

Annual Compliance Report - 2014
on the
Code of Containment
for the Culture of Salmonids in
Newfoundland and Labrador




**Newfoundland
Labrador**

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Table of Contents

Executive Summary	3
1.0 INTRODUCTION	5
2.0 INDUSTRY OVERVIEW.....	6
2.1 Number of Active Sites In Bay D’Espoir in 2014	7
2.2 Number of Active Sites in Harbour Breton Bay and Great Bay de l’Eau in 2014.....	8
2.3 Number of Active Sites in Fortune Bay in 2014.....	9
2.4 Number of Active Sites in Facheaux Bay in 2014.....	10
3.0 APPENDIX 1 - EQUIPMENT STANDARDS.....	11
A1.1 Nets and Net Testing.....	11
A1.2 Cage Types.....	12
A1.3 Mesh Sizes.....	12
A1.4 Moorings.....	12
4.0 APPENDIX 2 - INVENTORY MONITORING AND RECONCILIATION....	13
5.0 APPENDIX 3 - ICE PROTECTION.....	15
6.0 APPENDIX 4 - SYSTEM INSPECTIONS.....	15
7.0 APPENDIX 5 - PREDATOR CONTROL PLANS.....	17
8.0 APPENDIX 6 - HANDLING PRACTICES.....	17
9.0 APPENDIX 7 - MEASURES FOR THE RECAPTURE OF ESCAPED FISH..	18
10.0. APPENDIX 8- NET TESTING COMPLIANCE.....	19

EXECUTIVE SUMMARY

The Department of Fisheries and Aquaculture manages the growth of the industry through policies and management plans designed to ensure the sustainability of the industry and environment. The Code of Containment is an integral part of the approach to successfully manage the growth of the industry.

Compliance with the Code continues to be high. However, in an effort to continually seek improvements and efficiencies, the Code underwent major revisions in late in 2012 and further adjustments in 2013. The revisions were endorsed through the Aquaculture Liaison committee, a committee of industry, government and public stakeholder. These new changes were implemented in the 2013 and 2014 inspection year.

The Code of Containment inspection/reporting program was conducted by the Department of Fisheries and Aquaculture (DFA) throughout 2014. Inspections occurred on 37 active aquaculture sites between May and January. Reporting and inspection results are summarized below:

Nets and Net Testing:

643 nets were recorded in grower's net inventories in 2014. DFA staff recorded 267 nets on sites in the spring and 285 nets on sites in the fall. There was full compliance with net inventories and audits.

Cage Types: No new cage types were deployed this year.

Mesh Sizes: Appropriate mesh sizes were in use as per industry standard practice and in accordance with mesh size reports commissioned in 2000/01.

Moorings: A "Mooring Maintenance/Replacement Plan" is required to be submitted annually. All growers have submitted these plans.

Inventory Monitoring and Reconciliation: Industry was fully compliant with this section of the Code. Industry wide, the inventory reconciliation covered a starting number of 11,074,402 salmonids and ended with 12,548,654 salmonids.

Ice Protection: There were no new overwintering sites utilized in 2014.

System Inspections: DFA performed 32 site inspections in spring and 25 in the fall. 13 issues were recorded.

Handling Practices: During a Code inspection the inspector noted that a sea lice count was being completed without the use of a drop net in violation of Code handling practices. The company was informed that this was unacceptable and that in the future all elements of the Code where handling of fish occurs outside of a cage are concerned drop nets were to be used without exception.

Measures for The Recapture of Escaped Fish: DFO is responsible for this section of the Code. A process for reporting and assessing causes of escapes was added to the Code in 2013.

1.0 INTRODUCTION

The Code of Containment for the Culture of Salmonids in Newfoundland and Labrador has been in effect for twelve years. This *Annual Compliance Report* outlines compliance and inspection efforts as specified by the Code for the calendar year of 2014. This report will outline the effectiveness of the Code by indicating the compliance of the industry to the requirements, the inspection efforts of the Department of Fisheries and Aquaculture, the number of escapes (if any) and effectiveness of recapture efforts.

One of the objectives of the Code is to be forward-looking and seek continual improvement. This report will also indicate where improvements or revisions to the Code have been made. It should be noted that all revisions are undertaken with the full consultation of industry and both levels of government. The Aquaculture Liaison Committee meeting is the venue where such revisions are discussed.

The Code of Containment has also been recognized internationally for its adequacy in addressing the issue of escaped fish. The Code of Containment for the Culture of Salmonids in Newfoundland and Labrador 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 in 2014 consisted of 4 companies growing Atlantic salmon and Steelhead trout with farming operations in both Bay D’Espoir and Fortune Bay. There were 87 sites licensed for Atlantic Salmon and Steelhead production in 2014. 37 sites were in active production.

