



Environmental Management Plan

FMA-W4
North Gravir (FSXXXX)
Gravir (FS0242)

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Glossary of Terms

Abbreviation / Terms	Definitions
BFS	Bakkafrost Scotland
CAR	Controlled Activities Regulations
CoGP	Code of Good Practice
EMP	Environmental Management Plan
EN	Enforcement Notice
FMA	Farm Management Area
ISLM	Integrated Sea Lice Management
LPA	Local Planning Authority
MD	Marine Directorate
MTQ	Maximum Treatment Quantity
NTS	National Treatment Strategy
SEPA	Scottish Environment Protection Agency
SIWG	Salmon Interactions Working Group
SLMS	Sea Lice Management Strategy
TAQ	Total Allowable Quantity
VHP	Veterinary Health Plan
VMD	Veterinary Medicine Directorate
WFSLMS	Wild Fisheries Sea Lice Monitoring Strategy

1. Introduction

1.1. Purpose of the Environmental Management Plan (EMP)

This EMP has been designed to satisfy the EMP criteria set by Marine Directorate (MD) and to encompass the recommendations made by the Salmon Interactions Working Group (SIWG) (2020) ¹. The Local Planning Authority (LPA) regulates potential interactions between aquaculture and wild fisheries through planning powers afforded by the Town and Country Planning (Scotland) Act 1997, in addition to acting under its biodiversity responsibilities under the Nature Conservation (Scotland) Act 2004. Where this EMP is implemented by means of a Planning Condition, this provides the LPA with enforcement capabilities to ensure adherence by BFS to the environmental management commitments detailed within the EMP.

In 2021, the Scottish Government named the Scottish Environment Protection Agency (SEPA) as lead body responsible for managing the risk to wild salmonids from sea lice from fish farms, and that they would consult on proposals for an adaptive spatially-based risk assessment framework for managing sea lice interactions between farmed and wild salmonids, which will be applied through the Water Environment (Controlled Activities) (Scotland) Regulations 2011. Following this appointment and consultation, SEPA implemented the Sea Lice Risk Framework (SLRF) in February 2024, used as a screening tool to ensure development occurs in the areas of acceptable risk level, and applying conditions to limit levels of sea lice on sites of relative higher modelled risk. It is intended by SEPA (and arrangement with Local Planning Authorities) that the SLRF will supersede all existing EMPs by 2026, however the EMP will continue to serve as an interim measure until this transition is complete.

The EMP provides a mechanism for communication between relevant local wild fisheries interests (hereafter, the 'relevant parties') as detailed in Table 1.

Table 1: Local Wild Fisheries Interests

Organisation	Interest
Bakkafrost Scotland (BFS)	Aquaculture Operator
Marine Directorate (MD)	Industry Regulator
Local Planning Authority (LPA)	Planning Authority and Consent Compliance
Western Isles District Salmon Fishery Board (DSFB)	Statutory Consultee

The EMP is supported by the following Annexes:

- Annex 1: SEPA CAR Consents; and
- Annex 2: Wild Fisheries Sea Lice Monitoring Strategy.

1.2. Commitment for Action

BFS commits to achieving the aims and objectives of this EMP through taking the necessary management actions set out hereunder, to include:

- Complying with all relevant statutes and laws;
- Complying with all relevant standard operating procedures;
- Complying with hazardous substances regulations and guidance ensuring correct handling and storage;
- Complying with the Sea Lice Management Strategy (SLMS);
- Implementing all necessary mitigation measures as required; and
- On a regular basis, to evaluate the performance through appropriate audits and reviews and to strive for constant improvement.

¹ <https://www.gov.scot/publications/report-salmon-interactions-working-group/>

Additionally, in so far as not co-incident with the above, BFS commits to take appropriate action if there is a breach of the lice intervention criteria stipulated by the Code of Good Practice (CoGP)² or if an escape event occurs or is suspected. The course of action will be dependent on the exact situation but will be documented and communicated with the local wild fisheries interests and the LPA as required.

1.3. EMP Location Information

The Scottish Finfish Aquaculture CoGP² defines areas in which finfish aquaculture occurs into separate Farm Management Areas (FMAs). The FMA describes the area in which marine farm operators are recommended to synchronise operational activities such as fallowing, treatments and single-year class stocking to manage and minimise risks posed by infectious agents and parasites. This EMP covers all BFS sites within Farm Management Area (FMA) W-4 (Figure 1) (hereafter 'the Sites'), which encompasses Loch Ouirn (Loch Odhairn). BFS is the only marine finfish operator in FMA W-4. Should any other marine salmon operators wish to start production in FMA W-4, BFS will seek to engage with the operator to facilitate a coordinated EMP approach.

