Billy Baa Baseline Survey Design

This survey has been designed to support an application for a new marine pen fish farm at Billy Baa, North Scalloway, Shetland. The proposed site configuration is shown in Figure 1, and site infrastructure details are summarised in Table 1. Co-ordinates and a location plan for the proposed site are included as Attachments A and D.

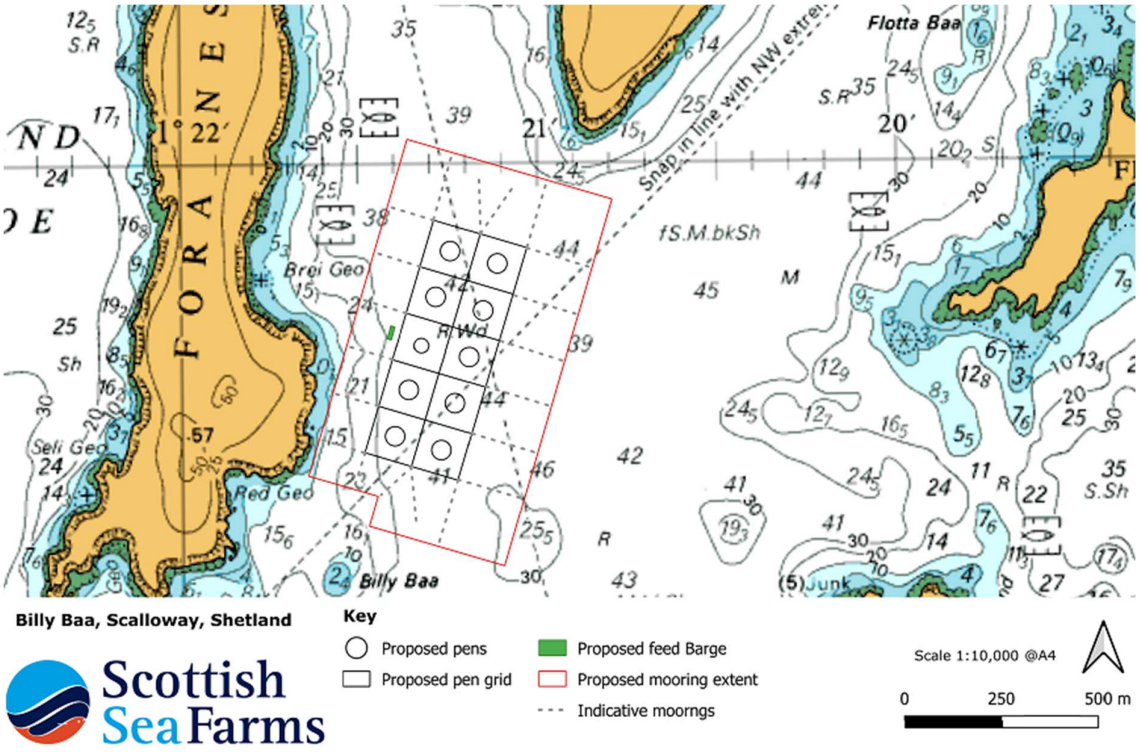

Figure 1: Proposed site configuration at Billy Baa.

Table 1: Proposed site details

Number of pens	10
Pen circumference (m)	9 x 160m, 1 x 120m
Net depth (m)	15
Number of pen groups	1 x 10
Grid spacing (m)	120
Maximum biomass (T)	4091

The survey has been designed broadly in accordance with SEPA guidance documents MACS-FFA-01 *Baseline survey & seabed and water quality monitoring plan design* (June 2019) and MACS-FFA-02 *Sampling of soft substrate* (July 2019). The survey work was carried out by Scottish Sea Farms staff, following approval of the survey protocol by SEPA and NatureScot.

Identification of biotopes

Biotopes were identified by Anderson Marine Surveys Ltd (AMSL) with reference to visual survey data they had collected in July 2023 and the resulting report (AMSL 2023, Appendix B). The survey transects were based on outputs from NewDepomod modelling of the proposed site and surrounding area, and were agreed with NatureScot and SEPA prior to the survey (pers.comm. Liam Wright email to Callum Tait, 26/06/23; Mhairi Wilson email to Callum Tait, 03/07/2023); a few amendments were made in line with advice received from SEPA. Analysis of the video footage by AMSL with reference to the Joint Nature Conservation Committee (JNCC) Marine Habitat Classification for Britain and Ireland (JNCC 2015) indicated that the survey area could be divided into thirteen biotopes, of which seven might be possible to sample by van Veen grab. These seven were then assigned to three broad biotope types: muddy sand, gravelly mud and gravelly sand.

Identification of sampling stations

In accordance with MACS-FFA-01 (June 2019), a grid was drawn over the survey area, dividing it into squares. Stations were then plotted within the selected squares more or less at random, but with some selectivity to ensure samples would be fully representative of the whole area covered by each biotope, and to avoid areas where Modiolus had been observed in the visual survey data (Figure 2). Five stations were plotted within each biotope and submitted to SEPA for approval, which was duly granted (pers.comm. Kirsty Barclay email to Alan Harpin, 12/07/2023). These stations were then plotted on the vessel charting system prior to starting the survey, allowing each station to be readily located by the skipper.

