Irish Fisheries Bulletin

No. 56 March 2025

National Survey of Sea Lice (*Lepeophtheirus Salmonis* Krøyer and *Caligus Elongatus* Nordmann) on Fish Farms in Ireland – 2024

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INTRODUCTION

Sea lice are a naturally occurring parasite found on marine fish, including salmonids. They are small ecto-parasitic copepod crustaceans, of the family Caligidae which comprises of over 500 valid species (Boxshall & Özak, 2022). The two main species of interest in Ireland are *Caligus elongatus* and *Lepeophtheirus salmonis* (the salmon louse). *C. elongatus* is known to parasitise over 100 distinct marine species while *L. salmonis* primarily infests salmonids (Hamre *et al*., 2024). *L. salmonis* commonly occurs on farmed Atlantic salmon *Salmo salar* and has been reported at a prevalence of over 90% within wild populations (Jackson *et al.,* 2013). Atlantic salmon were the only species of salmonid farmed at sea in Ireland on a commercial basis, in 2024.

L. salmonis is an obligate parasite with a direct lifecycle, which has 8 stages, comprising of nauplius 1 and 2, copepodid, chalimus 1 and 2, pre-adult 1 and 2, and the adult stage. The nauplius 1 stage hatches from paired egg-strings and is dispersed in the plankton, where it moults to the next planktonic stage, nauplius 2. This is followed by the infective copepodid stage where attachment to the host takes place. The time it takes for a newly hatched nauplii to develop into an infective copepodid varies from approximately 7.2 days in March (March average temp = 7±1°C) to 2.4 days in May (May average temp = 13±1°C). The copepodid then moults through the attached chalimus stages before becoming a mobile pre-adult. There are two pre-adult stages before maturing to the adult phase (Figure 1). The rate of this development through the stages is dependent upon sea water temperature (Figure 2; Hamre *et al*., 2019; Samsing *et al*., 2016). There are notable variations in the development time for female *L. salmonis* to reach maturity and produce egg strings from the beginning of the spring period (*c*. 90 days) to the end of the spring period (*c*. 30 days).

From a single mating event, the adult female can produce several batches of paired egg-strings, which in turn hatch from the distal end of the egg strings into the water column to give rise to the next generation (Hamre *et al*., 2013; Kabata, 1979; Schram, 1993). The number of days between batches of eggs is dependent on temperature and can vary from 17.1 days at 6 °C to 5.7 days at 14 °C (Hamre, *et al*., 2019). The mean length for an adult female is 8mm-11mm and an adult male is 5mm-6mm (Schram, 1993). Under experimental conditions female *L. salmonis* survived up to 210 days, producing as many as 11 pairs of egg strings (Boxaspen, 2006). Jackson and Minchin (1992), in Ireland, found fecundity (mean eggs per pair of egg strings) on wild salmon to be 965 ±30, which was higher than for farmed salmon at 758 ±39. This contrasts to a lower fecundity recorded for wild and farmed salmon

in Norway where mean egg numbers have been recorded as 304 ±32 with a range from 246 to 366 at 7.2°C (Heuch *et al.*, 2000). Fecundity is also seasonally affected with peaks observed in spring (Ritchie, *et al.*, 1993).

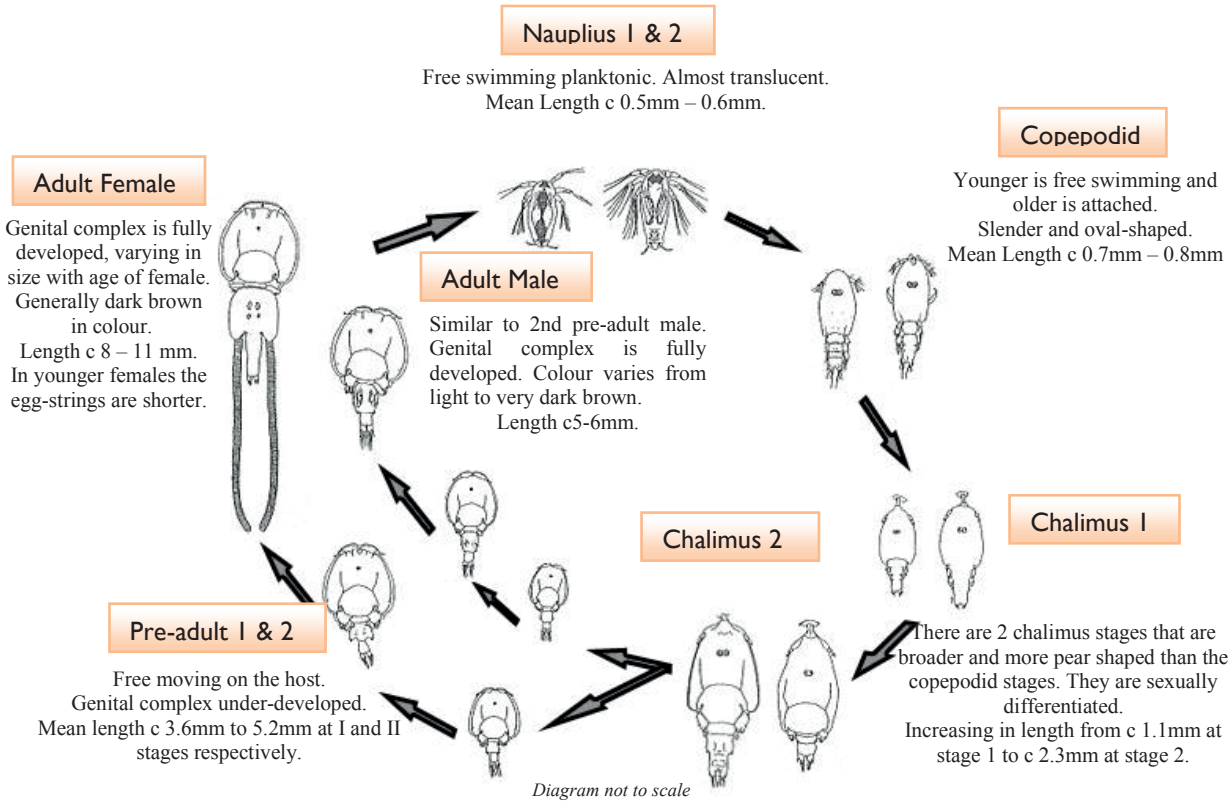


Figure 1 *Life cycle of Lepeophtheirus salmonis (after Schram, 1993 & Hamre et al., 2013).*

C. elongatus is smaller in size than *L. salmonis* averaging 6-8mm in length and has a slightly different documented life cycle to *L. salmonis*, with four chalimus stages and no pre-adult stage (Hogans & Trudeau, 1989). The fact that *C. elongatus* is not as host specific as *L. salmonis* (Kabata, 1979) and that the hosts migrate widely is thought to be a factor in the highly variable levels on farmed salmonids at various times of the year (Jackson *et al.*, 2000; Hemmingsen *et al.*, 2020).

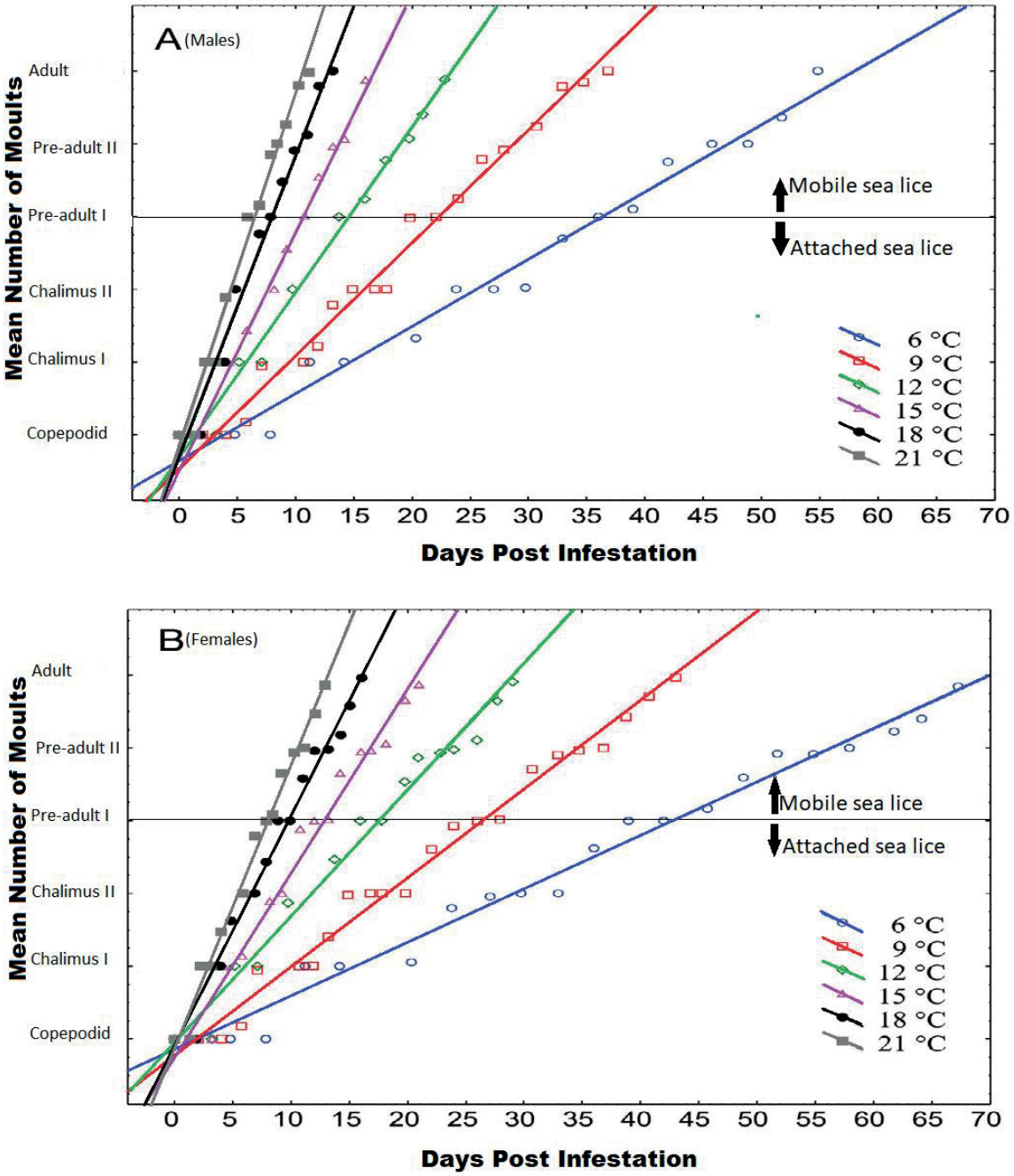


Figure 2 Mean number of moults vs. days post infestation for *L. salmonis* (A) males and (B) females. (Adapted from Hamre, *et al.*, 2019)

History of Sea Lice Monitoring in Ireland

In 1991, the Department of the Marine instigated a Sea Lice Monitoring Programme for Finfish Farms in Ireland (Jackson & Minchin, 1993) and in 1993 monitoring was expanded nationwide (Jackson *et al.*, 2002; Jackson *et al.*, 2005). In May 2000, the protocol for sea lice monitoring was formally published as the *Monitoring Protocol No.3 for Offshore Finfish Farms – Sea Lice Monitoring and Control* by the Department of Marine and Natural Resources.

