016), confirming that similar outcomes are perceived to be produced through the wider suite of seafood AFN types. Further, this promotion of both tangible market values and less tangible values fits with conceptualizations of social enterprises (Huybrechts, 2012), or “market-based approaches to address social issues” (Kerlin, 2009, pg. 1).

By seeking to create ‘alternatives’ to ‘conventional’ businesses while continuing to participate in capitalist economies, social enterprises such as AFNs operate within a ‘hybrid’ space (Pinkerton et al., 2008; Tolley and Hall-Arber, 2015) and face distinct structural conflicts as a result (Pratt, 2009; Tregear, 2011; Alkon and Mares, 2012; Mount, 2012; Galt, 2013; Johnson, Fraser and Hawkins, 2016). To this point, Chapter 3 demonstrates how this simultaneous ‘participation and resistance’ in market-based systems creates challenges for seafood AFNs, which aim to offer different options than larger-scale seafood supply chains yet may face business challenges due to their smaller-scale
operations. Such challenges affect the viability and scalability of seafood AFNs and their value chains.

Overall, the results in Chapter 3 are aligned with findings on agricultural AFNs that have highlighted their diversity, flexibility, and hybridity (Mount, 2012), yet my findings contribute specific details within the unique context of fisheries and seafood production. In addition, my results highlight how the movement toward ‘alternatives’ in the seafood industry is similar to the land-based food sovereignty movement, in which a “transnational community of resistance” is engaged in “a collective struggle to define alternatives to the globalization of a neoliberal, highly capitalized, corporate-led model of agricultural development” (Desmarais and Wittman, 2014, pgs. 1155 and 1157). Chapter 3 also identifies research gaps related to seafood AFNs that are explored in further detail in Chapters 4 and 5.

6.2 What are the challenges and opportunities associated with alternative seafood networks in a rural, coastal value chain context?

The viability and scalability of seafood AFNs is uncertain, as noted within Chapter 3 and through existing research on agricultural AFNs (Mount, 2012; Galt, 2013; Mount and Smithers, 2014; Galt et al., 2015; Johnson, Fraser and Hawkins, 2016; Paul, 2019). Noting this research gap, I used qualitative VCA in this chapter to explore the potential applicability of seafood AFNs to further rural, coastal areas. Specifically, I focused on a case study region – the Marine Planning Partnership (MaPP) area in British Columbia (BC), Canada – where planning processes have identified goals with similarities to the intended outcomes of seafood AFNs, including promoting economic opportunities for coastal communities through sustainable, traceable seafood production (Marine Planning Partnership Initiative, 2015a, 2015d, 2015b, 2015c).

Through analysis of stakeholder perceptions related to different stages of the region’s seafood value chains (e.g., fishing, processing, distribution, and end markets), I categorized general opportunities and challenges for seafood AFNs in the MaPP region. I found value chain challenges for these types of enterprises that were reflective of broader trends in fisheries (Himes-Cornell and Hoelting, 2015; Bennett et al., 2018; Beaudreau et al., 2019;
Edwards and Pinkerton, 2020) and food systems (Kirschenmann et al., 2008; Uematsu and Mishra, 2011; Dukeshire, 2013; Fischer and Burton, 2014; Clapp, 2018; O’Meara, 2019) and with similarities to some of the driving forces categorized by literature on both land-based and seafood AFNs (Park, Mishra and Wozniak, 2014; Stoll, Dubik and Campbell, 2015; DesRivières, Chuenpagdee and Mather, 2017; Paul, 2019). At the same time, I identified several opportunities for seafood AFNs in the region (see Table 5) and highlighted how the diversity, flexibility, and hybridity of AFNs (Mount, 2012) provide further opportunities to adapt seafood AFNs to specific value chain contexts.

Furthermore, as identified through the results reported in Chapter 3, seafood AFNs can have a variety of value chain structures, and in this chapter, I highlight the potential viability of different types of seafood AFNs within the case study region. For example, barriers to accessing shoreside infrastructure such as processing and cold storage in much of the region likely present constraints for AFNs selling seafood through farmer’s markets, online sales, and other channels typically requiring an inventory of frozen, canned, and/or other product forms with longer shelf lives than fresh products. At the same time, while business types such as off-the-boat sales can facilitate fresh seafood sales, the MaPP region’s rural context and small population may limit the consumer base in the area and make purchase volumes uncertain. Hence, this chapter has identified questions related to the consumer end of seafood value chains and the level of market demand for seafood from AFNs, and these questions are assessed in further detail in Chapter 5.

6.3 How might consumer preferences related to specific seafood features affect the market feasibility of alternative seafood networks?

Addressing questions identified in the previous chapters of the thesis related to the capacity of seafood AFNs to expand beyond niche markets and broaden impacts, Chapter 5 explores the market feasibility of expanding these enterprises in Canada. Specifically, I used an online survey to assess the potential demand for seafood products supplied through AFNs, with a focus on the five key features identified through Chapter 3, alongside other important features highlighted within the seafood marketing literature (e.g., price,
convenience, health factors, and production method) (Davidson et al., 2012; Carlucci et al., 2015).

In terms of seafood purchasing behaviors, I found that seafood is primarily purchased at grocery stores, whereas it was less often purchased at seafood shops or online, where seafood AFNs often target their sales (Market Your Catch, 2019). Purchased primarily frozen, fresh, and canned, the top three species consumed by survey respondents aligned with the top three species consumed in North America: salmon, tuna, and shrimp (Fisheries and Oceans Canada, 2018; National Fisheries Institute, 2018). At the same time, respondents indicated consuming an array of other species, as well as some degree of willingness to substitute between species, suggesting potential market opportunities for seafood AFNs, which often focus on offering a variety of seafood species aligned with local seasonality and abundance (McClenachan et al., 2014; LocalCatch.org, 2019a). One in ten respondents reported not consuming seafood and the main reason provided was not liking its taste. This hurdle may be difficult to surmount for seafood businesses (including AFNs) looking to stir up new interest in seafood (Birch, Lawley and Hamblin, 2012), especially insofar as household seafood consumption has been described as “strongly habituated” (Verbeke and Vackier, 2005, pg. 79).

Through measuring the attitudes and opinions of seafood purchasers in Canada, I found that seafood purchasers prioritized features at the consumption end of value chains (such as taste, appearance, and freshness), in alignment with findings within existing literature on seafood preferences (Birch, Lawley and Hamblin, 2012; Carlucci et al., 2015; Olsen, Tuu and Grunert, 2017). Affordability was ranked as the second most important seafood feature, yet most seafood purchasers did not think seafood was affordable. This is important to consider as AFNs in general have been critiqued as being unaffordable and more accessible to higher income groups (Guthman, Morris and Allen, 2006; Andreatta, Rhyne and Dery, 2008; Forssell and Lankoski, 2015; Hodgins and Fraser, 2018).

In assessing attitudes and opinions related to seafood purchasing, I also found perceived issues related to boat to fork traceability – which have also been highlighted within recent news media (e.g., Bernstien, 2019; Gibbens, 2019) – as well as lower prioritization to
features at the harvesting end of seafood value chains. For example, “economic benefits to harvesters and their communities” received the lowest overall ranking in terms of importance by respondents. Similarly, existing research has shown the social sustainability of seafood production – such as “good working conditions for fishermen, or support of small scale coastal fisheries” (Zander and Feucht, 2018, pg. 260) – receiving lower prioritization amongst consumers than ecological sustainability (McClenachan, Dissanayake and Chen, 2016). This may be related to high perceived overlap between social sustainability and other features, such as locally produced seafood (McClenachan, Dissanayake and Chen, 2016). Overall, this suggests that seafood AFNs looking to tap into broader markets should look to emphasize more than their ‘fair trade’ attributes (i.e., improved prices paid to harvesters).

Despite some degree of willingness to pay (WTP) – especially for high quality seafood – I found that purchasers are not willing to pay large price premiums for the other four features emphasized by seafood AFNs. This further suggests that seafood AFNs looking to expand their markets may wish to focus on highlighting their quality features and pricing their products competitively with ‘conventional’ seafood products to the extent that this is possible. My research results also uncovered associations between certain demographic variables and seafood purchasing preferences, perceived availability, and WTP, which could influence the development of targeted marketing strategies for seafood AFNs. For example, while younger groups had higher WTP for ‘alternative’ seafood features, older groups viewed seafood as healthy and easy to prepare, and inland consumers perceived lower availability of seafood that is high quality and of local or domestic origin.

