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Aquaculture, Introductions and Transfers and Transgenics Focus Area Report

EU-UK (Northern Ireland)

Draft

Focus Area Report on Aquaculture, Introductions and Transfers and Transgenics

UK – Northern Ireland

December 2009

Each Party or Jurisdiction will prepare a Focus Area Report by December 31, 2009. The report should be broadly structured as follows:

1. Introduction:

To provide an overview of:

1.1. Activities within the Party or Jurisdiction related to aquaculture, introductions and transfers, and transgenics; and

Structure of the aquaculture sector in Northern Ireland

There are currently 81 fish farms (covering 95 sites) in Northern Ireland licensed by the Department of Agriculture and Rural Development (DARD). These include 48 marine farms licensed for the cultivation of shellfish, 33 licensed for the cultivation of finfish including brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) and one salmon (*Salmo salar*) farm with marine sites in Glenarm Bay and Red Bay. (See maps below for location.)

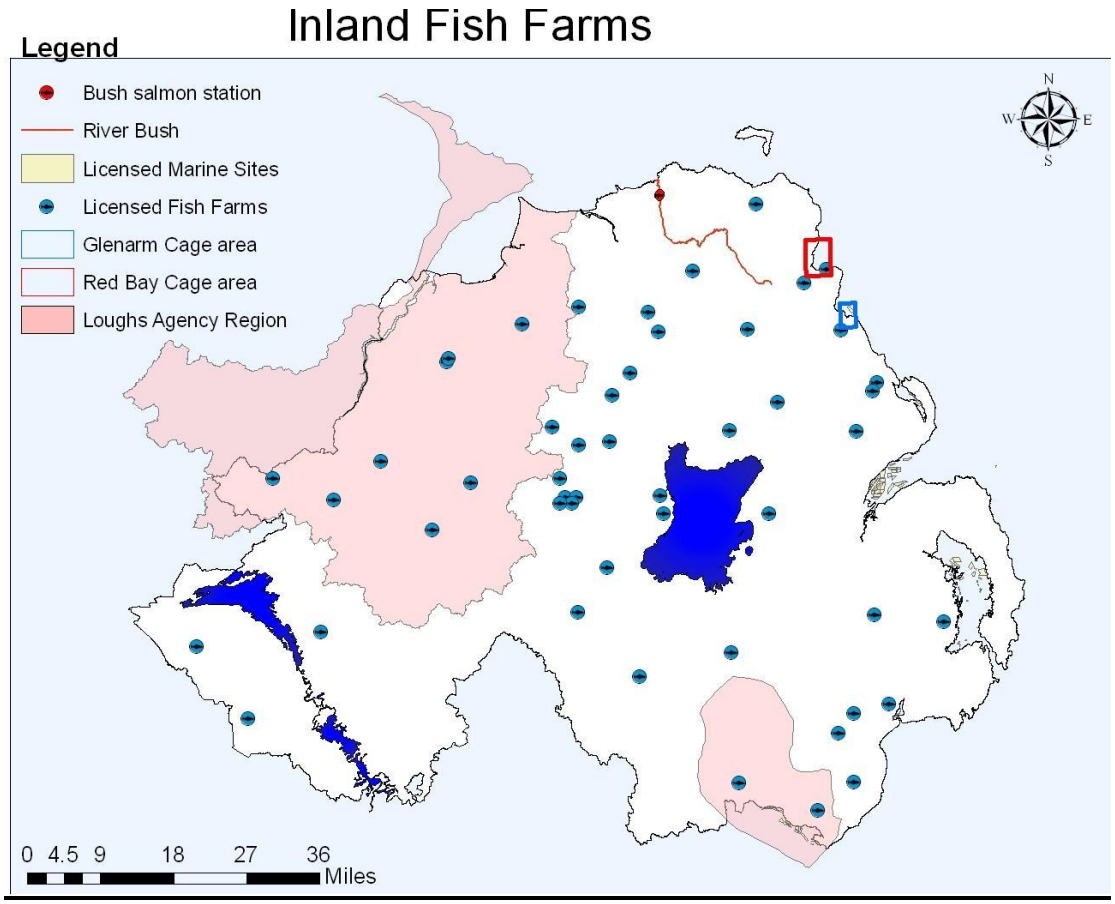
Statistical returns submitted by licensed operators indicate that in 2008 the total quantity of aquaculture products in Northern Ireland was 10,872 tonnes with a first hand sales value of £9.618m. This is broken down as follows:

Species	**Volume (tonnes)**	**Value (£m)**
Bottom grown mussels	9977	£7.349
Pacific Oysters	185	£0.526
Trout	531	£1.194
Salmon	138	£0.469
Other shellfish	41	£0.073
Other finfish	0.24	£0.007
Total	**10,872**	**£9.618m**

