

# NWIFCA TSB Quarterly Meeting: 5<sup>th</sup> November 2024

REPORT NO.  
2

## SURVEY AND INSPECTION REPORT 13<sup>TH</sup> AUGUST – 23<sup>RD</sup> OCTOBER 2024

**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:** Receive the report and related survey and inspection notes.

### 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 and inspections

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: Fleetwood, South America, Falklands, and Heysham.

#### Mussel inspection methodology overview

Inspections of mussel beds are undertaken by officers who will walk the perimeter of the mussel bed with GPS to map the location and extent. Officers will then access the middle of the bed and as much as can reasonably be accessed, taking notes on this size, coverage, presence of any important features (presence of sabellaria, exposed cobble and boulder substrate, depth of mud, indications of scour, looseness of mussel), and mussel size composition. Full inspection criteria is detailed in the agreed Agenda Item 10 at the February 6th 2024 TSB meeting: (<https://www.nwifca.gov.uk/app/uploads/Agenda-Item-10-Seed-mussel-definition-of-ephemerality-TSB-February-2024.pdf>). Typically these surveys are limited by tides and can only be conducted on spring tides. Inspections are undertaken to assess the suitability of a bed for either a seed or size fishery.

#### 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<sup>2</sup> quadrat. Officers pick and rake the cockles within the quadrat and collect them for analysis in the lab. In the lab, cockles are separated 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. MUSSELS

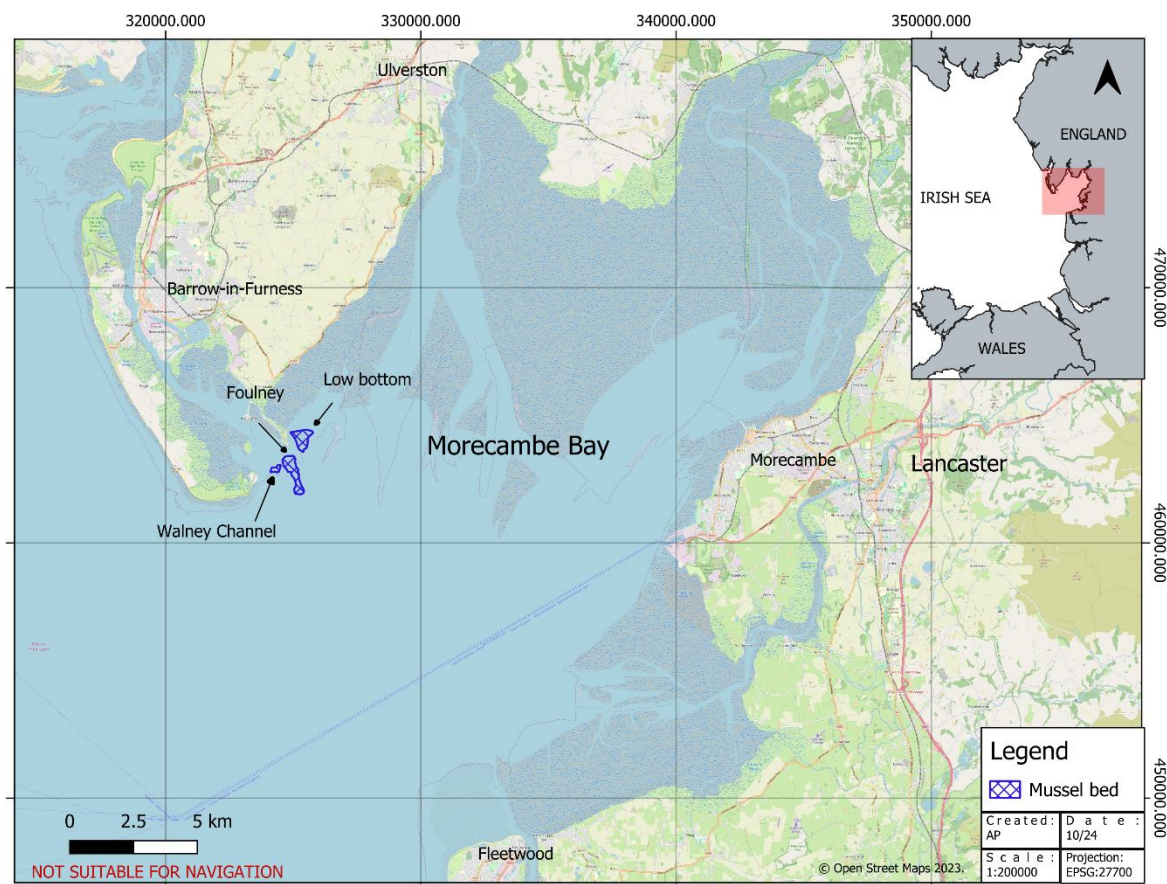
Between 13<sup>th</sup> of August and the 23<sup>rd</sup> of October, NWIFCA science officers carried out three mussel surveys across NWIFCA District. Full survey reports are provided in Annex 1 of this report. The location and extent of the beds inspected are provided in Figure 1.

**Table 1.** Mussel survey and inspections this quarter.

<b>Surveys and inspections this quarter</b>	<b>Date</b>
<b>Mussels</b>	
<b>Morecambe Bay</b> (Figure 1):	
Foulney (Dutch Wand survey)	18-09-2024
Low Bottom (Dutch Wand survey)	20-09-2024
Walney Channel (Dutch Wand survey)	20-09-2024

#### a) Morecambe Bay mussel beds overview:

The location and extent of mussel beds surveyed in Morecambe Bay from 13<sup>th</sup> of August and the 23<sup>rd</sup> of October is provided in Figure 1. An overview of the status of the bed is provided in the following section. Full inspection reports with images are provided in Annex 1.



**Figure 1.** The location of surveyed mussel beds in Morecambe Bay from 13th of August to 23<sup>rd</sup> October 2024.

## OVERVIEW:

### 1) Foulney main (Dutch wand survey)

From the transect and sample data the total mussel bed surveyed was 47 hectares. There was no separation made between the main Foulney bed and Foulney Island. There is approximately 2982 tonnes of size mussel and 822 tonnes undersize mussel currently on the bed. This is a slight decrease in the biomass of mussel on the bed, which typically has remained consistent over at least the past four years.

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 sizes, but mainly between 15mm and 23mm. Size mussel (>45 mm) is predominantly on the lower half of the main skear and on the island. Undersize mussels were mainly congregated higher up the main skear with some mixed in with size mussel in the middle of the skear. There was evidence of a seed settlement across the bed.

### 2) Low Bottom (Dutch wand survey)

The total mussel bed surveyed was 31.8 hectares. There is approximately 1819 tonnes size mussel and 600 tonnes undersize mussel. From the length frequency data, a significant proportion of mussel present on Low Bottom bed is currently size, with the majority ranging between 45mm – 50mm. In comparison, fewer mussel in the undersized category were present compared to last year’s survey, and many of the size mussel were barnacled.

### **3) Walney Channel (Dutch wand survey)**

The total mussel bed area was 7.6 hectares, with 454 tonnes of size mussel and 5 tonnes of undersize. The majority of mussel surveyed was between 52 mm and 63 mm. Size mussel was present across most of the bed, with small patches of undersize in the east, and little seed settlement observed at the time of survey.

## **2. COCKLES**

### **a) Leasowe re-survey**

#### ***Justification for re-surveying***

NWIFCA completed the annual cockle stock assessment of Leasowe cockle bed on the July 25<sup>th</sup> 2024 – the results of this survey were presented at the TSB meeting on the 13<sup>th</sup> of August 2024 (for full report see Agenda Item 6 from the August 13<sup>th</sup> TSB meeting: <https://www.nw-ifca.gov.uk/app/uploads/Agenda-Item-6-Survey-and-Inspection-Report-August-2024.pdf>)

July survey results showed there was 799 tonnes of size cockle on Leasowe. Historically, 800 tonnes of size cockle has been reserved on Leasowe for the birds, and anything in excess is available for the fishery. At the time of the July survey, there was not enough size stock to allow a TAC to be set for the fishery by September 1<sup>st</sup>. However, there was a significant biomass of undersize stock that was likely to grow to size by October as it was already close to size, and cockles on Leasowe are known for growing quickly. Therefore, it was agreed that the fishery would be opened by October 1<sup>st</sup>, subject to a second survey and there being sufficient size biomass to allow for a TAC to be determined.

Officers subsequently undertook a second, full survey of the bed on the 17<sup>th</sup> of September 2024. The results of this survey were presented at the Extraordinary TSB meeting on September 26<sup>th</sup> (<https://www.nw-ifca.gov.uk/meetings-archive/>)

Full results of the survey are provided in Annex 2, a brief summary of the results is as follows:

- 1) the biomass of size cockle had increased from 799 tonnes to 1370 tonnes
- 2) the biomass of undersize cockle had decreased from 751 to 350 tonnes (indicative of it having grown on to size)
- 3) The proportion of size to undersize had increased significantly

It was therefore recommended that the Leasowe cockle bed be opened as of 1<sup>st</sup> of October with a 570tonne TAC.

### **b) Pilling inspection**

#### ***Justification for partial-resurvey***

NWIFCA completed the annual cockle stock assessment of Pilling cockle bed on the 3<sup>rd</sup> of July 2024 – the results of this survey were presented at the TSB meeting on the 13<sup>th</sup> of August 2024 (for full report see Agenda Item 6 from the August 13<sup>th</sup> TSB meeting: <https://www.nw-ifca.gov.uk/app/uploads/Agenda-Item-6-Survey-and-Inspection-Report-August-2024.pdf>)

The results demonstrated that although the overall biomass of cockle on the bed was higher than it had been in previous years, there was a large portion of undersize to size cockle. In

particular, there was a large area in the north-eastern portion of the bed, where densities of cockle were high, but the ratio of size to undersize by number was on average 27 size to 73% undersize. This mixed composition posed concerns over disturbance to undersize stock, and compliance issues.

It was recommended, and agreed, that the fishery be opened as of October 1<sup>st</sup>, subject to further inspection by officers. It was hoped that the additional time would allow the undersize cockle to reach size, and reduce the high densities of undersize stock.

Officers re-surveyed the highly dense patch of cockles in the north-eastern portion of the Pilling cockle bed on the 13<sup>th</sup> of September. The main purpose of this re-survey was to identify whether the proportion of size to undersize in the highly dense area had improved enough to give confidence that significant portions of undersize would not be likely to be removed/disturbed. The results of the survey were presented at the Extraordinary TSB meeting on September 26th (<https://www.nw-ifca.gov.uk/meetings-archive/>).

Full results of the survey are provided in Annex 2, a brief summary of the results is as follows:

- 1) The biomass of both size and undersize cockle in the highly dense area had increased, indicative of further growth over the summer period
- 2) The proportion of size to undersize in the highly dense area was still low, at 35% size to 65% undersize.

*Annabel Plumeridge, North Western IFCA Head of Science, 23<sup>rd</sup> October 2024*

# Annex 1

## *Mussel Inspections and surveys:*

### **Foulney Dutch Wand Mussel Survey 18-09-2024**

Officers present: GG, LL, RL, ID

Low water: 18:52 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 25 hits using a 10 cm diameter corer. 13 transects were completed and 58 samples collected. The total weight of live undersize and size mussel was recorded as well as the size frequency of each sample.

A seed settlement was observed during the survey, with density of seed varying across the bed.

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 **47 hectares**. There was no separation made between the main Foulney bed and Foulney Island.

### **Biomass**

**2982 tonnes size mussel and 822 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 7mm to 70mm but mainly between 15mm and 23mm.

### **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<sup>2</sup>. 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 mussel >45 mm is predominantly on the lower half of the main skear and on the island. Undersize mussels were mainly congregated higher up the main skear with some mixed in with size mussel in the middle of the skear.