6.4 Significance of thesis research

This thesis addresses key knowledge gaps related to seafood AFNs and their associated value chains. In particular, questions around the viability and scalability of these types of businesses – and their ability to broaden their impacts – are explored. To begin, seafood AFNs have emerged as tools aiming to address challenges along seafood value chains, such as viability concerns for harvesters and diminished local seafood access for consumers (see Chapter 3). However, as highlighted by my case study in Chapter 4, these conditions also
present barriers to seafood AFNs themselves. For example, existing barriers to entry in fisheries could make the added costs of absorbing additional value chain functions within seafood AFNs prohibitive to harvesters (Kohls and Uhl, 1998; Forssell and Lankoski, 2015), while structural constraints to local seafood sales are often driven by broader economic and policy forces within the seafood industry (Kohls and Uhl, 1998; Gudmundsson, Asche and Nielsen, 2006; Johnson, 2007; DesRivières, Chuenpagdee and Mather, 2017; FAO, 2018). To this point, Jodice et al. (2018) describe how local seafood supply challenges in coastal communities – related to diminished local fishing fleets, inconsistent catch volumes, and most seafood being sold to wholesalers and distributed outside of the community – can limit opportunities to market seafood through AFNs, at the same time as creating impetus to establish these types of enterprises (Jodice et al., 2018).

My research results have highlighted additional viability challenges to seafood AFNs with similarities to findings on AFNs more generally (Galt, 2013; Godwin et al., 2017; Paul, 2019). For example, the emergence of these alternative enterprises is occurring within a seafood economy that is often grounded in established relationships between harvesters and seafood purveyors (Brinson, Lee and Rountree, 2011). Such connections to seafood buyers and processors allow fishers to get their product to market, including through the provision of services such as fueling, ice, and dockage (Knutson, 2017). As noted by interviewees in Chapter 4 – and within research on CSFs (Brinson, Lee and Rountree, 2011) – engaging in seafood AFNs can disturb these existing relationships, presenting financial and logistical risks to fishers who choose to market their catch in new ways. In addition, in the rural, coastal areas seeking to develop seafood AFNs (Vachon and Bendickson, 2017; Ahmed, 2018), there are often smaller population bases with uncertain market opportunities (see Chapter 4).

These results begin to highlight the scalability challenges inherent to seafood AFNs. To begin, AFNs are generally considered to be ‘niche’ marketing strategies (Oosterveer and Spaargaren, 2011; Pascual-Fernández et al., 2019), and previous research has described the infrastructure investments required to build local, direct markets, which may be challenged by the smaller volumes (and revenues) sold through these markets (Mount and Smithers, 2014). Similarly, Chapter 3 of this thesis found that the volume of seafood sold through
seafood AFNs may be a small portion of harvesters’ total catch, with the remaining catch sold through other channels. Further, Chapter 4 of this thesis highlighted barriers to accessing the shoreside infrastructure required to develop new seafood markets. To this point, many AFNs rely on the infrastructure of ‘conventional’ food networks in order to process, distribute, and market their products (Forssell and Lankoski, 2015). Along these lines, Galt et al. (2015) describe how AFNs are not immune to the broader political economy that has affected the structures and practices of ‘conventional’ food systems, nor to “the influence of capitalism’s laws of motion” (Galt et al., 2015, pg. 492).

This thesis has also described how seafood AFNs are ‘hybrid’ social enterprises that strive to produce both tangible market values and less tangible values (see Chapter 3). This follows conceptualizations of land-based AFNs operating in “hybrid spaces” (Ilbery and Maye, 2005, pg. 823), “sometimes adopting what might be considered alternative practices and at other times acting in a more mainstream or traditional way” (Blake, Mellor and Crane, 2010, pg. 411). For example, ‘alternative’ food producers may rely on “dipping in and out” of more conventional nodes (such as processing and distribution networks) or selling the bulk of their product volumes to larger-scale buyers in order to stay in business (Ilbery and Maye, 2005, pg. 841). At the same time, some larger-scale or ‘conventional’ food businesses are also adopting certain goals with similarities to those of AFNs (Sterling et al., 2015; Bailey et al., 2018; Barclay and Miller, 2018; Cochrane, 2018; Barendse et al., 2019).

Some have argued that the ability of AFNs to achieve their ‘alternative’ goals becomes diluted through their growth (Pratt, 2009; Mount and Smithers, 2014) and/or participation in capitalist economies (Galt et al., 2015). For example, Mount and Smithers (2014) argue that “intangible” and “noncommodity” benefits of food systems (e.g., ecological outcomes, food security, trust and reassurance, support for local farmers and communities) are more easily exchanged through smaller-scale value chains, and that “larger-scale local marketing efforts [that favor] increased volume and supply-chain efficiencies … reproduce commodity-chain relationships with [producers and create] a parallel, conventionalized form of local” (Mount and Smithers, 2014, pg. 104). Along these lines, Pratt (2009) has described the conventionalization of organic agriculture production in the United States,
which emerged in resistance to industrialized agriculture, but when expanded to capture efficiencies of scale and marketing, “transformed the original objectives of [the] innovation” (Pratt, 2009, pg. 160). On the other hand, Harris (2009) suggests that such critiques of the conventionalization of AFNs “might inadvertently be closing down possibilities for constructive socio-environmental change in and through food networks” (Harris, 2009, pg. 55). My thesis results are aligned with each of the abovementioned suggestions: scaling up seafood AFNs to achieve viability may affect their ‘small-scale’ and ‘place-based’ nature, but may also widen positive impacts, such as through shifting market demand towards more sustainable products and by producing positive education effects.

This thesis has also highlighted the diversity of potential forms of seafood AFNs (see Chapters 3 and 4), based on local contexts and objectives, which provides flexibility to those considering developing such enterprises. Specific opportunities and challenges for different types of seafood AFN are likely to vary from one region to the next, as well as between different fisheries, which are managed under different regimes and with unique ecological complexities (Bolton et al., 2016). Overall, it is rare for any one ‘type’ of seafood AFN to be utilized successfully in isolation (Bolton et al., 2016; Godwin et al., 2017). In addition, interpretations of the key features that unite seafood AFNs are also diverse (see Chapter 3), providing further flexibility to these enterprises. This has also been demonstrated in land-based food systems, in which a range of individuals attach a variety of interpretations to the meaning of ‘local’ food as it makes its way from farm to fork (Blake, Mellor and Crane, 2010).

My research also explores consumer preferences related to alternative seafood products. To begin, while seafood AFNs interviewed for Chapter 3 perceived that they were improving access to seafood for local consumers, existing literature has suggested that there are accessibility issues within AFNs, especially for lower income groups (Guthman, Morris and Allen, 2006; Andreatta, Rhyne and Dery, 2008; Forssell and Lankoski, 2015; Hodgins and Fraser, 2018). Interestingly, my seafood consumer survey (see Chapter 5) did not find associations with notable effect size between income and interest in or WTP for ‘alternative’ seafood features, nor between income and perceptions that seafood is
affordable. This begins to suggest that individuals of varying income levels may have preferences towards value-added seafood products. To this point, Dey et al. (2015) explain that a key component of the value chain approach is “the recognition that consumer choices are not always price driven, [and that consumers] may be willing to pay more for a value-added product” (Dey, Bjørndal and Lem, 2015, pg. 5).

There were some associations found between seafood preferences and demographic variables. For example, while survey respondents generally perceived high-quality seafood to have good availability where they currently shop, older groups and those living in larger locations or coastal areas perceived higher availability of high-quality seafood. Previous research has also found that those with higher price expectations for seafood (i.e., those who could possibly have higher WTP for more expensive seafood products sold through seafood AFNs) are more likely to already shop at specialty outlets and farmer’s markets, and therefore may already have good perceived access to high quality, sustainable, and/or traceable seafood (Hennig, 2017). This existing access may present potential barriers to consumer participation in seafood AFNs, and these enterprises may therefore wish to focus on marketing their products to demographic groups and locations that currently perceive lower availability of their key features. Overall, the prioritization of consumer-facing features (such as taste, appearance, freshness, affordability, health benefits, and seafood type) over harvesting-related features (such as sustainability, production method, and economic benefits to harvesters) (see Chapter 5) can provide insight into how seafood AFNs may wish to promote their products when tapping into new markets.