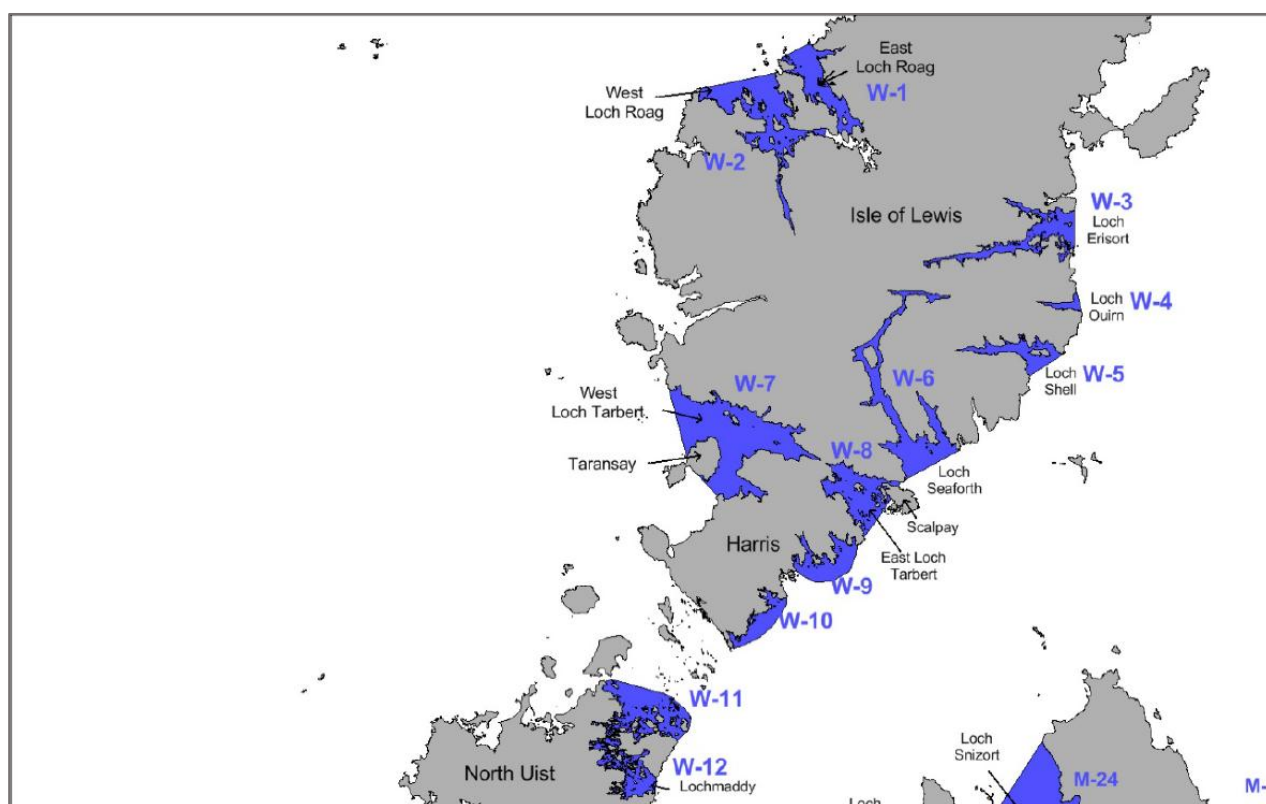


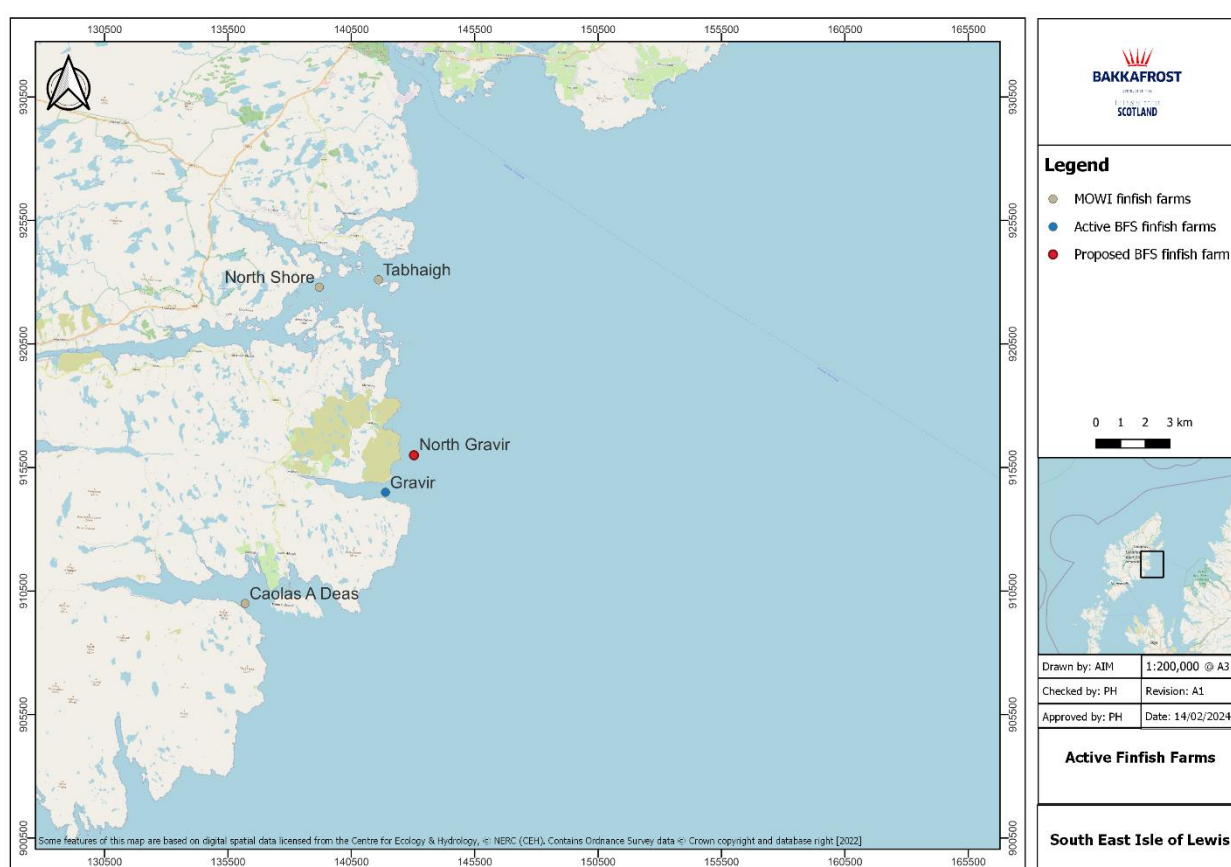
Figure 1: Location and Boundary of CoGP Management Area (MA) W-4

The specific information relating to each BFS site covered by this EMP is detailed in Table 2 and shown in Figure 2: FMA-W4 EMP Site Locations. Collectively, the named sites will hereafter be referred to as 'the Sites'.

² Salmon Scotland Code of Good Practice for Scottish Finfish Aquaculture (CoGP). Available at: <http://thecodeofgoodpractice.co.uk/>

Table 2: BFS Sites Covered by Loch Odhairn EMP

Site	Location	Site ID	Planning Reference	Planning Condition	Biomass Consent (Tonnes)	Pens (No. x Circumference)
Gravir ³	Loch Odhairn	FS0242	14/00109	N/A	2285	10 x 120 m
			17/00536	N/A	515.7	2 x 120 m
North Gravir	East Lewis, North of Loch Odhairn	FSXXX X	Proposed Site			5 x 200 m



2. Aims of the EMP

The purpose of the EMP is to provide a framework for interaction between BFS and the relevant parties to achieve the aims set out below.

The EMP is for use by those parties involved in the operational activities of the Sites and details the environmental management commitments made by BFS throughout the operational lifetime of the Sites in FMA W-4.

³ The Gravir fish farm is made up of two separate planning consents, Gravir Outer and Gravir West, but operate as a single farm.

In addition to satisfying the MD EMP criteria, this plan has been prepared to meet the requirements of the Town and Country Planning Regulations and The Conservation (Natural Habitats, &c.) Regulations 1994, and to enable the obligation of the LPA to manage potential impacts on wild salmonids from farming activity to be satisfied. The EMP is also a functional document and is linked to various BFS Standard Operating Procedures (SOP) and Strategies. This will also provide a framework for compliance auditing and monitoring to provide assurance to statutory stakeholders that the necessary levels of sea lice management are being met.

The EMP specifically illustrates the proposed actions required to manage sea lice sufficiently and appropriately at the Sites to achieve the principal Aim:

- To ensure that salmonid farming activity within the Farm Management Area does not result in negative impacts to local salmon and sea trout populations.

3. Objectives of the EMP

The Aims of the EMP will be achieved through the implementation of four Objectives identified as essential EMP criteria by the Marine Directorate (MD):

1. Report on the level of lice released into the environment;
2. Identify the likely area(s) of sea lice dispersal from the farm;
3. Provide details of the monitoring data that will be collected to assess potential interaction with wild fish; and
4. Provide details how this monitoring information will feed back to management practice.