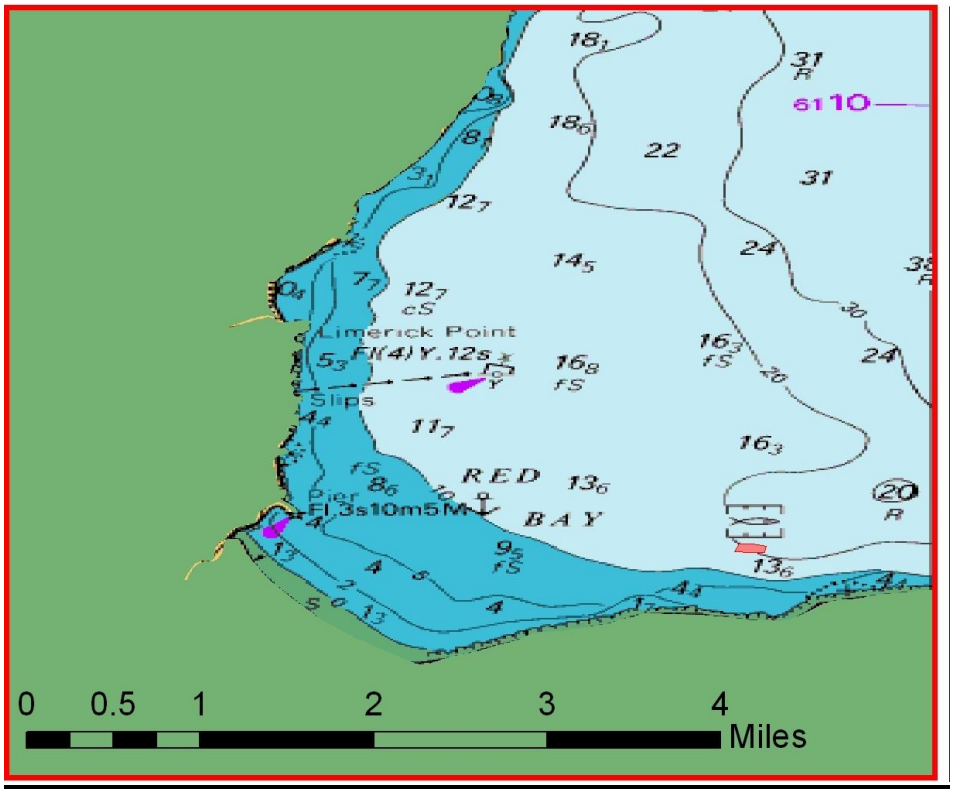
The aquaculture sector currently employs 91 full-time and 56 part-time employees of which 87 are employed in the shellfish sector and 60 are employed in the fin fish sector.

Transgenics

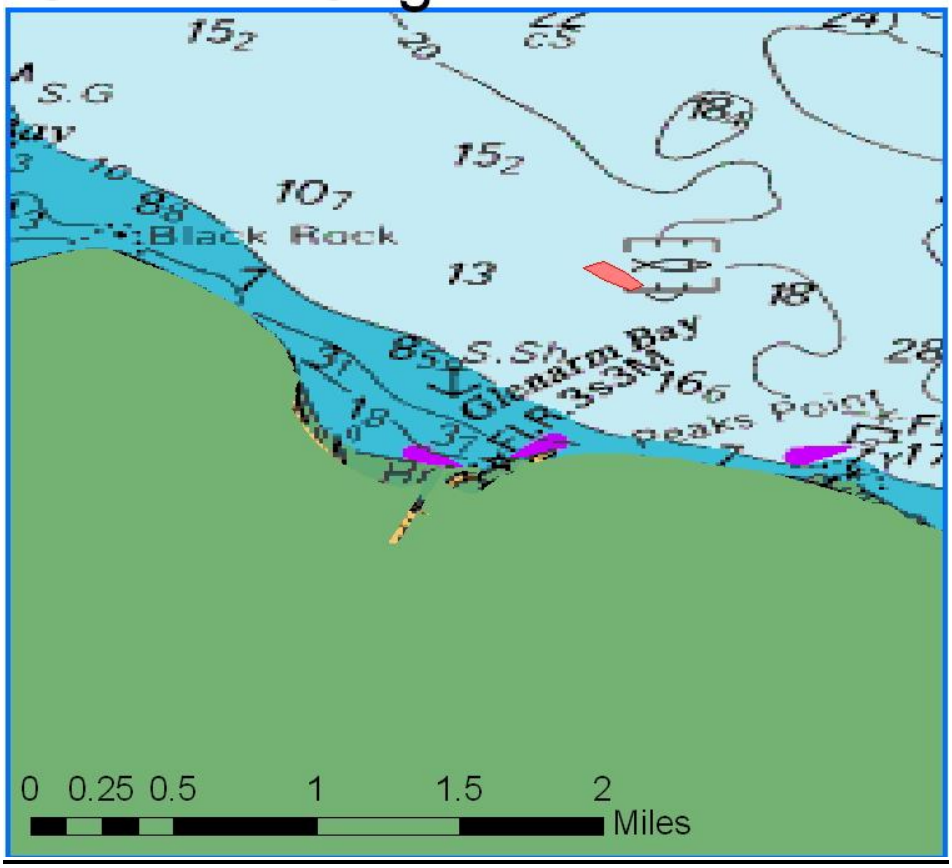
Given the NASCO definition of transgenic salmon ("salmon that contain genes from another organism") transgenics is taken to mean the taking of genes across species, and under this interpretation we can state that there is no transgenic activity carried out in Northern Ireland. Northern Ireland's only salmon farm is certified by the Organic Food Federation selling product at a premium, and has no aspiration to use transgenics.



Red Bay Cage Position



Glenarm Cage Position



1.2. Policy and management structure as it relates to aquaculture, introductions and transfers, and transgenics;

Management Structure

Department of Agriculture and Rural Development (DARD)

DARD's policy is to promote the sustainable development of aquaculture in Northern Ireland consistent with EU fisheries, environmental and aquatic animal health requirements. DARD is responsible for licensing aquaculture activity under the relevant legislation and for the authorisation of aquaculture production businesses under EU Fish Health legislation (see below).

Department of Culture, Arts and Leisure (DCAL)

DCAL is responsible for conservation and protection of salmon and inland fisheries, including authorising salmon stocking in the context of stock rebuilding programmes.

Loughs Agency/ FCILC

Legislation brought forward in 2007 conferred powers on the Foyle, Carlingford and Irish Lights Commission (FCILC) (a North/South Implementation Body formed under Agreements between the UK and Irish Governments) to develop and licence aquaculture in the Foyle and Carlingford Areas, and extended the FCILC's powers to protect the fisheries in areas such as conservation, protection, management, development and improvement of the wild fisheries and their habitats.

