



Agenda item 6.2
For information

Council

CNL(16)50

Progress and challenges in achieving NASCO's international goals

(Tabled by EU (Ireland))

CNL(16)50

Progress and challenges in achieving NASCO's international goals (Tabled by EU (Ireland))

Dr Michael Millane, Dr Paddy Gargan & Dr Cathal Gallagher
Inland Fisheries Ireland,

Scope

This paper accompanies the presentation *Progress and challenges in achieving NASCO's international goals, EU (Ireland)* at the NASCO theme-based special session *Addressing impacts of salmon farming on wild Atlantic salmon: Challenges to, and developments supports, achievement of NASCO's international goals* held on the 08th of June 2016 in Bad Neuenahr-Ahrweiler, Germany. The presentation was given by Dr Cathal Gallagher, EU (Ireland).

Background

NASCO has adopted agreements and guidelines designed to minimise impacts on the wild salmon stocks. These include the *Williamsburg Resolution* adopted in 2003 (*Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Aquaculture, Introductions and Transfers, and Transgenics on the Wild Salmon Stocks, CNL(06)48*) as well as *Guidance on Best Management Practices to Address Impacts of Sea lice and Escaped Farmed Salmon on Wild Salmon Stocks, SLG(09)5* adopted in 2009. The international goals under this guidance are:

- 100% of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms; and
- 100% farmed fish to be retained in all production facilities.

In 2015, the production of farmed salmon was estimated at 13,116 tonnes in Ireland (Millane *et al.* 2016). There are twenty active salmon farms in operation in the country, primarily focused on the production of one sea-winter stock. 60% of production is located along the south-west and north-west of Ireland in in-shore and estuarine waters. Salmon farming accounts for 64% of total aquaculture production in Ireland and is valued at €95 million euro per annum to the Irish economy, with the export component of this valued in the region of €50 million per annum (Anon. 2016).

Aquaculture licensing in Ireland primarily falls under the *Fisheries (Amendment) Act 1997*. **The Department of Agriculture, Food & the Marine (DAFM)** is the sole regulatory authority for aquaculture in the country and the licensing process is administered through the Aquaculture and Foreshore Management Division. The Minister for Agriculture, Food & the Marine has ultimate responsibility to decide on applications made to the Division and statutory consultees have the right make submissions of any licence applications made.

Strict licensing conditions are set out for the operation of salmon aquaculture facilities.

Relevant conditions include:

- that operations are conducted in compliance with international guidelines on containment (as developed by the North Atlantic Salmon Farming Industry & NASCO Liaison Group);
- that equipment must be fit for purpose;
- there is a fallowing requirement before any re-stocking takes place;
- DAFM must be notified within 24 hours of any disease or any abnormal loss or mortalities that occur;
- DAFM, Inland Fisheries Ireland (IFI) and the Marine Institute (MI) must be notified within 24 hours of any escapes that occur and licensees must keep a record of the numbers of fish that have escaped; and
- Equipment (e.g. containment cages) must be fit for purpose and in good working condition.

Progress towards goals and verifying compliance for containment: monitoring of escapes in Ireland

In the period 1980 to 2006, salmon catches have been routinely examined for the presence of escaped salmon primarily in the commercial drift net catch in the summer season as well as from fish dealers' premises and to a lesser extent recreational landings. Since 2007 with the cessation of the drift net fisheries, scanning for farmed salmon escapees has mainly been conducted from estuary and river system catches, notably through trapping facilities located in the lower reaches of river systems used for run counts and broodstock collections.

In addition, the National Coded Wire Tagging and Tag Recovery Programme has facilitated the scanning of large numbers of salmon returning to Irish freshwaters from the marine environment (Millane *et al.* 2016). To ensure that salmon farms have adequate containment facilities in place to minimise the risk of escape, DAFM engineers periodically undertake on-site inspections of installations such as sea cages for structural compliance and correct positioning as specified in their licence.

The identification of escaped salmon is primarily based on morphological variation of external features such as fin, operculum (gill cover), nose morphology or scale analysis which may distinguish these fish from their wild salmon counterparts.

The rate of farmed salmon escapees detected in the wild through monitoring has consistently been reported as under 0.5% of the total specimens examined (Millane *et al.* 2016). However, it is important to note that monitoring has been largely restricted to the catch season with little such monitoring occurring outside of this, particularly over the winter period.

In Ireland, official statistics indicate that approximately 415,000 salmon were reported to have escaped from salmon farms in coastal waters in the period 1996-2004. Since 2009, six escape events have been reported with the largest numbers of reports of fish escaping in conjunction with storm damage events (35,000 in 2009; 83,000 in 2010 and 230,000 in 2014). As regards the reported escape in 2014, a report on the event is being finalised by DAFM who have advised that "it is not possible, at this time, to exclude the possibility that fish escaped nor is it possible to quantify the potential number of mortalities versus escapees".

Other relatively, more moderate escape events have primarily been in association with damaged nets (e.g. in one case as a result of a service boat inadvertently breaching a containment net in a sea-cage). Such incidences have resulted in the escape of 1,000 and 25,000 in 2010 and 3,500 fish in 2016.

