



Labour Market Analysis
of the Newfoundland and Labrador
Aquaculture Industry

October 2018



*Prepared by MQO to inform the NL
Aquaculture Recruitment Strategy for NAIA*



TABLE OF CONTENTS

List of Tables ii

List of Figures ii

Executive Summary..... 1

1.0 Introduction 2

 1.1 Introduction and Background of Project..... 2

 1.2 Project Objectives 3

 1.3 Methodology..... 4

2.0 Profile of Newfoundland and Labrador 6

 2.1 Profile of Newfoundland and Labrador’s Aquaculture Industry..... 7

3.0 Survey and Key Informant Insight..... 10

 3.1 Key Issues in Attracting, Retaining Workers 10

 3.2 Current and Future Labour Requirements..... 19

 3.3 Education and Training 20

 3.3 Future Employment Requirements and Challenges 27

4.0 Employment Profiles..... 30

 4.1 Profile of Aquaculture Occupations..... 31

 4.2 Profile of Processors 33

5.0 Conclusions 35

 5.1 Key Considerations for Workforce..... 35

 5.1 Worker Education, Satisfaction, and Rural Community Stability 35

6.0 Aquaculture Case Studies 36

 6.1 Case Study 1: Salmon smolt hatchery (Northern Harvest Sea Farms – Stephenville)..... 36

 6.2 Case Study 2: Seafood processing (Barry Group – Benoit’s Cove)..... 39

Appendix A: Licensed Aquaculture Sites in NL (2015) 41

LIST OF TABLES

1	Summary of key informants interviewed (n=38)
2	Summary of site visits (n=4)
3	Profile of the aquaculture labour force in Newfoundland and Labrador (2011 and 2016), by gender
4	Aquaculture workers’ reasons for working in the industry, by employer type (n=117)
5	Aquaculture workers’ suggestions for attracting workers to the aquaculture industry (n=117)
6	Level of satisfaction with skill level, job performance, and career advancement, by employer type
7	Aquaculture workers’ perceived level of difficulty in identifying opportunities in the aquaculture industry, by employer type (n=108)
8	Aquaculture workers’ attitudes toward formal training in aquaculture, by employer type (n=115)
9	NAIA/Marine Institute workshop attendance
10	Desirability of additional training (n=113)
11	Survey respondents’ expected retirement plans over the next 10 years, by employer group (n=103)
12	Summary of the aquaculture and seafood processing industry
13	Number of commercial aquaculture sites (salmonid and mussel) between 2014-2017
14	Summary of primary occupations in aquaculture and related industries
15	Occupations related to seafood processing

LIST OF FIGURES

1	Profile of Aquaculture Workers Surveyed (n=134)
2	Change in Employment, by Province
3	Experience Levels Among Aquaculture Workers (n=134)
4	Previous Experience Prior to Aquaculture Industry (n=134)
5	Level of Satisfaction with Skill Level, Job Performance, and Career Advancement (n=134)
6	Perception on Ease of Finding Work in the Aquaculture Industry (n=108)
7	Attitudes Toward Formal Training in Aquaculture (n=115)
8	Certificates, Diplomas, and Degrees Obtained by Respondents (n=37)
9	Certificates and/or Credentials Obtained by Respondents (n=118)
10	Attitudes Toward Taking Training Related to Current Occupation (n=113)
11	Barriers to Pursuing Additional Training (n=74)
12	Length of Time Respondents Plan to Continue Working in the Aquaculture Industry (n=134)
13	Why Aquaculture Workers Plan to Continue Working in the Aquaculture Industry (n=86)
14	Organizational structure of Northern Harvest Sea Farms' salmon smolt hatchery in Stephenville
15	Organizational chart of the Benoit’s Cove fish processing plant (Barry Group)

EXECUTIVE SUMMARY

Aquaculture is one of the fastest growing sectors in Canada¹. In Newfoundland and Labrador (NL), the aquaculture industry contributes significantly to the GDP and offers diverse employment opportunities. In 2017, aquaculture production value in NL reached over \$276 million, a more than 70% increase from 2015². This growing industry remains a key priority for the provincial government, but it is not without challenges.

An aging population, increasing outmigration of youth and a shrinking rural population pose significant potential challenges for the aquaculture industry. In response, the Newfoundland Aquaculture Industry Association (NAIA) commissioned the development of an Aquaculture Attraction and Retention Strategy. The research presented in this document was prepared as part of the foundational work for the development of the Aquaculture Recruitment Strategy for NAIA.

The key insights presented in this report are based on a combination of key informant interviews with industry stakeholders, secondary research and a survey of 134 aquaculture workers.

Key Insights

- Overall, most aquaculture workers chose their profession because these positions offered a chance for them to stay in their own communities. Over time, aquaculture workers have chosen to continue working in the aquaculture industry and in their occupations specifically because they enjoy it and/or find it interesting.
- In general, retention is not currently seen as an issue by the majority of employers and/or key industry stakeholders. However, employers and other key industry stakeholders do have concerns about future workforce numbers as their current workforce retires. When asked about retirement, 23% indicating planning to retire in 5-10 years and 11% in 3-4 years.
- Recruitment to meet the current needs of growth in the industry was not at the forefront of most employers' minds. However, in addition to new entrants into the market, existing employers cited plans to hire well over 150 employees in the next 3 to 5 years.
- Aquaculture workers believe that they have the knowledge and skills they need to perform well in their current job and that their job makes good use of their skills and experience. However, there was a desire for training and some indication that workers wanted opportunities for career advancement, particularly among growers and hatcheries.

Overall, survey responses echo the insight provided by key informants, particularly employers, who generally presented an image of a stable, low employee-turnover culture. However, the need to address a growing industry, an aging rural population and the associated expectations for a high trend of retirement is a concern for the future.

¹ Aquaculture Labour Market Forecast to 2025, Canadian Agricultural Human Resources Council

² Department of Finance, Government of Newfoundland Labrador. (2017). *The economy 2017*. Retrieved from <http://www.economics.gov.nl.ca/E2017/-TheEconomy2017.pdf>

1.0 INTRODUCTION

1.1 Introduction and Background of Project

In 2014, the Department of Fisheries and Aquaculture (DFA; now Department of Fisheries and Land Resources - DFLR), Government of Newfoundland and Labrador, released an updated Sustainable Aquaculture Strategy 2014 – a strategy focused on ensuring the environmental, financial, and social sustainability of the province’s aquaculture sector. This strategy provided an update of the previous aquaculture strategy developed in 2000 and revised in 2005³. Specifically, the key updates of the 2014 strategy focused on sustainable management practices, support capacity, and research and development:

- **Aquaculture Sustainable Management.** Aquaculture sustainable management consists of management practices that “improve the standard of living by protecting human health; conserving the environment; using resources efficiently; and advancing long-term economic competitiveness” (pg. 3). The strategy outlines a number of priority areas for the department including: aquatic animal health management; aquaculture waste management; limiting environmental impacts; waste water treatment; and limiting farmed and wild fish interactions.
- **Aquaculture Support Capacity.** The key components of aquaculture support capacity includes: financial programs, human resources planning, infrastructure planning, governance renewal and communication. The department hopes to achieve this through:
 - *A human resources plan.* In partnership with the Department of Advanced Education and Skills, the Department of Finance, Economic and Statistics Branch, and aquaculture operators, the DFA will develop and implement a human resources plan to address the challenges experienced by the aquaculture industry relating to labour shortages.
 - *An aquaculture infrastructure and supply chain logistics assessment.* This assessment will outline key priorities, issues and approaches to support both salmonid and shellfish production.
 - *An enhanced aquaculture governance structure* that is in line with industry-wide standards and best practices. This structure will be implemented in order to ensure sustainable management of the industry.
 - *An aquaculture communications plan.* This communications plan will ensure that all the facts regarding aquaculture are communicated to the public, which will address ongoing concerns about sustainability and environmental impacts of the industry.

³ Department of Fisheries and Aquaculture, Government of Newfoundland and Labrador (2014). *Sustainable Aquaculture Strategy 2014*. Retrieved from http://www.fishaq.gov.nl.ca/publications/pdf/Sustainable_Aquaculture_Strategy_2014.pdf

- **Aquaculture Research and Development.** The research and development component of the provincial government’s strategy has several key priorities: investment, human resources, innovation, fish health strategies, marketing assistance, and governance structures. In order to address these priority areas, the DFA/DFLR plans to:
 - Establish an aquaculture research and development advisory committee. This committee will address industry-specific issues related to development needs and aquatic animal health.
 - Investigate new regions for potential growth and expansion (e.g., Placentia Bay and the Coast of Bays).
 - Enhance the mussel sector by addressing the current seed supply capacity and promoting sustainability. In so doing, the mussel sector will better meet the growing demand for organic mussels.

Also, in 2017, the Government of NL launched “*The Way Forward*” - The Aquaculture Sector Workplan, in collaboration with the NAIA⁴. This workplan outlined steps to double salmon production from its current 24,0411MT to 50,000MT, and triple mussel production from 3211MT to 10,750MT. Key challenges and opportunities include: aquaculture production; human resources and labour; research, innovation and diversification; market access and development; and business development and risk management.

In response to these 2014 and 2017 strategies, the NAIA contracted the services of MQO Research, in partnership with Training Works, to develop an Aquaculture Human Resources Plan (including three strategic initiatives: a Labour Market Analysis, Training Capacity Review, and an Attraction and Retention Strategy) to help strengthen the support capacity of the aquaculture industry. This report outlines the labour market analysis portion of the Aquaculture Human Resources Plan and will be used in conjunction with the Training Capacity Review to inform the development of an Attraction and Retention Strategy for Aquaculture in Newfoundland and Labrador.

1.2 Project Objectives

The overarching goal of the Aquaculture Human Resources Plan for Newfoundland and Labrador is to address the human resource challenges faced by aquaculture operators. Accordingly, the aim of the labour market analysis portion of the plan is to address employment issues and identify potential opportunities. With these considerations in mind, the specific goals of the Aquaculture Labour Market Analysis were three-fold:

- Use primary and secondary research methods to assess the current and projected supply and demand of workers;
- In consultation with aquaculture stakeholders and secondary research, assess labour force trends, gaps and needs including industry challenges and areas of opportunities; and
- Identify opportunities to attract and retain workers to fill positions in the aquaculture workforce.

⁴ <http://www.flr.gov.nl.ca/aquaculturesummit/pdf/Sector-Workplan-Online.pdf>

1.3 Methodology

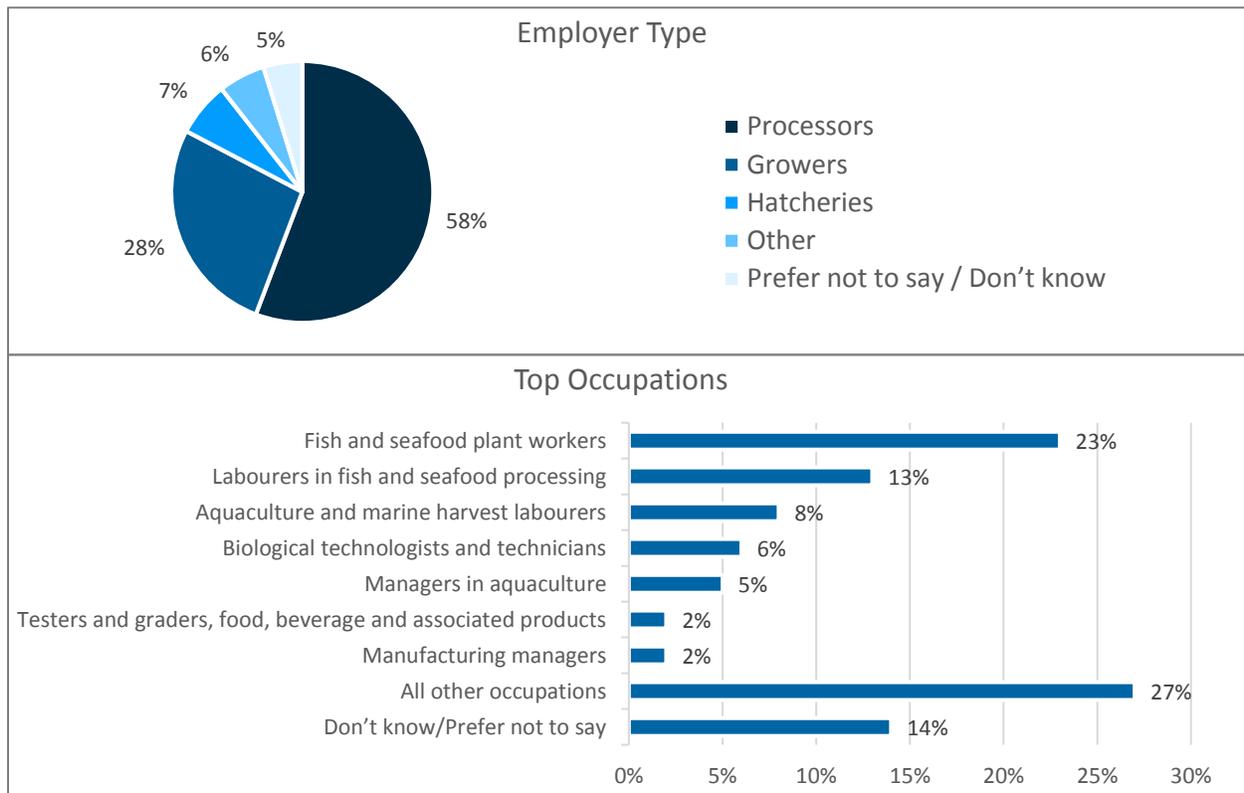
The Aquaculture Labour Market Analysis was based on feedback provided by key industry stakeholders including employers, government representatives, industry associations, training service providers and aquaculture workers in combination with extensive secondary research.

