



Final Report

To determine how Nova Scotia's lobster industry can increase its competitiveness and profitability — a pilot project

For the Catch-to-Plate Committee

Authors

Martin Gooch
Nicole Marenick
Jo Ann Fewer
Helen Arenburg
Karen Phillips
Dan Laplain
Benjamin Dent

Date of Report: January 28, 2015

About This Project

This project was conducted by VCM International (www.vcm-international.com) and Perennia Agriculture and Food Inc. (www.perennia.ca).

The project applied a rapid value chain analysis (RVCA) methodology to evaluate the current performance of Nova Scotia's lobster industry as perceived by representative fishermen operating in LFA 32 (a number of who also fish in other LFAs, including 33 and 34), buyers, live lobster shippers, industry organizations, retailers, and wider industry stakeholders (these included representatives from industry associations and government). Further insights were produced by analyzing anonymized data provided by industry and government.

Individuals' perceptions reflect their experiences and personal beliefs, which need to be understood as it influences how they will respond to potential recommendations. Critiquing "where people are now" through the application of RVCA enables the development and implementation of more effective solutions than if attempting to start from the perspective of "if individuals had more knowledge and possessed a dispassionate outlook."

The report contains assessments that are not necessarily the views of the authors, Perennia, or the Nova Scotia Department of Fisheries and Aquaculture.

Table of Contents

List of Tables	3
List of Figures	3
Executive Summary	4
1 Introduction	7
2 Research Methodology	8
2.1 Value Chain Analysis	8
2.2 Research Overview	10
2.2.1 Literature Review	10
2.2.2 Consumer Research	10
2.2.3 Rapid Value Chain Analysis	11
3 Research Findings	14
3.1 Consumers	14
3.2 Catch	16
3.2.1 Lobster Fishing Areas	21
3.2.2 Pricing Model	22
3.3 Buyers	24
3.4 Live Shippers	25
3.5 Processors	26
3.6 Markets	27
4 Conclusions	29
5 Recommendations	31
5.1 Initiatives That Involve the Nova Scotia Government	32
5.2 Initiatives That Extend Beyond the Nova Scotia Government	34
Appendix A	35

List of Tables

Table 2-1: Consumer Research Sample Frame.....	11
Table 2-2: Anonymized Interviewees.....	12

List of Figures

Figure 2-1: The Five Blocks of Nova Scotia’s Lobster Industry.....	13
Figure 3-1: How do you prefer to purchase lobster in a retail store, assuming it was available for sale?	16
Figure 3-2: Aggregated Price Trends across All LFAs.....	17
Figure 3-3: Scatter Plot of LFA 32 Prices in 2013.....	17
Figure 3-4: Price Spreads by Month for LFA 32 in 2013.....	18
Figure 3-5: Catch Weight Spreads by Month for LFA 32 in 2013.....	18
Figure 3-6: Prices Received in LFA 32, 33, 34: 2002-2013.....	19
Figure 3-7: Size of Catch Landed in LFA 32, 33, 34: 2002-2013.....	20
Figure 3-8: Impact of Effort Based Management and Speculative Pricing on Fishermen’s Behaviour.....	23
Figure 3-9: Impact of Current Situation on Industry’s Ability to Create and Capture Value.....	23
Figure 3-10: Comparative Analysis of Historical Snow Crab and Lobster Prices.....	24

Executive Summary

An industry's competitiveness and performance is determined by the extent to which the practices of the involved businesses and the value chains in which they operate reflect the five principles (listed below) of effective value chain management (VCM). These principles are currently not well evident when Nova Scotia's overall lobster industry is viewed from a whole of chain perspective.

Principles of Effective Value Chain Management

1. Focus on customers and consumers
2. Get the product right every time
3. Ensure effective logistics and distribution
4. Maintain constructive relationships
5. Establish effective communication and information systems

Differences exist in the extent to which specific stakeholders and sectors of industry reflect each of the five principles. The Nova Scotia lobster industry was found to comprise five sectors: catch, buy, live storage, process, and market. See Figure 2-1 (page 13) for a graphical representation of these five sectors. The findings suggest that those sectors which least reflect the principles of VCM are fishing and buying.

Nova Scotia enjoys a reputation of producing some of North America's highest quality lobster, and all five sectors of Nova Scotia's lobster industry comprise innovative and charismatic individuals. However, these individuals operate in relative isolation within a system that is unnecessarily complex. Consequently, while Nova Scotia's lobster industry is said to have improved its performance markedly compared to 20 years ago, the industry is in danger of squandering opportunities due to how it operates from strategic and operational perspectives. This has led to downstream businesses and consumers perceiving lobster to be a commodity rather than a premium item, although the industry tries to convince itself otherwise. A notion that traceability is a silver bullet that can reverse this trend is wrong. Traceability can assist industry to capture added value in consumers' eyes; however, its primary value stems from how it enables businesses to manage their operations more effectively and efficiently than otherwise possible.

Reasons for the current situation include that the consumer market is changing rapidly. How industry operates is changing only from a tactical sense, such as adopting technology to perform traditional practices more efficiently or reacting to increased market demand from Asia. A cultural mindset steeped in tradition, LFAs' current structure, along with a speculative pricing model and little connectivity with downstream businesses, has motivated the majority of lobster fishers to focus on quantity not quality. The lack of effective price discovery and reporting mechanisms has fueled ongoing resentment between fishermen,¹ shippers, and processors. The lack of effective reporting mechanisms has also created an illusion among fishermen that downstream businesses are profiting at their expense. Yet, like-for-like, it appears that fishermen generally attain greater profits and enjoy higher returns on investment than any other stakeholder. The lack of an effective science base and consumer insight leads to decisions made along the

¹ In the context of this report the term "fishermen" is used descriptively to denote people whose profession is the catching of lobster. It does not denote a specific gender.

value chain often being based on subjective assumptions rather than objective facts. This has led to industry reflecting few strategic considerations on how it operates and is governed.

This situation is not the fault of a specific agency, industry sector, or government department; it is a system-wide issue. The present situation has essentially been self-imposed, largely because the Nova Scotia lobster industry exhibits characteristics that are more akin to an emerging industry. These characteristics include the lack of effective quality management systems and pricing arrangements that reflect measurable determinants of value, and the lack of structure conducive to enabling consumer and customer-centric self-adjustments to occur. The root cause of this situation appears to lie in:

1. How a web of regulations, policies and infrastructure has not kept pace with the macro changes that have led to lobster becoming an increasingly important element in Nova Scotia's seafood industry and overall economy; and
2. How a lack of informed objective perspectives has led to polarized views and a distrusting industry culture.

The combined effects of the above have produced enormous disconnects and have fostered acrimonious relationships that typify the industry. This has negatively impacted the lobster industry's development, resulting in a less innovative, efficient, and successful industry than could otherwise exist.

The most obvious examples of the current practices, policies, legislation, and regulations found to have enabled the development of an industry that is structured to underperform² include the following:

1. Lobster fishing areas (LFAs) motivate many fishermen to focus on volume ahead of other considerations. This produces severe fluctuations in supply, resulting in enormous inefficiencies and waste. It also lessens industry's ability to operate effectively in relation to market demands.
2. The existence of a speculative pricing model does not reflect consumer-recognized value (other than price) nor quality. This leads to businesses primarily managing risk by paying the lowest price.
3. Licencing arrangements are unstructured from the perspective of proactively motivating and enabling the creation of innovative consumer-centric value chains.^{3 4}
4. Legislation separates the ownerships of boats from land-based operations. The global seafood industry is increasingly vertically integrated, because it enables greater coordination and creation of value. Independent fishermen are benefiting from aligning themselves with these initiatives.
5. Data on lobster catch, sale, price, downstream purchasing arrangements, processing, exports, and imports is largely gathered, analyzed, and reported in isolation, and "after the fact." This produces insights that lack rigour and have limited value for enabling informed policy and business decisions.

² This description is cited from the Gardner Pinfold report: *From Trap to Table – A long Term Value Strategy of the Canadian Lobster Industry* (October 2010).

³ The Nova Scotia Department of Fisheries and Aquaculture issues both Fish Buyers and Fish Processors Licences. Specifically for lobster, buyers may fit into one of several categories, dependent on their date of entry. Pre-1994 buyers are not required to maintain a holding and handling facility. Those licensed between 1994-2004 must have a holding and handling facility. Those licensed post 2004 require a holding and handling facility, as well as an approved Nova Scotia Live Lobster Protocol or the CFIA equivalent. Many buyers are licensed for a wide variety of species and do not actively engage in purchasing and/or exporting activities for all species. Many lobster buyers also operate CFIA registered processing facilities and hold provincial processing licenses. These licenses are linked to a specific facility.

⁴ Licences managed by the federal government include boat licenses and the licensing of processors from a food safety perspective.

6. A plethora of provincial and federal government departments reactively oversee distinct sections of industry, largely in isolation of each other.

The consumer research revealed a number of opportunities to increase market penetration and the frequency of purchase, and to add value to lobsters through developing new products. Retailers emphasized how much the market and demand for lobsters has changed, even over the last 10 years, with lobster increasingly viewed as a relatively expensive commodity compared to seafood alternatives.

The factors that have shaped how industry operates have led to an inflexible production-focused system, which might have made sense when business was largely provincial or regional, demand exceeded supply, and consumer demands were largely undifferentiated and static. In today's global marketplace, the current system diminishes the ability of Nova Scotia's lobster industry to respond to competition, and exploit the market opportunities that are emerging from increasing diverse consumer segments in which trends are dynamic.

The report concludes by making recommendations on activities that can translate into stakeholders acting in a manner that will enable Nova Scotia's lobster industry to benefit economically from capturing the market opportunities that undoubtedly exist, resulting in a truly sustainable industry. Recommendations accepted by industry would be piloted in LFA 32 in association with downstream stakeholders.

Findings contained in the body of the report are supported by a detailed value chain map that forms Appendix A. The map contains information provided by interviewees that could not be verified through the analysis of quantitative data. This includes average prices received in 2014.

1 Introduction

Financial and economic performance is an outcome of factors associated with individuals' motivation and ability to make then implement management decisions in a structured reiterating process, resulting in appreciable and continual improvements in businesses' performance. This can only occur by establishing closer, more aligned strategies and operations within and between businesses and stakeholders than traditional transactional approaches allow. Combined with an enabling environment that motivates the involved individuals to apply available resources in a more consumer-focused and coordinated fashion than would otherwise occur, these factors enable businesses to innovate in ways that enable them to adapt to changing market demands.

