SNOW CRAB FOOD SAFETY AND QUALITY

A discussion of issues related to provincial regulation

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There is Value in a Quality Focus.

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1.0 Introduction

The Province's Quality Assurance Program began in the mid-1990s in response to quality problems across all industry sectors. There was a need to change the mindset from an industrial fish production mentality to that of a quality and safe food producer. The reopening of the 3PS groundfish was the initial impetus for the program. Issues with quality in the snow crab fishery quickly resulted in an expansion of the program.

The industry has made remarkable progress relative to the state of the industry in the mid-1990s. The rapid expansion of the industry caused growing pains, and quality suffered. Industry participants recognized the challenge and cooperatively made many changes that improved product quality.

Newfoundland and Labrador has developed a reputation for quality crab. The Department of Fisheries, Forestry and Agriculture (DFFA) has a quality and food safety role in working with its industry partners to help maintain its competitive edge in the marketplace.

1.1 Review Purpose

The purpose of this review is to provide an overview of the regulatory environment of parties, including the Canadian Food Inspection Agency (CFIA) regulations, dockside grading performed by Independent Dockside Graders (IDG), and any other relevant instruments as pertains to snow crab quality and the food safety network. DFFA developed its quality assurance program to help move the industry forward on quality issues. Historically, it has been a cooperative approach.

On August 1, 2024, in a news conference held by the Association of Seafood Producers (ASP) and some of its member processing companies, statements were made regarding inconsistencies between Independent Dockside Graders' (IDG) methodology and technology and that used by the Department of Fisheries, Forestry, and Agriculture Inspectors. The Executive Director and Chief Negotiator with the ASP was quoted in a news article saying that the protocols used by provincial inspectors to determine dead or critically-weak crab are outdated and need to be changed.

Some of the issues raised by ASP bring into focus the nature of quality control, grading and food safety in the crab sector. It also highlights the need for a renewed cooperative approach amongst all parties to resolve any quality issues.

Some of the key issues raised in the public comments by the processing sector include:

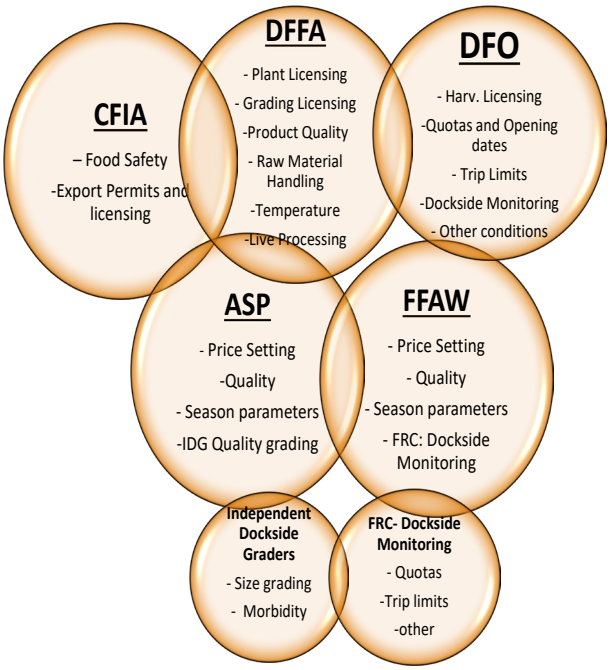
- There is a need for a cooperative approach to food quality and grading.
- The differences in grading standards between IDG and provincial inspectors.
- The regulation of IDG by the Province.
- The detention of product and the financial impact on an individual processor.
- Discussions around quality can have a market impact.
- The seafood products produced by provincial processors have a good reputation. The current discussion is focused on about 200,000 lbs. out of a landed 126 million lbs.

The seafood processors have raised several issues and suggests that a review is warranted. Discussion of the issues raised by the ASP will occur throughout this report. As in the past, the resolution of quality and other problems is best undertaken cooperatively by all parties with open and candid discussion. This document is a step in understanding the operating environment and is a desktop review.

2.0 Role of Oversight Bodies in the Snow Crab Fishery

The oversight of the snow crab fishery reflects the constitutional roles of the Provincial and Federal governments. Simply stated, the Province has a constitutional responsibility for activity that happens onshore and in the coastal bays. As such, it licenses fish processing facilities and provides oversight on economic development activities. This includes the regulation of fish products landed and conditions aboard harvesting vessels.

Figure 1
Snow Crab Players and Their Oversight Roles



The Federal Government licenses and manages the harvesting sector through the Department of Fisheries and Oceans and is responsible for food safety through Health Canada and the Canadian Food Inspection Agency. The CFIA also licenses seafood processing facilities when a product crosses provincial or national borders.

The Fish Food and Allied Workers Union/Unifor (FFAW) is the sole bargaining agent for harvesters setting fish prices and is enabled by the Fishing Industry Collective Bargaining Act. The Fisheries Resource Centres (FRC), an FFAW affiliate, operates the dockside monitoring program on behalf of DFO.

The Association of Seafood Producers represents fish processors producing the majority of seafood in the Province. It represents all snow crab producers in price setting for crab, i.e. the

price negotiated applies to all processors. ASP contracts the snow crab grader, currently IDG, that provides oversight when crab is landed.

In addition, other services have an impact on quality. Trucking companies and company-owned vehicles transport ice and crab around the Province. Offloading crews work each landing site and offload crab from vessels. The handling methods employed can result in a loss of value by increasing mortality through rough handling or loss of crab limbs. A crab losing one limb increases mortality by 50 percent, and losing two limbs guarantees death.

The following sections highlight the role of each of the parties listed in Figure 1. The Provincial role is covered in Chapter 3.

2.1 Snow Crab Collective Agreement

The parties, ASP and the FFAW, are signatories to the collective agreement that sets a price for the fishery each year. Included in the agreement are measures related to the conduct of the fishery.

The annual snow crab collective agreement provides some general parameters for the fishery each season. Some items included in the collective agreement focus on product quality. Many of these items are negotiated by harvesters and processors but are enabled or supported by government regulations and some are under the purview of the parties. These have included:

- Legal size – (DFO enabled)
- trip limits that vary by date and fleet (DFO enabled)
- size and size tolerance – price component (FICBA[1] enabled)
- Processor provision of ice – sufficient quantities – (Industry and DFFA enabled)
- tolerances for critically weak: e.g. %5 (industry enabled)
- poor quality or weak crab: 20% critically weak and/or 4% dead, requires DFFA be notified (Industry and DFFA enabled)
- quality adjustment for barnacles (Industry enabled)
- discharge/trucking/handling protocol (Industry enabled)
- selection of the Dockside monitor (DFO enabled)
- selection of a grading company through ASP (DFFA enabled)

[1] Fishing Industry Collective Bargaining Act

Members of each group are independent businesses. Neither group has robust mechanisms to ensure all the parameters of the collective agreements are adhered to throughout the season. Generally, only the government-enabled pieces survive the intense wharf competition.

Once the limits of pricing are met, i.e. bonus payments paid above the negotiated price, the pressure can come on its members to compete on quality. This was documented in the Dunne Commission report as well as in the Cashin review of the RMS system. For example, a load of poor-quality crab with excessive dead or critically weak crab, could slip through and be processed. If the catch was condemned, the harvester would lose the value of the catch, and the processor could lose the harvester as a supplier. In the current system, there is an incentive to look the other way, and regulatory bodies are the mechanism to ensure this doesn't happen.

> *Under the Quality Assurance Program, Government enforces regulations so that industry players can receive a greater return from the marketplace. The real question is why must Government establish and enforce quality standards and introduce protocols to ensure that raw material is handled properly. At first glance, it would seem that this is the role of private enterprise and not the role of Government. Economic theory would suggest that rational firms work to maximize their profits. The structural problems in the industry, however, prevent companies from maximizing their return by producing high quality products and enforcing quality measures throughout the supply network. This instability and lack of discipline inherent in the sector causes business decisions to be short-term.* Dunne p.77[2]

DFO enforces protocols around trip limits. The management approach for 2024 included trip and weekly limit requirements in the license conditions. These regulatory measures help enforce the season parameters for harvesting and processing members. Without DFO, the limits are difficult to implement solely by the collective agreement.

Similarly, protocols around critically weak and dead crab are ultimately enforced by DFFA. All crabs are required to be alive when they are processed.

2.2 The Canadian Food Inspection Agency

Fish sold in Canada must comply with the Food and Drugs Act (FDA), the Food and Drug Regulations (FDR), the Safe Food for Canadians Act (SFCA) and the Safe Food for Canadians Regulations (SFCR). CFIA has a presence in Newfoundland and Labrador, with offices and staff located around the Province.

