Annual Compliance Report - 2021
Code of Containment
for the Culture of Salmonids in Newfoundland and Labrador

Newfoundland & Labrador

Department of Fisheries, Forestry and Agriculture
Aquaculture Development Division

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1.0 Introduction

The Code of Containment for the Culture of Salmonids in Newfoundland and Labrador (herein referred to as "The Code") has been in effect since 1999. This annual compliance report outlines compliance and inspection results for the 2021 calendar year.

One of the objectives of the Code is to be forward-looking and seek continual improvement. A Code of Containment Aquaculture Liaison Committee made up of federal and provincial government representatives, and industry and identified stakeholders, meets annually to review the previous year annual compliance report. This forum provides committee representatives an opportunity to seek details on inspections and compliance, discuss new technologies/gear types being used, and put forth any changes to the Code for consideration.

The Code has also been recognized domestically and internationally for its adequacy in addressing containment elements and preventing escaped fish. The Code is recognized as an effective and leading document that addresses containment and escapes in Canada.

2.0 Industry Overview

The salmonid aquaculture industry in Newfoundland and Labrador (NL) in 2021 consisted of three companies growing Atlantic salmon and Steelhead trout. There were 106 sites licensed for Atlantic salmon and Steelhead production in 2021 and 25 sites were in active production as shown in Figure 1 on page 2.

Production increased from 7,802 MT in 2020 to 15,904 MT in 2021; continuing the rebuilding of the industry from loses experienced in 2018/19.

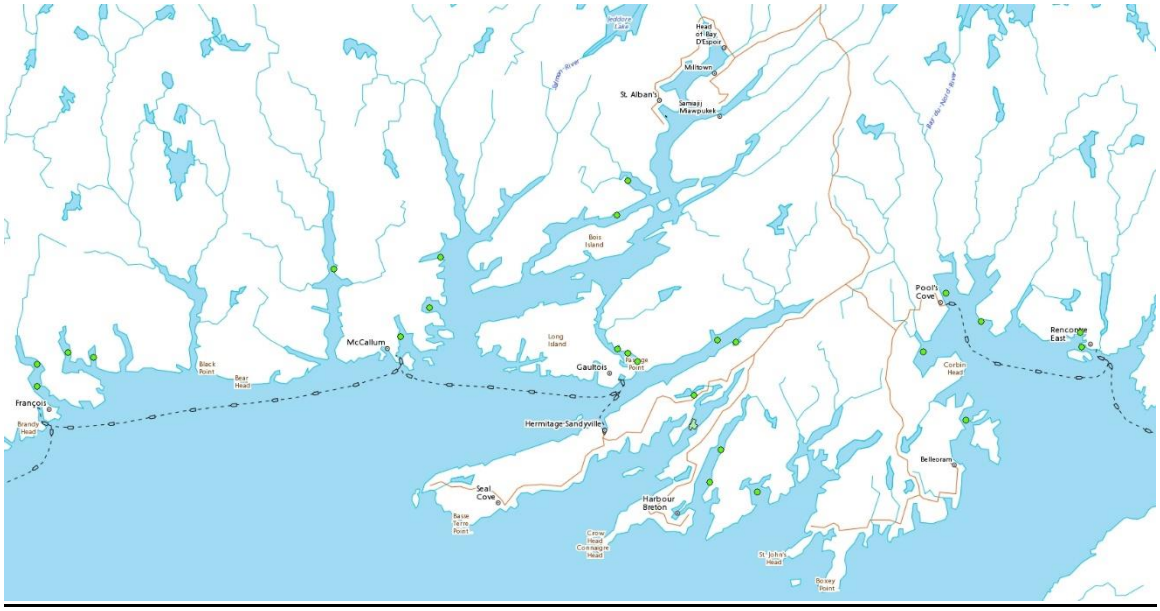


Figure 1: Map of active salmon farms in 2021

3.0 Equipment Standards

3.1 Nets and Net Testing

This section of the Code addresses net strength and integrity. Since the introduction of the Code, the causes of escapes due to equipment failure has decreased. Since that period, escapes have been mainly a result of procedural breakdowns or human error (e.g. when two nets are joined together in an improper manner resulting in the join failing and causing a hole in the net). The Code focuses heavily on nets in both this section and in System Inspections. Specific requirements for nets and net testing can be found in Appendix A1.1, page 7 of the Code.

Compliance:
Nets used for salmonid aquaculture along the south coast, made both locally, nationally and internationally, are made of either Dyneema® (a nylon knotless material) or High Density Polyethylene (HDPE) with a stainless steel core.