At the same time, there are mixed outcomes to expect from developing broader markets for ‘alternative’ seafood. On the one hand, as consumer interest in seafood sustainability and provenance grows (Marine Stewardship Council, 2018; James, 2019), enterprises providing seafood products with ‘alternative’ features are likely to encounter competition effects, such as a lower likelihood of attracting price premiums, customer retention issues (Galt et al., 2015), and challenges balancing product affordability with adequate harvester incomes (DesRivières, Chuenpagdee and Mather, 2017). Further, insofar as existing supply chains are under increasing pressure from governments, retailers, and consumers to address similar issues as AFNs (Sterling et al., 2015; Bailey et al., 2018), there are additional
competition effects that are likely to affect the potential future growth of seafood AFNs. On the other hand, it has also been suggested that increasing availability of ‘alternative’ food options may help to normalize their consumption amongst more consumer groups, and grow the size of the market for these products (Hodgins and Fraser, 2018).

There are several management implications of the abovementioned results for seafood value chains. Generally speaking, communities and organizations are considering options for adapting seafood value chains (Talley and Batnitzky, 2014; Dolmage, Macfarlane and Alley, 2016; Kittinger et al., 2017; Ahmed, 2018). With variation between the institutional contexts of different seafood value chains (Fabinyi, 2016; Swartz et al., 2017), it will be crucial to consider the key objectives within specific food systems, and how different value chain structures, as well as a broader suite of tools, may help to address or weaken those objectives (Bjørndal et al., 2015; Forssell and Lankoski, 2015; DesRivières, Chuenpagdee and Mather, 2017). For example, support for ‘local’ seafood systems or shortened seafood value chains through AFNs has been related to goals around community food security (Lowitt, 2013; Grafeld et al., 2017) and reducing the food miles of seafood (McClenachan et al., 2014). However, ‘local’ food may be less accessible to lower income community members (Guthman, Morris and Allen, 2006; Andreatta, Rhyne and Dery, 2008) and does not automatically result in a lower carbon footprint (Farmery et al., 2015) than alternate product options. Further, there are multiple social values produced along seafood value chains (Fabinyi, Dressler and Pido, 2018), and while this research has confirmed that seafood AFNs strive to promote less tangible values through their streamlined value chains (see Chapter 3), it is not impossible for such values to be supported along larger-scale food chains (Ilbery and Maye, 2005). In addition, Dolmage et al. (2016) have pointed out that “the current crisis facing world fish populations is at such a point that consumer-based techniques alone are not the solution” (Dolmage, Macfarlane and Alley, 2016, para. 44).

Overall, these results suggest that seafood AFNs should be considered as one potential option alongside a broader suite of tools for addressing value chain objectives in coastal areas. For example, there are various levers for adding value to seafood, including but not limited to enabling the provision of fresh or live seafood to high value markets (Johnson, 2007; Lee, 2014), building markets for abundant but underutilized species (Venugopal and
Shahidi, 1995; Witkin, Dissanayake and McClenachan, 2015), diversifying product lines through value-added processing (Bjørndal et al., 2015), utilizing processing by-products to generate additional value per unit of seafood harvested (Ferraro et al., 2010; Bruno et al., 2019), and ensuring infrastructure is in place to support such activities (GSGislason & Associates Ltd., 2017). However, beyond developing strategies to optimize the value of seafood, it is important to consider how this value is distributed (Bjørndal et al., 2015), whether it incentivizes responsible harvesting practices (Fabinyi, 2016; Sadovy de Mitcheson et al., 2018), and how the multiple values of fisheries and seafood chains beyond financial values (DesRivières, Chuenpagdee and Mather, 2017; Fabinyi, Dressler and Pido, 2018) are considered in planning, and not undermined by management practices. Seafood AFNs have emerged to support these broader objectives, yet would be insufficient if used in isolation (Oosterveer and Spaargaren, 2011).

6.5 Limitations and future directions

Sustainability concerns related to seafood production, consumption, and trade are a key driver of the emergence of market-based mechanisms that aim to complement fisheries management measures (Jacquet et al., 2009; United Nations Environment Program, 2009). As noted in this thesis, seafood AFNs are examples of such market-based measures. However, there are gaps within my thesis with regards to assessing the ability of these types of enterprises to achieve their goals. Specifically, my thesis is geographically focused on seafood harvesting contexts within North America, whereas much of the global wild fisheries catch occurs outside of North America (FAO, 2018). Further, while my thesis does provide insights into the market feasibility of growing seafood AFNs through a focus on consumer preferences related to ‘alternative’ seafood features, the scale of potential market demand for these products is unclear. Even with potential growth in consumer demand for products sourced through seafood AFNs, it is also unclear the extent to which this would displace consumption from other seafood production systems (Salladarré et al., 2018), versus contributing to the overall anticipated growth in global seafood consumption (Gephart and Pace, 2015; Watson et al., 2016; Guillen et al., 2019). In addition, it is important to note that some larger-scale or ‘conventional’ seafood chains, which AFNs appear to be resisting, are also striving to take on some of the less tangible values that
AFNs strive to promote, such as traceability (Sterling et al., 2015). Building on existing research related to adapting seafood value chains to support sustainability in harvesting contexts outside of North America (e.g., Bjørndal et al., 2015; Fabinyi, 2016; Sadovy de Mitcheson et al., 2018; Pascual-Fernández et al., 2019), a comparative analysis on the potential to use seafood AFNs as a tool for mitigating fisheries sustainability issues within varying global contexts would be interesting.

In addition, due to the use of qualitative VCA in Chapter 3, the perceived benefits of seafood AFNs presented within this thesis – such as supporting sustainable seafood harvesting and improving ex-vessel prices paid to fishers – are not explicitly measured or tested. While some existing research has empirically verified claims related to seafood AFNs – including certain environmental (McClenachan et al., 2014) and socio-economic (Brinson, Lee and Rountree, 2011) benefits – further research on this topic would be worthwhile. For example, measurement of the actual distribution of value along ‘alternative’ chains would be helpful, insofar as these enterprises strive to embody ‘fair’ pricing for both producers and consumers (see Chapter 3). While enhanced catch value for harvesters has been tested within a specific CSF on the East Coast of the United States (Stoll, Dubik and Campbell, 2015), comparative examination of price premiums in different types of seafood AFNs across multiple regions would be useful. On the consumer end, testing the prices that customers pay to purchase seafood from AFNs would also be useful, particularly as these types of enterprises aim to improve seafood access for consumers (see Chapter 3), yet consumer analysis of AFN participants is limited (Campbell et al., 2014; Salladarré et al., 2018). Further, AFNs have generally been critiqued for only being accessible to wealthier groups (Guthman, Morris and Allen, 2006; Andreatta, Rhyne and Dery, 2008), and may rely on charging prices that are competitive with ‘conventional’ seafood products if they wish to expand their marketing reach and impacts (see Chapter 5).

Further limitations are related to the survey methods used within the thesis (Chapter 5). In addition to the potential biases and errors associated with survey research (Fogli and Herkenhoff, 2018), the generalizability of my survey findings is uncertain. While an optimal allocation formula (Statistics Canada, 2010) was used to inform my regionally stratified sampling approach, and while survey respondents were represented across
various demographic categories within the sample (see Table 9), the survey results were not specifically weighted for alignment with demographic trends within the broader population. In terms of survey design and analysis, there are additional methods for measuring WTP, and for testing correlations with nominal variables (e.g., gender) and covariance between demographic variables, beyond those used in this thesis that could be useful for future research on seafood AFNs. Further, while some of my key survey findings align with conclusions within existing seafood marketing literature, others do not. This not only highlights issues related to comparing across heterogenous market research studies that have been conducted according to differing methodologies and objectives (Carlucci et al., 2015), but also how varying geographic locations, levels of economic development, and food traditions can lead to variable seafood consumption behaviors and preferences in different regions (Jensen, 2006; FAO, 2010). To this point, further market research related to seafood AFNs, including comparative consumer studies across different regions, could be a useful area for future research. First, the extent to which preferences related to alternative seafood products in different regions are consistent with the findings of this thesis, or variable across different harvesting, market, and cultural contexts, would be interesting to explore. Second, a comparative survey of seafood AFN participants would be helpful for contrasting their preference patterns with those of the general public, and for testing their demographic profiles, in order to contribute seafood-specific knowledge to accessibility-related questions raised within broader research on AFNs. In addition, gathering data on seafood purchasing prices and volumes in these consumer studies would provide a baseline for interpreting survey results.