A summary of the Objectives, the related Prescriptions (measures taken to achieve objective), are summarised in Table 3 below.

Table 3: EMP Objectives and Prescriptions

Objective	Prescription
Objective 1: Report on the level of lice released into the environment	Prescription 1.1: Area Lice Load Reports
	Prescription 1.2: Sea Lice Compliance Monitoring
	Prescription 1.3: Implementation of Improved Treatment Threshold
	Prescription 1.4: Adherence to Statutory Sea Lice Reporting Guidelines
Objective 2: Identify the likely area(s) of sea lice dispersal from the farm	Prescription 2.1: Sea Lice Dispersal Analysis
Objective 3: Provide details of the monitoring data that will be collected to assess potential interaction with wild fish	Prescription 3.1: Wild Fisheries Sea Lice Monitoring Strategy
	Prescription 3.2: Implementation of the Sea Lice Management Strategy
Objective 4: Provide details how this monitoring information will feed back to management practice	Prescription 4.1: Implementation of the Integrated Sea Lice Management Plan
	Prescription 4.2: Carry out Sea Lice Treatment Efficacy Monitoring (Bioassays)
	Prescription 4.3: Implementation of Sea Lice Action Plan
	Prescription 4.4: Continuous Operational Monitoring Feedback Loops
	Prescription 4.5: End of Production Cycle Review
	Prescription 4.6: Engagement Procedure

Objective 1: Report on the level of lice released into the environment

The following Prescriptions detail the commitments and measures to be undertaken by BFS, to achieve Objective 1 of the EMP.

Prescription 1.1: Area Lice Load Reports

BFS will produce an annual 'Area Lice Load' report which will indicate weekly site performance relative to CoGP based on the stocked numbers of fish and adult female lice counts. This will be compared to a theoretical benchmark specific to the FMA derived from a calculation of Maximum Stock Count x CoGP lice treatment threshold (subject to temporal variations). Calculation of the area lice load will be an iterative process with the basis for calculation subject to periodic review (See Prescription 4.5) and agreement by the Relevant Parties.

Prescription 1.2: Sea Lice Compliance Monitoring

Sea lice counts at the Sites will be undertaken on a weekly basis. The minimum lice monitoring that is undertaken is in accordance with the National Treatment Strategy (NTS) (as outlined in CoGP) i.e., a minimum of 5 fish from 5 pens are sampled. However, BFS's strategy involves sampling **10 fish from every stocked pen** at least once a week, unless the health of the fish dictates that fewer fish are sampled.

All individuals undertaking this monitoring will have undertaken full lice identification and life cycle training, biology and health monitoring training, and environmental training.

Count information will be collated and stored on BFS's Fishtalk database. This information is also held from previous cycles for review, and includes full staging breakdowns, trends, and treatments, to allow for benchmarking and improvements to be made in future production cycles, helping to ensure the adaptive management of each of BFS site. Under the Fish Farming Businesses (Reporting) (Scotland) Order 2020⁴, BFS reports the weekly average adult female sea lice numbers per fish on farm sites to Scottish Ministers within 8 days after the end of the reporting week. These data are then published online⁵.

Observation of lice counts by relevant parties shall be facilitated on reasonable request by BFS, on the understanding that reciprocal arrangements may be made possible for observation of wild fish lice counts. Lice count observation requests will be facilitated where reasonable notification has been provided, pending favourable weather and site operations permitting.

Prescription 1.3: Implementation of Improved Treatment Threshold

To facilitate more effective sea lice treatment at all of its sites, BFS operates to treatment thresholds that are below that of the NTS, as recommended by the CoGP. The NTS recommends a threshold of **0.5** female lice per fish from February to June and **one (1)** female louse per fish from July to January. However, BFS's threshold for intervention is lower, at **0.5** adult female lice throughout the year.

This is based on current knowledge of lice moult rates, which are temperature dependent, and allows ample time for treatment planning and resource allocation, as well as any other husbandry interventions that may reduce sea lice escalation.

In reality, intervention first occurs when lice are at absent or negligible levels on the farm, through the strategic use of cleanerfish, the use of freshwater bathing, and in-feed medicinal treatments, in accordance with the quantities permitted under CAR.

Prescription 1.4: Adherence to Statutory Sea Lice Reporting Guidelines

BFS adheres to the MD guidelines for sea lice reporting⁶. These measures help facilitate adaptive management and are enforced under the regime shown in Figure 3.