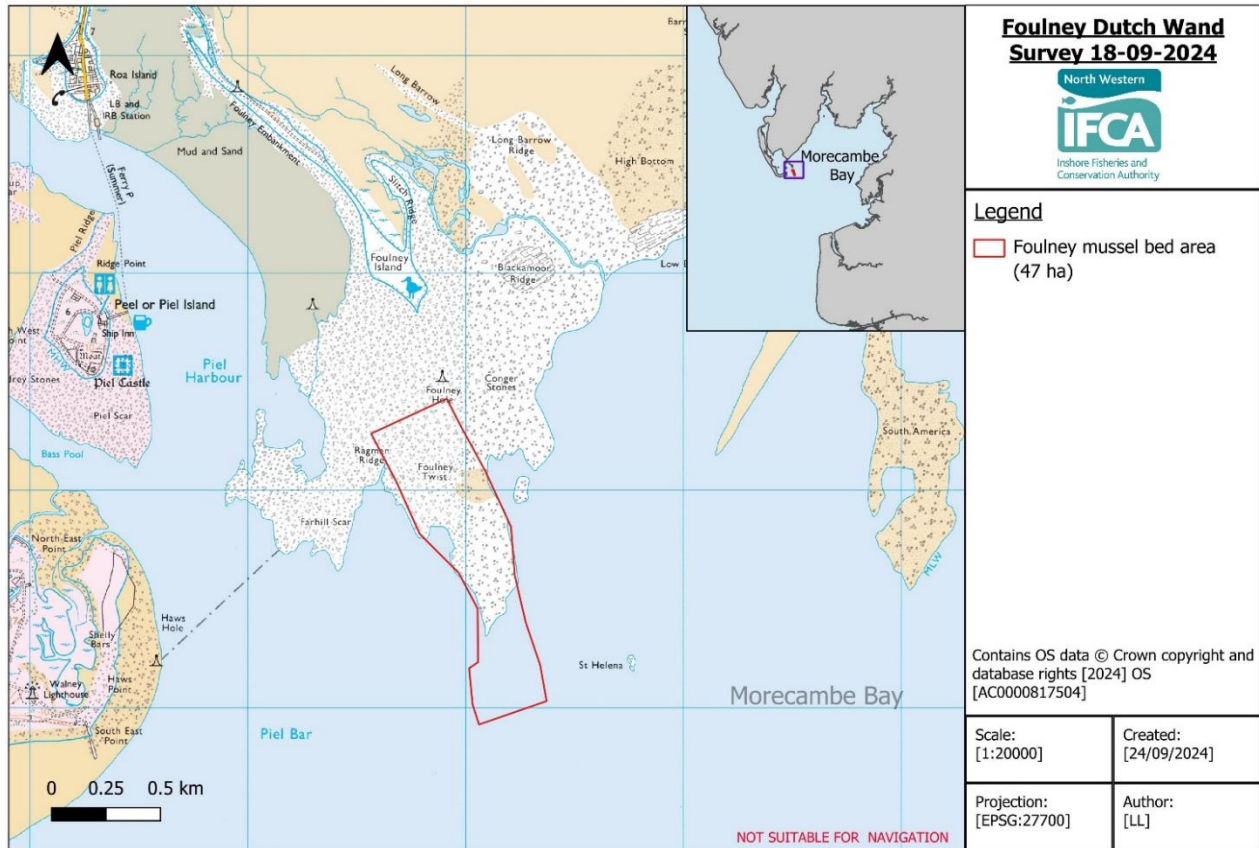


Figure 1: Location of Foulney mussel bed 18-09-2024

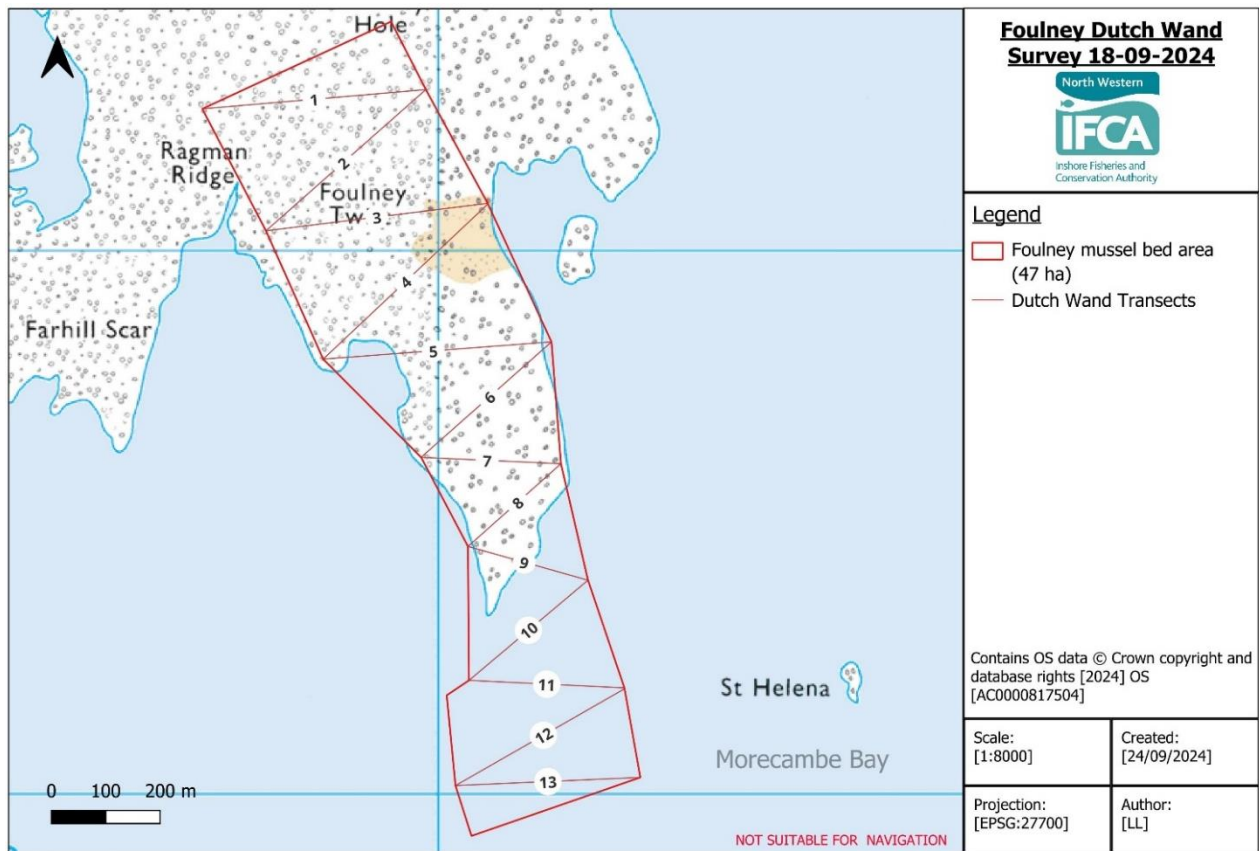


Figure 2: Foulney Dutch Wand survey transects and estimated bed area

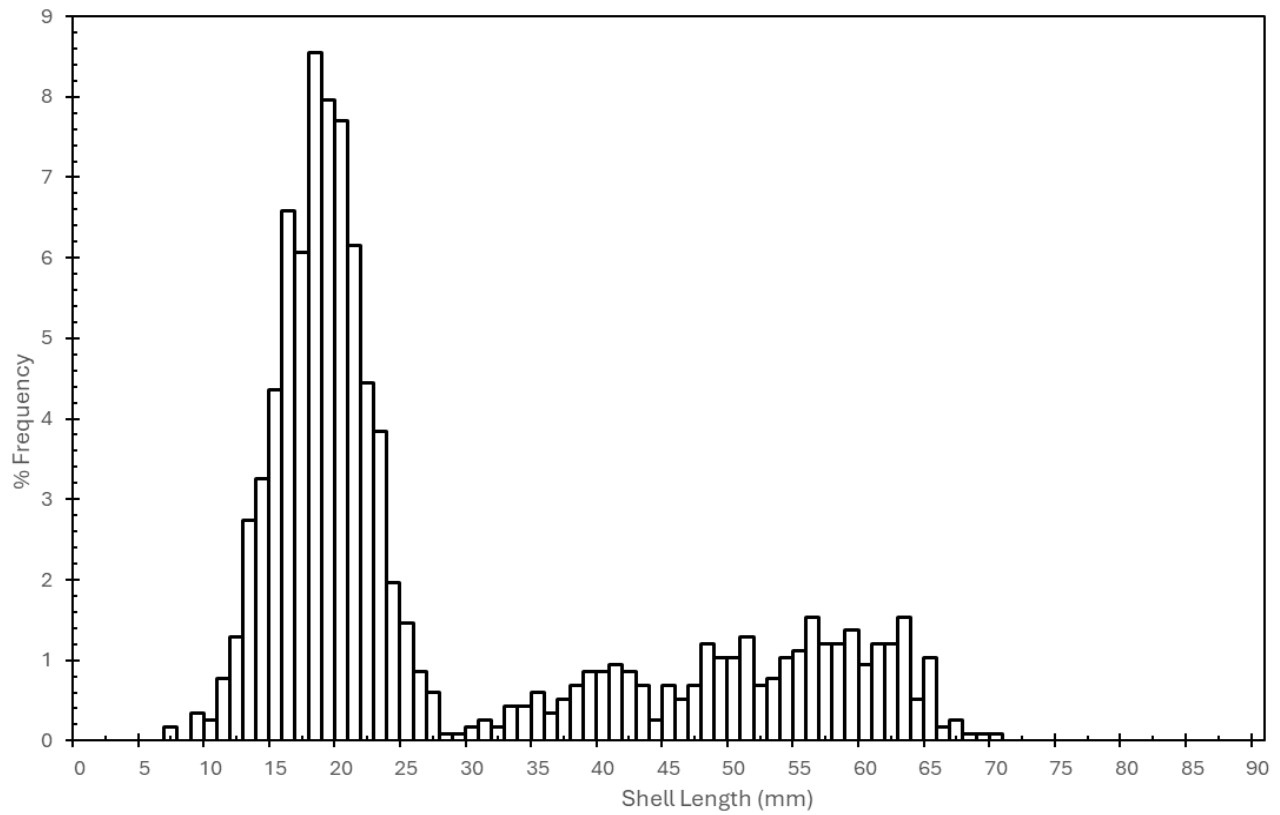


Figure 3: Histogram showing size frequency of mussels from all samples on Foulney

