Environmental Monitoring Plan
Bring Head, Scapa Flow, Orkney (CAR/L/1015854)
Version 1, 06/04/2022

Introduction

This Environmental Monitoring Plan (EMP) details the proposed monitoring protocol for our Scottish Sea Farms (SSF) site at Bring Head, Scapa Flow, Orkney (CAR/L/10015854). It has been produced to accompany an application to vary the CAR licence, to account for a proposed site expansion and biomass increase. A planning application has been submitted to Orkney Isles Council in respect of this development, and is currently awaiting determination. The proposal is to replace the existing 10 x 80m cages in a 50m grid with 12 x 120m cages in a 70m grid, with a concomitant biomass increase from 968T to 2500T.

Bring Head has a history of unsatisfactory seabed surveys, which we believe is attributable to a failing of AutoDepomod-based regulation. The model is unable to predict a footprint at sites where the near-bed current speeds are high (18 cm/s at Bring Head), and consequently a default monitoring protocol is imposed, requiring samples to be collected relatively close to the cage group (25m and 50m in both directions along the predominant current direction). The footprint against which these sites are assessed is therefore artificially small compared with a site-specific modelled footprint, and as a result they often struggle to meet SEPA's standards with respect to benthic impacts. SSF have a small number of sites that have been historically impacted by this issue, of which Bring Head is one. Remodelling using NewDepomod indicates that the existing site will pass under the new four-transect monitoring regime, and the site was monitored to this new regime at its most recent benthic survey in February 2022 (results not yet received).

Proposed EMP design

Benthic monitoring transects and sampling stations are proposed according to the draft SEPA guidance *Seabed Environmental Standards: Demonstrating Compliance,* 19th July 2021. Four sampling transects have been positioned at right angles to the cage group (Figure 1), with seven sampling stations along each transect. Transect 2 is situated to avoid the area of seabed occupied by the existing cage group. Cage edge co-ordinates, station distances and transect bearings are summarised in Table 1.

Table 1: Proposed transect and station details.

Transect	Pen edge co-ordinate	Bearing	Station distances (m)
T1	58°54.003, 03°15.315	129°	0, 65, 130, 230, 330, 450, 570
T2	58°54.018, 03°15.508	219°	0, 25, 50, 75, 100, 125, 150
T3	58°54.158, 03°15.694	309°	0, 60, 120, 180, 240, 300, 470
T4	58°54.111, 03°15.546	39°	0, 25, 50, 75, 100, 125, 150

Starting points for the proposed transects are shown in Figure 1.

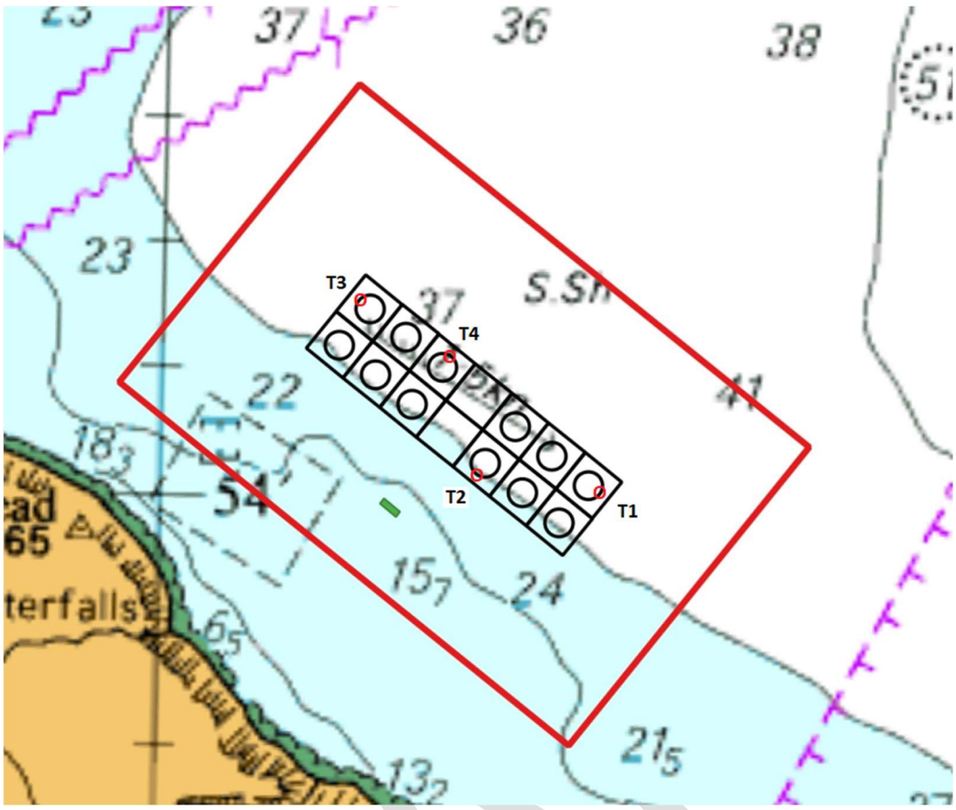

Figure 1: Bring Head proposed monitoring transects.

