NWIFCA Technical, Science and Byelaw Committee

9th of May: 10:00 a.m.

Agenda Item

6

SURVEY AND INSPECTION REPORT
7TH FEB – 9TH MAY 2023

Purpose: **To report on cockle and mussel surveys and inspections in the last quarter, and update members on the mussel and cockle fisheries in the district.**

Recommendation: **Approve the following:**

a) Receive the report and related survey and inspection notes

b) Mussel fishery: Agree that we inform TSB of the results of our final inspections, and they consider a proposal on the opening of the fishery via email or an extraordinary meeting, subject to HRA.

BACKGROUND

Every year NWIFCA officers undertake extensive surveys and inspections of the cockle and mussel beds across the NWIFCA District. The aim of the surveys is to conduct stock assessments on each bed, and the aim of the inspections is to gather information in areas that either; a) do not have enough stock to warrant survey, and/or b) conditions of the bed preclude surveying – for example, large channels or short exposure times which limit the time officers can safely access. Inspections may also take place to see if a full stock assessment is needed.

Mussel bed surveys

Large, accessible mussel beds that are stable (large areas are not frequently washed away) are typically surveyed by the Dutch Wand method. This method allows officers to calculate an overall biomass of stock on the bed, identify the proportion of the population that is size, and map a perimeter. Beds that are typically surveyed by Dutch Wand include: Foulney mussel bed, Low Bottom, and Walney Channel. Mussel beds which are exposed for short amounts of time or are typically fished for seed mussel and are therefore liable to large changes over short periods are inspected visually, with reports presenting pictures and a description of the stock. Beds that are typically inspected using this approach include: South America, Falklands, and Heysham.

Dutch Wand methodology overview

The Dutch Wand survey is conducted by walking zigzag transects across the mussel bed, collecting samples en-route. The transects are pre-determined from historical bed areas and mapped on a GPS to be followed on the day of survey. This approach ensures transects are equally spaced and run all the way to the bed perimeter.

A pair of surveyors use a “Dutch wand” to assess mussel coverage and patch density. The “Dutch wand” is a plastic ring (roughly 11cm diameter) attached to a cane. Surveyors follow a transect line and as they walk, every two or three paces the lead surveyor places the ring of the wand on the ground and records the presence (hit) or absence (miss) of mussels within the ring. This allows officers to calculate the density of mussels (%cover) across the bed.

Every 50 'hits', a sample of mussel is taken for analysis. A plastic corer (of the same diameter as the wand) is used for collecting mussel samples. To collect the sample, the corer is gently twisted into the ground and all the mussels within the corer removed. Using this method, numerous small random samples will be collected throughout the bed.

All sample mussels are measured for length to give a size frequency, and the total size (≥45mm) and undersize (<45mm) are weighed respectively. An estimate of the total weight of stock on the bed, and the total weight of size and undersize mussel on the bed is then calculated. Officers also note the condition of mussel (for example the presence of barnacles or mixing of size and undersize which makes some areas unfishable) when doing the survey, take representative photos, and note bird species present.

Cockle bed surveys

The purpose of cockle surveying is to establish data regarding the abundance, density and location of cockle stocks to inform fisheries management. Most cockle beds in the district are surveyed using the methodology outlined below.

Cockle survey methodology overview

Cockle surveys are undertaken by splitting each bed extent into a grid of sample points spaced between 250 to 500 m apart. Typically, each bed has between 40 and 140 sample points depending on its size. Each year, officers survey a minimum of approximately 750 sample points across the main beds from Morecambe Bay, the Ribble Estuary and Leasowe.

Sample locations are mapped on a GPS to ensure each year the same locations are surveyed. Officers access each sample location by quad, jumbo the sand to fluidise the sediment to cause cockles to rise to the surface and lay down a 0.5 m^2 quadrat. Officers pick and rake the cockles within the quadrat, separate them into size cohorts (0.1-<5mm, 5-<15mm, 15-<20mm, 20-<25mm, 25-<35mm, +35mm) and record the number in each. A total of 200 cockles (100 undersize, 100 size) are taken from the bed as a whole, for analysis of weight and length. From this data, the overall proportion of size and undersize and total stock biomass is estimated.

1. MUSSEL SURVEYS AND INSPECTIONS

Inspections and surveys completed since the last TSB report:

1) **Foulney MLS** – low water mapping (12-02-2023)*
2) **South America** – inspection (23-02-2023)
3) **Heysham** – inspection (24-02-2023)
4) **Seafield slip** – inspection (10-03-2023)
5) **Low bottom** – Dutch Wand Survey (20-03-2023)
6) **Foulney** – Dutch Wand Survey (21-03-2023)
7) **Foulney MLS** – Stunted Dutch Wand survey (04-04-2023)*
8) **Walney Channel** – Dutch Wand survey (05-04-2023)
9) **Foulney MLS** – additional sample collection (19-04-2023)*
10) **South America** – inspection – survey note in draft (20-04-2023)

Inspection and survey notes are provided in the Annex to this report. The following sections provide a summary of our findings and details of further relevant work

*Inspection and survey notes for the mussel MLS work are detailed in Agenda Item 8 Mussel MLS.

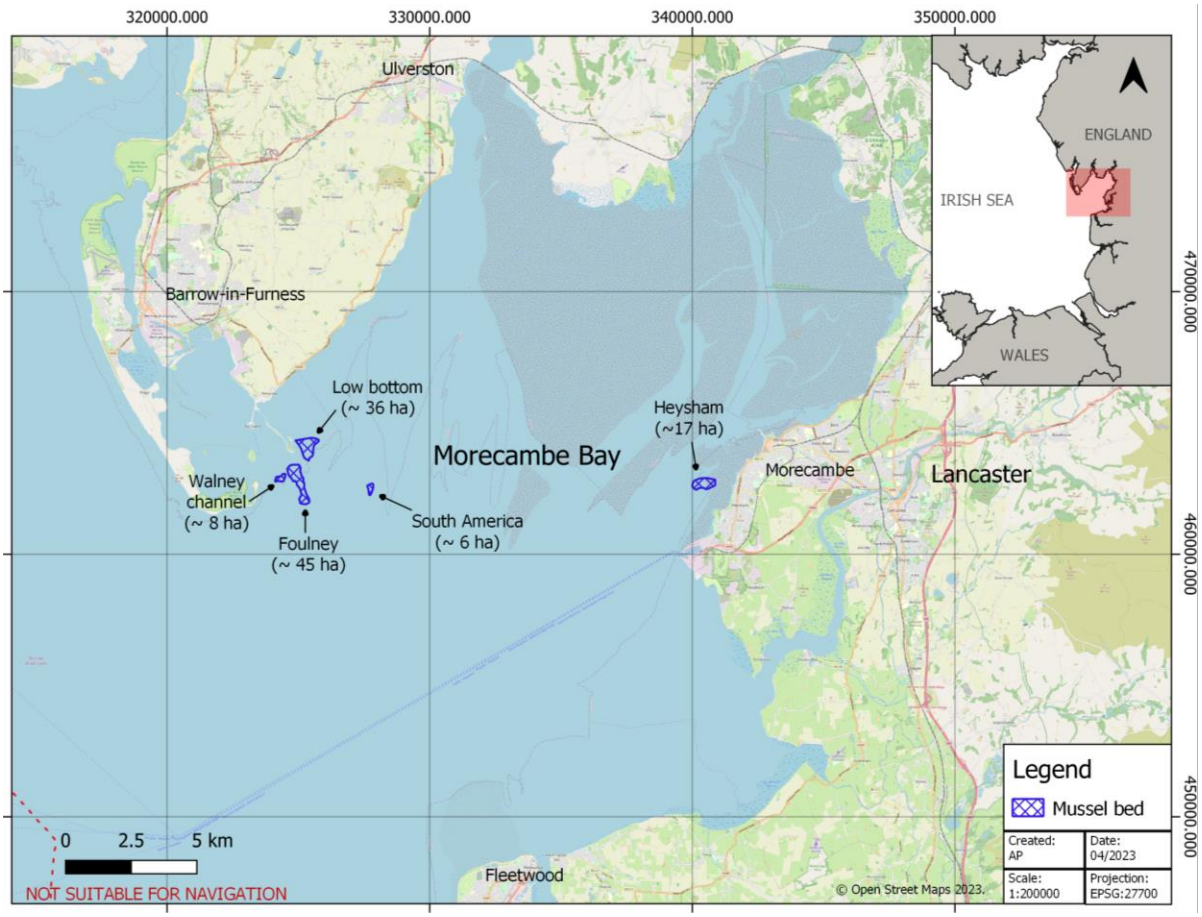

Figure 1. Approximate location and extent of surveyed and inspected mussel beds in 2023.

a) Morecambe Bay mussel beds:

1) Heysham:

24-02-2023 inspection

Heysham flat (Figure 1) is typically fished for hand gathered seed mussel, and size mussel. In February officers inspected the mussel on Heysham Flat to assess if mussel had persisted from 2022 and would be viable for fishing in 2023.

There was very little mussel persisting from last year as most of the mussel had been washed away and scoured leaving areas of bare cobble, dead shell and historic *Sabellaria alveolata* on the skear. Knott End skear looked bare, with cobble and no stock.

There was a significant historic *Sabellaria alveolata* reef extending across the skear from Conger Rock to Dallam Dyke, the same location as the previous year. The majority of the reef was dead and had been exposed with the scouring of the mussel and mussel mud that was present at the end of 2022.

Numerous bird species were present feeding in the area including oystercatchers and eiders. Access to the outer skears was not possible across Dallam Dyke.

2) South America:

23-02-2023 inspection

South America is located further out in the northern part of Morecambe Bay (Figure 1) and is exposed during spring tides. It is accessible by quad, though officers must cross a large channel (>600m) which limits their time on the bed. Typically, this area has large areas of seed mussel that do not persist through the winter, and is, therefore, considered for dredging if conditions are suitable (detailed in section B).

An inspection of South America was completed to assess if any mussel persisted from 2022, identify a spat fall, and to check the access to the bed after changes in the channels last year making it harder to access by quad/foot.

Although tide and conditions were good, access remains limited to a short period over low water due to the depth and size of the access channel.

The main area of the bed consisted of exposed hard substrate (mix of pebbles and small cobbles), sand and shell debris and areas of mussel which has persisted from 2022 that was 30-40mm in length. The area has received a 2023 mussel settlement across a larger proportion of the bed which may grow on through the spring and summer.

To the North of the bed a small area has been colonised by *Sabellaria alveolata.*

3) Low bottom

20-03-2023 survey

Low bottom is a bed close to Foulney mussel bed in the North of Morecambe Bay (Figure 1). It is typically not fished commercially. This year, the total area of the bed surveyed was 35.53 hectares. The bed has approximately 1083 tonnes of size mussel and 1075 tonnes of undersize mussel. From the length frequency data the majority of mussel present on the Low Bottom bed is currently a mix of size and undersize mussel with the majority undersize between 25mm and 45mm.