Legislation is targeted for introduction in early 2010 which will provide the FCILC with the necessary powers to licence aquaculture sites in the Foyle and Carlingford Areas. Responsibility for fish health will, however, remain with DARD. The Loughs Agency, an Agency which exercises the functions of the FCILC, is currently engaged in a Strategic Environmental Assessment (SEA) on the implementation of these new regulations. This will report in 2010 and will take into account ICES and NASCO advice.

Legislation

There are several pieces of legislation which regulate fish farming in Northern Ireland.

The Fisheries Act (Northern Ireland) 1966, as amended

It is an offence under section 11 of the above legislation to operate a fish farm in Northern Ireland other than under the authority of a fish culture licence granted by DARD and in accordance with any conditions attached to the licence.

Section 11(2) (a) of the 1966 Act enables DARD to include such conditions in a fish culture licence as it considers appropriate. The following are included as standard conditions for finfish farms, but these will be reviewed in light of the fish health authorisations granted under the Aquatic Animal Health Regulations (NI) 2009:-

(a) The Licence Holder shall notify DARD immediately of the appearance or suspected appearance of any of the following diseases: Infectious Salmon Anaemia (ISA), Infectious Hematopoietic Necrosis (IHN), Viral Haemorrhagic Septicaemia (VHS), Infectious Pancreatic Necrosis (IPN), Bacterial Kidney Disease (BKD), Proliferating Kidney Disease (PKD), Enteric Redmouth Disease (ERD), Furunculosis, Myxobolosis, Gyrodactylus salaris (GS) and Pancreas Disease (PD).

(b) The Licence Holder shall notify DARD of any other disease causing fish mortalities.

(c) In the event of disease appearing or being suspected among the fish, the Licence Holder shall comply with the directions of DARD as to the treatment and disposal of any or all stocks on the fish farm.

(d) The Licence Holder shall provide DARD with such samples of fish from the Fish Farm as DARD may require for the purpose of carrying out tests to establish whether any disease is present on the Fish Farm.

(e) The Licence Holder shall notify DARD within 48 hours of first becoming aware of the escapement of any fish from the Fish Farm giving the cause for escapement and shall keep a record at the Fish Farm of the estimated numbers, ages and size of fish which have escaped and shall comply with any remedial measures which DARD shall direct.

(f) Movements of fish within Northern Ireland also require a permit from DARD.

Under the provisions of Part IX of the Fisheries Act (Northern Ireland) 1966, as amended, the holder of a fish culture licence for a marine site may also apply for a marine fish fishery licence. A marine fish fishery licence is an optional licence which gives the fish culture licence holder the exclusive right to cultivate a particular species of marine fish within a specified area (and so take that marine fish from that area) and at the same time gives the licence holder recourse to criminal offences specified in the 1966 Act to protect his/her operations.

Movements of fish including aquaculture animals to the wild freshwater environment require an authorisation from the Department of Culture, Arts and Leisure (DCAL) under section 14 of the Act. This Section of the Act allows DARD or DCAL to authorise an action for the purpose of artificial propagation, for some scientific purpose, or the improvement of any fishery. DCAL has produced an advisory leaflet for those seeking such authorisations to undertake stock rebuilding programmes (Annexe 1).

The Aquatic Animal Health Regulations (Northern Ireland) 2009

Under the above Regulations, which implement Council Directive 2006/88/EC on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals, all fish farms/aquaculture production businesses (APB's) in Northern Ireland must be authorised for fish health purposes. All APB's will be subject to risk based surveillance and a sampling and testing regime in accordance with EU/OIE guidelines.

The Regulations make it an offence to introduce any aquaculture animal into Northern Ireland or to export any aquaculture animal unless accompanied by health certification as required for diseases listed in Council Directive 2006/88/EC and under the Regulations. These diseases include Viral Haemorrhagic Septicaemia (VHS), Infectious Hematopoietic Necrosis (IHN), Infectious Salmon Anaemia (ISA), Gyrodactylus salaris (GS) and Bacterial Kidney Disease (BKD). A full list of the diseases is attached at Annex A.

It is also an offence under the Regulations to fail to notify the competent authority, in this case DARD, of any increased mortalities or suspicion or outbreak of a listed disease.

Imports into Northern Ireland of any aquaculture animal that is a susceptible or vector species for diseases listed under Council Directive 2006/88/EC or the Regulations will only be accepted from within the EU or from a third country listed by the EU. Furthermore, all imports must be accompanied by a health certificate from the place of origin declaring the source to be disease free for the relevant disease and all consignments will be subject to inspection by the DARD Fish Health Inspectorate (FHI).

Exports from Northern Ireland to the EC or a listed third country also require health certification for species susceptible to or a vector for any of the diseases listed under the Directive or the Regulations.

Imports of ornamental aquatic animals from outside the EU may only come from EU listed countries and must also be accompanied by health certification for the listed diseases. Movements within the EU between 'closed' facilities do not require health certification for the diseases listed in the Directive 2006/88/EC. However, imports into Northern Ireland require certification in respect of SVC, BKD and GS. Northern Ireland was granted Additional Guarantee status by the EU for these diseases under Commission Decision 2004/453/EC and these diseases are now listed under the Aquatic Animal Health Regulations (Northern Ireland) 2009. Movements from a 'closed' ornamental facility to an 'open' ornamental facility, fish farm, put and take fishery or the wild would require permission from DARD and would require health certification in respect of the diseases listed under the Directive and the additional guarantees diseases listed in the Regulations.

Water (Northern Ireland) Order 1999

It is an offence under the above legislation to operate a fin fish farm in Northern Ireland that includes feeding and/or treating the fish with chemicals except in accordance with the terms and conditions of a discharge consent granted by the Northern Ireland Environment Agency

Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995, as amended

Under the above Regulations, which implement the Habitats Directive 92/43/EEC in Northern Ireland, DARD, as the competent authority in respect of licensing fish farms, is required to comply with a range of general and specific conservation obligations in order to protect habitats and species of Community interest.

