

Annual Compliance Report - 2015
on the
Code of Containment
for the Culture of Salmonids in
Newfoundland and Labrador



Department of Fisheries and Aquaculture
Aquaculture Branch
P.O. Box 340
Center for Aquaculture Health and Development
St. Alban's, NL
A0H 2E0

Table of Contents

Executive Summary	3
1.0 INTRODUCTION	5
2.0 INDUSTRY OVERVIEW	6
2.1 Number of Active Sites in the Trout Growing Region of Bay D’Espoir in 2015.	7
2.2 Number of Active Sites in from BMA 1 (Mal Bay) and BMA 2 (Recontre Island).....	8
2.3 Number of Active Sites BMA 3 (Fortune Bay West) in 2015.....	9
2.4 Number of Active Sites in BMA 4 (Great Bay de l’Eau) BMA 5 (Harbour Breton Bay) in 2015.	10
2.5 Number of Active Sites in BMA 6 (Connaigre Bay) and BMA 7 (Hermitage Bay) in 2015.....	11
2.6 Number of Active Sites in BMA 8 (Gaultois Passage) in 2015.....	12
2.7 Number of Active Sites in BMA 9 (Bay d’Espoir) in 2015.....	13
2.8 Number of Active Sites in BMA 10 (Facheaux Bay) and BMA 11 (Hare Bay/Devil Bay/Recontre West) in 2015.....	14
3.0 APPENDIX 1 - EQUIPMENT STANDARDS	15
A1.1 Nets and Net Testing	15
A1.2 Cage Types	16
A1.3 Mesh Sizes	16
A1.4 Moorings	16
4.0 APPENDIX 2 - INVENTORY MONITORING AND RECONCILIATION	17
5.0 APPENDIX 3 - ICE PROTECTION	19
6.0 APPENDIX 4 - SYSTEM INSPECTIONS	19
7.0 APPENDIX 5 - PREDATOR CONTROL PLANS	21
8.0 APPENDIX 6 - HANDLING PRACTICES	21
9.0 APPENDIX 7 - MEASURES FOR THE RECAPTURE OF ESCAPED FISH ..	22
10.0. APPENDIX 8- NET TESTING COMPLIANCE	24

EXECUTIVE SUMMARY

The Newfoundland and Labrador salmonid aquaculture industry grew in 2015. Production has increased from 5,980 MT in 2014 to 19,684 MT in 2015. 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 2012. 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 inspection year. Additional changes were made in 2014 and implemented during the 2014 inspection year.

The Code of Containment inspection/reporting program was conducted by the Department of Fisheries and Aquaculture (DFA) throughout 2015. Inspections occurred on the 39 active aquaculture sites between May and January. Reporting and inspection results are summarized below:

Nets and Net Testing:

894 nets were recorded in grower's net inventories in 2015. DFA staff recorded 328 nets on sites in the spring and 325 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 12,548,654 salmonids and ended with 11,452,165 salmonids.

Ice Protection: There were no new overwintering sites utilized in 2015.

System Inspections: DFA performed 28 site inspections in spring and 26 in the fall. 9 issues were recorded.

Handling Practices: There were no instances of handling practices that were in contravention of the Code of Containment Handling Practices.

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 2015. 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 any and 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 2015 consisted of 4 companies growing Atlantic salmon and Steelhead trout with farming operations in both Bay D’Espoir, Hare Bay, Facheaux Bay, Hermitage Bay, Great Bay de l’Eau and Fortune Bay. There were 87 sites licensed for Atlantic Salmon and Steelhead production in 2015. 39 sites were in active production. In 2015 production increased from 5,980 MT in 2014 to 19,684 MT