Finally, this thesis is limited in its ability to address questions related to the viability and scalability of seafood AFNs, as well as their further application within food systems. For example, my research does not quantitatively assess viability concerns related to individual seafood AFN enterprises, nor is the potential market size for ‘alternative’ seafood products specifically estimated. Further, the research does not present a longitudinal view. For example, with the majority of seafood AFNs interviewed within Chapter 3 having been in operation for four years or less, their perceived benefits and challenges are likely to shift with time. With changing climatic and ocean conditions (Lam et al., 2016), labour uncertainties in wild fisheries (Canadian Council of Professional Fish Harvesters, 2018),
potential conflicts between user groups over a shifting resource base (Bennett et al., 2018), and the growing prominence of aquaculture as a key production method (Bellmann, Tipping and Sumaila, 2016; FAO, 2018), there are many ways in which the focus and feasibility of seafood AFNs may change. Overall, further research evaluating the growth of seafood AFNs over time – and any related evolution of their core, ‘alternative’ values – could be useful for policy makers considering different mechanisms for improving seafood value chains.
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Appendices

Appendix 1: Different types of alternative seafood network.

Sources: Chase and Otts, 2016; Market Your Catch, 2019.

<table>
<thead>
<tr>
<th>Type</th>
<th>Potential benefits and challenges</th>
<th>Important considerations</th>
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</table>
| **Off-the-boat sales:** Fishers sell their catch to customers from their boats, at a dock or other landing point. | **Benefits:**  
  - Flexibility: Fishers can determine when they are open for business.  
  - Streamlined logistics: Minimal need for packaging, shoreside infrastructure, and distribution.  
  - Face-to-face connections: Helps with education and brand development, obtaining feedback, building relationships / markets, and quality control up to the end-user.  
  
  **Challenges:**  
  - Regulatory barriers: Fishers may not be allowed to advertise their product at the dock, process fish on their boats, and/or sell their products off the boat.  
  - Sales volumes: Amount of product sold may be low, due to limited sales hours, low storage capacity, poor proximity of docks to consumers, and competition with others who are selling at the same dock. | **-** Are off-the-boat sales allowed in the area? Under what conditions?  
  **-** Will processing at the boat or dock be required / permitted?  
  **-** Do enough potential consumers have access to the docks to make sales worthwhile? How many others sell their seafood products from the dock? |
| **Fisher’s or farmer’s market sales:** Fishers sell their catch to customers at a fisher’s or farmer’s market. Sales space at the market is obtained for a specific day and time, and fees, insurance, time commitments, and other details vary, depending on the market. | **Benefits:**  
  - Growing markets: Potentially well-attended and well-advertised, these markets can provide an opportunity to attract and establish a loyal consumer base.  
  - Face-to-face connections: Helps with education and brand development, obtaining feedback, building relationships / markets, and quality control up to the end-user.  
  
  **Challenges:**  
  - Market restrictions: Vendors pay fees and must abide by market rules and regulations, which can limit product offerings and the number of seafood suppliers allowed at one market.  
  - Sales volumes: Amount of product sold may be low, due to limited sales hours, instability of demand, low on-site storage capacity, and presence of other seafood suppliers at the same market. | **-** Are there markets in the area? If so, are fishers permitted to sell at them? Under what conditions?  
  **-** Do these markets operate at times that align with seafood product availability?  
  **-** Do enough potential consumers frequent the market to make sales worthwhile?  
  **-** How many others sell seafood products at the market?  
  **-** What processing, cold storage, and |
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<tr>
<th>Type</th>
<th>Potential benefits and challenges</th>
<th>Important considerations</th>
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| **Community supported fishery (CSF):** Based on the community supported agriculture (CSA) model. Consumers pre-pay for a subscription, or 'share', of seafood, often in advance of the harvesting season. CSF structures vary, including different subscription costs and share arrangements. | **Benefits:**                                                                                                                                                                                                                   | • Where are potential CSF members located?  
• Will there be enough diversity and frequency of seafood supply to meet demand and fill CSF member shares?  
• What processing, cold storage, and distribution capacity will be required? Is this accessible? |
|                               | • Stability: Pre-sales provide up-front capital that helps to cover expenses (e.g., gear, repairs, fishing licenses, fuel) in advance of the fishing season, as well as solidifying a consumer base for a set period of time.  
• Flexibility: Provides an outlet (through share structure) to sell species that are abundant and/or seasonal, yet less familiar to consumers.  
• Face-to-face connections: Helps with education and brand development, obtaining feedback, building relationships / markets, and quality control up to the end-user. |                                                                                           |
|                               | **Challenges:**                                                                                                                                                                                                                   |                                                                                           |
|                               | • Time and labour requirements: CSFs require ongoing coordination, including for member share sales and logistics, and for providing consistent customer service.  
• Logistical requirements: Often need to build or access processing and distribution infrastructure, and secure convenient pick-up locations for members.  
• Supply uncertainties: Need to account for uncertainties in seafood volumes and types alongside member expectations and regularly scheduled pick-ups, which may require recruiting additional fishers. |                                                                                           |
| **Seafood buying club:** A group of customers places periodic bulk seafood orders with a fisher (or a group of fishers), and subsequently distributes the seafood they receive amongst themselves. | **Benefits:**                                                                                                                                                                                                                   | • Where are potential buying clubs (and organizers) located?  
• Will there be enough seafood supply to fill buying club order commitments?  
• What processing, packaging, cold storage, and/or shipping capacity will be required? Is this accessible? |
|                               | • Scalability: Provides a structure for distributing larger volumes of seafood to multiple customers at once, which can be scaled up as more clubs are added to the enterprise.  
• Efficiency: A single shipment can serve multiple customers, and club members may take on responsibility for seafood processing. |                                                                                           |
<p>|                               | <strong>Challenges:</strong>                                                                                                                                                                                                                   |                                                                                           |
|                               | • Time, labour, and financial requirements: Resources are required to establish the club, and to pay for packaging and shipping (especially to distant clubs). |                                                                                           |</p>
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<tr>
<th>Type</th>
<th>Potential benefits and challenges</th>
<th>Important considerations</th>
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<tr>
<td></td>
<td><strong>• Seafood prices:</strong> Group sales through a club may yield a lower unit price than individual sales.</td>
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<td></td>
<td><strong>• Logistical risks:</strong> The supplier absorbs the risks of shipping, product availability may not coincide with times that club members want to receive seafood, and a trusted club organizer (often in a distant location) must be secured in order for coordination and distribution to succeed.</td>
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<td></td>
<td><strong>Online sales:</strong> Seafood is marketed over the internet, orders and payments are completed electronically rather than in person, and seafood is typically shipped to customers.</td>
<td><strong>• Is the seafood supply consistent enough to meet online demand?</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Benefits:</strong></td>
<td><strong>• Can seafood be processed into products with a longer shelf life (e.g., canned, smoked, jerky)?</strong></td>
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<tr>
<td></td>
<td>• Efficiency and scalability: Customers can be reached quickly and as soon as product is available, and broader markets can potentially be accessed.</td>
<td><strong>• What processing, packaging, cold storage, and/or shipping capacity will be required? Is this accessible?</strong></td>
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<tr>
<td></td>
<td>• Flexibility: Fishing story and product can be shared with limited direct interaction with customers, reducing time commitments.</td>
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<td></td>
<td>• Convenience: 24/7 sales through the internet could be more convenient for some customers than other types of sales.</td>
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<tr>
<td></td>
<td><strong>Challenges:</strong></td>
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<tr>
<td></td>
<td>• Time, labour, and financial requirements: Resources are required to source and pay for packaging and shipping, website must be built and maintained, and advertising is required in order to establish a web presence.</td>
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<td></td>
<td>• Logistical requirements and risks: Inventory and website must be kept up-to-date in order to accurately reflect product availability, and the supplier absorbs the shipping risks.</td>
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<tr>
<td></td>
<td><strong>Retail market sales:</strong> Seafood is sold at a grocery store or seafood shop. Sales may be managed by a small-scale seafood business, rather than the fishers themselves.</td>
<td><strong>• Where are retail markets potentially willing to purchase seafood located?</strong></td>
</tr>
<tr>
<td></td>
<td><strong>External market:</strong></td>
<td><strong>• How frequently do markets require seafood deliveries, and at what quantities? Does this fit fishing schedules / seafood availability?</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Benefits:</strong></td>
<td><strong>• What processing, cold storage, and</strong></td>
</tr>
<tr>
<td></td>
<td>• Stability and scalability: Opportunities for bulk sales due to stable demand, and access to multiple consumers.</td>
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<tr>
<td></td>
<td>• Time savings: Advertising and sales arranged by the retailer.</td>
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<td></td>
<td>• Partnerships and shifting preferences: Providing lesser known fish through an established / trusted shop can help to shift consumer preferences.</td>
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<tr>
<td></td>
<td><strong>Challenges:</strong></td>
<td></td>
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<tr>
<td>Type</td>
<td>Potential benefits and challenges</td>
<td>Important considerations</td>
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<tr>
<td>• Supply uncertainties: Need to account for uncertainties in seafood volumes and types when committing to regularly fill larger orders.</td>
<td>distribution capacity will be required? Is this accessible?</td>
<td></td>
</tr>
</tbody>
</table>

**Own market:**

**Benefits:**

• Efficiency: Centralized sales location (with potential for in-house processing) minimizes the need to access external shoreside infrastructure.