1.3.1 Aquaculture Workers' Survey

A survey of aquaculture workers was conducted with 134 individuals who were employed by growers/harvesters, hatcheries or processors. As shown in Figure 1, the majority of those surveyed were employed by processors (58%).

Survey respondents were asked to provide details regarding their occupation, including their job title and responsibilities. These responses were used to classify their occupations using the National Occupation Classification System (NOC). As shown in Figure 1, the top occupations among survey respondents were *fish and seafood plant workers* (23%), *labourers in fish and seafood processing* (23%), and *aquaculture and marine harvest labourers* (13%). The majority of respondents have been employed in their current occupation for more than one year, but less than 3 years (28%), or more than 10 years (23%).

Figure 1. Profile of Aquaculture Workers Surveyed (n=134)



1.3.2 Key Informant Interviews and Site Visits

Key informant interviews. In-depth, key informant interviews were conducted with 38 stakeholders from across the aquaculture industry including training providers and students, municipal and provincial government, employers, business owners, industry associations and others. A breakdown of the type and number of key informant interviews is provided in Table 1.

Table 1. Summary of key informants interviewed (n=38)

Key Informants	n	% of total
Industry associations, government representatives and other industry stakeholders	16	42%
Support or indirect industry employers	12	32%
Growers	5	13%
Processors	3	8%
Hatcheries	1	3%
Training providers and academic advisors	1	3%
Total	38	100%

Site visits. Four site visits were conducted during the first week of July, 2017. The purpose of the site visits was to gather in-person insight into the aquaculture labour market in specific regions, explore the communities and observe any spin-off effects the industry had in the communities. Perhaps most importantly, the site visits also provided the opportunity to speak with employers. In-depth case studies for two sites – the hatchery in Stephenville and the seafood processing plant in Benoit’s Cove – are provided in S. 6 of this report. Details regarding the site visits are provided in Table 2.

Table 2. Summary of site visits (n=4)

Site Visit	Location
Northern Harvest Sea Farms	Pool’s Cove
Northern Harvest Smolt Hatchery	Stephenville
Barry Group Processing Plant	St. Alban’s
Barry Group Processing Plant	Benoit’s Cove

1.3.3 Secondary Research

A thorough literature review was conducted to gather insight on current and projected economic trends, socio-economic data, potential barriers and areas of opportunity for the aquaculture industry in the province. Secondary research was particularly valuable in contextualizing the aquaculture industry in the broader provincial and national economic context.

The secondary research included a review of federal government sources and databases to obtain labour market information related to aquaculture, such as information from Statistics Canada (e.g., data from the Labour Force Survey), provincial data (Newfoundland and Labrador Statistics Agency, Department of Fisheries and Land Resources, etc.), industry associations (e.g., Canadian Aquaculture Industry Association, Canadian Agriculture Human Resources Council), and others.

2.0 PROFILE OF NEWFOUNDLAND AND LABRADOR

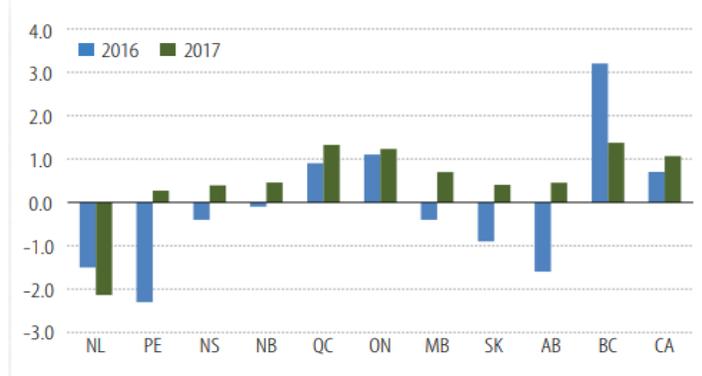
From the most southern coast of the Island portion of the province and extending to the far northern tips of the Ungava Bay, Newfoundland and Labrador’s population of 520, 000 expands across 371, 000 km². Of the total population, nearly half (205, 955) resides within St. John’s and the surrounding area on the island portion of the province. Other regions of high population density include Corner Brook, Grand Falls-Windsor, Gander and Bay Roberts, communities also located on the island. The province enjoyed a period of population growth between the years 2008 – 2016, after more than a decade of steady decline, as project construction provided new and attractive opportunities for in-migration⁵. However, population numbers began to decline again in 2017 in tandem with a slowing economy, delayed major project timelines and low commodity prices, namely oil⁶.

The average age of the population in Newfoundland and Labrador (43.7 years), is slightly older compared to the national average of (41.2 years). The provincial population is expected to continue aging at a rapid pace with ongoing high rates of youth out-migration and declining birth rates. This is particularly true for rural populations, which has the added factor of increased migration of people from coastal communities to urban areas⁷.

The top industry employers in the province are currently: health care and social assistance; construction; wholesale and retail trade; public administration; and accommodation and food services⁸. The current unemployment rate in Newfoundland and Labrador (14.8%) is the highest among the Atlantic Provinces and more than double the national average (6.3%)⁹. As Figure 2 demonstrates, employment growth change has decreased for the province over the past two years.

Figure 2. Change in Employment, by Province

Source: *The Economy 2017*, (Dept of Finance, Gov NL)



⁵Department of Finance, Government of Newfoundland and Labrador: <http://www.economics.gov.nl.ca/POP-overview.asp>

⁶ <http://www.economics.gov.nl.ca/POP-overview.asp>

⁷ Regional Population Projections for Newfoundland and Labrador 2016-2036

⁸ Statistics Canada, CANSIM table 282-0088.

⁹ Statistics Canada, CANSIM, table 282-0002.

2.1 Profile of Newfoundland and Labrador's Aquaculture Industry

- Newfoundland and Labrador, well-known as a province whose history, culture and economy have traditionally been linked to the fishery, has seen tremendous growth over the past decade in the aquaculture industry, with total value reaching \$161 million in 2015, up from almost \$14 million in 2000¹⁰. Atlantic Canada is the fastest growing region for aquaculture development in Canada¹¹.

Historically, the economies of rural communities across the island have been largely dependent on the fishery, and with the collapse of the cod stocks in 1992, high rates of youth out-migration and urbanization combined with low birthrates, rural economies have struggled to thrive. Aquaculture has been a key point of interest for potential rural economic development. In 2017, aquaculture accounted for 17% of the total NL fish and seafood production value¹².

Currently, the primary species that are farmed in the province are salmonids (Atlantic salmon and steelhead trout) and Blue Mussels. Newfoundland's aquaculture also includes arctic char farms, but in smaller amounts¹³. The majority of licensed aquaculture sites are clustered in Notre Dame Bay (shellfish) and the Coast of Bays Region/Connaigre Peninsula (predominantly salmonid/hatchery), with some other sites scattered around the Island's coast. A map of aquaculture sites in the province is provided in Appendix A.

The Government of Newfoundland and Labrador conducted a macroeconomic assessment in 2014, concluding that aquaculture is an expanding industry that is becoming an increasingly important economic contributor to rural areas of the province. Increasing employment opportunities in rural communities can draw skilled labour to the communities and allows individuals with family and local roots career choices that enable them to stay in the province. In addition to providing direct opportunities in the aquaculture industry, there is also a "spin-off effect" with indirect employment opportunities, through supply and service companies, academic institutions, research and development, and other key areas. Newfoundland's aquaculture industry contributes significantly to the GDP and offers diverse employment opportunities. In 2017, aquaculture production value reached over \$276 million, a more than 70% increase from 2015¹⁴.

2.1.1 Aquaculture Occupations

As of 2017, there were currently 424 people *directly* employed by the aquaculture industry in Newfoundland and Labrador¹⁵. This number has remained unchanged from 2016, a slight dip from the 439 workers employed in the industry in 2015¹⁶. In general, the aquaculture industry is male dominated,

¹⁰ Seafood Industry in Review 2015, Department of Fisheries and Aquaculture Newfoundland and Labrador

¹¹ Aquaculture Labour Market Forecast to 2025, Canadian Agricultural Human Resources Council

¹² Seafood Industry in Review 2017, Department of Fisheries and Aquaculture, Newfoundland and Labrador

¹³ <https://sencanada.ca/content/sen/Committee/412/pof/rep/rep12jul15Vol1-e.pdf>

¹⁴ <http://www.economics.gov.nl.ca/E2017/TheEconomy2017.pdf>

¹⁵ Seafood Industry in Review 2017, Department of Fisheries and Aquaculture, Newfoundland and Labrador

¹⁶ Seafood Industry in Review 2015, Department of Fisheries and Aquaculture, Newfoundland and Labrador

with the only exception being occupations as labourers in fish and seafood processing¹⁷. In contrast to aquaculture positions, seafood processing is a female dominated occupation. Table 3 summarizes the number of people employed in aquaculture related positions in Newfoundland and Labrador across the most recent census periods, by gender. The occupations included in the table are described using their National Occupation Classification System codes (NOCS).

Table 3. Profile of the aquaculture labour force in Newfoundland and Labrador (2011 and 2016), by gender¹⁸

Occupation (NOCs)	Number of Employees (2011) ¹⁹					Number of Employees (2016) ²⁰				
	Males		Females		Total	Males		Females		Total
	#	%	#	%		#	%	#	%	
0823 – Managers in aquaculture	70	88%	10	13%	80*	70	88%	10	13%	80
8613 – Aquaculture and marine harvest labourers	145	94%	10	6%	155	180	95%	10	5%	190*
9618 – Labourers in fish and seafood processing	350	24%	1,095	76%	1,445*	715	41%	1,010	59%	1,725*
2221 – Biological technologists and technicians	175	67%	85	33%	260*	115	64%	65	36%	180

Note: Due to Statistics Canada’s use of disclosure controls the number of males and females employed in each occupation does not always sum to the total identified in the Statistics Canada data. Thus, the total number employed has been revised (where necessary) from the original Statistics Canada data so that the total employed equals the sum of males and females employed and the percentage of total can be properly calculated. Revisions have been indicated (*) in the table above and does not exceed 5 individuals in all instances.

2.1.2 Challenges Faced by the Aquaculture Industry

The aquaculture industry faces a number of inherent challenges as a result of operating in rural areas. In particular, geography, human resources and environmental factors all pose unique challenges to the industry. These challenges are summarized below:

- Geographical limitations.** Aquaculture requires consideration of certain environmental conditions. For example, biological and water quality parameters, and access to fresh and marine water sources often result in companies having to operate in rural areas. Operating within rural areas poses a number of challenges to developing an aquaculture workforce including: a trend of increasing rural, domestic labour supply shortage, especially for young, skilled workers; a declining rural population due to low birth rates and out-migration; limited access to social

¹⁷ Fish and seafood processing is not considered by Industry Canada to be an aquaculture-specific occupation. Accordingly, those employed as labourers in fish and seafood processing are not included in the total number of aquaculture workers.

¹⁸ The Economy 2017, Department of Finance, Newfoundland and Labrador: <http://www.economics.gov.nl.ca/E2017/TheEconomy2017.pdf>

¹⁹ Statistics Canada, 2011 National Household Survey, Statistics Canada Catalogue no. 99-012-X2011033

²⁰ Statistics Canada, 2016 Census of Population, Statistics Canada Catalogue no. 98-400-X2016295

infrastructure; and seasonal employment combined with non-competitive wages which negatively affects job attractiveness²¹.

■ **Human resources:**

- *Aging population.* A recent report from Memorial University found that NL has one of the oldest workforces in the country, especially in rural areas²². Accordingly, the aging population of NL will likely be a key issue in the future. However, in 2011 nearly half of the total aquaculture workforce in NL was between the ages of 21 and 35 years (considerably lower than fishing)²³. Therefore, while it is unlikely that the relatively young workforce in the aquaculture industry will not be impacted by retirement rates, it is possible that an aging population will contribute to a decrease in labour supply in general.
 - *Lower birth rates.* As shown in government statistics.
 - *Out-migration.* Also documented in Memorial University and Government of NL data.
 - *Poor public image.* Currently, young people do not see aquaculture as a career choice and/or have a negative image of the aquaculture industry²⁴.
 - *Year-round vs seasonal.* Although most aquaculture employment is year round, organizations face retention challenges due to employees wanting to only work a portion of the year in order to qualify for unemployment insurance. Other organizations do require seasonal workers that tend to be low wage positions, a combination that has also been noted to present retention challenges, although this may relate primarily to wild capture²⁵.
 - *Limited social infrastructure.* Community infrastructure such as schools, amenities, and entertainment, are limited in regions typically associated with aquaculture farms²⁶.
 - *Gender.* Table 3 on page 8 indicates a dominance of males in the manager and aquaculture harvester sectors, while more women are in processing. Challenges exist for attracting more women into some aquaculture positions.
- **Environmental challenges.** The aquaculture industry is held to a high standard when it comes to environmental sustainability. There are a number of environmental challenges the industry faces such as improving waste management and waste water treatment, and protection of the natural ocean environment in which organizations operate²⁷.