The Canadian Food and Drug Act provides specific guidance for overall food products. Legislation states:

4 (1) No person shall sell an article of food that

[2] The structural problems outlined by Dunne appear to remain key features of the industry. Indeed, policy changes by the Federal government may even have exacerbated the structural issues.

(*a) **has in or on it any poisonous or harmful substance;***
(b) is unfit for human consumption;
*(c) **consists in whole or in part of any filthy, putrid, disgusting, rotten, decomposed or diseased animal or vegetable substance;***
(d) is adulterated; or
(e) was manufactured, prepared, preserved, packaged or stored under unsanitary conditions.

The SFCA/SFCR and the FDA do not define the term "decomposed". The FAO/WHO[3] however defines decomposition as "*The deterioration of fish, shellfish and their products including texture breakdown and causing a persistent and distinct objectionable odour or flavour."* This is same definition that had been used in the repealed Federal Fish Inspection Act.

The Safe Food for Canadians Act and its regulations apply to all food businesses in Canada, including snow crab processors. Snow crab processors must obtain a license under the SFCR to operate legally given their export focus. This ensures that they meet the necessary food safety standards.

Before the SCFR came into full force, regulations were more prescriptive. There were 17 pieces of legislation guiding food production. Fourteen of them have been repealed due to the new food safety framework.

The Federal Fish Inspection Act, repealed in 2019, was very prescriptive with regards to processing crab. Section 23 of the Act stated:

23 No person shall:

***(a) process crabs, lobsters, clams, oysters, mussels or whelks that are not alive;** or*

(b) pack, sell, export or import clams, oysters, mussels or whelks in any form unless such molluscs are free from shellfish toxin when tested by a method approved by the President of the Agency.

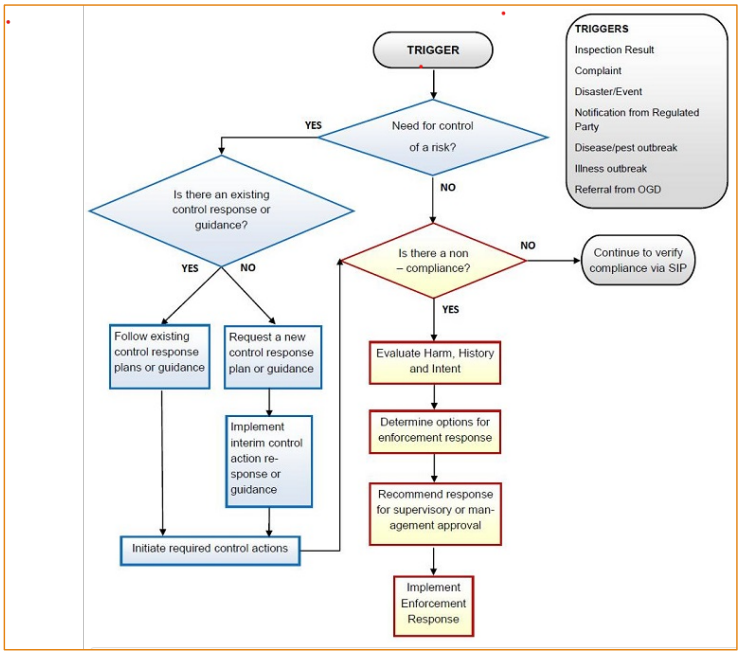
The federal mandate of the Fish Inspection Act was for both quality and food safety and this was enforced by the CFIA. An official with CFIA indicates they no longer have a food quality mandate. Their focus is primarily on food safety.

As part of the new food safety system, seafood processors are required to implement preventive control plans (PCPs) to identify and manage risks to food safety. This includes monitoring and documenting processes to ensure the safety of snow crab products. The preventive controls related to food safety are based on the internationally accepted Codex Alimentarius General Principles of Food Hygiene CAC/RCP 1-1969 (PDF).

[3] Food and Agriculture Organization of the United Nations / World Health Organization

The SFCR mandates that snow crab processors maintain traceability records. This means they must be able to trace the crab from the point of harvest to the final product, ensuring that any food safety issues can be quickly identified and addressed.

Figure 2: CFIA Regulatory Response



Snow crab products must be labeled and packaged according to SFCR standards. This includes providing accurate information about the product, such as its origin, ingredients, and any allergens.

Snow crab processors are subject to inspections by the Canadian Food Inspection Agency (CFIA) to ensure compliance with the SFCR. Non-compliance can result in penalties, including fines and suspension of licenses. CFIA in this Province visits the processing facilities however, statistics are not readily available on the frequency. An audit notification is given in advance and the audit framework is announced, i.e. what part of the process is being audited.

The Canadian Food Inspection Agency (CFIA) inspects to:

- verify compliance with regulations (for example, complaints)
- investigate reported problems
- respond to a request from industry (for example, to obtain an export certificate or import permit)
- follow up on a previous inspection
- investigate establishment or product contamination

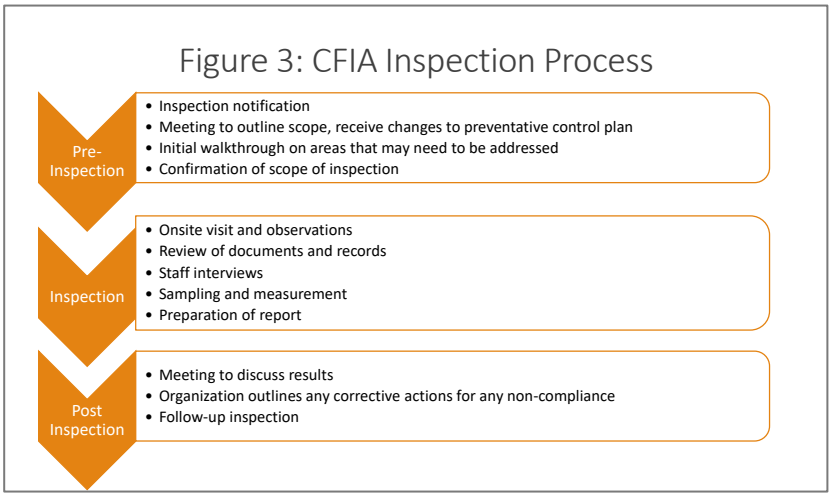
CFIA indicates that the triggers for an inspection are an inspection result, a complaint, disaster/event, notification from a regulated party, disease/pest outbreak, illness outbreak, or a referral from another government department.[4]

Once a trigger is initiated the risk evaluation process begins. If a risk needs to be controlled, then it is evaluated with existing controls, or a new control is developed. If non-compliance is found then harm, history and intent are evaluated. This will result in a review of response options and any required enforcement.

[4] Standard Regulatory Response Process - inspection.canada.ca

There are three key processes involved in the food inspection process, this includes pre-inspection, onsite inspection and observation, and a post-inspection reporting[5].

In the pre-inspection phase, the establishment is notified via telephone or email that an inspection and the scope of the inspection will occur.



The onsite inspection results in the verification of preventive controls and their completeness and effectiveness. It includes document reviews, staff interviews, and sampling and measurement. A report is generated based on this review. After the inspection, a follow-up inspection will be conducted using the same process.

If an issue is found, the CFIA's regulatory response can be in the form of control actions, enforcement actions or both. Regulatory control actions are undertaken to mitigate risk, while enforcement actions may also be undertaken to respond to non-compliance.

Within the Province, CFIA visit processors on a regular basis, however, data on in-facility inspections and engagement is not readily available. As well, the nature of its actions were not available for this review.

Export Requirements

Seafood exports from Canada to the United States of America (U.S.) must comply with both Canadian and U.S. regulations. While Canadian exporters must meet the standards set by the CFIA, they also need to adhere to the U.S. Food and Drug Administration (USFDA) regulations.

The USFDA's regulations include the Foreign Supplier Verification Program (FSVP), which ensures that imported food meets U.S. safety standards. Additionally, seafood products must comply with the FDA's Hazard Analysis and Critical Control Points (HACCP) requirements.

Since Canada has a food safety system comparable to that of the U.S., Canadian suppliers may be subject to modified FSVP requirements. If a Canadian supplier is in good compliance with the CFIA, they may not need to meet all FSVP requirements.

Australia, Japan, New Zealand, Canada, the United States, and countries under the European Union have similar safety systems and have endorsed the implementation of HACCP for food safety. (Samanta, 2019). Under HACCP, all parts of the seafood processing operation are

[5] Infographic - What to expect when you're inspected - inspection.canada.ca

examined for hazards, including raw materials, ingredients, processing steps, storage, and distribution.

Hazards include disease-causing organisms, toxins, environmental contaminants (such as pesticides), chemicals (cleaners, sanitizers, lubricants, etc.), and physical hazards (wood, metal, and glass). For each hazard, a critical control point is identified where the potential food safety problem is controlled. Records are kept at each crucial control point so inspection agencies can be certain that the HACCP system is operating to provide safe food. Certain sanitation activities must also be conducted and documented as an extra measure of safety.

