

Integrated Pest Management / Single Bay Management Plan
MOWI IRELAND 2026

Introduction

Single Bay Management arrangements for fin-fish farms are designed to co-ordinate husbandry practices in such a way that best practice is followed and that stocking, fallowing and treatment regimens on individual farms are compatible with the arrangements on neighbouring farms. The goal is to ensure that practices on individual farms act synergistically to enhance the beneficial effects to the bay as a whole. A major component in this process is the build-up of a communication network between the operators. The non-confrontational environment of SBM meetings between licensed operators has proved a valuable forum in the process of conflict resolution and avoidance both within the industry and between the industry and its neighbours. The SBM process has proved very effective in enhancing the efficacy of lice control and in reducing the overall incidence of disease in the stocks. Single Bay Management plans are subject to revision for each production cycle. This arises out of changes in production plans related to:

- New license applications
- In response to changing markets
- New husbandry requirements
- Both internal company restructuring and inter-company agreement

Crucial elements in the success of this plan are identified as;

- separation of generations
- fallowing of sites in between different year classes
- strategic application of chemotherapeutants
- good fish health management
- close co-operation between farms

This management strategy was endorsed by the then Dept. of Marine, the Sea Trout Task Force and the Irish Salmon Growers Association as fundamental to the rational management of the salmon farming industry. This practice has since been re-enforced with the introduction by the Department of Agriculture, Fisheries and Food (DAFF) of "A strategy for improved pest control on Irish salmon farms", published in May 2008, revised 2010. This strategy seeks to establish a new role for SBM (Single Bay Management) as a focus for management cells to manage sea lice control at a local and regional level

This plan outlines how Mowi Ireland (MI) intends to control sea lice infestations at all of its Sea Farms in Ireland. This plan is approved by the Mowi Ireland Fish Health Manager.

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MOWI IRELAND

Monitoring of Sea lice:

The lice monitoring methodology set down in DAFM Protocol No. 3 comprises the inspection and sampling of fish on every salmonid farm site in each Single Bay Management Area a minimum of fourteen times per annum. Inspections must be carried out monthly, with the following exceptions: -

- During the "susceptible spring period" for migrating wild salmonid smolts, especially sea trout smolts, during March to May, when there are two inspections per month.
- Over the two-month period of December to January, when lice growth is slow and therefore only one inspection is required.

On each inspection, two samples of 30 fish are taken, under standard conditions. The first sample is taken from a standard pen, sampled on every inspection, whilst the second is taken from another pen, selected at random.

In addition to the statutory monitoring of Sea lice, Mowi Ireland will examine at least 20 fish from each salmon pen, every week. During the susceptible spring period, if levels of ovigerous female lice numbers reach an average of 0.5 per fish and/or a total of 5 *Lepeophtheirus salmonis* lice per fish then a treatment is mandatory. At all other times of the year the treatment trigger level is 2.0 ovigerous lice per fish. If a therapeutic lice treatment is required this is subject to organic regulations concerning allopathic treatments which includes notification to the organic control bodies.

Strategies to combat sea lice infestation in Mowi Ireland Sea farms.

Health status of input stock

All salmon stock introduced into Mowi sea sites will comply with;

I. Commission Delegated Regulation (EU) 2020/691 of 30 January 2020 supplementing Regulation (EU) 2016/429 of the European Parliament and of Council as regards rules for aquaculture establishments and transporters of aquatic animals
II. European Communities (Health of Aquaculture Animals and Products) regulations 2008 (S.I. No 261 of 2008), as amended by the European Communities (Health and Aquaculture Animals and Products) (Amendment) Regulations 2010 (S.I. No 398 of 2010), 2011 (S.I. No 430 of 2011) and 2015 (S.I. No 23 of 2015).
III. EC Council Directive 2001/82/EC and SI 144 of 2007 (Animal Remedies Regulations).
IV. Commission Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 as amended in Regulation (EU) 2019/1009, laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation).
V. Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council.

Prior to sea transfer, all salmon smolts will be inspected and certified as disease and parasite free. All such movements into and within salmon production areas shall be notified to the Fish Health section of the Marine Institute.