One of the key obligations imposed by the Habitats Directive is the requirement to designate certain categories of natural sites as Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) (also referred to as Natura 2000 sites). Member States are then required to afford specific forms of legal protection to these sites including the control of activity that could threaten the conservation value of the protected site.

Article 6(3) of the Habitats Directive imposes an obligation on Member States to undertake a prior "appropriate assessment" when considering whether to grant consent for any plan or project not directly connected with or necessary to the management of a Natura 2000 site, but which is deemed likely to have a significant affect thereon, either individually or in combination with other plans or projects, for example a salmon farm. The assessment must consider the implications of the proposed plan or project for the Natura 2000 site, taking into account its conservation objectives. In light of the conclusions of the assessment on the implications for the site, and subject to the provisions of Article 6(4) of the Habitats Directive, the competent authority, which in the case of licensing fish farms is DARD, may only give consent to the plan or project if it has ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations 2007

Any application for a fish culture licence in respect of a marine fin fish farm in Northern Ireland will be subject to the provisions of above Regulations where:

(a) any part of the proposed development is an a sensitive area as defined in regulation 2(1) of the Regulations; or

(b) the proposed development is designated to hold a biomass of 100 tonnes or greater; or

(c) the proposed development will extend to 0.1 hectare or more of the surface area.

Use of alien and locally absent species in aquaculture

Council Regulation (EC) No 708/2007, which came into force on 18 July 2007, establishes a framework to ensure adequate protection of aquatic habitats from the risk associated with the use of non-native species in aquaculture. This framework includes procedures for the analysis of potential risks, the taking of measures based on the prevention and precautionary principles and the adoption of contingency plans where necessary. DARD is currently bringing forward legislation to implement the requirements of Regulation 708/2007.

Record keeping and traceability

DARD operates an electronic database that records details of all APBs including fish culture licence and authorisation details and fish movements into and out of the facility including place of origin or destination. This information allows the Department to act quickly and effectively in response to any suspicion of a disease outbreak.

2. Implementation of the Williamsburg Resolution:

To provide an assessment of progress made and/or planned to address the following articles in the Williamsburg Resolution:

2.1. The Parties shall cooperate in order to minimize adverse effects to the wild salmon stocks from aquaculture, introductions and transfers and transgenics.

Health and Sea lice management

Northern Ireland's only marine salmon farm employs a specialised veterinarian to carry out health checks on stock at its Glenarm and Red Bay sites every 4-6 weeks. DARD is informed of any significant findings.
The veterinarian collects monthly samples of fish from all cages which are inspected for the presence of sea lice and of any diseases such as IHN, ISA, BKD and GS. To date, due to the hydrodynamics of the sites, sea lice have not been present in significant numbers. Further sampling is undertaken by DARD at 18 month intervals with samples examined by a specialist independent Fish Health Unit of the Agri-Food and Biosciences Institute in accordance with the OIE manual.

There is also an independent monitoring programme by the Agri-Food and Biosciences Institute for salmon louse (*Lepeophtheirus salmonis*). In over a decade of monitoring the incidence of salmon louse has been exceptionally low. There has been some evidence of transient *Cagilus elongates* settlements due to herring and mackerel shoals in Red Bay and Glenarm

Bay, but this has not led to clinical disease. There has been no necessity for treatment for lice on either site in the past 20 years, as the sites have strong currents with consequent strong flushing of the cages. Fulfilment of the requirement for organic status prohibits the use of chemicals.

Retention of Farmed fish in production facilities

The Company employs a diving company to check the structure and integrity of the site on a monthly basis. This consists of dives taking place within the cages, netting is checked thoroughly for any weakness, rips and tears so as to keep chances of escapes to a minimum. The anchorage of cables to the seabed is also checked routinely so cages are kept within the parameters of the site. In addition DARD operate an inspection programme at the cage sites to ensure retention of farmed fish. Cages, rigging and anchoring grid are all inspected by the Department staff by Remotely Operated Video (ROV) looking for signs of wear within the structure of the cage netting and in supporting structures. Any defects would be recorded and reported to the company who are required to make a repair which is then subject to follow-up inspection.

2.2. Each Party should require the proponent of an activity covered by the Williamsburg Resolution to provide all information necessary to demonstrate that the proposed activity will not have a significant adverse impact on wild salmon stocks or lead to irreversible change.

Northern Ireland's only marine salmon farm has sites in Glenarm Bay and Red Bay off the Co Antrim coast. Each site has an individual fish culture licence granted by DARD which includes conditions setting limits on cage numbers, biomass and feeding together with a requirement to notify DARD of any escapees. The Company has a Contingency Plan in place to ensure a rapid and effective response to escapes. The licences also include a condition requiring prior approval from the Department for all movements of fish into or from the farms.

Both sites are also authorised under the Aquatic Animal Health Regulations (Northern Ireland) 2009 and must comply with conditions specified in these authorisations including the immediate notification of a suspected disease outbreak. DARD has measures and contingency plans in place to enable it to react quickly to any suspected disease outbreak. The cage and structure inspection programme is currently being reviewed to assess its effectiveness with the introduction of the animal health directive. This consists of frequent underwater surveys using the departments R O V. This survey looked for signs of wear within the structure of the cage netting and in the supporting grid structure, linkages and anchor systems. If anything is apparent. This is recorded and a request made to rectify the problem immediately.

The sites also have bio-security plans in place which have been assessed by DARD, to ensure the sites can comply with the regulations

2.3. The Parties should develop and apply appropriate risk assessment methodologies in considering the measures to be taken in accordance with the Williamsburg Resolution.

There is currently only one marine salmon farm in Northern Ireland with licensed sites in Glenarm Bay and Red Bay. Given the limited availability of suitable sites around the Northern Ireland coastline it is unlikely there will be any further licence applications submitted to develop such sites.