The term "value chain management" (VCM) describes a process where businesses situated along the value chain purposely work together to attain sustainable competitive advantage. In developing closer strategic relationships, businesses acquire the ability to learn and accelerate the pace of innovation in line with consumer demands, leading to improved financial performance. Activities that do not create value for customers and consumers or are not required to create value for customers and consumers are waste. System-wide waste markedly reduces profitability and competitiveness.

Focused primarily on lobsters caught in LFA 32 and the Eastern Shore of Nova Scotia, the purpose of this project is to determine how Nova Scotia's lobster industry can measurably increase its competitiveness and profitability by assessing the industry from a whole of chain perspective. The objective of the project is to assist Nova Scotia's lobster industry to acquire the protocols, knowledge, and skills required to profitably produce, distribute, and then market live and processed lobster as effectively and efficiently as possible. This was achieved through characterizing the current state of the lobster industry from "catch to plate," and identifying gaps in capabilities or structure that, if addressed, could establish a more competitive industry.

The resulting insights enabled the research to generate a demand-pull versus production-push perspective. This generated new insights on opportunities to capture value from improving quality management and business practices, then produced recommendations for sharing with the wider industry. The findings enabled the project team to propose actions that can enhance the competitiveness of Nova Scotia's lobster industry.

2 Research Methodology

This project applied a rapid value chain analysis (RVCA) methodology (described below) to evaluate the current performance of Nova Scotia's lobster industry as perceived by representative fishermen operating in LFA 32 (a number of who also fish in other LFAs, including 33 and 34), buyers, live lobster shippers, industry organizations, retailers, and wider industry stakeholders (including representatives from industry associations and government). Further insights were produced by analyzing anonymized data provided by industry and government.

2.1 Value Chain Analysis

Value chain analysis (VCA) assesses whether the businesses that together comprise a value chain are effective at maximizing opportunities for creating value in the eyes of customers and end consumers, and efficient in adding value, producing, processing, and distributing live lobsters and lobster products. This requires that the value chain

- understands what customers and consumers value in the product/service and focuses on creating and delivering this value,
- develops strategic collaboration and operational co-operation, and
- strives for continuous innovation to improve both effectiveness and efficiency.

The research achieved this by analyzing the interplays that exist between the three sub-systems which determine the value chains' ability to acquire sustainable competitive advantage:

- 1) How physical processes, including research and development, are employed to produce attributes that customers/consumers value;
- 2) How information and communication relating to customer/consumer behaviour and the performance of products, services, and processes is generated, shared, and used; and
- 3) How relationships determine the strategic and operational alignment along the value chain to produce efficiencies and customer/consumer value, and how this influences the building of trust and commitment between businesses.

The RVCA employed for this study is a variant of this methodology. Its distinction is that the main data collection, analysis, and reporting takes place in an intense period of time. It produces a swift diagnosis, rather than generating detailed insights that are verified through extensively triangulating insights and results across a wide body of industry stakeholders. Further insights were produced by analyzing anonymized data provided by industry and government.

In combination, these techniques provided a rigorous and systematic assessment of the current state, root causes, and what changes in practices and behaviour (as well as external interventions) could enable Nova Scotia's lobster industry to benefit, by addressing critical gaps in the industry's value proposition from a customer and consumer perspective.

The RVCA was conducted in four phases, each of which is described below.

Phase 1: Define

The primary purpose of the define phase was to quantify the nature of the Nova Scotia lobster value chain under examination by investigating the perspectives of those businesses that participated in the study. This included mapping information and material flows, assessing the relative impact that specific factors have on performance, and identifying risk reduction opportunities. The analysis produced insights that quantified the extent to which revenues are being wasted on non-value adding activities, and the nature and extent of undesired effects. It also showed where improvement opportunities lie, and what strategies should be employed to identify root causes and develop long-term solutions. The analysis produced a structured framework that enables opportunities to be prioritized and identifies how performance can be measured quantifiably.

Consumers' perceptions of value towards Nova Scotia lobster and lobster products was assessed through primary consumer research. Conducted in November 2014, the research sought insights into the relative importance of specific attributes that consumers associated with live lobsters or lobster products purchased in retail stores and meal occasions in a restaurant (e.g., place of purchase, meal occasion, etc.). Further consumer insights were gained during interviews with retailers, restaurants, and distributors operating in Canada and the United States (US).

Phase 2: Measure

Once the present structure and nature of the industry level value chain was quantified, its performance was measured objectively using data collected and identified in phase 1. This enabled the researchers to assess the integrity of data used to measure performance, identify whether the correct metrics are used to measure performance, and evaluate the effectiveness of current processes. It also enabled the researchers to quantify the strength of relationships between activities occurring at multiple points along the value chain and suggest means to monitor such relationships more effectively going forward. It also enabled a determination to be made of the extent to which traceability can help Nova Scotia's lobster industry strengthen its competitive advantage, and why.

Phase 3: Analyze

The third phase of the project analyzed the data gathered in phase 2 in an attempt to identify the root causes of challenges faced by the businesses that together comprise the value chain. The results produced insights into where along the value chain the most effective improvements can be made over the short, medium and long term. This included identifying where along the value chain do the greatest financial challenges emanate and why.

Phase 4: Report

Insights produced during phases 1 to 3 of the research were analyzed to develop and propose practices that can improve the performance of individuals' businesses and the overall lobster value chain. The recommendations include how to implement the proposed solutions by establishing roles, responsibilities and accountabilities, and communicating the improvements through establishing key performance indicators. This will provide the value chain participants with the ability to continually improve upon the gains achieved prior to the project's conclusion by controlling the determinants of success. That improvements will occur at multiple points along the chain provides the opportunity for industry to innovate in ways that would not otherwise be possible.

2.2 Research Overview

Research findings form Sections 3 of the report. Section 5 contains recommendations for how Nova Scotia's lobster industry, initially as pilots with LFA 32, can act upon the findings to progressively establish a more effective, efficient, and sustainable lobster industry.

2.2.1 Literature Review

The project commenced with an extensive literature review. Conducted by Perennia, this is a separate document. The review informed subsequent phases of the research and provided a backdrop against which findings from the value chain analysis are presented. The review summaries:

1. Known insights into consumer perceptions of value relating to fresh (live) and processed lobster;
2. Drivers of consumer behaviour and purchasing trends for fresh (live) and processed lobster;
3. A typical route to the Northeastern US market for fresh, frozen and value-added lobster;
4. Lobster harvest locations and date;
5. Harvested volumes and prices according to industry defined indicators of quality;
6. Lobster imports and exports, by volume and quality;
7. Factors found to impact lobster quality, including the environment handling practices; and
8. Exemplary performers identified as occurring in the global lobster industry.

2.2.2 Consumer Research

As all successful value chain initiatives start and end with consumers, the study included primary consumer research. To produce an overall market perspective that extended beyond Nova Scotia, the research focused on capturing randomized responses from across the consumer population. Time and resource constraints did not allow consumer research to be conducted in the growing markets of Asia.

An online questionnaire was circulated in November 2014. The survey sought insights into the drivers and determinants of interviewees' consumption of food and seafood per se, along with current consumption of and perceptions towards lobster. Outreach was made via emails and social media announcements, through retailers, community groups, industry influencers, and personal contacts. In total, 805 responses were received. The sample frame and subsequent margin of error are presented below in Table 2-1.

Table 2-1: Consumer Research Sample Frame

	Actual Sample	Percentage of Total	Statistical Margin of Error (95% Confidence Level)
Total	805		
Canada	749	93%	3.6
Ontario	203	25%	6.8
Nova Scotia	431	54%	4.7
Eastern Canada (incl. QC)	68	8%	11.8
Western Provinces	44	5%	14.7
US	44	5%	
Other	12	1%	

* Segments apart from “Canada” and “Nova Scotia” have relatively small base sizes. These findings should be interpreted directionally only.

2.2.3 Rapid Value Chain Analysis

The insights contained in this report were gathered through confidential interviews conducted in Canada and the US with industry representatives during November and December 2014. Key insights are expanded upon in the detailed value chain map, which forms Appendix A. Each interview was conducted in a semi-structured format, enabling the researchers to delve into topics of importance as they arose, while ensuring that each discussion produced standardized responses that could be analyzed thematically. When an interviewee gave an example of a situation or mentioned an LFA other than 32, the researcher asked for comparisons in relation to lobsters harvested from LFA 32 and operations performed by fishermen or buyers associated with LFA 32. This enabled the findings to be contextualized.

Each interview lasted between one and three hours, and were mostly conducted in person. In a number of cases, individuals were interviewed more than once. The anonymized list of industry representatives who participated in the study forms Table 2-2. These interviews occurred outside of discussions held with the Catch to Plate Committee⁵ and official meetings held with government and industry.

⁵ The purpose of the Catch to Plate Committee, which comprises Eastern Shore Fisherman's Protective Association, harvesters, interested buyers, Nova Scotia Department of Fisheries and Aquaculture, and Perennia Food and Agriculture Inc., is to ensure viable growing coastal communities/industry, by creating higher lobster prices for provincial industry stakeholders throughout the value chain. This will be achieved by establishing and maintaining consistent quality lobster standards from boat to consumer, and reducing value loss.

Table 2-2: Anonymized Interviewees

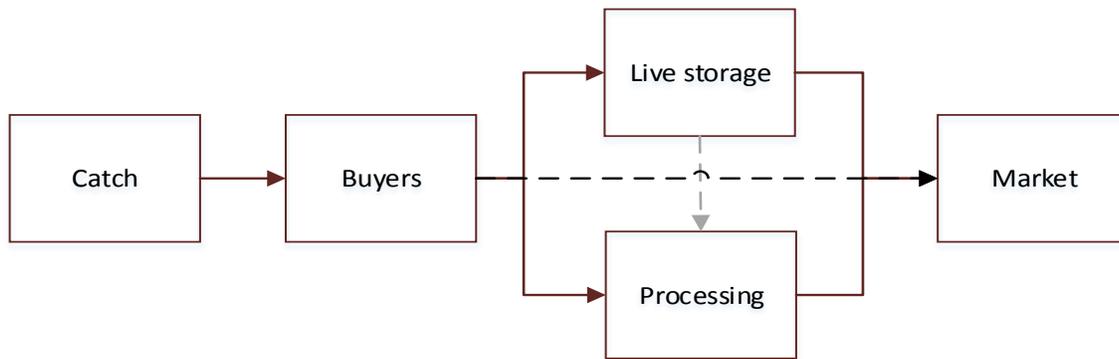
Industry Sector	Number of Interviewees
Fishermen	9
Buyers	3
Shippers	5
Retail	7
Restaurants / foodservice	2
Industry organizations	4
Service (logistical) providers	2
Government	5
Total interviewees	37

Many interviewees subsequently provided quantitative data that was analyzed to identify trends and other determinants of industry performance. Data on catches, prices, and sales were provided by fishermen. Information on vendors' prices, margins, operating costs, sales volumes, and retail prices was provided by retailers. Anonymized data on lobster catches (kg and price) was provided by the Nova Scotia Department of Fisheries and Aquaculture, and the federal Department of Fisheries and Oceans.⁶ This data covered the period 2002 to 2013, and was analyzed statistically to identify trends and patterns between catches and price by month, season, and year. Because interviewees stated that LFAs 33 and 34 influence the commercial and political environment in which LFA 32 operates, LFAs 33 and 34 were included in the statistical analysis.