2.3 Department of Fisheries and Oceans

The Department of Fisheries and Oceans provides the management regime for the fishery. The Department's broad mandate incudes fishery science, harvester licensing, regulations around the structure of the fleet, and management measures related to each species.

The snow crab fishery is a quota-based fishery with individual quotas set for each license. Quotas vary by vessel size, and gear restrictions are used to control effort.

DFO has supported the collective bargaining process by imposing trip limits. Trip limits are one tool used to control the actual volume of crab landed at one time. They are a quality-focused limitation intended to help reduce gluts at processing facilities.

Historically, DFO oversaw regulations related to fish quality through the now repealed Fish Inspection Act. In addition, DFO requires that snow crab landings are monitored and that a dockside monitoring company records landings.

2.4 Dockside Monitoring

The dockside monitoring program collects data for DFO on all landings and related data. The program is operated by the Fish Harvester Resource Centres (FRC). The FRC's main business lines currently include dockside monitoring and a gear tag and logbook supplier to harvesters. Their website notes that the FRC monitors all major groundfish, shellfish and pelagic fisheries in Newfoundland and Labrador fishing areas. Fish harvesters fund this mandatory program.

The FRC does not have an enforcement responsibility nor an explicit role in crab quality. At the time of the Dunne review, some industry players considered this another layer of oversight and just another "clipboard" on the wharf.

2.5 Independent Dockside Graders

The dockside grading program is established through the collective bargaining process between the FFAW and ASP. The grading program is currently implemented through a private company, Independent Dockside Graders (IDG) and is licensed through the Province. The company offers inspection services, lab services and fisheries consulting services. Prior to IDG, the program was operated by Tavel.

The Provincial Government's licensing of the dockside grader is solely an administrative function. The Province created a Handling and Grading license type to give credibility to the industry's grading program. This approach was undertaken in consultation with stakeholders when the program was established.

The Province does not oversee grading operations. Industry stakeholders are responsible for establishing the grading processes to support the collective bargaining framework. As noted, it is a grading program primarily for price with minimum criteria around the actual handling and care of the snow crab or the quality of the crab.

IDG is licensed for grading of snow crab and shrimp. Their methodology for assessing the state of crab is as determined as part of the collective bargaining process. For snow crab, IDG records the landings from each vessel, size grades the crab into two sizes and determines the percent of crab with barnacles. It takes samples to determine if the crab is lively, weak, critically weak or dead. If 20 percent of the load is critically weak and/or 4 percent dead, DFFA must be notified. When this happens, Provincial inspectors, if possible, inspect the load when it arrives at the food processing facility.

IDG graders have no legal authority and only serve a reporting function for the industry – they cannot detain products. The grader is unable to ensure crab quality is maintained other than by reporting the inspections, which serve as the basis for payment to the harvester.

The approach used by graders to assess crab is based on visual observations. As such, it is a more subjective approach than that used by provincial inspectors. Inspectors use a crab life detector to determine if the crab is alive. The industry standards are based on visual clues, and therefore there is a potential for a high degree of variability between regions, graders and in comparison to the results of Provincial inspectors.

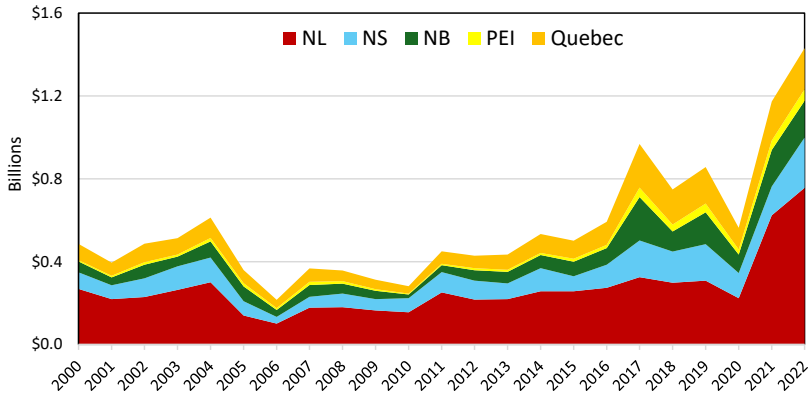
The actual consistency of grades between IDG graders and inspectors has not been recently studied in detail.

The trigger provision for a government inspection as a result of high levels or weak or dead crab give the whole grading system a degree of credibility. Without the Provincial presence, the grading program would revert to the already strained relationships between harvesters and processors. If history is any indication, quality would surely suffer.

2.6 Industry Background

Snow crab is the most valuable seafood product in the Province, with exports of over 35 thousand tonnes (primarily sections or clusters) valued at approximately $615 million in 2023, accounting for 56% percent of total seafood exports by value. The main markets, by value, were the United States (92.3 percent) and China (4.6 percent), with Indonesia, Vietnam, and Japan accounting for most of the remaining export value. Most of the snow crab exported to China, Indonesia, and Vietnam is for reprocessing into crab meat products, mainly for markets in Japan, Europe, and the United States.

Figure 4
Value of Snow Crab Landings by Province, 2000-2022

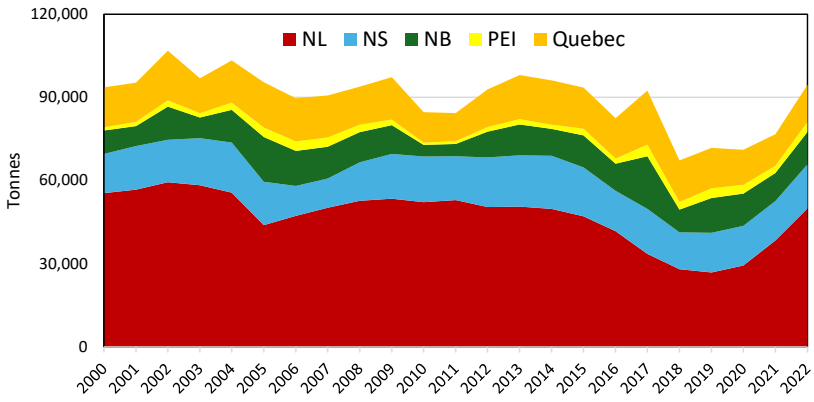


Source: DFO

In 2022, Canadian snow crab landings totaled 94,500 tonnes worth $1.4 billion. Newfoundland and Labrador represented 53 percent of the landed value, followed by Nova Scotia with 17 percent, New Brunswick at 12 percent, Quebec at 14 percent, and Prince Edward Island at 4 percent.

In this Province, there are 27 licensed snow crab processing plants, up from 24 in 2021 but down from a high of 36 licensed facilities in 2005. The decline in processing followed the trend of declining landings during the period and was a time of some industry consolidation. Crab quotas increased and new licenses were issued. Plants are located around the Province. The Canadian Food Inspection Agency has approved all of the facilities for export.

Figure 5
Snow Crab Landings by Province, Tonnes, 2000-2022



Source: DFO

Newfoundland and Labrador snow crab quotas and landings reached a trough in 2019 and have increased 92 percent to 51.6 million tonnes in 2024. The increase in landings is a function of favorable environmental conditions from 2012 to

2017 that resulted in good resource growth and improved catch-per-unit (CPUE). The duration of the quota increases is uncertain.

The fishery occurs in adjacent waters along most areas of the Province. Generally, small boat harvesters' fish inshore areas, whereas the larger vessels fish to the margins of the Grand Banks and the continental shelf. In 2020, there were 2,587 harvesting licenses. This is down 23 percent from 2005 levels of 3,364, and as with fish processing, the fewer licenses are a result of consolidation in the industry.