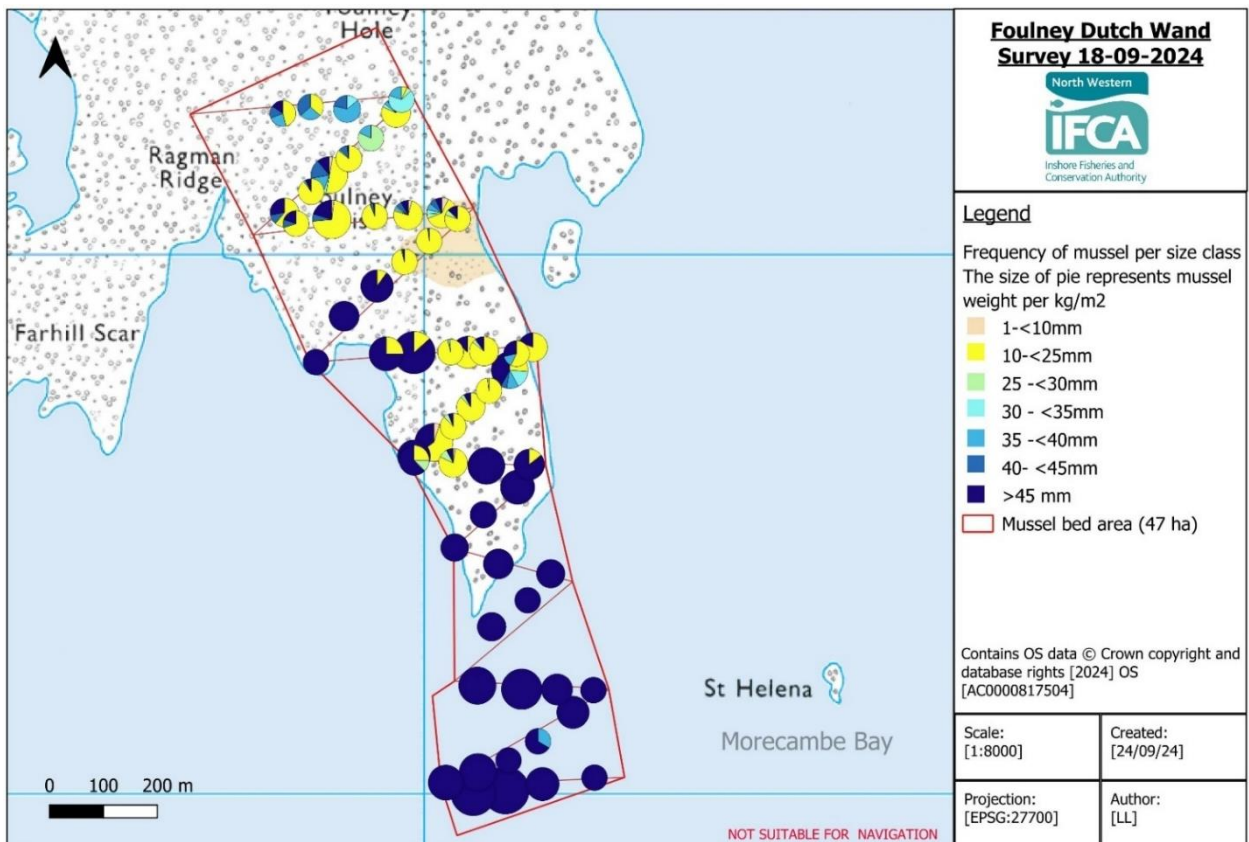


Figure 4: Frequency of mussel by size class



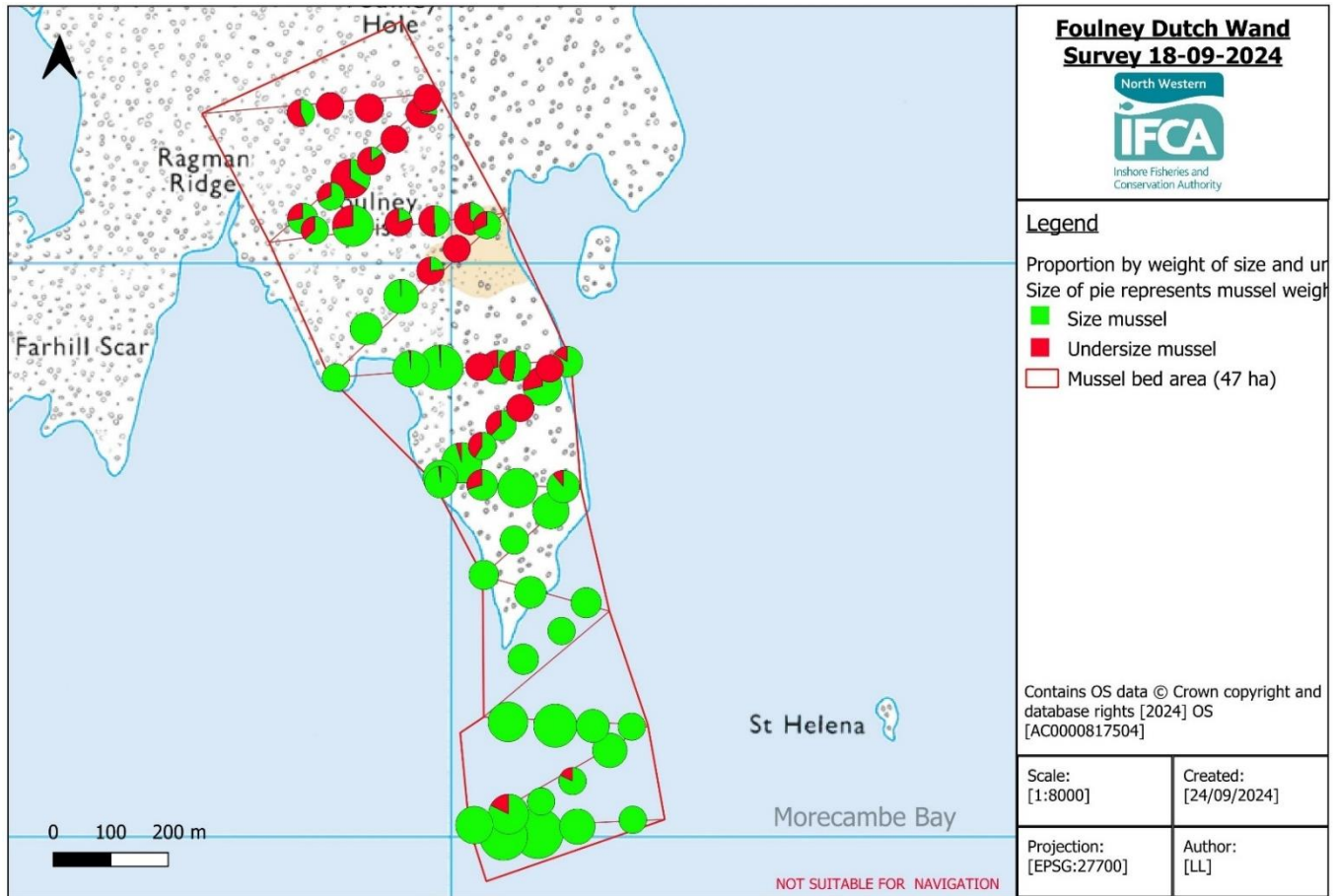


Figure 5: Proportion of size and undersize mussel by weight represented as kg/m<sup>2</sup>

## **Low Bottom Dutch Wand Mussel Survey 20-09-2024**

Officers present: RL, GG

Low water: 08.03 0.4m (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 25 hits using a 10 cm diameter corer. 6 transects were completed and 27 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. Almost all size mussel sampled on this bed were fouled with barnacle.

From the transect and sample data the total mussel bed surveyed was **31.8 hectares**.

### **Biomass**

**1819 tonnes size mussel** and **600 tonnes undersize mussel**.

### **Length Frequencies**

The total length frequency for the surveyed bed is provided in Figure 3. From the length frequency data, a significant proportion of mussel present on Low Bottom bed is currently size, with the majority ranging between 45mm – 50mm. In comparison, fewer mussel in the undersized category were present compared to last year's survey.

### **Maps**

The frequency of each size class of mussel per sample has been mapped in Figure 4 with the size of the pie adjusted for sample weight standardised to kg/m<sup>2</sup>. 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 predominantly located across the central and southern areas of the bed. Largest proportion of undersized is located across the southern most transect.

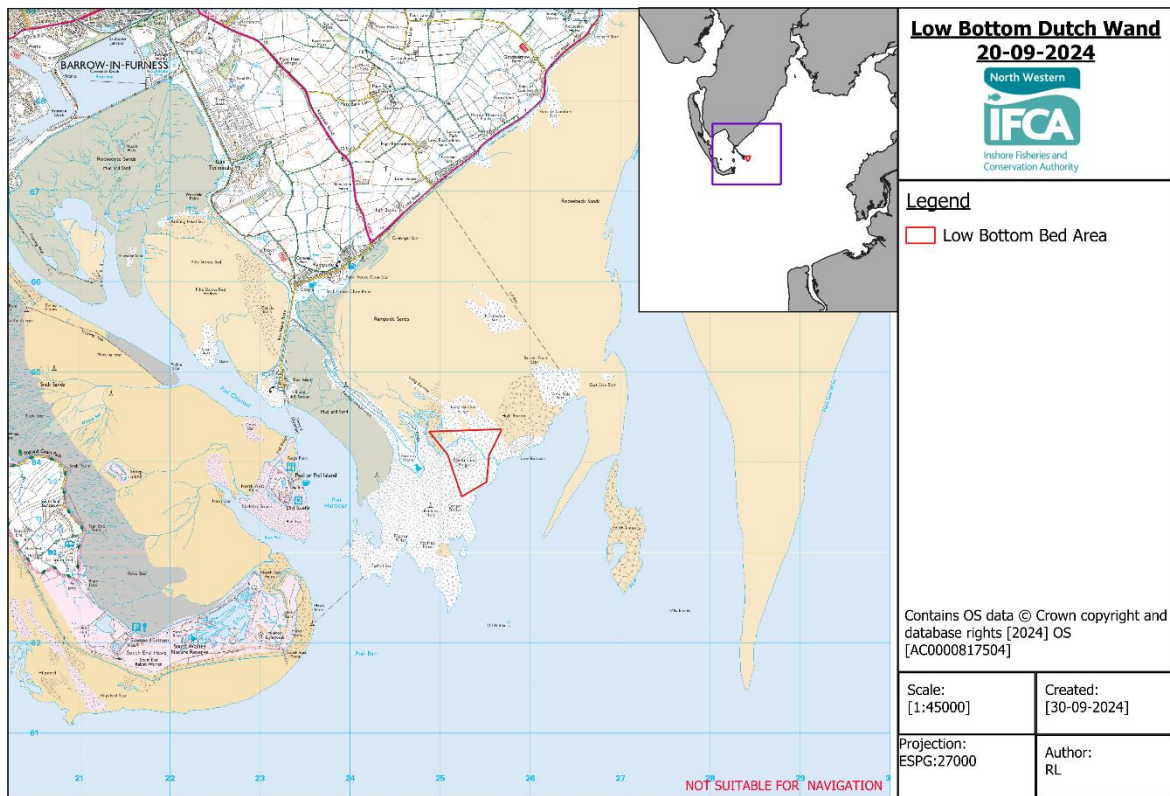


Figure 1 – Location of Low Bottom Mussel Bed surveyed 20-09-2024.

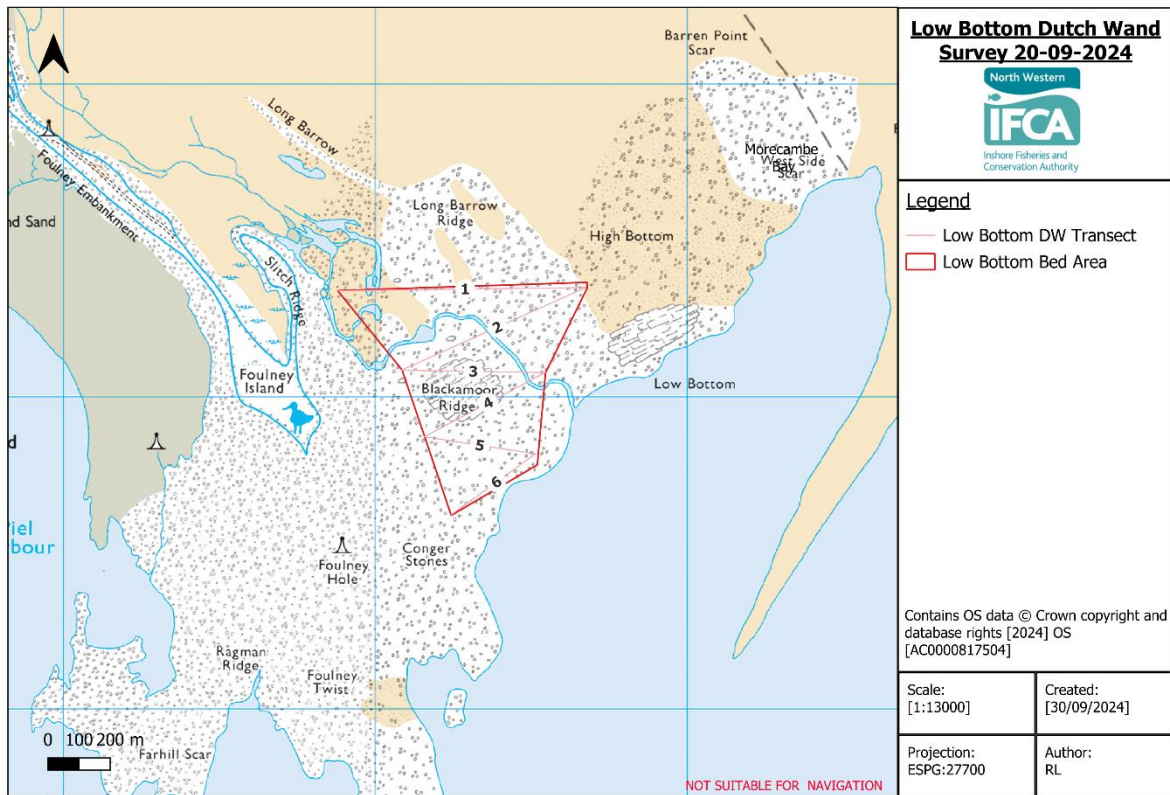


Figure 2 – Low Bottom Dutch Wand survey transects and estimated bed area 20-09-2024.