• Face-to-face connections: Helps with education and brand development, obtaining feedback, building relationships / markets, and quality control up to the end-user.

**Challenges:**

• Time, labour, and financial requirements: High overhead costs to develop, staff, operate, advertise, and maintain the market, including permitting, licensing, and insurance.

• Scalability: Likely requires access to product from multiple fishers in order to cover operational costs.

**Boat-to-restaurant sales:** Fishers sell their catch directly to restaurants, sometimes through pre-sales for a share of seafood (similar to the CSF model).

**Benefits:**

• Time savings: Fishing story and product can be shared with limited direct interaction with customers, reducing some labour requirements.

• Partnerships and shifting preferences: Providing lesser-known fish through an established restaurant and/or trusted chef can help to shift consumer preferences.

**Challenges:**

• Sales volumes: Amount of product sold may be limited, as one restaurant is unlikely to buy all of a fisher’s catch, and thus coordination of sales to multiple restaurants is likely required.

• Supply uncertainties: Need to account for uncertainties in seafood volumes and types when committing to supply a restaurant.

• Infrastructure requirements: Cold storage and processing may be required, in order to facilitate frequent, small deliveries to restaurants with limited storage and preparation space.

• Where are restaurants potentially willing to purchase seafood located?

• How frequently do restaurants require seafood deliveries, and at what quantities? Does this fit fishing schedules / seafood availability?

• What processing, cold storage, and distribution capacity will be required? Is this accessible?
<table>
<thead>
<tr>
<th>Type</th>
<th>Potential benefits and challenges</th>
<th>Important considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boat-to-institution sales:</strong> Seafood is sold (typically in large volumes) to food service providers that supply universities, schools, hospitals, and other institutions. Seafood is subsequently prepared and sold at the institution to staff, students, patients, visitors, and/or other consumers.</td>
<td>Benefits:</td>
<td>Where are institutions potentially willing to purchase seafood located?</td>
</tr>
<tr>
<td></td>
<td>• Stability: Steady, year-round demand for seafood.</td>
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<tr>
<td></td>
<td>• Efficiency and scalability: Larger purchasing capacity than individual consumers, allowing for higher sales volumes.</td>
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<tr>
<td></td>
<td>• Partnerships and shifting preferences: Potential to partner on educating about the lesser-known fish provided through the institution, in order to help shift consumer preferences.</td>
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<tr>
<td></td>
<td>Challenges:</td>
<td></td>
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<tr>
<td></td>
<td>• Time and labour requirements: Resources are required to initiate and establish contracts with institutional buyers.</td>
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<tr>
<td></td>
<td>• Seafood prices: Bulk sales to an institution are likely to yield a lower unit price than individual sales, and payments are rarely immediate.</td>
<td></td>
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<tr>
<td></td>
<td>• Infrastructure requirements: Cold storage and processing capacity are likely required to meet institutional demand for large volumes, and to deal with limited institutional food service capacity to deal with fresh products.</td>
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</tbody>
</table>
**Appendix 2: Interview script (Chapter 3).**

**Program background**

1. What year did [enterprise name] start?

2. Who owns [enterprise name]?

3. Where is [enterprise name] based?

4. How many people does [enterprise name] employ in total?
   
   a. How many of these are paid full time or part-time positions?

   b. How many of these are volunteer positions?

**Supply chain overview**

5. What are the different stages of [enterprise name’s] supply chain from boat to plate?

**Seafood supply**

6. Approximately how many fishers supply [enterprise name]?

7. Are there any necessary criteria for fishers who supply [enterprise name]? (Y/N)
   
   a. If ‘yes’, what are they?

8. Do any aquaculture operations supply [enterprise name]? (Y/N)
   
   a. If ‘yes’, how many aquaculture operations?

   b. AND, are there any necessary criteria for aquaculture operations to supply [enterprise name]? (Y/N)

      i. If ‘yes’, what are these criteria?
9. Are pre-payments provided to seafood producers? (Y/N)

10. From your perspective, what are the economic/financial advantages or disadvantages for seafood producers who work with [enterprise name]?

   **Seafood purchasing**

   11. Does your enterprise purchase seafood directly from seafood producers? (Y/N)

      a. If ‘no’ or ‘sometimes’, who are the intermediaries?

   12. From your perspective, what are the economic/financial advantages or disadvantages of [enterprise name] working as a seafood buyer?

   **Seafood processing**

   13. Does your enterprise offer whole or processed fish, or both?

      a. If ‘whole’, what are the economic/financial advantages or disadvantages of not providing processed fish? [and skip Question 15 & 16]

      b. If ‘processed’ or ‘both’, what processed options does [enterprise name] offer?

   14. Who does the processing for [enterprise name]?

   15. What are the economic/financial advantages or disadvantages of providing processed fish through [enterprise name]?

   **Seafood storage & distribution**

   16. Does [enterprise name] sell fresh or frozen seafood, or both?

   17. Does [enterprise name] have access to cold storage facilities? (Y/N)

      a. If ‘yes’, does the enterprise keep an inventory of frozen fish? (Y/N)
i. If ‘no’, why not?

18. What are the transportation needs for [enterprise name]?

19. Who does the distribution for [enterprise name]?

20. What are the economic/financial advantages or disadvantages of [enterprise name]’s cold storage and/or distribution system?

Seafood sales

21. Where does [enterprise name] sell seafood?

22. Who manages these sales?

23. Are [enterprise name]’s products branded or labeled? (Y/N)

24. Do customers buy seafood from [enterprise name] through pre-payments?

25. What are the economic/financial advantages or disadvantages of [enterprise name]’s sales approach?

Seafood end markets

26. Does [enterprise name] program have members? (Y/N)

   a. If ‘yes, approximately how many?

27. What are the economic/financial advantages or disadvantages for consumers who purchase from [enterprise name]?

Closing questions

28. Does [enterprise name] make any additional economic/financial contributions that have not been discussed yet?
29. Is [enterprise name] involved in any charitable giving or donations?

30. Are there any costly or problematic points of [enterprise name]’s supply chain that haven’t been discussed yet?
Appendix 3: Values and challenges along alternative seafood value chains highlighted through preliminary thematic analysis (Chapter 3).

Note: These values and challenges were further refined after feedback data from 114 participants in a conference plenary workshop was received (see Appendix 4) and analyzed. The final results for this chapter, including the tangible market values and less tangible values of alternative seafood value chains, are summarized in Figure 3 within Chapter 3.