⁴ <https://www.legislation.gov.uk/ssi/2020/447/article/3/made>

⁵ <https://www.gov.scot/publications/fish-health-inspectorate-sea-lice-information/>

⁶ <https://www.gov.scot/publications/fish-health-inspectorate-sea-lice-information/>

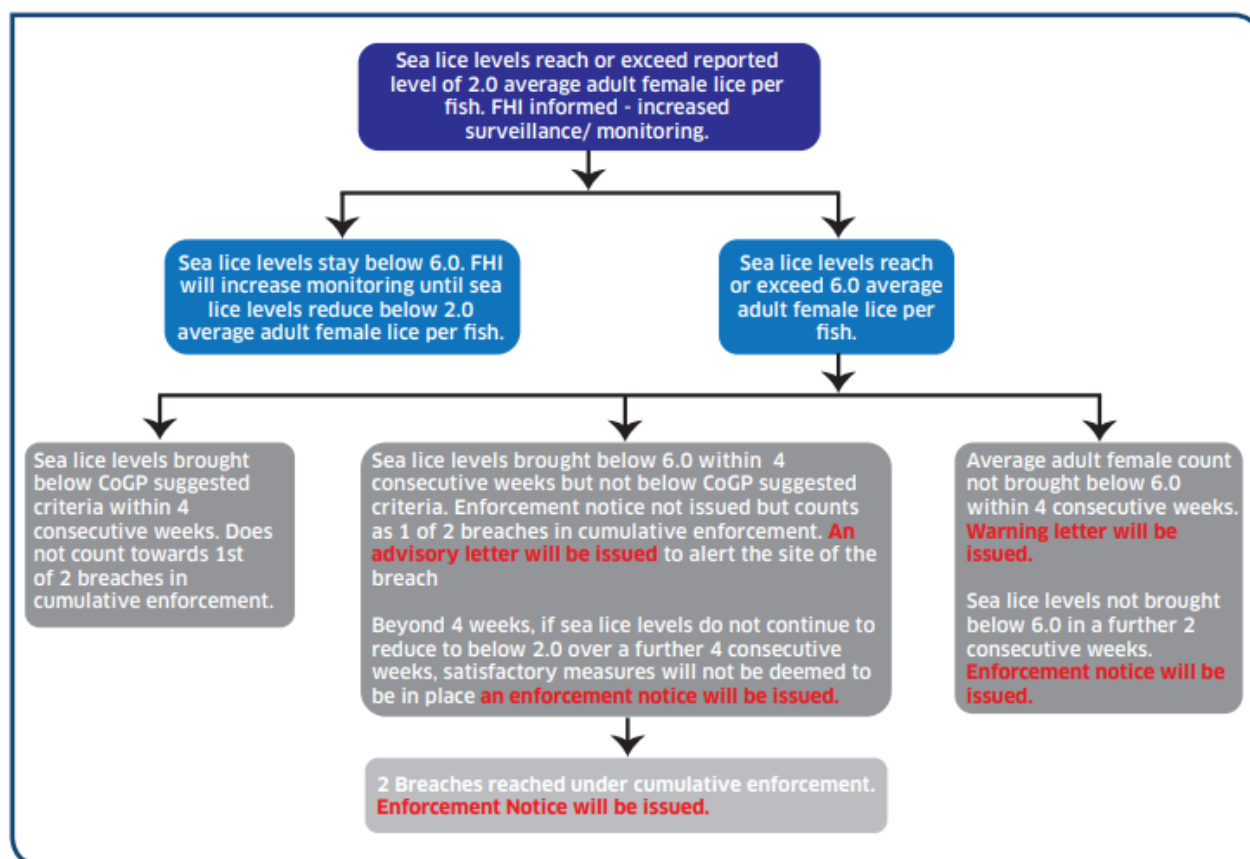


Figure 3: MD Sea Lice Policy Enforcement Regime⁷

Reporting will be to the Fish Health Inspectorate Duty Inspector by telephone (0131 244 3498) or by e-mail (MS.FishHealth@gov.scot).

If sea lice levels reach company thresholds (as detailed in Prescription 1.3), BFS will follow the ISLM Plan (see Prescription 4.1 Implementation of the Integrated Sea Lice Management Plan (ISLM Plan)). This details the options for intervention that are available to BFS and the decision-making process that will be followed on the Sites. The appropriate course of action will be determined by BFS Production and Biology staff.

⁷ <https://www2.gov.scot/Resource/0054/00547487.pdf>

Objective 2: Identify the likely area(s) of sea lice dispersal from the farm

The following Prescription details the commitments and measures to be undertaken by BFS to achieve Objective 2 of the EMP.