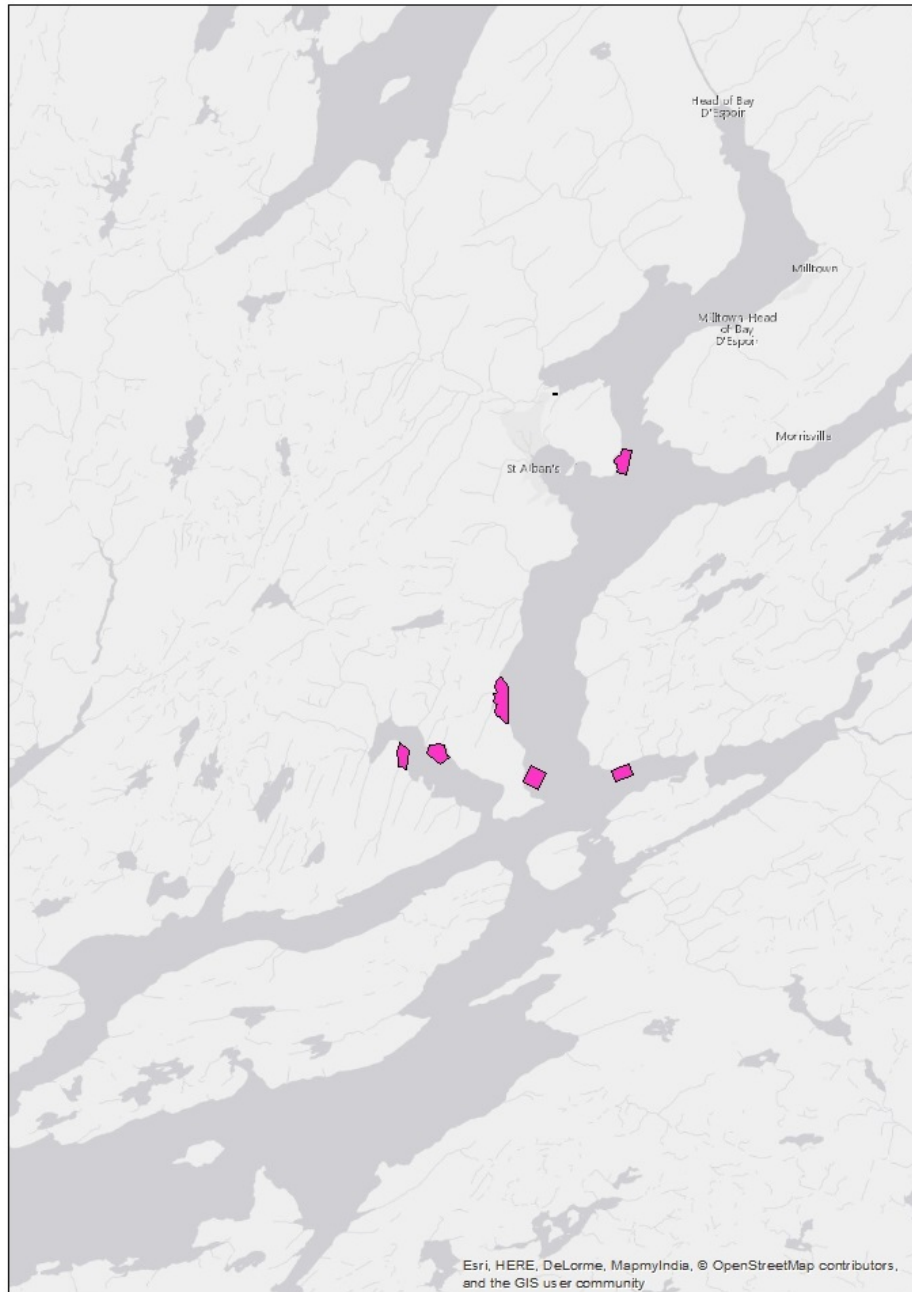
In 2013, the industry transitioned to a Bay Management Area (BMA) system. The use of BMAs is a sound, scientifically based and proven method of reducing disease and parasite impact. It also enables stable and orderly management of industry practices to ensure environmental sustainability. Active site locations as described below will now be reported via the BMA that they reside in.

Note: The rainbow trout growing area is not included in the BMA system.

2.1 Number of Active Sites in the Trout Growing Region of Bay D'Espoir in 2015

In 2015, there were 6 active sites (currently farming fish). The following figure indicates the 6 sites growing Rainbow Trout (Steelhead).