In 2008, the Department of Agriculture, Fisheries and Food (DAFF) published "*A strategy for the improved pest control on Irish salmon farms*". This strategy outlines a comprehensive range of measures to provide for enhanced sea lice control and was developed by a joint DAFF, Marine Institute and Bord Iascaigh Mhara workgroup in response to difficulties experienced by farms in achieving the low levels of infestation required by the national monitoring programme. These measures draw on the on-going Single Bay Management (SBM) process and, through a comprehensive action plan and list of recommendations, seek to advance the suite of tools necessary for improved sea lice control on farms.

The objectives of the National Sea Lice Monitoring Programme are:

- To provide an objective measurement of infestation levels on farms.
- To investigate the nature of infestations.
- Provide management with information to drive the implementation of control and management strategies.
- To facilitate further development and refinement of this strategy.

The sea lice control and management strategy has five principal components:

- Separation of generations.
- Annual fallowing of sites.
- Early harvest of two-sea-winter fish.
- Targeted treatment regimes, including synchronous treatments.
- Agreed husbandry practices.

These components combine to reduce the development of infestations and to ensure the most effective treatment. They seek to minimise infestation levels whilst decreasing reliance on, and reducing the use of, veterinary medicines. Separation of generations and annual fallowing prevent the transmission of infestations from one generation to the next. Targeted treatments, particularly in late winter/early spring are important to break the cycle of salmon lice infestation. Reducing the salmon lice burden when seawater temperatures are at a minimum, when the development rate of salmon lice is slower (Figure 2), is fundamental to achieving near zero egg-bearing salmon lice on farms in spring to protect wild smolts leaving rivers. The agreed husbandry practices cover a range of related fish health, quality, and environmental issues in addition to those specifically related to salmon lice control. The Single Bay Management Programme serves to facilitate this control and management strategy, in addition to providing a forum for exchange of information between farmers.

Ovigerous female salmon lice are those which produce the infective larvae. Setting the treatment trigger at 0.5 ovigerous *L. salmonis* per fish in spring ensures that treatments are

carried out when a maximum of half of the fish examined have one ovigerous salmon louse. This is a practical time to interrupt sea lice development. Later in the year, the development of new generations is not as synchronised and automatic intervention at a salmon lice level of 0.5 ovigerous by way of treatment is not justified. A level of 2.0 ovigerous salmon lice per fish has been shown to be a pragmatic level at which intervention by way of treatment is advisable. Levels of mobile and juvenile salmon lice are important in advising fish health professionals in developing a control strategy. However, they are not, of themselves, appropriate measures upon which to trigger mandatory treatments.

Results of the monitoring programme are sent to the relevant farm within 5-10 days of each inspection. Salmon lice levels of 2.0 ovigerous (0.5 ovigerous in spring period) are used as Treatment Trigger Levels (TTL) to inform management to take action to reduce levels, as outlined in the *Monitoring Protocol No.3 for Offshore Finfish Farms – Sea Lice Monitoring and Control,* Department of Marine and Natural Resources (2000). A monthly report of results is circulated to relevant parties and the data is published annually https://www.marine.ie/; Marine Institute Annual Sea Lice Reports (Appendix 1).

Sea Lice Management

The sea lice management strategy on farms includes the use of husbandry, management practices, prescription-only veterinary medicines, and non-medicinal measures to control sea lice infestation. All veterinary medicines require prior authorisation from the Health Products Regulatory Authority (HPRA) before being placed on the market in Ireland. Table 1 shows a list of the veterinary medicines authorised to assist in the control of sea lice in Ireland. In exceptional circumstances, national and EU legislation allows for the use of veterinary medicinal products authorised for use in another EU member state excluding Ireland. This process, known as the 'cascade-system' is under the direction of the Department of Agriculture, Food, and the Marine (DAFM). Veterinary medicines for the control of sea lice can be administered topically or incorporated into the diet. Topical treatments are administered by bathing the fish in specified concentrations of the medicine. Bath treatments can be conducted using well-boats or tarpaulins/skirts to enclose the salmon net-pens. In-feed medicines are incorporated into the diet to get the required dose to the fish. An over-reliance on any one veterinary medicine can result in reduced efficacy in the short term and lead to development of resistance over time. For this and other reasons, current management practices are migrating away from veterinary medicines and are moving toward non-medicinal removal of sea lice. A multi-pronged approach to sea lice control is considered more effective in the long-term and includes biological, mechanical, thermal, and freshwater/hyposaline measures.

Cleaner fish as a control method of sea lice continue to be used in Ireland. These include the use of wild-caught and hatchery reared ballan wrasse (*Labrus bergylta)*. These have played a key role in maintaining the low salmon lice levels recorded on all farms in 2024. Farms typically stock the five species of wrasse most common in Irish waters (Bolton-Warberg, 2018):

- Ballan wrasse *Labrus bergylta* (Ascanius, 1767)
- Goldsinny wrasse *Ctenolabrus rupestris* (L.*,* 1758)
- Rock cook wrasse *Centrolabrus exoletus* (L.*,* 1758)
- Corkwing wrasse *Crenilabrus melops* (L.*,* 1758*) and*
- Cuckoo wrasse *Labrus mixtus* (L., 1758).

Lumpfish *Cyclopterus lumpus* (L., 1758) are considered a more suitable cold-water option for biological delousing of Atlantic salmon (Imsland *et al.*, 2014) and continue to be deployed with positive effects on farms in Ireland as part of sea lice management plans.

The use of filtration methods at harvest sites have also proven to be a successful method of preventing sea lice from re-entering the water column and potentially re-infesting stocks adjacent to the harvest area (O'Donohoe & McDermott, 2014).

Thermal and mechanical delousing methods continue to be used and are successful at removing the mobile stages, however, they are known to be less successful at removing the attached stages (Grøntvedt, *et al.*, 2015; Overton, *et al.*, 2019). In addition, the use of hyposaline water bathing for control of *Neoparamoeba perurans (*the aetiological agent of amoebic gill disease) continues to be an effective tool in the control of sea lice (Mc Dermott, *et al.*, 2021).

Table 1 *Prescription-only veterinary medicines authorised for use in the control of sea lice on salmonids in Ireland* in 2024 *(www.hpra.ie).*

Compound	*Group*	*Licensing status*	*Delivery Method*	*Mode of action*	*Stages targeted*	*Withdrawal period*
Animal medicines						
Deltamethrin	Pyrethroid	Full MA	Bath	Interferes with nerve transmission by blocking sodium channels in nerve cells	Adults, Preadults. Chalimus unknown	5 degree-days
Emamectin benzoate	Avermectin	Full MA	In-feed	Interferes with neurotranmission disrupting nerve cells causing paralysis and death	All stages	Zero

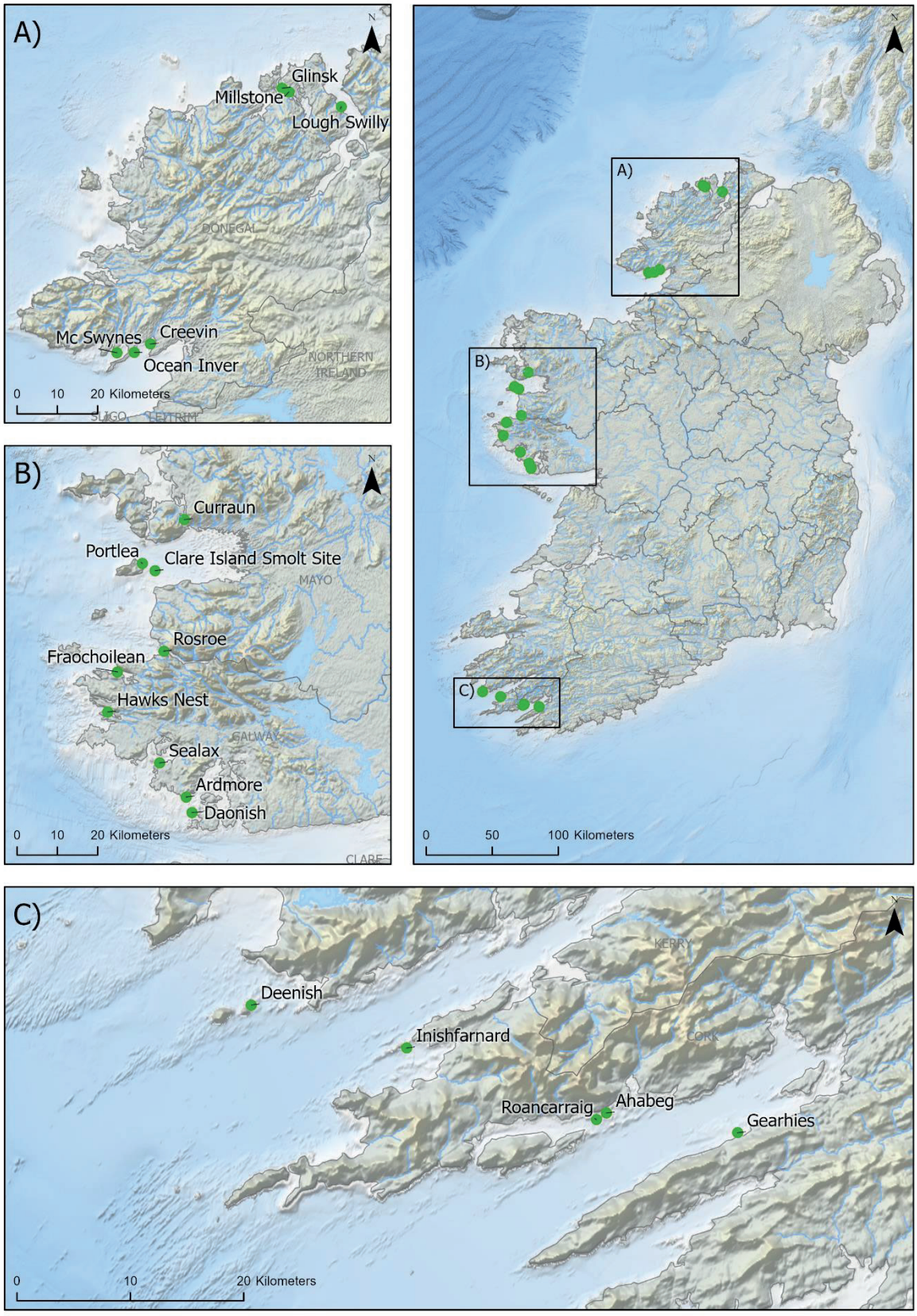
MA: Marketing authorisation from the Health Products Regulatory Authority.