Figure 6
Licensed Snow Crab Processing Plants, 2024

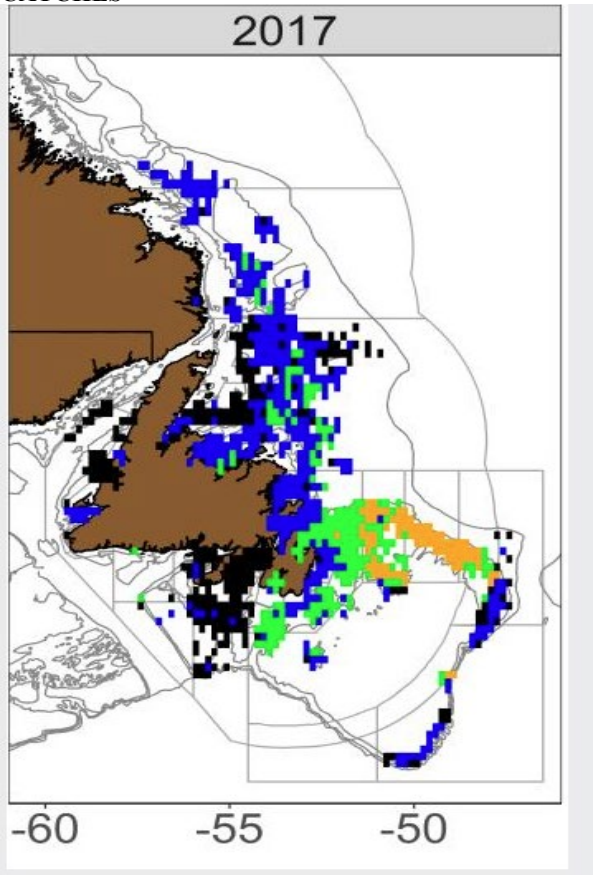
Company Name	Region	Plant Location
3 T's Limited	Northern	Woody Point
Allen's Fisheries Limited	Western	Benoit's Cove
Aqua Crab Producers Inc.	Eastern	Aquaforte
Barry Group Inc.	Eastern	Witless Bay
Bay Roberts Seafoods Limited	Eastern	Bay Roberts
Beothic Fish Processors Limited	Central/Western	New-Wes-Valley
Conche Seafoods Limited	Northern	Conche
Dandy Dan's Fish Market Ltd	Eastern	Argentia
Fogo Island Co-Op Society Ltd.	Central/Western	Fogo
Green Seafoods Limited	Eastern	Winterton
Golden Shell Fisheries (2014) Limited	Eastern	Hickman's Hr
Happy Adventure Sea Products Ltd	Central/Western	Happy Adventure
Independent Fish Harvesters Inc.	Eastern	Brigus
Labrador Fishermen's Union Shrimp Co	Northern	Cartwright
Labrador Fishermen's Union Shrimp Co	Northern	Mary's Harbour
Notre Dame Seafoods Inc.	Central/Western	Comfort Cove
Nu Sea Products Inc.	Eastern	Port de Grave
Ocean Choice International	Eastern	Bonavista
Ocean Choice International	Eastern	St. Lawrence
Ocean Choice International	Central/Western	Triton
Quinlan Brothers Limited	Eastern	Bay de Verde
Quin-Sea Fisheries Limited	Eastern	Old Perlican
Quin-Sea Fisheries Limited	Eastern	Cape Broyle
Terra Vista Limited	Central/Western	Glovertown
Torngat Fish Producers	Northern	Makkovik
St. Anthony Seafoods Ltd	Northern	St. Anthony
St. Mary's Bay Fisheries Inc.	Eastern	St. Mary's

Dockside grading data indicates that in 2024, there were over 9,100 crab landings in 104 different ports[6]. Approximately 21 percent or 1,953 landings were at a crab plant[7]. This represented 28 percent of total landings or 34 million pounds. The remaining 7,148 landings consisting of 86.6 million lbs of product, were trucked around the Province. Dunne and Vardy noted that the high volume of trucked landings can impact crab quality and mortality.

Snow crab landings in 2024 occurred from April to August, with 57 percent of landings occurring in April and May. The months of June, July, and August tend to be warmer with air and water temperatures potentially impacting crab conditions prior to processing.

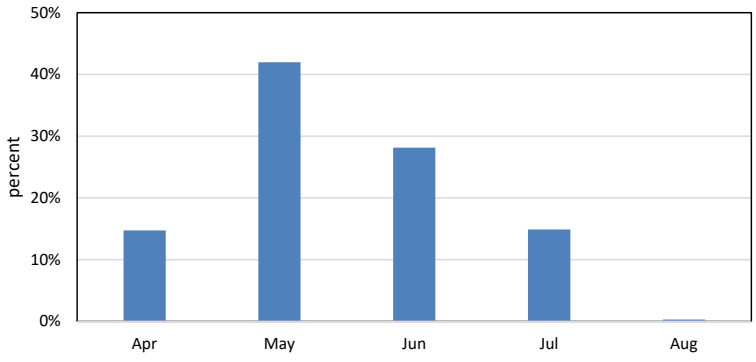
Air and water temperatures were higher than usual for 2024, with water temperatures increasing over the past few years. As will be discussed, inspectors indicate that this appears to have challenged industry operations and existing infrastructure.

FIGURE 7 SNOW CRAB TRAP SETS AND CATCHES



Canada is the largest producer of snow crab. In 2022, it represented 76 percent of the world's output. Historically, the USA was the next largest producer, however, catch rates have declined due to moratoria in Alaska. Russia has recently emerged as the next largest producer.

Figure 8
Percent of Total Snow Crab Landed by Month, 2024



Source: DFFA; IDG

[6] IDG data provided by DFFA. Landings until August 4, 2024
[7] Based on landings site where a plant is located. Not necessarily processed at that site.

3 .0 The Province's Quality Focus

The Department's focus on fish quality stems from a historical need to ensure that products produced in the Province are safe for consumers, are of the highest quality, and that these products garner the best price in the marketplace. A reputation for producing high-quality products benefits harvesters, fish processors and communities through improved marketability and higher prices.

Fish quality has been a long-standing issue for the Province. The 1933 Amulree Commission[8] noted that the fish produced in the Province was noted for its lower quality due to the industry structure and hence commanded lower market prices due to a poor reputation. While the focus of the comment at the time was for groundfish, it does highlight the challenges that pricing historically caused in the industry.

> *"The individual fisherman naturally asked himself why he should take trouble with his fish…when his neighbour took none and received the same return. The good fisherman, anxious to do his best, was thus penalised by the system and tempted to lower his standards. This destructive system has continued almost up to the present day and is largely responsible for the loss of reputation suffered by Newfoundland products in the principal markets."* Paragraph 278.

Many studies over the years reaffirmed the need for regulatory intervention. In an environment where competition on the wharf can be fierce, weather conditions prevent year-round harvesting by inshore vessels, and there is a challenge to schedule boats, quality can suffer. This has been an issue in the past, and it posed a quality risk and a substantive loss in economic value. There is value in a quality focus.

The 2003 Dunne Commission studied quality issues in the industry.

> "*A review conducted for the Commission indicates that from 1992 to 1999 crab from this Province consistently received a 10 percent to 17 percent lower price than received by crab from Alaska. In 2000, the marketplace began to recognize the quality of the Province's production and in 2003 the price difference actually disappeared." P.74*

If the price differential had continued, the industry would have received over $1 billion less in value than it did over the 2003 to 2024 period[9] - clearly, quality pays. Quality improvement directly resulted from the industry's focus on its challenges and seeking solutions. It was a cooperative effort between harvesters, processors, DFFA, and DFO. Many of the quality issues

[8] The Amulree Commission was established in 1933 to review the Dominion of Newfoundland's fiscal situation and conducted a review of the economy. https://www.heritage.nf.ca/articles/politics/pdf/amulee-report-1933.pdf

[9] The cumulative crab landed value was approximately $6.2 billion over this period. The market return would have been greater however, a complete time series is not readily available. As well actual market sales would also give a more reliable figure.

ultimately were tied to the intrinsic quality of the product entering the marketplace that had been compromised by many of the industry processes and structure.

Most of the fish inspection regulations have been in place since the mid-1970s, with more recent changes occurring from the late 1990s to the early 2000s. The regulatory framework prevents processing of dead crab regardless of the time of death. Dead crab deteriorates immediately after death, but this deterioration accelerates under warm conditions. The time of death is tough to determine. Did the crab die 15 minutes ago, or did it die four days before at sea?

3.1 Does Dead or Alive Matter?

The processing of crab when they are dead is an issue for two reasons. Firstly, the crab rapidly deteriorates when it is dead, and melanosis begins. The resulting deterioration gives the shell and meat a bluish-black coloring. This can affect the taste and texture of the meat and can reduce the shelf life.

Secondly, there is a potential food safety issue. Crab is primarily made into a ready-to-eat (RTE) product. Decomposing crab can develop pathogens. It is possible that these pathogens can survive the processing and freezing processes. For example, if salmonella was present, this could grow if the RTE product is not handled properly. Unlike many pre-cooked protein/meat products, reheating RTE crab to critical temperatures seldom occurs before consumption.

The safety and quality risks inherent in the legislated best practice of processing crab while alive recognized these two factors. Indeed, the risk profile has changed very little but there has been a change in the regulatory framework.

Federal regulations that were once prescriptive have been repealed nationally and are now outcome-based. New rules focus on food safety, with operators telling regulators how risks are mitigated rather than regulators telling operators their risks and how to mitigate them.

The risk tolerance is now left to the processor to interpret under the new federal regulatory framework overseen by the CFIA. Federal inspectors appear to have become process auditors in the seafood sector and the industry is effectively left to police itself. It is an honor system. Some of the behaviors exhibited over the years suggest that a more prescriptive approach is still required.