Not all size mussel is fishable due to the presence of fouling species on slower growing individuals or the mixing of undersize and size in close proximity that prevents the removal of sizeable mussel without removing undersize. Almost all size mussel on this bed were fouled with barnacle.

4) Foulney

21-03-2023

Foulney mussel bed is the main commercially fished size mussel bed in Morecambe Bay Figure 1). The bed extends approximates 1.5 km from its upper extent out into the bay, and normally has a small island of mussel at the end which becomes exposed during spring tides.

This year, the total mussel bed surveyed was 44.75 hectares. There was no separation made between the main Foulney bed and Foulney Island. No seed settlement was observed during the survey. The biomass of size mussel was 3702 tonnes and 2365 tonnes undersize mussel. From the length frequency data the majority of mussel present on Foulney Skear is currently a mix of size and undersize with a wide spread of mussel from 20mm to 66mm but mainly

between 30mm and 55mm. The size class is varied across the bed, with the size mussel >45 mm predominantly on the end of the main skear and on the island.

5) Walney Channel

05-04-2023 survey

Walney channel is located on the northern side of Morecambe bay, close to Foulney (Figure 1). From the transect and sample data the total mussel bed surveyed was 8.05 hectares, with approximately 510 tonne of size and 138 tonne of undersize mussel present. No seed settlement was observed during the survey. From the length frequency data the majority of mussel present on the Walney channel bed is currently a mix of size and undersize mussel mainly between 42mm and 54mm.Very little <25mm mussel was present in the survey area.

b) Seed mussel fishery

South America and the Falklands mussel beds are assessed each year to see if they can be opened as a hand gathered or seed dredge fishery. The conditions which we normally look for to allow a seed fishery to take place are:

- loose mussel,
- a single size class of seed (<1yr old) with dense settlement,
- a large amount of sediment, and
- a high probability of washing away.

This year, between May and July, there will be no spring tides suitable to allow surveying of the South America and Falkland mussel beds. The earliest officers will be able to access the beds are the 6th of July and the 4th and 5th of August. Should an inspection identify that the conditions on these beds are suitable for a seed dredge fishery, the next tides suitable for the fishery to be opened would be the week following.

In previous years, the earliest these beds have been opened is the 30th of July, it is therefore, likely that the survey on the 4th/5th of August will require a decision to be made on the fishery for commencement on the 9th to 15th of August. The next TSB date falls on the 15th of August which is not conducive to considering an agreement in time for either of the possible survey dates.

NWIFCA have discussed with Natural England the possibility of putting together a HRA prior to the surveys being undertaken, with set criteria for the fishery to meet. If these criteria are met, it will allow officers to put forward a proposal for the fishery shortly after the surveys have been completed. We will require TSB to consider our proposal for the fishery, and results of the inspection in the same time frame, as the next TSB meeting falls on the 15th of August, outside of the suitable tide dates for a potential fishery.

We therefore propose that **we inform TSB of the results of the inspection of these sites after our surveys in July and August, and members consider a proposal on the fishery, subject to HRA, via email or as an extraordinary meeting.**

2. COCKLE SURVEYS AND INSPECTIONS

Inspections and surveys completed since the last report:

There have been no cockle surveys since the last report

NWIFCA, 24th of April 2023

Annex 1

Mussel Inspections and surveys:
Heysham Flat Mussel Inspection 24-02-23

Officers present: GG, MC, JH
Tides LW 08:27 1.1m (Liverpool tides)

Officers inspected the mussel on Heysham Flat to assess if mussel had persisted from 2022 (Figure 1). Access to the outer skears was not possible across Dallam Dyke due to depth of water and timings.

There is a significant historic *Sabellaria alveolata* reef extending across the skear from Conger Rock to Dallam Dyke (Figure 2 and 3). The majority of the reef is dead and has been exposed with the scouring of the mussel and mussel mud that was present at the end of 2022. The reef is in the same location as last year, data from 01-03-22 was used to show the extent of the *Sabellaria alveolata.*

There was very little mussel persisting from last year as most of the mussel has been washed away and scoured leaving areas of bare cobble (Figure 4.), dead shell (Figure 5 and 6.) and historic *Sabellaria alveolata* present on the skear. Knott End skear looked bare, with cobble and no stock (Figure 7.)

Numerous bird species were present feeding in the area including oystercatchers and eiders.

Figure 1. Map showing the extent of *Sabellaria sp.* and the officer track on Heysham Flat survey 24-02-23.

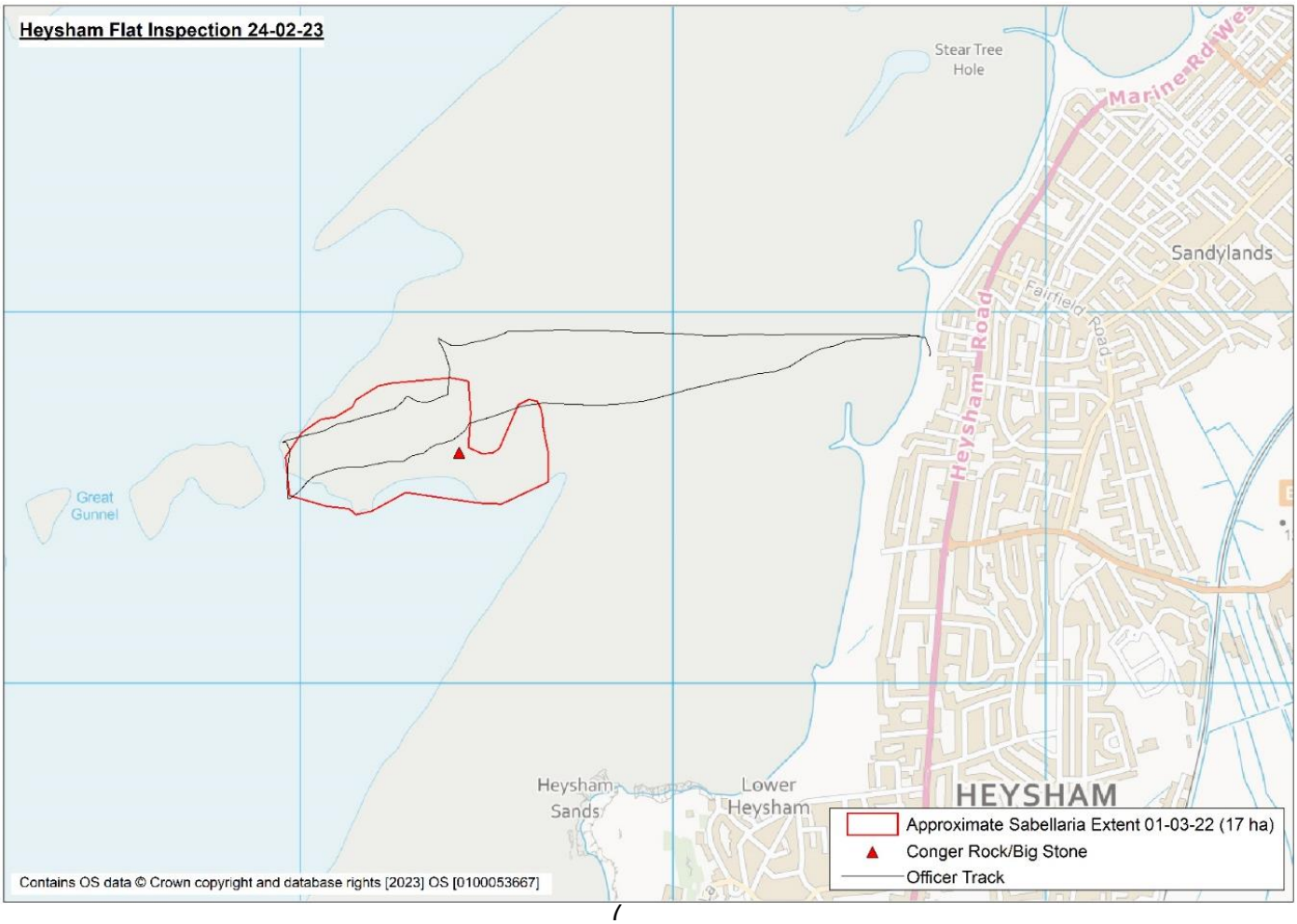

Figure 2. Extensive *Sabellaria* sp. reefs 23-02-24.

Figure 3. *Sabellaria sp*. Heysham 23-02-24.

Figure 4. Bare Cobble 24-02-23.

Figure 5. Dead mussel shell 24-02-23.

Figure 6. Dead mussel shell and wash out 24-02-23.

Figure 7. Knott end skear 24-02-23.

South America Mussel Inspection (Quad) 23-02-23

LW: 07:50 0.8m (Liverpool tides)

An inspection of South America was completed to assess if any mussel persisted from 2022 and to check the access to the bed after changes in the channels making it harder to access. Although tide and conditions were good, access remains limited to a short period over low water due to the depth and size of the channel needing to be crossed to access the bed.

NWIFCA Track data has been provided in Figure 1 with the bed area mapped for reference from 2022. The area consisted of exposed hard substrate (mix of pebbles and small cobbles), sand and shell debris and areas of mussel which has persisted from 2022 (Figure 2). Where mussel persisted, it was 30-40mm in length. There was the occasional larger mussel 50-60mm (Figure 3).

The area has received a 2023 mussel settlement across a larger proportion of the bed (Figure 4). To the North of the bed a small area has been colonised by *Sabellaria alveolata* (Figure 5).

Across the channel a large area has been scoured back to hard substrate by the movement of the channel. No mussel settlement was observed although there was a large area being colonised by *Sabellaria alveolata* (Figure 6).