The RVCA found that the lobster industry can be broken into five parts. Shown below in Figure 2-1, headline findings on each of the five parts regarding factors impacting current performance, along with associated challenges and opportunities, are presented in Sections 3.2 (Catch), 3.3 (Buyers), 3.4 (Live Shippers), 3.5 (Processors), and 3.6 (Markets).

⁶ The rigorousness of data analysis relies on the integrity of the raw data being analyzed. While obvious anomalies were filtered out prior to analyzing the data, VCM International cannot guarantee that the results accurately show price and catch trends and patterns across the three LFAs analyzed (32, 33, and 34) during the period 2002 to 2013. The analysis produced box plots to show the spread price and volume trends in quartiles. Control charts were developed to show a time series line chart of data superimposed with lines that show the average, and upper and lower control limits.

Figure 2-1: The Five Blocks of Nova Scotia's Lobster Industry



3 Research Findings

While the primary focus of the study is on LFA 32, the nature of Nova Scotia's lobster industry (and the Maritime lobster industry as a whole) means that LFA 32 cannot be considered in isolation. There are two key reasons for this. The first reason is that all but one LFA (#25) is open at some point during the LFA 32's April 20 to June 20 season.⁷ The second reason is that the storage of live lobster for up to six months means that lobster from any of the LFAs will at times simultaneously compete against each other. Weak soft-shelled lobsters with "low yield" (shipped to market immediately, because they are not suited to storage) compete against hardy hard-shelled lobsters with "high yield" (harvested months earlier) in the same market. This was raised on multiple occasions as one of the primary factors for why North American lobster has become commoditized in many circles and is valued less than alternative crustaceans, such as snow crab.

3.1 Consumers

As all successful value chain initiatives start and end with consumers, the first of the research insights presented are headline findings from the consumer research. To keep the survey length to a minimum, skip logic was used to avoid redundancy and minimize repetition. Furthermore, it was not a requirement that every answer be completed, as this would have encouraged participant drop-out. Therefore, not every question was answered by every participant. In some questions, interviewees were invited to provide more than one answer (e.g., select your top three choices). Therefore, results do not always total 100 percent or may exceed 100 percent.

Similar to former projects conducted by VCM International, consumers are driven by differing factors depending on the meal occasion. For everyday meals *nutrition* (66%), *taste* (54%), and *price* (40%) are the top three drivers. For special occasions *taste* (72%), *I will feel proud to serve it* (57%), and *my whole family will eat it* (53%) are the top three factors driving purchase decisions. This provides insight on how to develop and target different products to suit different types of meal. For everyday meals: what nutritional advantages does lobster offer? For special occasions: how can lobster be sold/prepared to make it appeal to all members of the family?

The majority of interviewees are eating seafood (excluding lobster) regularly. A third eat seafood several times a month, 29 percent eat it once a month and 23 percent eat it weekly. For use at home, they are mainly buying fresh fish (e.g., plain fillets) (81%), followed by canned (tuna or salmon) (73%), or plain frozen fish (66%).

However, contrary to seafood in general, the majority of interviewees (54%) report eating lobster just once or twice a year. Twelve percent report eating lobster monthly, and another 12 percent never eat it. Accordingly, increasing the frequency of purchase should be a priority for value chain initiatives.

Childhood experiences appear to impact lobster consumption later in life. Seventy-one percent who eat lobster remember eating it as a child; but just 42 percent of those who do not eat lobster recall being served it as a child. This suggests that lack of familiarity with lobsters may be one of the obstacles to attracting new shoppers.

⁷ This excludes LFA 40, which is entirely closed to inshore and offshore lobster fishing.

Segment That Does Not Eat Lobster

Among the 12 percent who do not eat lobster, only 15 percent do not eat lobster due to an allergy. The main barriers are that lobster is perceived to be too expensive and interviewees are uncomfortable selecting and cooking live lobster. A further 40 percent agree that lobster is *too hard to eat*, they *don't know how to prepare it at home*, and *it is not readily available at the restaurants they frequent*.

These findings strongly suggest that improving the convenience of lobster products in terms of preparation and eating could increase consumption amongst those who currently never eat them. Indeed, of the group who never eat lobster, 55 percent disagreed that *nothing would encourage me to eat more lobster*. A cheaper price and a better availability of pre-cooked lobster were the most cited reasons why they would consider eating lobster.

Segment That Eats Lobster

Interviewees report primarily buying lobster to eat at home, and they are generally buying live lobster (81%) or whole cooked lobster (46%). The vast majority of this segment eat lobster because they like it (97%). This group also agrees that lobster is *a consistently good quality eating experience* (86%), that *it's satisfying as a meal* (84%), and is *easy to prepare* (80%).

That said, only half of this segment indicated that they *know how to determine if a lobster is good quality*. Generally, they evaluate *the condition of the tank*, *look to see if the lobster is moving*, and check if it is *in season*.

Almost 80 percent also agreed that lobster from Canada or the US would be an indication of quality. The majority (81%) indicated a preference for Canadian lobster, especially from Nova Scotia (93%) or the Atlantic Region (92%). The majority indicated that they do not prefer lobster from the US, nor Maine, specifically. It should be noted, however, that these findings will be biased, due to the majority of interviewees living in Canada, and over half living in Nova Scotia.

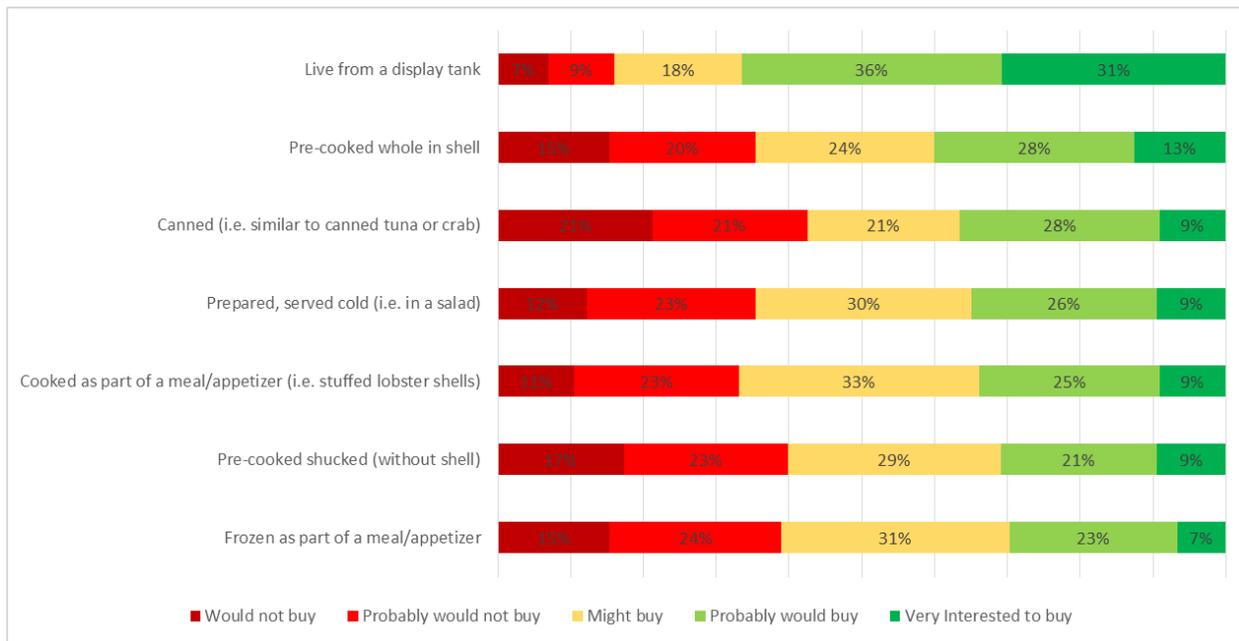
Among this group, almost half indicated that *convenience to prepare or eat* is important and a third indicated that *faster to prepare/eat* is important when buying lobster. However, less than half agree that lobster is *a convenient ingredient for meal preparation* and only 16 percent agree that *there is a good availability of pre-prepared lobster available*. This reveals that frequency of consumption could be increased amongst those already eating lobster if value-added products (faster and easier to prepare) were more widely available.

Among lobster eaters, half agree that *lobster is for special occasions*. Accordingly, there may be an opportunity to increase consumption by overturning this perception, which may largely originate from times when lobster was more expensive relative to other options.

These attitudes relating to convenience, availability, and lobster for everyday meals are likely barriers as to why people report only eating lobster a few times a year.

Although buying live lobsters from a tank was the most popular lobster product, interviewees expressed moderate to significant interest in buying all of the "ready to eat" options suggested in Figure 3-1 below.

Figure 3-1: How do you prefer to purchase lobster in a retail store, assuming it was available for sale?