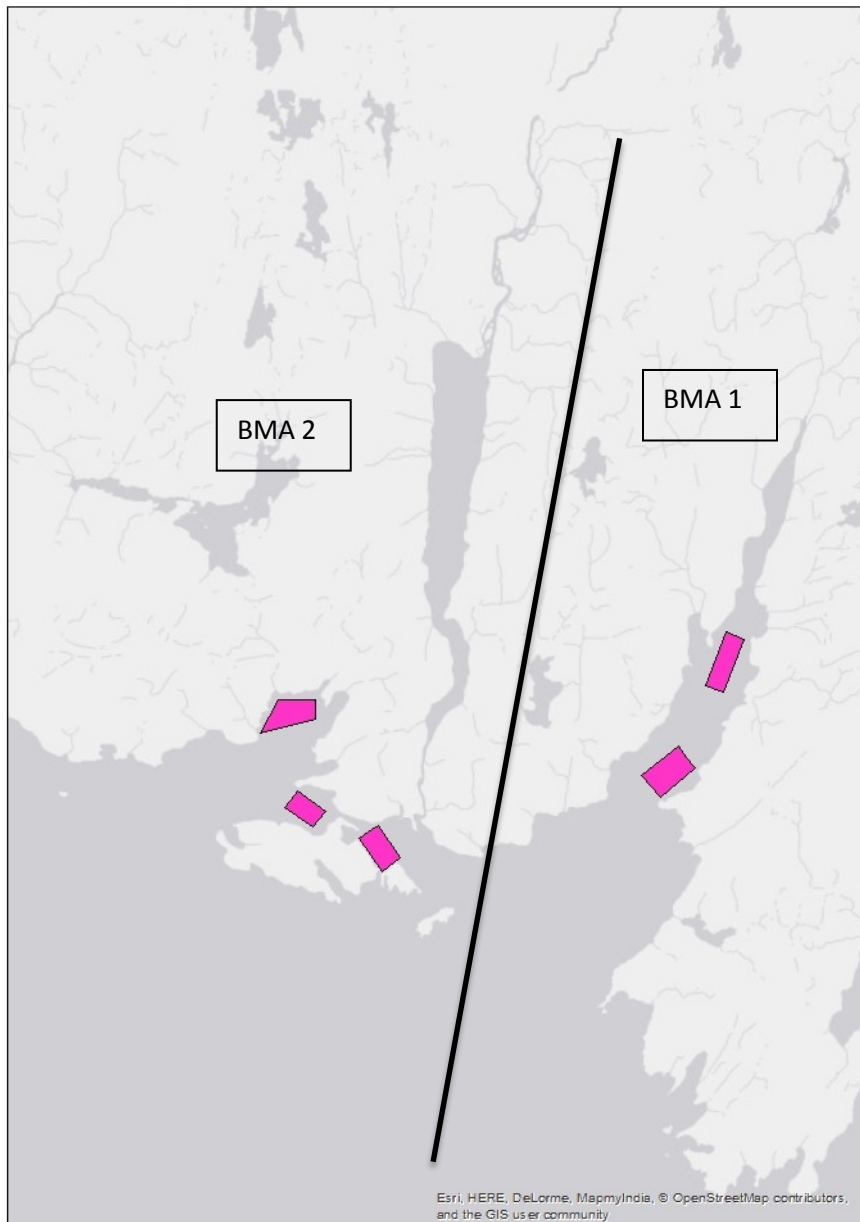
Figure 1: Active finfish sites in Bay D'Espoir Trout Growing Region in 2015.



2.2 Number of Active Sites in from BMA 1 (Mal Bay) and BMA 2 (Recontre Island) in 2015.

There were 5 active sites in BMAs 1 and 2 in 2015 growing Atlantic salmon.