Any applications received however would be processed in accordance with the legislative requirements specified at paragraph 1.2 above. This involves assessment of environmental risk, and statutory consultation which (through consultation with DCAL) would identify any risk to nearby salmonid habitat and/or designated riverine habitat for salmon. This process was followed prior to the grant of licences to the existing farm

2.4. Each Party shall take measures in accordance with Annexes 2, 3 and 4 of the Williamsburg Resolution to:

2.4.1 minimize escapes of farmed salmon to a level that is as close as practicable to zero through the development and implementation of action plans as envisaged under the Guidelines on Containment of Farm Salmon (Annex 3 of the Williamsburg Resolution - CNL(01)53);

The Department and the salmon farm have adopted procedures in line with **CNL(01)53 Guidelines on Containment of Farm Salmon:**

Site Selection.

The sites selected were subject to hydrodynamic study and equipment deployed is designed to withstand environmental conditions at both sites The site is marked in accordance with advice from the Maritime and Coastguard Agency and depicted on Admiralty charts.

Equipment and Structures

All equipment deployed at the salmon farm is specifically designed for that use, cages for example have been upgraded to Fusion 70 metre (circumference) which, together with the mooring grids are designed to meet the conditions of this site. A maximum of 10 cages are used per site (usually fewer) attached by ropes, plates and chain to a mooring grid of anchors in standard industry practice. All materials are industry standard. Each net and cage has an identification number and the company compiles specific maintenance records for each structure detailing repairs and net changes etc and these are examined by DARD staff during routine monthly inspections, as well as a physical inspection of the structures by ROV.

The Salmon farm has consent for a hatchery on an adjacent water course. Conditions attached to this consent ensure there is adequate biosecurity by

way of grates and screens on the outflows above and below the settlement tank, and water entering the facility passes securely through screens of small dimensions and a drum filter. The hatchery is not in current use due to economic factors, and is unlikely to be used in future years, but is subject to regular inspection by DARD Inspectors and would be so inspected if it became operational in future.

There is effective predator deterrence at the marine sites and anti-bird netting is used on all cages. There is no significant predation from seals. There are also contingency arrangements for jellyfish which have at times been present in sufficient numbers in the past to destroy the stock through anoxia. These arrangements use screens and aeration equipment.

Management System Operations

The company ensures staff are properly trained and maintains training records.
Containment measures are adopted during stocking, counting, grading, transport and harvesting of fish, net changes and cleaning. The company does not use a fish pump during these operations.

There is regular preventative maintenance including cleaning of cages by pressure washer on site and inspection by diver. In addition, DARD carry out regular inspections of the cages and structures by ROV. The company uses two specialist companies to mend nets as necessary, which includes stress testing, and keeps records of such maintenance to each cage/net. Cages are deployed on site by towing, but to avoid damage to nets, these are attached to the collar on site, no cages are towed with the nets assembled or containing fish.

Verification

Company records exist for each cage detailing all handling of fish including introductions, grading, transfers etc, and the operator is required to inform the authorities immediately in the event of an escape. Under such circumstances a contingency plan exists to permit the company to deploy drift nets in the immediate vicinity under supervision of DARD and any farmed salmon would be removed from adjacent freshwater systems by electrofishing.

The Company’s two sites at Glenarm Bay and Red Bay are operated independently and stock is not moved between sites.

The principles of the guidelines on containment of farm salmon are emplaced by both existing regulations and the licence issued by DARD and compliance is determined by inspection. The Department is able to add or modify conditions attached to the licence and to revoke the licence if necessary.

The company are required to report losses and their causes by condition attached to the licence, see 1.2.

Both sites have individual discharge consents granted by Water Management Unit of the Northern Ireland Environment Agency under the provisions of the Water (Northern Ireland) Order 1999. There has been no notification of failure to comply with the discharge consents since the farms were established.

2.4.2 minimize impacts of ranched salmon by utilizing local stocks and developing and applying appropriate release and harvest strategies;

There is no commercial ranching of salmon in Northern Ireland, there are experimental ranched salmon currently produced in Northern Ireland which originate from the River Bush research project. A ranched strain, originally developed from the wild R. Bush stock in the 1970's, provides annual data on marine survival rates of discrete smolt age groups and, via CWT tagging, on levels and patterns of exploitation at sea. Returns are fairly limited with a 10 year mean (1999-2008) of around 800 fish per annum. Returning ranched fish are all removed at the adult trap at the River Bush Salmon Station.
Elsewhere, parties undertaking stock rebuilding programmes are restricted to stocking with salmon sourced from the river to be stocked except where the salmon population has been extirpated.

2.4.3 minimize the adverse genetic and other biological interactions from salmon enhancement activities, including introductions and transfers; and

The Loughs Agency has undertaken extensive genetic sampling on the wild Atlantic salmon in the Foyle catchment since 1999 and has identified a number of differing populations. This work currently informs management decisions and use of hatchery produced fish is only authorised in incidents where a local wild genetically suitable population is available. Similarly, genetic sampling is underway also within the DCAL jurisdiction which shall refine the further development of protocols and guidelines for stock rebuilding programmes. DCAL distribute an advisory leaflet for organisations intending to undertake stock rebuilding programmes, and this is available to NASCO on request.

2.4.4 minimize the risk of disease and parasite transmission between all aquaculture activities, introductions and transfers, and wild salmon stocks.

<u>Lice load management</u>

The 2 salmon sites are approximately ten miles apart and are operated independently and stocked and harvested on an alternate basis. Each of these sites is monitored for lice loads but due to the high energy environment there have been only low levels of lice detected and no

management or treatment has been necessary to reduce lice loads. The company have also recently put in place a "dead basket" regime so any mortality can now be disposed of quickly by employees and not having to wait on the dive team. This involved the fitting of baskets to the base of the net which collect any dead fish so they can be disposed of as soon as any mortalities' are identified

Single year class

Each site is stocked with a single year class alternately so harvesting and stocking are happening at different sites each year. This process allows a 6-week fallowing of each site between final harvesting and restocking with another year class of smolts.