Environmental concerns, geographic considerations and labour shortages are not unique challenges to Newfoundland and Labrador’s aquaculture industry. Nevertheless, while these issues are widespread across Canada²⁸, they may pose immediate barriers to the expansion of the aquaculture industry in Newfoundland and Labrador.

²¹ http://www.opec.gov.nl.ca/pe/whatweredoing/cbr_reports/12.AnalysisofLabourMarketFactors%20.pdf

²² http://www.opec.gov.nl.ca/pe/whatweredoing/cbr_reports/12.AnalysisofLabourMarketFactors%20.pdf

²³ http://www.opec.gov.nl.ca/pe/whatweredoing/cbr_reports/12.AnalysisofLabourMarketFactors%20.pdf

²⁴ <http://www.cahrc-ccrha.ca/sites/default/files/files/publications/Farm-Profiles/Marine%20Harvest%20Canada%20Profile.pdf>

²⁵ <http://www.fishaq.gov.nl.ca/publications/pdf/whatweheard.pdf>

²⁶ <http://www.fishaq.gov.nl.ca/publications/pdf/whatweheard.pdf>

²⁷ <http://www.releases.gov.nl.ca/releases/2008/fishaq/0320n07.htm>

²⁸ http://www.cahrc-ccrha.ca/sites/default/files/files/Labour-Employment/factsheetAQU_E_0.pdf

3.0 SURVEY AND KEY INFORMANT INSIGHT

In general, key informants described the aquaculture sector in Newfoundland and Labrador as a growing industry, with remarkable potential. Some described the industry as young and still in its infancy, requiring government and industry support to help alleviate regulatory restrictions, and provide research and development support. Others pointed to the recent appearance of multinational companies such as Grieg and Marine Harvest, and/or a strong demand in export as key indicators of a strong industry. In short, key informants were quick to describe the industry as having considerable potential to grow.

Some of the potential barriers facing the aquaculture industry described by key informants include: human resources issues (both skilled and unskilled labour shortage projected); issues relating to fish health; geographic limitations; climate change; consolidation and monopolization of aquaculture business; both social and industry infrastructure (e.g., medical services, community centres, wharves, waste management, etc.). This section outlines the key insights relating specifically to human resources brought forward by both key informants as well as aquaculture workers.

3.1 Key Issues in Attracting, Retaining Workers

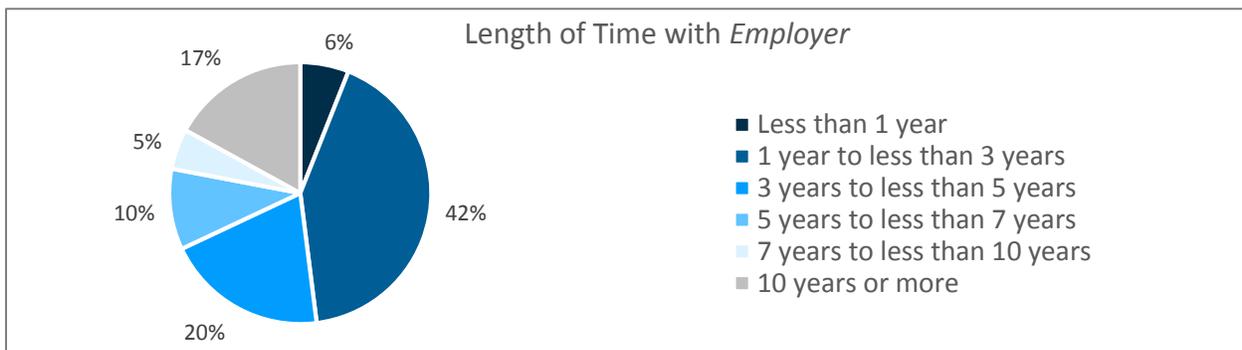
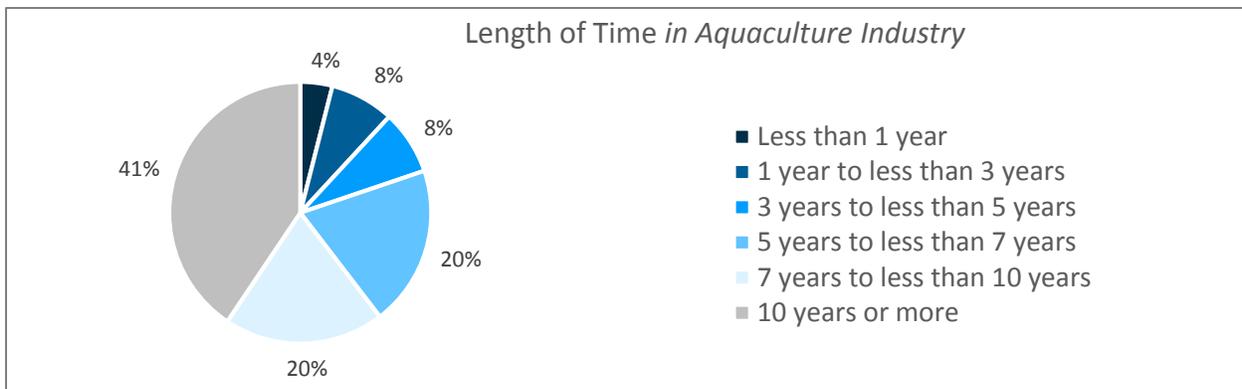
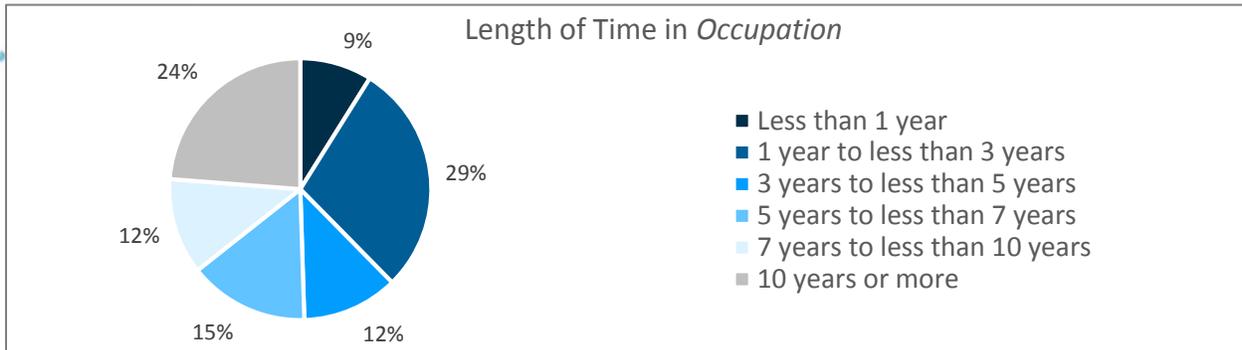


KEY INSIGHTS:

In general, attracting and retaining workers to the industry is not perceived to be an immediate concern; however, key informants raised concerns about the future labour force supply.

A broad range of experience levels were reported by survey respondents, with the majority having been in their current job for 1 – 3 years (29%) or 10 years or more (24%). When asked how long survey respondents had been employed by their current employer, survey respondents most frequently reported 1 – 3 years (43%) or 3 – 5 years (20%). While half of those surveyed had been in their current occupation for five years or more, slightly less than a third (32%) have been employed by their current employer for five years or more. Over half of all aquaculture workers surveyed reported working in the industry for at least 7 years. Figure 3 on page 11 provides further details on the length of time aquaculture worker survey respondents have been in their current occupation, working for their current employer, and working in the aquaculture industry overall.

Figure 3. Experience Levels Among Aquaculture Workers (n=134²⁹)



The majority of survey respondents described their employment status as full-time³⁰ (50%) or seasonal full-time³¹ (32%).

²⁹ Don't know/refusals were excluded.

³⁰ Defined as working for an employer for 30 or more hours per week.

³¹ Defined as working for an employer for 30 or more hours per week during parts of the year.

3.1.1 Reasons for Joining Aquaculture Industry

KEY INSIGHTS:

Four in ten aquaculture workers surveyed had previous work experience in the fishery (including processing). The opportunity to work close to home is a key driver for workers in the aquaculture industry.

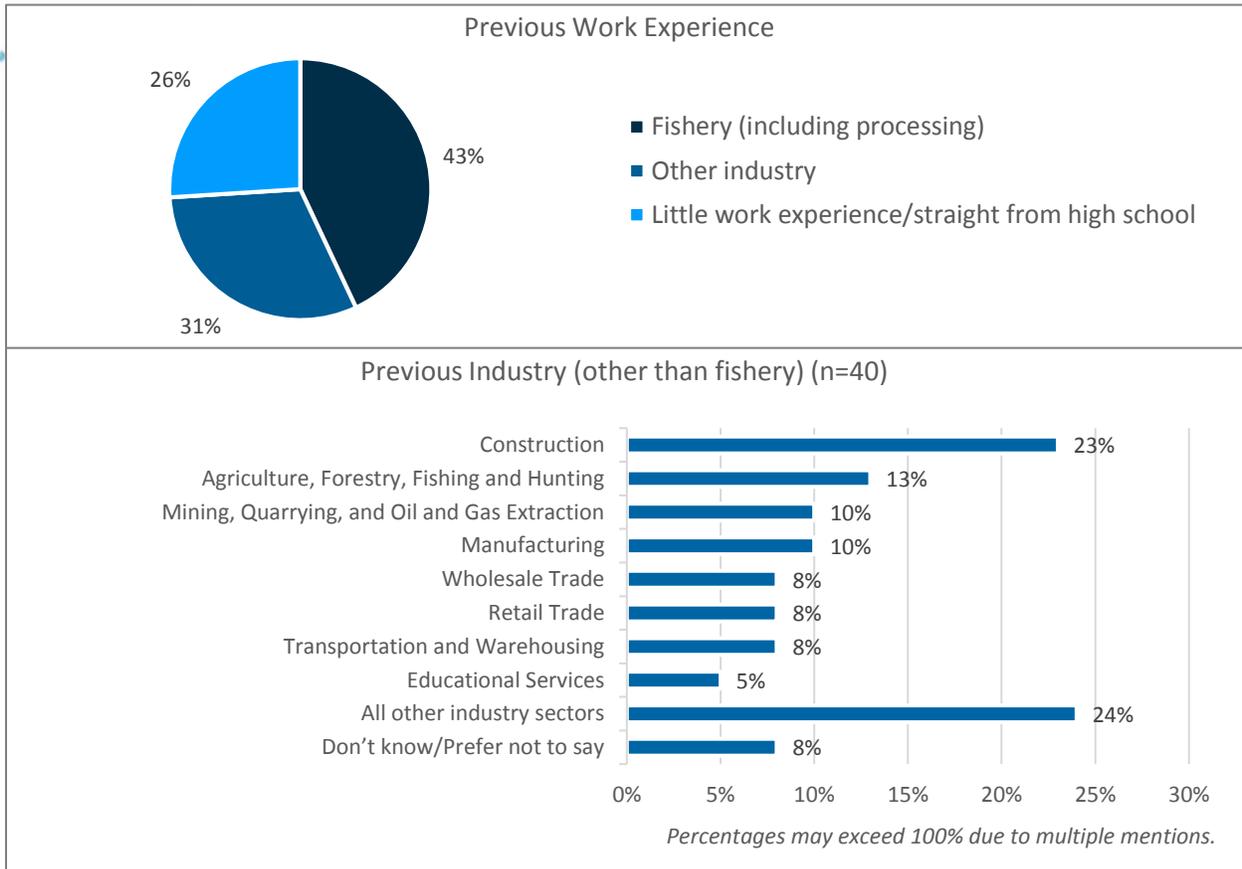
When asked, the vast majority of key stakeholders reported that they believed the aquaculture industry provides secure career options either directly (e.g., farms) or indirectly (e.g., net maintenance, research and development). Although some key informants reiterated the unpredictability of farming, many reinforced the idea that the aquaculture industry is a means for people living in rural communities to stay in their home communities.

To understand why workers in the aquaculture industry chose their current occupation, survey respondents were asked to describe their work experience prior to working in the aquaculture industry and why they chose to work in the aquaculture industry.

As shown in Figure 4 on page 13, survey respondents reported a mixed level of prior experience before joining the aquaculture workforce. Over 40% of workers reported previous experience in fisheries, including 28% who had previously *worked in a fish processing plant* and 15% who had previously *worked in the fishing industry*. Almost one-third (31%) of respondents reported having previously *worked in some other industry* and 26% reported having *little work experience/straight from high school* (26%). Figure 4 also includes the breakdown of industry sectors for those who indicated that they had previously worked in an industry other than the fishery (n=40)³².

³² Multiple mentions allowed. Percentages may exceed 100% due to multiple responses.

Figure 4. Previous Experience Prior to Aquaculture Industry (n=134³³)



Nearly half (45%) of survey respondents reported that working in the aquaculture industry provided an opportunity to work close to home. Nearly-one quarter (22%) of survey respondents reported that a lack of other jobs/needed a job (general) was a primary reason for working in aquaculture. Table 4 on page 14 provides a breakdown by employer type of the top 3 reasons why survey respondents chose to work in aquaculture. Observationally, the proportion of aquaculture workers working for growers/harvesters who cited *personal interest / enjoyment of the work* as a reason for working in the aquaculture industry was slightly higher (11 of 32 respondents, or 34%) than among respondents working for other employer types. However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small.