Around the world, it is generally accepted practice that crab, lobster and other shellfish have to be processed while it is alive. Shellfish deteriorates within minutes of death and microbiological and enzymatic decomposition begins.

> *Because live crabs are delicate animals, they need to be handled with great care at all times. If weakened to the point that they are barely alive before processing, the meat may be discolored and chalky in texture and have poor keeping qualities. Kramer, 2009.*

Once a crab dies, bacteria such as Vibrio, which are naturally present in marine environments, can multiply rapidly. These bacteria can cause foodborne illnesses if the crab is consumed. Dead crabs spoil quickly. The breakdown of tissues releases enzymes and other compounds that can

lead to off-flavors, odors, and textures, making the crab unappetizing and potentially unsafe to eat.

> *A number of illnesses in humans arise from the consumption of fish and seafood products that have either been contaminated at the source as a raw material or become contaminated during their processing. These illnesses are caused primarily by a variety of bacteria themselves or by the ingestion of their toxins formed in the foodstuff prior to consumption. Among many species of bacteria involved in fish and seafood poisoning, the most common bacteria belong to the genus of Vibrio, Salmonella, Yersinia, Listeria, Escherichia, Staphylo, Shigella, and Clostridium*. Samanta, 2019

> The National Fisheries Institute in the U.S. notes: *There are several species of bacteria in the genus Listeria. One species, Listeria monocytogenes (L.M.), is a food borne pathogen that can grow under conditions that usually inhibit the growth of other pathogens. The Food and Drug Administration (FDA, or the Agency) has a "zero tolerance" policy for the presence of the bacterium L.M. in ready-to-eat (RTE) foods, including seafood products that will support the growth of L.M.* **The Agency's L.M. risk assessment has ranked smoked seafood and cooked RTE crustaceans as having a high relative risk to support the growth.** (National Fisheries Institute, 2018)

The U.S. FDA (2017) indicates that *L. monocytogenes can survive longer under adverse environmental conditions than can many other vegetative bacteria that present a food safety concern. In addition to being able to survive and grow at refrigeration temperatures, L. monocytogenes tolerates high salt concentrations (such as in non-chlorinated brine chiller solutions) and survives frozen storage for extended periods (Ref. 39 and Ref. 40). It survives acid conditions and is more resistant to heat than many other non-spore forming foodborne pathogens, although it can be killed by heating procedures such as those used to pasteurize milk.*

The bluish/black color seen in crabs after death is a taste and quality issue. It is a result of the enzymatic decomposition of the flesh and is called melanosis. It increases with time and temperature. As Lian (2018) points out *"Although melanosis does not pose a health concern, it negatively affects product acceptability (Ruddy, 2007) and may develop at a faster rate than microbial deterioration, hence representing a critical event determining product shelf-life"* Lian, 2018

Crab quality has been an issue for the crab industry since it started in the 1960's. A quality workshop in the early 1980's highlighted the problem. It noted the time and temperature relationship.

> *The overall quality evaluations on Atlantic queen crab are based on post-mortem quality deterioration and black discolouration. Since both changes are temperature dependent, a proposed time/temperature relationship has been described…Post mortem queen crab can be preserved at an acceptable grade for about 30 and 10 hours at 3 and 13°C respectively,*

However, if the keeping temperature is increased to 23 "C for 2 hours the crab meat becomes unacceptable for food uses. (Burns et al, p. 36)

In the workshop it proposed guidelines for crab spoilage.

Crustacean Spoilage – (Guidelines for Snow Crab Processing)

1. *Crustacea must be alive for processing as food;*
2. *the keeping time after death is extremely short,*
3. *the visceral enzymes of crustacea (crabs and lobsters) are very potent,*
4. *the rate of enzyme activity is temperature dependant,*
5. *digestive ferments need only temperature to speed up their operation, which is autolysis or the attacking and breaking down the animal, itself, after it is dead;*
6. *after the animal is dead, the checks and balances nature provided are no longer functioning, so the enzyme systems attacks the animal and breaks it down - viscera becomes watery, flesh becomes soft, etc.*
7. *crabs must be handled and stored in a way that prolongs survival and keeps them in good condition.*

3.2 Other Jurisdictions

Alaska

Alaska is one of the world's largest producers of crab species and once was the number two producer of snow crab. Quality has been a focus of the industry and live processing of crab is a best practice. Like Canada, the FDA has moved to a less prescriptive food safety model.

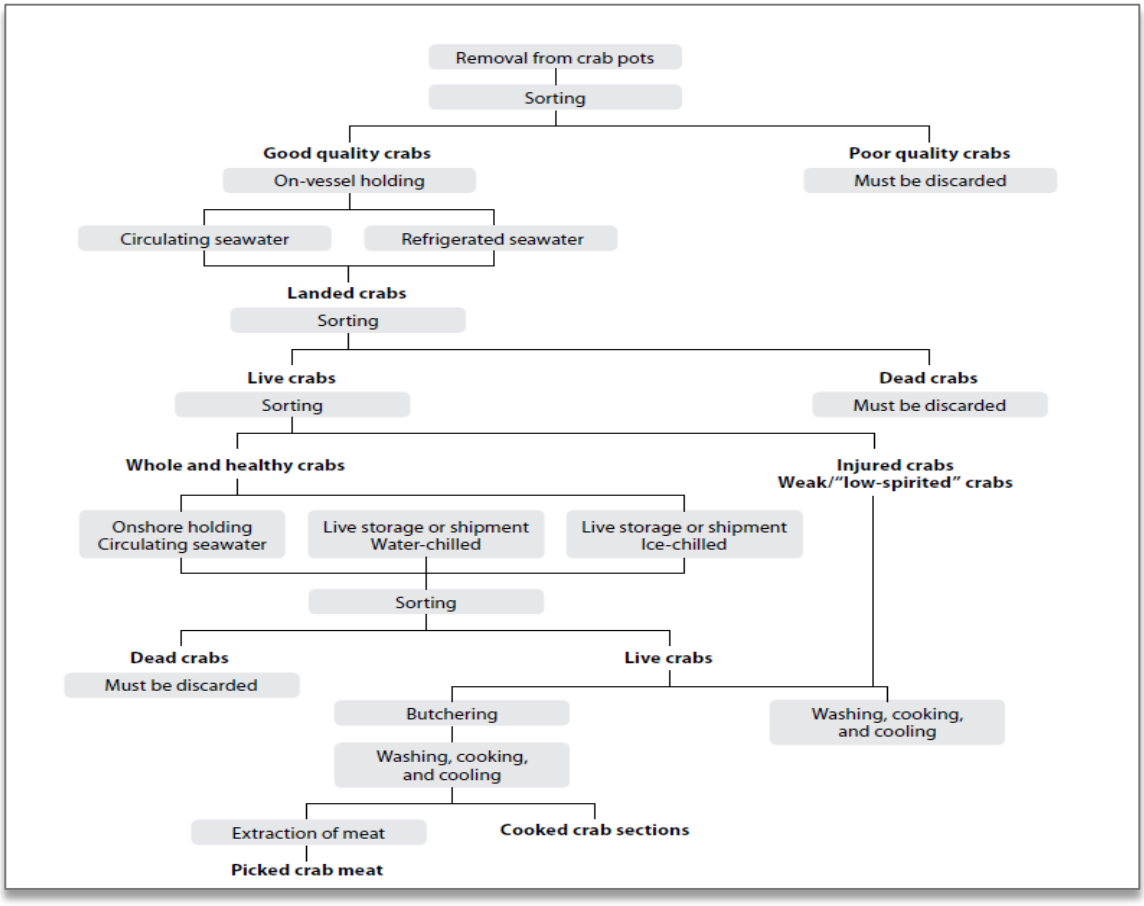
As noted in an Alaska seafood processing guidance document, *Crabs deteriorate very rapidly after death, as a consequence of the growth and multiplication of microorganisms and the action of enzymes. Deterioration is much more rapid than for most species of fish. Therefore crabs must be kept alive until they are processed.*

Seafood processors who produce a **frozen** or **refrigerated** ready-to-eat (RTE) seafood product are required to submit to a qualified laboratory 12 random product samples from the first lot produced each calendar year for *Listeria monocytogenes* and *Salmonella* testing. Ready-to-Eat Seafood Product Sampling Requirements (alaska.gov)

18 AAC 34.030. Prohibited activities. In addition to the prohibitions set out in AS 17.20.290, a person may not process, sell, or transport

(1) SEAFOOD that has an odor associated with microbiological or enzymatic DECOMPOSITION or that otherwise shows signs of decay such as fungus on the fish, excluding the fins and tail; (Alaska, Department of Environmental Conservation, 2019 18 AAC 34 Seafood Processing and Inspection Amended through August 21, 2019)

FIGURE 9 ALASKAN PROCESS FOR SNOW CRAB



Requirements in other provinces

Snow crab is landed in New Brunswick, Nova Scotia, Prince Edward Island and Quebec. All provinces that export crab are required to follow federal legislation.