<table>
<thead>
<tr>
<th>Value chain stage</th>
<th>Values</th>
<th>Challenges</th>
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</thead>
<tbody>
<tr>
<td><strong>Fishing</strong></td>
<td>Secure and consistent markets</td>
<td>Competition with mislabeled seafood products</td>
</tr>
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<td></td>
<td>Higher and steadier prices</td>
<td>Persistent threats to small boat fleets (e.g., consolidation, cost of fishing access)</td>
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<td></td>
<td>Income stability</td>
<td>Extra time required for alternative marketing</td>
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<td></td>
<td>Rewards for quality and sustainability</td>
<td>Transitioning from volumes sold to other buyers</td>
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<td></td>
<td>Money for under-utilized species</td>
<td>Unpredictability of fishing</td>
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<tr>
<td></td>
<td>Profit sharing (e.g., co-operative ownership)</td>
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<td>Social networks</td>
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<td></td>
<td>Autonomy and independence</td>
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<td></td>
<td>Opportunities to educate others (e.g., speeches, interviews, films)</td>
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<tr>
<td><strong>Purchasing</strong></td>
<td>Buying and promoting under-utilized species</td>
<td>Some control lost when purchasing from other buyers</td>
</tr>
<tr>
<td></td>
<td>Customized, two-way buying negotiations</td>
<td>Difficulty achieving tangible gains in advocacy work</td>
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<tr>
<td></td>
<td>Monetary advances to fishers</td>
<td>Absorbing risk through pre-season commitments to fishers</td>
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<td></td>
<td>Traceable purchases</td>
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<td>Value chain stage</td>
<td>Values</td>
<td>Challenges</td>
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<tr>
<td><strong>Processing</strong></td>
<td>Increasing economic value of raw product</td>
<td>Health and safety regulatory constraints</td>
</tr>
<tr>
<td></td>
<td>Meeting consumer preferences</td>
<td>Lack of access to processing</td>
</tr>
<tr>
<td></td>
<td>More types of products and sales opportunities</td>
<td>Cost of processing</td>
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<tr>
<td></td>
<td></td>
<td>Risk and cost of investing in own infrastructure</td>
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<tr>
<td><strong>Cold storage</strong></td>
<td>Fishers can access more distant markets</td>
<td>Lack of access to cold storage</td>
</tr>
<tr>
<td></td>
<td>More options for consumers through frozen inventory</td>
<td>Cost of external cold storage</td>
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<tr>
<td></td>
<td>Reduced risk of perishability</td>
<td>Risk and cost of investing in own infrastructure</td>
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<tr>
<td></td>
<td></td>
<td>Predicting volumes for frozen inventory and sales</td>
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<tr>
<td><strong>Distribution</strong></td>
<td>Connecting to distant markets and growing business</td>
<td>Logistical challenges</td>
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<tr>
<td></td>
<td>Employment</td>
<td>Cost of distribution</td>
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<td></td>
<td>Sufficient volumes for external distributors</td>
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<tr>
<td><strong>Sales</strong></td>
<td>Percentage of sales to charity and research</td>
<td>Earning sufficient margin between supply and demand</td>
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<tr>
<td></td>
<td>Direct connections facilitate seafood education and advocacy</td>
<td>Being overworked and underpaid</td>
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<td></td>
<td>Influencing tastes in regional restaurants</td>
<td>Optimizing share structure and pricing</td>
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<td></td>
<td>Potential for fair price average between high and low value species</td>
<td>Working within existing food service infrastructure at institutions</td>
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<td></td>
<td>Sales channels for underutilized species</td>
<td>Human resource capacity</td>
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<tr>
<td>Value chain stage</td>
<td>Values</td>
<td>Challenges</td>
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<tr>
<td>Employment</td>
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<tr>
<td><strong>End markets</strong></td>
<td>Improved seafood access</td>
<td>Fulfilling member expectations</td>
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<td></td>
<td>High quality products</td>
<td>Managing growth</td>
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<td></td>
<td>Freshness of product</td>
<td>Member/customer retention</td>
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<td></td>
<td>Traceability, accountability, and story</td>
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<td>Connections to fishers and like-minded consumers</td>
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<td>Education on seafood preparation</td>
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<td>Education on local fishing issues and possible</td>
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<td>solutions</td>
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<td>Fair prices</td>
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</table>
Appendix 4: Draft value map based on preliminary findings (Chapter 3).

Note: This is one copy of 18 that were marked with feedback by workshop participants at the Local Seafood Summit in Norfolk, Virginia in February 2016.
Appendix 5: Strategies related to adapting seafood value chains with potential relevance to alternative seafood networks in BC’s MaPP region (Chapter 4).


<table>
<thead>
<tr>
<th>Location</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Haida Gwai</strong></td>
<td>7.3.1.1A Support opportunities for a community-based fisheries economy.</td>
</tr>
<tr>
<td></td>
<td>7.3.1.1B Promote local seafood processing opportunities and employment by Haida and other island residents in processing operations.</td>
</tr>
<tr>
<td></td>
<td>7.3.2.1A Assess feasibility of local processing and marketing.</td>
</tr>
<tr>
<td></td>
<td>7.3.2.1B Provide incentives for local fishers to deliver locally and improve quality of the catch.</td>
</tr>
<tr>
<td></td>
<td>7.3.2.1C Support development of a Haida Gwaii brand and other products.</td>
</tr>
<tr>
<td></td>
<td>7.3.2.1D Investigate the potential for new markets and new products for the Haida Gwaii fisheries economy.</td>
</tr>
<tr>
<td></td>
<td>7.3.2.1E Support investment and partnership opportunities related to the development of infrastructure essential for maintenance and growth of local fishing.</td>
</tr>
<tr>
<td></td>
<td>7.3.3.1A Work with others to encourage sustainability fisheries certification for fisheries originating in and around Haida Gwaii.</td>
</tr>
<tr>
<td></td>
<td>7.3.3.1B Encourage local purchasing and processing by fishing lodges and charter operations.</td>
</tr>
<tr>
<td><strong>North Coast</strong></td>
<td>4.11.1.1 Support independent fishers and fisheries-related tenure holders so they can establish and thrive in coastal communities.</td>
</tr>
<tr>
<td></td>
<td>4.11.1.2 Work with appropriate government agencies and industry to promote and enhance current seafood traceability and sustainability program efforts.</td>
</tr>
<tr>
<td>Location</td>
<td>Strategy</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>4.11.1.3</td>
<td>Explore opportunities for local community and First Nations investment, partnership and participation in local seafood processing activities.</td>
</tr>
<tr>
<td>4.11.1.4</td>
<td>Support development of value-added markets for North Coast products.</td>
</tr>
<tr>
<td>4.11.1.5</td>
<td>Explore mechanisms for enhancing local economic benefits from fisheries-related activities.</td>
</tr>
<tr>
<td>4.11.3.1</td>
<td>Prepare a review of marine infrastructure requirements, including First Nations, commercial, and recreational fisheries requirements, in the North Coast plan area in cooperation with industry and stakeholders.</td>
</tr>
<tr>
<td>4.11.4.2</td>
<td>Work with appropriate government agencies, industry and others to develop programs to increase local participation in fisheries-related activities.</td>
</tr>
<tr>
<td>4.11.6.3</td>
<td>Explore mechanisms to support local community food security.</td>
</tr>
<tr>
<td>4.12.2.1</td>
<td>Identify marine economic development opportunities and constraints in the North Coast plan area.</td>
</tr>
<tr>
<td>Central Coast 5.1.5.1</td>
<td>Explore opportunities for First Nations and local community investment, partnership and participation in seafood processing and other value-added activities.</td>
</tr>
<tr>
<td>5.1.6.1</td>
<td>Expand and promote participation in seafood traceability and/or certification programs, such as ThisFish, that focus on reducing poaching and adding commercial value to sustainably caught seafood.</td>
</tr>
<tr>
<td>5.1.6.2</td>
<td>Market Plan Area fisheries that have been certified as sustainably harvested.</td>
</tr>
<tr>
<td>5.1.6.3</td>
<td>Promote seafood processing and value-added initiatives developed through goals 5.1.6.1 and 5.1.6.2.</td>
</tr>
<tr>
<td>Location</td>
<td>Strategy</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>5.1.1.6.4</td>
<td>Identify new and expandable export markets for Central Coast seafood products.</td>
</tr>
<tr>
<td>North Vancouver Island</td>
<td>4.3.10.1.1.1 Increase local resident and First Nations involvement in and benefit from commercial and recreational fisheries through offloading, processing and guiding.</td>
</tr>
<tr>
<td></td>
<td>4.3.10.2.1.1 Support opportunities for local and First Nations investment, partnership and participation in sustainable BC seafood processing activities and operations.</td>
</tr>
<tr>
<td></td>
<td>4.3.10.2.1.2 Facilitate a First Nations-based marketing strategy that includes certification by an independent body.</td>
</tr>
<tr>
<td>MaPP region</td>
<td>3.3a Confirm specific gaps in regional and coastal community marine infrastructure and services, and initiate action to address them to improve economic development and human well-being.</td>
</tr>
<tr>
<td></td>
<td>3.3b Enhance regional collaboration and improve local economic benefits related to shellfish aquaculture and fisheries, including developing and marketing value-added products, identifying potential economic incentives, identifying and promoting new or niche markets, promoting the viability of shellfish aquaculture to attract investment, and encouraging new regional investment in seafood processing.</td>
</tr>
</tbody>
</table>
Appendix 6: Interview script (Chapter 4).

Harvesting

*Questions for fishers:*

- When did you start fishing?
- How have your fishing operations changed over the years?
- Where / what / when do you fish now?
- In which ways do you benefit from fishing currently? What are your main challenges?
- How could the value of your fishing operations be increased?
- Do you employ other people as fishing crew?
- What are the opportunities for new entrants into the fishery you work in, or other fisheries in your area? What are the obstacles?
- Who do you think are the primary beneficiaries of the seafood sector in your area? Where are they located?