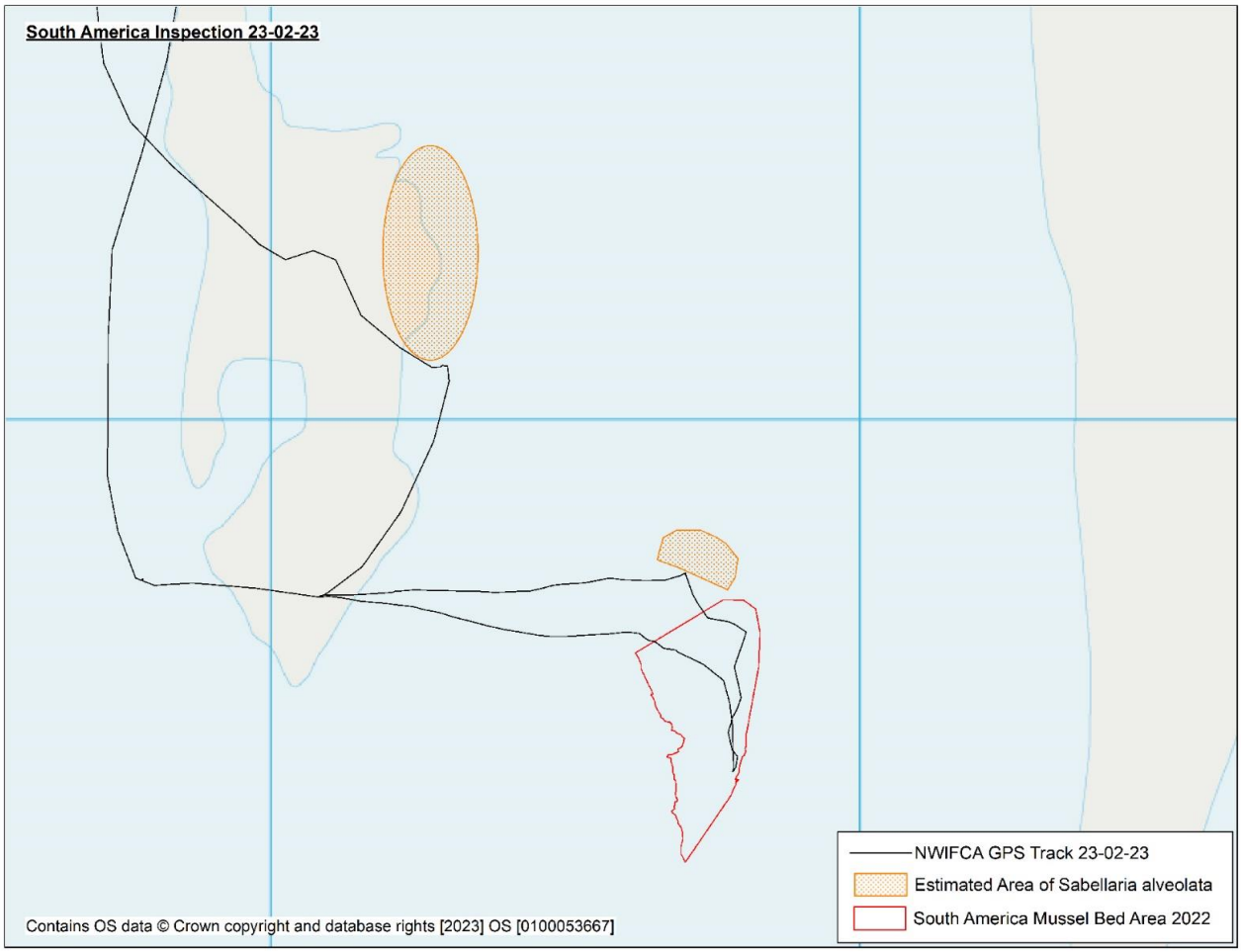

Fig 1. Map of South America including area of mussel suitable for fishing

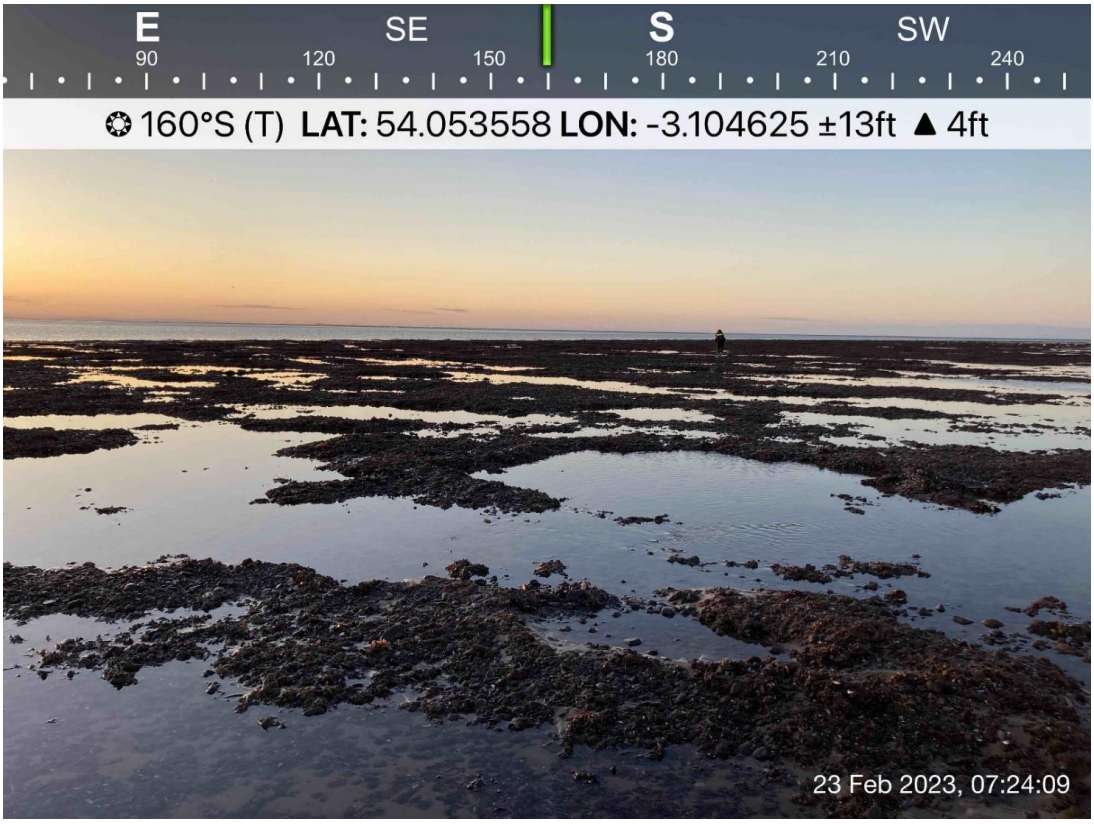

Fig 2. Overview of South America 23-02-23

Fig 3. Mussel 30-40mm in length with the occasional larger mussel 23-02-23

Fig 4. 2023 mussel settlement 23-02-23

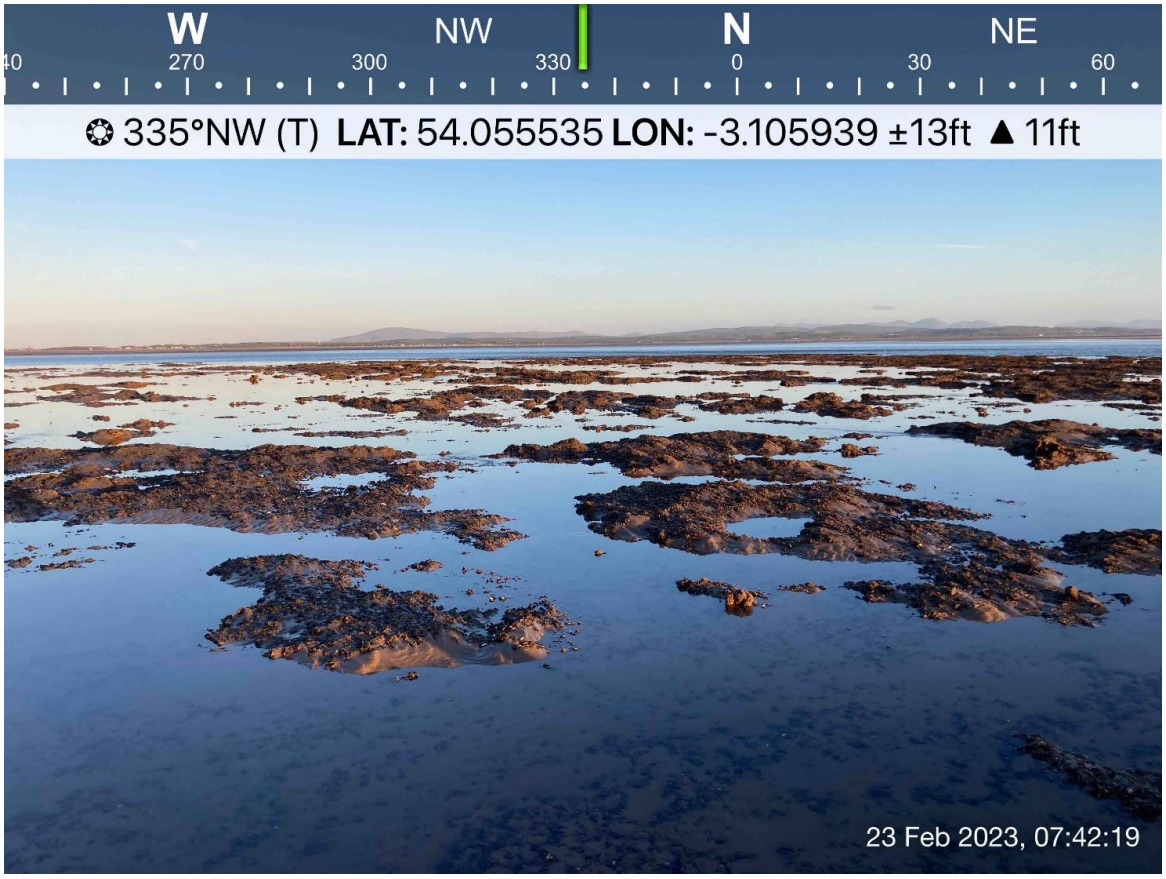

Fig 5. Area of *Sabellaria alveolata* near the mussel bed 23-02-23

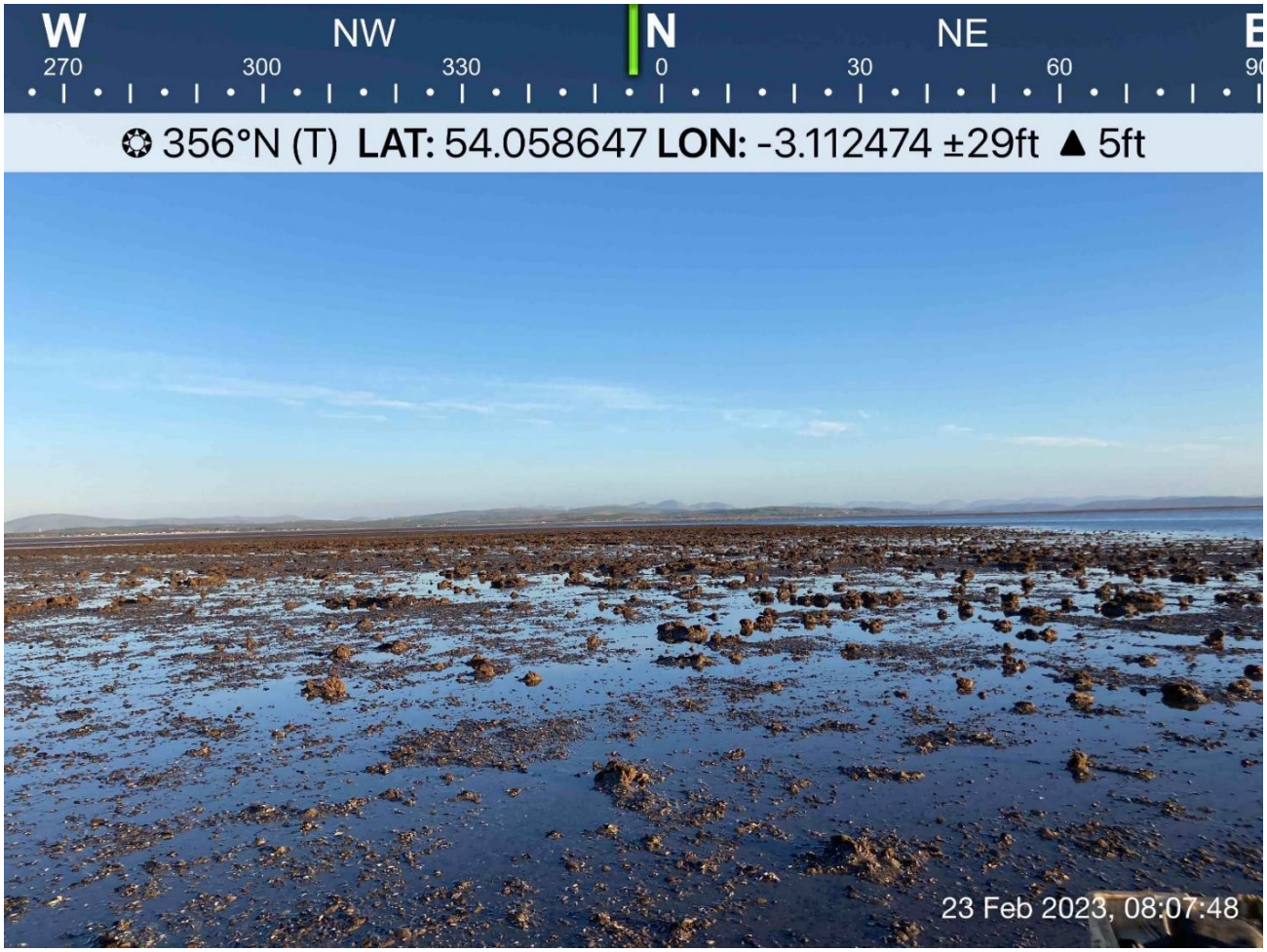

Fig 6. Area of *Sabellaria alveolata* North of the mussel bed further up the channel 23-02-23

Low Bottom Dutch Wand Mussel Survey 20-03-23

Officers present: MC, GG

Low water: 17:06 1m (Liverpool Tides)

Survey method: Dutch Wand

Line transects were completed across the mussel bed using a Dutch Wand, transects start and finish at the edge of the bed as shown in Figure 2. The number of hits and misses of live mussel were recorded to give percentage cover. The bed area was calculated from the start and end of transects and from observations of officers whilst surveying. It was not possible to walk the perimeter of the bed due to time and tide restraints. A mussel sample was taken every 50 hits using a 10 cm diameter corer. 6 transects were completed and 22 samples collected. The total weight of live undersize and size mussel was recorded as well as the size frequency of each sample. Note, not all size mussel is fishable due to the presence