GLENELG SEA FOREST SEAWEED FARM:

AIRD A MHILL, LOCH ALSH

APPENDIX 8:

BIOSECURITY PLAN

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Contents

1 Introduction

In accordance with the Marine Biosecurity Planning guidance document, February 2014, produced by Scottish Natural Heritage (NatureScot), this document aims to detail the site/ operation activities and actions that will be undertaken to minimise the introduction or spread of non-native species (NNS) or disease from the proposed seaweed farm.

This is a live document and, as such, should be reviewed and updated on a regular basis.

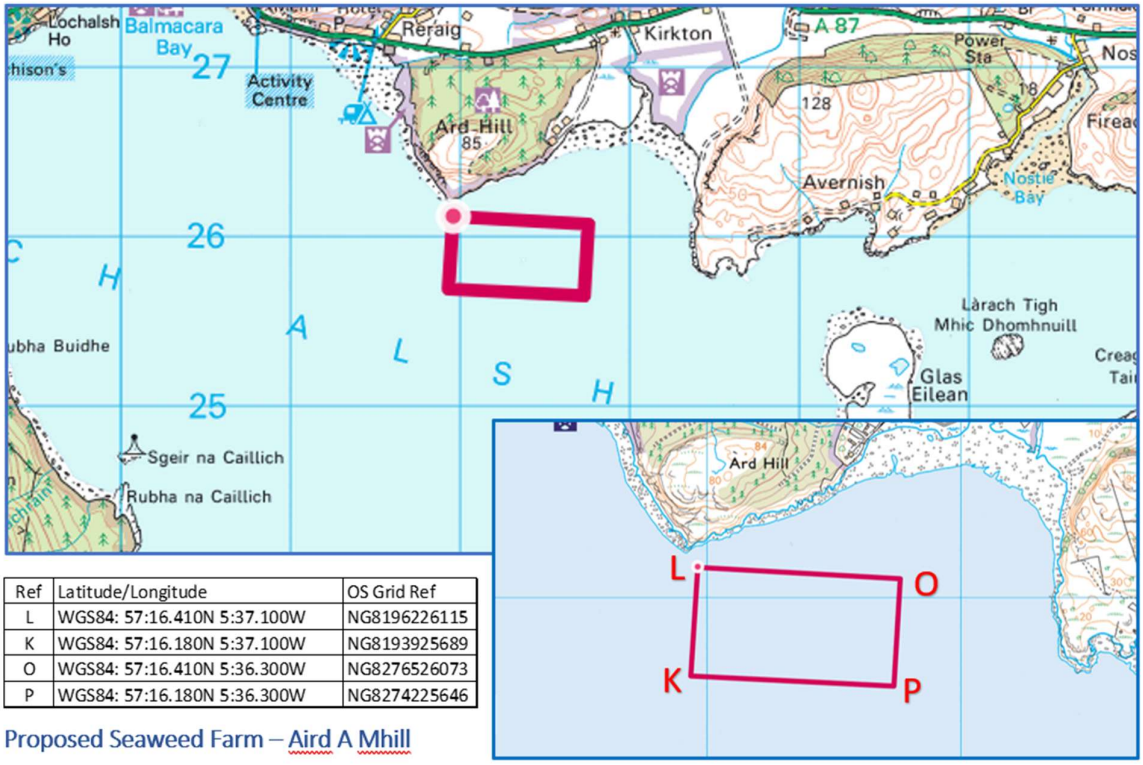
2 Site Contact Details

Site/ Emergency Contact: Bruce Langlands, [redacted]

3 Site Description

3.1 Site Location and Overview

The proposed seaweed farm location is defined as Aird A Mhill, Loch Alsh, Wester Ross, Highlands (Fig.1). The site lies within/adjacent to two Special Areas of Conservation (SACS) for Rocky Reefs, and Harbour Porpoises; and a Marine Protected Area (MPA)[1]. The farm is set back from the coastline in rapidly deepening water to beyond 40m below water level; and thus will not have an impact on these features.