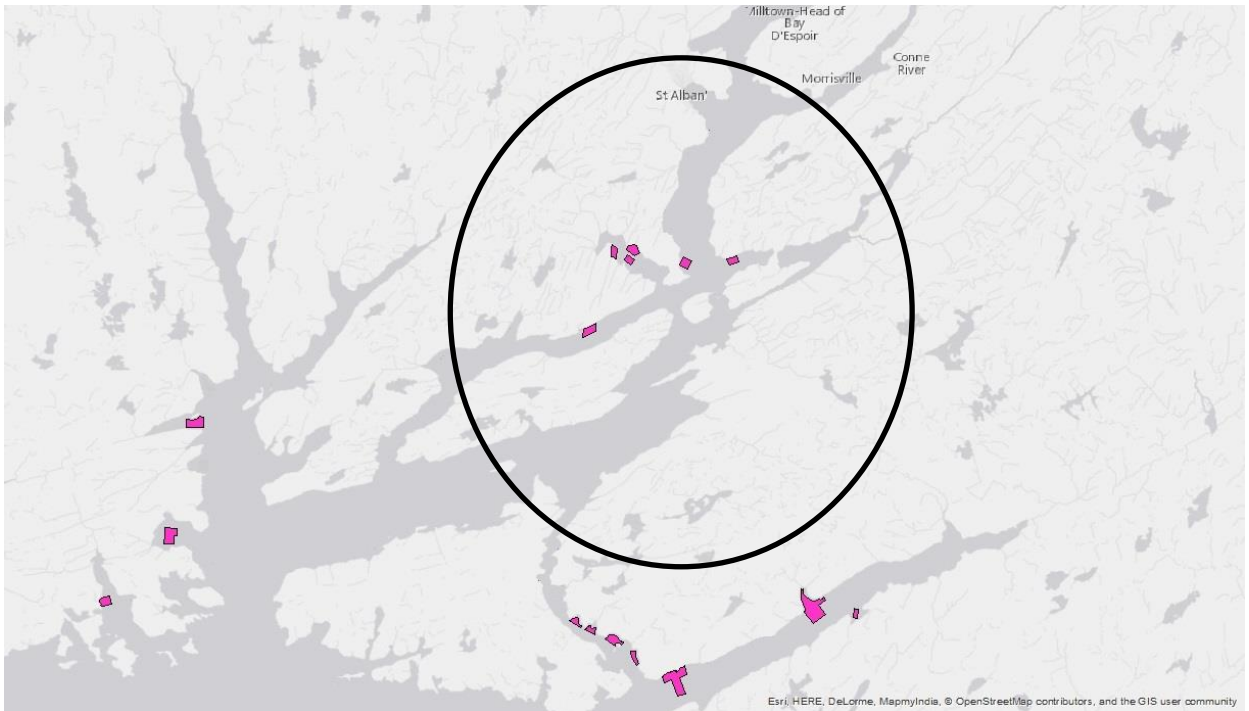
The 2014 salmonid production was 5,980 MT. This was far lower than originally expected and was a result of losses incurred due to ISA_v in 2012/13 and the winter 2014 super chill event. There was significant mortality during the 2014 winter due to super chill conditions (sustained cold temperatures dropped the temperature of the water to the level that fish blood freezes, which is around -0.7 C).

It is anticipated that industry production will recover to pre-ISA_v levels in 2015.

2.1 Number of Active Sites In Bay D’Espoir in 2014

Both salmon and steelhead are grown in Bay d’Espoir and in 2014 there were 16 active sites (currently farming fish). The following figure indicates the 16 sites. Sites not circled are salmon sites.

Figure 1: Active finfish sites in Bay D’Espoir in 2014.



2.2 Number of Active Sites in from Harbour Breton Bay and Great Bay De l'Eau

There were 6 active sites from Hermitage, Harbour Breton Bay and Great Bay De l'Eau in 2014 growing Atlantic salmon.

Figure 2: Active finfish sites from Harbour Breton Bay and Great Bay De l'Eau in 2014.



2.3 Number of Active Sites in from Fortune Bay

There were 13 active sites from Fortune Bay in 2014 growing Atlantic salmon.