Lice levels and lice Resistance to treatment

No lice treatment is used as levels are low (see 2.11)

Regulated fish health programme

Imports into Northern Ireland of Atlantic salmon require health certification in respect of IHN, GS and BKD. All imports must be accompanied by a health certificate from the place of origin declaring the source to be disease free for the relevant disease and all consignments are inspected by the Fish Health Inspectorate.

Exports from Northern Ireland to the EU or a listed third country also require health certification by DARD following inspection of the consignment. Movements for further processing before human consumption also require health certification and there is a regular inspectorate presence (at least twice a month) for that purpose during harvesting.

Stock is monitored by the Company vet every 4-6 weeks and NIEA survey the sites approximately every 3-4 months to ensure compliance with the water discharge consent. The farms are subject to an annual sampling and testing regime by the Agri-Food and Biosciences Institute in respect of the listed diseases and will be subject to risk-based surveillance under the Aquatic Animal Health Regulations (NI) 2009. Testing is carried out by the Fish Diseases Unit of the Agri-food and Biosciences Institute in accordance with EU guidelines and the OIE Manual.

2.5 Movements into a Commission area of reproductively viable Atlantic salmon or their gametes that have originated from outside that Commission area should not be permitted.

DARD maintains electronic records of fish movements going back to April 2006. Movements to and from the salmon farms must be notified in advance to DARD and are set out below (does not include movements between sites or movements for human consumption). The salmon farm

sources mainly from the Republic of Ireland and the UK. They do not import from other EC or 3rd countries. DARD would not permit imports from outside the North East Atlantic Commission area.

Movements of Atlantic salmon onto and off sites 2006 – Nov 2009

	2006	**2007**	**2008**	**2009**
Movements onto sites	1 (UK)	2 (ROI) 1 (UK)	1 (UK)	6 (all from ROI)
Movements off site				17 (all to ROI)

2.6 Introductions into a Commission area of reproductively viable non-indigenous anadromous salmonids or their gametes should not be permitted.

Such introductions are prohibited under the Prohibition of Introduction of Fish Order (NI) 1979.

2.7 No non-indigenous fish should be introduced into a river containing Atlantic salmon without a thorough evaluation of the potential adverse impacts on the Atlantic salmon population(s) which indicates that there is no unacceptable risk of adverse ecological interactions.

Such introductions are prohibited under The Prohibition of Introduction of Fish Order (NI) 1979

2.8 The Parties should apply the Guidelines for Action on Transgenic Salmon (Annex 5 of the Williamsburg Resolution – CNL (04)41), to protect against potential impacts from transgenic salmon on wild stocks.

There is no transgenic activity being carried out in Northern Ireland, and there has not been any expression of interest in this area.

2.9 Parties should, as appropriate, develop and apply river classification and zoning systems in accordance with Annex 6 of the Williamsburg Resolution for the purposes of developing management measures concerning aquaculture, and introductions and transfers.

All Northern Ireland's 27 Salmon rivers are designated as 'salmonid' under the EU Freshwater Fish Directive (2006/44/EC) and authorisation processes reflect this designation and would restrict activities likely to have an impact on their native salmon populations.

2.10 The Parties should initiate corrective measures without delay where significant adverse impacts on wild salmon stocks are identified.

A population genetic study into the genetic impacts of a documented escape of salmon from the salmon cages in Glenarm Bay was carried out in the adjacent Glenarm River by Crozier (1993). Comparison of gene frequencies at a number of polymorphic allozyme loci in the wild stock before and after the known escape event demonstrated that escaped farmed salmon had undergone interbreeding with the wild population, resulting in a change in gene frequencies at some of the genes examined. While the impact of these changes on the wild salmon stock in the Glenarm River was not evaluated in the study, the author concluded that interbreeding between escaped farmed salmon and wild salmon should be avoided where possible. A follow-up study carried out several years later (Crozier, 2000), indicated that some of the genetic changes observed in 1993 had persisted in the wild population, suggesting that hybrid progeny between the wild stock and the original escaped salmon had reproduced successfully.

This information was used to inform development of the procedures outlined in Section 2.2.

2.11 Each Party should encourage research and data collection (as detailed in Annex 7 of the Williamsburg Resolution) in support of the Williamsburg Resolution and should take steps to improve the effectiveness of the Williamsburg Resolution.

Sea Lice Sampling on Atlantic Salmon in UK (N. Ireland).

A sampling programme was initiated in 1998 to determine the sea lice (*Lepeophtheirus salmonis*) burden on commercially captured Atlantic salmon in the FCB area of UK (N. Ireland). Freshly landed salmon were examined and the number of lice evident on each carcass was recorded. The results from the time series are outlined in Table 1. An average of around 5-6 sea lice per salmon was observed over the 10 year period, with a range of between 0-20 lice per fish recorded across the time series. These counts should be regarded as minimum estimates, as some lice may have been dislodged between capture and sampling at the point of landing.

Table 1. Sea lice counts for commercially caught salmon in UK (N. Ireland).

Year	Number of salmon sampled	Mean number of sea lice fish-1 (S.D.)	Number sea lice fish -1 (range)
1998	12	3.9 (3.9)	0-11
1999	0	n/a	n/a
2000	0	n/a	n/a
2001	42	5.2 (2.8)	0-11
2002	24	5.8 (2.3)	2-10
2003	26	4.5 (3.0)	0-10
2004	11	5.9 (2.5)	3-10
2005	33	5.6 (2.8)	0-11
2006	24	6.5 (4.0)	1-20
2007	45	6.9 (2.6)	2-11

Lice Treatment Efficacy

There is no lice treatment.