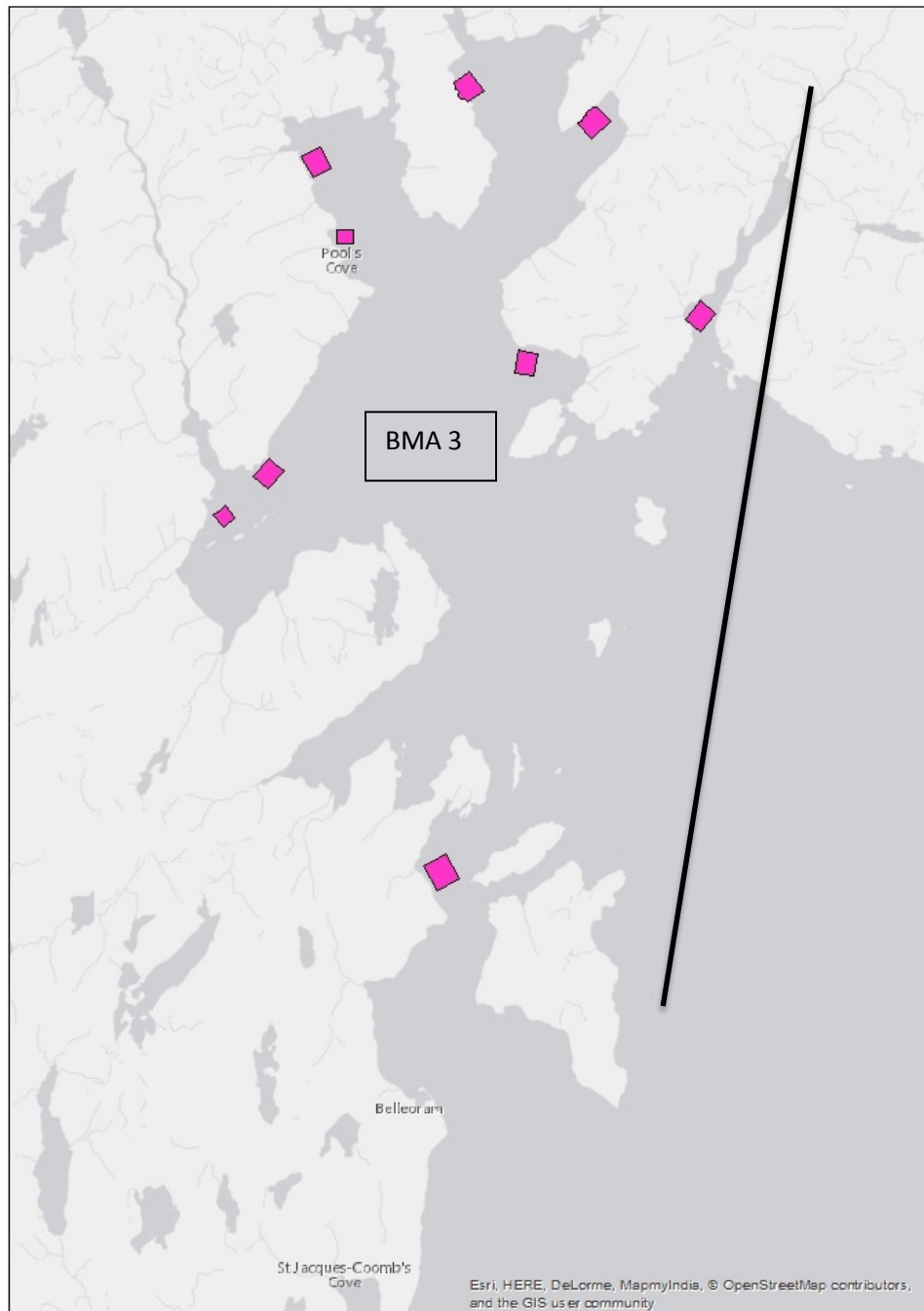
Figure 2: Active Sites in from BMA 1 (Mal Bay) and BMA 2 (Recontre Island) in 2015.



2.3 Number of Active Sites BMA 3 (Fortune Bay West) in 2015.

There were 9 active sites in BMA 3 in 2015 growing Atlantic salmon.

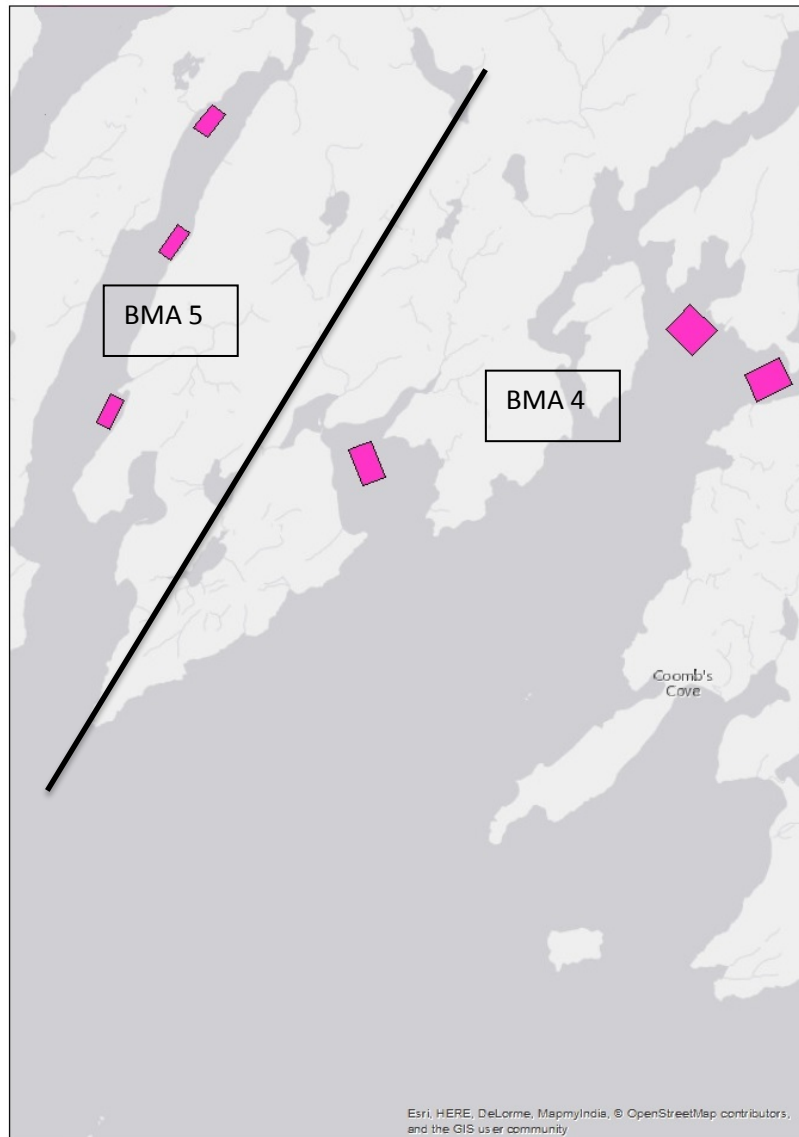
Figure 3: Active finfish sites in BMA 3 (Fortune Bay West) in 2015.