of fouling species on slower growing individuals or the mixing of undersize and size in close proximity that prevents the removal of sizeable mussel without removing undersize. Almost all size mussel on this bed were fouled with barnacle.

From the transect and sample data the total mussel bed surveyed was **35.53 hectares**.

Biomass

1083 tonnes size mussel and **1075 tonnes undersize mussel**.

Length Frequencies

The total length frequency for the surveyed bed is provided in Figure 3. From the length frequency data the majority of mussel present on the Low Bottom bed is currently a mix of size and undersize mussel with the majority undersize between 25mm and 45mm.

Maps

The frequency of each size class of mussels per sample has been mapped in Figure 4 with the size of the pie adjusted for sample weight standardised to kg/m^2. The weight of the size and undersize mussel has been mapped and represented in Figure 5.

It can be seen in Figure 4 and Figure 5 that the size mussel >45 mm is predominantly located on the Northern area of the bed and 25-45mm mussel across the centre of the survey area. A mix of size mussel and undersize mussel is located on the seaward end of the bed.

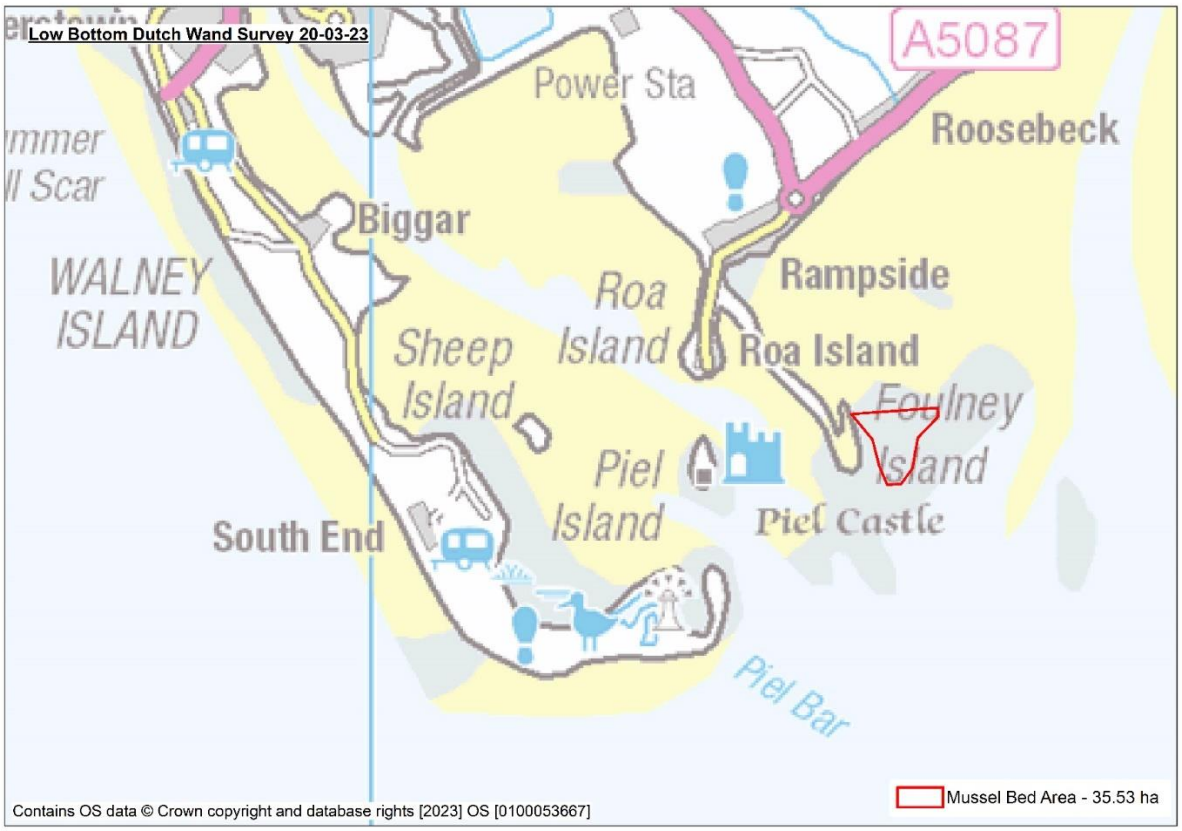

Figure 1 – Location of Low Bottom Mussel Bed surveyed 20-03-23.

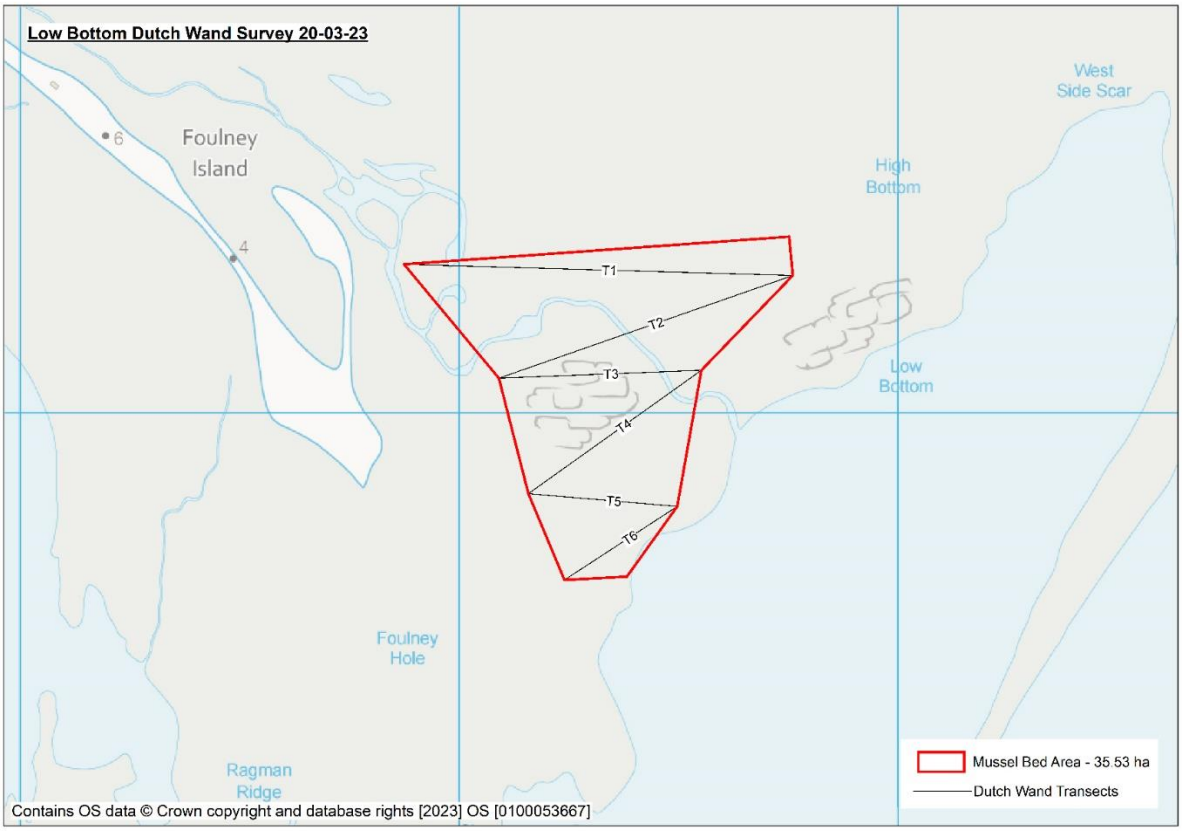

Figure 2 – Low Bottom Dutch Wand survey transects and estimated bed area.