N=550

The key implications of the consumer research are that it reveals a number of opportunities to increase market penetration and frequency of purchase, and to add value to lobsters through developing new products. While these opportunities require further investigation, they are primarily:

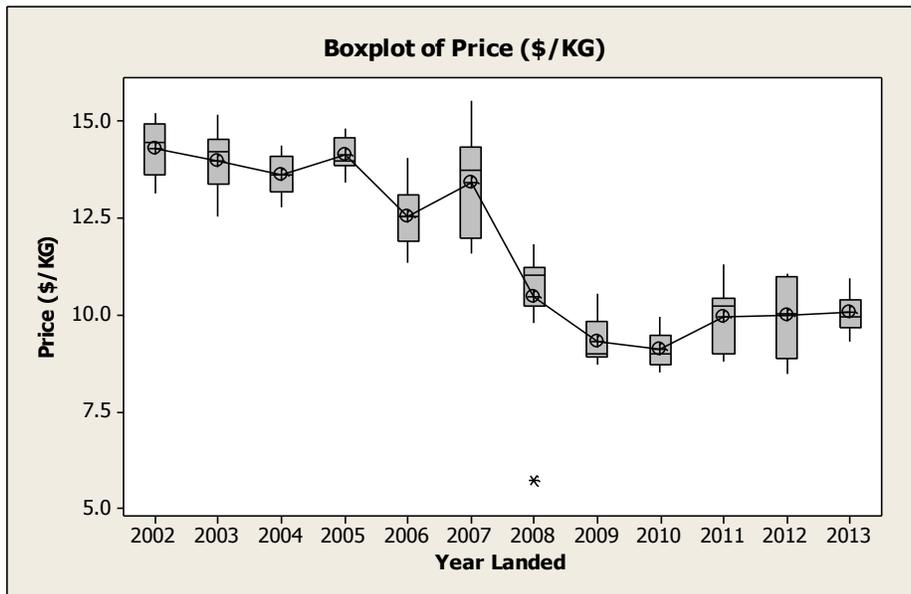
- Giving consumer greater confidence/more information about the quality of high quality lobsters;
- Making lobster more convenient, such as removing concerns about ignorance over quality; not wanting to kill a live animal; not knowing how to prepare a whole lobster; it taking too long to prepare and therefore impractical for more frequent consumption; appealing to all family members; and
- Promoting any nutritional advantages of lobsters and countering the historic perception that lobster should only be for special occasions.

3.2 Catch

Seafood is the only remaining sector of the mainstream food industry that reflects a hunter-gatherer approach. By nature this practice means that the opportunity to selectively harvest products (in this case lobsters) of a certain size and quality is limited compared, for example, to the production of livestock. This does not mean that fisherman are entirely dependent on natural forces in terms of determining what they can catch when.

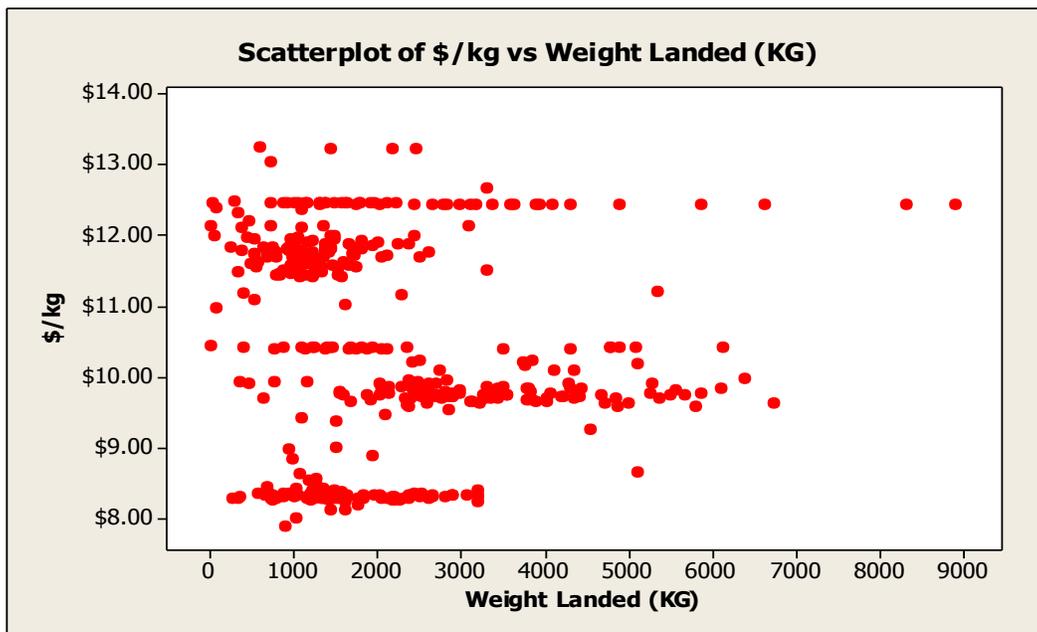
In 10 years (2002-2012), landings of lobster in the Maritimes rose by 40 percent (26,000 tonnes to 44,000 tonnes). Over the same ten years, prices paid at the wharf rose by 6 percent. Figure 3-2 shows the price trends that occurred between 2002 and 2013, aggregated across all LFAs in Nova Scotia. Presented as box plots, the results show a reduction in prices followed by a slight rise in prices from 2011 onwards. The results also show the extent to which aggregated prices varied in a particular year.

Figure 3-2: Aggregated Price Trends across All LFAs



A fitted line regression showed no causal relationship between individual catch size and price. It did, however, show three distinct groups of prices paid to LFA 32 fishermen in 2013. Termed a tri-modal scatter plot, further analysis of why these differences in prices occur, when they occur, and for which fishermen would require a robust data collection and analysis plan. The tri-modal findings are presented below in Figure 3-3.

Figure 3-3: Scatter Plot of LFA 32 Prices in 2013



Shown below in Figures 3-4 and 3-5 is further analysis conducted to assess whether a relationship exists between catch volumes and price during the time that an LFA is open. The example shown below is LFA 32 in 2013 over three calendar months (April, May, and June). Figure 3-4 shows prices (\$) by month; Figure 3-5 shows catch (kg) per month. As can be seen, prices decrease as the volume of catch increases. Similar results were found for LFAs 32, 33 and 34 in each of the years analyzed. While a correlation exists between price and supply, fluctuations in price are not statistically significant. Why price fluctuations consistently reflect a marked ceiling and floor price is unknown. A more detailed analysis of the current situation, including the relative impact of specific causal factors on price trends among specific boats, is not possible without the development of a thorough data collection plan.

Figure 3-4: Price Spreads by Month for LFA 32 in 2013

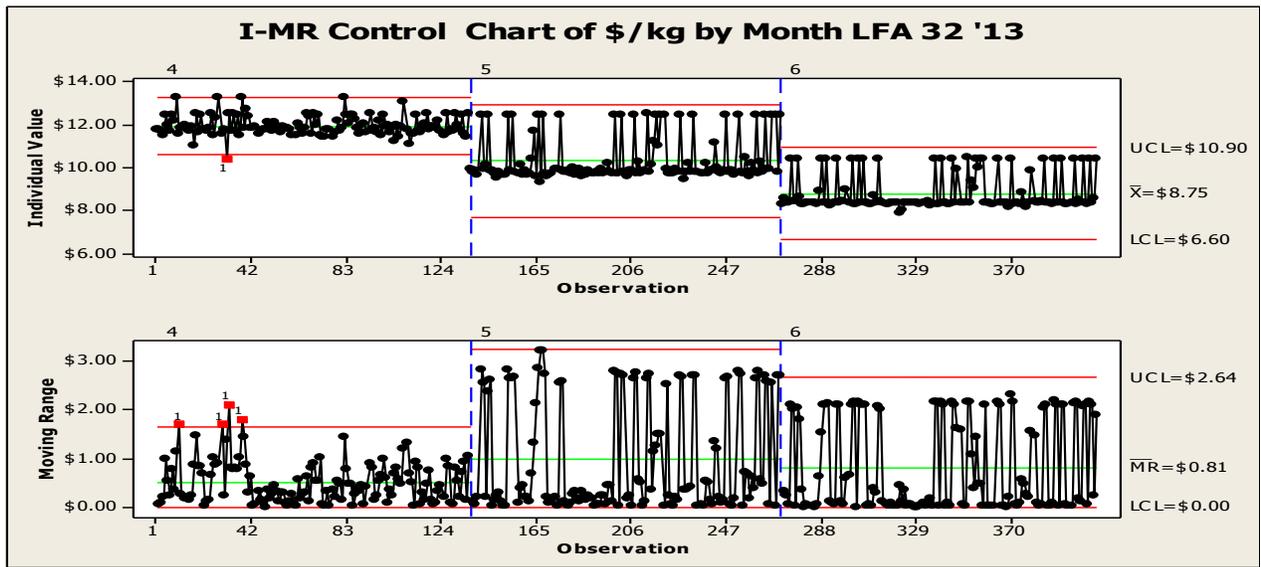
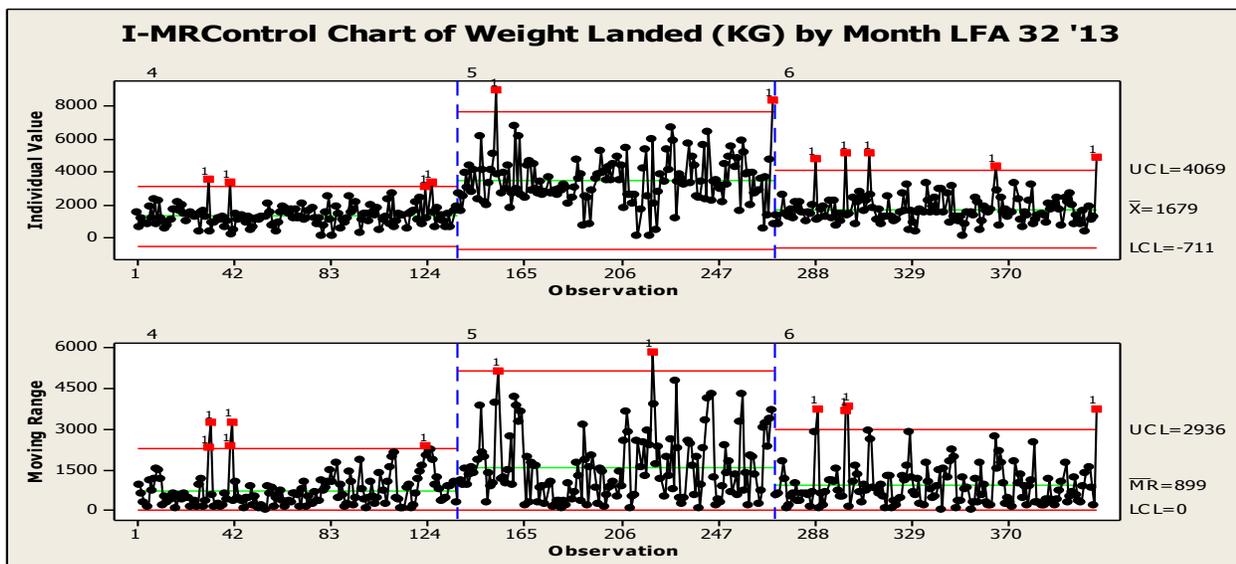