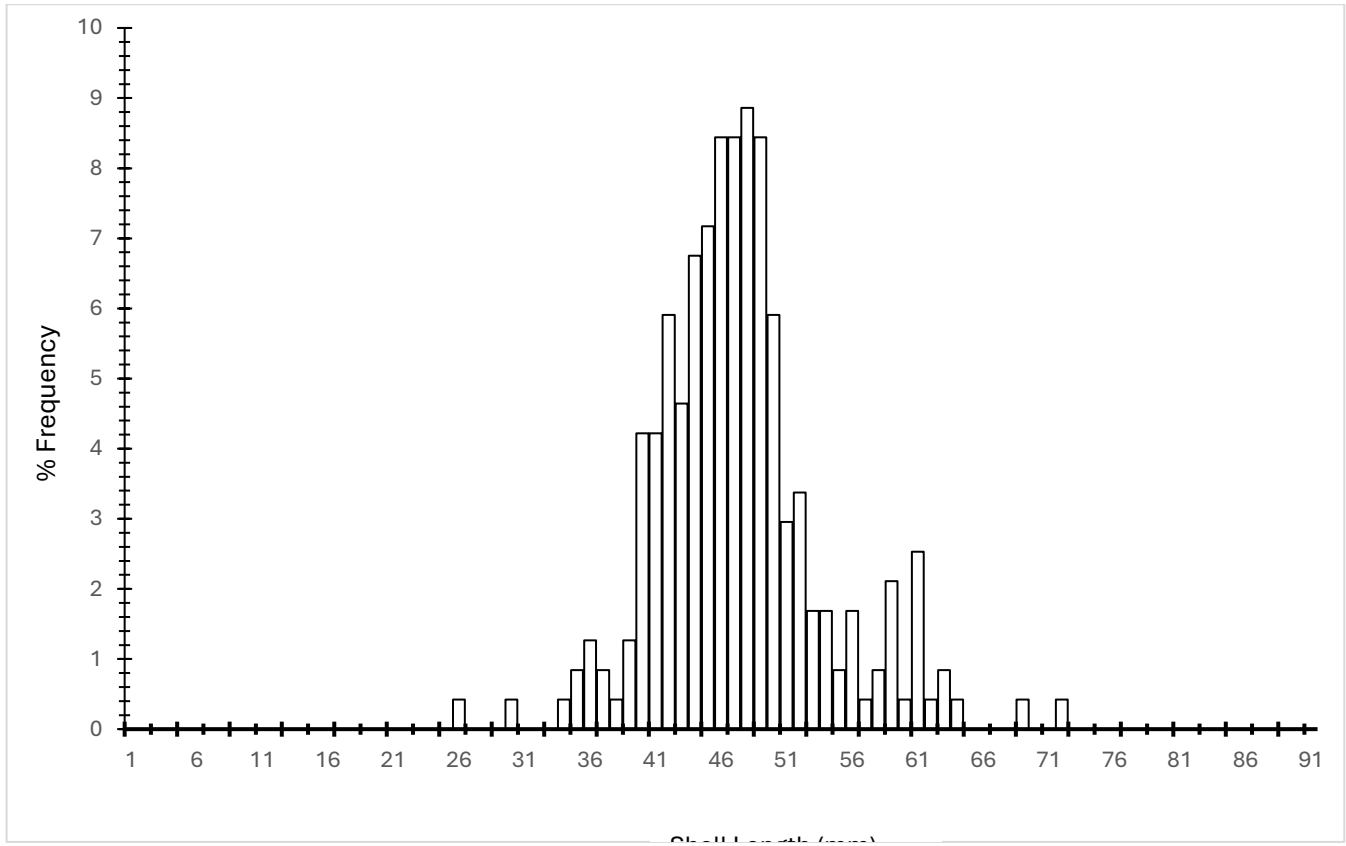


Figure 3 – Histogram showing size frequency of mussels from all samples on Low Bottom 20.09.2024.

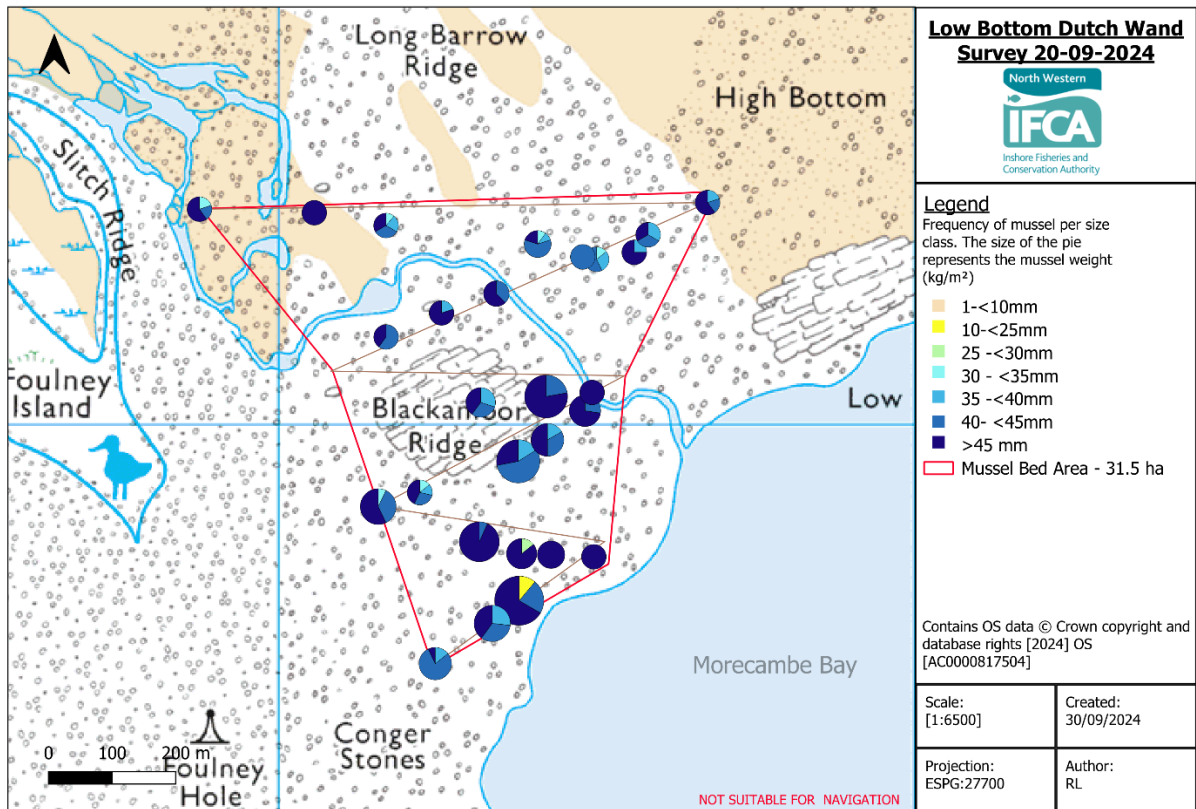


Figure 4 – Proportion of each size class of mussel 20.09.2024

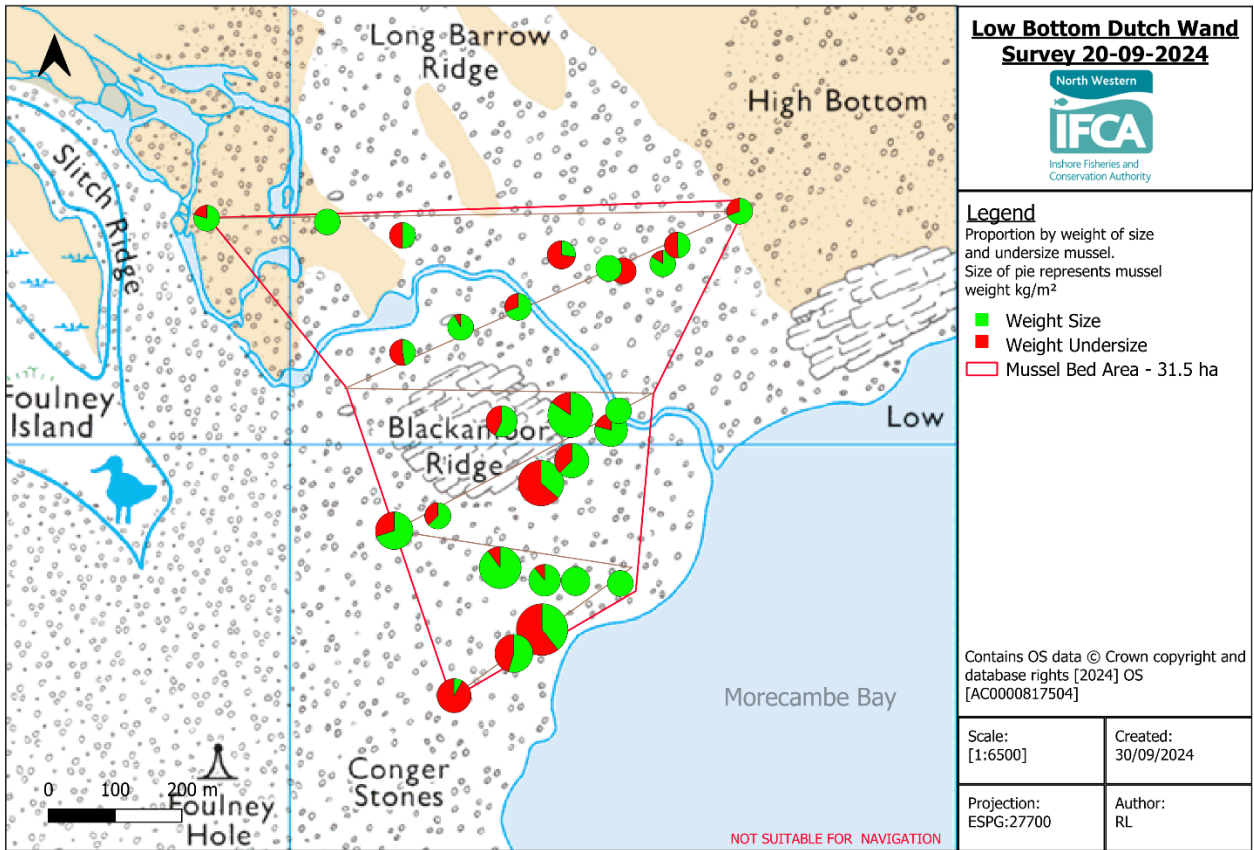


Figure 5 - Proportion of size and undersize mussel by weight represented as kg/m<sup>2</sup>.

## **Walney Channel Dutch Wand Mussel Survey Note 20-09-24**

Officers present: JH, MT

Low water: 08:03 0.4m (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 25 hits using a 10 cm diameter corer. Five transects were completed and 8 samples collected. The 6<sup>th</sup> transect surveyed the previous year was not completed due to lack of mussel on the Southern edge of the bed. 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 **7.62 hectares**.

### **Biomass**

**454 tonnes size mussel and 5 tonnes undersize mussel**

### **Length Frequencies**

The total length frequency for the surveyed bed is provided in Figure 3. From the length frequency data the mussel present on the Walney Channel bed ranges from 43mm to 63mm, with the majority of mussel present size mussel between 52mm to 63mm.

### **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<sup>2</sup>. 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 with a small patch of undersize mussel of 40-<45mm found in the East region of the survey area. Very little undersize mussel was present in the survey area.