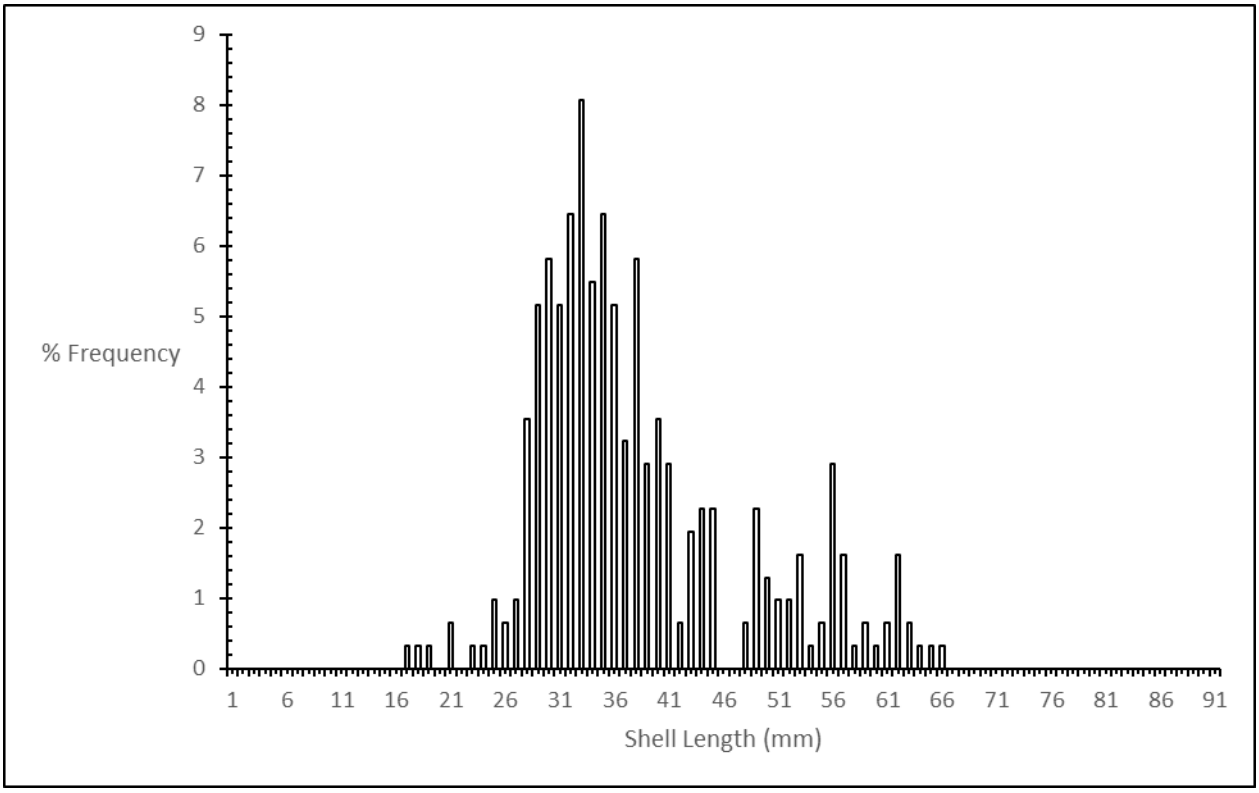

Figure 3 – Histogram showing size frequency of mussels from all samples on Low Bottom mussel Bed.

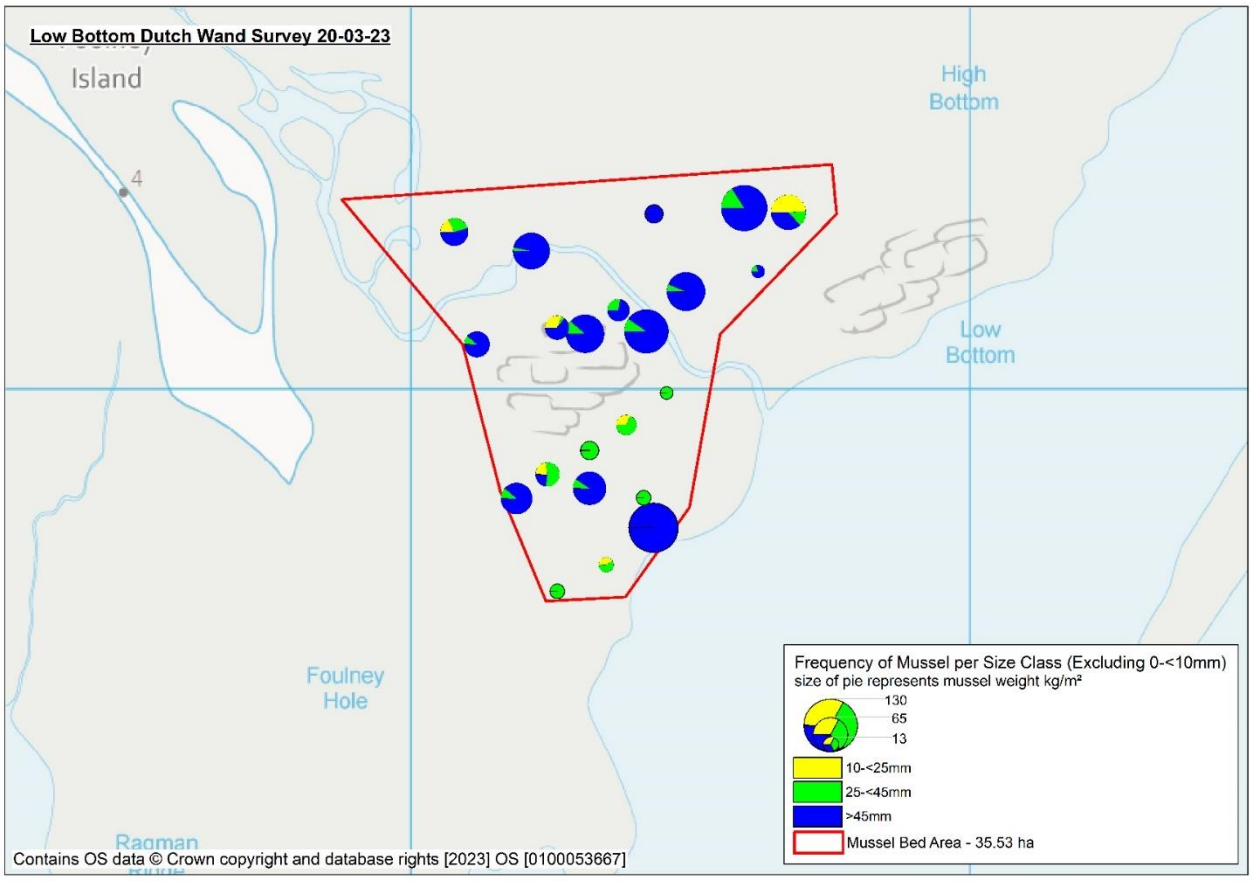

Figure 4 – Frequency of mussel by size class.

Foulney Dutch Wand Mussel Survey 21-03-23

Officers present: MC, JH, AP, ID

Low water: 17:53 0.5m (Liverpool Tides)

Survey method: Dutch Wand

Line transects were completed across the mussel bed using a Dutch Wand, transects start and finish at the edge of the bed as shown in Figure 2. The number of hits and misses of live mussel were recorded to give percentage cover. The bed area was calculated from the start and end of transects and from observations of officers whilst surveying. It was not possible to walk the perimeter of the bed due to time and tide restraints. A mussel sample was taken every 50 hits using a 10 cm diameter corer. 13 transects were completed and 33 samples collected. The total weight of live undersize and size mussel was recorded as well as the size frequency of each sample. No seed settlement was observed during the survey. Note, not all size mussel is fishable due to the presence of fouling species on slower growing individuals or the mixing of undersize and size in close proximity that prevents the removal of sizeable mussel without removing undersize.

From the transect and sample data the total mussel bed surveyed was **44.75 hectares**. There was no separation made between the main Foulney bed and Foulney Island.

Biomass

3702 tonnes size mussel and **2365 tonnes undersize mussel.**

Length Frequencies

The total length frequency for the surveyed bed is provided in Figure 3. From the length frequency data the majority of mussel present on Foulney Skear is currently a mix of size and undersize with a wide spread of mussel from 20mm to 66mm but mainly between 30mm and 55mm.

Maps

The frequency of each size class of mussels per sample has been mapped in Figure 4 with the size of the pie adjusted for sample weight standardised to kg/m². The weight of the size and undersize mussel has been mapped and represented in Figure 5.

It can be seen in Figures 4 and 5 that the size class is varied across the bed, with the size mussel >45 mm predominantly on the end of the main skear and on the island. 25-45mm mussels were mainly congregated higher up the main skear with some mixed in with size mussel on the island.