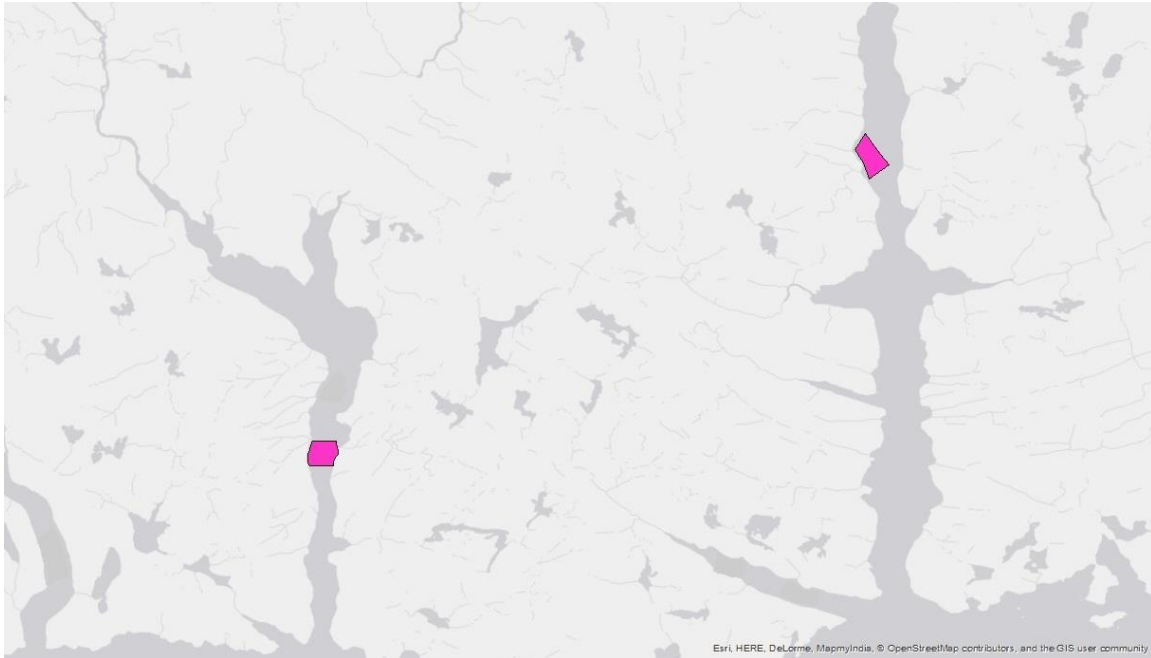
Figure 3: Active finfish sites from Fortune Bay in 2014.



2.4 Number of Active Sites in from Facheaux Bay and Hare Bay

There were 2 active sites in Facheaux Bay/Hare Bay in 2014 growing Atlantic salmon.

Figure 4: Active finfish sites from Facheaux Bay and Hare Bay in 2014.



3.0 APPENDIX 1 - EQUIPMENT STANDARDS

A1.1 Nets and Net Testing

This section of the Code of Containment addresses net strength and integrity. Equipment failure and, in particular, net failure, has been recognized as a leading cause of escape incidents internationally. The Newfoundland Code of Containment focuses heavily on nets in both this section and in appendix 4 - System Inspections. Specific requirements for nets and net testing can be found in Appendix A1.1, page 11 of the Code of Containment.

Compliance:

The nets used for finfish aquaculture along the south coast, made both locally and in New Brunswick, are of dyneema or a nylon, knotless material and are, in most cases, treated with antifoulant. Mesh sizes vary depending on the size of fish going into the cage. Nets over three years of age must be tested every 18 months. The following table provides a consolidated summary of the net inventories submitted by growers for 2014. See Appendix C of the Code for 4 Point Stress Test Inspection form used for net testing. Please refer to Appendix A1.1, page 14 of the Code for net strength standards.

Net Inventories	Number of nets
Total number of nets in inventories	643
Number of nets over 3 years of age	269
Number of nets under 3 years of age	268
Number of nets of unknown age*	106
Number of nets audited	307
Nets in use during spring inspection**	267
Nets in use during fall inspection**	285

* Nets of unknown age are treated as if they are over three years of age.

** Refers to site System Inspections, see appendix 4 of the Code of Containment and page 16 of this report.

Not all nets in inventories are in active use at the same time. DFA has verified that nets in inventories in 2014 were tested by a net testing agent *or* were under three years of age. Each company's net inventory is audited 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.

A1.2 Cage Types

Two types of cage designs were in use in 2014. The first and most common is the circular High Density Polyethylene (HDPE) plastic cages. These are manufactured locally to national and international industry standards and have proved to be very reliable in Newfoundland's environment. They are manufactured in several sizes but are found most commonly in 70m, 90m and 100m circumference sizes as well as 150m. The second type in use is square systems, made of both steel and HDPE; however, these are slowly being phased out of use in favour of the HDPE circular cages.