2.4 Number of Active Sites in BMA 4 (Great Bay de l'Eau) BMA 5 (Harbour Breton Bay) in 2015.

There were 6 active sites in BMAs 4 and 5 in 2015 growing Atlantic salmon.

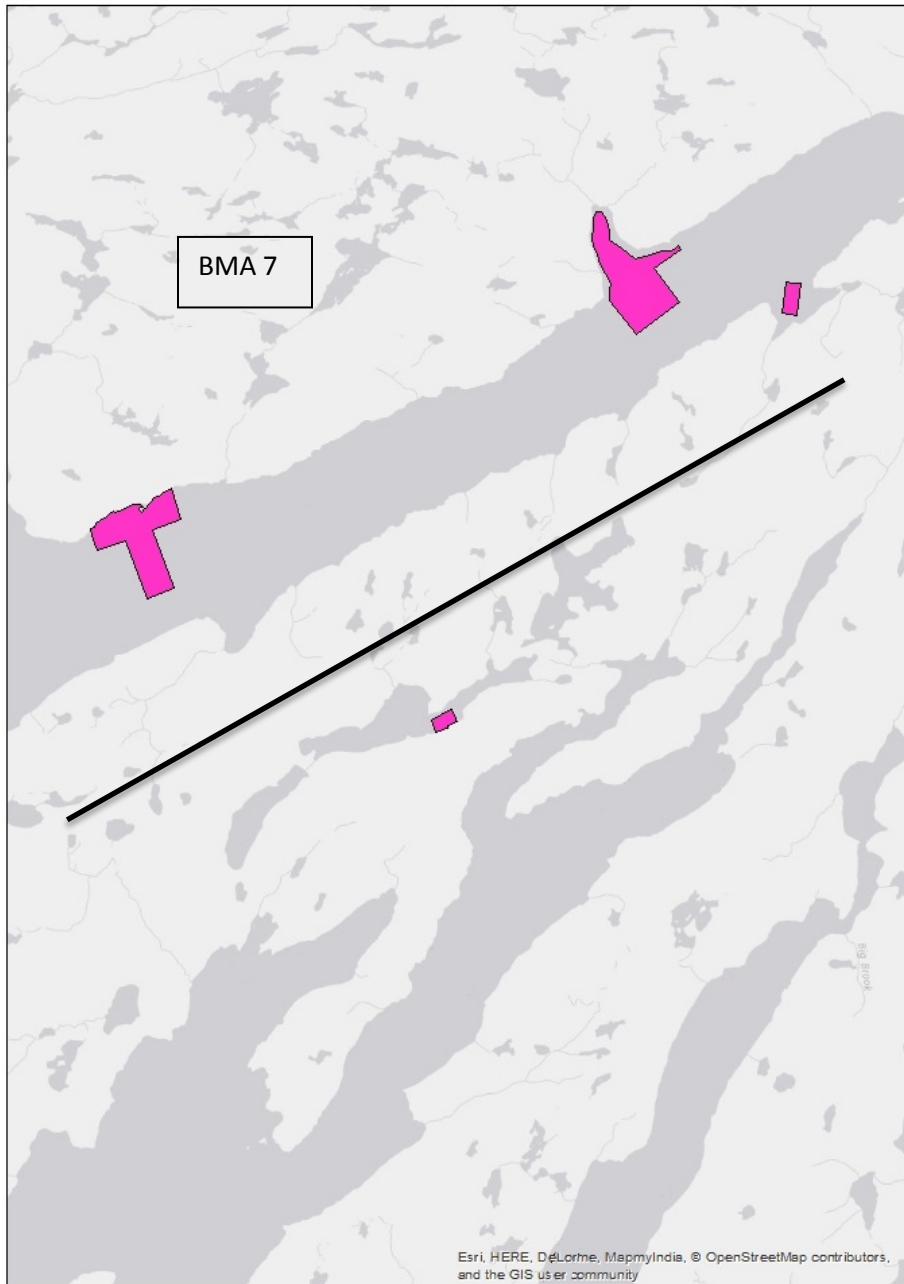
Figure 4: Active finfish sites from BMA 4 (Great Bay de l'Eau) and BMA 5 (Harbour Breton Bay) in 2015.