METHODOLOGY

Farmed stocks of Atlantic salmon in Ireland are inspected monthly to monitor sea lice levels as part of the national programme, and twice per month in March, April, and May (the spring period), up to 14 occasions throughout the year. December and January are combined and only one inspection is carried out. Follow-up inspections may be carried out when deemed appropriate. At each inspection 2 samples are taken for each generation of fish on site, a sample from a standard pen, which is sampled at each subsequent inspection, and a sample from a random pen, which is chosen on the day of the inspection. Thirty fish are examined for each sample after anaesthetising using tricaine methanesulfonate in seawater. Fish are examined individually for all mobile sea lice. Sea lice are removed and preserved in 70% ethanol. The seawater the fish were held in is also sieved for any detached sea lice. In the laboratory the species, quantity and life-stage of the sea lice are determined and recorded. The mean number of sea lice per fish is calculated (including those in the sieve). The mean ovigerous sea lice levels and mean total mobile sea lice levels for *L. salmonis* and *C. elongatus* per fish are reported.

Ovigerous sea lice levels are a measure of the breeding female population, and total mobile levels provide an indication of current infestation levels. The information gathered aims to evaluate the level of sea lice on the fish and to inform the farmer on a sea lice management strategy. Effective parasite control is characterised by a reduction in sea lice levels on the subsequent inspection.

There are 3 distinct regions where salmonid farming is carried out: The Southwest (Counties Cork and Kerry), the West (Counties Mayo and Galway) and the Northwest (Co. Donegal). These regions (Figure 3) are geographically separate, with distances between regions of *c.*160 km from Northwest to West and *c.*200 km from West to Southwest.



Basemap: GGS Geo Consultancy (2021): EMODnet Bathymetry consortium; Rivers: Environmental Protection Agency

Figure 3 *Locations of active marine fish farm sites in 2024*

RESULTS

During 2024, a total of 179 sea lice inspections were carried out on 20 active farm sites. 98% of Atlantic salmon sea lice inspections were below the Treatment Trigger Levels (TTL) as outlined in the *Monitoring Protocol No.3 for Offshore Finfish Farms – Sea Lice Monitoring and Control,* Department of Marine and Natural Resources (2000). There were 113 inspections on salmon smolt sites, 100% of which were below the TTL. Of the 66 inspections from one-sea-winter salmon sites 95% were below the TTL.

Results of monthly sea lice inspections of all active salmonid sites for 2024 are presented in Appendix 2.

Atlantic salmon 2023 (one-sea-winter salmon)

One-sea-winter salmon were present in 11 sites in 10 bays in 2024. 66 inspections were carried out on this generation of fish. Ovigerous *L. salmonis* levels greater than the TTL were recorded on three occasions for one-sea-winter fish. For details on the numbers of inspections at each site see Table 2.

Table 2 *Summary of inspection results on one-sea-winter salmon nationally in 2024.*

	Samples in Spring	Ovigerous >TTL in Spring	Samples outside Spring	Ovigerous >TTL outside Spring	Total Samples	Total Ovigerous >TTL	% over TTL in Spring	% over TTL outside Spring	Total % over TTL
National Totals	40	3	26	0	66	3	7.5%	0.0%	4.5%

Southwest Region

In the Southwest there were no recorded instances of *L. salmonis* infestation levels greater than the TTL (Table 3).

Table 3 *Summary of sea lice reports on one-sea-winter salmon in the Southwest in 2024.*

Company	Site	Samples in Spring	Ovigerous >TTL in Spring	Samples outside Spring	Ovigerous >TTL outside Spring	Total Samples	Total Ovigerous >TTL	% over TTL in Spring	% over TTL outside Spring	Total % over TTL
Mowi Irl	Gearhies	0		2	0	2	0		0%	0%
	Deenish	6	0	4	0	10	0	0%	0%	0%
Southwest	**Totals**	6	0	6	0	12	0	0%	0%	0%

West Region

In the West, there was 0% out of the 12 inspections carried out showed of *L. salmonis* infestation levels greater than the TTL outside the spring period and 1 out of 16 inspections (6%) within the spring period. (Table 4).

Table 4 *Summary of sea lice reports on one-sea-winter salmon in the West in 2024.*

Company	Site	Samples in Spring	Ovigerous >TTL in Spring	Samples outside Spring	Ovigerous >TTL outside Spring	Total Samples	Total Ovigerous >TTL	% over TTL in Spring	% over TTL outside Spring	Total % over TTL
Bradan Beo Teo.	Daonish	6	1	2	0	8	1	17%	0%	13%
Mannin Bay Salmon Company Ltd.	Hawk's Nest	1	0	2	0	3	0	0%	0%	0%
Bifand Ltd.	Fraochoilean	2	0	2	0	4	0	0%	0%	0%
Clare Island Seafarms Ltd.	Portlea	6	0	4	0	10	0	0%	0%	0%
Curraun Blue Ltd.	Curraun	1	0	2	0	3	0	0%	0%	0%
West	**Totals**	16	1	12	0	28	1	6%	0%	4%

Northwest Region

In the Northwest, the TTL was exceeded on 2 out of 18 inspections (11%) in the spring period (Table 5). There were no instances when the TTL was exceeded outside the spring period.

Table 5 *Summary of sea lice reports on one-sea-winter salmon in the Northwest in 2024.*

Company	Site	Samples in Spring	Ovigerous >TTL in Spring	Samples outside Spring	Ovigerous >TTL outside Spring	Total Samples	Total Ovigerous >TTL	% over TTL in Spring	% over TTL outside Spring	Total % over TTL
Ocean Farm Ltd.	McSwyne's	6	0	3	0	9	0	0%	0%	0%
Mowi Irl.	Creevin	6	1	2	0	8	1	17%	0%	13%
	Millstone	0	0	1	0	1	0		0%	0%
	Lough Swilly	6	1	2	0	8	1	17%	0%	13%
Northwest	**Totals**	18	2	8	0	26	2	11%	0%	8%

Mean levels more than 10 mobile *L. salmonis* per fish were recorded on 1 occasion. It was the maximum mean mobile *L. salmonis* level recorded on one-sea-winter salmon at 10.14 per fish in Lough Swilly during April.

C. elongatus levels greater than 10 individuals per fish were recorded on 1 occasion, during the year. The highest total mobile *C. elongatus* level recorded was 17.78 per fish in McSwyne's Bay during April.

Atlantic salmon 2024 (smolts)

A total of 113 inspections were undertaken at 11 sites stocking Atlantic salmon 2024 S1 and S½ smolts during the year 2024. *L. salmonis* levels were below the TTL for all inspections (100%) throughout 2024 (Table 6).

Table 6 *Summary of inspection results on salmon smolts nationally in 2024.*

Company	Site	Samples in Spring	Ovigerous >TTL in Spring	Samples outside Spring	Ovigerous >TTL outside Spring	Total Samples	Total Ovigerous >TTL	% over TTL in Spring	% over TTL outside Spring	Total % over TTL
Mowi Irl.	Ahabeg	1	0	6	0	7	0	0%	0%	0%
	Roancarraig	6	0	8	0	14	0	0%	0%	0%
	Inishfarnard	3	0	6	0	9	0	0%	0%	0%
Southwest	**Totals**	10	0	20	0	30	0	0%	0%	0%
Bradan Beo Teo.	Ardmore	6	0	8	0	14	0	0%	0%	0%
Bifand Ltd./Mowi Irl.	Sealax	6	0	8	0	14	0	0%	0%	0%
Mannin Bay Salmon Company Ltd.	Rosroe	6	0	8	0	14	0	0%	0%	0%
Clare Island Seafarms Ltd.	Clare Island Smolt Site	4	0	6	0	10	0	0%	0%	0%
West	**Totals**	22	0	30	0	52	0	0%	0%	0%
Ocean Farm Ltd.	Ocean Inver	6	0	7	0	13	0	0%	0%	0%
Mowi Irl.	Glinsk	3	0	4	0	7	0	0%	0%	0%
	Millstone	3	0	6	0	9	0	0%	0%	
	Lough Swilly	0	0	2	0	2	0		0%	0%
Northwest	**Totals**	12	0	19	0	31	0	0%	0%	0%
National Totals		44	0	69	0	113	0	0%	0%	0%

There was 1 instance when the mean total mobile *L. salmonis* per fish was greater than 10 in Bantry Bay in November. The highest mean total *C. elongatus* per fish recorded was 8.9 in Bantry bay in May.

Sampling record

One sample was missed due to fish health reasons at Ocean Inver, Donegal Bay, in November 2024. All other samples were collected in 2024.

One-sea-winter salmon monthly trend by bay

Mean ovigerous and mean mobile *L. salmonis,* and *C. elongatus* levels for each bay are shown in Table 7 for one-sea-winter salmon throughout the year. Monthly ovigerous *L. salmonis* levels greater than the spring TTL of 0.5 ovigerous salmon lice per fish, on a bay level, were not recorded in 2024.