Management and disposal of biological wastes

Dead fish and runts will be removed regularly, to maintain the health of stocks. The frequency of mortality dives will be determined by the site manager based on time of year and numbers/type of mortalities but at minimum this will be bi-weekly. Records of mortalities shall be maintained for each pen. All dead fish will be sent to an approved Animal By-Product Management Facility.

Where harvesting is carried out at sea, all harvest water including blood will be collected with harvest fish in the wells of the harvest vessel. Thereafter all fish and waste products will be transferred to insulated food tankers and transported by road to the Mowi fish processing plant at Rinmore, Co. Donegal. Blood and waste water are treated in a licenced, on-site effluent treatment facility at the Rinmore plant.

Non-medicinal sea lice management:

Cleaner fish

Mowi Ireland has developed a non-medicinal strategy to control sea lice using cleaner fish. This is the preferred strategy for managing sea lice infestations. Cleaner fish are species which display a natural behaviour of removing parasites and dead skin from other fish species in the wild. The main interest is in wrasse of the genus *Labroides*, of which there are a number of species indigenous to European waters, and the Lumpsucker fish (*Cyclopterus lumpus*) are also used for this purpose.

Mowi Ireland will endeavour to stock all sea sites with cleaner fish. This will involve the stocking of wrasse and Lumpsucker at a minimum stocking rate of 7% of the salmon pen population. Cleaner fish are already deployed in Mowi farms in Ireland with good success. Results to date illustrate that cleaner fish will maintain ovigerous lice levels on salmon in pens at below 0.1 lice per fish. It also has the beneficial effect of radically reducing the use of chemical treatments and, therefore, treatment dispersal.

At Mowi sea farms, farmed Ballan wrasse will be deployed from November onwards, while wild-caught wrasse cleaner fish will be deployed from the first week in June at a ratio of at least 7 cleaner fish per 100 salmon. Wrasse will only be sourced using locally caught species and using local fishers, or farmed wrasse whenever possible (from a Mowi owned hatchery in Wales).

Since wrasse hibernate during winter months, the site will be stocked with hatchery reared lumpfish sourced from commercial rearing facilities in Ireland and Wales (Mowi owned) between November and May at the same rate. As a precaution, cleaner fish are removed from the pens before size-grading of salmon, freshwater bath treatments and when fasting salmon prior to harvest. All cleaner fish can be re-captured using baited lobster pots or creels.

There are five species of wrasse found in Irish waters. These are the Ballan wrasse (*Labrus bergylta*), the Goldsinny wrasse (*Ctenolabrus rupestrus*), the corkwing wrasse (*Symphodus melops*), the rock cook wrasse (*Centrolabrus exoletus*) and the cuckoo wrasse (*Labrus mixtus*). All five species have been found to be efficient in the removal of sea lice from salmon and can be accepted by fishermen for use in sea pens.

The increased use of cleaner fish, namely wrasse and lumpfish, for the control of sea lice, brings with it an onus of responsibility for the health and welfare of the cleaner fish species and of the salmon alike. Of paramount importance – whether the cleaner fish are wild or cultured in origin – is the prevention and control of disease and pathogens and the welfare of the fish.

maintenance of cleaner fish for use in salmon aquaculture:

- Cleaner fish will not be fished within 1km of a sea farm.
- Cleaner fish will not be sourced from areas where there are outbreaks of clinical disease in salmon populations.
- Cleaner fish should be sourced locally from within a bay/sea loch. For biosecurity purposes, the capture and deployment of cleaner fish shall be confined to the local bay area compartments;

Since it is not practical to collect and store cleaner fish prior to stocking on salmon sites, the fish health section of the Marine Institute will be notified, at least two weeks in advance of the cleaner fish collection and deployment season, of the proposed cleaner fish stocking plan at notification@marine.ie.