Compliance:

No new types of cage systems were deployed during 2014.

A1.3 Mesh Sizes

Industry continues to use mesh sizes that meet or exceed the minimum size retained per mesh size as determined in "Determination of the Appropriate Cage Mesh Size for Retention of Salmonid Juveniles" by the Memorial University of Newfoundland's Marine Institute.

Compliance:

The industry was using appropriate mesh size prior to the study being completed. The study which was completed in 2000 verified industry practice. Mesh sizes of nets to be used during production are listed in the cage culture application form for all licensed sites. DFA does not perform audits or inspections on this aspect of the Code.

A1.4 Moorings

This section of the Code addresses mooring components. Mooring failure has not been identified as a cause of escapement in the Newfoundland industry. The Code requires that the grower submit a Mooring Maintenance and Replacement Plan annually for each site in production or newly installed mooring system. Additionally updated plans will be required upon replacement of a site system. See Form A.6 within Code.

Compliance:

All Mooring Maintenance and Replacement Plans were submitted for sites in production in 2014.

4.0 APPENDIX 2 - INVENTORY MONITORING AND RECONCILIATION

Industry members are required to submit an annual inventory review to DFA for the calendar year. They are to be submitted at the beginning of the next calendar year (i.e. Inventory reconciliations for 2014 will be submitted in January/February 2014).

Compliance:

There was full compliance for the year 2014. Industry wide, the 2014 Inventory Reconciliations tracked four year classes of fish, starting with an inventory total of 11,074,402 salmonids and ended with 12,548,654 salmonids. The *2013 Code Annual Report* gave a final inventory of 10,343,282. There was a counting error which failed to include fish from two sites which would have increased the 2013 end numbers to match the 2014 beginning numbers, in addition to a MS Excel error. Data from growers indicated that there were both 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 DFA review of shrinkage and surpluses has shown that shrinkage and surpluses vary by species and year class of fish.

Table 2 is an example of a particular cage grouping which shows a sample of the inventory reconciliation exhibiting both shrinkages and surplus (positive or negative deviations). The example illustrates the inherent errors involved in fish numbers. Errors are a result of counting errors when stocking, grading or during mort removal.

Table 2

Cage Number	Starting Number of fish	Year Class	Number of Fish Introduced	Number of Fish Mortalities	Number of Fish Removed/Harvest	Number of Fish Removed/Transfer	Counting Deviation	Number of Fish Escaped	Fish Remaining
1	17040	2012		742	15430		-868		0
2	32606	2012		1513	29763		-1330		0
3	30078	2012		1556	27449		-1073		0
4	32729	2012		24536	8193				0
5	33710	2012		20062	13648				0
6	30903	2012		890	29390		-623		0
7	33363	2012		1373	33886		1896		0
8	32923	2012		19976	12947				0
9	33259	2012		24211	9048				0
10	32841	2012		14910	17931				0
11	33196	2012		7074	26122				0
12	29958	2012		16818	13140				0
13	-1996	2012		60	1186		3242		0
14	3080	2012		447		5100	2467		0
15	2629	2012		120	3008		499		0
TOTAL	378315		0	134288	241141	5100	4210	0	0

Note: Inventory reconciliations cover from Jan. 1 to Dec. 31 of the reporting year. In cage 13 as of Dec.31, 2013, the majority of fish were harvested out except for @2000 fish. These were harvested in the first few days of January 2014. Since the cage was now emptied, the submitting company reported the numbers in this manner, with the counting deviation for the entire cage carried over into 2014.

Code of Containment - Inventory Reconciliation -SPECIES – 20XX

Company Name: _____

Aquaculture Site Licence #'s: _____

Contact Name: _____

Site Locations: _____

Company Address: _____

Number of Active Cages: _____

Company Telephone: (709) _____

START DATE: January 1, 20XX

Company Fax: (709) _____

END DATE: December 31, 20XX

Signature: _____

Cage Number	Starting Number of fish	Year Class	Number of Fish Introduced	Number of Fish Mortalities	Number of Fish Removed/Harvest	Number of Fish Removed/Transfer	Counting Deviation	Number of Fish Escaped	Fish Remaining
1									0
3									0
4									0
5									0
6									0
7									0
8									0
TOTAL									

Note: Sites used during this year included

Note: 1. Use additional pages as required.

5.0 APPENDIX 3 - 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. The Code requires that new seasonal sites be reviewed by DFA for the potential of damage from moving ice. Any new seasonal sites may require ice booms. Existing overwintering sites at Roti Bay are proven sites protected from moving ice.