³³ Don't know/refusals were excluded.

Table 4. Aquaculture workers’ reasons for working in the industry, by employer type (n=117³⁴)

“Why did you choose to work in the aquaculture industry?” *					
Top Reasons	Total (%)	Hatchery	Grower / Harvester	Processor	Other
Opportunity to work close to home	45%	3	11	38	0
Lack of other jobs / needed a job (general)	22%	0	4	20	2
Personal interest / enjoyment of the work	13%	1	11	3	0
Total (n)	117	6	32	68	7

*Counts, instead of percentages, are presented for responses by employer type due to small sample sizes for some employer types (e.g., hatchery).

3.1.2 Attraction and Retention



KEY INSIGHTS:

A variety of suggestions for attracting workers into the industry were provided by survey respondents. More than two-thirds of surveyed workers in aquaculture suggested offering increased wages.

Aquaculture workers were asked to provide their thoughts on what they believed could be done to attract more workers into the aquaculture industry. Overall, the top suggestion was *offering increased wages* (71%), other suggestions include: *have more work or hours available* (14%); *increase positive public awareness* (13%); *more full-time, stable, or steady employment opportunities* (12%); *more training opportunities* (4%); *diversify species in aquaculture* (3%); and a variety of other mentions (18%).

Observationally, the proportion of aquaculture workers working for hatcheries who cited *increase positive public awareness* as a suggestion for attracting workers into the aquaculture was slightly higher (5 of 6 respondents) than among respondents working for other employer types.

Details regarding the top three suggestions for attracting workers to the industry are provided in Table 5 on page 15. However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small.

³⁴ Multiple mentions allowed. Percentages may exceed 100% due to multiple responses. Don't know/refusals were excluded.

Table 5. Aquaculture workers’ suggestions for attracting workers to the aquaculture industry (n=117³⁵)

“What do you think can be done to attract more people to the Newfoundland and Labrador aquaculture industry?” *					
Top Responses	Total (%)	Hatchery	Grower / Harvester	Processor	Other
Offer increased wages	71%	1	18	55	5
Have more work / hours available	14%	0	1	15	0
Increase positive public awareness	13%	5	6	3	1
Total (n)	117	7	30	69	6

*Counts, instead of percentages, are presented for responses by employer type due to small sample sizes for some employer types (e.g., hatchery).

Examples of suggestions beyond the top three mentions include:

3.1.3 Compensation and Advancement



KEY INSIGHTS:

Aquaculture workers believe that they have the knowledge and skills they need to perform well in their current job and that their job makes good use of their skills and experience. In general, aquaculture workers, and growers/harvesters in particular, were less satisfied with their compensation in relation to their duties and responsibilities.

For the most part, survey respondents reported that they have the knowledge and skills they need to perform well in their current job, and that their employers make good use of their skills and experience. However, respondents appeared less satisfied with their rate of pay in relation to their duties and responsibilities.

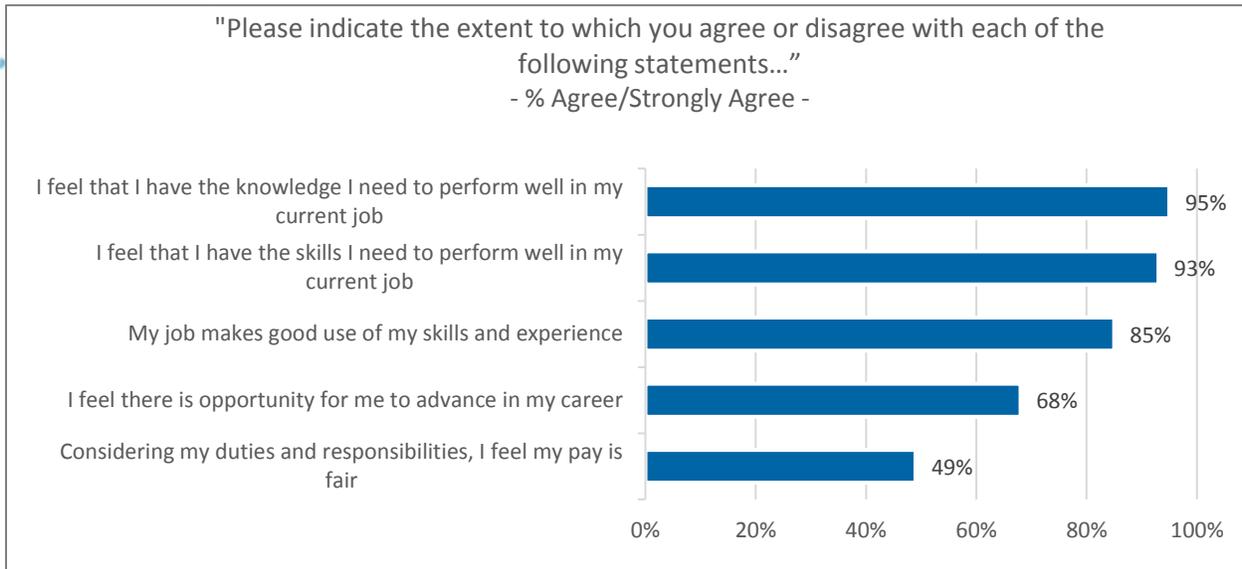
“More permanent positions with better pay and options for growth within a company.”

“More pay, locations to live in rural NFLD.”

“Invest in infrastructure to enable access to new and remote sites”

³⁵ Multiple mentions allowed. Percentages may exceed 100% due to multiple responses. Don't know/refusals were excluded.

Figure 5. Level of Satisfaction with Skill Level, Job Performance, and Career Advancement (n=134³⁶)



Observationally, the proportion of aquaculture workers working for growers/harvesters who agreed that compensation in relation to their duties and responsibilities is fair was slightly lower (9 of 36 respondents, or 25%) than among respondents working for other employer types.

Details regarding the level of satisfaction with skill level, job performance, and career advanced are provided in Table 6 on page 17. However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small.

³⁶ Don't know/refusals were excluded.

Table 6. Level of satisfaction with skill level, job performance, and career advancement, by employer type³⁷

"Please indicate the extent to which you agree or disagree with each of the following statements..."					
-Those who Strongly Agree/Agree - *					
Statement	Total (%)	Hatchery	Grower / Harvester	Processor	Other
I feel that I have the knowledge I need to perform well in my current job	95%	9	35	69	8
Total (n)	130	9	36	72	8
I feel that I have the skills I need to perform well in my current job	93%	9	34	67	8
Total (n)	131	9	36	73	8
My job makes good use of my skills and experience	85%	7	32	61	8
Total (n)	117	8	34	63	7
I feel there is opportunity for me to advance in my career	68%	6	22	45	5
Total (n)	123	8	33	69	8
Considering my duties and responsibilities, I feel my pay is fair	49%	5	9	39	5
Total (n)	131	9	36	73	8

*Counts, instead of percentages, are presented for responses by employer type due to small sample sizes for some employer types (e.g., hatchery).

³⁷ Don't know/refusals were excluded.

3.1.4 Identifying Employment Opportunities

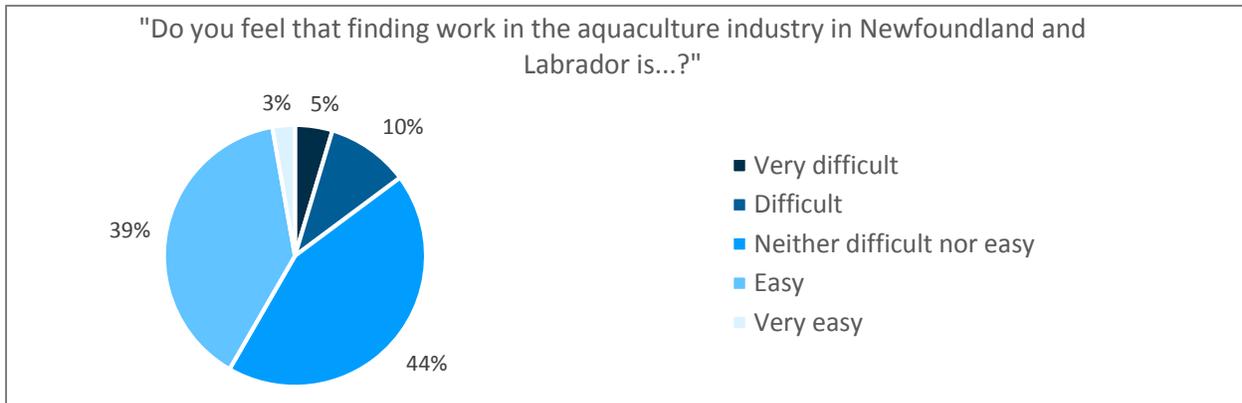


KEY INSIGHTS:

Aquaculture workers report that it is not difficult to find opportunities for employment in the aquaculture industry.

Overall, the majority of respondents reported that it was *neither difficult nor easy* (44%) or *easy* (39%) to find employment opportunities in the aquaculture industry.

Figure 6. Perception on Ease of Finding Work in the Aquaculture Industry (n=108³⁸)



Details regarding the survey respondent’s perception of the level of difficulty for finding employment opportunities in aquaculture are provided in Table 7 on page 19. However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small.

³⁸ Don’t know/refusals were excluded.

Table 7: Aquaculture workers’ perceived level of difficulty in identifying opportunities in the aquaculture industry, by employer type (n=108³⁹)

“Do you feel that finding work in the aquaculture industry in Newfoundland and Labrador is...?” *					
Reason	Total (%)	Hatchery	Grower / Harvester	Processor	Other
Very difficult	5%	0	2	3	0
Difficult	10%	1	4	5	1
Neither difficult nor easy	44%	4	15	22	4
Easy	39%	2	10	28	1
Very easy	3%	0	1	0	0
Total (n)	108	7	32	58	6

*Counts, instead of percentages, are presented for responses by employer type due to small sample sizes for some employer types (e.g., hatchery).

3.2 Current and Future Labour Requirements



KEY INSIGHTS:

Generally, employers project needing to hire a greater number of new employees in the medium (three to five years) and longer term (six to ten years), compared to the immediate future (next two years).

Half of the employers who were interviewed reported that the number of employees at their company fluctuated significantly depending on the time of year. The high number of companies reporting significant fluctuations in the number of their employees is unsurprising, considering the nature of the aquaculture industry (i.e., seasonal, dependent on live product, etc.). Some of the reasons provided by employers to explain the fluctuation in workforce numbers include the season and the temperature, consumer demand for a product, and the amount of product that was harvested.

When asked to provide an estimate on the number of employees needed during peak season, employers reported an average number of 41⁴⁰. During off season, the average number of employees required was reduced to 30⁴¹. It is important to note that these averages are based on a small number of employers (i.e., less than 10) and includes all employers interviewed (i.e., hatcheries, growers, processors, and support employers) for both salmonid and mussel aquaculture operations. As a result, caution should be used when generalizing across all aquaculture employers.

³⁹ Don't know/refusals were excluded.

⁴⁰ Don't know/refusals were excluded. Mean values were calculated with outliers removed +/- 3 SDs (n=7).

⁴¹ Don't know/refusals were excluded. Mean values were calculated with outliers removed +/- 3 SDs (n=7).

For the most part, employers do not currently experience difficulty filling vacant positions and challenges to recruitment and retention are reported to have either no impact at all or a low impact on the company's ability to meet client needs.

Aquaculture employers were asked to provide an estimate on the number of workers they expected to hire over the next two years, between three and five years, and in six to ten years from now. Responses varied by employer type/product (i.e. salmonid, processors, mussels).

- **Next two years:** Among employers who were able to provide an estimate (n=12)⁴², five employers reportedly planned to hire between one and five new employees, three were planning to hire more than five workers, and four were not planning on hiring in the next two years.
- **Three to five years:** Among employers who were able to provide an estimate (n=11)⁴³, six employers planned to hire between one and five new employees, three were planning to hire more than fifty new employees, and two were not planning on hiring in the next three to five years.
- **Six to ten years:** Among employers who were able to provide an estimate (n=9)⁴⁴, three employers intended to hire between one and five employees; two employers reported that they intended to hire between 5 and 10 workers; and two employers reported that they intended to hire thirty and seventy-five workers, respectively. The remaining two employers indicated that they were not planning to hire any workers during this time period.

In summary, it appears that employment needs for existing companies are expected to significantly exceed 150 workers over the next 5 years. Employers are expecting to hire a greater number of workers between three and five years, and six to ten years than in the immediate future.

3.3 Education and Training



KEY INSIGHTS:

Six in ten aquaculture workers surveyed felt that college or university level training was not at all important for their job. Among respondents who had completed formal training, some had completed an aquaculture related program, but a large proportion of survey respondents completed some other type of formal training.