2.5 Number of Active Sites in BMA 7 (Hermitage Bay) in 2015.

There were 3 active sites in BMA 7 in 2015 growing Atlantic salmon. Additionally there was one freshwater nursery site in operation.

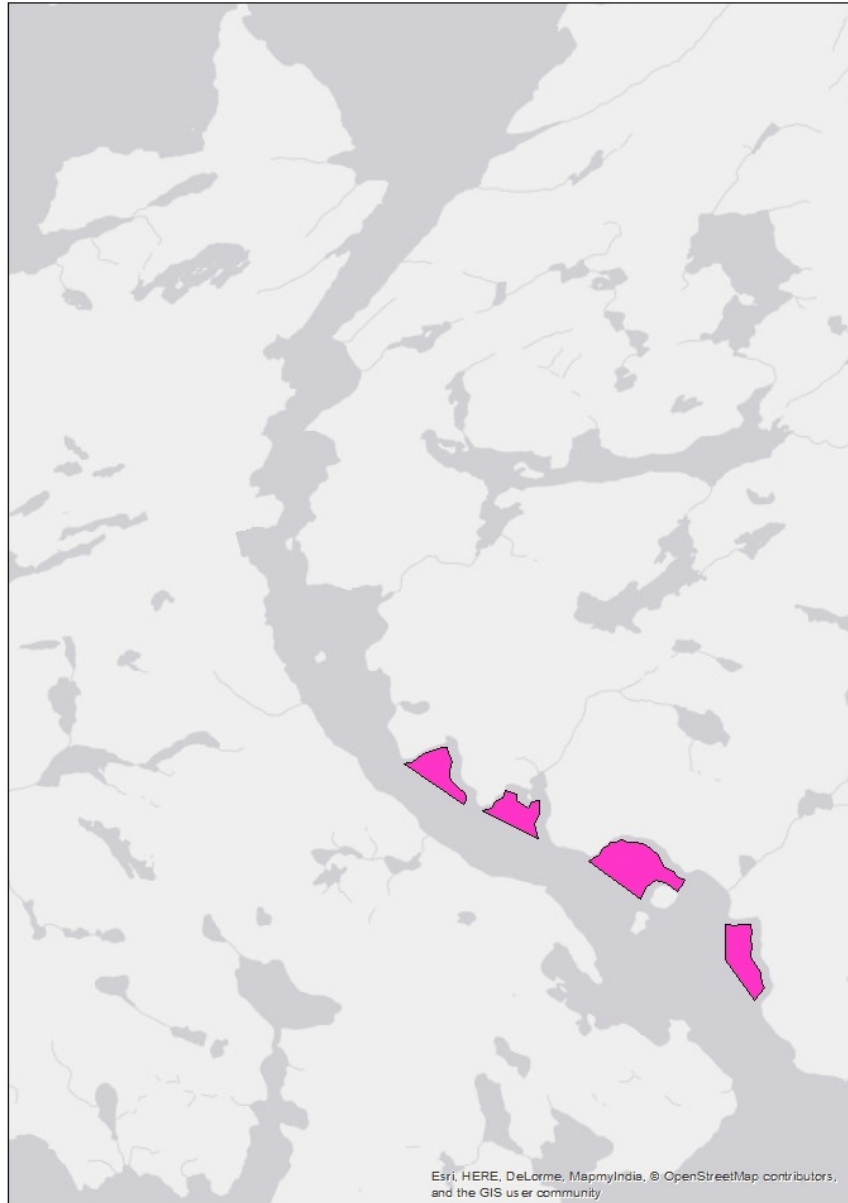
Figure 5: Active finfish sites from BMA 7 (Hermitage Bay) in 2015.



2.6 Number of Active Sites in BMA 8 (Gaultois Passage) in 2015.

There were 4 active sites in BMA 8 in 2015 growing Atlantic salmon.