Table 7 *Mean ovigerous and mean mobile Lepeophtheirus salmonis and Caligus elongatus levels per month, for one-sea-winter salmon, for each bay inspected in the year 2024.*

Mean ovigerous *L. salmonis*

	Dec/Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Bantry Bay	0.00	0.00	HO								
Kenmare Bay	0.00	0.00	0.00	0.00	0.00	0.05	0.02	HO			
Kilkieran Bay	0.21	0.36	0.16	0.41	0.34	HO					
Clifden Bay	0.09	0.02	0.00	HO							
Ballinakill Harbour	0.00	0.17	0.15	HO							
Clew Bay	0.00	0.00	0.01	0.00	0.02	0.07	0.19	HO			
Bealacragher Bay	0.05	0.24	0.13	HO							
Donegal Bay	0.14	0.31	0.22	0.16	0.25	0.77	HO				
Mulroy Bay	0.24	HO									
Lough Swilly	0.07	0.54	0.12	0.41	0.04	HO					

Mean mobile *L. salmonis*

	Dec/Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Bantry Bay	0.08	0.00	HO								
Kenmare Bay	0.00	0.00	0.00	0.01	0.03	0.15	0.02	HO			
Kilkieran Bay	1.20	2.49	3.58	0.92	3.24	HO					
Clifden Bay	0.87	0.25	3.55	HO							
Ballinakill Harbour	0.07	0.52	1.32	HO							
Clew Bay	0.00	0.00	0.01	0.00	0.06	0.12	0.44	HO			
Bealacragher Bay	0.22	0.77	0.63	HO							
Donegal Bay	0.46	1.41	0.75	2.68	0.99	1.07	HO				
Mulroy Bay	2.59	HO									
Lough Swilly	2.23	3.35	1.97	6.08	0.13	HO					

Mean ovigerous *C. elongatus*

	Dec/Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Bantry Bay	0.41	0.00	HO								
Kenmare Bay	0.25	0.18	0.31	0.18	0.71	1.20	0.00	HO			
Kilkieran Bay	0.00	0.07	0.01	0.00	0.09	HO					
Clifden Bay	0.12	0.00	0.13	HO							
Ballinakill Harbour	0.71	3.15	1.21	HO							
Clew Bay	0.23	3.60	1.67	0.68	1.23	1.41	1.35	HO			
Bealacragher Bay	0.03	0.00	0.00	HO							
Donegal Bay	0.03	1.44	0.86	1.26	0.01	0.10	HO				
Mulroy Bay	0.00	HO									
Lough Swilly	0.06	0.35	0.13	0.43	0.00	HO					

Mean mobile *C. elongatus*

	Dec/Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Bantry Bay	0.73	0.00	HO								
Kenmare Bay	0.39	0.24	0.48	0.23	1.11	2.69	0.02	HO			
Kilkieran Bay	0.00	0.19	0.06	0.00	0.13	HO					
Clifden Bay	0.22	0.00	0.23	HO							
Ballinakill Harbour	2.28	5.46	2.08	HO							
Clew Bay	0.41	6.55	3.37	1.80	3.16	2.84	2.80	HO			
Bealacragher Bay	0.03	0.00	0.00	HO							
Donegal Bay	0.05	4.86	1.69	6.27	0.01	0.10	HO				
Mulroy Bay	0.00	HO									
Lough Swilly	0.41	1.36	1.08	2.55	0.00	HO					

HO = Harvested out

Regional monthly means for one-sea-winter salmon and smolts

L. salmonis ovigerous and monthly mean mobile levels per fish for one-sea-winter salmon regionally are shown in Figures 4 and 5. In 2024, the mean regional ovigerous salmon lice levels per fish did not exceed the TTL. The highest mean regional ovigerous salmon lice levels per fish (0.77) occurred in the Northwest in June.

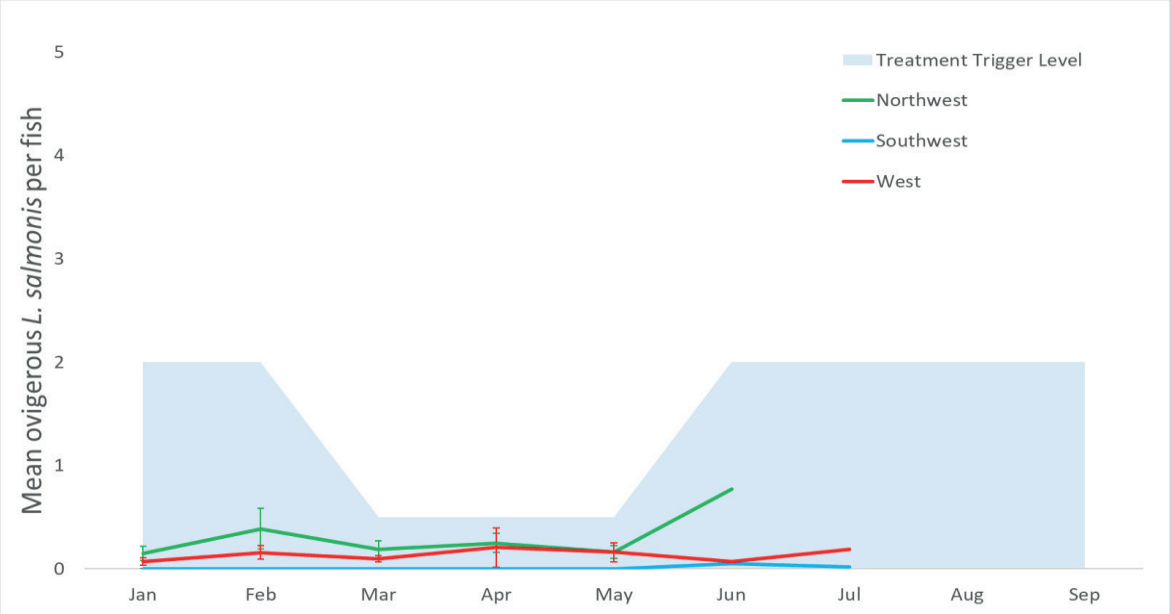


Figure 4 *Mean (±SE) monthly ovigerous L. salmonis per fish per region in 2024 on one-sea-winter salmon.*

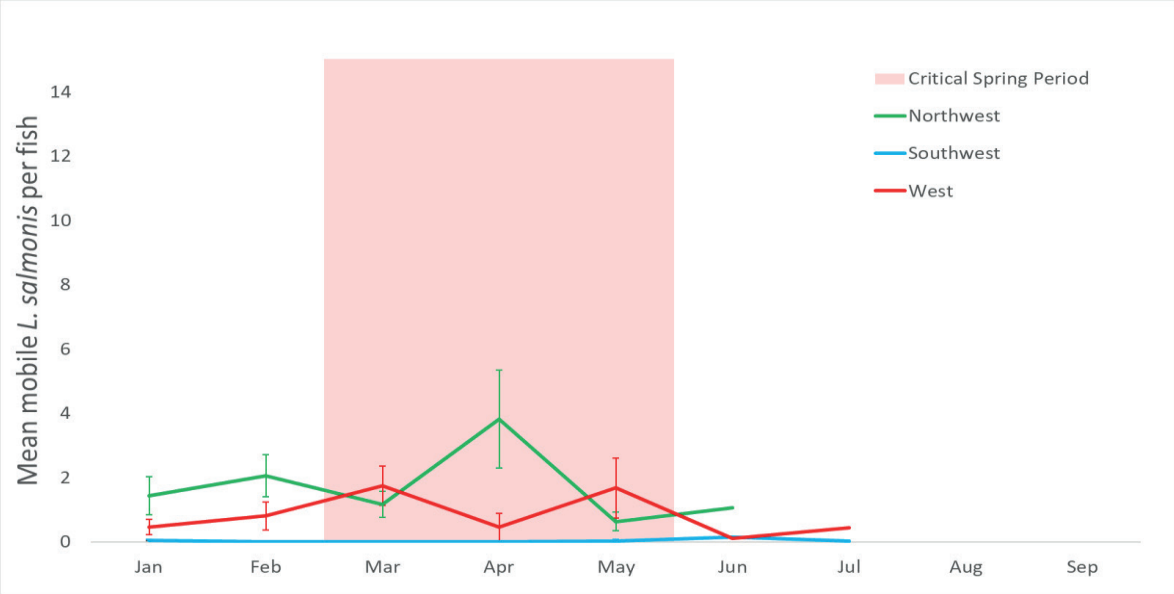


Figure 5 *Mean (±SE) monthly mobile L. salmonis per fish per region in 2024 on one-sea-winter salmon.*

Total regional mean mobile *L. salmonis* levels peaked at 3.81 mobile sea lice per fish in the Northwest region in April, 0.15 in the Southwest in June, and 1.75 in the West in March.

L. salmonis ovigerous and monthly mean mobile levels per fish for smolts regionally are shown in Figures 6 and 7. In 2024, the mean regional ovigerous salmon lice levels per fish did not exceed the TTL. The highest mean regional mobile salmon lice levels per fish (0.83) occurred in the Southwest in November.

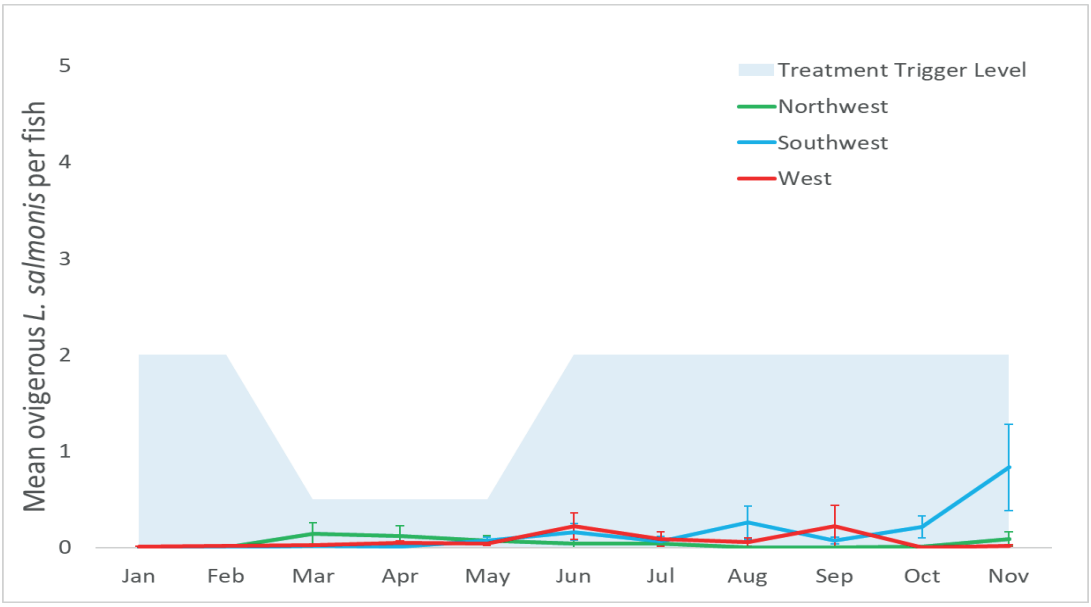


Figure 6 *Mean (±SE) monthly ovigerous L. salmonis per fish per region in 2024 on smolts.*