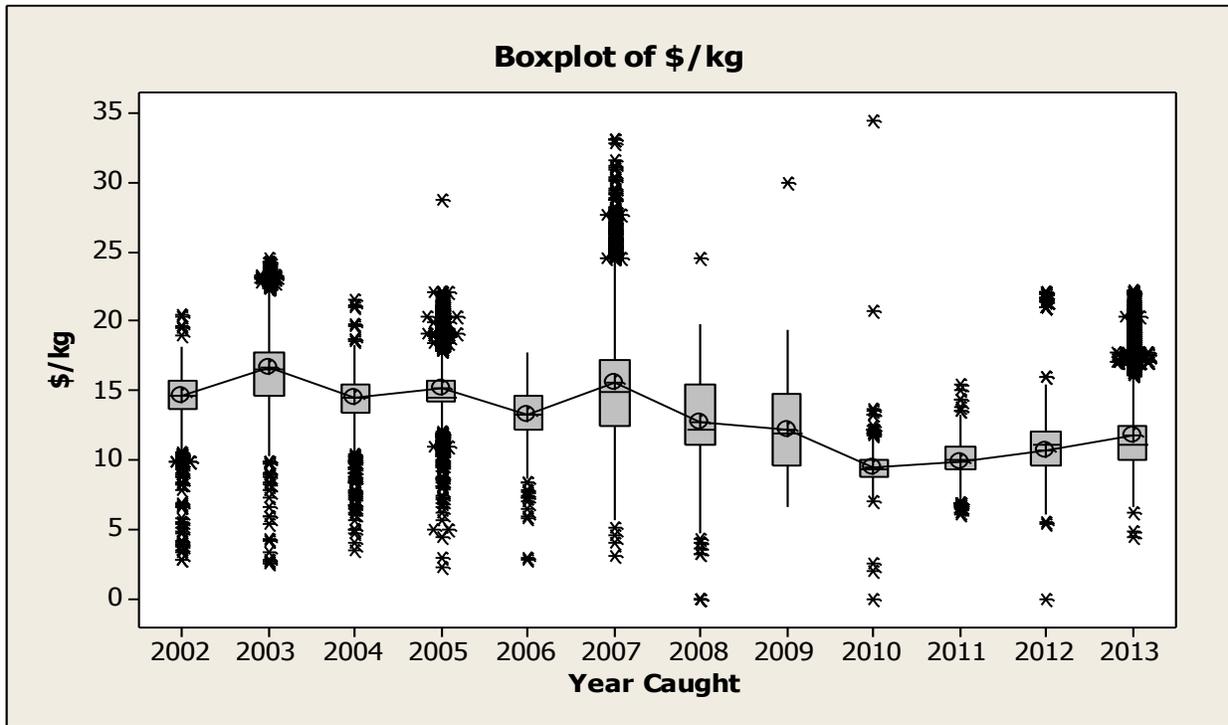
Figure 3-5: Catch Weight Spreads by Month for LFA 32 in 2013



Insights provided by interviewees support the data analysis, which showed that while increased catch is negatively impacting prices received by fishermen overall, certain fishermen operating in the same LFA and time period receive higher prices than others. Questions regarding why and which fishermen receive higher prices cannot be answered at this time.

Figure 3-6 shows the extent of price fluctuations across LFAs 32, 33, and 34 from 2002 to 2013. The results show a wide variation in prices paid in any year. The greatest price spread occurred in 2007.

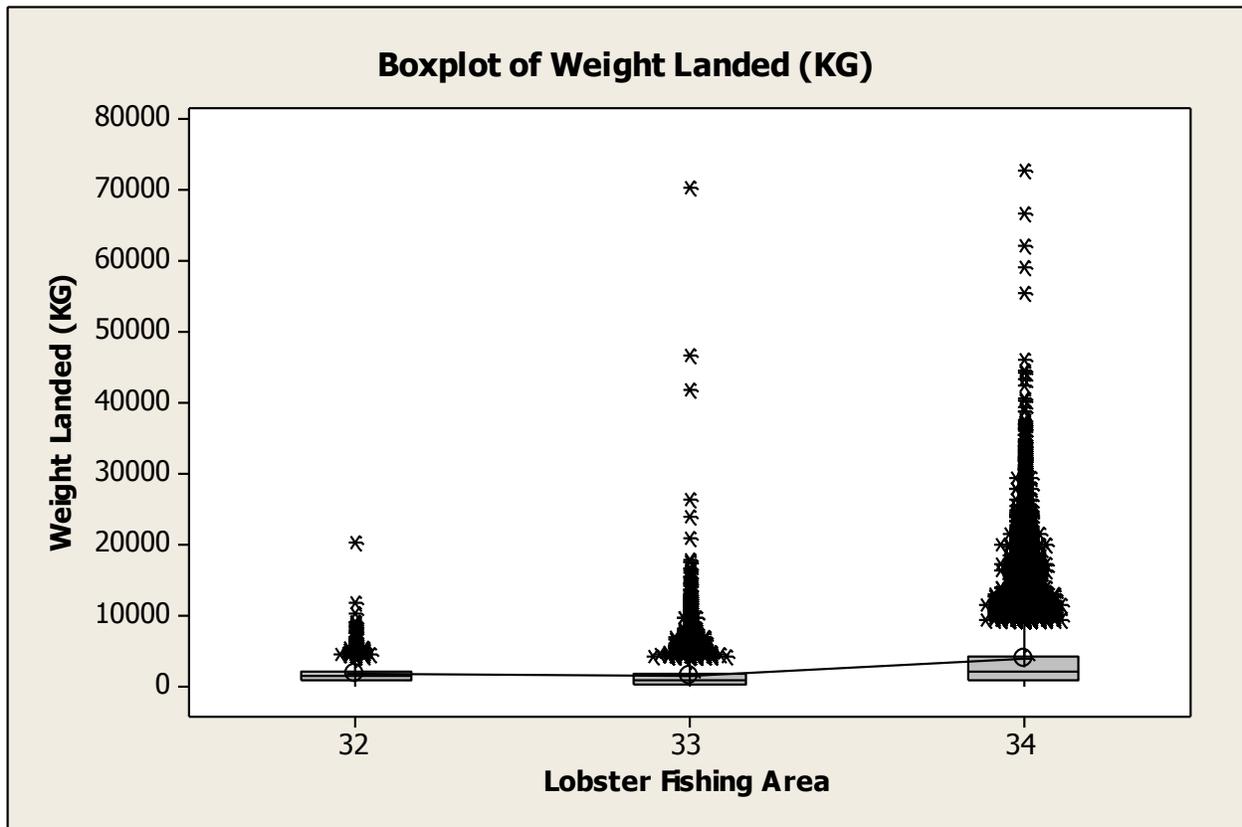
Figure 3-6: Prices Received in LFA 32, 33, 34: 2002-2013



No definitive reason is known for why such a marked increase has occurred in the lobster population. The assumption is that the increased catch is primarily due to a diminished ground fish population. With an increase in cod and other ground fish populations, if and when will a reversal in the lobster population occur? While this is not known, what is known is that the rate of recent increases in lobster catches is unsustainable. At some point the Maritime lobster population will plateau or reduce, and then the extent to which increased landings have masked the problem of a stagnant price will become clear, and the industry may lack the capacity to find alternative strategies. The risk of not implementing policies and practices required to maintain a healthy biomass was raised by most interviewees.

As shown below in Figure 3-7, the size of individual catches of lobster differs across LFAs 32, 33, and 34. The analysis also showed that, while no statistical difference exists between the average sizes of catch between LFAs, some boats catch considerably higher volumes of lobster than others. Insights provided by interviewees suggest that this is due (at least in part) to differences in the size and sophistication of fishing equipment. It is also due to location and seasonality. The seabed in LFA 34 is more conducive to lobster production than LFA 32. However, an example of the anomalies in the data provided by industry stakeholders is that individual catches reportedly reached approximately 70,000 kgs.

Figure 3-7: Size of Catch Landed in LFA 32, 33, 34: 2002-2013⁸



An important finding is that no obvious correlation was found to exist between catch size and price. Nova Scotia’s lobster industry undeniably comprises innovative fishermen. The findings may support interviewees’ perspectives that fishermen can be categorized into two general groups: “strategists” and “conservative.”

The term “strategists” denotes that people in this group actively seek to learn and apply their resources to maximum effect by viewing their operations and linking to the wider industry from a strategic perspective. Interviewees stated that they proactively seek opportunities and believe that they are accountable for their own commercial success, and are believed to comprise approximately 25 percent of the fishermen operating in LFA 32. These types of fishermen may consistently achieve higher prices than others.

The term “conservative” denotes that this is a group of people who stick rigorously to historical approaches. They may use new technology and larger boats than previously to catch more lobster, though the fundamental way in which they operate and the information on which they base key decisions has largely not changed — perhaps for decades. The challenge that they pose for the industry’s future is that being the largest segment of the population translates to them having the loudest voice.

⁸ Anomalies surrounding extreme catch weights should be disregarded.

3.2.1 Lobster Fishing Areas

Of the challenges and opportunities discussed during the research, LFAs received the greatest attention. All but one of the interviewees (36 out of 37 / 97%) believe that LFAs in their present form are one of the top three root causes of issues that negatively impact the competitiveness and profitability of Nova Scotia's lobster industry. The factors that received the second and third highest topics of attention are the speculative pricing system by which lobsters are sold at the wharf, and buyers (discussed in Section 4.3).

The data analysis appears to refute perspectives commonly expressed by interviewees towards LFAs. One such perspective is the notion that each time an LFA opens, the prices received across all LFAs are reduced. The analysis does not show a direct correlation between prices and the opening of LFAs. The only indirect correlation between the LFAs and prices is the impact of increased volume on price, due to supply and demand fluctuations that occur in a commodity-orientated industry. This increase in volume occurs due to lobsters feeding more as the water warms and in preparation for moulting, not just because LFAs are open.

The 2002 to 2013 data provided by DFO appears to refute three other commonly held misconceptions: 1) all fishermen receive similar prices on the same day, 2) the average catches of boats operating in LFA 33 and 34 have increased markedly compared to average catches in LFA 32, and 3) that the average prices received by LFAs 33 and 34 are considerably higher than the average prices received by LFA 32. These misconceptions help perpetuate what was commonly described by Nova Scotia interviewees as a distrusting "us versus them" attitude, particularly among fishermen, and an unwillingness to consider new business models. Why these misconceptions continue appear to include the lack of an effective price discovery and market reporting system.

The LFA model was referred to as an effort-based management system, meaning that it determines the effort that fishermen can invest to catch lobster. This assessment is not entirely correct. Fishermen have invested increasingly greater effort into purposely mitigating restrictions imposed on them by the LFAs. The most obvious effect of LFAs is how they motivate fishermen to catch as many lobster as humanly possible in a specific space of time, for fear of someone else catching "their" lobster. Interviewees stated that this behaviour produces severe fluctuations in volume and quality. This, in turn, negatively impacts downstream businesses' efficiencies and ability to capture value. At times, it also results in significant wastage of resources and high levels of mortality. The economic implications of this, stated by most interviewees, is the negative impact that these losses have on buyers' willingness to pay higher prices.