Mesh sizes vary depending on the size of fish entering the cage. Nets over three years of age are required to be tested every 18 months. Table 1 provides a consolidated summary of the net inventories submitted by growers for 2021. See Page 14 of the Code for the 4 Point Stress Test Inspection form used for net testing. Please refer to Appendix A1.1, page 11 for net strength standards.

Table 1: Net inventory summary for 2021

Net Inventories	Number of nets
Total number of nets in inventories	150
Number of nets over 3 years of age	79
Number of nets under 3 years of age	46
Number of nets of unknown age*	25
Number of nets audited	106
Nets in use during spring inspection**	148
Nets in use during fall inspection**	111

*Nets of unknown age are treated as if they are over three years. Therefore, they are required to be tested to determine if they are suitable for use as outlined under the Code. Nets under three years of age do not require testing.
** Refers to site System Inspections on page 5 of this report.

Not all nets in inventories are in active use at the same time. The Department of Fisheries, Forestry and Agriculture (FFA) has verified that nets in inventories in 2021 were tested by a net testing agent or were under three years of age. Each company's net inventory is audited by FFA to ensure nets are tested and to verify net age. Net tag numbers are recorded during system inspections and cross-referenced with the net inventories each farm submits.

3.2 Cage Types

There were two types of cage designs in use in 2021. The first and most common are the circular High Density Polyethylene (HDPE) plastic cages. These are manufactured locally to national and international industry standards and have proven to be very reliable in the NL environment. They are manufactured in several sizes ranging from 70 meters up to 150 meters. The second type of system uses a combination of steel and HDPE and is manufactured and installed to the Norwegian aquaculture standard NS9514 and manufactured by Aqualine.

Compliance:
No new type of cage systems were deployed during 2021.

3.3 Mesh Sizes

Industry continues to use mesh sizes that meet or exceed the minimum size retained per mesh size. Mesh sizes of nets to be used during production are listed in the cage

culture application form for all licensed sites. FFA does not perform audits or inspections on this aspect of the Code.

3.4 Moorings

Mooring failure has not been identified as a cause of escape in the NL aquaculture industry, and mooring inspections are not currently covered under this Code. Mooring systems have changed substantially over the last number of years, with growers utilizing larger systems with more robust anchorage. Site holders monitor their own systems and regularly perform maintenance and replacement of the systems. The current Code requires that the grower submit a Mooring Maintenance and Replacement Plan annually for each site in production or each newly installed mooring system. Additionally, updated plans will be required upon replacement of a site system. See Form A.2, page 18 within the Code.

As of January 1, 2024, companies will be required to demonstrate that all marine site cage system components and installation meet ISO or certified third-party engineering standards. Companies are currently working towards this policy change, which was adopted in 2019.

Compliance:
All Mooring Maintenance and Replacement Plans were submitted for sites in production in 2021.

4.0 Inventory Monitoring and Reconciliation

Operators are required to submit annual Inventory Reconciliation (IR) reports to FFA for the calendar year. They are to be submitted at the beginning of the next calendar year (e.g. IRs for 2021 were submitted in January 2021). Submission forms for IRs can be found in Appendix 2, page 20 in the Code.

During their production cycle from egg to harvest, populations of fish are counted many times: within a hatchery as the fish move through their growth cycle, from egg to smolt, and when they are moved to sea cage sites. As the fish are moved from the hatchery to sea cages, they are counted again, and this number is officially reported to FFA. All mortalities retrieved over the course of the grow-out are noted and the final harvest numbers counted. This information is provided to FFA in the annually submitted IR, which states the number of fish at the beginning of the year, any new introductions of smolt, the number of mortalities, fish transferred out of the cages, fish harvested, fish escaped, and fish left on site at the end of the year.

Compliance:
Full compliance was achieved for the year 2021. Industry-wide, the 2021 IRs tracked four year-classes of fish, starting with an inventory total of 8,757,117 salmonids and ending with 6,313,401 salmonids. Data from growers indicated inventory shrinkages and inventory surpluses. Evidence of shrinkage or surplus is only experienced after a cage has been completely emptied by either harvesting or grading out (transfers). A FFA review of shrinkage and surpluses has shown that shrinkage and surpluses vary by species and year-class of fish.

5.0 Ice Protection

The industry continues to use proven overwintering sites protected from moving ice.

Compliance:
The industry has not applied for any new overwintering sites where moving ice may be an issue. Existing overwintering sites at Roti Bay are proven sites protected from moving ice.