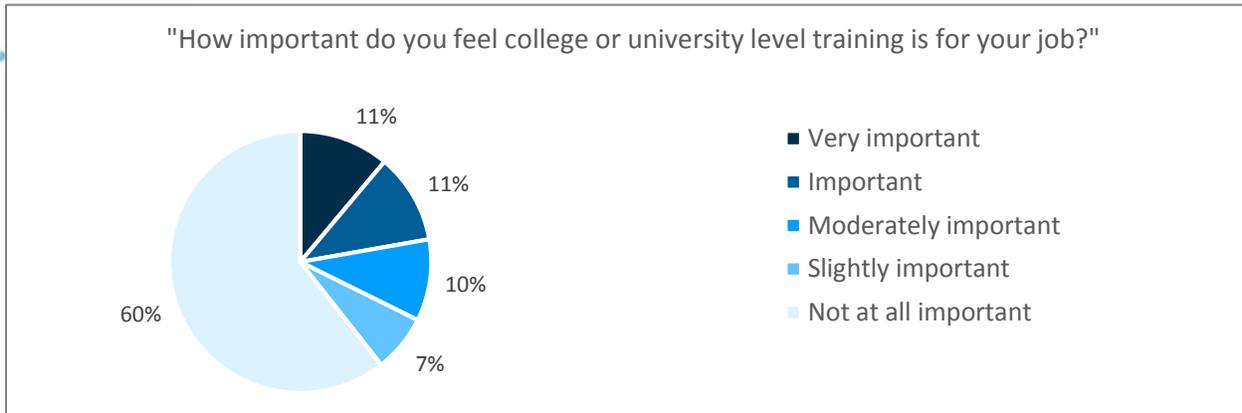
Overall, the aquaculture workers surveyed do not believe that college or university-level training is required to perform their job. Sixty percent of respondents believe that college or university-level training is, in fact, *not at all important* to their job. This was particularly prevalent among aquaculture workers working for processors (48 of 62 respondents, or 77%) stated post-secondary training was not important to their job. It is important to note that these are employee attitudes and does not necessarily reflect the views of employers.

⁴² Don't know/refusals were excluded.

⁴³ Don't know/refusals were excluded.

⁴⁴ Don't know/refusals were excluded.

Figure 7. Attitudes Toward Formal Training in Aquaculture (n=115⁴⁵)



Details regarding the survey’s respondent’s attitudes toward formal training in aquaculture are provided in Table 8. However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small.

Table 8: Aquaculture workers’ attitudes toward formal training in aquaculture, by employer type (n=115⁴⁶)

How important do you feel college or university level training is for your job? *					
Response	Total (%)	Hatchery	Grower / Harvester	Processor	Other
Very important	11%	3	4	4	1
Important	11%	2	8	1	2
Moderately important	10%	2	3	5	2
Slightly important	7%	0	4	4	0
Not at all important	60%	2	12	48	3
Total (n)	115	9	31	62	8

*Counts, instead of percentages, are presented for responses by employer type due to small sample sizes for some employer types (e.g., hatchery).

Among those who reported receiving some type of formal training⁴⁷ (n=37⁴⁸), some respondents reported completing an aquaculture related program (see Figure 8 on page 22), but a large proportion of survey respondents completed some other type of formal training.

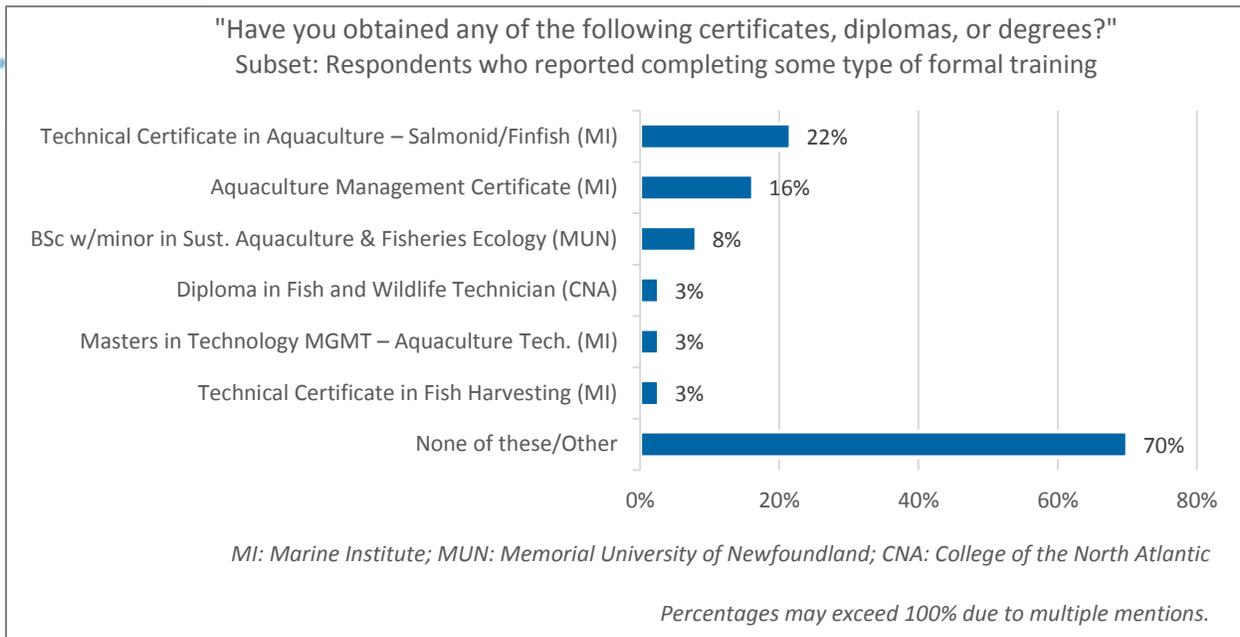
⁴⁵ Don't know/refusals were excluded.

⁴⁶ Don't know/refusals were excluded.

⁴⁷ Formal training refers to completion or partial completion in community-based training workshops, trade/technical college or university.

⁴⁸ Don't know/refusals were excluded.

Figure 8. Certificates, Diplomas, and Degrees Obtained by Respondents (n=37⁴⁹)



Survey respondents who were employed by growers/harvesters (n=36) were more likely to have completed some type of aquaculture related training. Among the 15 respondents employed by growers/harvesters who identified their formal training program, respondents reported completing a variety of aquaculture related programs:

- Technical Certificate in Aquaculture – Salmonid / Finfish (Marine Institute) – 7;
- Aquaculture Management Certification (Marine Institute) – 6;
- Advanced Diploma in Sustainable Aquaculture (Marine Institute) – 2;
- Bachelor of Science with Minor in Sustainable Aquaculture and Fisheries Ecology (Memorial University of Newfoundland) – 1;
- Technical Certificate in Fish Harvesting (Marine Institute) – 1;
- Masters in Technology Management – Aquaculture Technology (Marine Institute) – 1; and/or
- Diploma in Fish and Wildlife Technician (College of the North Atlantic) – 1⁵⁰.

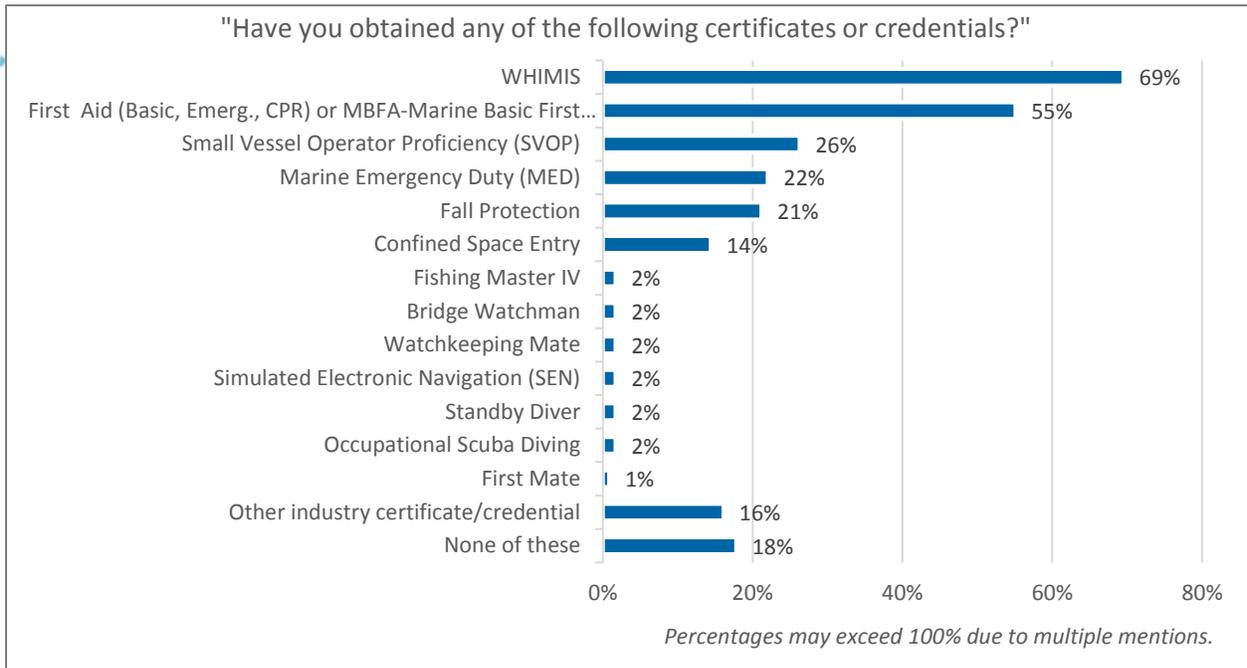
Few respondents working for processors, hatcheries, or other aquaculture employers reported completing formal training in aquaculture. However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small.

In addition to formal training, survey respondents were also asked if they have obtained specific certificates and/or credentials relevant to work in the Aquaculture industry. As shown in Figure 9 on page 22, the two most frequently reported training credentials among survey respondents were *WHMIS (Workplace Hazardous Materials Information System)* training and *First Aid or Marine Basic First Aid* training.

⁴⁹ Don't know/refusals were excluded.

⁵⁰ Multiple responses allowed.

Figure 9. Certificates and/or Credentials Obtained by Respondents (n=118⁵¹)



Observationally, survey respondents who were employed by growers/harvesters (n=36) more often reported that they had *Small Vessel Operator Proficiency (SVOP) training* (21 of 36, or 58%) and *Marine Emergency Duty (MED) training* (21 of 36, or 58%). However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small.

In addition to self-reported training from the survey of aquaculture workers, workshop attendance records from the NAIA/Marine Institute Technical Certificate in Aquaculture, Mussels and Salmonids (2010-2015) and the Technical Certificate in Aquaculture Management (TCAM⁵²) Workshop project (2017) were collected. Table 9 on page 24 provides details of workshop attendance for these programs.

⁵¹ Don't know/refusals were excluded.

⁵² The TCAM was developed by the Marine Institute and Industry in response to need to enhance aquaculture management skills.

Table 9. NAIA/Marine Institute workshop attendance

NAIA/Marine Institute Technical Certificate in Aquaculture Workshops (Mussels and Salmonids) 2010 - 2015	Attendance	NAIA/Marine Institute Technical Certificate in Aquaculture Management (TCAM) Workshop Project 2017	Attendance
Marine Basic First Aid (MBFA)	134	Computer Skills	8
Biology & Husbandry	72	External Communications	13
Feeds & Feeding	73	HR Management	29
Fish Health & Biosecurity	63	Salmonid Farm Management	18
Small Vessel Operators Efficiency (SVOP)	108	Calculations in Aquaculture	5
Radio Operators Course Marine Certification (ROC-MC)	44	Salmonid Regulation & Policy	10
Marine Emergency Duties A3 (MED A3)	67	Aqua Project Management	6
Oil Spill Response Awareness	39	Total seats	89
Basic Farm Safety	11	Number of students overall	31
Marine Hydraulics	28	Graduates (in 2017 pilot offering; others may complete in upcoming years)	16
Outboard Motor Maintenance	40		
Ropework	8		
Harvesting Handling & Processing	13		
Diesel Engine Maintenance	9		
WHMIS	13		
HACCP	6		
Quality Management Program	6		
Total seats	734		
Number of students overall	315		
Graduates	15		

In addition to asking survey respondents about their current level of training and the perception of its importance to their current position, respondents were also asked whether or not they felt that they needed additional training. Three-quarters (76%) of survey respondents reported that they didn't need additional training.

Among those indicated that they would benefit from training (n=21), slightly more than half (n=11) reported that some type of training specifically related to aquaculture, such as animal husbandry, water circulation systems, and blood water would be desirable. Other frequent mentions include machine operation (n=4), boat operation (n=3) and management training (n=3).

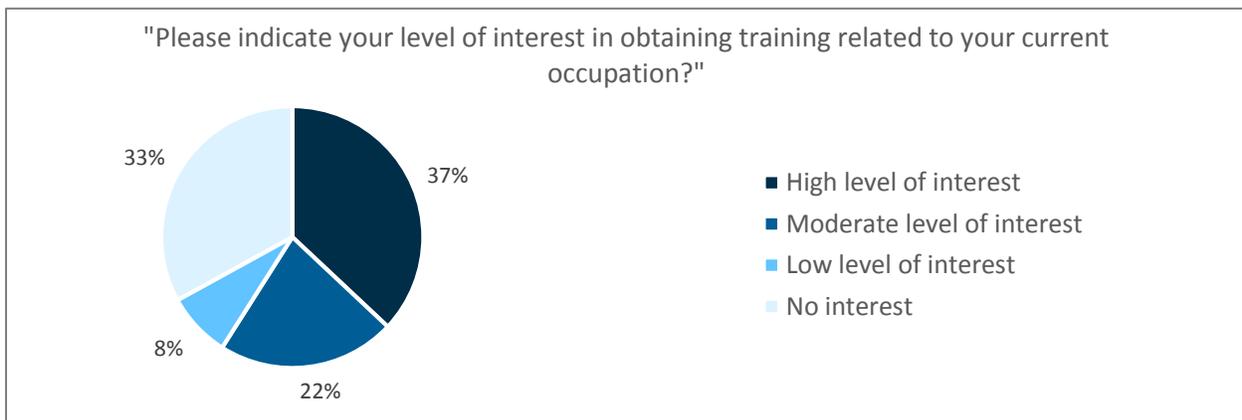
3.1.4 Attitude Toward Training

KEY INSIGHTS:

Almost six in ten aquaculture workers surveyed expressed an interest in taking training related to their current occupation. However, cost, location/travel, and a lack of opportunities were commonly perceived as barriers to pursuing additional training.