Progress towards goals: National Sea Lice Monitoring Programme

The National Sea Lice Monitoring Programme aims to provide an objective measurement of sea lice infestation (*Lepeophtheirus salmonis* Krøyer and *Caligus elongates* Nordmann) and inform management approaches to mitigate for this. There are five components of this strategy as follows:

- separation of generations;
- annual fallowing of site;
- early harvest of two sea-winter fish;
- targeted treatment regimes, including synchronous treatment in bays with more than one installation; and
- agreed husbandry practices.

Separation of generations and annual fallowing aim to prevent the vertical transmission of infestations from one generation to the next, thus retarding the development of lice infestations.

The early harvest of two sea-winter salmon aims to remove a potential reservoir of sea lice infestation. Agreed husbandry practices and targeted treatments aim to enhance the efficacy of treatment regimes. In addition, targeted treatments in the autumn to winter period are intended to reduce sea lice burdens on over-wintering fish to minimise infestation in the following period.

All licensees must adhere to Monitoring Protocols on Sea Lice Monitoring and Control as a licence condition and establish an Integrated Pest Management (IPM) Plan. The latter must contain:

- a fish stocking and lice management plan in consultation with any other farms in a bay;
- a sea lice sampling and monitoring plan during the periods of high infestation;
- measures to minimise use of medicinal/ chemical treatments;
- types of treatment used & their administration to ensure effective clearance of lice; and
- product rotation to minimise the risk of resistance in lice populations to active ingredients.

Verifying compliance: Inspection regime for sea lice

All salmon farms are obliged to monitor for sea lice on an ongoing basis and to take remedial action where necessary (*Monitoring Protocol No. 3 for Offshore Finfish Farms -Sea Lice Monitoring and Control 2000*). The Marine Institute (An Agency under DAFM) manages the inspection regime with monitoring undertaken 14 times per year. This is conducted twice per

month during March, April and May to coincide with the ‘critical period’ of infestation risk for wild salmon smolts as they migrate from Irish river systems out to sea. Throughout the rest of the year, sea lice monitoring is conducted on a monthly basis with the exception of a single monitoring in the December / January period.

During the critical period in spring, treatment trigger levels (TTLs) *i.e.* where remedial action must be taken to reduce lice levels, are set close to zero (0.3 to 0.5 egg-bearing females per fish) but may also be informed by numbers of mobile lice on fish. During other periods of the year TTLs are set at 2.0 egg-bearing lice per fish. Lower TTL thresholds can also be specified for individual licences where there is considered to be a heightened risk of infestation to wild salmon.

Verifying compliance: Results of lice monitoring in 2015 and long-term trends

In 2015, 212 inspections were conducted by the Marine Institute in the 20 active coastal / estuarine salmon farms in operation in Ireland. Overall results indicated that 86% of inspections were below TTLs. This was broken down by 97% compliance for smolts and 78% for 1 sea–winter fish. The highest TTLs non-compliance (36-39%) occurred in salmon farms location in the west of Ireland (O’Donohoe *et al.* 2016).

Since TTLs were set in 2000, mean TTLs for ovigerous (egg-bearing) females in the critical period in May have exceeded the threshold for remedial actions in all years except for the year 2001, the period 2011-2013 and the year 2015 (O’Donohoe *et al.* 2016).

Identify particular challenges in achieving NASCO’s international goals for sea lice

The following issues have been identified as particular challenges in achieving NASCO’s international goals for sea lice:

- farm sites located too close to salmonid rivers;
- mixed year class production (smolt & grower fish reared in close proximity);
- rearing two sea winter fish with difficulty of controlling lice;
- lack of sea lice control due to protracted harvesting;
- lack of synchronised sea lice treatments between sites;
- incomplete separation of generations and insufficient fallowing; and
- fallowing not aligned with wild smolt runs

Methods to support innovation to develop alternative production techniques to promote sustainable farming

The following methods are proposed to support innovation to develop alternative production techniques to promote sustainable salmon farming:

- use of single generation sites, often in separate bays;
- fallowing before re-stocking (4-6 weeks);
- whole bay spring fallowing;
- harvesting carried out remote from the grower sites;

- annual synchronous "winter" lice treatment for all adjacent sites;
- when a problem is persistent with sea lice control, an incremental series of actions occurs; Management Cell Approach (MCA); and
- part of MCA may be - compulsory harvesting in March where lice are not controlled, not carried out consistently.

Acknowledgements

Inland Fisheries Ireland

Marine Institute

Department of Communications, Energy and Natural Resources

Department of Agriculture, Food and the Marine

References

Anon. (2016). BIM Annual aquaculture survey 2016. Bord Iascaigh Mhara, 14 pp.

Millane, M., Ó Maoiléidigh, N., O'Higgins, K., Gargan, P., White, J., Dillane, M., McGrory, T., Bond, N., McLaughlin, D., Rogan, G., Cotter, D. and Poole, R. (2016). National Report for Ireland - The 2015 Salmon Season. Working Group on North Atlantic Salmon (WGNAS) International Council for the Exploration of the Seas. Working paper 6. 128 pp. Monitoring

Protocol No. 3 for Offshore Finfish Farms -Sea Lice Monitoring and Control (2000). Department of Marine and Natural Resources. 7 pp.

O'Donahue, P., Kane, F. Kelly, S., McDermott, T. Drumm, A., Nixon, P. and Jackson, D. (2016). National survey of sea lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongates* Nordmann) on fish farms in Ireland - 2015. Marine Institute, *Irish Fisheries Bulletin* No. 46