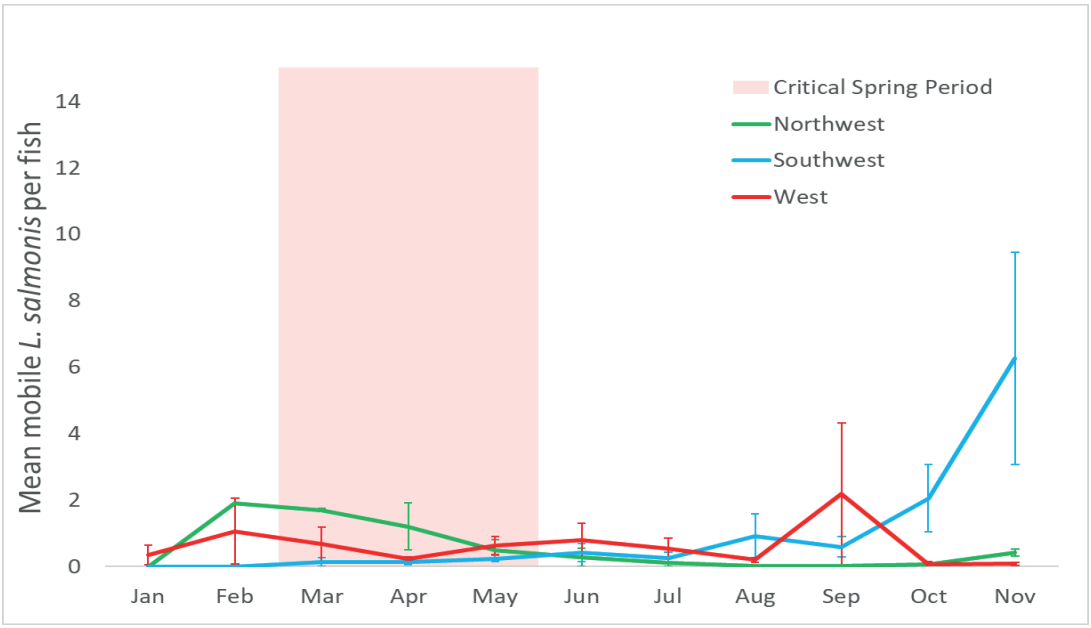


Figure 7 *Mean (±SE) monthly mobile L. salmonis per fish per region in 2024 on smolts.*

Total regional mean mobile *L. salmonis* levels for smolts peaked at 2.17 mobile salmon lice per fish in the Western region in September, 6.26 in the Southwest in November and 1.91 in the Northwest in February.

Annual trends (One-sea-winter salmon)

The annual trends of *L. salmonis* ovigerous and mobile salmon lice levels are compared in Figures 8 and 9 for one-sea-winter salmon for the month of May from 1991 to 2024.

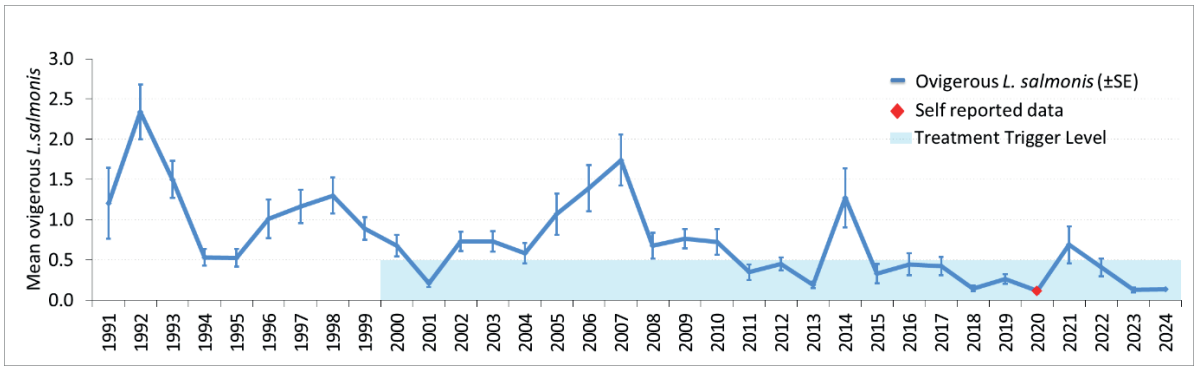


Figure 8 *Annual trend (May mean ±SE) ovigerous L. salmonis on one-sea-winter salmon.*

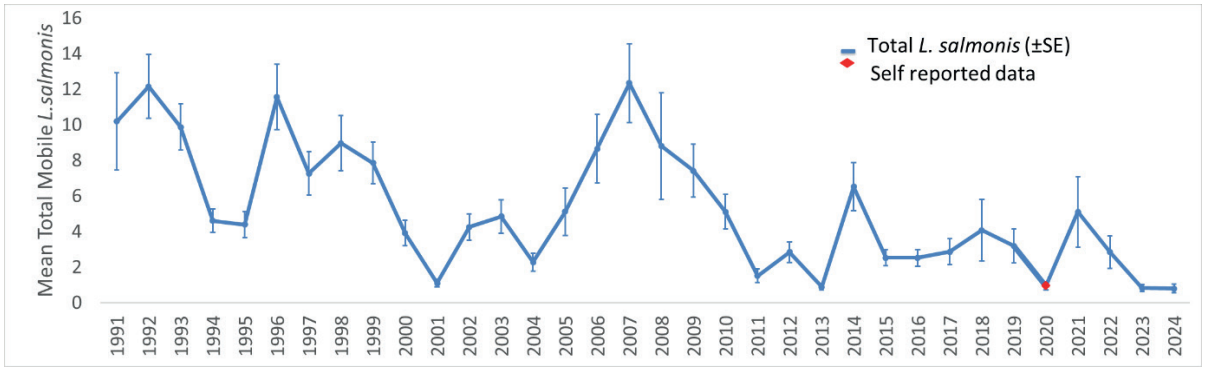


Figure 9 *Annual trend (May mean ±SE) mobile L. salmonis on one-sea-winter salmon.*

Mean ovigerous *L. salmonis* levels in May increased to 0.14 salmon lice per fish in 2024 from 0.13 in 2023. The 5-year May mean ovigerous *L. salmonis* from 2019-2023 was 0.35 ±0.05 (S.E.) per fish. Total mobile *L. salmonis* levels decreased to 0.80 per fish which is lower than the 5-year May mean total *L. salmonis* from 2019-2023 of 2.51 ±0.43 (S.E.) per fish.

Regional Spring trends of salmon lice in Ireland

A regional assessment of the spring period (March, April, and May) means of ovigerous *L. salmonis* levels over the previous five years show levels were typically lower than the TTL. Salmon lice levels are higher in one-sea-winter salmon than in smolts. The Southwest region has had consistently low salmon lice levels among all salmon cohorts. The West and Northwest are regions where elevated salmon lice levels have occasionally occurred in spring over the previous 5 years (Figures 10 and 11).

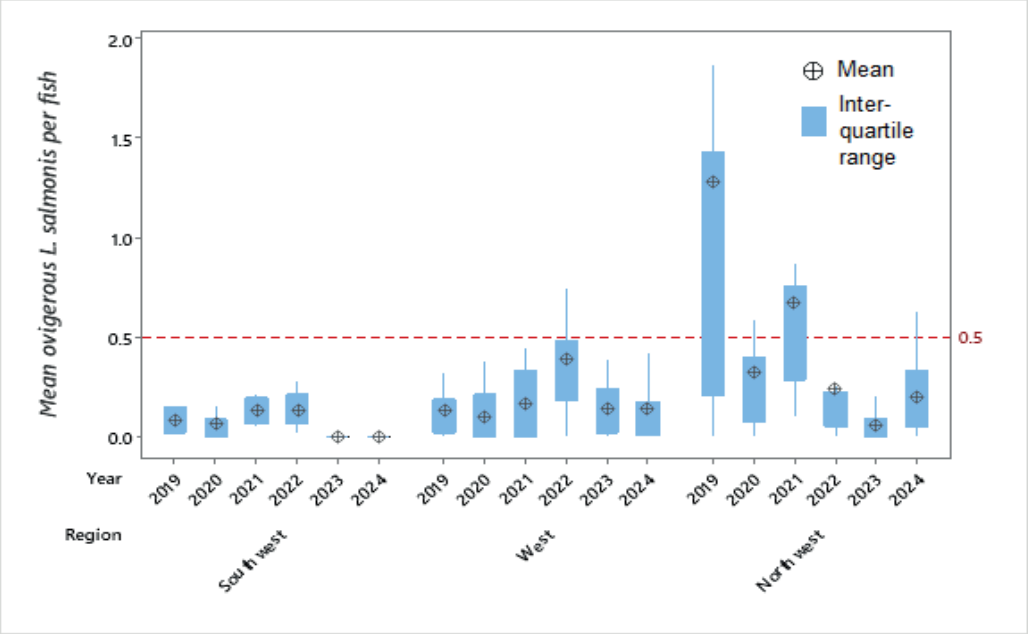


Figure 10 *Spring mean ovigerous L. salmonis per fish for one-sea-winter-salmon, 2019-2024*

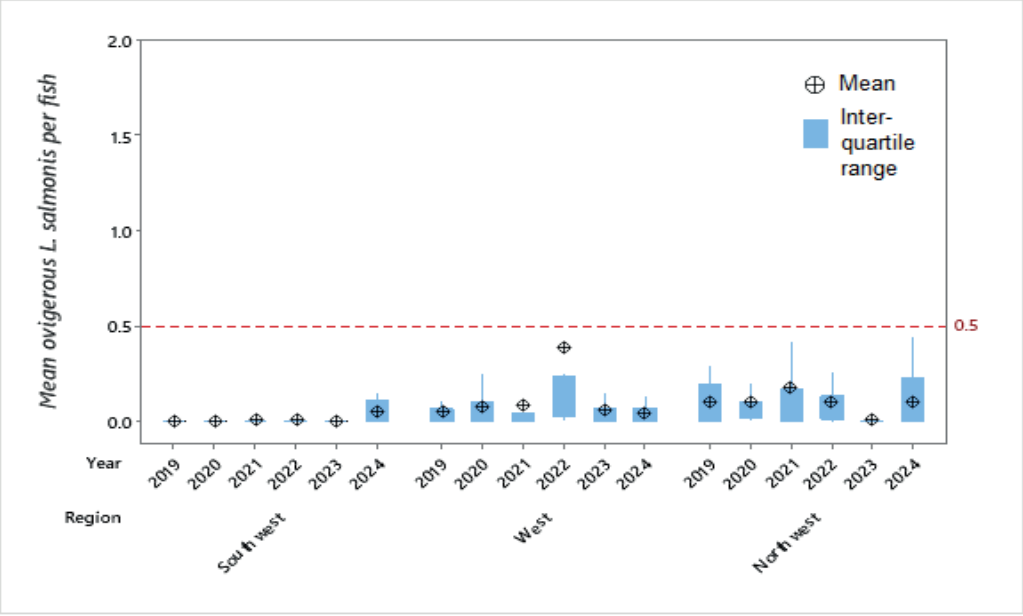


Figure 11 *Spring mean ovigerous L. salmonis per fish for smolts, 2019-2024*

DISCUSSION

In 2024, 98% of all salmon lice inspections were below the TTL, 100% of smolt inspections and 95% of one-sea-winter salmon inspections were below TTL. This is a decrease from the 100% reported in 2023 (D'Arcy *et al*., 2024), but higher than the 93% reported for 2022 (D'Arcy *et al*., 2023). This continues a trend of decreasing salmon lice levels on Irish salmon farms since monitoring commenced in 1991.