6.0 System Inspections

The Code requires operators to maintain ongoing inspections of their cage and mooring system structures. FFA is required to complete seasonal inspections on each site in operation, in spring and late fall, after cages are secured on site for that growing period.

Table 2: Summary of Inspection Efforts

Season	Number of sites inspected	Number of cages/nets on site	Number of issues recorded
Spring	15	148	56
Fall	10	111	71

Source: FFA

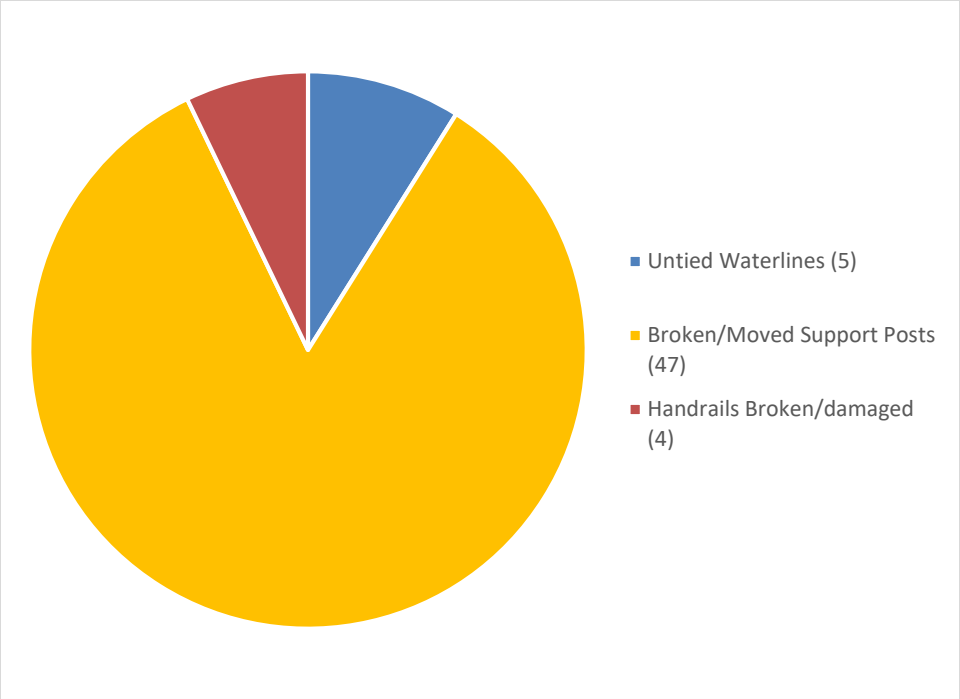
Only sites actively engaged in culturing fish are inspected. If any farm is under quarantine, inspectors follow protocols as set out by the Canadian Food Inspection Agency (CFIA) and the provincial Aquatic Animal Health Division (AAHD). Table 2 indicates the number of inspections in both the spring and fall round of inspections, the number of nets on these sites at the time of inspection, and the total number of issues recorded during the inspection.

Code inspections include:

1. Visual check of all nets near the surface for holes and tears.
2. The tag number of each net is recorded.
3. Nets are checked to verify if they were tied into the cage collar.
4. Each cage on site is physically checked by completely walking around it and checking its condition. This includes checking rails, stanchions and the cage collar for structural integrity, excessive wear, and major cracks.
5. Surface moorings are visually checked for excessive wear and overall condition. This includes checking all visible lines, thimbles, shackles, chains, and compensator buoys.

Figure 2 illustrates the non-compliances discovered during spring inspections in 2021.