New Brunswick is known for its high-quality crab products. Provincial legislation is not specific to individual species, but each processor is subject to Federal regulations. 2009-20 - General (gnb.ca)

Nova Scotia has similar limitations on processing dead crab as Newfoundland and Labrador. Provincial regulations state that no person shall process crabs, lobster, clams, oysters, mussels or whelks that are not alive. Fish Inspection Regulations - Fisheries and Coastal Resources Act (Nova Scotia). The government inspects fish processing establishments to ensure food safety standards, and monitoring the handling and processing of seafood.

Nova Scotia also has a seafood quality program. The Nova Scotia Seafood Quality Program (NSSQP) was developed by the Department of Fisheries and Aquaculture and managed by

Université Sainte-Anne and Perennia. This voluntary program includes annual product quality assessments and audits to ensure high standards for seafood quality. As well, Perennia offers seafood processing training.

Prince Edward Island's Fish inspection regulations requires that crab and lobster must be alive before processing. **Section 21. Prohibition No person shall process any crabs or lobsters that are not alive.** Fish that is decomposed cannot be processed. Fish Inspection Act Regulations (princeedwardisland.ca)

Quebec regulations prohibit the production of decomposed fish and food products, and it has a food inspection program. Federal government regulations also cover the industry.

3.3 The Evolution of Snow Crab Quality Requirements

Snow crab quality issues have been an industry focus since the early 1980s. Handling and processing practices have always been central issues in the debate on how to produce the best product. Over time, there seems to be an ebb and flow of crab quality. In every decade since the 1960s, there has been a boom and bust in the snow crab fishery. With the dramatic swings, there often came a discussion on product quality.

Seafood Producers, harvesters and the provincial Government have recognized the importance of producing high quality products.

1998 Crab Price Task Force[10]

The 1997/1998 Task Force on Crab Prices was instrumental in unlocking value in the industry by providing a new price-setting mechanism and bringing the parties together to focus on producing a quality product.

The industry's rapid expansion in 1995 with the introduction of temporary crab licenses resulted in the existing vessels being pushed further out to offshore waters. New fishing grounds were opened and new players landed product without a complete understanding of the delicate species being harvested and the care required.

The expansion into offshore areas brought with it quality issues from a couple of perspectives. Vessels that normally fished within 50 miles from shore were now fishing in waters at the edge of the continental shelf. These new grounds provided great catch rates but much of the crab was in terminal molt with barnacles and poor shell quality. At the same time, the extra distance required longer times at sea and hence crab were out of the water longer before reaching processing facilities. The ice required for a three- or four-day trip was substantially greater than what the industry had normally carried for shorter trips.

[10] New Beginnings: Bringing Stability and Structure to Price Determination in the Fishing Industry. Report of the Task Force on Fish/Crab Price Settlement Mechanisms in the Fishing Industry Collective Bargaining Act January 15, 1998

The high quotas and uncontrolled landings resulted in gluts and crab not being processed in time to ensure good quality. At the same time, market prices were near record levels for the day, creating a feeding frenzy mentality. There were horror stories of decomposed crab being processed, product with poor shell quality being sold, and melanosis evident or developed in cold storage. As well shell had black spots or barnacle damage. The small number of provincial inspectors were overwhelmed.

In 1996 and 1997, the market kicked back for a number of reasons. While all snow crab producers such as Alaska experienced a price decline, N.L. producers were particularly hard hit. Prices dropped but more importantly, some of the Newfoundland and Labrador crab had garnered a poor reputation. A differential in price arose. Mistrust prevailed between harvesters and producers and prolonged strikes delayed the start of fisheries. Peak landings occurred in the hot summer months in 1996 and 1997. Quality continued to suffer for those years.

David Vardy and Joe O'Neill were tasked with finding solutions to price setting and investigating price issues. One of the most significant accomplishments of the task force was to bring harvesters and producers together to talk about the industry's problems. Mistrust was a common feature of the industry.

> *In the minds of most fish harvesters, there is a common belief that fish processors use quality related issues and concerns as a means of downgrading the price that they are paid for their product. They also believe processors pursue a volume production related marketing strategy that is indifferent to quality and that they process rejected product when inspectors are not present. Fish processors, on the other hand, say that fish harvesters need to improve the quality of the fish that they land, thereby allowing them to produce a higher quality product that may command a higher price in the marketplace. P.92*

The task force's work provided a template for issues to be addressed. Indeed, even long after the task force disbanded, the parties continued to work together on product quality.

The Task Force was focused on crab quality given the impact on landed price. Improving quality would improve market and landed prices, which would provide stability to the sector. The Task Force had over 30 recommendations on quality covering all aspects of the business from onboard handling, grading, transportation, holding, processing and marketing. The Task Force rightly focused on the fundamental issues related to product quality.

> *As with any fish species, the key criterion in producing a high-quality snow crab product is the raw material's freshness, i.e. liveliness. This one factor takes precedence over all other quality issues. In order to accomplish this objective, handling practices, and the holding conditions to which the crab is subjected, from the point of harvest to the point of processing, must be conducive to the survival of the animal. Furthermore, these conditions must be met throughout the entire process. The survivability of crab is primarily dependent upon three factors;*

- *the avoidance of physical trauma;*
- *the maintenance of the conditions to which it is exposed within the temperature limits of 0.5/C to 4.0/C at a relative humidity greater than 75 percent; and*
- *reducing the time elapsing from harvesting to processing. (p.156)*

The work that began to resolve quality helped the industry close the gap on market prices. By 2003, the Dunne Commission found that the 17% differential found in the marketplace had been eliminated.

2003 Dunne Commission

In 2003 the Provincial Government appointed Eric Dunne to conduct a review of the Province's fish processing licensing framework. As part of its mandate, the Commissioner reviewed the Province's Quality Assurance Program. Most of the recommendations from the Commissioner were implemented including changes to the QAP. A ticketing system was introduced, and administrative penalties were applied for violations of regulations.

Below are some of the report's key findings.

> *The QAP inspectors consider their role to be the enforcing of raw material quality standards to ensure top quality. Since the program's inception, inspectors have witnessed significant improvements in quality, handling practices and the overall attitude towards seafood handling. P.70*
>
> *Harvesters indicated the program had resulted in a substantial positive change in how they handle fish. This has happened from a combination of training and actual vessel inspections. Shortcomings of the program include a lack of training in raw product inspection for inspectors, especially for crab and shrimp. Discrepancies occur between TAVEL grading results and DFA. This can be quite significant and result in a substantial reduction in money received for final product. Harvesters view this as being unfair. P. 68*
>
> *Processing companies generally support the Quality Assurance Program. Most companies indicated the program has been effective and has played a significant role in improving the overall quality of raw material. Operators expressed the opinion that the most appropriate role for provincial inspectors is at dockside as opposed to plant holding rooms and processing areas.*
>
> *Processors suggested that inspection officers must be willing to act immediately at dockside when inspections indicate poor quality. Consultations with, and advice to, harvesters is critical to delivery of high-quality raw material. Shortcomings of the program include major inconsistencies in grading results between TAVEL and QAP inspectors. This has resulted in many arguments between harvesters and processors over final compensation determination*. P. 69

In general, the quality practice regulations under the Fish Inspection Act are not the most suitable for achieving the QAP objectives of maximizing the value of the resource or of attaining the highest quality possible. Many of the regulations ultimately only ensure food safety. There is a need to develop new standards that are designed to ensure the quality of the product is more than just acceptable. This requires the development of species-specific protocols for stowage, handling, icing, transporting fish and measuring fish quality. Such new standards can only be developed in consultation with industry. P.73

The Dunne Commission Review provided the expanded foundation for the licensing and regulatory framework under which the Department currently operates. Limited entry licensing was strengthened, and resource thresholds were introduced. As well, a processing licensing board was established.

3.4 The Fish Inspection Program/Quality Assurance Program

The Fish Inspection Act and the Fish Inspection Administrative Regulations authorize the licensing of fish processors and buyers. The Fish Inspection Act and its regulations are designed to ensure that all fish and fish products intended for market meet certain health, quality and safety standards. The Province's Fish Inspection Act also establishes the authority of the Minister to provide for the regional distribution of processing licences, the development of the fishing industry in the Province and other matters not directly related to fish quality.