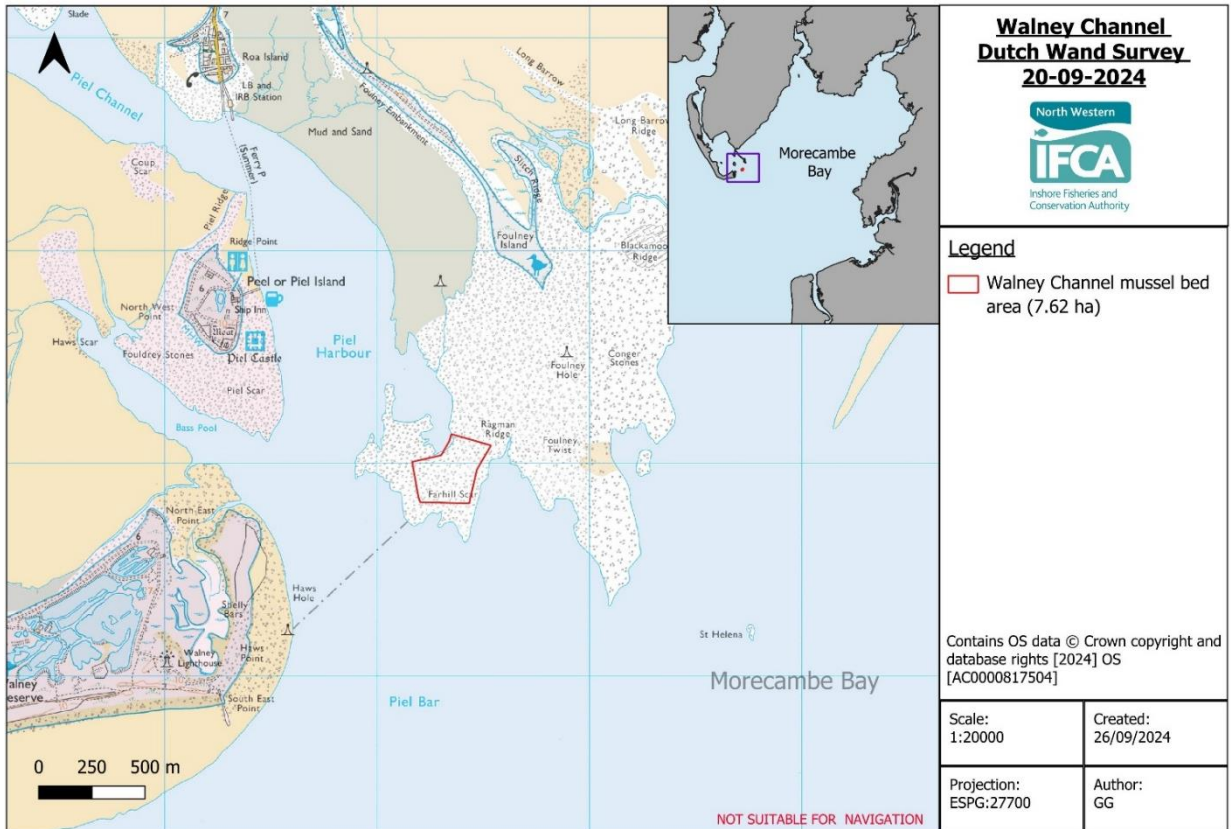


Figure 1: Location of Walney Channel mussel bed 20-09-2024

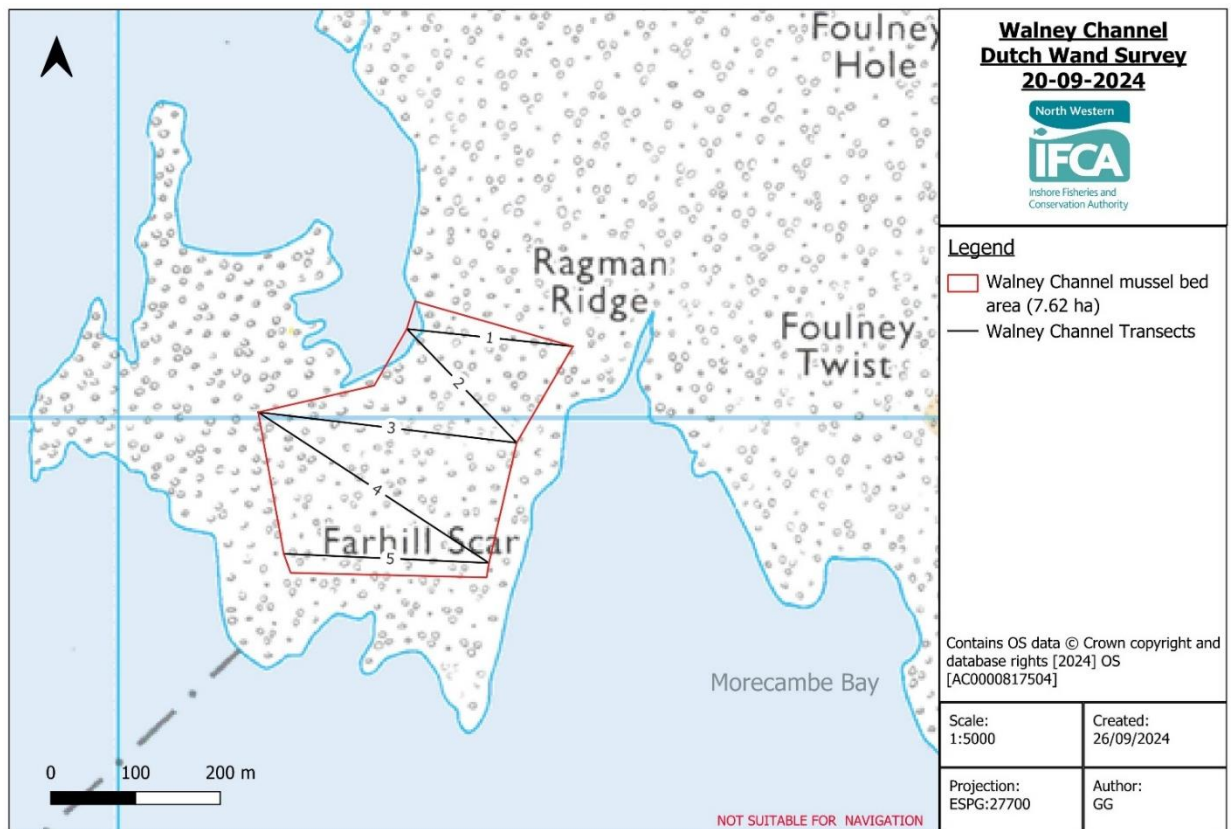


Figure 2: Walney Channel Dutch wand survey transects and estimated bed area 20-09-2024

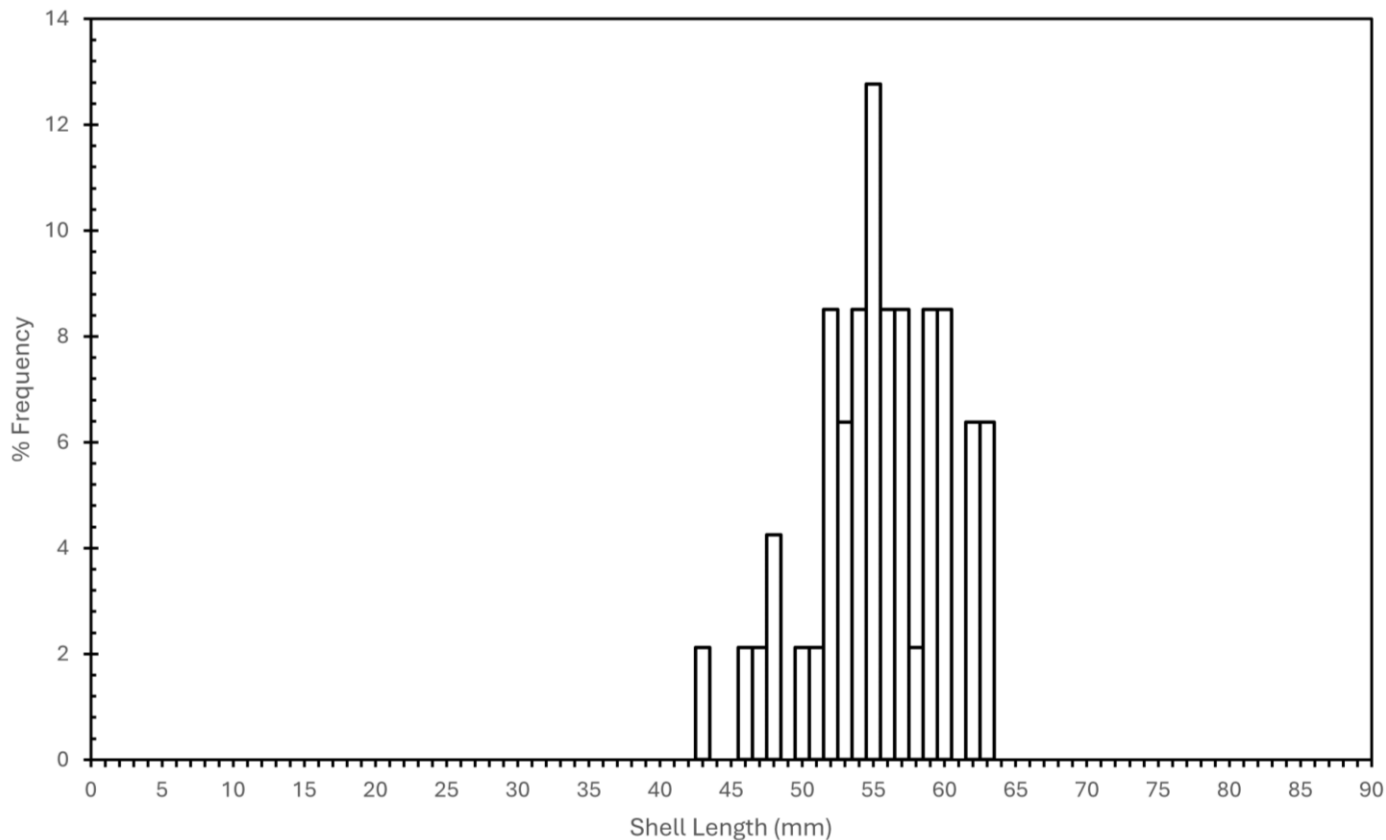


Figure 3: Histogram showing size frequency of mussels from all samples on Walney Channel 20.09.2024