Figure 2: Spring Inspection Results



Source: FFA

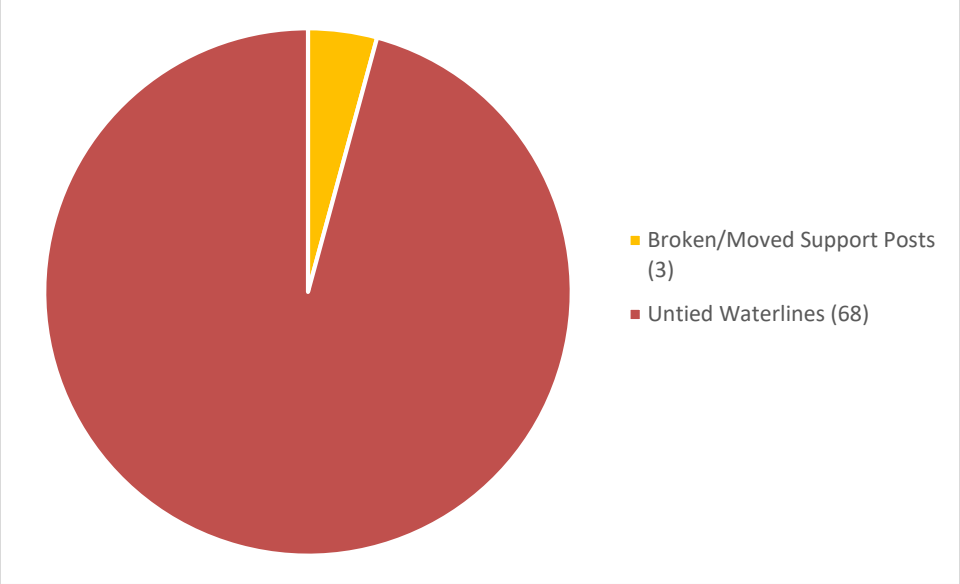
Summary:

- 47 of the incidents were either cage posts that were missing or cracked. Follow-up inspections confirmed all repairs necessary were completed, or the cages in question were replaced. In all instances, the potential for escapes was considered minimal.
- 5 incidents were due to waterlines being untied. The company was notified of the non-compliance. Follow-up inspections confirmed all repairs necessary were completed, or the cages in question were replaced. In this instance, the potential for escapes was minimal.

- 4 incidents involved broken handrails/jump rails. The company was notified of the non-compliance. Follow-up inspections confirmed all repairs necessary were completed.

Figure 3 illustrates the non-compliances discovered during the fall inspections in 2021.

Figure 3: Fall Inspection Results



Source: FFA

Summary:

- 3 of the incidents involved cage posts that were missing or cracked. Follow-up inspections confirmed all repairs necessary were completed, or the cages in question were replaced. In all instances, the potential for escapes was considered minimal.
- 68 incidents were due to waterlines being untied. Notifications of the non-compliance were issued. Follow-up inspections confirmed all waterlines were retied. In this instance, the potential for escapes was minimal.

7.0 Predator Control Plans

Effective since the fall of 2002, predator control plans were incorporated into all aquaculture license applications.

Compliance:
Industry is fully compliant with this section of the Code. FFA has predator control plans for each site on record.

8.0 Handling Practices

The salmonid aquaculture industry handles fish in accordance with accepted, industry-wide practices that are humane and guard against the escape of fish.

Compliance:
Industry is fully compliant with this section of the Code.

9.0 Measures for the Recapture of Escaped Fish

The Department of Fisheries and Oceans (DFO) is responsible for monitoring and implementing this section of the Code. As per FFA policy, all escapes have to be reported publicly. DFO administers the escape recapture section of the Code through a Post-Escape Report. This allows DFO and FFA to conduct a review of each incident, its cause, whether the recapture efforts were successful, and how/if the incident could have been prevented. It also requires the licensees to adopt changes to prevent future incidences.

In the event of an escape incident where it is reasonable to believe there may have been an estimated loss of any fish, the incident shall be deemed to constitute an escape and the Licensee shall be required to commence discussions with DFO and FFA within 24 hours of the incident to determine if recapture efforts should be initiated.

DFO continues to conduct research into the fate and behavior of escaped farmed salmon to help refine recapture methods.

As indicated in Figures 4 and 5 below, escapes have decreased overall since the Code has been in effect. Since 2014 the scale had to be adjusted on the charts to capture the magnitude of the decline.