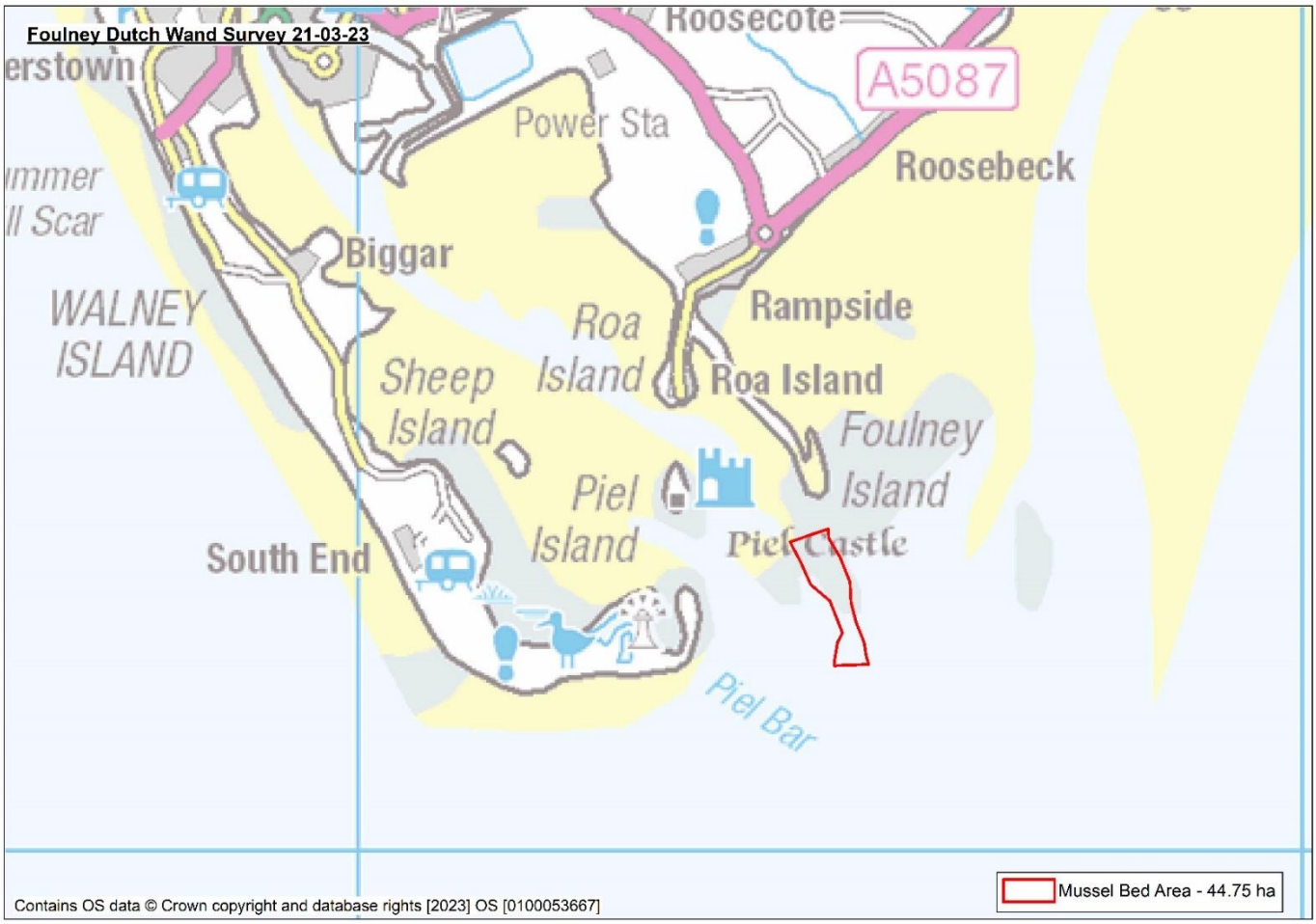

Figure 1 - Location of Foulney Mussel Bed surveyed 21-03-23.

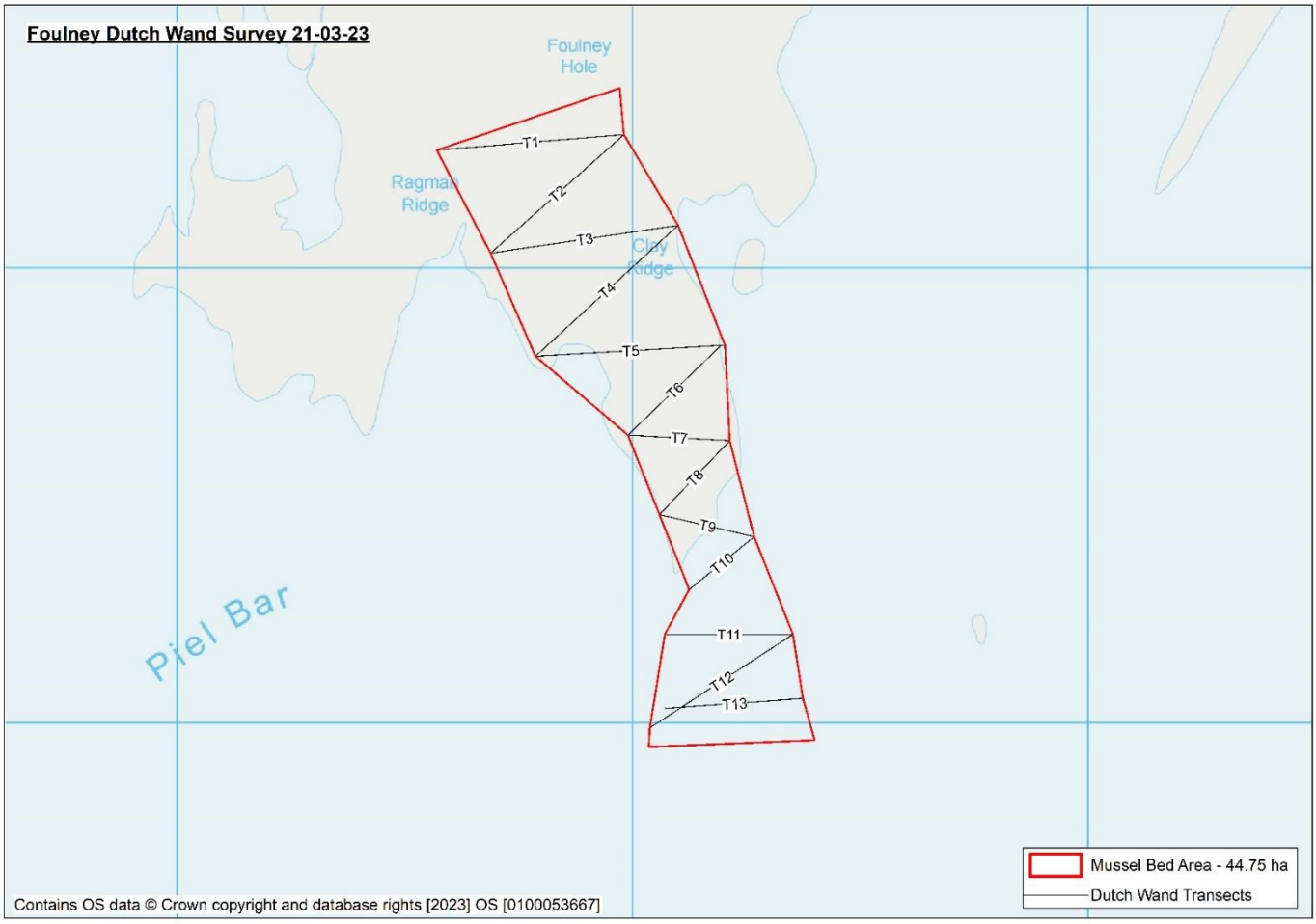

Figure 2 - Foulney Dutch Wand survey transects and estimated bed area.

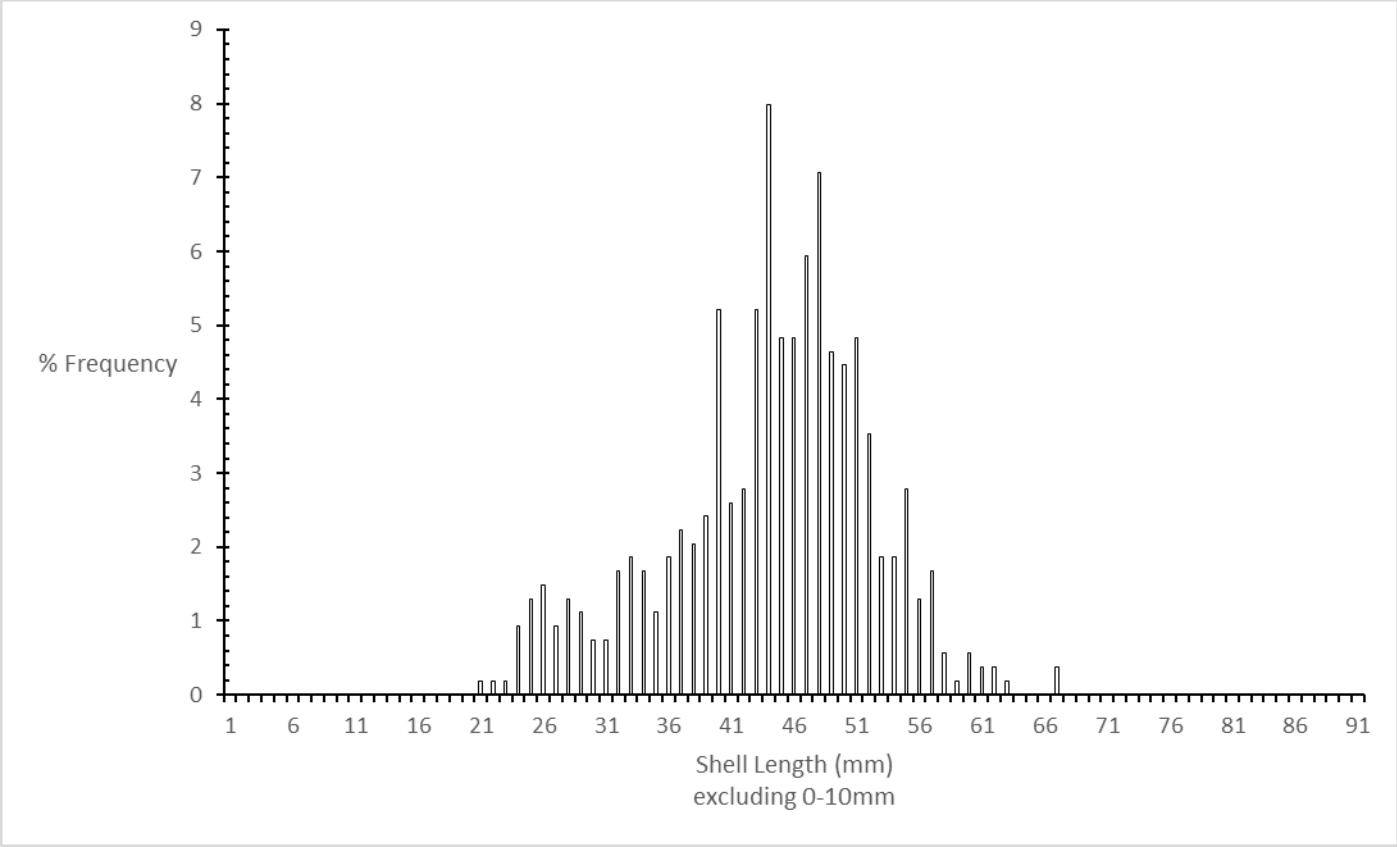

Figure 3 - Histogram showing size frequency of mussels from all samples on Foulney.