Prescription 2.1: Sea Lice Dispersal Analysis

In support of the North Gravir development, BFS will undertake a sea lice dispersal analysis of the Sites covered by the EMP. The analysis will aim to provide a spatial representation of likely areas of sea lice dispersal from the Sites using environmental data to simulate passive particle movement along hydrographic pathways.

The scale and resolution of the analysis will be determined by a review of existing environmental data, modelled outputs and published literature, and the analysis may range from coarse-scale 2D representations to fine-scale 3D modelling, depending on available data and the size of the area to be analysed.

Once available, the dispersal analysis output will be used to inform the sampling locations included within the Wild Fisheries Sea Lice Monitoring Strategy (WFSLMS), i.e. by predicting likely areas of dispersal, the analysis will enable sampling to occur proportionately, in areas of both high and low predicted lice connectivity.

Objective 3: Provide details of the monitoring data that will be collected to assess potential interaction with wild fish

The following Prescription details the commitments and measures to be undertaken by BFS, to achieve Objective 3 of the EMP. Specifically, data will be collected with the aim of improving understanding of interactions between farming activity and wild salmonid populations.

Prescription 3.1: Wild Fisheries Sea Lice Monitoring

From consultation with the Outer Hebrides Fisheries Trust (OHFT), it is understood that the closest wild fish sensitivity to the Sites is the Laxay River, Loch Erisort, approximately 15 km by sea. Between the Sites and the Laxay River are two sites in FMA W-3 (Loch Erisort) operated by MOWI Scotland Ltd (MOWI), Tabhaigh and North Shore.

It is understood that there is an existing monitoring strategy developed by MOWI and OHFT in Loch Erisort for the Laxay River. BFS will consult with MOWI and OHFT to identify opportunities to utilize, support and build upon the existing monitoring strategy to prevent duplication of effort and data collection.

It is also understood that SEPA intends to establish a National Monitoring Programme, in support of the SLRF, with a phased implementation commencing in 2025. BFS is fully committed to engaging with the SLRF and the development of an appropriate monitoring program.

Prescription 3.2: Implementation of the Sea Lice Management Strategy

The BFS Sea Lice Management Strategy (SLMS) provides an overarching framework of strategic principals under which lice will be managed on the Sites, aiming to achieve **zero ovigerous sea lice, particularly during the wild smolt migration period**. The framework includes:

- Adherence to FMA requirements (CoGP), in particular synchronising production cycles between sites within the FMA; and
- Implementation of available sea lice management measures (**Table 4**).

Table 4: Available Sea Lice Management Measures

Management Option	Implementation Adaptations	Management Type
Treatment Forecasting (End of Cycle Review)	<ul style="list-style-type: none"> Intervention frequency Intervention type Intervention duration Adjust intervention criteria as circumstances dictate 	Strategic
Treatment Plan (Real Time)	<ul style="list-style-type: none"> Adjust intervention criteria as circumstances dictate Target higher risk pens 	Reactive
Pre-transfer preparation	<ul style="list-style-type: none"> Vaccination Strategy for optimal salmon health Pre-transfer sea lice treatments where possible Target larger smolt to higher risk sea farms 	Strategic/ Preventative
Biological - Cleanerfish	<ul style="list-style-type: none"> Species (wrasse or lumpfish) Source (wild caught or farmed) Stocking ratio Stocking dates 	Strategic/ Preventative
Production Planning	<ul style="list-style-type: none"> Stock to avoid peak lice challenges with smolt migration window 	Strategic
Freshwater Bathing	<ul style="list-style-type: none"> Maintain gill health to promote robustness to sea lice intervention Frequency Duration 	Strategic/Reactive
Mechanical – Thermal (e.g. Thermolicing)	<ul style="list-style-type: none"> Increased vessel resource Frequency Duration 	Reactive
Mechanical – Water Jets (e.g. FLS)	<ul style="list-style-type: none"> Increased vessel resource Frequency Duration Combined treatment with Freshwater 	Reactive
Medicinal	<ul style="list-style-type: none"> Dosage (subject to consents & prescriptions) SLICE Alphamax (AMX) Salmosan/Azasure 	Preventative/ Therapeutic
Efficacy Testing	<ul style="list-style-type: none"> Targeted testing for resistance/efficacy Assessment of treatment success 	Reactive/Strategic
Stock Movements	<ul style="list-style-type: none"> To reduce biomass and density 	Reactive/Strategic
Harvest Plan	<ul style="list-style-type: none"> Accelerated harvest 	Reactive
Genetics	<ul style="list-style-type: none"> Breeding programme to enhance sea lice resistance 	Ongoing
Research and Development	<ul style="list-style-type: none"> Ongoing R&D to develop novel technologies and procedures and optimise existing technologies. 	Ongoing

Objective 4: Provide details of how this monitoring information will feed back to management practice

BFS commits to adaptive management in accordance with the following prescriptions to achieve the aim of the EMP. Adaptive management means that BFS shall be responsive to evidence of impacts on wild salmonid populations from wild fish monitoring.