The Minister of Fisheries Forestry and Agriculture has authority under the Fish Inspection Act to make regulations to prescribe criteria for fish buying and processing operations. The accompanying regulations include:

- Fish Inspection Administrative Regulations
- Fish Inspection Operations Regulations
- Fish Inspection Ticket Offences Regulations

The Broad policy framework for the Fish Inspection program stems in part from the Department's Quality Assurance Program. Quality Assurance Program was first introduced in 1996. The objective of quality assurance is "to demonstrate a confidence in achieving a grade of excellence on a consistent basis for both our wild and farmed seafood products".

Figure 10 Fish Inspection Act Changes			
Year	Bill	Section Changes	Links
1994	C38		
1996	C26	Housekeeping- 1. S.4 Amdt. Regulations 2. S.5 Amdt. Issue conditions of licence	Authority to add conditions of license Statutes of Newfoundland 1996 Chapter 26 (assembly.nl.ca)
2004	C36, C43	Most of the changes stem from the Dunne Review. Included are provisions for ticketing, a review of the Act every 5 years, ability to issue ticketing regulations, set fees, processing plans	Changes stemming from Dunne Report 2004 BILL 57 (assembly.nl.ca)
2005	C49	Amendments related to ticketing and administrative penalties	Changes to Allow for Ticketing 2005 BILL 72 (assembly.nl.ca)
2006	C40, C45	Powers of inspectors were strengthened as well as items around search and seizure and warrants.	Strengthens inspectors powers 2006 BILL 57 (assembly.nl.ca)
2011	C23	Housekeeping around inspectors make it an offence to process fish or marine plants for human consumption that are tainted, decomposed or unwholesome;	A BILL 29 (assembly.nl.ca)

The basic features of the Quality Assurance Program are:

- Expanded inspection effort;
- Delivered regionally;
- Focus on raw material but covers inspections on vessels through to retail outlets;
- Quantify quality by applying industry accepted grade standards;
- Complement role of the Canadian Food Inspection Agency;
- Promote quality consciousness throughout all sectors of the industry through training, workshops, seminars, etc.;
- Provide funding to develop systems that serve to maintain top quality;
- Enhance the value of the fishery resource to both harvesters and processors; and,
- Promote Newfoundland and Labrador as leading producer of premium quality seafood products in the international marketplace Quality Assurance - Fisheries, Forestry and Agriculture (gov.nl.ca)

The Provincial inspection program operates Province wide. With over 9,000 landings in over 100 different landings sites for snow crab, inspectors cannot be everywhere. The inspection program relies on random inspections and landed protocols such as the percentage critically weak or dead, to help guide inspection activity. Their presence is both a deterrent and a support to the industry.

The provincial inspection program covers facility inspections, vessels, dockside, point of export, direct sales, license compliance and multi-species inspections.

Facility Inspections: Spring and Fall inspections that includes exterior walls, roofs, exterior stairways and walkways, windows, doors of the establishment to ensure they are kept in good repair and maintained in a safe and sound condition to provide protection from weather, contamination and the entry of insects and animal pests. Facilities are required to be of a certain standard to trade with the United States and other countries.

Dockside and Vessel Inspection: vessels landing snow crab include stowage method, height, and temperature of product onboard vessel and to ensure product is protected from contamination, weather, and physical damage. Vessel construction/equipment is also examined to ensure materials are smooth, non-absorbent, non-corrodible and are constructed in a way to facilitate cleaning. Vessel inspections generally result in the most enforcement actions.

Grade Standard Assessments (GSA) Inspection: conducted primarily to monitor and measure the quality grade standards of groundfish species (namely cod) being processed in the province. Grade standard criteria assessed during these inspection include, odour, colour, texture, blood clots, bruising/discoloration, jelly or chalky.

Direct Sales Inspection: In 2015, the *Fish Inspection Operations Regulations* was amended which led to the development of the Direct Sales inspection type in 2016. Criteria assessed during this inspection include checking stowage method, height, and temperature of product to ensure product is protected from contamination, weather, and physical damage.

License Compliance Inspection: Monitoring/Inspection for compliance with licensing conditions and exemptions. This inspection consists of a walk through the holding and production areas and the cold storage. Inspections focus on ensuring species being processed and finished product processing requirements are following licence conditions and any directives issued by the Minister. Any unlabeled packaged product found in the cold storage will be opened and inspected to ensure the species and product form are complying.

Multi-Species Inspection: This type of inspection is conducted at processing plants. Criteria checked include live, weak, critical weak, dead and TDU. Stowage method, height, and temperature of product are also checked to ensure product is protected from contamination, weather, and physical damage.

Inspection activity occurs dockside, aboard vessels, and at seafood facilities, but not at the production line. The Province does not overlap with the CFIA inspections related to the production process and does not monitor quality in the facility. Historically, it was thought that doing so would be a duplication of effort and would unnecessarily increase program costs.

As noted, IDG must notify the Province when graded thresholds reach 20% critically weak or 4% dead. These thresholds were based on agreed-upon values developed by the Department and industry in the late 1990s.

These thresholds do not appear to have been formally revisited since being established. In 2024, there were over 60 calls to the Department with these thresholds being reached. With warming ocean and air temperatures, a review of the protocols is likely warranted.

When a problem arises, provincial inspectors are typically the last resort to ensure product quality. For example, if IDG grades a vessel's catch and there is a high percentage of critically weak, then the provincial inspectors are notified as per their protocol. The inspectors then will work to ensure all the products landed are alive before being processed. They will also work with the harvester to assist them in improving the liveliness of the crab in the future and with the seafood producer to ensure a safe product ends up in their freezer.

The entire process is both helpful and cumbersome/intrusive. This is the nature of any enforcement activity. The involvement of inspectors is meant to be a deterrent to ensure a high quality and safe product is landed and processed. Their involvement carries with it a high level of oversight. The best outcome is that they are never called.

Consistency of grading is important whether undertaken by government inspectors or private sector. Government standards however must be consistently applied and defensible in a court of law. As such, high transparency is required, and the methodology must be systematic and defensible.

In response, Government and the Marine Institute developed the crab life detector to remove subjectivity. In the absence of obvious signs of life, the crab life detector applies a small electrical charge that results in crab movement if it is still alive albeit in a substantially weakened state. The only other way to ensure the crab is alive is to remove the carapace to check for a beating heart, however this will kill the crab. With the evolution of technology, a new tester is now being developed.

In comparison, industry grades have minimum legal enforceability, and the commercial arrangement between the harvester and processor defines the client relationship. Any grading that identifies dead crab has a corresponding protocol for processing culls of suspect product. It is not known how much crab is culled and dumped annually by processors. It could be a new data collection point for the Department.

In general, seafood processors cannot enforce quality initiatives onboard vessels such as height stacking, temperature, or other quality initiatives. DFFA inspectors are generally the only group that ensures the adherence of quality standards onboard vessels. There are many harvesters that take great care in their product and others that may not. In the current model, they would both receive the same price and hence the quality challenge for processors and the Department.

3.5 Inspectors Observations of The 2024 Season

As part of the work associated with this overview document, discussions with Program administrators and inspection staff were conducted. Unfortunately, the discussions with inspectors in 2024 are like the discussions that occurred 20 years ago as part of the Dunne review and even the Vardy Task Force. Indeed, many of the issues in those studies remain a concern albeit at a lower level. Staff have indicated that the 2024 season is reminiscent of the early 2000 period. Conditions and attitudes in the industry were the worse they have seen in many years.

Some of the observations include:

- Warm weather and high-water temperatures impacted crab quality.
- High water temperatures impacted cooling systems onboard vessels. Systems were not able to cool onboard water in crab holds to sufficiently low temperatures.
- There is a discrepancy between the dockside grades and the Inspectors grades.
- What was once a 5-day training program for dockside graders is now only one or two days.
- There is high grader staff turnover.
- There is intimidation of graders and pressure placed on them to underreport critically weak and dead crab.
- As with 2023, gluts continued to occur at levels not seen in many years.
- Dead crab was being processed and there was constant pressure to let the crab go through the processing lines.
- High air temperatures impacted crab holding at the plant.
- Crab left outside plants in tractor trailers or boxes when temperatures were hot.
- New rules for truckers impacted availability of transport resulting in crab staying aboard trucks or vessels.
- Hot weather impacted the availability and quality of ice.
- Missing limbs remain a significant issue for RSW vessels.
- Offloading companies often damage crab.
- Some processors worked under capacity this year while others suffered gluts. The lack of sharing amongst processors means crab quality was sometimes compromised.

4.0 The Industry Risk

In a 1983 crab quality seminar, the participants and industry organizers noted that despite the industry having been operating for almost 20 years, quality was still an issue. Forty years later and we seem to be talking about many of the same things.