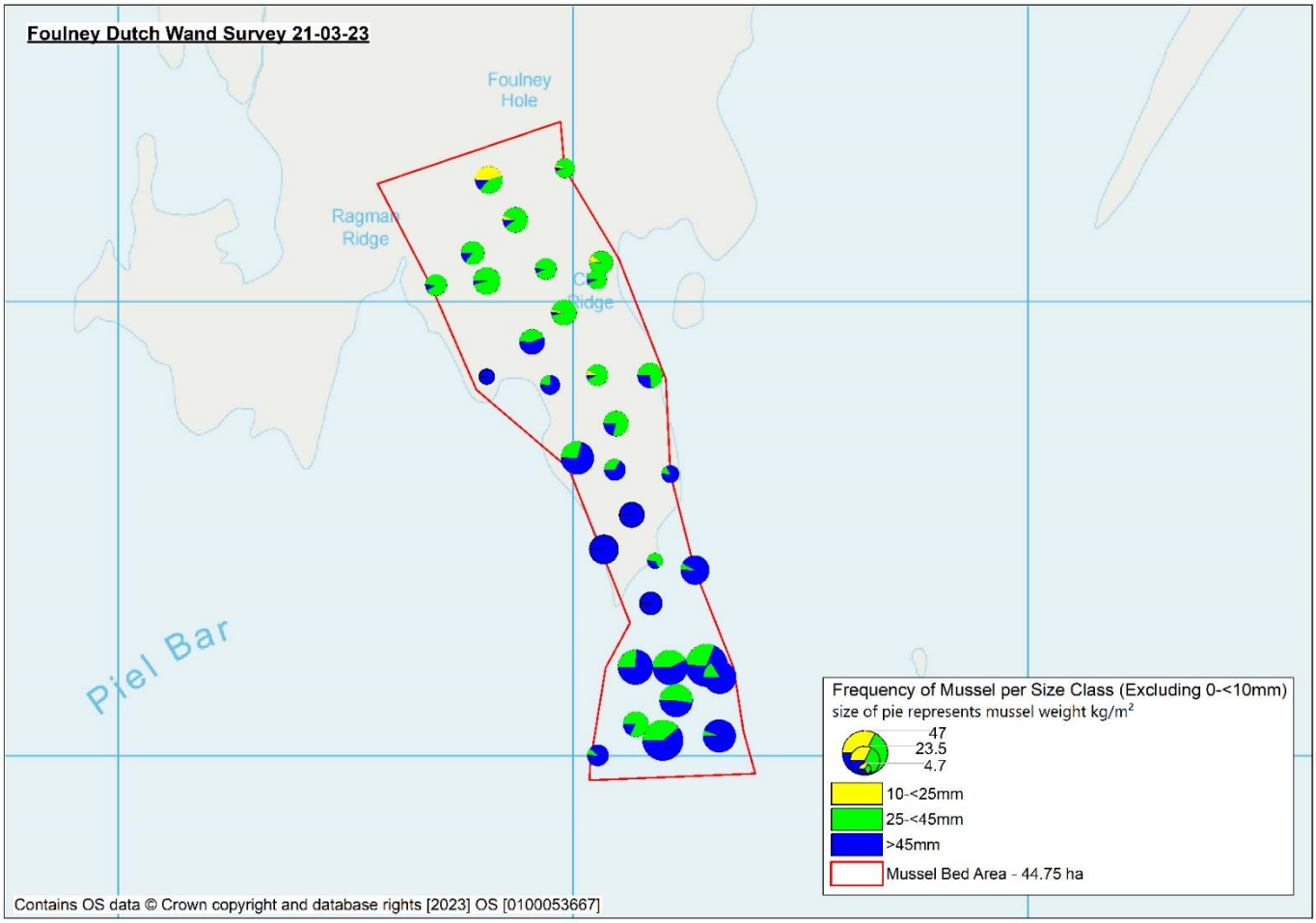

Figure 4 - Frequency of mussel by size class.

Walney Channel Dutch Wand Mussel Survey Note 05-04-23

Officers present: MC, JH

Low water: 18:39 1.4m (Liverpool Tides)

Survey method: Dutch Wand

Line transects were completed across the mussel bed using a Dutch Wand, transects start and finish at the edge of the bed as shown in Figure 2. The number of hits and misses of live mussel were recorded to give percentage cover. The bed area was calculated from the start and end of transects and from observations of officers whilst surveying. It was not possible to walk the perimeter of the bed due to time and tide restraints. A mussel sample was taken every 50 hits using a 10 cm diameter corer. 6 transects were completed and 7 samples collected. The total weight of live undersize and size mussel was recorded as well as the size frequency of each sample. No seed settlement was observed during the survey. Note, not all size mussel is fishable due to the presence of fouling species on slower growing individuals or the mixing of undersize and size in close proximity that prevents the removal of sizeable mussel without removing undersize.

From the transect and sample data the total mussel bed surveyed was **8.05 hectares**.

Biomass

510 tonnes size mussel and **138 tonnes undersize mussel**

Length Frequencies

The total length frequency for the surveyed bed is provided in Figure 3. From the length frequency data the majority of mussel present on the Walney channel bed is currently a mix of size and undersize mussel mainly between 42mm and 54mm.

Maps

The frequency of each size class of mussels per sample has been mapped in Figure 4 with the size of the pie adjusted for sample weight standardised to kg/m^2. The weight of the size and undersize mussel has been mapped and represented in Figure 5.

It can be seen in Figure 4 and Figure 5 that the size mussel >45mm is present across the entire bed, and 25-45mm mussel in the central region of the survey area. Very little <25mm mussel was present in the survey area.

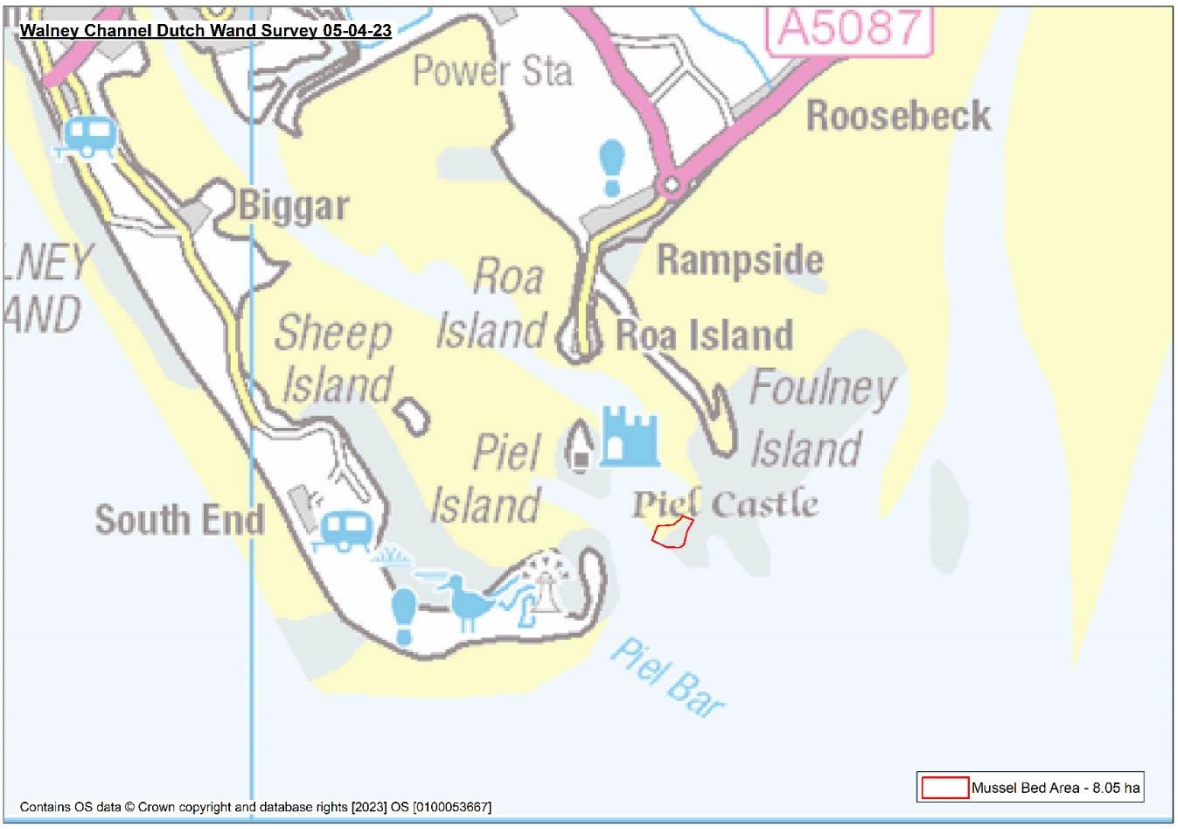

Figure 1 – Location of Walney Mussel Bed surveyed 05-04-23.

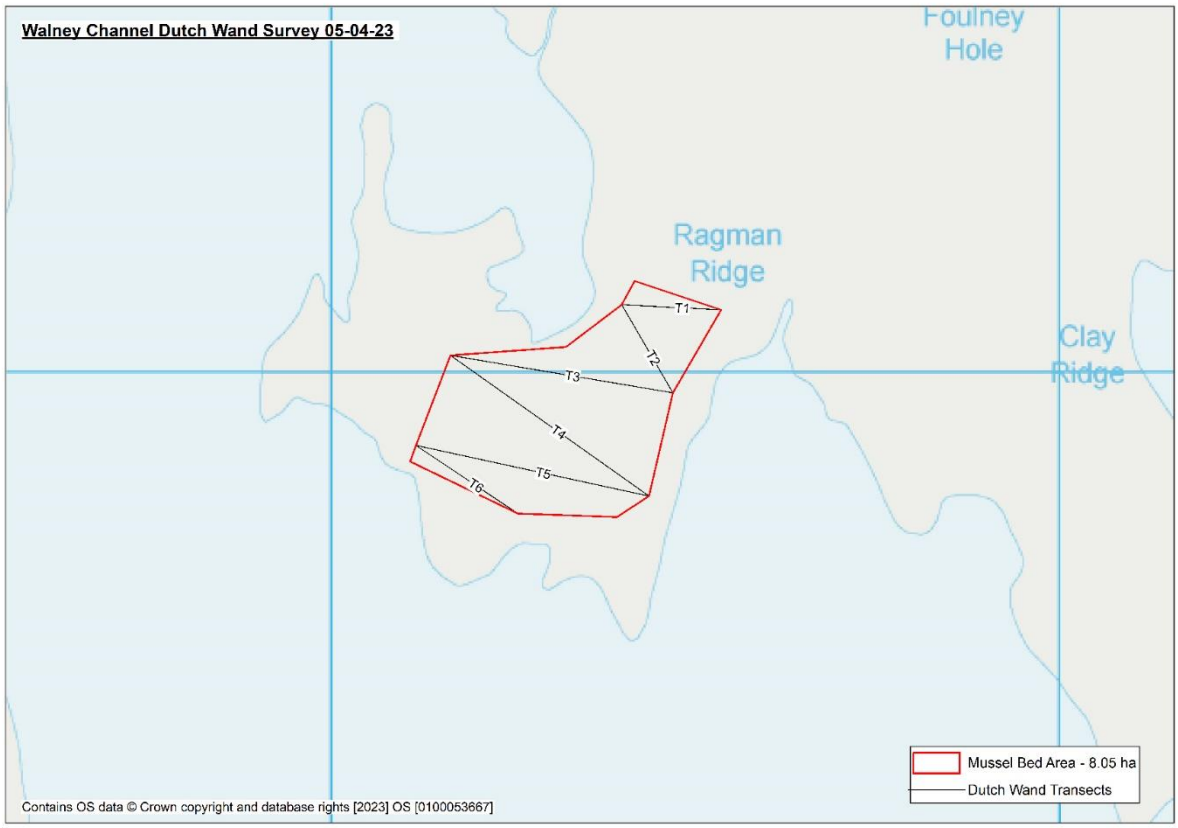

Figure 2 – Walney Dutch Wand survey transects and estimated bed area.