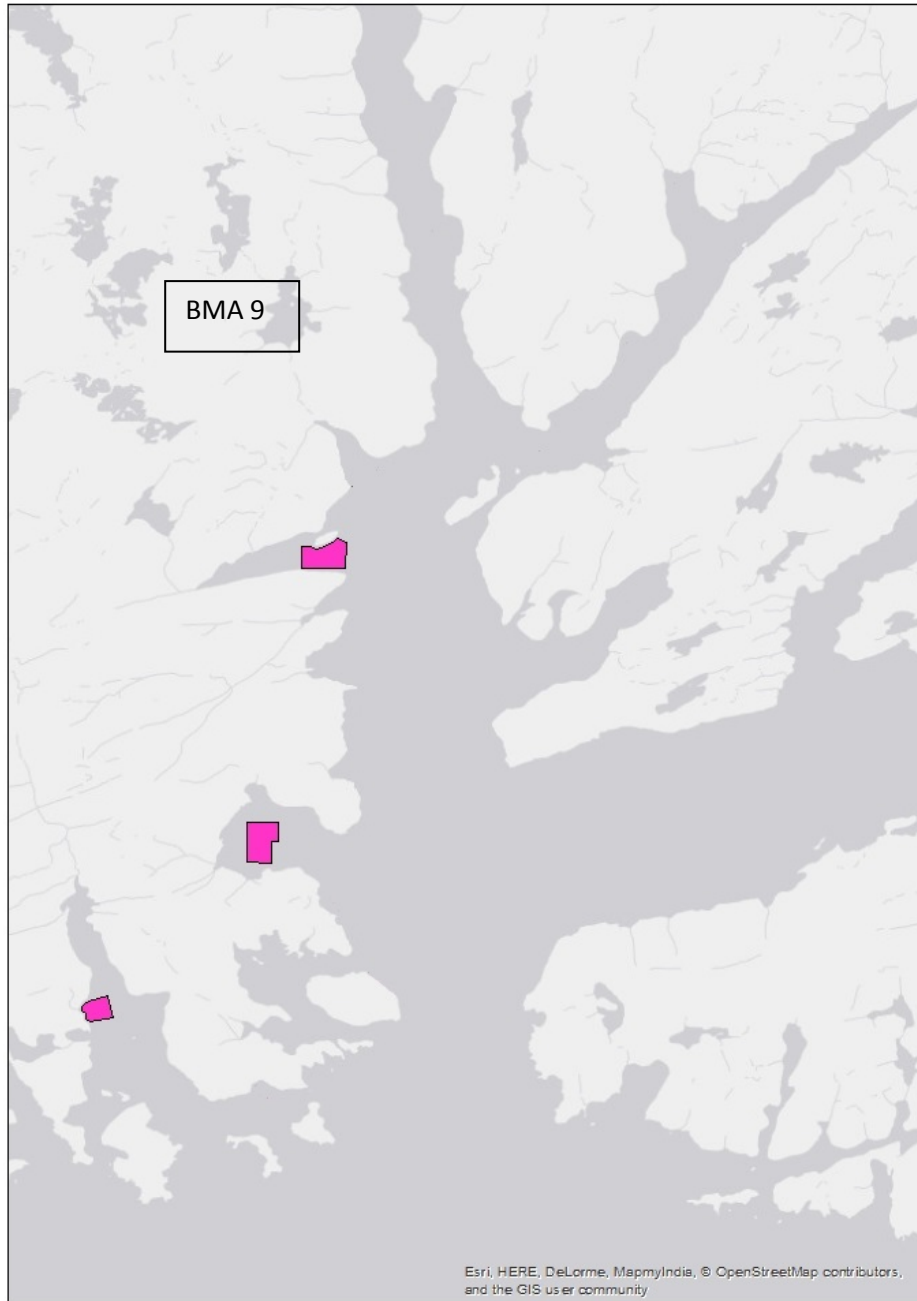
Figure 6: Active finfish sites from BMA 8 (Gaultois Passage) in 2015.



2.7 Number of Active Sites in BMA 9 (Bay d’Espoir) in 2015.

There were 3 active sites in BMA 9 in 2015 growing Atlantic salmon.

Figure 7: Active finfish sites from BMA 9 (Bay d’Espoir) in 2015.



2.8 Number of Active Sites in BMA 10 (Facheaux Bay) and BMA 11 (Hare Bay/Devil Bay/Recontre West) in 2015.

There were 2 active sites in BMA 10 and BMA 11 in 2015 growing Atlantic salmon.