Although training was generally not perceived as important for their current jobs, more than half (59%) of survey respondents reported an interest in receiving additional training.

Figure 10. Attitudes Toward Taking Training Related to Current Occupation (n=113⁵³)



All survey respondents who were employed in hatcheries who responded to this question (n=8) reported a *high level of interest* in receiving additional training. The vast majority (28 of 34, or 88%) of survey respondents who were employed by growers/harvesters also reported an interest in receiving additional training. Table 10 provides details of respondents' attitudes toward additional training. However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small (see Table 10 on page 26).

⁵³ Don't know/refusals were excluded.

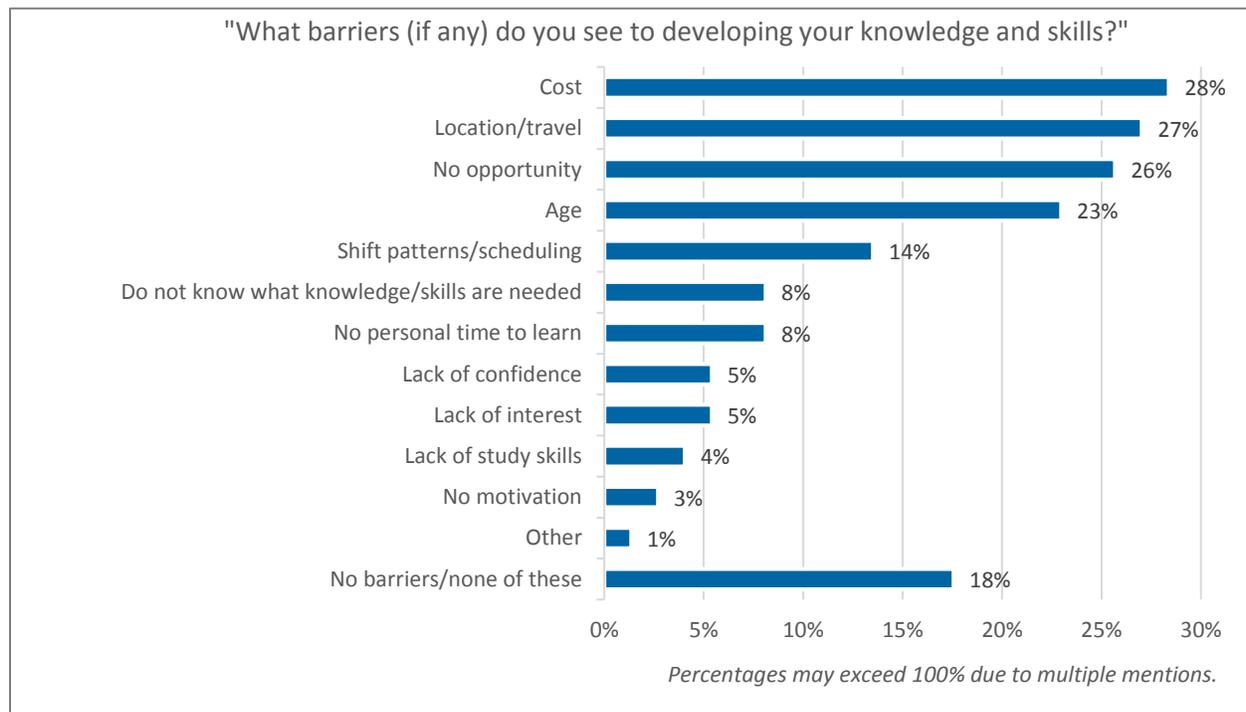
Table 10. Desirability of additional training (n=113⁵⁴)

Please indicate your level of interest in obtaining training related to your current occupation... *					
Response	Total (%)	Hatchery	Grower / Harvester	Processor	Other
High level of interest	37%	8	16	16	1
Moderate level of interest	22%	0	12	11	1
Low level of interest	8%	0	2	3	3
No interest	33%	0	4	29	2
Total (n)	113	8	34	59	7

*Counts, instead of percentages, are presented for responses by employer type due to small sample sizes for some employer types (e.g., hatchery).

Survey respondents were provided with a list of potential barriers that might impact their ability to develop their knowledge and skills and were asked to provide insight into any existing barriers that they personally faced. A large portion of respondents (45%) reported that they were unsure or preferred not to answer. However, among those who did provide an answer (n=74), top responses were cost, location/travel, and a lack of opportunities were barriers to additional training.

Figure 11. Barriers to Pursuing Additional Training (n=74⁵⁵)



⁵⁴ Don't know/refuses were excluded.

⁵⁵ Don't know/refusals were excluded.

3.3 Future Employment Requirements and Challenges

3.3.1 Future Outlook for Careers in Aquaculture



KEY INSIGHTS:

Two in three aquaculture workers surveyed plan to work in the industry as long as they are able. In terms of retirement, of responding workers, almost eight in ten planned to retire in either the next 5-10 years (30%) or more than 10 years (47%).

In addition to asking about the reasons why an individual chose to work in the aquaculture industry, survey respondents were also asked to provide insight on whether or not they planned to continue working in the industry and the reasons for their decision. The majority (67%) of survey respondents indicated that they planned to continue working in the industry *as long they were able to*.

Figure 12. Length of Time Respondents Plan to Continue Working in the Aquaculture Industry (n=134)

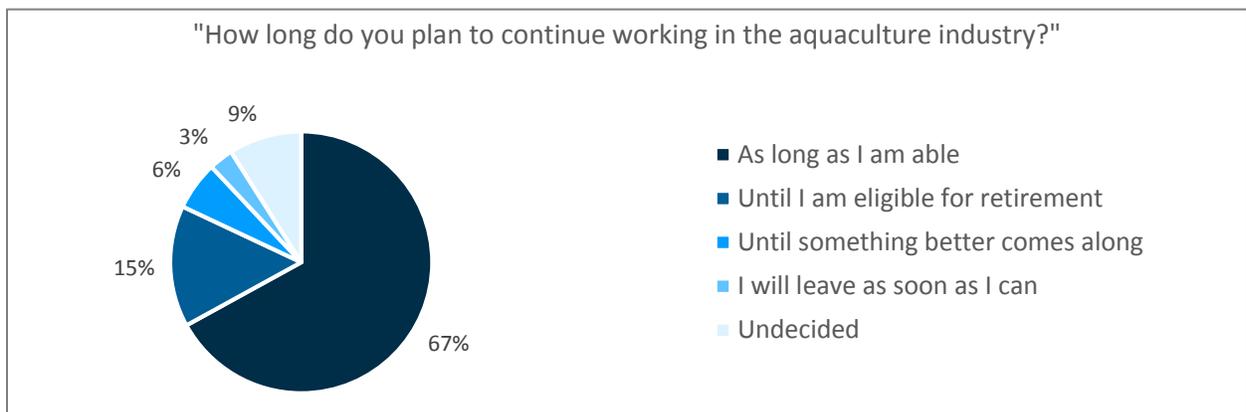
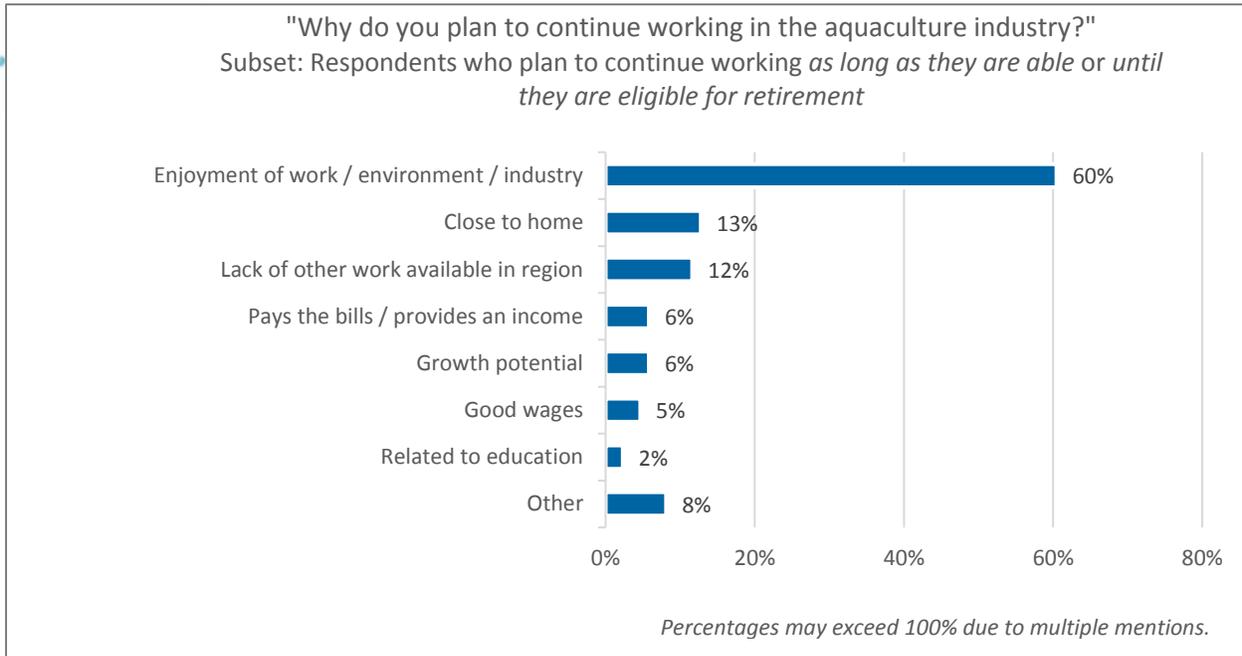


Figure 13 on page 28 shows that the most frequent response explaining why they chose to remain in the industry was that respondents (63%) enjoyed the work/work environment/aquaculture industry. Other frequently mentioned reasons were that it provided respondents with an opportunity to remain close to home (13%) or because there was a lack of other jobs in the area (12%).

Figure 13. Why Aquaculture Workers Plan to Continue Working in the Aquaculture Industry (n=86⁵⁶)



Among the small number of individuals planning to leave the industry (n=11), several reasons were offered:

"Because of the environmental destruction of the industry."

"Low pay and disrespect to workers."

"I don't feel that the chance for me to advance is going to be presented, so, when I can find a better career I will pursue it. Unfortunately, in this area it isn't that easy so for now aquaculture is a great way to make a living."

Survey responses echo the insight provided by key informants, particularly employers, who generally presented an image of a stable, low employee-turnover culture. However, many key informants indicated that an aging rural population and the associated expectations for a high trend of retirement was a concern for the future.

⁵⁶ Don't know/refusals were excluded.

Survey respondents who had reported that they intended to continue to work in aquaculture *as long as they were able* or *until they were eligible for retirement* were asked specifically about their retirement plans, and when they planned to retire from the industry (n=103). The largest proportion of respondents (37%) indicate that they plan to retire in 10 or more years, 5-10 years (23%) or 3-4 years (11%). However, a large proportion of the respondents were unsure or preferred not to say (21%). Table 11 provides details regarding respondents’ retirement plans across various types of aquaculture employers. However, results by employer type should be interpreted with caution as sample sizes for each employer type are disproportionate and some are quite small.

Table 11. Survey respondents’ expected retirement plans over the next 10 years, by employer group (n=103)

Are you planning to retire in the next...?					
Subset: Subset: Respondents who plan to continue working <i>as long as they are able</i> or <i>until they are eligible for retirement</i> *					
Response	Total (%)	Hatchery	Grower / Harvester	Processor	Other
1-2 years	8%	0	0	8	0
3-4 years	11%	0	1	9	1
5-10 years	23%	0	4	19	1
More than 10 years	37%	6	9	16	5
Prefer not to say	2%	0	0	2	0
Don't know	19%	1	9	10	0
Total (n)	103	7	23	64	7

*Counts, instead of percentages, are presented for responses by employer type due to small sample sizes for some employer types (e.g., hatchery).

4.0 EMPLOYMENT PROFILES

The aquaculture industry broadly encompasses all businesses engaged primarily in farm-raising aquatic animals and plants⁵⁷. The various sectors of this industry, namely, growers/harvester, hatcheries as well as related industries including suppliers and support organizations, are profiled in this section. The NAICS classification for *Aquaculture* (112510) does not formally include the processing sector. Instead, processors are classified under the NAICS description, *seafood product preparation and packaging* (311710). However, in consideration of the fact that processing is intertwined with the aquaculture industry, this sector of the industry has also been profiled below. Table 12 provides an overview of the aquaculture industry and other related industries.