The discussion around whether to process dead crab is about whether it is okay to produce mediocre and potentially unsafe products. There is value in quality and the work of industry has proven that cooperative work can produce measurable results. There remains work to be done to garner even more value from the resource. Anecdotally it seems that issues such as broken limps, handling practices, and crab mortality remain a drain on the industry.

It must be noted that there haven't been any reported outbreaks of salmonella or Listeria.

Food safety issues can have a long-term impact on price and reputation. Dungeness crab for example no longer commands a price premium over snow crab. This directly results from the domoic acid[11] contamination scare in 2015/17. Dungeness clusters have lost the substantive premium they used to have over snow crab. Sackton, 2023

As noted, poor crab quality resulted in N.L. receiving a lower market price than Alaska, i.e. up to 17 percent lower. Changes in quality closed the gap. This is estimated to have added over $1.0 billion to the value of crab over the 2003 to 2024 period. Quality improved through cooperative action.

Reputations are hard fought to achieve but can easily be lost. The New Brunswick tainted tuna scandal, often called "Tunagate," occurred in 1985. It involved a significant political controversy where inspectors sold large quantities of tuna, deemed unfit for human consumption, to the public.

The scandal broke when it was revealed that the tuna, processed by a plant in New Brunswick, was decomposed and had been rejected by federal inspectors. The Minister overruled the inspectors' decision and allowed the tuna to be sold to avoid the economic impact of shutting down the plant. The actual product was foul-tasting and had a poor texture but did not pose an immediate health risk. The public outcry led to Minister Fraser's resignation and changes in regulations to prevent ministers from overruling food inspectors in the future. The fish plant, however, did not survive the scandal and 500 people lost their jobs when the plant closed a few years later.

Westland/Hallmark Meat Packing Company (2008) was a U.S.-based company that was involved in the largest meat recall in U.S. history. The animals slaughtered and sold were in poor physical condition. An undercover video showing the animals and their slaughter had been made

[11] Domoic acid (DA) is a kainic acid-type neurotoxin that causes amnesic shellfish poisoning (ASP). It is produced by algae and accumulates in shellfish, sardines, and anchovies.

public. All its meat production for a 2-year period was recalled. Initial costs exceeded $100 million, and the company eventually went bankrupt after reaching a $500 million settlement.

Boars Head, a U.S. food manufacturer, had a 2024 listeria outbreak that spread to 18 states, left 57 people hospitalized and led to nine deaths. It is one of the United States largest listeria outbreaks since 2011.[12] The Virginia plant producing the recalled product was officially closed in September displacing about 600 workers.[13]

Food safety issues can be a significant issue for consumers and occurrences can be known around the world in real time. There have been no known cases of anyone dying or getting sick from Canadian snow crab.

An occurrence from product in any province, however, could impact all Canadian output. Most likely, the offending Province and the company would bear the brunt of any consumer and market backlash. Cooperatively, the entire industry must be diligent in ensuring that food safety is at the forefront of all decisions related to product quality and that maximum value is achieved by producing a fresh and very high-quality product.

4.1 Key Findings

The following is a summary of the results of this desktop review. Many of the points require further investigation but are a starting point for further discussion.

1. The changes in Federal food safety rules focus on food safety and are no longer prescriptive nor do they focus on producing a quality product. The system is based on the operator identifying risks and developing plans to mitigate those risks.

2. The CFIA has become an auditor of the food safety processes responding to triggers rather than its historical role as a food quality and food safety inspector in seafood plants.

3. The Federal requirement for live crab to be processed is no longer explicit. It is implicit in the risks identified by the seafood producer and by the Canada Health Act.

4. Simply stated, the Federal system has become an honor system with operators responsible for implementing food safety.

5. Best practice is to require live crab to be processed. Alaska follows this best practice. Their food safety system is similar and complementary to Canada's system.

6. PEI and Nova Scotia require crab to be alive to be processed.

[12] Boar's Head Closes Plant Behind Deli Meat Recall & Listeria Outbreak
[13] Help available to ex-Boar's Head workers after 'devastating' Virginia layoff

7. Crab, by its nature, begins to decompose rapidly after death with both an enzymatic and a microbiological component. Time and temperature affect the rate of decay.

8. The enzymatic decline is both a food quality and shelf-life issue. The enzymatic decline, melanosis, negatively impacts product taste, color and texture and hence product quality.

9. Food safety is a direct result of the microbiological risk associated with Ready to Eat foods. Most of the crab produced is for products in the form of RTE cooked sections. These carry a high food safety risk for the end consumer.

10. The inconsistency between how crab assessments are undertaken by IDG and Inspectors is an issue that needs to be further examined.

11. The Provincial government inspection process is a general oversight role and is typically a last resort process.

12. The provincial regulations around processing live crab enable grading around critically weak and dead crab. In the absence, IDG grades would have little force.

13. Product quality can be challenged due to the factors outlined.

14. If quality or food safety concerns arise, it could have a substantial financial impact on the Province, industry and individual companies.

15. Industry and government cooperation on quality appears not to be as coordinated as it was in the past.

16. A cooperative approach to quality is required for the industry to continue to move forward. The regulatory approach is normally the last resort, but it can be an impetus for change.

4.2 Conclusion

Food safety issues and the production of high-quality products has been a focus of the provincial Government and industry for the past 20-plus years. Historically, defining and improving snow crab quality has been a cooperative challenge for all industry stakeholders. Substantial progress was realized as the industry matured.

Newfoundland and Labrador has emerged as one of the largest snow crab producers in the world. As such, all eyes are upon the industry and the quality of the product produced. Any efforts to improve product quality will be watched and likely rewarded. The opposite is also true. As

Warren Buffett has often been quoted as saying: *"It takes 20 years to build a reputation and five minutes to ruin it. If you think about that, you'll do things differently."* [14]

The Province's role in product quality is twofold. First, it provides an overarching regulatory framework ensuring minimum product standards and safety. Unfortunately, the structure of our industry and the nature of the industry itself suggests that government intervention is still required. Relaxing processing requirements of live crab could result in a race to mediocrity, given the number of players involved from the harvest to the freezer.

The processing sector has little control over what happens onboard vessels and harvesters have little power at the food processing facility. DFFA has stepped in to help ensure consistency. The one-price model (beyond size) and the federal licensing and regulatory regime, creates an environment that challenges participants and often impedes a common vision. The result is an industry that is often fragmented with competing interests and there is often mistrust.

Secondly, the province has assumed a role in ensuring there is a quality focus and a minimum standard. This is to ensure product can compete internationally and good value is obtained from adjacent resources. Requiring crab to be alive before being processed ensures that a good quality product is produced and that the seafood being produced is safe. In a perfect world, government regulations would not be required.

The requirement for live processing by the Province helps offset the host of challenges faced by the industry. The QAP gives credibility to many aspects of the collective bargaining model, the dockside grading program, and how snow crab are handled. It is highly likely that in the long-term product quality will suffer in the absence of the Provincial presence.

The changes to the federal food regulatory framework have lessened the federal Government's oversight on product safety, and there appears to be little to no oversight on food quality. The CFIA has become an auditor and a reactionary agency rather than its more proactive historical roles. The onus is now left to the seafood producer to identify and manage risks.

This can work well when the operator completely controls their business and all the risk factors they face. This is often not true in the Newfoundland, Labrador, and Atlantic fisheries. The provincial regulations and oversight are a fallback for the industry and are minimum standards. They help to ensure a safe and high-quality food product. Industry itself can raise its standards, but lowering provincial government standards could have long-term implications.

The linkage made by industry that the licensing of IDG provides an endorsement of its processes is a misnomer. The province's licensing of IDG is solely an administrative function. The grading program is based on the price negotiation framework and does not require the robust processes and standards to which Government must adhere.

The industry itself is left to define the processes to ensure a high-quality product is landed and processed. A regulatory framework that defines every step from harvest to the freezer would be

[14] Warren Buffett." AZQuotes.com. Wind and Fly LTD, 2024. https://www.azquotes.com/quote/40635

cumbersome. Indeed, regulation begets more regulation, and increased regulation would negatively impact industry efficiency.

Criticism of Government's grading processes by seafood producers may be misplaced given that it is generally only involved with landed product when a problem is identified. With over 9,000 product landings, and only hundreds of inspections, provincial inspectors are involved very infrequently in the industry's affairs.

When inspectors become involved, it is generally a last resort, and the processes used must be transparent and legally defendable. Government might want to review the arrangement with IDG given the issues raised by industry and the results seen by provincial inspectors in the field.

There is always an opportunity to garner more value from the resource. This can be undertaken as it has in the past through industry players cooperatively raising standards and striving to be the best. Snow crab is a delicate creature. Careful product handling and stowage prior to processing is critical. Cooperative efforts to reduce missing limbs and mortality, improve handling and offloading practices, to ensure timely processing of products etc. are always opportunities to improve, or at least maintain, value.

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