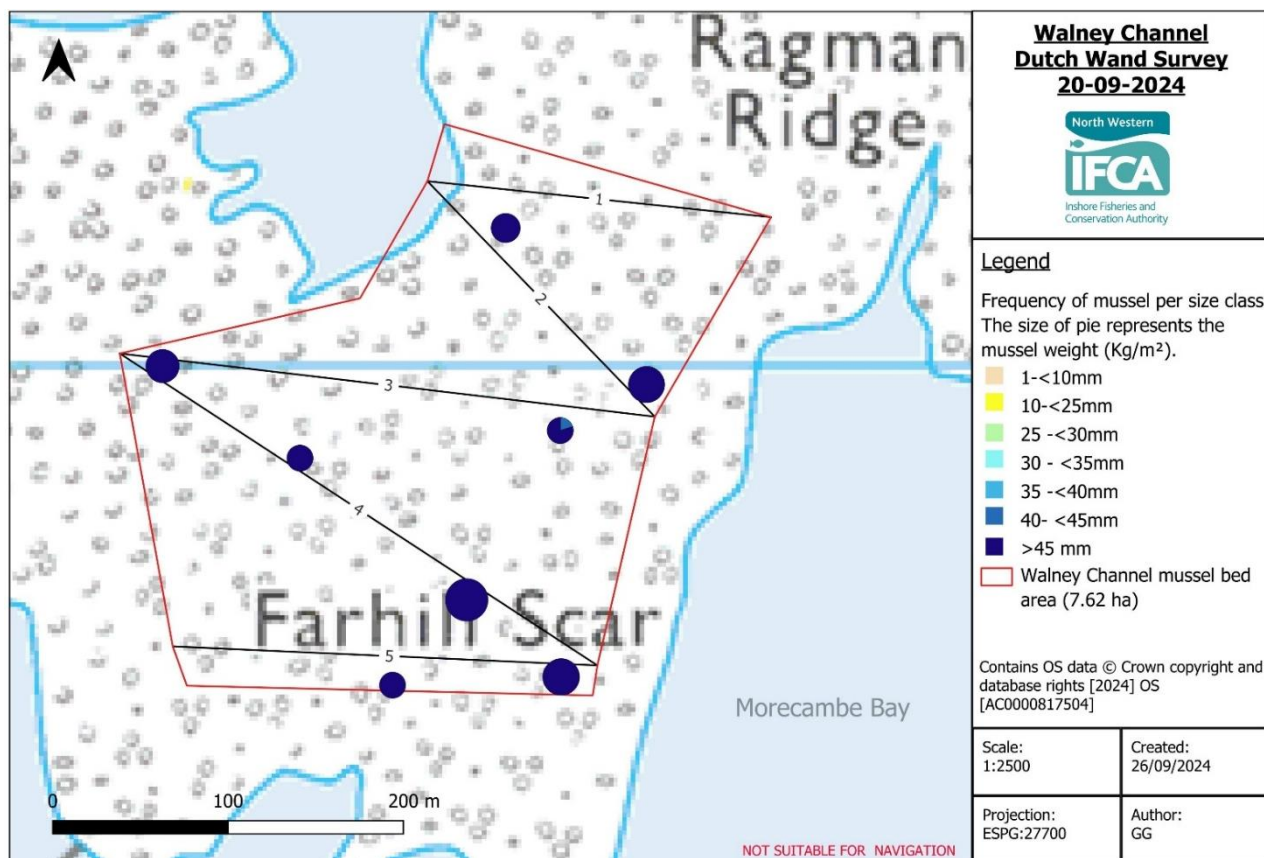
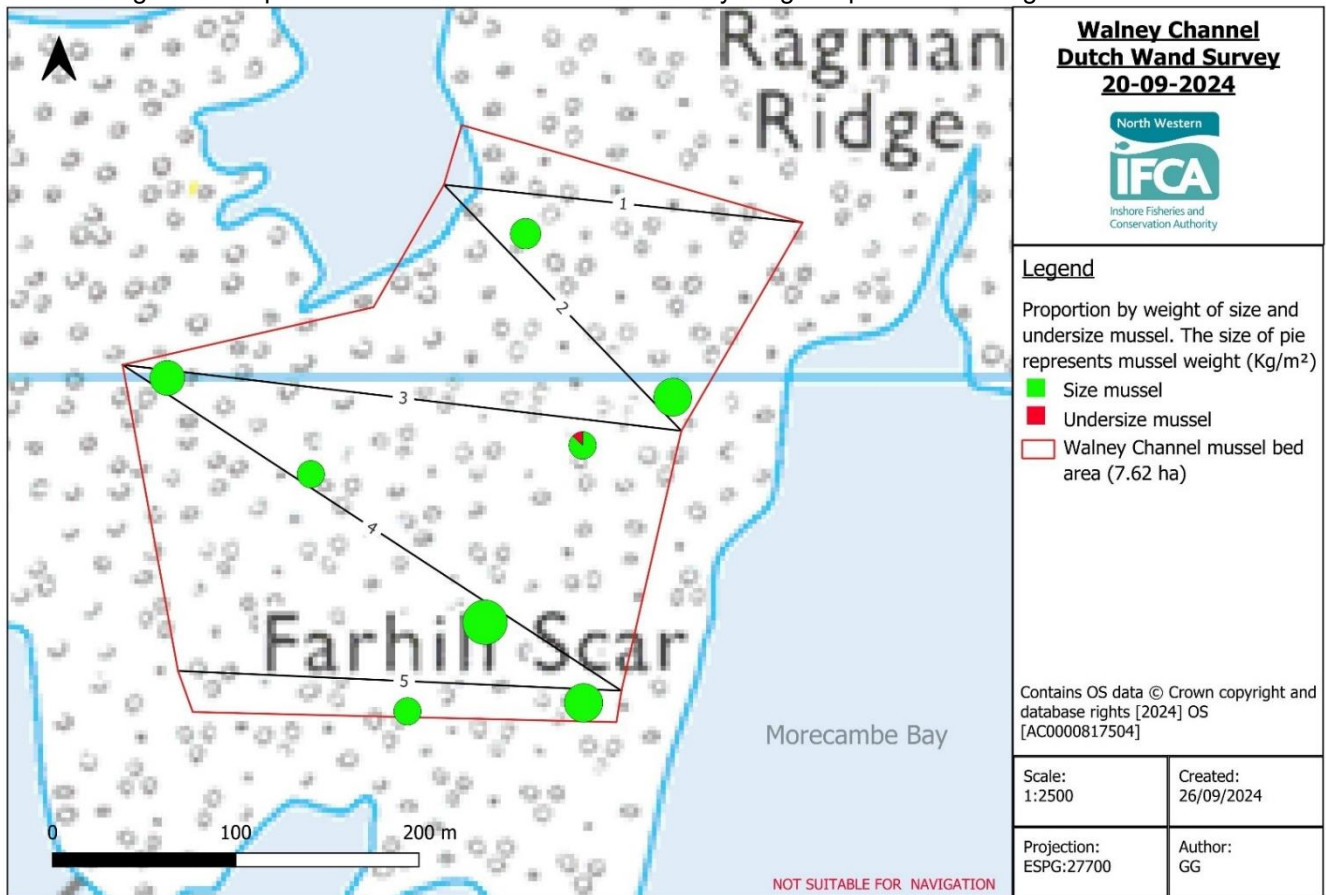


Figure 4: Frequency of mussel by size class 20.09.2024



Figure 5: Proportion of size and undersize mussel by weight represented as kg/m<sup>2</sup> 20.09.2024



## Annex 2

### Cockle surveys:

#### Leasowe Cockle Survey 17-09-2024

Officers present: JH, GG, LL, MT  
Tides: LW 18:06 1.4m (Liverpool Tides)

Survey method - Jumbo and 0.5m<sup>2</sup> quadrat

71 stations were sampled from a 250m grid. On the previous survey two additional points were added to the East of the survey grid to ensure full coverage of the bed; these points were re-surveyed this time. There was a wide range of cockle sizes across the bed from < 5mm to > 35mm. The main biomass of cockles are in the 20-25mm and 25-35mm size classes. There has been an increase in the number of size cockle due to growth.

### Means

Means were calculated from all stations with zero counts removed. Less than 5mm cockle was not used in the undersize figures due to the high variable survivability of cockle at this small size.

Mean number of size cockle	61 per m <sup>2</sup>	(min 0, max 474)
Mean number of undersize cockle	28 per m <sup>2</sup>	(min 0, max 338)
Mean number of 0-5mm cockle	1 per m <sup>2</sup>	(min 0, max 10)
Mean weight of size cockle kg/m <sup>2</sup>	0.535 kg/m <sup>2</sup>	(min 0, max 3.893)
Mean weight of undersize cockle kg/m <sup>2</sup>	0.137 kg/m <sup>2</sup>	(min 0, max 1.710)

### Maps

Maps were created showing the overall survey area, sampled points including additional points, density of size cockle, density of undersize cockle, the frequency of size classes, the size of the pie chart indicates the total density of cockles present, and the weight of undersize and size cockle.

### Biomass

	Area (ha)	Size Cockle (tonnes) <sup>1</sup>	Undersize Cockle (tonnes) <sup>2</sup>
<b>Leasowe</b>	<b>256</b>	<b>1370</b>	<b>350</b>

5-15 Class (tonnes)	15-20 Class (tonnes)	20-25 Class (tonnes)	25-35 Class (tonnes)	>35 Class (tonnes)
3	6	264	1418	29

<sup>1</sup>In regards to biomass size cockle defined as cockle which will not pass through a square gauge 20 x 20mm in size.

<sup>2</sup>The biomass of undersize cockle does not include any estimates of cockle less than 5mm due to the high variability of survival of this size class.

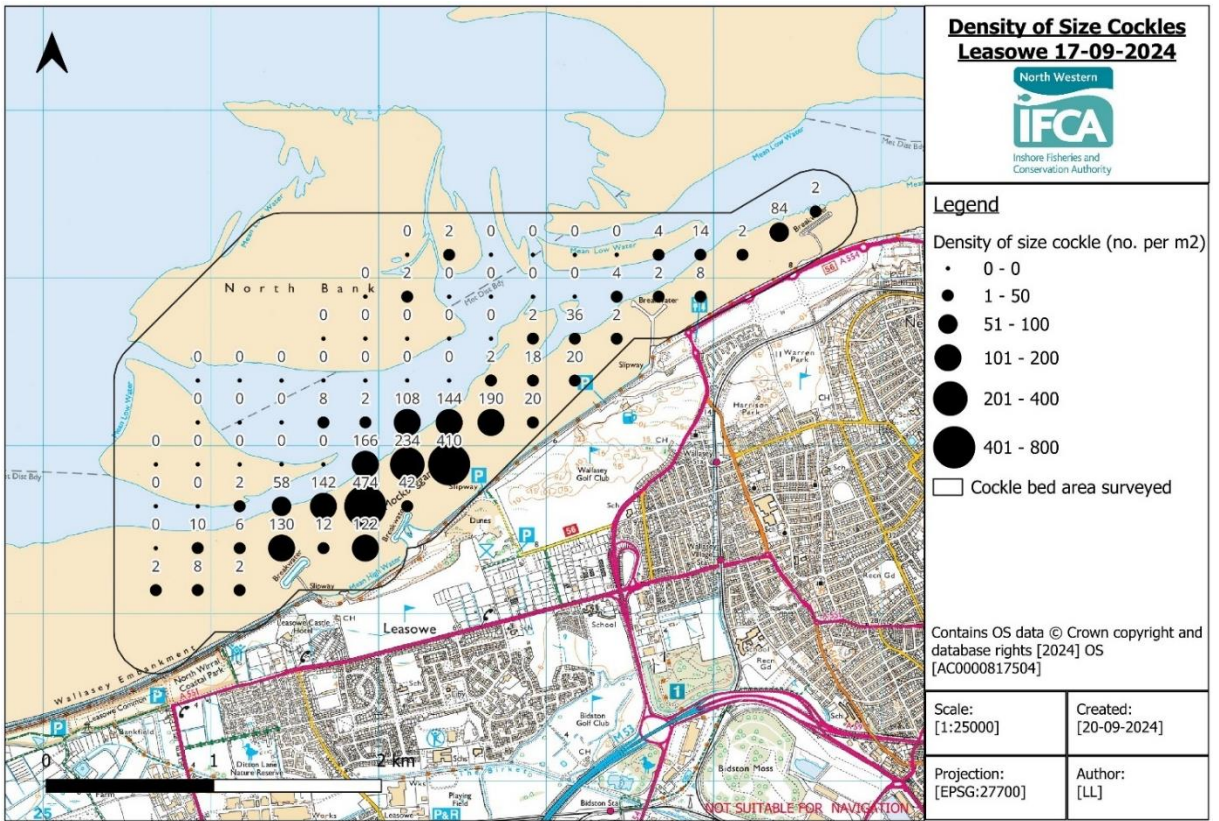
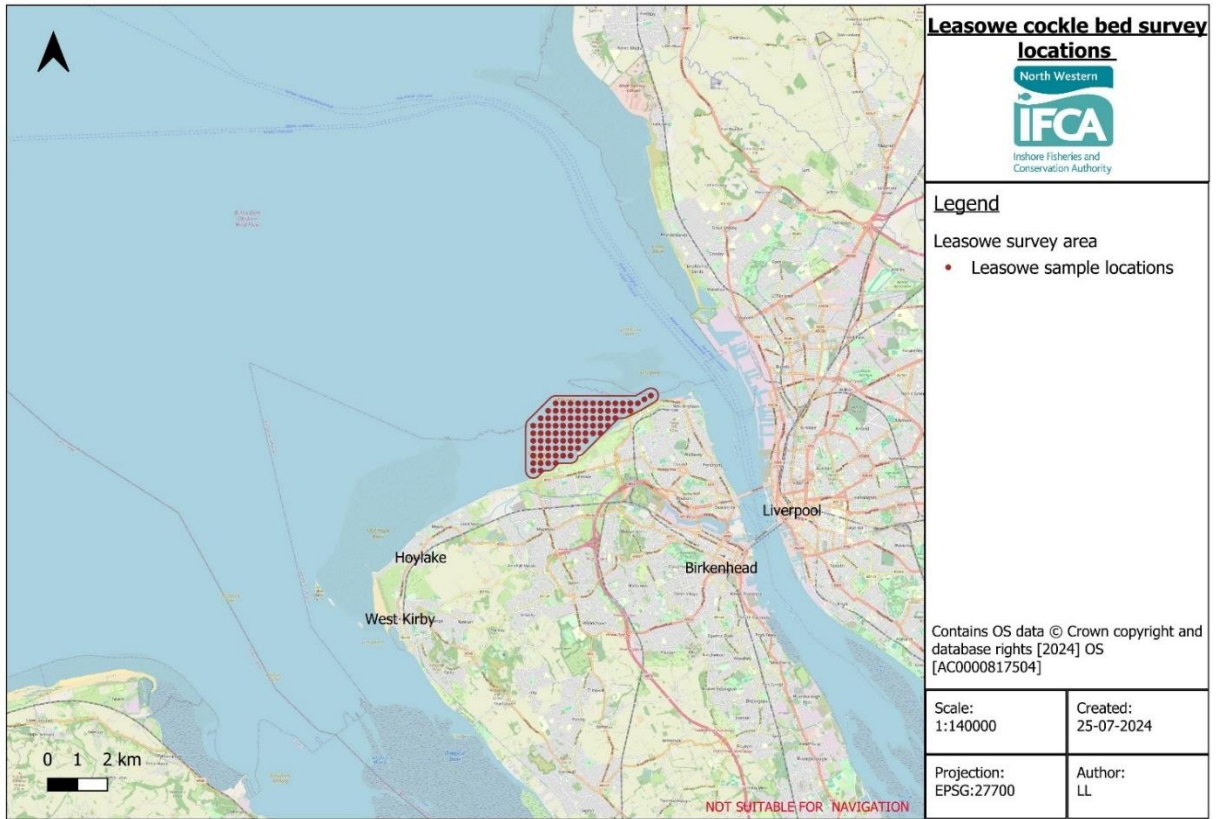