Table 12. Summary of the aquaculture and seafood processing industry⁵⁸

Industry (NAICS)	Description	Examples
112510 - Aquaculture ⁵⁹	“This Canadian industry comprises establishments primarily engaged in farm-raising aquatic animals and plants. Establishments primarily engaged in raising both aquatic animals and plants in integrated growing operations, aquaponics, are also included. These activities can occur both in natural waters and in artificial aquatic impoundments and include the use of some form of intervention in the rearing or growing process to enhance production.”	finfish hatcheries; shellfish farming; fish breeding and propagating service, freshwater; fish breeding and propagating service, salt water
311710 - Seafood product preparation and packaging ⁶⁰	“This Canadian industry comprises establishments primarily engaged in canning seafood, including soup; smoking, salting and drying seafood; preparing fresh fish by removing heads, fins, scales, bones and entrails; shucking and packing fresh shellfish; processing marine fats and oils; and freezing seafood. Establishments known as floating factory ships, that are engaged in shipboard processing of seafood, are included.”	fish meal, manufacturing fish, fresh or frozen, manufacturing frozen fish oils, manufacturing mollusc cleaning and preparation for market, contract services oil, fish and marine animal, manufacturing seafood and seafood products, fresh prepared or frozen, manufacturing seafood dinners (e.g., fish and chips), frozen, manufacturing shellfish, fresh prepared or frozen.

⁵⁷<http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=307532&CVD=307548&CPV=112510&CST=01012017&CLV=5&MLV=5>

⁵⁸ All descriptions and examples are provided by the National Industry Classification System (2012):

<http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=118464>

⁵⁹<http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=307532&CVD=307548&CPV=112510&CST=01012017&CLV=5&MLV=5>

⁶⁰<http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=118464&CVD=118471&CPV=311710&CST=01012012&CLV=5&MLV=5>

4.1 Profile of Aquaculture Occupations

Aquaculture growers, harvesters and hatcheries are what would typically be associated with farms and farming. In 2017, there were 88 commercial salmonid and 53 mussel site licenses in NL. According to the annual report published by the Department of Fisheries and Land Resources, Newfoundland and Labrador, the number of commercial site licenses have changed little since 2014. While the number of sites has remained fairly stable (see Table 13), several key informants noted that the number of companies has changed over time as smaller companies have been consolidated into operations of larger companies.

Table 13 summarizes the number of commercial licenses for salmonid and mussel sites in the province.

Table 13. Number of commercial aquaculture sites (salmonid and mussel) between 2014-2017

Year	# of sites (salmonid)	# of sites (mussel)
2014	87	51
2015	87	51
2016	88	53
2017	88	53

Businesses within this category require a broad range of occupations in order to operate effectively and efficiently. From boat operators to site supervisors to farm labourers, these sites oversee the breeding, growing and farming of aquaculture plants and animals in the province. A summary of the occupations included within this sector are provided in Table 14.

Table 14. Summary of primary occupations in aquaculture and related industries

Occupation (NOCS)	Description	Qualifications	Examples
0823 – Managers in aquaculture ⁶¹	<p>“Managers in aquaculture manage operations of facilities which cultivate and harvest fish, shellfish or marine plants for replenishment of wildlife stocks or for commercial sale. They are employed by public or private fish hatcheries and commercial aquatic farms, or they may be self-employed.”</p> <p>Typical duties include:</p> <ul style="list-style-type: none"> Managing the overall operation of an aquatic farm Identify requirements of the species and oversee preparation of site for cultivation 	<p>Typically, those in this occupational group have completed a post-secondary education program and/or have several years of experience in aquaculture operations.</p>	<p>Aquaculture managers and operators; hatchery managers; fish farmer; salmon/mussel farmer; etc.</p>

⁶¹ National Occupation Classification System (NOCS): <http://noc.esdc.gc.ca/English/noc/ProfileQuickSearch.aspx?val=0&val1=0823&ver=16&val65=aquaculture>

Occupation (NOCS)	Description	Qualifications	Examples
	<ul style="list-style-type: none"> Determine food requirements and structure feeding regimes. Collect and record growth data and production. Maintain financial records and establish market strategies, inventory and quality control methods. 		
2221 – Biological technologists and technicians ⁶²	<p>“Biological technologists and technicians provide technical support and services to scientists, engineers and other professionals working in fields such as agriculture, resource management, environmental protection, plant and animal biology, microbiology, cell and molecular biology and health sciences, or may work independently in these fields. They are employed in both laboratory and field settings by governments, manufacturers of food products, chemicals and pharmaceuticals, biotechnology companies, health, research and educational institutions, environmental consulting companies, and resource and utilities companies.”</p> <ul style="list-style-type: none"> Set-up and conduct biological, microbiological and biochemical tests and laboratory analyses in support of research and quality control in food production, sanitation, etc. Perform experimental procedures in agriculture, plant breeding, animal husbandry, biology and biomedical research Analyze data and prepare reports 	<p>Qualifications for this occupation typically require completion of a post-secondary program in agriculture, biology, biomedical research and environmental protection; assist in conducting field research and surveys to collect data and samples of water and/or others. Certification with provincial associations is recommended, but not necessary.</p> <p><i>Note: There is limited mobility among occupations in this group.</i></p>	<p>Fish hatchery technician; aquaculture technician; microbiologist technician; fish farm technician</p>
8613 – Aquaculture and marine harvest labourers ⁶³	<p>“This occupational group includes aquaculture support workers, marine plant gatherers, shellfish diggers and other labourers in aquaculture and fishing. Aquaculture support workers are employed by public or private fish hatcheries and commercial aquatic farms. Marine plant gatherers and shellfish harvesters may be self-employed.” Typical duties and responsibilities associated with this occupation include:</p>	<p>Typically, partial completion of secondary education is required and/or have several years of experience in aquaculture operations. For wild shellfish harvesters, commercial fishing licenses are required.</p>	<p>Fry marker; shellfish harvester; fish farm helper/labourer; aquaculture support worker; hatchery worker/helper</p>

⁶² National Occupation Classification System (NOCS):

<http://www23.statcan.gc.ca/imdb/p3VD.pl?CLV=4&CPV=2221&CST=01012011&CVD=122376&Function=getVD&MLV=4&TVD=122372>

⁶³ National Occupation Classification System (NOCS):

<http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=122372&CVD=122376&CPV=8613&CST=01012011&CLV=4&MLV=4>

Occupation (NOCS)	Description	Qualifications	Examples
	<ul style="list-style-type: none"> ▪ “Clean, sort, and transport shellfish to market ▪ Prepare aquaculture stocks for market ▪ Keep daily records of water flow and fish samples ▪ Feed aquaculture stocks, vaccine stocks, perform culling and marking or banding techniques and report any observed irregularities in stocks. ▪ Grade and weigh aquaculture stocks.” 		

4.2 Profile of Processors

Table 15. Occupations related to seafood processing

Occupation (NOCS)	Description	Qualifications	Examples
9618 – Labourers in fish and seafood processing ⁶⁴	<p>“Labourers in this unit group perform clean-up, packaging, material handling and other elemental activities related to fish and seafood processing. They are employed in fish and seafood processing and packaging plants.” Typical duties and responsibilities include:</p> <ul style="list-style-type: none"> ▪ “Unload fish and shellfish from fishing vehicles and transport them by hand or forklift truck to work area in fish processing plant. ▪ Immerse fresh fish fillets in brine solution to condition them for wrapping/freezing ▪ Sort fish according to species, weight and destination ▪ Clear work areas and equipment ▪ Measure and dump ingredients into hoppers of mixing and grinding machines.” 	<p>Some secondary education may be required, but is not necessary. With experience, progression to other occupations in the fish processing industry is possible.</p>	<p>Cannery labourer; fish briner - fish processing; fish plant labourer; fish salter - fish processing; fish weigher; shellfish labourer; shellfish packer - fish processing</p>
9213 – Supervisors, food, beverage and associated	<p>“Supervisors in this unit group supervise and coordinate the activities of workers who operate processing and packaging machines, and workers who grade food, beverage and associated products. They are employed in fruit and vegetable processing plants, dairies, flour mills, bakeries, sugar refineries, fish plants, meat</p>	<p>Completion of secondary education coupled with several years of experience in the food, beverage or associated products processing industry are</p>	<p>Foreman/women of workers in fish processing; fish processing supervisor</p>

⁶⁴ National Occupation Classification System (NOCS):

<http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=122372&CVD=122376&CPV=9618&CST=01012011&CLV=4&MLV=4>

<p>products processing⁶⁵</p>	<p>plants, breweries and other food, beverage and associated products processing establishments.” Typical duties and responsibilities associated with this position include:</p> <ul style="list-style-type: none"> ▪ “Supervise, coordinate and schedule the activities of workers who process, package, test and grade food ▪ Resolve work problems and recommend measures to improve productivity and product quality ▪ Recommend personnel actions such as hiring and promotions.” 	<p>typically required. Additional qualifications that are dependent on the specific role of the supervisor are also generally required. Examples include: Hazard analysis critical control point (HAACP); Post-secondary certification in microbiology or chemistry.</p>	
<p>9463 – Fish and seafood plant workers⁶⁶</p>	<p>“This unit group includes fish and seafood plant machine operators who set up and operate machinery to process and package fish and seafood products, and fish and seafood plant cutters and cleaners who cut, trim and clean fish or seafood by hand. Fish and seafood plant workers are employed in fish and seafood processing plants.” Typical duties and responsibilities include:</p> <ul style="list-style-type: none"> ▪ “Set-up and operate machines to clean, cut, cook, smoke, brine dehydrate, or otherwise process fish or seafood products. ▪ Set-up and operate machine to can, bag, box or otherwise package fish and seafood products. ▪ Cut, clean and trim fish or seafood prior to marketing and further processing.” 	<p>Some secondary school education may be required, but is not necessary; on-the-job training is required.</p> <p>Advancement to supervisory positions may be possible with experience.</p>	<p>Shellfish shucker; trimmer; fish plant worker; cleaner and cutter; fillet chopper</p>

⁶⁵ National Occupation Classification System (NOCs):

<http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=122372&CVD=122376&CPV=9213&CST=01012011&MLV=4&CLV=4>

⁶⁶ National Occupation Classification System:

<http://www23.statcan.gc.ca/imdb/p3VD.pl?CLV=4&CPV=9463&CST=01012011&CVD=122376&Function=getVD&MLV=4&TVD=122372>

5.0 CONCLUSIONS

5.1 Key Considerations for Workforce

- The rural population of Newfoundland and Labrador is declining and the population who are residing in rural communities is aging faster than other Canadian provinces.
- In general, retention is not currently seen as an issue by the majority of employers and/or key industry stakeholders. However, employers and other key industry stakeholders have concerns for accessing future workforce numbers as their current workforce retires and younger people are out-migrating.
- Many employees had previous experience in the fishery, construction, oil/gas, wild seafood processing and forestry sectors. Strategies for future workforce needs may look to attracting from these sectors.
- Under the Government of NL's "*The Way Forward*" for the Aquaculture Workplan, the doubling and tripling of the salmonid and mussel sector production will necessitate increased labour needs and/or automation technology to reduce labour demands.
- Retention and recruitment strategies need to consider how to attract new workers, such as wages, annual hours of employment, opportunities for advancement, female workforce in aquaculture jobs, social infrastructure needs to entice young families to work and live in rural communities, future considerations for migratory (travel in/out for rotational work schedules) and foreign worker programs.

5.1 Worker Education, Satisfaction, and Rural Community Stability

- Overall, most aquaculture workers chose their profession because these positions offered a chance for them to stay in their own rural communities. Most aquaculture workers have chosen to stay in the aquaculture industry and their occupations specifically because they enjoy it and/or find it interesting. Thus, it is critical that these messages of overall satisfaction get relayed to other potential workers.
- Some of those surveyed noted negative public perceptions of the aquaculture industry and potential impacts on attracting young workers. Again, positive messages from workers and the industry need to be key messages about the industry.
- Most workers gained knowledge from formal training programs or on-the-job experience. Mentorship, work experience and opportunities for advancement will be important as the industry continues to grow and seek new employees.
- Social infrastructure needs (e.g. housing, schools, community services) will also be important to assess and consider when seeking to attract and retain workers from other communities and regions.

6.0 AQUACULTURE CASE STUDIES

6.1 Case Study 1: Salmon smolt hatchery (Northern Harvest Sea Farms – Stephenville)

6.1.1 Company Background

Northern Harvest Sea Farms' salmon smolt hatchery is located in Stephenville, on the Island's Western coast. The hatchery is relatively new, beginning early operations in 2011 – a year following the company's excited announcement of its impending construction⁶⁷. The hatchery is Best Aquaculture Practice (BAP) certified, and has been very successful. In late 2016, Northern Harvest Sea Farms announced a \$6 million expansion plan for the Stephenville operation, raising the company's total production amounts up 6,000 tonnes/year⁶⁸.

The hatchery itself is large, made up of three buildings and covering approximately 95,000 squared feet. In 2016, the hatchery employed 27 people, including a small management team of three. The following profile is based on a site visit of Northern Harvest's Stephenville Hatchery, including a tour and an interview with Andrew Skanes, Operations Manager of the hatchery.