Containment Breaches

June 1991, a structural failure of a cage caused an escape of approximately 200 2kg+ fish. August 2001, a structural failure to one cage during storms caused a large escape. The company reported a loss of approximately 1,000 2kg+ fish.
A subsequent technical failure in October 2003 resulted in a further escape of approximately 100 2+kg fish and DARD intervened to remove all the remaining fish in the structure which were likely to escape from a broken cage.

Escapes Monitoring Programme

Summary information from Northern Ireland's escapes monitoring programme (carried out by the Agri-Food and Bio-sciences Institute (AFBI) is reproduced below.

Farm origin salmon in UK (N. Ireland)

The numbers of farm origin salmon are routinely examined in UK (N. Ireland) through both coastal and freshwater monitoring programmes. In freshwater escaped salmon are monitored at the adult salmon trap on the River Bush at the River Bush Salmon Station. Escapees are identified through visual inspection of a series of morphological characteristics typical of farm origin fish including; finray defects, gill cover shortening and heavy

pigmentation. Data has also been collected from commercial fishermen on presumed escaped farmed salmon in the UK (N. Ireland) coastal fishery.

Coastal Farm Origin Salmon

The number of farmed salmon detected in coastal fisheries in UK (N. Ireland) has varied from around 16 fish (0.14% of total catch) in 1997 to 872 salmon (9.1% of total catch) in 2001 (Fig. 1). A long term average of around 311 fish (6.8% of total catch) has been apparent across the time series from 1992-2007. The UK (N. Ireland) coastal fishery has been reduced in recent years due to a series of buyouts of coastal commercial licence holders in the two fishery jurisdictions (Fisheries Conservancy Board[1] and Loughs Agency). In 2001/02 a buyout was initiated in the FCB area and in 2007 a second buyout was undertaken in the Loughs Agency area.

In recent years the relative percentage of escapees recorded within the commercial coastal catch has increased with a five year average of 390 fish (13.9% of total catch) apparent between 2003-07. In 2007 (407 fish out of 2,695 fish examined; 15.1%) the number of escapees was higher than 2006 (11.6%). The fixed netting stations on the North east coast (FCB area) recorded the majority of the escapees. These nets are closest to the major salmon aquaculture sites in Northern Ireland. It is also noted that due to the few remaining nets in FCB area being in vicinity of the single salmon farm in NI, the records of escapees will be skewed upwards, compared to data pre buyout.

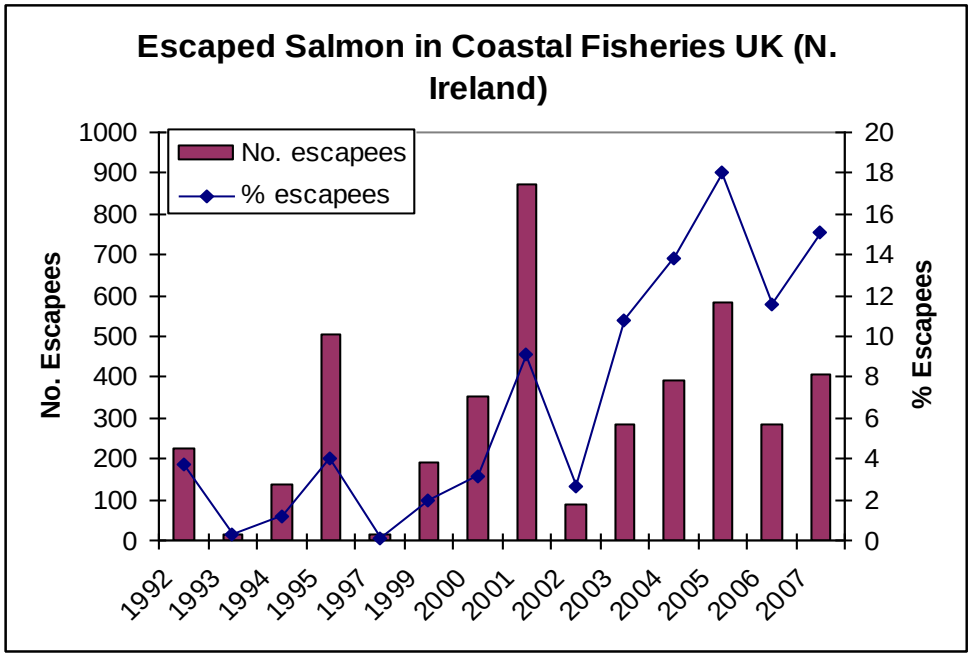


Figure 1 Number and relative contribution of escaped salmon in coastal fisheries in UK (N. Ireland).

[1] Now Dept Culture, Arts and Leisure (DCAL)

Freshwater Farm Origin Salmon

The number of farmed salmon detected in the River Bush, UK (N. Ireland), has varied from 54 fish (2.61% of total wild run) in 1994 to 0 salmon in 2005, 2007 and 2008 (Fig. 2). A long term average of around 8 fish (0.4% of total wild run) has been apparent across the time series from 1991-2008. The overall trend has been downward across the time series with no farm origin salmon identified at the trap in 3 years out of the most recent 5 year period (2004-08).