Ref	Latitude/Longitude	OS Grid Ref
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K	WGS84: 57:16.180N 5:37.100W	NG8193925689
O	WGS84: 57:16.410N 5:36.300W	NG8276526073
P	WGS84: 57:16.180N 5:36.300W	NG8274225646

Proposed Seaweed Farm – Aird A Mhill

Figure 1: Aird A Mhill Seaweed Farm Location and Coordinates

[1] Refer to Appendix 2 – Impacts and Proposed Mitigations for further information

3.2 Seaweed Species

Initially, the main target species will be Alaria Esculenta (Atlantic Wakame) and Saccharina Latissima (Sugar Kelp); with Laminaria Digitata (Oarweed) seeded later. All these are found growing wild locally. The details of the cultivation process described below is for Alaria, and this is also close to the process of the other species.

3.3 In-water Equipment

A subsurface grid will be used similar to that used by finfish farming, but with no surface cages; and will be secured to the seabed with a robust anchoring system (design to be finalised). Only the cushion (outer) and dropper line (intermittent) buoys will be visible on the surface, as will appropriate special marks denoting the site outer limits. The buoys will be anti-fouled and maintained on a regular basis.

The farm will be set out as a grid of 3 squares (3 x 150m x 150m), with between 20-24 number 150m long growing lines per grid, 6-8m apart, held roughly 1.5-3m below the water level. This will provide a growing length of 9-10.8km at full capacity (all grids). 0.6km (4 long lines) will be seeded in year 1, 2.4km (remaining grid lines) in year 2, and the remaining 6-7.2km (2 other grids) in year 3.

No equipment or ropes based on the Aird A Mhill site will be moved to another site, and no equipment or ropes used on another site will be brought to Aird A Mhill. Any equipment or ropes brought ashore from the farm will treated by cleaning with fresh water above the high tide mark.

All in water equipment will be removable.

3.4 Seeding Process

The plant seeds into the water in late November through to early January, through fruiting bodies (sporophylls) that develop near the base of the plants. Seeded stock is cultured from locally-sourced reproductive material. The collection of fertile plants will comprise very small volumes (<1 wet kg), with no more than around 25% from any given patch on the seabed or on the shore. The small amounts collected are propagated in laboratory conditions into stocks of cells that can be held in stasis to suit operational needs.

Around 1-2 months ahead of deployment, the cells are triggered to develop into microscopic plants that can be attached to growing media; typically thin twine wound round spools in 100m lengths. These spools areheld under controlled conditions in aquaria until juvenile plants become visible (around 1-2mm long), at which point they are out-planted onto growing rope on the seaweed farms. Partnership with commercial partners for cell culture and preparation of growing media is underway.

There are no chemical additions or treatments used for the seaweed growing process. The small amounts collected are propagated in laboratory conditions into huge amounts of fertile material. This can be stored for long periods to suit operational needs.

3.5 Line Deployment Process

Deploying seaweed on string will be the main deployment method for seaweed cultivation, with the method outlined below:

- fertile seaweed material is allowed to settle onto thin string wound round spools in 100m lengths, in a controlled environment e.g., an aquarium.
- spools are laced onto seaweed (culture growth) lines to be grown in the sea on the farm.
- lines are then deployed by small local (>8m LOA) work vessels. Narrow ropes (10mm or 12mm) are passed through the spools of Alaria string and the two fixed together. These combined lines are strung out in either horizontal, vertical or zig-zag patterns (site- specific optimum growing patterns

for Loch Alsh sites will be assessed on an ongoing basis) at depths between 0m and 3m initially, and 6m later on, below water level.

During stage 1 (trial, year 1) four underwater longline structure based on a 150m length will be installed. Then in stage/year 2, the moorings for these initial long lines will be incorporated as part of a grid system and the remaining lines for grid 1 installed. In stage/year 3 the other two grids will be installed.

Line deployment will be completed between mid-October and late November to give the juvenile plants time to establish on the lines before the darkest winter days shut down their growing. Growth should start to pick up again in late February as day length grows.