Interviewees stated that the reasons for why LFAs have developed as they have are due to the lobster industry being highly traditional and regulated. They are also due to the DFO basing decisions relating to LFAs on political rather than economic factors. The DFO's focus is on appeasing the majority of fishermen, which has prevented them from adopting a value chain perspective.

Marketers of live lobsters described LFAs as "human made boundaries which lobsters do not follow" and "a challenge that we have addressed by making enormous investments in sophisticated storage facilities." From a traditional fishermen's perspective, the lack of firm evidence about how an alternative system would work to the benefit of fishermen appears to perpetuate an attitude of "LFAs might not be the right approach, but I am comfortable with them, so I support their continuation." Another assumption that perpetuates the continuation of LFAs is that they are necessary for sustaining the lobster population. While LFAs assist in

sustaining the lobster population by limiting the duration of harvest,⁹ they encourage fishermen to catch the most lobsters possible — often when they are not at their peak quality. This suggests that LFAs could hinder the establishment of a sustainable lobster population. Numerous interviewees also stated that there is limited correlation between LFAs and

- market demand
- quality
- meat yield
- the best time to catch

Even if market demand from Asia continues to grow, potentially offering some level of counter-seasonal demand compared to traditional North American markets, issues relating to the management of LFAs compared to meat quality and yield will continue.

This is not to say that the majority of interviewees believe that LFAs should be eradicated. Very few hold that belief. The concern is that the current management of LFAs perpetuates an inflexible production-focused system, which might have made sense when business was largely provincial or regional, demand exceeded supply, and consumer demands were largely undifferentiated and static. The current system diminishes the ability of the Nova Scotia lobster industry to respond to competition and exploit the market opportunities that are emerging from increasing diverse consumer segments in which trends are dynamic.

3.2.2 Pricing Model

That the current pricing model is entirely speculative and has no explicit correlation to value, as defined by customers and consumers (beyond), perpetuates a focus on volume. Interviewees stated that such a focus can lead to injuries through careless handling. The current pricing system was also stated to diminish fishermen's desire to only catch the highest quality lobster. If it meets minimum standards (size and not a berried female), then "it's a keeper!" This attitude increases the costs associated with downstream operations; for example, due to mortality, having to re-grade using quality criteria, needing to find outlets for low quality lobster, and uncertainty over the ability to fulfil orders for a higher quality product.

Fishermen who have tried to focus more on quality — often through more selective grading on the boat — acknowledge that it had largely proved to be futile, as the current pricing model does not reward them for their efforts. Rather than keeping only the best lobsters — those most suited for a defined market — the focus, therefore, is on keeping every possible lobster.

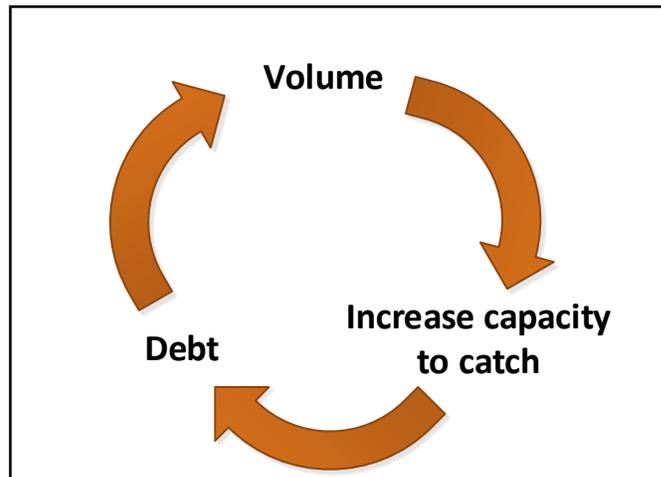
The majority of fishermen with whom we spoke stated that they would prefer a stable price to the current speculative pricing model. In general, based on current catch levels, a general consensus exists among interviewees that \$5.00 per pound enables virtually all fishermen to make a reasonable profit, regardless of the LFA in which they operate.

Presented below in Figure 3-8 is an illustration for why the combined effects of LFAs and a speculative pricing system translate into fishermen focusing foremost on maximizing their catch versus other

⁹ LFAs therefore manage the time-orientated effort that fishermen employ to catch lobsters. Their relationship to the management of bio-mass to achieve greatest affect is therefore incidental, not explicit by design.

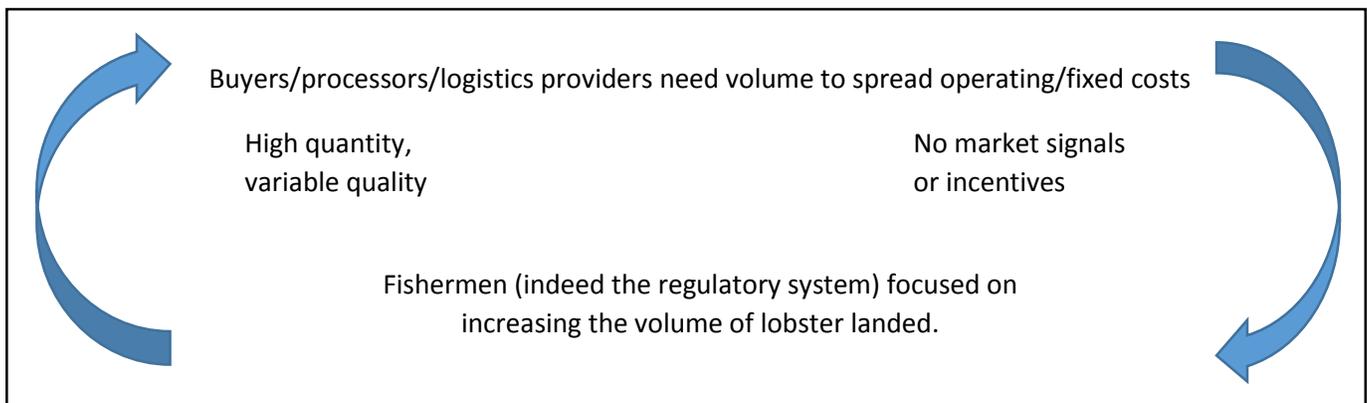
considerations. Volume has traditionally been viewed as the determinant of success. With more lobsters being caught by others, fishermen invest in larger boats and more technology. This results in greater debt, which motivates them to focus even more ardently on catching more lobster, and so on. That these cycles occur in an environment typified by envy of and distrust towards others (incl. other fishermen, buyers, shippers, etc.) exacerbates the situation further.

Figure 3-8: Impact of Effort Based Management and Speculative Pricing on Fishermen’s Behaviour



This has driven a race to the bottom – the commoditization of Nova Scotia lobster – through the self-perpetuating cycle of behaviour that is illustrated below in Figure 3-9.

Figure 3-9: Impact of Current Situation on Industry’s Ability to Create and Capture Value

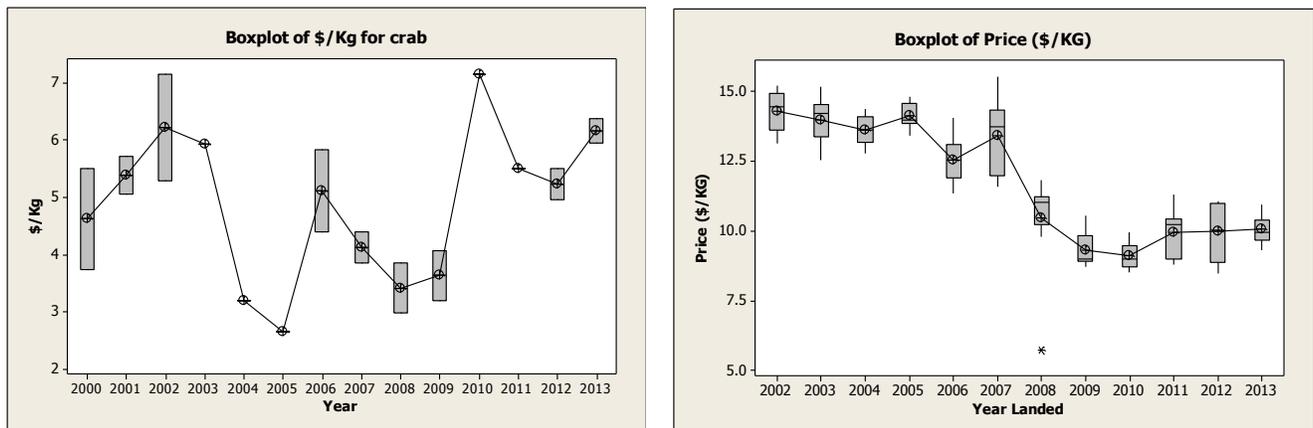


Breaking this cycle to enable the development of a more value-adding and market-focused lobster industry is why interviewees stated that Nova Scotia’s lobster industry would be better served by the introduction of a new management and pricing system. The optimal system would enable businesses to capture increased revenue and reduce operating costs, through having the flexibility required for participants to proactively react to changing market demands from a whole of chain perspective. A key challenge to introducing such a system is that little empirical research is undertaken by the DFO to monitor the abundance of lobster at

various stages of their lifecycle and optimize their quality and value at the time of capture. This would be necessary to enabling the effective management of a new system.

While quota systems were voiced by a number of interviewees as a means that has enabled the development of sustainable high value seafood sectors, such as halibut and snow crab, an analysis of snow crab versus lobster prices shows that the current snow crab quota system is not a panacea. As shown below in Figure 3-10, Nova Scotia snow crab prices have historically been more volatile than prices achieved by the current lobster pricing model. The quota system is said to have improved the quality and consistency of snow crab harvested, though it does not appear to have resulted in consistent prices.

Figure 3-10: Comparative Analysis of Historical Snow Crab (First Chart) and Lobster Prices



3.3 Buyers

Buyers were regularly referred to as the most disruptive element in the lobster value chain. This reflects a blame culture, where no one is willing or able to take leadership of the chain. The root cause of this perspective is the severe disconnects that occur between catch and subsequent links in the chain. Buyers believe that they have been unfairly portrayed and neglected by provincial and federal governments who, they believe, have “babysat fishermen” for too long. The words of one buyer sum up the attitudes of all buyers of lobster with whom we spoke: “We are caught between fishermen and government, which is no fun.” Others, including fishermen interviewed for the study, agree with both perspectives.