*General questions:*

- Are there obstacles to First Nations and/or local community participation and employment in this area’s seafood sector? If yes – what are they?
- Are there potential opportunities to increase First Nations and/or local community participation and employment in this area’s seafood sector? If yes – what are they?
- Are there existing initiatives in this area that aim to develop more community-oriented fishing economies? If yes – what are they?
- Do you think there are any emerging seafood sectors in your area? If yes – what are they? AND Are there obstacles to the growth and development of these new sectors? If yes – what are they?

Processing

*Questions for fishers:*

- Do you know where your fish gets processed? If yes – where?
• Do you have access to processing facilities? If yes – does this provide you with any advantage? If no – would having access provide you with any advantage?

**General questions:**

• Where does processing of marine species landed or cultured in this area occur?
• Do seafood producers have access to processing facilities? If yes – where? If no – why not?
• Would there be any advantage to developing more local processing capacity in this area? If no – why not? If yes – who would benefit and how? AND what might this look like? AND what are the obstacles to achieving this?
• Do you think there are any particular opportunities for adding value to marine species landed or cultured in this area? If yes – what are they? If no – why not?

**Distribution**

**Questions for fishers:**

• Where do you land your fish?
• Where does your fish go after you land it?
• Do you have access to cold storage facilities? If yes – does this provide you with any advantage? If no – would having access provide you with any advantage?

**General questions:**

• How does seafood distribution work in this area? (i.e. what are the main routes, main modes, & main companies for transportation)
• Are there any obstacles with getting fish to market?
• Do seafood producers have access to cold storage facilities in this area? If yes – where? If no – why not?

**Marketing**

**Questions for fishers:**

• Who do you currently sell your catch to?
• Is this different from who you sold your catch to in the past?
• Have you thought of marketing your catch elsewhere? Why or why not?
• Any insights on opportunities / challenges of direct marketing of seafood in your fishery / area?

**General questions:**

• Do you think there is any unmet local or regional demand for local seafood products? If no – why not? If yes – where/who? AND What are the obstacles to meeting this demand with local products?

• Do you know of any strategies for marketing seafood caught or cultured in this area? If yes – what are they? AND who could I talk to to get more information on them?

**Questions for alternative seafood marketers:**

• What year did you start your direct marketing business?
• Who owns it?
• Where is it based?
• Do you have any employees? If yes – how many?
• What does your seafood chain look like? (i.e. list stages and locations)
• How many fishers do you work with? What type of fishing operations?
• Any aquaculture suppliers? If yes – how many and what kind?
• What are the advantages for fishers/aquaculturists who work with you?
• Do you buy seafood directly from the producers or from intermediaries (i.e. other buyers, brokers)?
• What types of seafood products do you sell?
• Do you sell fresh or frozen seafood, or both?
• Do you sell whole or processed fish, or both?
• If ‘processed’ or ‘both’, what processed options do you sell? AND Who does the processing?
• Do you have access to cold storage facilities? If yes – do you keep an inventory of frozen fish?
• Who distributes your seafood products?
• What are the end markets for your seafood products?
• What are the advantages for consumers/businesses who buy from you?
• Are your products branded or labeled?
• Do you feel there is potential to grow your business? If yes – in which ways? If no – why not?
• What are your business’ main challenges?
Appendix 7: Survey questionnaire (Chapter 5).

Introduction & screening questions

You are being asked to participate in a research study. Before you provide your consent to participate, please read the following information about the survey.

- **Who is conducting the survey?** Allison Witter, Fisheries Economics Research Unit, Institute for the Oceans and Fisheries, The University of British Columbia; email: a.witter@oceans.ubc.ca. The survey is being conducted in conjunction with the Ocean Canada Partnership (http://www.oceancanada.org).

- **What is the purpose of this survey?** The aim of the survey is to learn about current and future seafood purchasing and consumption behaviours of individuals across Canada.

- **How does the survey work?** You will be asked to respond to a set of questions, which will take approximately 15 minutes of your time. There is no obligation to complete the survey questionnaire.

- **What will happen to the survey results?** The compiled results of this study will be utilized within a PhD dissertation and academic paper(s). Your responses will remain anonymous and no identifying information will be included within the research results. You are welcome to request the research results by emailing a.witter@oceans.ubc.ca.

- **Questions?** If you have any questions or comments about the survey, please email a.witter@oceans.ubc.ca. If you have any concerns or complaints about your rights as a research participant and/or your experience participating in this survey, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance email RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

I acknowledge the above information and give permission to the research team to use my answers to the questionnaire in their research results. If the questionnaire is completed, it will be assumed that consent has been given.
1. In which province or territory do you currently reside?
   - Alberta
   - British Columbia
   - Manitoba
   - New Brunswick
   - Newfoundland and Labrador
   - Nova Scotia
   - Ontario
   - Prince Edward Island
   - Québec
   - Saskatchewan
   - I live in a territory (Northwest Territories, Yukon, Nunavut)
   - I don't live in Canada

2. You indicated that you live in [insert province]. Which city do you reside in?
   ___________________

3. In this survey, ‘seafood’ refers to any edible aquatic life (from marine or fresh water), including fish (e.g., salmon, cod, tuna, trout), molluscs (e.g., clams, oysters, octopus), crustaceans (e.g., shrimp, crab, lobster), echinoderms (e.g., sea cucumber, sea urchins), and edible sea plants (e.g., seaweed), among others. This includes fresh, frozen, canned, smoked, pre-prepared, and all other product forms.

   Have you purchased seafood for consumption in your household within the last year?
   - Yes
   - No
4. Although you do not currently purchase seafood for your household, do you currently consume seafood?
   o Yes
   o No

5. Where do you primarily consume seafood?

   Please select one option.
   o At restaurants or other food service establishments
   o At home
   o Other (please specify): _________________________________

Seafood purchasers for consumption at home

Current purchasing behavior

6. Where do you purchase seafood for your household?

   Please select all that apply.
   o Grocery store
   o Seafood shop or fish market
   o Online
   o Other (please specify): _________________________________

7. How often do you typically purchase the following types of seafood for your household?

   Please note: This includes fresh, frozen, canned, smoked, pre-prepared, and all other product forms.
<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Less than once every three months</th>
<th>Once every 2-3 months</th>
<th>Once per month</th>
<th>2-3 times per month</th>
<th>Once per week</th>
<th>Twice or more per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmon</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Tuna</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Sardine or herring</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Cod or halibut</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Crab or lobster</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Shrimp or prawn</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Clam or oyster</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Tilapia</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Other</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
</tbody>
</table>
8. If you indicated purchasing other type(s) of seafood, please specify them here:

____________________

9. In which product form(s) do you typically purchase seafood?

Please select all that apply.

- Fresh
- Frozen
- Canned
- Smoked
- Pre-prepared (e.g., fish sticks)
- Other (please specify):

____________________

10. When your preferred seafood is unavailable where you usually shop, are you willing to substitute with other types of seafood?

- Always
- Sometimes
- Rarely
- Never
**Attitudes and opinions**

11. To what extent do you agree or disagree with the following general statements related to seafood products?

Please rate each statement using the scale of 'Strongly Disagree' to 'Strongly Agree'.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Disagree nor Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of seafood (e.g., species) is the most important factor to me when choosing what seafood to eat</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>It is easy to know whether or not a seafood product is sustainable</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Information is typically available about which seafood species I am purchasing</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Information is typically available about the geographic origin of a seafood product</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Statement</td>
<td>Rating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>--------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I find it easy to access seafood products from Canada</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I find it easy to access seafood products from my local region</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual fishers and producers in Canada are paid fairly for the seafood they harvest</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High quality seafood is readily available where I live</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seafood is a healthy food choice</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I prefer fresh seafood over frozen seafood</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seafood should have official certification (e.g., Marine Stewardship Council) to prove that it is sustainable</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I’m concerned with possible food safety issues associated with seafood</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I prefer wild-caught seafood over farmed seafood</td>
<td>O  O  O  O  O  O  O</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seafood is affordable</td>
<td>O  O  O  O  O  O  O</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seafood is easy to prepare</td>
<td>O  O  O  O  O  O  O</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My perception is that smaller-scale seafood production is more sustainable than large-scale production</td>
<td>O  O  O  O  O  O  O</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12. When you purchase seafood, how important are the following product features?