Figure 8: Active finfish sites from BMA 10 (Facheaux Bay) and BMA 11(Hare Bay/Devil Bay/Recontre West) in 2015.



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 2015. See Appendix C for 4 Point Stress Test Inspection form used for net testing. Please refer to Appendix A1.1, page 14 for net strength standards.

Net Inventories	Number of nets
Total number of nets in inventories	894
Number of nets over 3 years of age	737
Number of nets under 3 years of age	142
Number of nets of unknown age*	15
Number of nets audited	328
Nets in use during spring inspection**	325
Nets in use during fall inspection**	295

* 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 2015 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 2015. 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 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 2015.

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 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 2015.

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	28	328	7
Fall	26	325	2

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.

Two sites were not inspected during the fall inspection round due to inclement weather. Inspections on these sites were attempted through the early winter, but near zero water

temps made visiting the sites impossible. Best husbandry practices require avoidance of sites during near superchill temperatures.

Compliance:

All incidents were nets past their 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. Please see Appendix 8 for details of these 9 nets.

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:

Industry is fully compliant with this section of the Code during DFA inspections.

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
2015	*	1000	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 efforts were undertaken by Code of Containment Liaison Committee members to update this section of the code. 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 two instances of escapes in 2015. Industry is compliant with escape reporting. Both instances resulted in a Post Escape Report being filed with DFA and Fisheries and Oceans Canada (DFO).

Incident 1)*

During fall of 2015, salmon were observed in vicinity of a farming area believed to be of farm origin. DFO discovered farm origin fish in a local river mouth near a site in Fortune Bay. There was only one farm rearing fish in that area. DFO requested the farm conduct a review of their sites to determine if an escape event occurred. Upon review of the sites records it was noted that sharks had been repeatedly observed in the vicinity of the farm. Additionally a number of holes had been found and repaired by divers in the months prior to the inquiry. Fish behavior and feeding patterns were slightly abnormal, common when predators (sharks/tuna) loiter in the vicinity of the cages, and it was determined that escapes were unlikely at that time as feeding patterns returned to normal when the predators left area. Further review of site records indicated that due to the presence of predators the salmon in the cages were spooked by their presence and crowded near the bottom of the cage. The company determined that the likely cause of escape was crowding of fish near the bottom of the net (when predator related holes are most likely to be found) prior to a sea lice treatment when the net is raised. To prevent any further escapes in the future company initiated the following actions: increasing the frequency of divers diving in the nets to twice a week on all sites, waiting until just prior to treatment to raise any nets (which would crowd fish into the direction of any holes that may be in the net), increasing the frequency of divers diving in the nets to twice a week on all sites and hole checking any net to be raised by divers to just prior to the raising. The site in question has not been fully harvested (due for completion in spring 2016). Once complete, the escape numbers will be reported in the 2016 Inventory Reconciliation and the 2015 report will be updated to reflect such.

Incident 2:

In the spring of 2015 during harvest at the wharf in St. Albans a 10 inch tear was discovered in a net, along one of the down lines. The cage in questions had been transferred to the wharf in the fall of 2014 in preparation for overwintering/spring harvest. The hole was found as the crews were pulling the net up to complete the harvest of that cage. At the time of discovery the hole was reported to DFO/DFA no fish were thought to have escaped. The Post Escape Report stated that no obvious cause could be

identified. The location of the hole was near the surface of the water and it was speculated that ice could cause of the damage although the company had never experienced ice damaged holes in the past. At the time of the hole being discovered there were no observations in the bay of possible farm origin trout. Combined with the large winter mortality it was reasonable to believe that the hold did not result in an escape when final harvest counts were completed. Once possible farm origin trout were observed the company was asked to provide an estimate of escape numbers. The grower has estimated the loss at 1000 fish. The grower has stated that, as preventative measures, they would continue to monitor moorings and equipment involved in containment, maintain bird netting and stands in place and ensure that the cage frames are not damaged which could lead to chaffing of the nets.

11.0. APPENDIX 8- NET TESTING COMPLIANCE

In 2015 there were 653 net inspections performed on salmonid aquaculture sites. Of these, 9 were not in compliance with the requirement to have each net tested every 18 months (Section A1.1 of Code of Containment).

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
July 23/2015	Net 1: 7 months	Sept 17/2015	2
	Net 2: 7 months		
	Net 3: 6 months		
	Net 4: 6 months		
	Net 5: 5 months		
	Net 6: 5 months		
	Net 7: 4 months		
December 17/2015	Net 1: 1 month	Last week of Feb 2016	2
	Net 2: 1 month		