The national mean ovigerous salmon lice per fish for one-sea-winter salmon in May (0.14) increased from 0.13 in 2023 (D'Arcy, *et al*., 2024). The 5-year May mean ovigerous salmon lice per fish from 2019-2023 was 0.35. The national total mobile salmon lice per fish for May (0.80) decreased in 2024 to the lowest since the beginning of the National Sea Lice Monitoring Programme. The 5-year May mean total mobile salmon lice per fish from 2019-2023 was 2.51.

As with 2023, the regional graphs demonstrate a similar pattern of low salmon lice levels for both smolts and one-sea-winter-salmon throughout 2024. Salmon lice levels remained typically low in the South-western region throughout the year and in the western region, apart from Kilkieran Bay in March. The Northwest region had two occasions above the TTL in March (Inver Bay) & April (Lough Swilly). Early interventions in Spring resulted in successful efforts to reduce overall salmon lice levels in time for the outward migration of wild salmon in May.

All sites that harvested one-sea-winter-salmon in 2024 had low salmon lice levels in the inspection prior to harvest. This continues a positive shift when compared to previous years when it was not unusual for levels to increase prior to harvest. Protracted harvests which involve the early harvest of larger grade fish were observed at several sites in 2024 and this practice may have reduced salmon lice infestation pressure at those sites.

Non-medicinal treatments and optimal husbandry practices increasingly play a significant role in the management of salmon louse infestation levels. It is worth highlighting that most of the sites that had consistently low salmon lice levels frequently bathed the salmon in fresh/hyposaline water and were stocked with cleaner fish.

In summary, 98% of sea lice inspections were below the mandatory treatment trigger levels for action throughout 2024 (see Appendix 2 for details). This was a small departure from 2023 when there were no recorded incidents above the treatment trigger level which demonstrates that it is possible to maintain exceptionally low salmon lice levels throughout

the year. Elevated salmon lice levels continue to be the exception rather than the rule. The fact that there were no consecutive occasions above the TTL demonstrates a high degree of adherence to the pest management strategy and proactive salmon lice management. The continued use of non-medicinal delousing practices such as cleaner fish, hyposaline/freshwater bathing and thermal delousing methods as well as effective husbandry, timely use of authorised veterinary medicines and implementation of Single Bay Management practices is proving to be effective in maintaining low salmon lice levels on all marine Atlantic salmon farms in Ireland.

GLOSSARY

Mobile lice	All sea lice (*C. elongatus* and *L. salmonis*) that are mobile – male and female (pre-adult and adult stages) sea lice that have developed beyond the attached larval stages.
Ovigerous lice	An egg bearing adult female sea lice.
Random (Ran.) Pen	A pen which is selected by the Inspector on the day of inspection.
Salmonids	A fish of the family Salmonidae. It includes salmon, trout, and char.
Standard (Std.) Pen	The selected pen which is sampled at each inspection.
S1 Smolt	Smolt pertains to a stage in the salmon life cycle when it changes from being a freshwater fish to a seawater fish, a process known as smoltification. S1 fish are transported to the saltwater environment in the spring, which is approximately 15 months after they were hatched.
S½ Smolt (also known as S0)	These fish are put under lights to hasten the onset of smoltification. An S½ smolt is ready to go to sea during the autumn/winter, approximately 11 months after hatching. They are sometimes referred to as S0 (S zero) smolts.
SE	Standard error (error bars in the graphs) is the standard error of the mean of a sample from a population with a normal distribution, which is equal to the standard deviation of the normal distribution divided by the square root of the sample size.
TTL	Treatment Trigger Levels

REFERENCES

Bolton-Warberg, M. 2018 'An overview of cleaner fish use in Ireland', *Journal of Fish Diseases* 41: p.935-939. doi.org/10.1111/jfd.12731.

Boxaspen, K. 2006 'A review of the biology and genetics of sea lice', *ICES Journal of Marine Science* 63: p.1304–1316. doi.org/10.1016/j.icesjms.2006.04.017.

Boxshall, G.A. and **Özak, A.A.** 2022 'Introduction to sea lice morphology and biology' in *Sea Lice Biology and Control*'. J. Treasurer, I. Bricknell & J. Bron (Eds.). 5M Books, UK. doi.org/10.52517/9781789182194

Department of Agriculture, Fisheries and Food. 2008 'A strategy for the improved pest control on Irish salmon farms.' link.

Department of the Marine and Natural Resources 2000 'Monitoring Protocol No. 3: Offshore Finfish Farms - Sea Lice Monitoring and Control.' link.

Grøntvedt, R.N., **Nerbøvik, I.-K.G.**, **Viljugrein, H.**, **Lillehaug, A.**, **Nilsen, H.** and **Gjevre, A.-G.** 2015 *Thermal de-licing of salmonid fish–documentation of fish welfare and effect*, Norwegian Veterinary Institute.

Hamre, L., **Bui, S.**, **Oppedal, F.**, **Skern-Mauritzen, R.** and **Dalvin, S.** 2019 'Development of the salmon louse *Lepeophtheirus salmonis* parasitic stages in temperatures ranging from 3 to 24°C', *Aquaculture Environment Interactions* 11: p.429–443. doi.org/10.3354/aei00320

Hamre, L.A., **Eichner, C.**, **Caipang, C.M.A.**, **Dalvin, S.T.**, **Bron, J.E.**, **Nilsen, F.**, **Boxshall, G.** and **Skern-Mauritzen, R.** 2013 'The salmon louse *Lepeophtheirus salmonis* (Copepoda: Caligidae) life cycle has only two chalimus stages', *PloS ONE* 8: e73539. doi.org/10.1371/journal.pone.0073539

Hamre LA, Dalvin S, Myhre G, Bui S. 2024. Effect of temperature on development rate and egg production in *Caligus elongatus* and other sea louse species. *Aquaculture Environment Interactions* **16**: 227–240. doi.org/10.3354/aei00486

Hemmingsen, W., **MacKenzie, K.**, **Sagerup, K.**, **Remen, M.**, **Bloch-Hansen, K.** and **Dagbjartarson Imsland, A.K.** 2020 '*Caligus elongatus* and other sea lice of the genus *Caligus* as parasites of farmed salmonids: A review', *Aquaculture* 522: p.735160. doi.org/10.1016/j.aquaculture.2020.735160.

Heuch, P., **Nordhagen, J.** and **Schram, T.** 2000 'Egg production in the salmon louse [*Lepeophtheirus salmonis* (Krøyer)] in relation to origin and water temperature', *Aquaculture Research* 31: p.805–814. doi.org/10.1046/j.1365-2109.2000.00512.x.

Hogans, W. and **Trudeau, D.** 1989 'Preliminary studies on the biology of sea lice, *Caligus elongatus, Caligus curtus* and *Lepeophtheirus salmonis* (Copepoda: Caligoida) parasitic on cage-cultured salmonids in the lower Bay of Fundy.', *Canadian Technical Report of Fisheries and Aquatic Sciences* 1715: p.14. link.

Imsland, A.K., **Reynolds, P.**, **Eliassen, G.**, **Hangstad, T.A.**, **Foss, A.**, **Vikingstad, E.** and **Elvegård, T.A.** 2014 'The use of lumpfish (*Cyclopterus lumpus* L.) to control sea lice (*Lepeophtheirus salmonis* Krøyer) infestations in intensively farmed Atlantic salmon (*Salmo salar* L.)', *Aquaculture* 424: p.18–23. doi.org/10.1016/j.aquaculture.2013.12.033

Jackson, D. & **Minchin, D.** 1992 'Aspects of the reproductive output of two caligid copepod species parasitic on cultivated salmon', *Invertebrate Reproduction & Development.* 22: p87–90. doi.org/10.1080/07924259.1992.9672260

Jackson, D., Deady, S., Hassett, D. and **Leahy, Y.** 2000 '*Caligus elongatus* as parasites of farmed salmonids in Ireland', *Contributions to Zoology* 69: p65-70. doi.org/10.1163/18759866-0690102007

Jackson, D., Hassett, D., & Copley, L. 2002. Integrated lice management on Irish salmon farms. *Fish Veterinary Journal* 6: 28–38.

Jackson, D., **Kane, F.**, **O'Donohoe, P.**, **Mc Dermott, T.**, **Kelly, S.**, **Drumm, A.** and **Newell, J.** 2013 'Sea lice levels on wild Atlantic salmon, *Salmo salar* L., returning to the coast of Ireland', *Journal of fish Diseases* 36: p.293–298. doi.org/10.1111/jfd.12059

Kabata, Z. 1979 '*Parasitic copepoda of British fishes*', London: The Ray Society London.