Please rate each option using the scale of 'Not Important' to 'Very Important'.

<table>
<thead>
<tr>
<th></th>
<th>Not Important</th>
<th>Not Very Important</th>
<th>Moderately Important</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate information about seafood product</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Convenience of meal preparation</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Health benefits</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Affordability</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Preferred production method (wild or farmed)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Economic benefits to harvesters and their communities</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
13. If there are additional feature(s) that are important to you when you purchase seafood, please specify them here: ________________________________

14. When purchasing seafood, how would you rank the importance of the following features?

Please rank the importance of the following list of features from 1 to 9 (where 1 = Most Important) by dragging and dropping each feature into the appropriate numbered position on the list below.

- [ ] Accurate information about seafood product
- [ ] Convenience of meal preparation
- [ ] Health benefits
- [ ] Local or domestic origin
- [ ] Affordability
- [ ] Preferred production method (wild or farmed)
- [ ] Economic benefits to harvesters and their communities
- [ ] Sustainability
- [ ] Taste, appearance, and/or freshness
15. Are your top ranked features from the prior question important for all types of seafood or only for specific species?
   o All types of seafood
   o Specific seafood species (please specify): ______________________________

16. Generally speaking, how satisfied are you with the current availability of seafood where you usually shop?

   Please rate your overall satisfaction using the scale of 'Not at all Satisfied' to 'Extremely Satisfied'.

<table>
<thead>
<tr>
<th>Not at all satisfied</th>
<th>Neutral</th>
<th>Extremely satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. If you are not satisfied with the availability of seafood where you usually shop, please briefly explain: ______________________________

18. More specifically, how would you rank the availability of seafood with the following features where you usually shop?

   Please rate each option using the scale of 'Poor' to 'Excellent', or as 'Not Sure'. 
<table>
<thead>
<tr>
<th></th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
<th>Not Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate information about</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>seafood product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convenience of meal preparation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health benefits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affordability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferred production method</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(wild or farmed)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Economic benefits to</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>harvesters and their</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>communities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taste, appearance, and/or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>freshness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Willingness to pay**

19. How much more are you willing to pay for seafood with the following features?

Please compare to the cost of seafood that does not have these features.
<table>
<thead>
<tr>
<th></th>
<th>0% more</th>
<th>5-10% more</th>
<th>11-20% more</th>
<th>21-30% more</th>
<th>31-40% more</th>
<th>41-50% more</th>
<th>51% or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate information about seafood product</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Convenience of meal preparation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Health benefits</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Preferred production method (wild or farmed)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Economic benefits to harvesters and their communities</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Sustainability</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Taste, appearance, and/or freshness</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
20. Please indicate whether your willingness to pay more for the seafood product feature(s) you just selected is relevant for:
   o All types of seafood
   o Specific seafood species (please specify): ____________________________

**Seafood purchasers at restaurants**

**Seafood purchasing behavior**

21. How often do you typically purchase the following types of seafood at restaurants or other food service establishments?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Less than once every three months</th>
<th>Once every 2-3 months</th>
<th>Once per month</th>
<th>2-3 times per month</th>
<th>Once per week</th>
<th>Twice or more per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmon</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Tuna</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Sardine or herring</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Cod or halibut</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>----------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Crab or lobster</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shrimp or prawn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam or oyster</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tilapia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22. If you indicated purchasing other type(s) of seafood, please specify them here:

_______________

23. When your preferred seafood is unavailable where you usually eat, are you willing to substitute with other types of seafood?
   - ☐ Always
   - ☐ Sometimes
   - ☐ Rarely
   - ☐ Never

*Attitudes and opinions*

24. To what extent do you agree or disagree with the following general statements related to seafood products?

Please rate each statement using the scale of 'Strongly Disagree' to 'Strongly Agree'.
<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Disagree nor Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of seafood (e.g., species) is the most important factor to me when choosing what seafood to eat</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>It is easy to know whether or not a seafood product is sustainable</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Information is typically available about which seafood species I am purchasing</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Information is typically available about the geographic origin of a seafood product</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I find it easy to access seafood products from Canada</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I find it easy to access seafood products from my local region</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Statement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Individual fishers and producers in Canada are paid fairly for the seafood they harvest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>High quality seafood is readily available where I live</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Seafood is a healthy food choice</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I prefer fresh seafood over frozen seafood</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Seafood should have official certification (e.g., Marine Stewardship Council) to prove that it is sustainable</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I’m concerned with possible food safety issues associated with seafood</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I prefer wild-caught seafood over farmed seafood</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Seafood is affordable</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Seafood is easy to prepare</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
25. When you purchase seafood, how important are the following product features?

Please rate each option using the scale of 'Not Important' to 'Very Important'.

<table>
<thead>
<tr>
<th></th>
<th>Not Important</th>
<th>Not Very Important</th>
<th>Moderately Important</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate information about</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>seafood product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convenience of meal preparation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Health benefits</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Affordability</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
26. If there are additional feature(s) that are important to you when you purchase seafood, please specify them here: ____________________________________________

27. When purchasing seafood, how would you rank the importance of the following features?

Please rank the importance of the following list of features from 1 to 9 (where 1 = Most Important) by dragging and dropping each feature into the appropriate numbered position on the list below.
28. Are your top ranked features from the prior question important for all types of seafood or only for specific species?
  o All types of seafood
  o Specific seafood species (please specify): ______________________________

29. Generally speaking, how satisfied are you with the current availability of seafood where you usually eat?

Please rate your overall satisfaction using the scale of 'Not at all Satisfied' to 'Extremely Satisfied'.

<table>
<thead>
<tr>
<th>Not at all satisfied</th>
<th>Neutral</th>
<th>Extremely satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
30. If you are not satisfied with the availability of seafood where you usually eat, please briefly explain: ________________________________

31. More specifically, how would you rank the availability of seafood with the following features where you usually eat?

Please rate each option using the scale of 'Poor' to 'Excellent', or as 'Not Sure'.

<table>
<thead>
<tr>
<th></th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
<th>Not Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate information about seafood product</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Convenience of meal preparation</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Health benefits</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Affordability</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Preferred production method (wild or farmed)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Economic benefits to harvesters and their communities</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Sustainability</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Taste, appearance, and/or freshness</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

_Willingness to pay_

32. How much more are you willing to pay for seafood with the following features?

Please compare to the cost of seafood that does not have these features.
<table>
<thead>
<tr>
<th></th>
<th>0% more</th>
<th>5-10% more</th>
<th>11-20% more</th>
<th>21-30% more</th>
<th>31-40% more</th>
<th>41-50% more</th>
<th>51% or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate information about seafood product</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convenience of meal preparation</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health benefits</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local or domestic origin</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferred production method (wild or farmed)</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic benefits to harvesters and their communities</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainability</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taste, appearance, and/or freshness</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
33. Please indicate whether your willingness to pay more for the seafood product feature(s) you just selected is relevant for:

- All types of seafood
- Specific seafood species (please specify): ________________________________

At home seafood consumers and non-purchasers

Access and consumption behavior

34. Where do you currently obtain the seafood consumed within your household?

Please select all that apply.

- From myself or a member of my household who fishes
- From a friend or family member outside the household who fishes
- From another source (please specify): ________________________________

35. How often do you typically consume the following types of seafood in your household?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Less than once every three months</th>
<th>Once every 2-3 months</th>
<th>Once per month</th>
<th>2-3 times per month</th>
<th>Once per week</th>
<th>Twice or more per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmon</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Tuna</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
### Seafood non-purchasers and non-consumers

#### Barriers to consumption

37. What are your reasons for not currently purchasing or consuming seafood?

Please select all that apply.

- [ ] High price
- [ ] Dislike taste
- [ ] Lack of availability
- [ ] Difficult to prepare
- [ ] Environmental impacts
- [ ] Health reasons
- [ ] Other (please specify): ________________________________
Demographics

38. You are:
   o Female
   o Male
   o Trans
   o Other: ________________________________
   o Prefer not to answer

39. Your age group is:
   o 19 or younger
   o 20-29
   o 30-39
   o 40-49
   o 50-59
   o 60-69
   o 70 and older

40. What is the highest level of education that you have attained?
   o High school or less
   o College or technical school
   o Some university or undergraduate degree
   o Graduate degree

41. What was your annual total household income (in Canadian dollars) during the last year?
   o Below $20,000
   o $20,000-$39,999
   o $40,000-$59,999
   o $60,000-$79,999
   o $80,000-$99,999
   o More than $100,000