Mechanical Methods:

Another non-chemical treatment method has been developed by Mowi called HydroLicer®. Salmon are pumped gently into a pipe. They swim against water current and travel down the pipe, tail first. Seawater jets are directed in a special flow pattern into the pipe flow, towards the tails of the salmon, as they pass. The jet is insufficient to stop the salmon from passing through the pipe but is powerful enough to strip sea lice off the salmon. This is achieved because each louse is only attached to the salmon by a suction cup on its thorax. The jets lift the abdomen of each louse, which is not attached and this dislodges the lice from the salmon as they pass. Detached lice are removed and destroyed automatically whilst the deloused salmon are returned to their pen.

The HydroLicer® offers an effective non-chemical intervention alternative for the treatment of lice infestation. If required, this will be used on site with the intention of achieving zero ovigerous female lice on fish stocks.

Medicinal treatments:

The principal objective in lice treatment is to avoid the development of ovigerous female lice, since it is the Nauplius larvae hatched from egg strings carried by ovigerous female lice, that initiates the spread of infestation. Reduction in ovigerous female lice numbers can be achieved by killing them directly or otherwise by killing any settled lice stage, so that fewer remain viable to develop to maturity. Mowi Ireland focuses its lice treatment regime around the pre-spring treatment.

Mowi will only use treatments that are effective against all lice stages. This can be achieved using the oral treatment Slice®, and the bath treatment Alpha Max®, using either well boat tanks or fully bagged pens. The Mowi Ireland treatment strategy is to rotate treatment products.

Slice® in-feed treatment.

Slice® was developed specifically as an oral treatment against salmonid lice infestation. The recommended dosage is 50µg Emamectin Benzoate per kg fish biomass per day for seven consecutive days. Slice® -medicated feed is supplied by the feed manufacturer, using the appropriate quantity of Slice® pre-mix supplied under veterinary prescription.

If required, Mowi Ireland shall apply one Slice® treatment to stocks in the spring of the first input year. This will at latest be applied in May.

Alpha Max® bath treatment.

Alpha Max® active ingredient is the synthetic pyrethroid, Deltamethrin. Pyrethroids are a group of natural and synthetic chemicals which act on insects and related organisms (such as sea lice) by blocking neural transmission pathways. Deltamethrin does not bio accumulate in fish and, if released into the environment, less than 10% persists (and this part is widely dispersed) after 10 days. Its half- life in sediments under treated fish pens has been found to be 140 days, with 90% biodegraded by 12 months. Mowi Ireland use enclosed well boat tanks for Alpha Max® treatments.

Treatment dosage is 0.2ml Alpha Max®, equivalent to 2µgm of Deltamethrin) per m^3 seawater in the well tank for 40-45 minutes.

Treatment planning:

Mowi Ireland shall focus its lice treatment regime around the pre-spring treatment. During the months of January to May, numbers of ovigerous female and total *Lepeophtheirus salmonis* will be maintained as close to zero as possible using cleaner fish and appropriate treatments where necessary.

Rotation of Treatment Products:

In order to reduce the risk of resistance development by sea lice to lice pharmaceuticals it is imperative that the limited number of treatment products is rotated in use. Mowi Ireland rotation rules are as follows;

- Where there is more than one chemical class available, there will be no more than 2 consecutive treatments with the same chemical class or product on the same site
- Following 2 consecutive treatments with the same chemical class/product then an alternative chemical class/product will be used on the same site, even with a break of several months (due to fallowing and/or a new generation being stocked)
- Treatments with products having shown resistance will not resume until sensitivity is restored
- Resistance bioassays will be conducted

- If there are indications of reduced sensitivity to a particular product after any single treatment
- If more than 2 consecutive treatments are planned
- If resistance to another product/chemical class exists
- to document restoration of sensitivity

- Product rotation will be applied as a zone management tool, targeting coordinated rotation also within neighbouring sites in the same area/ zone.

Site Fallowing:

The stocking / fallowing strategy is designed to break sea lice infection and infestation cycles by fallowing for a minimum of one month per cycle.

When appropriate, agreement will be reached with any other fin fish growers in the local embayment through the Single Bay Management system which is chaired by the Marine Institute.

Review of IPM:

The efficacy of Mowi integrated pest management plan shall be reviewed continuously during the operation of sites. Such reviews shall consider advances in knowledge and innovations for sea lice management as well as the sustainable deployment of cleaner fish and other biosecurity aspects.