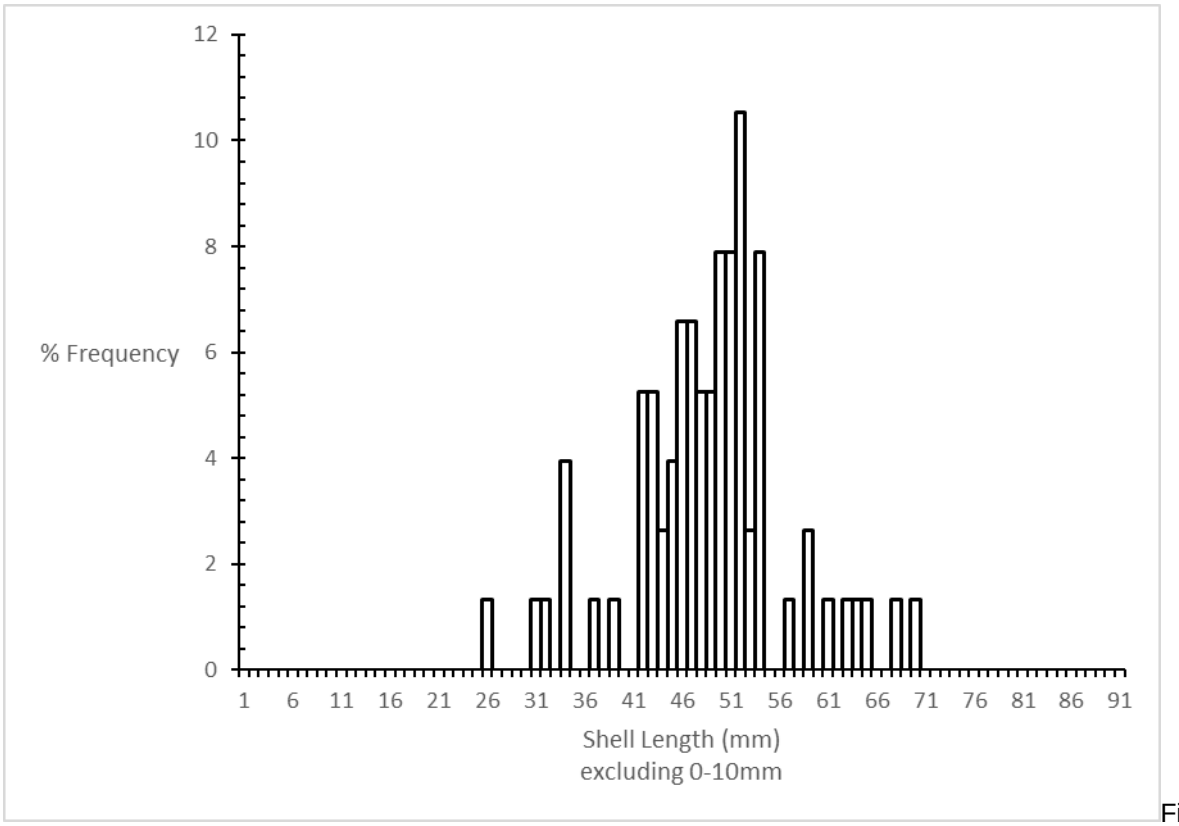

Figure 3 – Histogram showing size frequency of mussels from all samples on Walney Channel.

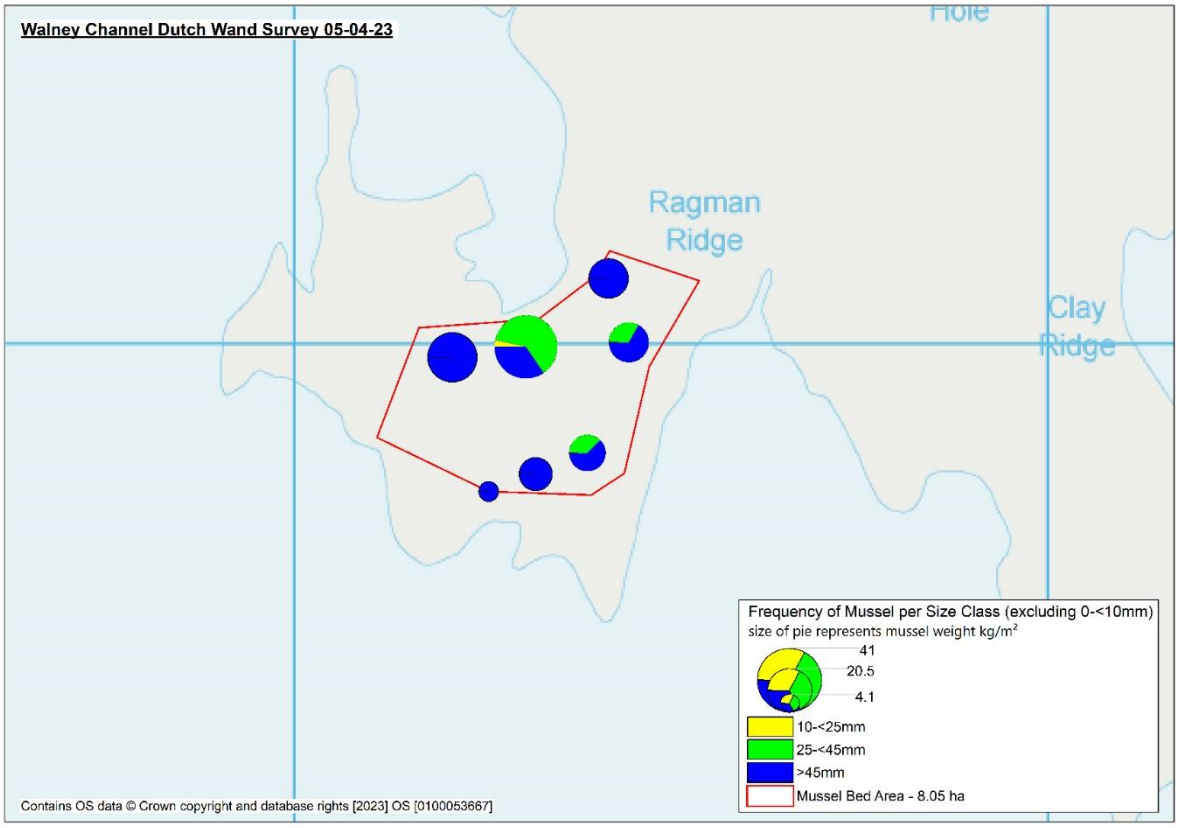

Figure 4 – Frequency of mussel by size class.

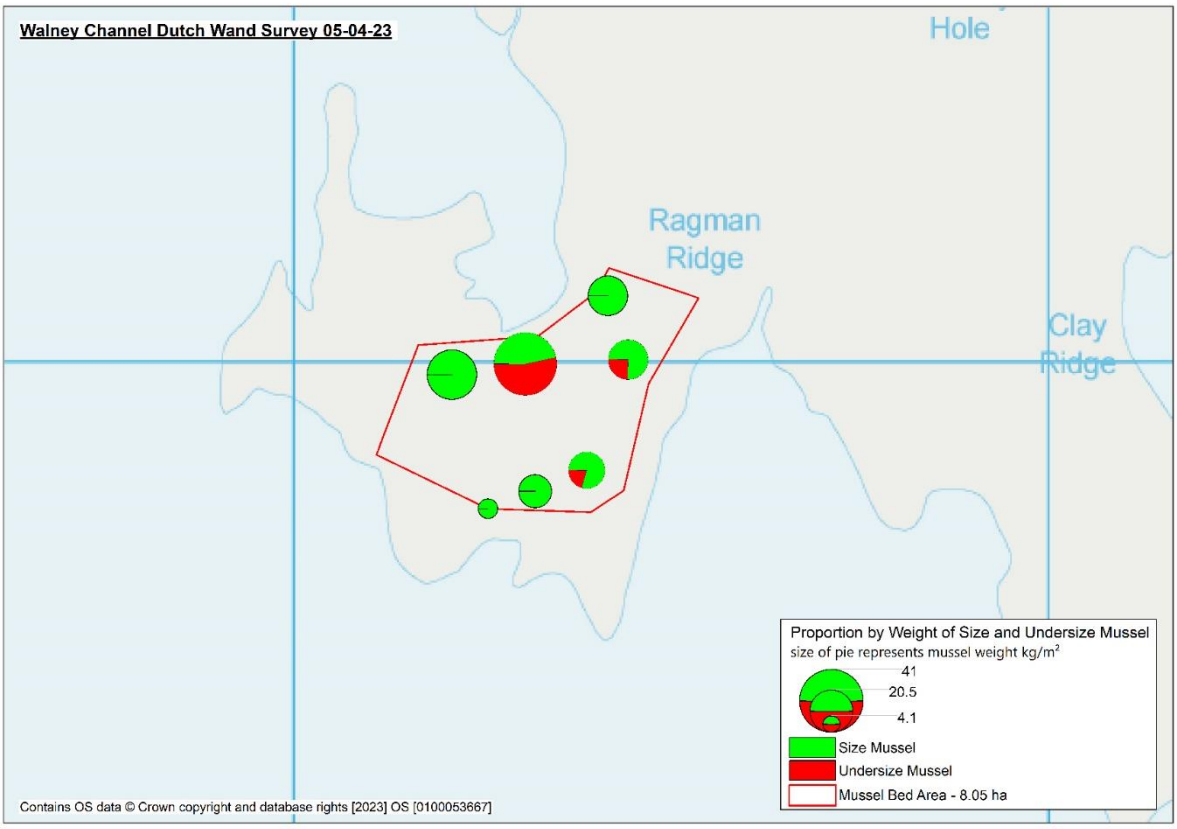

Figure 5 – Proportion of size and undersize mussel by weight represented as kg/m^2.