Mc Dermott, T., **D'Arcy, J.**, **Kelly, S.**, **Downes, J.K.**, **Griffin, B.**, **Kerr, R.F.**, **O'Keeffe, D.**, **O'Ceallachain, M.**, **Lenighan, L.**, **Scholz, F.** and **Ruane, N.M.** 2022 'Novel use of nanofiltered hyposaline water to control sea lice (*Lepeophtheirus salmonis* and *Caligus elongatus*) and amoebic gill disease, on a commercial Atlantic salmon (*Salmo salar*) farm', *Aquaculture Reports* 20: p.100703. doi.org/10.1016/j.aqrep.2021.100703

O'Donohoe, P. and **McDermott, T.** 2014 'Reducing sea lice re-infestation risk from harvest water at a salmon farm site in Ireland using a bespoke sieving and filtration system', *Aquacultural engineering* 60: p.73–76. doi.org/10.1016/j.aquaeng.2014.04.004

Overton, K., **Dempster, T.**, **Oppedal, F.**, **Kristiansen, T.S.**, **Gismervik, K.** and **Stien, L.H.** 2019 'Salmon lice treatments and salmon mortality in Norwegian aquaculture: a review', *Reviews in Aquaculture* 11: p.1398-1417. doi.org/10.1111/raq.12299

Ritchie, G., Mordue, A., Pike, A., & Rae, G. 1993. The reproductive output of *Lepeophtheirus salmonis* adult females in relation to seasonal variability of temperature and photoperiod. *Pathogens of Wild and Farmed Fish: Sea Lice. Ellis Horwood, Chichester* 153–165.

Samsing, F., **Oppedal, F.**, **Dalvin, S.**, **Johnsen, I.**, **Vågseth, T.** and **Dempster, T.** 2016 'Salmon lice (Lepeophtheirus salmonis) development times, body size, and reproductive outputs follow universal models of temperature dependence', *Canadian Journal of Fisheries and Aquatic Sciences* 73: p.1841–1851. doi.org/10.1139/cjfas-2016-0050

Schram, T.A. 1993 'Supplementary descriptions of the developmental stages of *Lepeophtheirus salmonis* (Krøyer, 1837) (Copepoda: Caligidae)' in *Pathogens of wild and farmed fish: sea lice.* G.A. Boxshall & D. Defaye (Eds.). London: Ellis Horwood Ltd.

APPENDIX 1.

National Surveys of Sea lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann)

Copley L, McCarney P, Jackson D, Hassett D, Kennedy S, Nulty C. 2001. The occurrence of Sea lice (*Lepeophtheirus salmonis* Krøyer) on Farmed Salmon in Ireland (1995 to 2000). *Marine Institute, Marine Resource Series* **17**.

McCarney P, Copley L, Jackson D, Nulty C, Kennedy S. 2001. National Survey of the Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2000. *Marine Institute, Fisheries Leaflet* **180**.

McCarney P, Copley L, Kennedy S, Nulty C, Jackson D. 2002. National Survey of the Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2001. *Marine Institute, Fisheries Leaflet* **181**.

O'Donohoe P, Kennedy S, Copley L, Kane F, Naughton O, Jackson D. 2003. National Survey of the Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2002. *Marine Institute, Fisheries Leaflet* **184**.

O'Donohoe P, Kennedy S, Kane F, Naughton O, Tierney D, Copley L, Jackson D. 2004. National Survey of the Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2003. *Marine Institute, Fisheries Leaflet* **184**.

O'Donohoe P, Kennedy S, Kane F, Naughton O, Tierney D, Jackson D. 2005. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2004. *Marine Institute, Irish Fisheries Bulletin* **22**.

O'Donohoe P, Kane F, Kennedy S, Naughton O, Nixon P, Power A, Jackson D. 2006. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2005. *Marine Institute, Irish Fisheries Bulletin* **24**.

O'Donohoe P, Kane F, Kennedy S, Nixon P, Power A, Naughton O, Jackson D. 2007. National Survey of Sea lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2006. *Marine Institute, Irish Fisheries Bulletin* **28**.

O'Donohoe P, Kane F, Kelly S, Nixon P, Power A, Naughton O, Jackson D. 2008. National Survey of Sea lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2007. *Marine Institute, Irish Fisheries Bulletin* **31**.

O'Donohoe P, Kane F, Kelly S, Nixon P, Power A, Naughton O, Tully D, Jackson D. 2009. National Survey of Sea lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2008. *Marine Institute, Irish Fisheries Bulletin* **32**.

O'Donohoe P, Kane F, Kelly S, Nixon P, Power A, McDermott T, Drumm A, Jackson D. 2010. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2009. *Marine Institute, Irish Fisheries Bulletin* **33**.

O'Donohoe P, Kane F, Kelly S, McDermott T, Drumm A, Jackson D. 2011. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2010. *Marine Institute, Irish Fisheries Bulletin* **34**.

O'Donohoe P, Kane F, Kelly S, McDermott T, Drumm A, Jackson D. 2012. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2011. *Marine Institute, Irish Fisheries Bulletin* **40**.

O'Donohoe P, Kane F, Kelly S, McDermott T, Drumm A, Jackson D. 2013. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2012. *Marine Institute, Irish Fisheries Bulletin* **41**.

O'Donohoe P, Kane F, Kelly S, McDermott T, Drumm A, Jackson D. **2014**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2013. *Marine Institute, Irish Fisheries Bulletin* **44**.

O'Donohoe P, Kane F, Kelly S, McDermott T, Drumm A, Jackson D. **2015**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2014. *Marine Institute, Irish Fisheries Bulletin* **45**.

O'Donohoe P, Kane F, Kelly S, McDermott T, Drumm A, Nixon P, Jackson D. **2016**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2015. *Marine Institute, Irish Fisheries Bulletin* **46**.

O'Donohoe P, Kane F, Kelly S, McDermott T, D'Arcy J, Casserly J, Nixon P, Jackson D. **2017**. National survey of sea lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on fish farms in Ireland - 2016. *Marine Institute, Irish Fisheries Bulletin* **47**.

O'Donohoe P, Kane F, Kelly S, McDermott T, D'Arcy J, Casserly J, Downes JK, Jackson D. **2018**. National survey of sea lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on fish farms in Ireland - 2017. *Marine Institute, Irish Fisheries Bulletin* **48**.

O'Donohoe P, Kane F, Kelly S, McDermott T, Casserly J, D'Arcy J, Downes JK, McLoughlin S, Ruane NM, Jackson D. **2019**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Krøyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2018. *Marine Institute, Irish Fisheries Bulletin* **49**.

O' Donohoe P, Kane F, Kelly S, Mc Dermott T, D'Arcy J, Casserly J, Downes J, McLoughlin S, Ruane N, Jackson D. **2020**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Kroyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2019. *Marine Institute, Irish Fisheries Bulletin* **50**.

O'Donohoe P, Kane F, Kelly S, McDermott T, D'Arcy J, Casserly J, Downes JK, McLoughlin S, Thomas K, Ruane NM. **2021**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Kroyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2020. *Marine Institute, Irish Fisheries Bulletin* **52**.

D'Arcy J, Kelly S, McDermott T, Casserly J, Downes J, Hynes P, Kane F, O'Donohoe P, Ruane N. **2022**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Kroyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland - 2021. *Marine Institute, Irish Fisheries Bulletin* **53**.

D'Arcy J, Kelly S, McDermott T, Kane F, Casserly J, Power A, O' Donohoe P, Ruane N. **2023**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Kroyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2022. *Marine Institute, Irish Fisheries Bulletin* **54**.

D'Arcy J, Kelly S, McDermott T, Casserly J, Power A, Waters C, O' Donohoe P, Ruane N. **2024**. National Survey of Sea Lice (*Lepeophtheirus salmonis* Kroyer and *Caligus elongatus* Nordmann) on Fish Farms in Ireland – 2023. *Marine Institute, Irish Fisheries Bulletin* **55**

APPENDIX 2.

Mean sea lice levels on salmonid farms in 2024.

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
BANTRY BAY					
MOWI IRL.					
Ahabeg					
Atlantic Salmon, 2024 S 1/2	20/05/2024	0.11	0.40	0.03	0.05
	20/06/2024	0.28	0.93	0.05	0.06
	09/07/2024	0.17	0.61	0.01	0.05
	27/08/2024	0.59	2.23	0.06	0.09
	13/09/2024	0.11	0.74	0.02	0.10
	17/10/2024	0.27	3.02	0.00	0.02
	19/11/2024	0.97	8.35	0.00	0.00
Gearhies					
Atlantic Salmon, 2023 S 1/2	04/01/2024	0.00	0.08	0.41	0.73
	14/02/2024	0.00	0.00	0.00	0.00
			Harvested Out		
Roancarraig					
Atlantic Salmon, 2024 S 1/2	04/01/2024	0.00	0.00	0.03	0.10
	14/02/2024	0.00	0.00	0.00	0.03
	14/03/2024	0.04	0.27	1.25	2.15
	27/03/2024	0.00	0.00	0.04	0.04
	03/04/2024	0.00	0.10	0.11	0.14
	25/04/2024	0.03	0.30	2.23	5.70
	03/05/2024	0.12	0.48	4.42	8.98
	20/05/2024	0.15	0.32	0.13	0.21
	20/06/2024	0.21	0.34	0.02	0.04
	09/07/2024	0.02	0.14	0.02	0.02
	27/08/2024	0.19	0.48	0.02	0.02
	13/09/2024	0.11	1.03	0.00	0.02
	17/10/2024	0.38	3.11	0.03	0.03
	19/11/2024	1.53	10.44	0.04	0.07

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
KENMARE BAY					
Deenish					
Atlantic Salmon, 2023	15/01/2024	0.00	0.00	0.25	0.39
	13/02/2024	0.00	0.00	0.18	0.24
	15/03/2024	0.00	0.00	0.21	0.35
	27/03/2024	0.00	0.00	0.41	0.62
	04/04/2024	0.00	0.02	0.27	0.32
	24/04/2024	0.00	0.00	0.08	0.15
	02/05/2024	0.00	0.00	0.22	0.30
	27/05/2024	0.00	0.07	1.20	1.93
	19/06/2024	0.05	0.15	1.20	2.69
	08/07/2024	0.02	0.02	0.00	0.02
			Harvested Out		
Inishfarnard					
Atlantic Salmon, 2024	25/04/2024	0.00	0.00	0.02	0.03
	03/05/2024	0.00	0.00	0.02	0.08
	20/05/2024	0.00	0.00	0.00	0.05
	20/06/2024	0.00	0.00	0.00	0.00
	09/07/2024	0.00	0.00	0.00	0.05
	27/08/2024	0.00	0.02	0.00	0.04
	12/09/2024	0.00	0.00	0.00	0.00
	16/10/2024	0.00	0.02	0.03	0.07
	19/11/2024	0.00	0.00	0.17	0.20