The outermost stations along T3 have been positioned to avoid the risk of interference with two sub-sea cables which run across the seabed in this area. On the advice of SSEN, who own the cables, a buffer has been placed around the points where the transect crosses each cable, at a distance equivalent to twice the water depth. The outermost station 7 lies midway between the two buffer zones, and station 6 has been positioned at the SE edge of the buffer, with the other stations spaced evenly between the cage edge and station 6 (Figure 2).

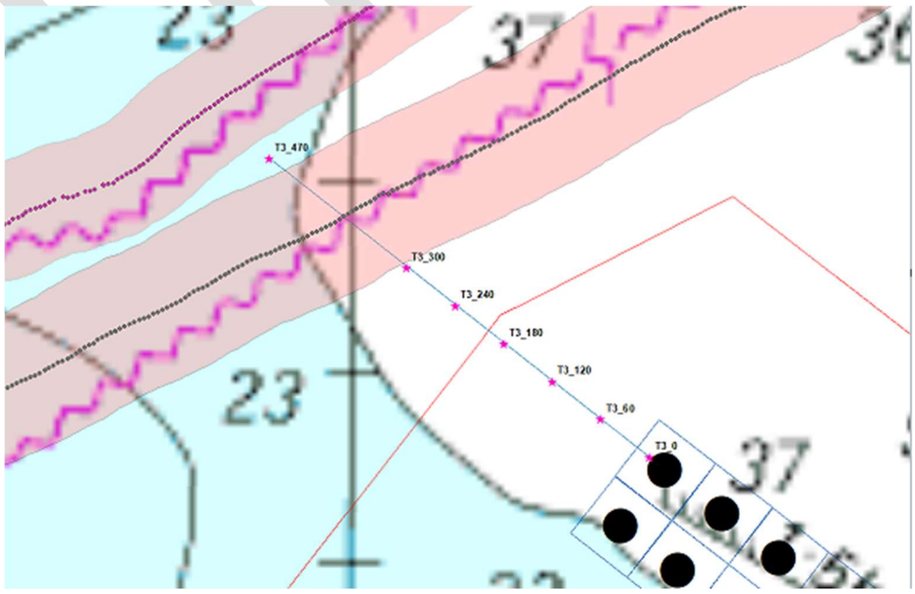

Figure 2: Detail from proposed T3 showing outermost stations located to avoid sub-sea cables.

Post-peak biomass benthic monitoring

SSF propose to monitor in accordance with the transects and stations detailed in Table 1. This monitoring protocol will be reviewed and amended as considered necessary following the next benthic survey, at which point it is anticipated that the number of sampling stations may be reduced. The revised EMP will be submitted to SEPA for review and, once approved, an application will be made to vary the CAR licence accordingly.

Emamectin benzoate residues monitoring

The sample positions for residue sampling at Bring Head will be as detailed in the CAR licence (CAR/L/1015854).

Benthic survey protocol

- The benthic survey will be carried out by suitably qualified SSF staff or SSF-approved contractor.
- All stations listed in Table 1 will be sampled, subject to any amendments required in the field.
- Sampling stations will be located using vessel or hand-held GPS.
- Three 0.045m^2 van Veen grab samples will be obtained from each station – two replicates for benthic fauna, and one for particle size analysis (PSA).
- The two faunal replicates will be combined into a single sample prior to/during sieving. The combined sample will be carefully rinsed through a 1mm mesh sieve, with the residues being transferred to labelled 1 litre containers and preserved in a buffered formalin solution (approx. 10% concentration). The containers will be placed in clear plastic bags secured with a cable tie, and stored in large, watertight plastic boxes for delivery or dispatch to the laboratory for analysis.
- The PSA samples (one per station) will be obtained direct from the grab sampler through the full depth of the sediment, and transferred to labelled polypropylene pots, to be stored in a freezer (-18°C) until they can be dispatched to the laboratory for analysis.

Emamectin benzoate residues sampling protocol

- The residues sampling will be carried out by suitably qualified SSF staff or SSF-approved contractor.
- All stations detailed in the CAR licence will be sampled, using a 0.045m^2 van Veen grab.
- Sampling stations will be located using vessel or hand-held GPS.
- Three replicate samples will be obtained from each station for emamectin residues analysis.
- From each station, additional samples will be obtained from at least one of the residues grabs for total organic carbon (TOC) and particle size (PSA) analysis.
- Samples will be obtained from the top 5cm of sediment within the grab and transferred to labelled aluminium (residues) and polypropylene (TOC & PSA) pots, to be stored in a freezer (-18°C) until they can be dispatched to the laboratory for analysis.

For all sampling work, records will be made of station positions, water depths, sediment type and condition, and any other relevant observations. Data reporting will be carried out using the environmental monitoring survey results template provided by SEPA.