6.1.2 Labour Force

Andrew reported a very small shortage in worker supply – if any at all – for the hatchery. To demonstrate, Andrew estimated that he receives 3-4 resumes per week. In part, this might be explained by the distinctiveness of each of the three main employers in the region – the hospital, the hatchery, and Wal-Mart, which are each likely to attract individuals with interests related to the specific industries. Andrew also acknowledged that the hatchery offers competitive compensation, both for the region and the industry. However, Andrew qualified his own experience accessing the workforce as a result of living in a more populated area and indicated that rural areas, such as Harbour Breton, may report a different experience.

When asked to explain why he thought rural areas may have more difficulty finding local workers, Andrew explained that it was likely the result of a shortage in housing infrastructure and/or limited social and technological infrastructure.

⁶⁷ As of December 22, 2016, Marine Harvest has entered into a Share Purchase Agreement with Northern Harvest Sea Farms.

⁶⁸ CBC News: <http://www.cbc.ca/news/canada/newfoundland-labrador/northern-harvest-farm-expansion-1.3879828>

6.1.3 Workforce Profile

The majority of the workers employed by the hatchery are originally from Stephenville, but all workers are from the Island. Employee retention is good, with the majority of the employees – approximately 15 of the 27 employed at the time of the site visit – had been employed by the hatchery since it began operating in 2011.

The type of occupations and work environment in the hatchery vary, depending on what sector of the hatchery an individual is employed. For example, the two positions related to vaccination and incubation are seasonal (four month and one month contract positions, respectively). All positions at the hatchery, with the exception of the aforementioned, are full-time and permanent. Figure 14 on page 38 provides an overview of the organizational structure of the hatchery.

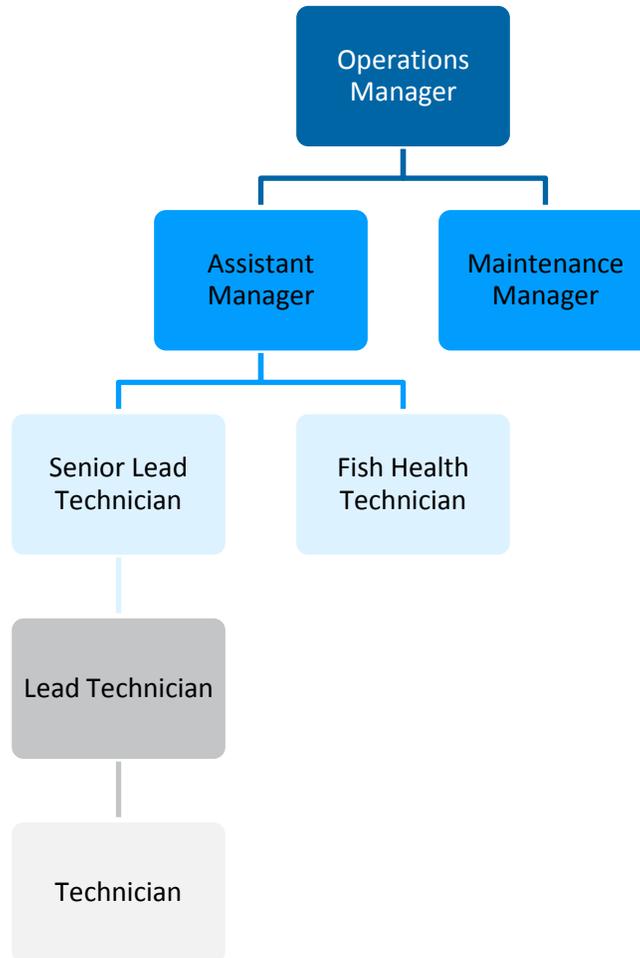
The scheduling system is set-up so that shifts run 24/7, with 6-8 people working per shift. Shifts are long, averaging 12 hours.

Demographic Snapshot

Gender: Evenly split among workers in non-management positions. Four of the ten supervisors employed by the hatchery are women. More women than men work in egg incubation. Similarly, men are more likely to work in the smolt building, which requires heavy lifting.

Age: Ages range between 19 – 60 years. Andrew estimated that the average age of hatchery workers was likely late 30s to early 40s.

Figure 14. Organizational Structure of Northern Harvest Sea Farms' Salmon Smolt Hatchery in Stephenville



6.2 Case Study 2: Seafood processing (Barry Group – Benoit’s Cove)

6.2.1 Company Background

Barry Group’s seafood processing plant is located in the little outpost community of Benoit’s Cove, nestled on the Island’s West Coast⁶⁹. The plant in Benoit’s Cove processes a range of seafood including crab, lobster, finfish, and both organic and non-organic mussels. The only aquaculture product processed at the plant at the time of the site visit was conducted were mussels from Badger Bay Mussel Farms.

6.2.2 Labour Force

The Benoit’s Cove fish processing plant is perceived as a means for locals to remain in their home community. Many consider the plant to offer a suitable option for obtaining a second income. Since the plant has diversified the product that is processed, the plant offers workers the opportunity to work throughout the year.

Attitude and a willingness to learn are the primary attributes currently being sought for the majority of positions at the Benoit’s Cove processing plant. However, particular skillsets in machine maintenance and repair from post-secondary training are also required – particularly in the cold storage department.



Competition for workers with other industries like oil and gas has been a challenge for the Benoit’s Cove plant. Other challenges include housing since there are few if any vacant houses and little space to construct additional buildings as well as geography. The Benoit’s Cove plant maintains strict quality control measures, particularly in regards to shelf life of the product, which means that reliable transportation on and off the island is crucial. Additionally, many workers are accustomed to working seasonally or only during parts of the year, which lends itself to an unpredictable workforce size.

⁶⁹ Barry Group purchased the processing plant from Allen’s Fisheries Ltd. during the summer of 2017.

6.2.3 Workforce Profile

The majority of the workers at the Benoit’s Cove processing plant are from the immediate region, with some travelling in from nearby communities. Retention at the plant is considered to be fairly high, a result of people from the community wanting to remain in Benoit’s Cove. There are a variety of different types of occupations at the processing plant including a management team, maintenance department (approx. 9 people), refrigeration department (approx. 3 people), supervisors (approx. 5 people), quality control and general labourers (approx. 100 workers).

Demographic Snapshot

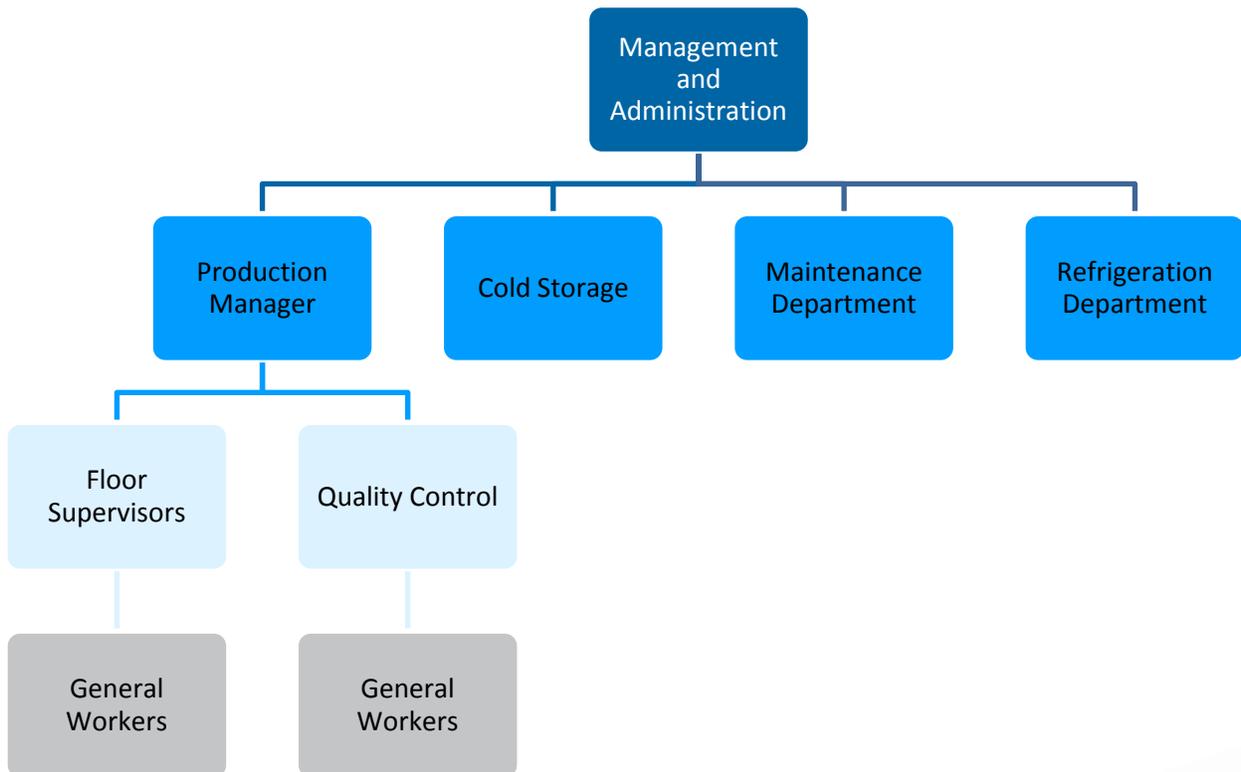
Gender: The majority of the workers at the processing plant are women. It was estimated that approximately 80% of the workers are women.

Age: Average age of the worker was estimated to be in their 50s.

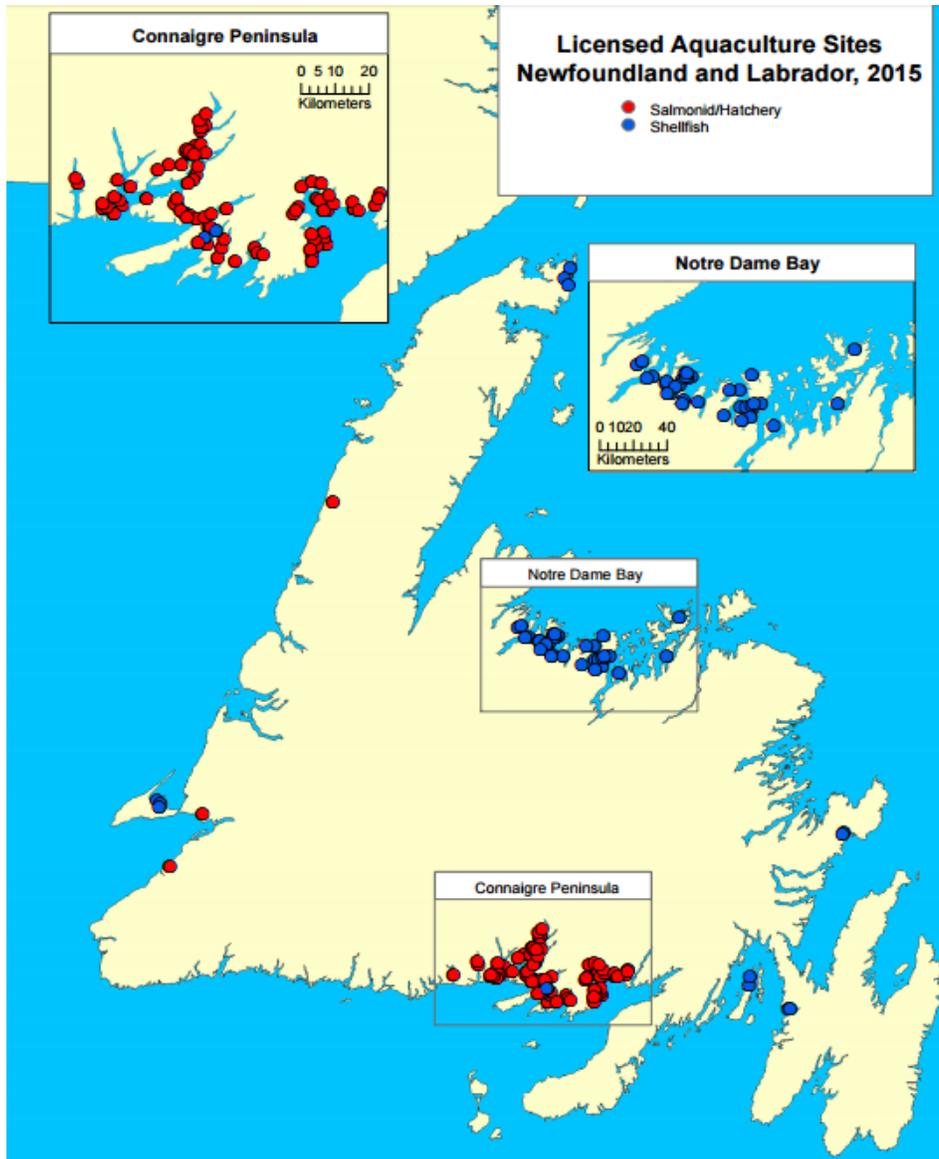
Education: On the job training is typically required by all workers. Specifically, mentorship and job shadowing are the preferred methods of training.

Refer to Figure 15 for an organizational chart of the Benoit’s Cove fish processing plant.

Figure 15. Organizational chart of the Benoit’s Cove fish processing plant (Barry Group)



APPENDIX A: LICENSED AQUACULTURE SITES IN NL (2015)⁷⁰



⁷⁰ Department of Fisheries, Government of Newfoundland Labrador (2018). Fisheries and land resources. Retrieved from <http://www.fishaq.gov.nl.ca/aquaculture/support.html>