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
KILKIERAN BAY					
BRADAN BEO TEO.					
Ardmore					
Atlantic Salmon, 2024 S 1/2	12/01/2024	0.00	0.92	0.00	0.00
	26/02/2024	0.05	3.04	0.00	0.00
	01/03/2024	0.04	3.26	0.00	0.00
	20/03/2024	0.07	0.25	0.00	0.00
	04/04/2024	0.05	0.40	0.00	0.00
	23/04/2024	0.03	0.42	0.00	0.09
	03/05/2024	0.00	0.07	0.00	0.00
	16/05/2024	0.07	1.49	0.02	0.07
	04/06/2024	0.05	0.12	0.00	0.00
	18/07/2024	0.02	0.04	0.00	0.00
	08/08/2024	0.02	0.12	0.05	0.13
	04/09/2024	0.00	0.00	0.02	0.02
	11/10/2024	0.00	0.00	0.00	0.00
	05/11/2024	0.04	0.11	0.00	0.00
Daonish					
Atlantic Salmon, 2023 S 1/2	15/12/2023	0.21	1.20	0.00	0.00
	14/02/2024	0.36	2.49	0.07	0.19
	12/03/2024	0.23	4.52	0.02	0.11
	20/03/2024	0.09	2.64	0.00	0.02
	10/04/2024	0.77	1.73	0.00	0.00
	30/04/2024	0.05	0.12	0.00	0.00
	08/05/2024	0.42	3.15	0.08	0.08
	16/05/2024	0.17	3.43	0.13	0.23
			Harvested Out		

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
BERTRAGHBOY BAY					
BIFAND LTD./MOWI IRL.					
Sealax					
Atlantic Salmon, 2024 S 1/2	17/01/2024	0.02	0.13	0.14	0.21
	09/02/2024	0.00	0.13	0.06	0.23
	06/03/2024	0.04	0.28	0.41	0.61
	27/03/2024	0.01	0.15	0.40	0.52
	09/04/2024	0.13	0.34	0.25	0.34
	22/04/2024	0.13	0.42	0.45	0.77
	03/05/2024	0.09	0.35	0.00	0.03
	22/05/2024	0.12	1.99	0.02	0.05
	06/06/2024	0.61	2.28	0.00	0.02
	25/07/2024	0.02	1.23	0.46	1.14
	09/08/2024	0.00	0.15	0.10	0.21
	19/09/2024	0.00	0.02	0.00	0.00
	10/10/2024	0.00	0.00	0.00	0.00
	04/11/2024	0.00	0.00	0.02	0.02
CLIFDEN BAY					
MANNIN BAY SALMON COMPANY LTD.					
Hawks Nest					
Atlantic Salmon, 2023 S 1/2	19/12/2023	0.09	0.87	0.12	0.22
	19/02/2024	0.02	0.25	0.00	0.00
	08/03/2024	0.00	3.55	0.13	0.23
			Harvested Out		

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
BALLINAKILL HARBOUR					
BIFAND LTD.					
Fraochoilean					
Atlantic Salmon, 2023 S 1/2	12/12/2023	0.00	0.07	0.71	2.28
	07/02/2024	0.17	0.52	3.15	5.46
	05/03/2024	0.18	2.21	1.97	3.38
	19/03/2024	0.12	0.43	0.46	0.79
			Harvested Out		
KILLARY HARBOUR					
MANNIN BAY SALMON COMPANY LTD.					
Rosroe					
Atlantic Salmon, 2024 S 1/2	24/01/2024	0.00	0.00	0.00	0.08
	22/02/2024	0.00	0.00	0.00	0.08
	13/03/2024	0.00	0.00	0.10	0.29
	26/03/2024	0.00	0.05	0.00	0.00
	08/04/2024	0.00	0.00	0.00	0.00
	22/04/2024	0.04	0.15	0.00	0.02
	13/05/2024	0.00	0.07	0.02	0.10
	24/05/2024	0.06	0.96	0.00	0.00
	07/06/2024	0.23	0.70	0.03	0.05
	16/07/2024	0.32	0.87	0.15	0.40
	21/08/2024	0.19	0.40	0.02	0.02
	18/09/2024	0.88	8.62	1.76	4.21
	17/10/2024	0.01	0.28	0.11	0.22
	29/11/2024	0.00	0.02	0.07	0.22

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
CLEW BAY					
CLARE ISLAND SEAFARMS LTD.					
Clare Island Smolt Site					
Atlantic Salmon, 2024	03/04/2024	0.00	0.01	0.05	0.16
	19/04/2024	0.00	0.02	0.15	0.38
	10/05/2024	0.00	0.04	0.83	1.15
	21/05/2024	0.00	0.02	0.97	2.13
	26/06/2024	0.00	0.09	0.05	0.29
	05/07/2024	0.00	0.00	0.02	0.12
	27/08/2024	0.02	0.11	0.34	0.47
	09/09/2024	0.00	0.05	0.04	0.11
	16/10/2024	0.00	0.00	0.03	0.06
	08/11/2024	0.04	0.19	0.67	1.05
Portlea					
Atlantic Salmon, 2023	11/12/2023	0.00	0.00	0.23	0.41
	13/02/2024	0.00	0.00	3.60	6.55
	11/03/2024	0.00	0.00	3.09	5.88
	25/03/2024	0.02	0.02	0.26	0.87
	03/04/2024	0.00	0.00	0.85	2.52
	19/04/2024	0.00	0.00	0.50	1.09
	10/05/2024	0.02	0.02	1.98	3.53
	21/05/2024	0.03	0.10	0.48	2.79
	26/06/2024	0.07	0.12	1.41	2.84
	05/07/2024	0.19	0.44	1.35	2.80
			Harvested Out		
BEALACRAGHER BAY					
CURRAUN BLUE LTD.					
Curraun					
Atlantic Salmon, 2023 S 1/2	14/12/2023	0.05	0.22	0.03	0.03
	13/02/2024	0.24	0.77	0.00	0.00
	14/03/2024	0.13	0.63	0.00	0.00
			Harvested Out		

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
DONEGAL BAY					
MOWI IRL.					
Creevin					
Atlantic Salmon, 2023	09/01/2024	0.28	0.92	0.00	0.02
	28/02/2024	0.62	1.30	0.04	0.14
	04/03/2024	0.55	1.64	0.08	0.10
	28/03/2024	0.08	0.38	0.02	0.10
	02/04/2024	0.18	0.81	0.03	0.23
	26/04/2024	0.02	0.66	0.15	0.35
	09/05/2024	0.12	1.90	0.04	0.05
	28/05/2024	0.07	0.11	0.00	0.00
			Harvested Out		

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
DONEGAL BAY					
OCEAN FARM LTD.					
Mc Swynes					
Atlantic Salmon, 2023 S 1/2	12/12/2023	0.00	0.00	0.07	0.09
	13/02/2024	0.00	1.51	2.85	9.59
	05/03/2024	0.24	0.64	3.12	5.72
	21/03/2024	0.02	0.36	0.24	0.84
	08/04/2024	0.09	2.91	0.76	6.72
	19/04/2024	0.37	6.33	4.12	17.78
	14/05/2024	0.32	1.03	0.00	0.00
	20/05/2024	0.39	0.50	0.00	0.00
	21/06/2024	0.77	1.07	0.10	0.10
			Harvested Out		
Ocean Inver					
Atlantic Salmon, 2024 S 1/2	12/12/2023	0.00	0.00	0.02	0.02
	13/02/2024	0.00	1.91	0.07	0.35
	05/03/2024	0.26	1.66	0.28	0.46
	21/03/2024	0.03	1.74	0.18	0.47
	08/04/2024	0.04	1.91	0.07	0.31
	19/04/2024	0.44	2.84	0.00	0.00
	14/05/2024	0.22	1.29	0.00	0.00
	20/05/2024	0.23	1.62	0.04	0.04
	26/06/2024	0.12	0.82	0.00	0.02
	26/07/2024	0.12	0.34	0.00	0.02
	19/08/2024	0.00	0.02	0.00	0.00
	19/09/2024	0.00	0.00	0.00	0.00
	02/10/2024	0.00	0.00	0.02	0.02
	30/11/2024	Not sampled for fish health reasons			

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
MULROY BAY					
MOWI IRL.					
Glinsk					
Atlantic Salmon, 2023			Transferred to Creevin		
Atlantic Salmon, 2024	25/04/2024	0.00	0.00	0.00	0.11
	08/05/2024	0.00	0.02	0.05	0.09
	27/05/2024	0.00	0.02	0.00	0.00
	14/06/2024	0.00	0.00	0.02	0.02
	25/07/2024	0.00	0.02	0.00	0.00
	20/08/2024	0.00	0.00	0.00	0.00
	23/09/2024	0.00	0.02	0.00	0.00
			Transferred to Lough Swilly		
Millstone					
Atlantic Salmon, 2023	08/01/2024	0.24	2.59	0.00	0.00
			Transferred to Lough Swilly, Creevin		
Atlantic Salmon, 2024	25/04/2024	0.00	0.05	0.02	0.02
	08/05/2024	0.00	0.00	0.03	0.10
	27/05/2024	0.00	0.00	0.00	0.00
	14/06/2024	0.00	0.00	0.00	0.00
	25/07/2024	0.00	0.00	0.00	0.02
	20/08/2024	0.00	0.01	0.00	0.00
	23/09/2024	0.00	0.00	0.00	0.00
	11/10/2024	0.02	0.11	0.00	0.05
	06/11/2024	0.02	0.32	0.03	0.08

	Date	*Lepeophtheirus salmonis*		*Caligus elongatus*	
		F + eggs	Total	F + eggs	Total
LOUGH SWILLY					
Lough Swilly					
Atlantic Salmon, 2023	09/01/2024	0.07	2.23	0.06	0.41
	28/02/2024	0.54	3.35	0.35	1.36
	06/03/2024	0.24	2.91	0.27	1.83
	20/03/2024	0.00	1.03	0.00	0.33
	03/04/2024	0.20	10.14	0.78	4.84
	25/04/2024	0.63	2.02	0.08	0.27
	08/05/2024	0.02	0.02	0.00	0.00
	27/05/2024	0.06	0.25	0.00	0.00
			Harvested Out		
Atlantic Salmon, 2024	11/10/2024	0.00	0.06	0.05	0.08
	06/11/2024	0.16	0.53	0.56	1.61

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ISSN 1649-5055

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