6.0 APPENDIX 4 - SYSTEM INSPECTIONS

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

Season	Number of sites inspected	Number of cages/nets on site	Number of issues recorded
Spring	32	267	11
Fall	25	285	2

*DFA performed 57 cage system inspections in 2014.

Only sites that are engaged actively in culturing fish are inspected. System inspections include visually checking all nets near the surface for any holes and tears. The tag number of each net is recorded. Nets are also checked to verify if they were tied into the cage collar. Each cage on site is physically checked by completely walking around it and checking its condition. This includes checking the rails, stanchions and the cage collar for structural integrity, excessive wear and major cracks. Surface moorings are also visually checked for excessive wear and overall condition. This includes checking all visible lines, thimbles, shackles, chains and compensator buoys.

In addition to the visual inspection, DFA audits on-site records. In accordance with Appendix 4 – System Inspections, industry members are required to monitor and inspect surface components of the farm once per week and record those findings on form A.4. Inspectors ensure that these are being completed as required and take note of any issues or discrepancies between form A.4 and their own observations. Inspectors review net diver reports to ensure net checks are being completed every 90 days as outlined in the Code of Containment 2014.

Compliance:

12 of the compliance incidents involved nets in the water past their due date for net testing date. In all instances DFA recommended harvesting begin to clean the fish out of the affected cages. DFA maintained a close watch on the sites in questions to ensure this process was completed in a timely manner. Please see Appendix 8 for details of these 12

nets. The final issue occurred when, during a Code inspection, the inspector noted that a sea lice count was being completed without the use of a drop net. The company was informed that this was unacceptable and that in the future all elements of the Code where handling of fish occurs outside of a cage are concerned drop nets were to be used without exception. The industry fully cooperated with DFA during each site inspection.

7.0 APPENDIX 5 - PREDATOR CONTROL PLANS

Each aquaculture site requires a plan to deal effectively with predators because they can be responsible for creating holes in nets which may contribute to escapement. Effective in 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. DFA has on record predator control plans for each site.

8.0 APPENDIX 6 - HANDLING PRACTICES

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

Compliance:

There was one incident of drop nets not being employed during a lice count.

9.0 APPENDIX 7- MEASURES FOR THE RECAPTURE OF ESCAPED FISH

DFO is responsible for the monitoring and implementation of this section of the Code. A Rapid Response Licensing Policy for the recapture of escaped fish was put in place in the fall of 2002, replacing the former recapture plan of 1999 (please see current copy of the Code).

Since the Code of Containment has been in effect, escapes have decreased overall (see Table 3).

Table 3
REPORTED ESCAPES SINCE 1995

Year	Salmon	Steelhead	Charr
1990		6600	
1991		1700	
1992			
1993			
1994			
1995		31000	
1996	140000	4000	
1997			
1998	69500	93000	
1999	6300	8000	
2000	0	45000	
2001	0	0	
2002	0	0	
2003	6500	0	
2004	0	0	
2005	0	0	
2006	0	0	
2007	500	4400	
2008		39653	
2009	300		
2010		32,443	69,827
2011		12,382	
2012	0	0	0
2013	20,800	0	7513
2014	0	0	0

The current approach to recapture as specified in the Rapid Response Licensing Policy has never been proven to be very effective in actual escape events. There have been problems with fishing gear, delays between detection of losses and deployment of fishing gear, problems with subordination of recapture responsibilities to other on farm priorities following escapement incidents, and policy limits that restricts fishing effort to the cage

site only. In 2013, the Code of Containment Liaison Committee members updated this section of the code to include a section on Post Escape Reporting, which includes provisions for reviewing the incident and its cause, whether the recapture efforts were successful and how/if the incident could have been prevented.

Compliance:

There were no escapes reported in 2014.

11.0. APPENDIX 8- NET TESTING COMPLIANCE

In 2014 there were 552 net inspections performed on salmonid aquaculture sites. Of these, 12 were not in compliance with the requirement to have each net tested every 18 months (Section A1.1 of Code of Containment).

2014

Date of Inspection when Noncompliance was noted	Number of months net testing was out of date	Harvest completed	Number of follow ups to monitor progress of harvest
December 23/14	Net 1: 2 months	March 27/15	1
	Net 2: 2 months		
	Net 3: 2 months	Sept 17/15	2
	Net 4: >1 month		
May 20/14	Net 5: 2 months	Sept 2/14	1
	Net 6: >1 month		
	Net 7: 2 months		
June 4/14	Net 8: 2 months	Net Change in July 2014	2
	Net 9: 2 months		
	Net 10: 3 months		
May 30/14	Net 11: 7 months	Net change in June 2014	2
	Net 12: 5 months		