Figure 1: Illustration of position of Leasowe survey area

Figure 2: Density of size cockle per m<sup>2</sup> at Leasowe September 2024

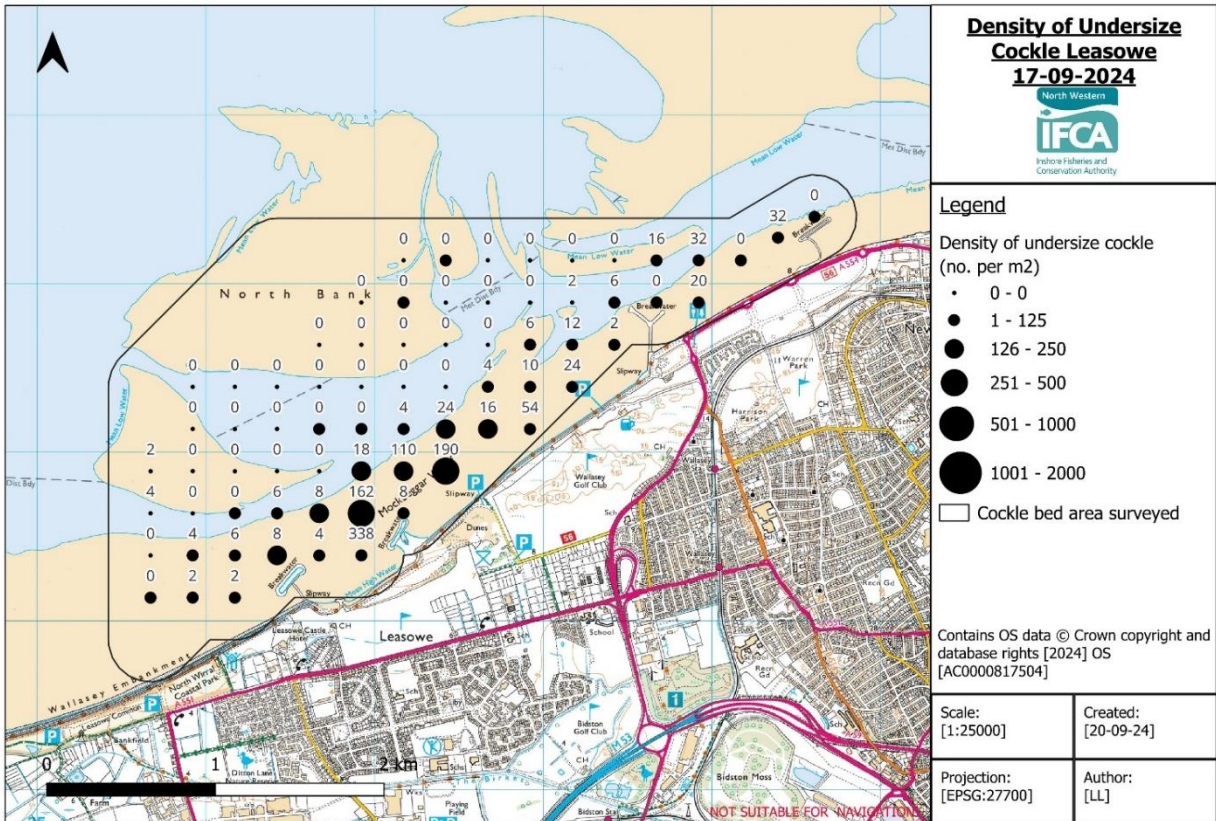


Figure 3: Density of undersize cockle per m<sup>2</sup> at Leasowe September 2024

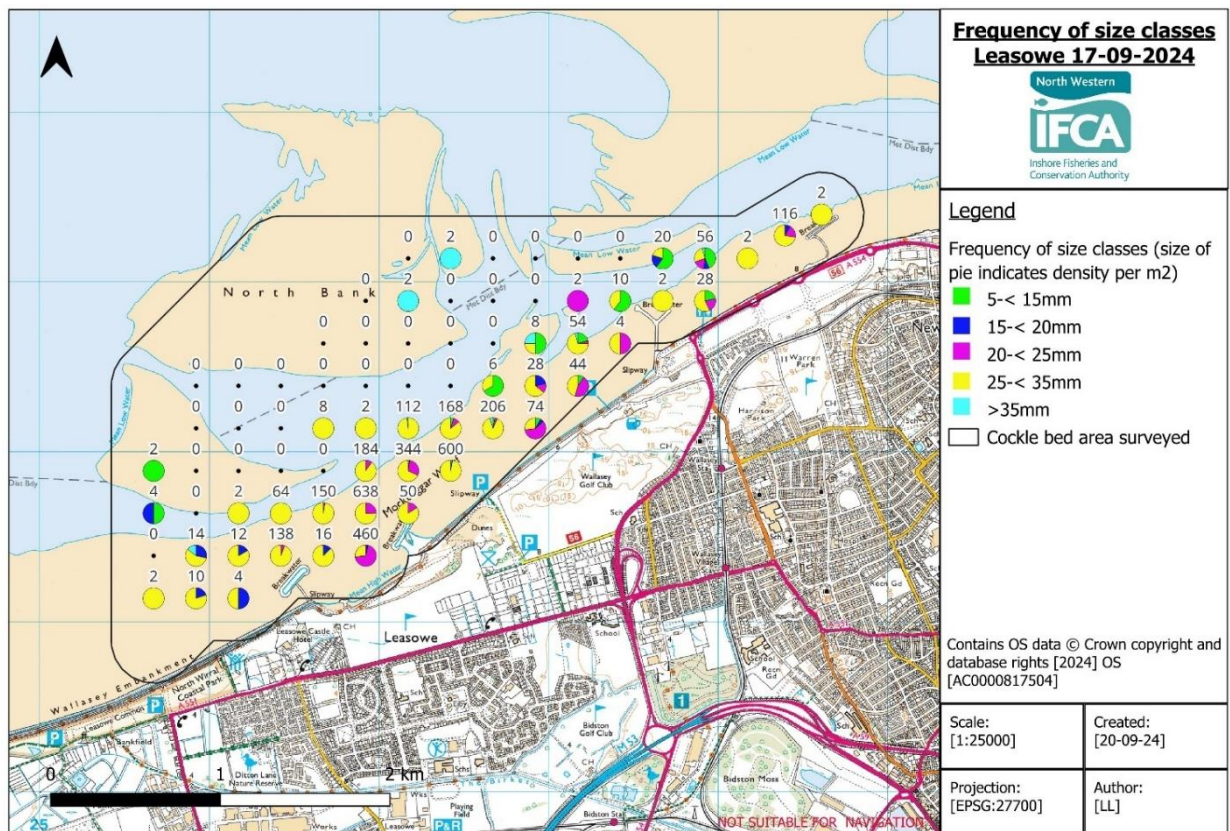


Figure 4: Frequency of size classes of cockle per m<sup>2</sup> at Leasowe September 2024

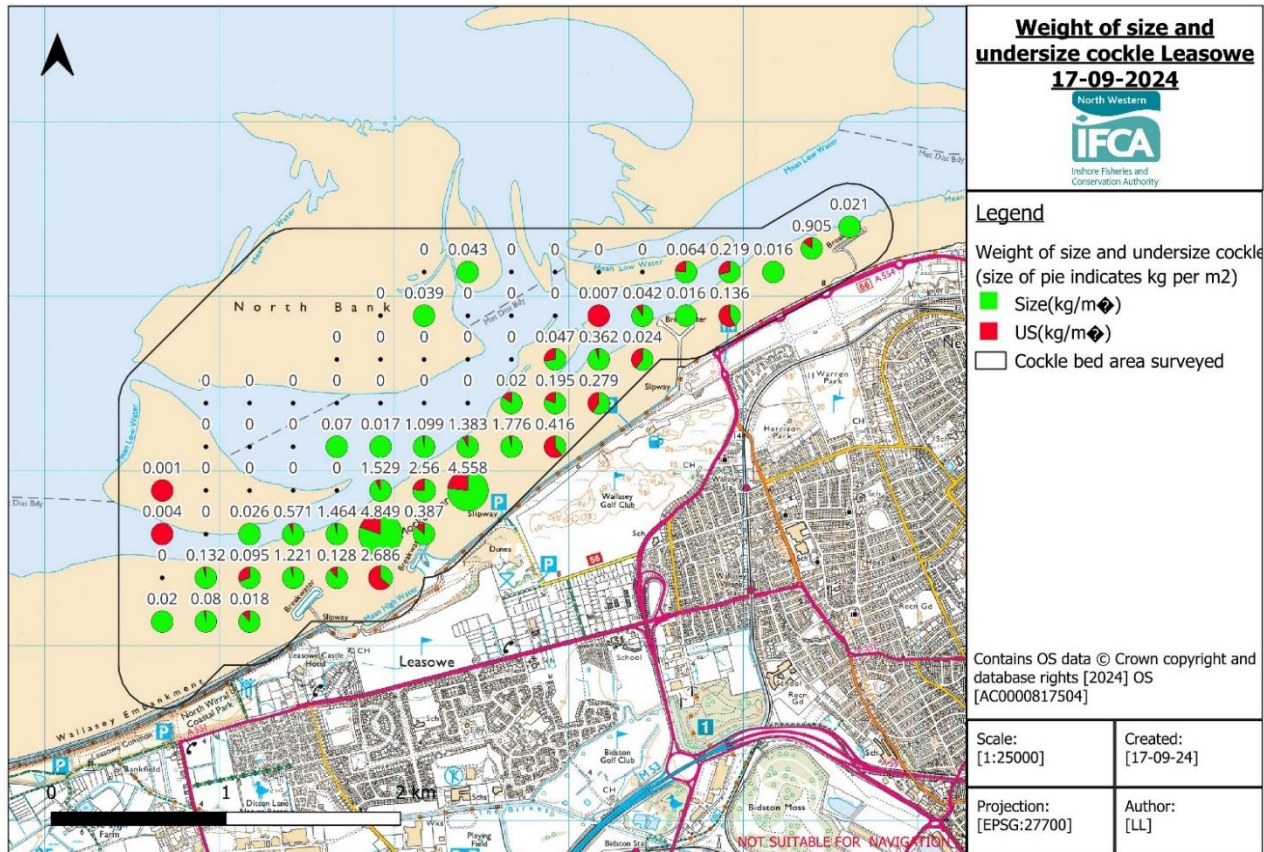


Figure 5: Weight of size and undersize cockle kg/m<sup>2</sup> at Leasowe September 2024

**Pilling Cockle (partial) re-survey 13-09-2024**

Officers present: JH, LL  
 Tides: LW 13:57 3.8m (Liverpool Tides)

Survey method - Jumbo and 0.5m<sup>2</sup> quadrat

18 stations located in the north-eastern corner of the bed were re-sampled (see figure 1). Cockles were sampled following the same method applied to the annual summer surveys.