The vessels used to deploy the seaweed lines onto the farm site are based around Kyle of Lochalsh and work locally. It is therefore unlikely that non-native invasive species will be brought to site by this route.

3.6 Harvesting Process

Regular monitoring of seaweed growth will be done via visits to the seaweed farm by small vessels, that work locally within the vicinity of the farm and will not be brought in from external areas. This will decide the optimum harvest periods (expected between May and July).

Harvesting will use a simple roller frame with cutting heads that will trim the useable material of the plant into bins or boxes while leaving the rope and growing base of the plant intact. Other cultivation operations where these can be returned to the water and coppiced again to create a second crop are being considered, but this will be dependent on the level of fouling.

All vessels and equipment will be washed thoroughly and equipment, ropes etc will be brought ashore, washed and stored ashore.

3.7 Onward Processing

To keep the seaweed to the highest standard the product needs to be brought to shore and processed as soon as possible. The processing is essentially one of lowering the water content without excessive heat, similar to herb processing. This creates a stable, storable product that can be rehydrated as an ingredient. Other species and small amounts of Alaria may be kept as a wet, fresh ingredient with shorter shelf life, but the bulk of seaweeds are expected to go through a drying process. For either processing routes, any surplus or waste product will be disposed of via controlled waste routes as per normal commercial waste procedures.

3.8 Contingency Plan, Monitoring and Review

Disease issues are not envisaged at the farm site, as would be seen in animal husbandry around mussels, oysters or finfish; but GSF recognise that should diseases be present on the site that it can have serious negative impacts on the whole ecosystem and a contingency plan should be implemented. Therefore, to ensure that all eventualities are covered, the following procedures shall be implemented:

- staff working at the farm:
    - will be trained in identifying invasive non-native species (INNS).
    - shall undertake a thorough check of the farm site on every visit, recording details as required in section 4.
- In the event of the positive identification of an outbreak, staff will ensure that no product leaves the site; with any equipment and ropes taken ashore will be treated; and Nature Scotland will be informed immediately.

4 Site Visits – Biosecurity Information

Information for each site visit and the operations undertaken during them, should be recorded in the format set out within this section.

4.1 General Information

4.2 Site Details

Date	
Farm Site & Location	
Site Biosecurity Manager & Contact Details	
Information on person(s) visiting the site:	
1. Company 2. Individual Name 3. Contact Details 4. Reason for Visit	
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4.3 Site Features Affecting Biosecurity

Weather during visit	
Salinity	
Submerged structures	
NNS/INNS Present?	

4.4 Vessels Type using the Site/ Involved in Operation(s)

The following table should be filled out for each and every vessel or piece of equipment visiting the site. Should any of the responses return a risk where it should be further investigated or reported to NatureScot then details of this should be recorded in section 4.6.

Vessel and/or equipment details e.g., name, type, registered			
Ref	**Question**	**Response**	**Risk (H/M/L)**
1	Has the vessel/equipment just arrived from the local area?		
2	Has the vessel/equipment had an anti-fouling coating applied to submerged structures within the last 12 months (or time recommended by manufacturer)?		

Ref	Question	Response	Risk (H/M/L)
3	Are all the visible submerged surfaces free of bio-fouling (a green 'slime' is OK)?		
4	Do the visible submerged surfaces have more than a green 'slime' coating?		
5	Does the vessel/equipment have noticeable clumps of algae and/or animals clinging to the visible parts of the hull/rudder/propeller?		
6	Has the vessel/ equipment just arrived from another country, region or water body with similar environmental conditions e.g., seawater temperatures?		
7	Has the vessel/equipment just arrived from a water body known to have NNS present?		
8	Does the vessel/equipment spend long periods of time stationary at sites in between anti-fouling treatments?		
9	Is the vessel 'slow moving', such as a construction barge or drilling rig?		

4.5 Site Activities which have a significant risk of introducing or spreading INNS

Ref	Activity Description & Response Required

4.6 Contingency Plan

In the event of an emergency, the procedure as set out in the contingency plan should be followed; with details noted as detailed in the table below.

Action Required	Responsibility (Person/Company)	Follow up e.g., date