Prescription 4.1 Implementation of the Integrated Sea Lice Management Plan (ISLM Plan)

The ISLM Plan has been developed to provide guidance on how SLMS measures will be implemented at the Site.

The aim of the ISLM Plan is to actively reduce the use of medicinal products, prioritising the use of biological control and systems that physically remove sea lice. A flow diagram of the ISLM Plan is presented in Figure 4. This demonstrates the decision-making process to be applied to inform the appropriate implementation of SLMS treatment measures.

The interventions that BFS have available include those detailed in the SLMS **up to, and including, depopulation** of a site in the event that all prior interventions have proved unsuccessful, evidenced by continued monitoring of lice on farmed fish and intervention efficacy review (see Prescription 4.2: Carry Out Sea Lice Treatment Efficacy Monitoring). The ultimate decision to undertake biomass reduction will be undertaken by BFS veterinarians and BFS senior management.

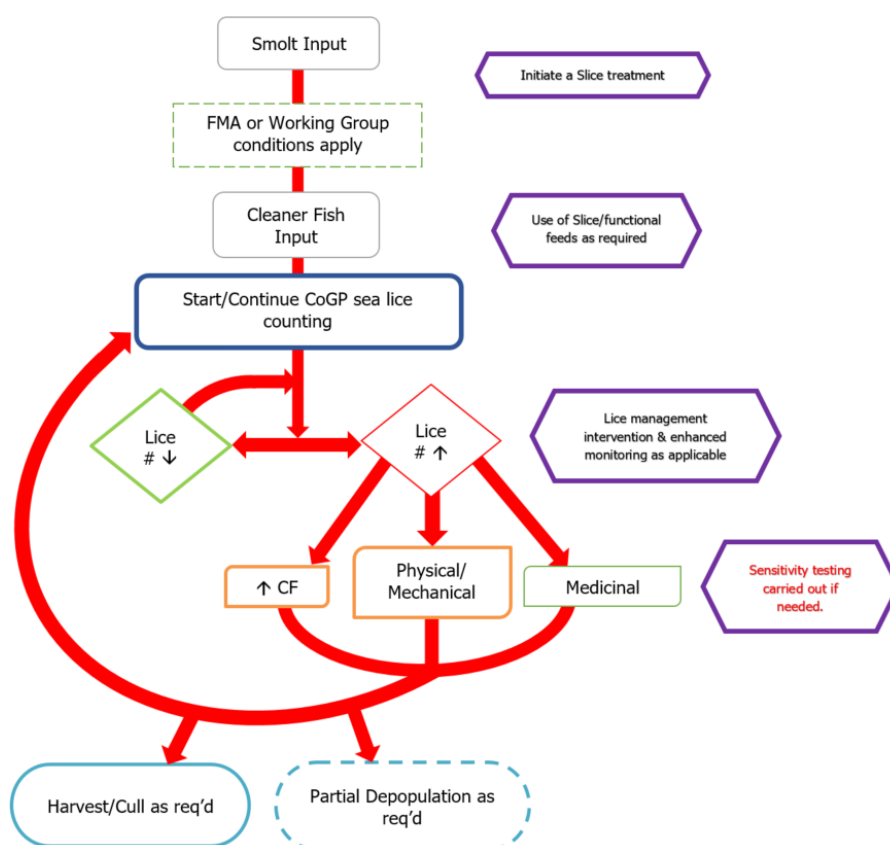


Figure 4: Integrated Sea Lice Management Plan

Prescription 4.2: Carry Out Sea Lice Treatment Efficacy Monitoring

Efficacy of sea lice treatments is monitored during the production cycle, partly through assessing ongoing treatment outcomes, and may be supplemented by laboratory bioassays if appropriate. These assessments inform future treatment decisions and facilitate the adaptive management of sea lice.

Treatments are determined to be successful if they achieve at least 50 % clearance, dependant on fish health and treatment type. If a treatment is determined not to be successful, the Biology Department are notified in the first instance, who will determine appropriate action. If the failure is suspected to be of a pharmacological nature, the Veterinary Medicines Directorate (VMD) is also notified.