Figure 4: Annual Salmonid escapes since 1990-2021

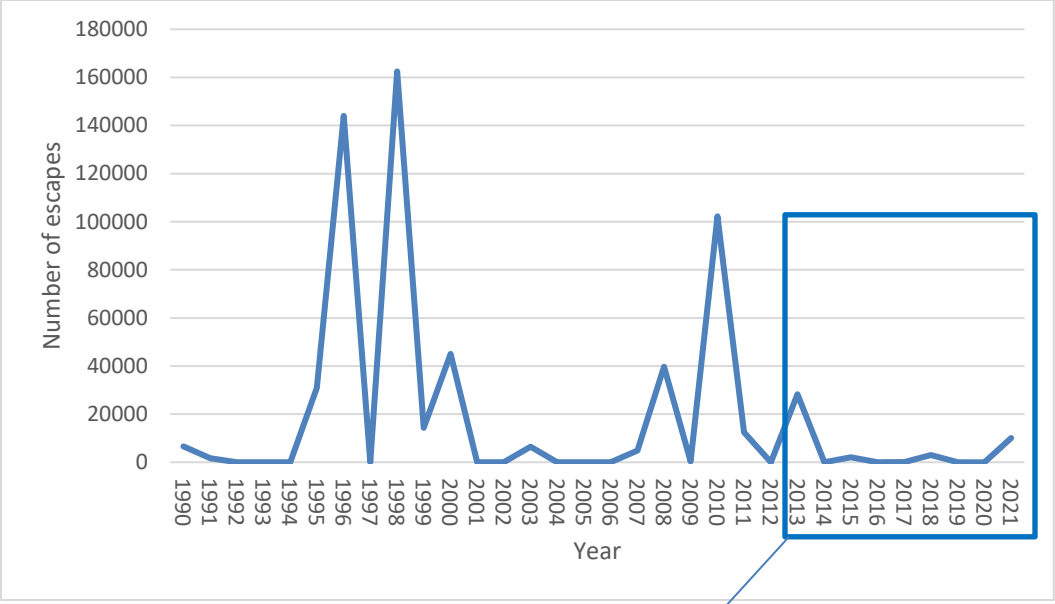
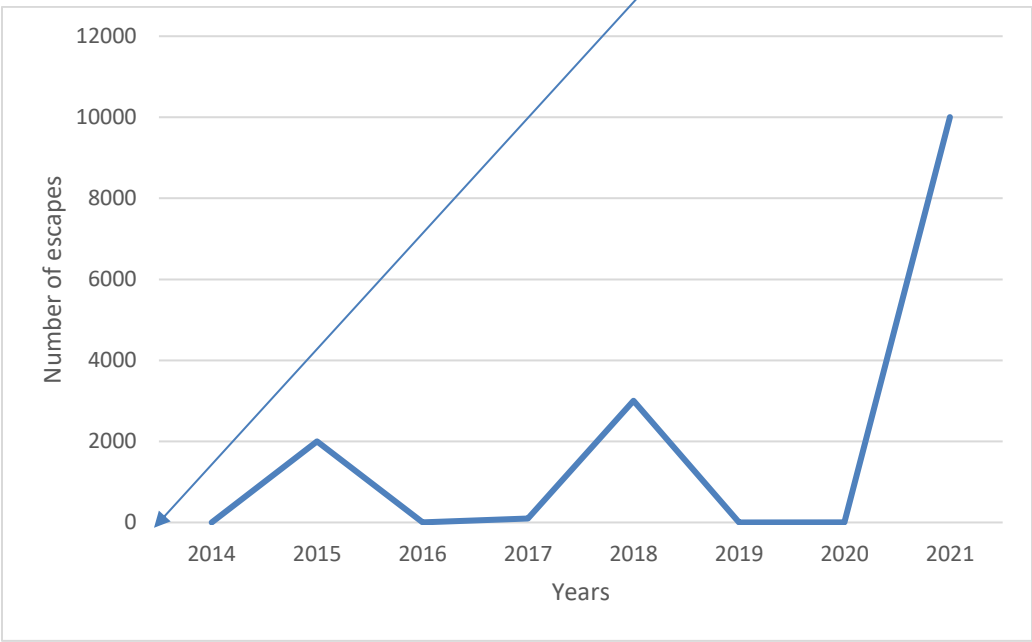


Figure 5: Annual Salmonid escapes, 2014-2021 (added to adjust for scale)



Compliance:
There were two incidents of escapes in 2021. The first incident occurred when four fish were observed swimming outside a cage. Recapture efforts were undertaken and all structures and cages were checked for damage and verified by a third-party contactor to be intact.

The second event was due to otters tearing holes in cages at a freshwater nursery site allowing approximately 10,000 fry/parr to escape into the landlocked pond. Recapture efforts were authorized by DFO.

Glossary of Terms

Cage – The floating structure in which nets are hung from. Construction materials include galvanized steel and PVC.

Cage collar – Main attachment point for net and mail floatation for the cage structure. Any damage to this portion of the cage is of immediate concern for escapes.

Compensator buoy – A part of the mooring system that is key in ensuring that cages do not submerge as the buoyancy in the buoy has to be overcome before the cage will sink.

Hand Rail – Section of the cage from which the Jump net is suspended.

Jump net – The portion of the net that extends up from the main attachment point to hang from the handrail. Its purpose is to prevent escapes from leaping salmon.

Net – Actual containment structure. Consists of the follow sections: net panels x 4 (four sides and bottom) and the jump net.

Stanchion/post – Vertical post from the cage collar that supports the handrail.