

## METHOD STATEMENT - RAASAY

### Experiment Design - Overall Aim:

The aim of this project is to:

- investigate the site for capability to wild seed seaweed species of commercial interest
- test sustainably sourced plant-based materials as suitable seeding and cultivation materials for sustainable intertidal aquaculture
- monitor the potential of these materials over a study period
- to optimise design of growing areas to help enhance the biodiversity of the sites

This project will be testing different hard substrates (traditional plant-based rope, wood, and metal) for the purpose of determining the presence and settlement preferences of commercially (and intertidal ecosystem) important seaweed. Some species may be present within the area in a low abundance due to the lack of suitable substrates. Most aquaculture relies on human-made material (e.g. polypropylene rope) and seaweed cultivation is no different with seeding material often of long lasting human-made material. This project will also test the durability of the different materials for potential suitability within an intertidal aquaculture setting.

This project will look at the survival of locally collected seaweed species (*Chondrus crispus*, *Mastocarpus stellatus* and *Gracilariopsis longtissima*), using nylon mussel socks, as no plant-based alternative is readily available to test this method of farming.

This project will look at collecting wild edible mussel (*Mytilus edulis*) spat on the structures and growing it out using the same nylon mussel socks as above. Mussel spat will be allowed to settle on wooden poles wrapped with a natural fibre rope before being transferred to the nylon sock for onward growth.

The project will monitor species diversity near the test structures and away from the test structures, in order to determine the current site-specific biodiversity, and monitor any changes to the biodiversity due to the installations.

The small structures within the designated areas will cover a total area of 50m x 20m (1000m<sup>2</sup>) marked on the supplied maps and within the coordinates given.

The installation area will contain the following:

- 3 pairs of trestles (attached together on their shorter ends), measuring 1.6m x 3.90m (each trestle is 1.6m x 1.8m), with 2m spacing between them. The trestles will have rope nets of different plant-based materials suspended from them.

- 6 x 0.1m x 0.1m oak posts in seabed, (driven 0.5m into the sand) with nylon mussel socking wrapped around. (1.5m in length above ground.)

### **Net Rope Collector:**

Nets and ropes, made from six different rope materials will be deployed to act as hard substrate collectors:

- Hemp
- Sisal
- Jute
- Heather
- Purple Grass
- Kelp seaweed

Each rope will be 3 strand weave and 12mm thick. The rope is made into nets in a variety of sizes (from 0.3 x 0.4m to 2m x 1m) and apertures (from 30mm to 150mm.) The nets will be suspended from the metal trestles in the designated area (see drawings). Each Net will have a minimum of 0.35m of excess line for sections to be removed for settlement analysis every two weeks throughout the trial. (See attached design drawings of the set-up that will be deployed.)

The 6 (2m x 1m) metal trestles (same as oyster trestle typology), will have 2m spacing between them, and are secured to the seafloor using 500mm galvanised U-pins. The installation area will be approximately 50m x 20m, to be situated within the total lease area of around 980 meters squared.

The suspended rope from each net will be analysed for species settling and the density (mass/m (seaweed) or number/m (invertebrates) ) of each species settling on the rope.

Visual analysis and sample scrapings will be taken every two weeks.

### **Mussel Sock Seaweed Survival Trial:**

After the trestles have been installed, within the period of the license, survival trials of locally collected wild *Chondrus crispus*/ *Mastocarpus stellatus* / *Gracilaria gracilis* will be tested below the trestles, within the area outlined above. Only one of the species will be cultivated at each site, based on which species is present at the site. The nylon mussel sock will be filled with locally collected specimens. The socks will be suspended between posts. The aim is to have three replicates of 1m of nylon mussel sock at the tide height closest to MLWS. Wooden posts will be used if possible to attach the socks to. The contents will be weighed every four weeks and visually inspected to assess condition.

### **Summary of Materials:**

*Mussel Socking* - Nylon Net Suspended by wooden pole structure. Tied to metal trestle installed in the seabed.

*Rope Net* : Hemp - Natural Hemp Rope, twisted 3 strand, 12mm. Aperture : 150mm Tied to metal trestle installed in the seabed.

*Rope Net* : Jute - Natural Jute Rope, twisted 3 strand, 3-6mm. Aperture : 30mm. Tied to metal trestle installed in the seabed.

*Rope Net* : Jute - Natural Jute Rope, twisted 3 strand, 6mm. Aperture : 100mm. Tied to metal trestle installed in the seabed.

*Rope Net* : Natural Purple Moor Grass, twisted 3 strand, 6-10mm. Aperture : 100mm. Secured to a willow frame, tied to a metal trestle installed in the seabed.

*Rope Net* : Jute - Natural Jute Rope, twisted 3 strand, 6mm. Aperture : 150mm. Tied to metal trestle installed in the seabed.

*Rope Net* : Hemp - Natural Hemp Rope, twisted 3 strand, 6mm. Aperture : 150mm. Tied to metal trestle installed in the seabed.

*Rope* : Heather - hand-twisted and locally gathered by hand, twisted 3 strand, 12mm. Tied to metal trestle installed in the seabed.

*Rope* : seaweed - hand-twisted and locally gathered by hand, twisted 3 strand, 12mm. Tied to metal trestle installed in the seabed.

*Rope* : Purple Moor Grass - hand-twisted and locally gathered by hand purple moor grass, twisted 3 strand, 12mm. Tied to metal trestle installed in the seabed.

*Rod* : Willow - 12mm. Tied to metal trestle installed in the seabed.

*Oak Posts*: 2.4m in height. Will be secured into the seafloor using galvanized steel pins. Used to suspend ropes for ecological test.

*Metal Trestle* (oyster trestle typology): Used to suspend ropes for ecological test. Secured to seabed with 500mm galvanized U-pins.

[See Tulach Ard Deposits Document for more]

### **Decommissioning plan**

All deposits are between mean high water spring tide and mean low water spring tide. These structures can be removed easily by hand during a low spring tide.