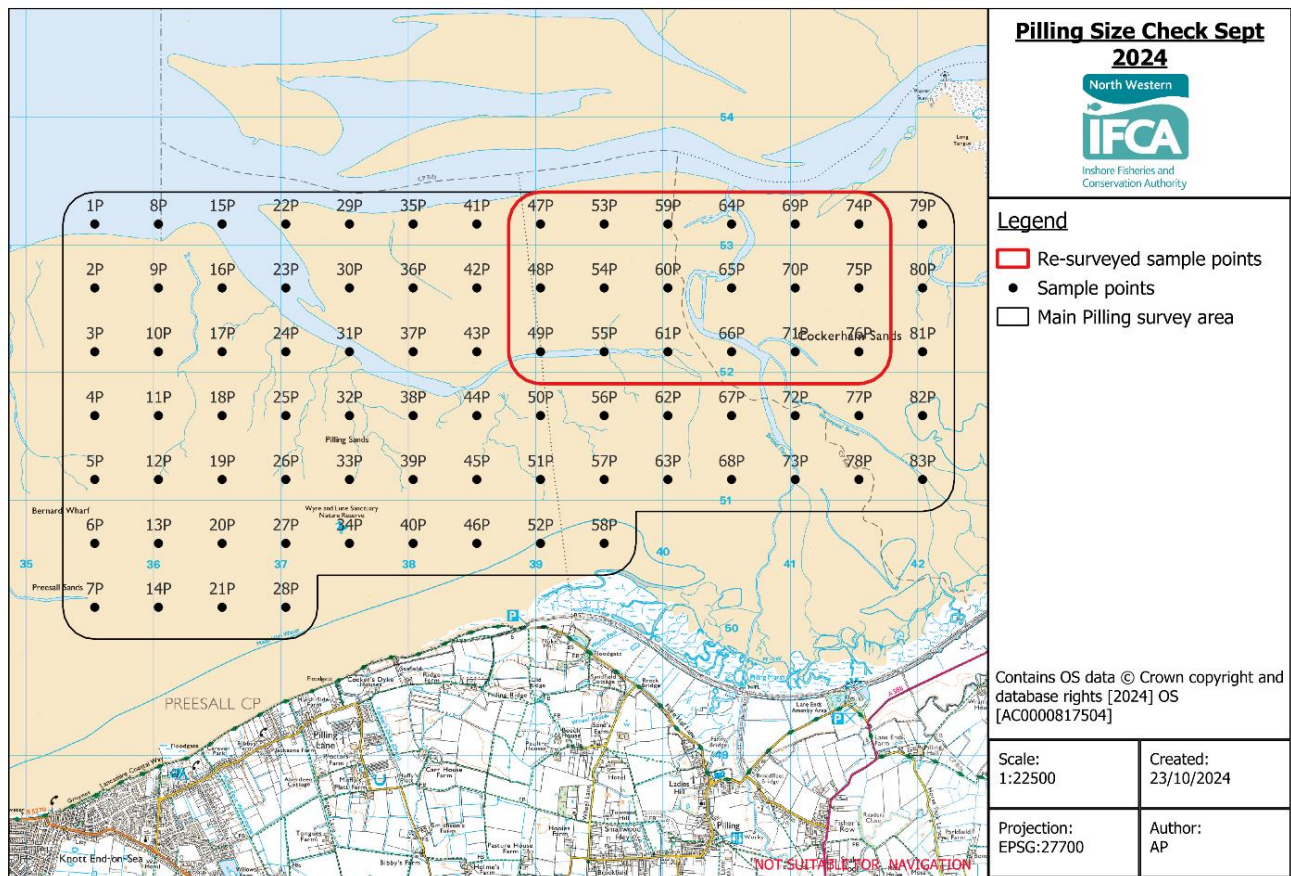


Figure 1. The location of re-surveyed sample points on Pilling cockle bed

The mean biomass of each size class of cockle was calculated (with zero counts removed, and less than 5 mm cockle removed from the undersize figures due to the high variable survivability of cockle at this small size). The mean biomass of each size class is detailed in table 1, and compared to July survey results for the same sample points.

Table 1. The mean biomass of size and undersize cockle at the 18 sample points surveyed in July 2024, and September 2024 respectively.

Biomass (tonnes)	5-15mm	15-20mm	20-25mm	25-35mm	>35mm	Size	Undersize	Total
Jul 24	4	201	1395	710	10	907	1413	2320
Sep 24	4	93	2045	1854	0	1895	2101	3997
+/-	-0	-108	+650	+1144	-10	+988	+688	+1676

Each cockle sampled was passed through a gauge to identify if it was size or undersize. The total number of size and undersize cockle was then calculated for each sample point, and the re-surveyed area as a whole. The results are presented in table 2, alongside the July results for the same sample points.

The number of size to undersize was used to calculate a percentage composition of size to undersize cockle present in the re-surveyed area (Table 2)

Table 2. Proportion of size to undersize cockle present at the 18 sample points surveyed in July 2024, and September 2024 respectively.

	Date	Size	Undersize	Total
Number (n)	Jul 24	506	1348	1854
	Sep 24	940	1780	2720
Percentage (%)	Jul 24	27	73	-
	Sep 24	35	65	-

### Maps

Maps were created showing the overall survey area, sampled points, the density of size cockle, and density of undersize cockle. The size of the symbol indicates the total number of either size or undersize cockles present.

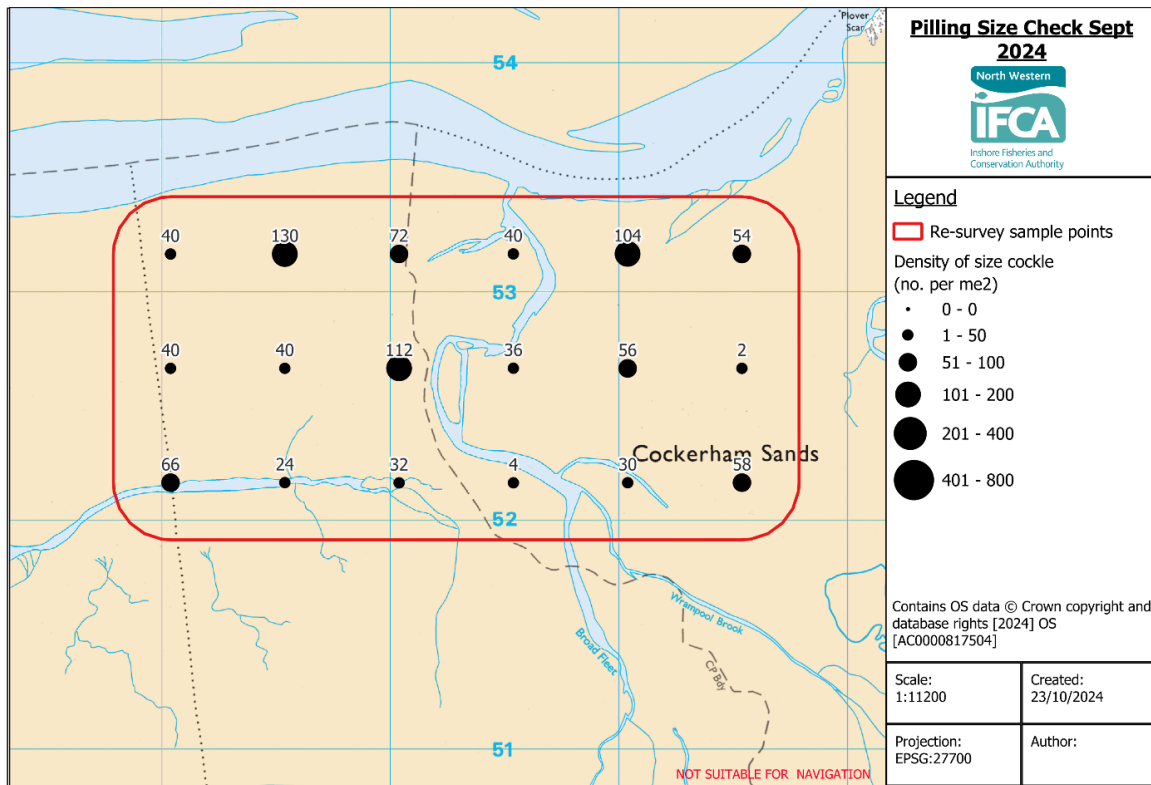


Figure 2. The number of size cockle present at the 18 re-surveyed sample point on Pilling September 13<sup>th</sup> 2024

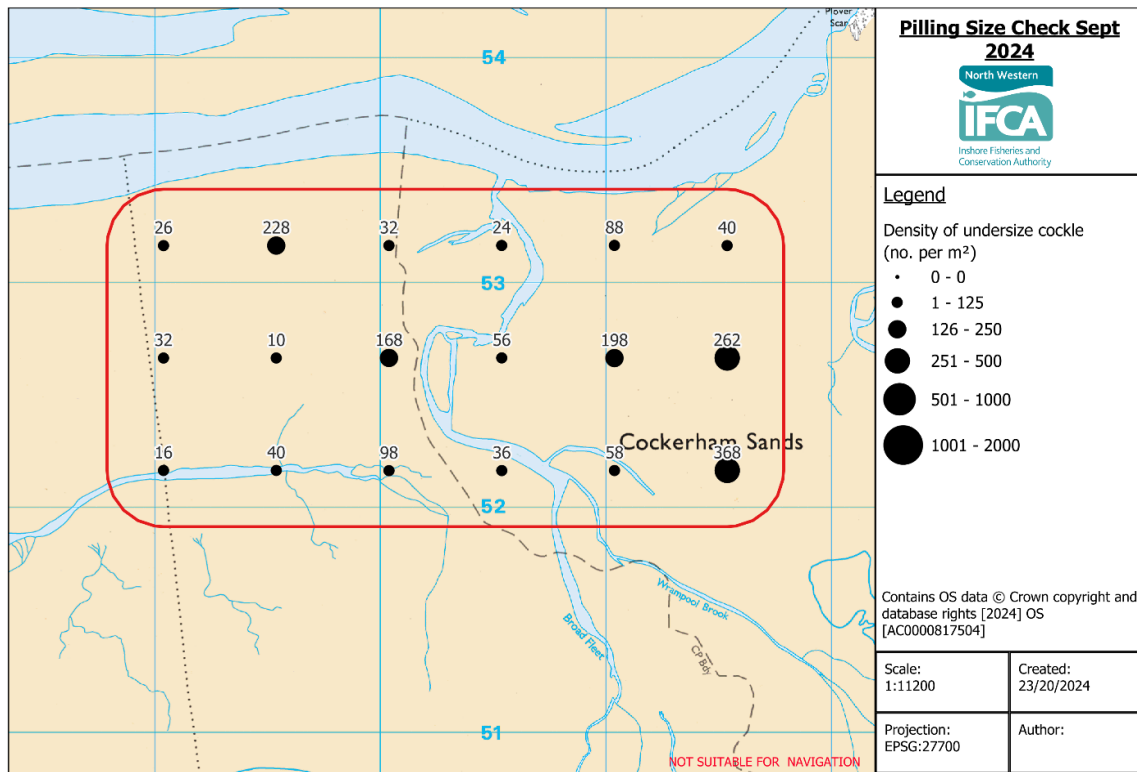


Figure 3. The number of undersize cockle present at the 18 re-surveyed sample point on Pilling September 13<sup>th</sup> 2024