In essence, our analysis suggests that how the overall buying segment of the value chain operates is due to how a combination of government policies, unpredictable supply, defined periods of harvest, the lack of an informed objective reporting system, and a speculative pricing model have combined to produce a situation where most buyers opportunistically focus foremost on their immediate self-preservation (financially) ahead of other considerations. Purchasing and operational decisions are tactical at best. As with most of the lobster industry, few examples were found of strategic considerations being factored into buyers’ behaviour.

We found three categories of buyer, each driven by differing agendas and motivations. They are:

1. **Flippers:** little if any allegiance to any customer. Act solely on an arbitrage arrangement, buying at the lowest price then selling at the highest price in quick succession. Power is gained by keeping fishermen and customers apart, to limit the flow of timely and accurate information.
2. **Aligned:** engaged by a customer(s) (usually live shippers or processors) to buy lobster on their behalf, often on a flat commission that ranges between 50c to 75c per lb.
3. **Direct:** employed by a distributor, live shipper, or processor to buy directly from boats.

Regardless of the category into which buyers fall, competition is fierce — to the point that, on occasions, buyers knowingly buy sub-quality lobsters because they want to maintain their relationship with a specific boat. A common reason for this relates to buyers seeing the purchase of lobster as the means by which to secure access to higher valued seafood from the same boat; for example, snow crab and ground fish. Lobster is viewed as a loss leader. Buyers might break even or lose a little on lobster so that they can make money on other species. Handling lobster also enables buyers to spread their operating (fixed) costs across a larger volume and longer period of the year. This reflects objective bounded rationality on the part of buyers. It also suggests that a thorough analysis of lobster value chains would not occur in isolation of other species of seafood.

While the research was not sufficiently expansive to make a definitive conclusion about the influence of current regulations on buyers' behaviour, the majority of Nova Scotia interviewees believe that a flaw exists in how they are licensed and allowed to operate. This includes the buyers interviewed. Regardless of regulations and licensing arrangements, it appears likely that a more quality-focused, less speculative pricing model, along with an effective market reporting system, would help address the value chain disconnects that stem from buyers' attitudes and behaviour.

3.4 Live Shippers

The study encompassed live shippers and logistic service providers operating in Canada and the US. Four common themes emerged from the interviews and subsequent analysis. The first is the extent to which inconsistency in lobster health and quality can markedly increase shippers' and downstream businesses' costs, and overall financial risk. The second is the extent to which disconnects that exist between how and when lobsters are harvested and market demands is growing. The third is that lobster shipping is a nickel and dime volume-driven sector, which, with relatively few exceptions, essentially incentivizes the movement of lobster towards the market through reducing prices. The fourth is that a negative correlation is said to exist between when peaks occur in volumes harvested and the quality of lobsters received.

Every LFA believes it is the best; none are performing optimally. More importantly, this behaviour is leading to lobster becoming viewed as a commodity compared to competing crustaceans — examples given by interviewees included lobster produced elsewhere (e.g., Australia and Norway) and snow crab.

Investments that have occurred over the last two decades to produce a sophisticated (from a technical perspective) lobster storage sector is said to have resulted from the activities of a fishing industry that downstream interviewees stated as being largely out of touch with market realities. The main benefit that shippers perceive towards LFAs in their current form is that prices are reduced during periods of the year when lobsters are generally suitable for storing (January/February and May/June). However, as described earlier, it is the behaviour that current legislation and industry structure engenders in fishermen rather than

the LFAs themselves which results in reduced prices. Lower prices enable shippers to lessen their financial risk. On the flipside, the opening of LFAs regularly leads to increased volume and manmade issues that heighten shippers' risks. The most noticeable of these is low quality and incidences of injured lobsters.

During the research, examples were given of shippers in Nova Scotia and elsewhere that are considered exemplary. Unfortunately, no objective data appears to exist on how the performance of purported exemplars compare to the wider industry, and why. While shippers that are recognized as industry leaders track performance individually – through indicators such as operating costs, margin, mortality, and blood protein – other shippers do not. This is despite the fact that it was stated that buyers in Asia and elsewhere are willing to pay for yield and quality.

The lack of a rigorous systematic scientific reporting process means that the information that exists on shippers' comparative performance and determining factors from an industry perspective is anecdotal. So too is information on lobsters held in inventory and quality. That an objective system-wide reporting system does not exist means that there is a dearth of rigorous and timely information that could be used to identify and promote best practices. This dearth of data perpetuates the distrust and deceit that is displayed in how shippers relate to each other. It also perpetuates the severe disconnects and distrust that exist between shippers and upstream members of the industry, particularly fishermen, and the potentially incorrect assumptions that shape their opinions towards others.

3.5 Processors

As few lobsters caught in LFA 32 are believed to supply the processing sector, the RVCA invested considerably less attention on the processing sector than the shipment of live lobster. That said, driven by changes in consumer behaviour and attitude, the research findings suggest the processing sector will become an increasingly important facet (in terms of volume and potential value) to sustaining a viable lobster industry, particularly for supplying the North American market.

The processing sector is an important determinant of the lobster industry's viability. Of the estimated 330 million pounds of lobster caught annually in North America (205 million pounds of which are caught in the Maritimes), approximately 55 percent is processed. Canada processes the vast majority of North American lobster, primarily in New Brunswick and Prince Edward Island.

The importance of the processing sector to the success of Canada's overall lobster industry will only increase. Distributors, retailers, and foodservice operators told us that the importance and value of live lobster is diminishing in the North American market compared to processed lobster. Examples of value-added lobster products include whole cooked (popsicles, with or without brine), uncooked and cooked tails, and cooked and shelled lobster meat (tinned or frozen), while some retailers stock a much wider range of ready-to-cook/eat products. It stands to reason that, unless supplying popsicles, supplying processors with lobsters that are larger than those generally demanded by the live market would help reduce their operating costs — resulting in a more economically viable process industry. No evidence was found of such an approach existing in Nova Scotia's lobster industry, even though demand was found to exist for tails that are larger than those generally supplied to the end market. This reveals another opportunity for upstream members of value chains to become more market orientated.

3.6 Markets

Retailers and restaurants based in Canada and the US participated in the RVCA. While the research did not ignore growing markets such as Asia, the primary focus was Canadian and Northeastern US markets.

In retail and foodservice markets in both Canada and the US, there is a marked trend towards cooked whole lobsters and processed lobster products. Demand for live lobsters is regional and increasingly polarized within specific segments of the market. As reflected in the consumer research, drivers of this trend relate to both customers and consumers. Among the interviewees are individuals who have been at the leading edge of using traceability to achieve commercial advantage in the capture, production, processing, distribution, and marketing of seafood.

Customers (retailers and restaurants) are seeking ways to cut costs. For retailers, stocking live lobster is expensive due to the cost of maintaining the necessary tanks and associated equipment. That lobster is increasingly viewed as a commodity with narrow margins and higher mortality rates than other types of seafood negatively impacts the financial case for selling live lobster still further. The greatest driver behind the relative importance of live versus processed lobster for retailers is that the purchase of live lobsters is a purposeful decision — usually for intermittent special occasions.

The purchase of processed lobster is more often an impulse buy any day of the week. Reasons for this include consumers' perceiving the convenience of prepared lobster as added value, consumers' increasingly being uncomfortable with killing a live creature, and, in the words of a respondent who interacts daily with consumers, "cooking lobsters stinks the house out." All of these factors translate into sales of processed lobster occurring more frequently and offering retailers' greater net margin than live lobster; that is, unless an exception occurs, such as a retail store frequented by many consumers who prepare live lobster.

Factors driving the trend towards processed lobster in restaurants include that, for the same reasons as in retail, stocking live lobster is expensive. Other drivers include the need to cut costs by producing a consistent eating experience with fewer skilled staff. Processed lobster also enables restaurants to more precisely manage meal portions, reducing the cost per plate prepared. Restaurants are also challenged by the need to minimize the chances of a food safety incident occurring in their premises; handling live lobsters is considered a potential food safety issue.

The challenges facing lobster are exacerbated by changes that have occurred in the marketing of alternative seafood, against which lobster competes. Compared to other crustaceans, such as snow crab, retailers told us that lobster has not been marketed from the standpoint of differentiating it by quality or provenance. Compared to premium items, such as halibut or sock eye salmon, live lobster is available year round and is in plentiful supply. Consequently, it is viewed from a commodity perspective, with greater focus placed on price. A retailer cannot afford to pay above minimum prices to suppliers unless they are able to justify to consumers why they are charging a higher price than their competitors. That retailers experience higher shrink and operational costs for live lobster compared to other seafood further discourages them from paying above minimum prices. That the price of live lobster fluctuates also negatively impacts demand. As described by a US distributor: "Lobster is economics 101. Low prices translate into higher sales. Prices are only higher when demand outweighs supply."

None of three primary peaks in North American demand for live lobster occur during LFA 32's April 20 – June 20 season. While demand for live lobster increases around Mother's Day, retailers said that demand does not peak anywhere near that seen at Valentine's Day, Christmas, and New Year.

Traceability

In relation to traceability, interviewees stated that the role and purpose of traceability in the food industry as a whole (not just seafood) is changing rapidly. They also stated that, from experience, they knew that what consumers say about the value of traceability often does not translate into changes in their purchasing habits. They view the primary benefits of traceability as stemming from its use for operational reasons — to provide a level of transparency that enables businesses to reduce costs and improve quality by identifying root cause of issues that they experience. Traceability provides a means of collecting, gathering, and analyzing continuous measurable data to enable managers to make more informed objective decisions, and continually improve business performance — in the best cases, from a whole of chain perspective. This best occurs when the involved businesses share close trusting relationships. This means that traceability is important for effective value chain management.

Some interviewees stated that some elements of the Canadian lobster industry were using service providers and auditors (such as the Marine Stewardship Council) in an attempt to capture value from traceability. Others stated that sectors of the seafood industry which the Canadian lobster industry should look towards for ideas and inspiration include the Alaskan salmon industry, which has succeeded by developing its own verification programs.

4 Conclusions

Nova Scotia's lobster industry is missing opportunities to create and capture value. This impacts the commercial value of lobsters harvested from LFA 32. The primary cause of this situation is that the Nova Scotia lobster industry exhibits characteristics that are akin to emerging industries, not an established industry. The characteristics of emerging industries¹⁰ are

1. Competition being more common than cooperation among members operating at the same level of industry and between members operating at different levels of industry,
2. A lack of reliable information,
3. A lack of a marketing orientation, and
4. A lack of collective behaviour.