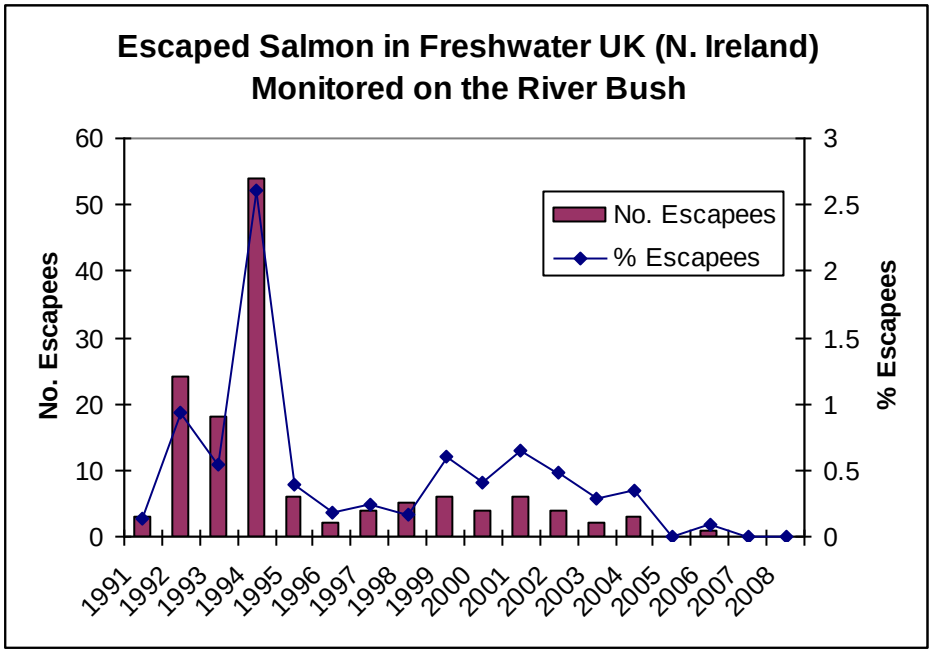


Figure 2 Number and relative contribution (to the total wild run) of escaped salmon detected at the River Bush adult trap 1991-2008, UK (N. Ireland).

2.12 Educational materials should be developed and distributed to increase awareness of the risks that introductions and transfers of aquatic species may pose to wild salmon stocks and the need for measures to control these activities.

Northern Ireland's Environment Agency has distributed material relating to the risks of introduction of Zebra Mussels, see: http://www.ni-environment.gov.uk/zebramusselleaflet09.pdf.and DARD has distributed a contingency plan for dealing with outbreaks of *Gyrodactylus Salaris* in Northern Irelands.

References cited:

Crozier, W.W. (1993). Electrophoretic evidence of genetic interaction between escaped farmed salmon and wild Atlantic salmon (*Salmo salar* L.) in a Northern Irish river. *Aquaculture*, 113:19-29.

Crozier, W.W. (2000). Escaped farmed salmon, *Salmo salar* L., in the Glenarm River, Northern Ireland: genetic status of the wild population 7 years on. *Fisheries Management and Ecology*, 7:437-446.

LISTED DISEASES ANNEX A

Listed diseases in Part II, Annex IV of Council Directive 2006/88/EC		
NON-EXOTIC DISEASES		
	DISEASES	**SUSCEPTIBLE SPECIES**
FISH	Viral haemorrhagic septicaemia (VHS)	Herring (*Clupea* spp.), whitefish *Coregonussp*.), pike (*Esox lucius*), haddock (*Gadusaeglefinu*s), Pacific cod (*G. macrocephalus*), Atlantic cod (*G. morhua*), Pacific salmon (*Oncorhynchus spp*.) rainbow trout (*O.mykiss*), rockling (*Onos mustelus*), brown trout (*Salmo trutta*), turbot (*Scophthalmus maximus*), sprat (*Sprattussprattus*) and grayling (*Thymallus thymallus*)
	Infectious haematopoietic necrosis (IHN)	Chum salmon (*Oncorhynchus keta*), coho salmon (*O. kisutch*), Masou salmon (O. *masou*), rainbow or steelhead trout (*O. mykiss*), sockeye salmon (*O. ne*rka), pink salmon (*O. rhodurus*) chinook salmon (O.*tshawytscha*), and Atlantic salmon (*Salmo salar*)
	Koi herpes virus (KHV) disease	Common carp and koi carp (*Cyprinus carpio*)
	Infectious salmon anaemia (ISA)	Rainbow trout (*Oncorhynchus mykiss*), Atlantic salmon (*Salmo salar*), and brown and sea trout (*S. trutta*)
MOLLUSCS	Infection with *Marteilia refringens*	Australian mud oyster (*Ostrea angasi*), Chilean flat oyster (*O. chilensis*), European flat oyster (O. edulis), Argentinian oyster (*O. puelchana*), blue mussel (*Mytilus edulis*) and Mediterranean mussel (*M. galloprovincialis*)
	Infection with *Bonamia ostreae*	Australian mud oyster (*Ostrea angasi*), Chilean flat oyster (*O. chilensis*), Olympia flat oyster (*O. conchaphila*), Asiatic oyster (O. *denselammellosa*), European flat oyster (*O. edulis*), and Argentinian oyster (*O. puelchana*)
CRUSTACEANS	White spot disease	All decapod crustaceans (*order Decapoda*)

Aquatic Animal Health Regulations (NI) 2009 - SCHEDULE 1 ***List of diseases which are not listed in Directive 2006/88***	
Disease	*Susceptible species*
Infection with *Gyrodactylus salaris*	Atlantic salmon (*Salmo salar*), rainbow trout (*Oncorhynchus mykiss*), Arctic char (*Salvelinus alpinus*), North American brook trout (*S.fontinalis*), grayling (*Thymallus thymallus*), North American lake trout (*Salvelinus namaycush*), and brown trout (*Salmo trutta*). Other species of fish on sites where any of the above species are present shall also be considered as susceptible species.
Bacterial kidney disease	Fish belonging to the family *Salmonidae.*
Spring viraemia of carp	Bighead carp (*Aristichthys nobilis*), goldfish (*Carassius auratus*), crucian carp (*C.carassius*), grass carp (*Ctenopharyngodon idellus*), common carp and koi carp (*Cyprinus carpio*), silver carp (*Hypophthalmichthys molitrix*), sheatfish (*Silurus glanis*) and tench (*Tinca tinca*).