Treatments are administered taking fish health and welfare into account. If treatments are unsuccessful, and health suggests that fish would tolerate further treatment, then the next appropriate option in the ISLM Plan would be conducted. **If no further options are available, or fish health suggests that handling will not be tolerated well, depopulation of biomass would occur.**

Prescription 4.3: Continuous Operational Monitoring Feedback Loops

As detailed in Prescription 4.1, ongoing monitoring of sea lice numbers forms part of the ISLM Plan and, through the application of feedback loops, will help to inform the appropriate implementation of both preventative and reactive SLMS treatment measures. Ongoing monitoring measures on-site, and furthermore, monitoring in the wider marine environment will actively inform adaptive sea lice management decisions made during operations, as well as the longer-term management of preceding generations and production cycles.

Prescription 4.4 Feedback from Wild Fish Monitoring

BFS commits to meeting with the relevant parties annually. It is expected that one meeting will occur mid-production cycle to discuss any themes resulting from the first year of the cycle, including monitoring results from the WFSLMS and on-farm lice management. The second meeting will be reserved for the end of cycle review as detailed in Prescription 4.5, to take place during the fallow period prior to restocking of the Sites.

Prescription 4.5: End of Production Cycle Review.

Following the completion of each production cycle, and ahead of fish being stocked to the Sites for the next production cycle, a meeting will be held between BFS and the relevant parties to review all relevant monitoring data collected through the production cycle. This monitoring data will be presented as an End of Production Cycle Report.

BFS shall identify and deploy outcome-focussed farm management measures designed to remedy impacts on wild salmonid populations caused by farming activity, if evidenced through wild fish monitoring in the previous production cycle. These may include, for example, a reduced cumulative area lice threshold for farms in the management area (see Prescription 1.1) or the implementation of alternative technologies (See Table 4).

This review process will also provide the opportunity to agree any potential changes to the EMP and supporting documents with the relevant parties.

Prescription 4.6: Engagement/Action Request Procedure

Outwith the formalised meetings described in Prescriptions 4.4 and 4.5, relevant parties on the EMP may contact another in the event that monitoring activities or risk assessment suggest that farming activity may be directly impacting wild salmonids. The engagement procedure will be undertaken as follows:

1. Either party (the 'initiator'), notifies the other (the 'recipient') by email or in writing the reasons for initiating contact. This notification will include the necessary information that has triggered the initiator to make contact for example, results of the wild fish monitoring that evidence impacts, or an increased risk, to wild salmonid populations resulting from farming activity. The notification will indicate a time frame in which management action is requested to be taken;
2. Examples of such information that may result in engagement include, but are not limited to; significantly elevated lice levels detected during monitoring, the notification of atypical management

measures relating to either recreational fisheries or farm management, matters of urgency relating to biosecurity within the local environment, or matters of urgency relating to the health and welfare of fish which would benefit from the assistance of the other party. The notification should also include a statement of urgency and anticipated outcomes of the engagement;

3. The recipient will assess the evidence in the light of the aims of this EMP and indicate what management action needs to be taken and the metrics that will be used to review success within a suitable time frame;
4. Where the engagement cannot be concluded in writing and further action is required, that a meeting may be facilitated e.g. to accommodate the sharing or presentation of information/data; or to discuss further potential management actions; and
5. Any disputes regarding interpretation of this EMP or action arising out of the EMP shall be referred to an appropriate mediator as may be agreed by the relevant parties.

ANNEX 1: SEPA CAR Consents

Table 5 lists the consented medicinal products for the Sites covered by this EMP.

Table 5: SEPA CAR Consents – Details of Consented Medicinal Products

Site	CAR Licence Number	Emamectin Benzoate			Cypermethrin	Deltamethrin	Azamethiphos	
		MTQ (g)	TAQ (g)	MEQ (g)	3 hrs (g)	3 hrs (g)	3 hrs (g)	24 hrs (g)
Gravir ⁸	CAR/L/1003879	799.8	2275 (x2.8)	N/A	32.2	12.1	N/A	126.2
	CAR/L/1166445	180.5	189 (x1.05)	N/A	24.3	9.1	134.0	504.2
North Gravir (Proposed Site)	CAR/L/5002629	N/A	N/A	26.70	TBC	43.4	43.4	318.7

**MTQ – Maximum Treatment Quantity; TAQ – Total Allowable Quantity*

⁸ The Gravir fish farm is made up of two separate CAR licences, Gravir Outer (CAR/L/1003879) and Gravir West (CAR/L/1166445), but operate as a single farm.

ANNEX 2: Wild Fisheries Sea Lice Monitoring Strategy

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Monitoring strategy to be agreed through consultation with the relevant parties