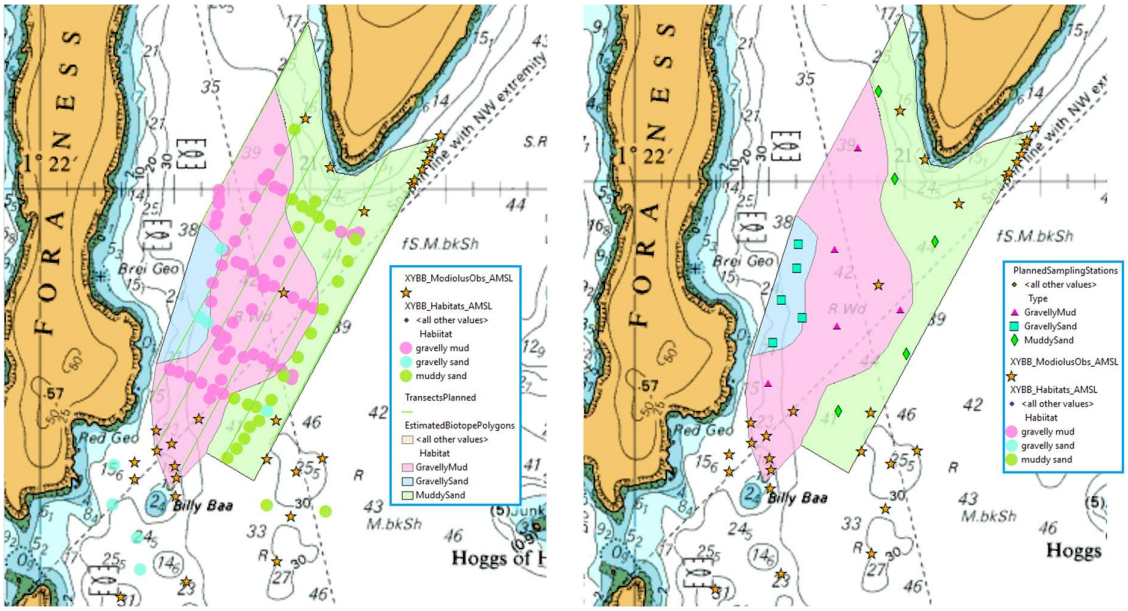

Figure 2: Transect lines and biotope distribution (left); sampling stations agreed with SEPA (right).

Station co-ordinates are summarised in Table 3. From each station, 2 x 0.045m^2 grab samples were collected for faunal analysis. The two replicates from each station were combined and passed through a 1mm sieve, to produce a single combined sample per station. Sample residue retained in the sieve was transferred to a labelled container and preserved with buffered formalin (approximate concentration 10%). Faunal identification, statistical analysis and reporting was carried out by Ocean Ecology Ltd.

An additional grab sample was obtained from each station for geochemistry, from which a single sub-sample was obtained for each of PSA and TOC, and three sub-samples for emamectin benzoate residues. Samples were frozen within 24 hours of collection, prior to despatch for analysis to Peatfield Scientific Ltd (PSA & emamectin benzoate residues) and TerraTek Ltd (TOC).

Results of the analyses are attached as Appendices C2-C5.

Table 3: Co-ordinates of proposed sampling stations

Habitat Type	Station	Lat (proposed)	Long (proposed)	Lat (actual)	Long (actual)
Muddy Sand	A1	60°12.165'N	01°21.099'W	60°12.165'N	01°21.099'W
Muddy Sand	A2	60°12.005'N	01°21.040'W	60°12.000'N	01°21.036'W
Muddy Sand	A3	60°11.890'N	01°20.891'W	60°11.892'N	01°20.887'W
Muddy Sand	A4	60°11.578'N	01°21.247'W	60°11.579'N	01°21.249'W
Muddy Sand	A5	60°11.684'N	01°20.996'W	60°11.683'N	01°20.997'W
Gravelly Mud	B1	60°11.630'N	01°21.506'W	60°11.628'N	01°21.501'W
Gravelly Mud	B2	60°12.061'N	01°21.176'W	60°12.060'N	01°21.178'W
Gravelly Mud	B3	60°11.735'N	01°21.253'W	60°11.735'N	01°21.256'W
Gravelly Mud	B4	60°11.765'N	01°21.019'W	60°11.756'N	01°21.011'W
Gravelly Mud	B5	60°11.875'N	01°21.261'W	60°11.873'N	01°21.260'W
Gravelly Sand	C1	60°11.884'N	01°21.395'W	60°11.884'N	01°21.396'W
Gravelly Sand	C2	60°11.704'N	01°21.489'W	60°11.704'N	01°21.493'W
Gravelly Sand	C3	60°11.749'N	01°21.381'W	60°11.749'N	01°21.377'W
Gravelly Sand	C4	60°11.782'N	01°21.458'W	60°11.783'N	01°21.455'W
Gravelly Sand	C5	60°11.840'N	01°21.401'W	60°11.841'N	01°21.409'W

References

AMSL (2023). Billy Baa Seabed Video Survey: Report to Scottish Sea Farms, 17th July 2023.

JNCC (2015) The Marine Habitat Classification for Britain and Ireland Version 15.03 [online]. Available from: https://mhc.jncc.gov.uk