All four characteristics typify Nova Scotia's (and the wider Canadian) lobster industry. This produces the severe disconnects that interviewees stated as typifying the lobster industry and results in an industry focused on quantity. Little real regard is generally paid to producing products whose qualities are valued by consumers. Pushing high volumes of inconsistent quality products towards the market and not having an effective quality management system creates inefficiencies that impact everyone. Not proactively reacting to changing market demands, particularly for processed value added products, is seeing reduced consumption in traditionally important markets. This, the research suggests, is leading to lobster being viewed by many as an expensive commodity — not a premium item. As such, to the extent Nova Scotia Lobster is a brand, it is being damaged, because there is no collective ownership, nor any leadership to establish quality standards that the brand would embody to customers and consumers.

Numerous reasons exist for the present situation. They include a dearth of objective information on industry performance and determining factors, which has helped foster an environment of deceit and distrust. This dearth of information is due to a lack of standardized methods for gathering, analyzing, and reporting data from catch to sale in domestic and export markets. The situation has also been caused by policy and program decisions that have not considered the overall industry from a value chain perspective. This reflects the many comments interviewees made about the Nova Scotia (Canadian) lobster industry operating in a bubble and lacking a strategy. It also reflects the many comments made about the lack of an effective science-based (biological and organizational) decision process.

Vertical integration is increasingly common in all sectors of the seafood industry. Increasing value through differentiation and quality, along with restricting supply, typify the "premium" side of the seafood industry. Many interviewees believe that consolidation and rationalization will occur in Nova Scotia's lobster industry. The question asked by interviewees from industry and government was whether it will be a managed transition, coordinated from a strategic perspective, to produce a strong more vibrant industry; or will a crisis caused by external forces create an enormous indiscriminate upheaval that leaves industry in disarray?

¹⁰ Mowat A, Collins R. 2000. "Consumer behaviour and fruit quality: supply chain management in an emerging industry." *Supply Chain Management: An International Journal*, Vol. 5 Iss: 1, pp.45 – 54.

The research findings suggest that the stakeholders who generally enjoy the strongest position in the chain and are the least exposed to immediate financial risk are fishermen. However, like all industry stakeholders, fishermen face the risk of experiencing a marked reduction in lobster population.

Addressing the risks posed to industry by the potential for a marked and unexpected reduction in lobster population will require greater collaboration between the government departments and agencies that oversee the lobster industry than has previously occurred. It will also require greater cooperation between progressive industry leaders.

5 Recommendations

Set out below are recommendations for initiatives designed to enable Nova Scotia's lobster industry to create and capture added value that is presently being missed. The initiatives will act as demonstration projects, the results of which will be shared with industry to encourage a market-orientated shift in the attitudes and behaviours of individuals involved in the harvest, handling, distribution, and retailing of lobster. The first series of recommendations do not require the involvement of government agencies that are outside of Nova Scotia's jurisdiction. The second series of recommendations are purposely concise, longer term, and would require the involvement of government agencies that are outside of Nova Scotia's jurisdiction.

The recommendations reflect three themes that enable effective value chain management:

- 1) Those businesses from emerging industries that have succeeded the most have concentrated on implementing systems required to
 - acquire market knowledge,
 - establish effective information systems, and
 - establish effective marketing systems.
- 2) Systemic problems need systemic solutions. While initiatives, investments, and external interventions can be sequenced, they must form a coherent package across value chains. Piecemeal activities fail because unresolved problems elsewhere prevent them from delivering sufficient outcomes to sustain the engagement of businesses across the chain. This results in participants reverting to volume and price as the main currency, rather than remaining focused on a strategy based on volume and value.
- 3) A pre-requisite for achieving cooperation among participants from along the chain is that they must recognize and share the economic benefits that can flow from collectively focussing on consumers' needs. Two types of data are especially important for understanding and having the ability to react to consumer needs and demands:
 1. Product quality attributes, and
 2. How different consumer segments' behaviour responds to those attributes, in particular:
 - a. Whether an item is purchased,
 - b. How frequently an item is purchased,
 - c. The volume purchased, and
 - d. The price consumers are willing to pay for it.

The consumer related information required to produce this data include

- The market size of a product category and the share of market held by the chain;
- Market penetration: consumer numbers, rate of consumption and frequency of purchase;
- Customer perceptions about the product; and
- Factors affecting consumer perception of the products being produced.

5.1 Initiatives That Involve the Nova Scotia Government

The first three recommended initiatives could be run concurrently, potentially even rolling them into one. As the adoption of innovative value chain management practices will be an important determinant in industry's development and future success, the recommendation on establishing a value chain is described in detail.

Initiative #1

Implement a data-gathering plan that enables a more thorough and objective analysis of relationships between lobster quality, supply, demand, and other determinants of commercial success than is currently possible. The data gathered will encompass which boats are catching what, when, who they are selling to, and for how much. Ideally, it will encompass the entire chain, from catch to the point of sale to consumer. While the reporting would be anonymous, fishermen and businesses involved in the study must be willing to be identified, record the data daily, and share the data on a weekly basis during the duration of the LFA 32 season. Insights produced by the data plan could assist the Nova Scotia government (and DFO) to establish a more effective market reporting system than presently exists.

Initiative #2

The above data plan could be run in conjunction with a traceability pilot for lobsters caught in LFA 32. The primary purpose of the pilot would not be to differentiate lobsters in the market; it would be to produce a level of transparency that does not currently exist on factors impacting lobster health, quality, and business performance. Traceability could be enabled through lobster bands that contain RFID chips and are printed with identifying markings. Design of experiment approaches will be used to determine if statistically important relationships exist between how lobsters are harvested, handled, distributed, and prepared, as well as consumer perceptions of value. If desired, the study could include sensory tests to determine the impact of handling and storage practices on lobster eating quality.

Initiative #3

Establish a demonstration value chain initiative sourcing lobsters from LFA 32. The initiative will exemplify the benefits of this alternative business model to the largely opportunistic, volume-driven behaviour that currently typifies the industry.

The ideal collaborative project should

- Be based on building long-term consumer value, not competing solely on price nor (just) improving efficiency;
- Use actual consumer behaviour rather than reported attitudes as the basis for product and process development, and subsequent evaluation;
- Accept the need for long-term commitment, including transcending changes in personnel;
- Be based on a realistic assessment of a chain's current state of collaborative capacity;
- Recognize distinctive levels of motivation and degrees of inter-dependence between partners, and either align incentive systems across the value chain or reflect their differences to ensure the project results in mutual benefits;
- Be jointly planned and implemented by the participants; and
- Include processes for mutual appraisal and feedback.

This project will use the completed consumer research and subsequent insights to better target consumer groups, and to investigate purchase drivers and merchandising methods of capturing target shoppers' interest and subsequent repeat purchases. This would involve using consumer research

- As the starting point for product development and positioning to identify target consumer segments and select appropriate stores, and
- Subsequently for monitoring consumers' response, through monitoring penetration and repeat purchasing, including the effectiveness of promotional mechanics other than price.

The consumer research suggests that lobster products which meet consumer expectations for convenience and nutrition should result in greater market penetration and more frequent purchasing. This requires the marketing of value added products, the implementation of appropriate handling practices, and packaging that complements this positioning strategy. It also requires promotional mechanics that would encourage shoppers to try lobster for the first time and engage in more frequent/impulse buying; thus moving lobster out of the "special-occasion" basket. This should grow the value of the lobster category over successive years and improve the chain's efficiency. It may also provide lessons that chain members could leverage to serve export markets better and extend market opportunities to other lobster products.

Stage 1 - Identification of Potential Partners

It will be essential to recruit innovative, progressive participants across the chain, and then to ensure they understand that this project is not a quick fix, but will require sustained commitment. While "just do it" opportunities can expect to be found that benefit participants early on, it will require time and commitment to realize the greatest opportunities afforded by the proposed approach.

Stage 2 - Development of a Value Chain Strategy

Develop a marketing strategy for live and value-added lobster products, based on consumer research, which is then translated up the chain through a pricing structure for lobsters that reflects consumer value, not the commodity basis of fluctuating spot prices. Utilizing the willingness that exists among individuals and businesses to enter into direct contractual, consumer-driven relationships is critical to enabling this to happen. Supplier agreements that align with the marketing strategy to deliver the quality, volume and margins (not price) required to make the initiatives economically viable will then be established.

This may start as a small scale pilot, and grow as consumer demand is proven and increasingly understood. Agreements formed to support the initiative should be reflected in KPIs and incentives between and within firms in the chain that are aligned to the project's critical success factors and long-term growth of the category. Information systems will be required to monitor these metrics. KPIs and internal incentives that encourage a short-term perspective on margin and sales are not compatible with this approach. These agreements should provide participants with the confidence in the sustainability of supply/demand, and so mitigate the risks in their own investment in the project.

Stage 3 - Implementation

Precise implementation will depend upon the strategy agreed. Examples of probable ongoing activities are:

- ***Fishermen and buyers*** to ensure they comply with their delivery in full, on time, and to quality commitments;

- **Shippers** to work with other chain members to exploit traceability data to improve reporting practices (e.g., blood protein and mortality), to improve grading and quality, and to reduce costs.
- **Processors** to identify the grading criteria, such as size and quality, which would allow them to manufacture value-added products most efficiently.
- **Retailers** to stock products in the most suitable stores for a pre-agreed period and follow a pre-agreed strategy to thoroughly test their potential. The retailer must also facilitate both in-store promotion and monitoring of shopper behaviour in reaction to marketing and new products.

Initiative #4

Review regulations and licences over which Nova Scotia has authority, the aim being to propose changes that would help ensure the establishment of more constructive value chain relationships and practices than currently typify the Nova Scotia lobster industry. The study would encompass an analysis of the extent to which the unintended consequences of current regulations and licences described in this study are caused by the specific regulations and legislation, or other factors. For example, would changes in how regulations or licences are enforced have the desired change? This approach would prevent changes being proposed that may actually have a negative effect on how the industry operates.

5.2 Initiatives That Extend Beyond the Nova Scotia Government

Initiative #1

Set in place plans to commence abundance research in LFA 32, and potentially other LFAs, in anticipation of piloting new fishing and pricing arrangements in LFA 32 during 2016. The 2016 pilot could occur in conjunction with a quality based payment schedule and flow control system, developed in conjunction with scientists, economists, and live lobster shippers.

Initiative #2

Implement a means of establishing closer more constructive relationships between the provincial and federal departments and agencies that oversee the Nova Scotia lobster industry. The agreement on which the cooperative arrangement is based will identify the initiative's purpose and intended outcomes, individuals' (or department/agency) roles and responsibilities, and performance measures.

Appendix A

