Annex 2 - August 13th 2024 TSB Agenda Item 6

Cockle Surveys – MORECAMBE BAY

Pilling Cockle Survey 03-07-2024

Officers present: AP, JH, GG, LL
Tides: LW 16:30 2.3m (Liverpool Tides)

Survey method - Jumbo and 0.5m^2 quadrat

78 stations were sampled from a 500m grid. There was a wide range of cockle sizes across the bed from 5mm to > 35mm. Size cockle has increased in density with a max of 112 cockles per m², though it is still relatively low across the bed, with an average of 14 per m². There was little evidence of a 2024 cockle settlement with very little spat seen.

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 but has been included as a separate figure.

Mean number of size cockle	14 per m²	(min 0, max 112)
Mean number of undersize cockle	26 per m²	(min 0, max 254)
Mean number of 0-5mm cockle	0.4 per m²	(min 0, max 10)
Mean weight of size cockle kg/m²	0.116 kg/m²	(min 0, max 0.804)
Mean weight of undersize cockle kg/m²	0.109 kg/m²	(min 0, max 1.093)

Maps

Maps were created showing the overall survey area, density of size cockle, density of undersize cockle (excluding cockles in the 0-5mm size range), the frequency of size classes (size of pie chart indicating the total density of cockles present), and the weight of undersize and size cockle.

Biomass

	Area of cockle present (ha)	Size Cockle (tonnes)[1]	Undersize Cockle (tonnes)[2]
Pilling	**1500**	**1742**	**1640**

5-15 Class (tonnes)	15-20 Class (tonnes)	20-25 Class (tonnes)	25-35 Class (tonnes)	>35 Class (tonnes)
10	**221**	**1586**	**1400**	**166**

[1]In regards to biomass size cockle defined as cockle which will not pass through a square gauge 20 x 20mm in size.
[2]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.

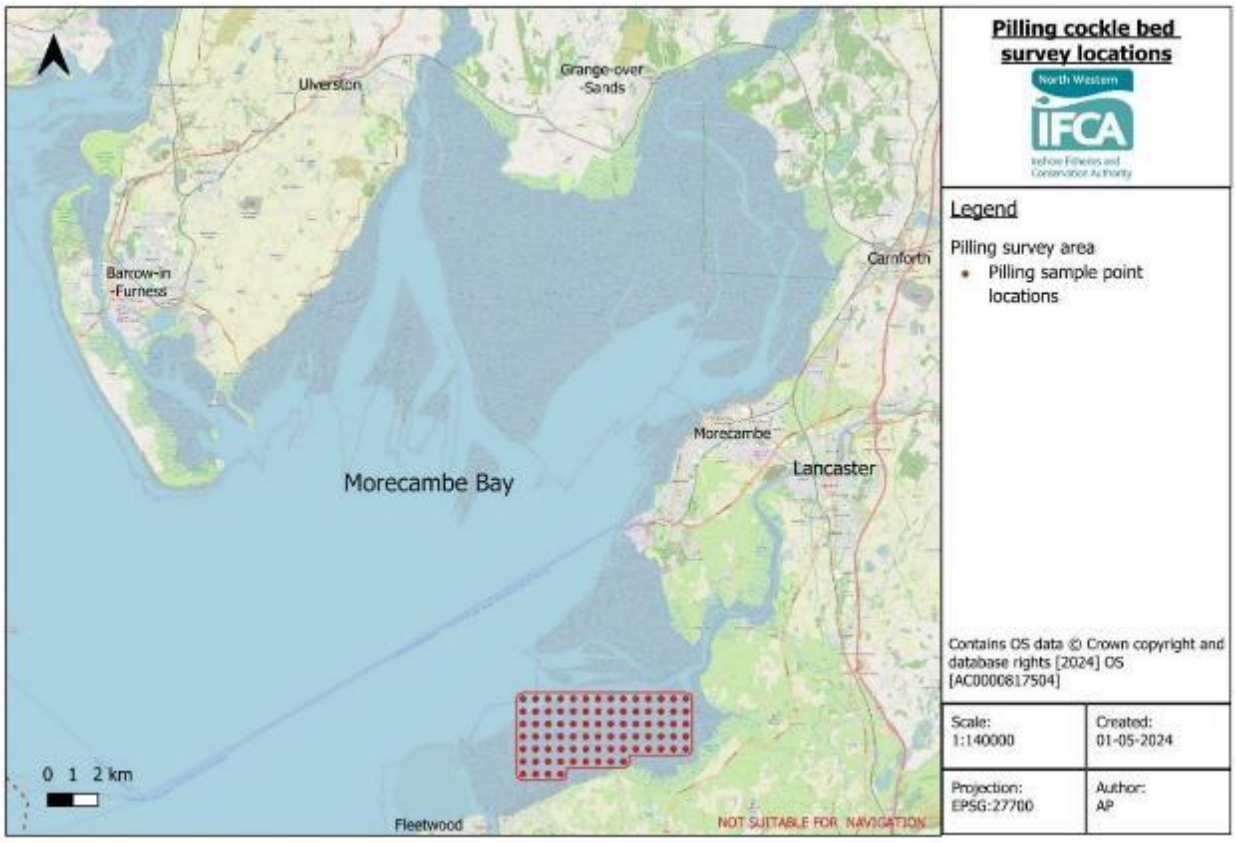

Figure 1. Illustration of position of Pilling Survey Area

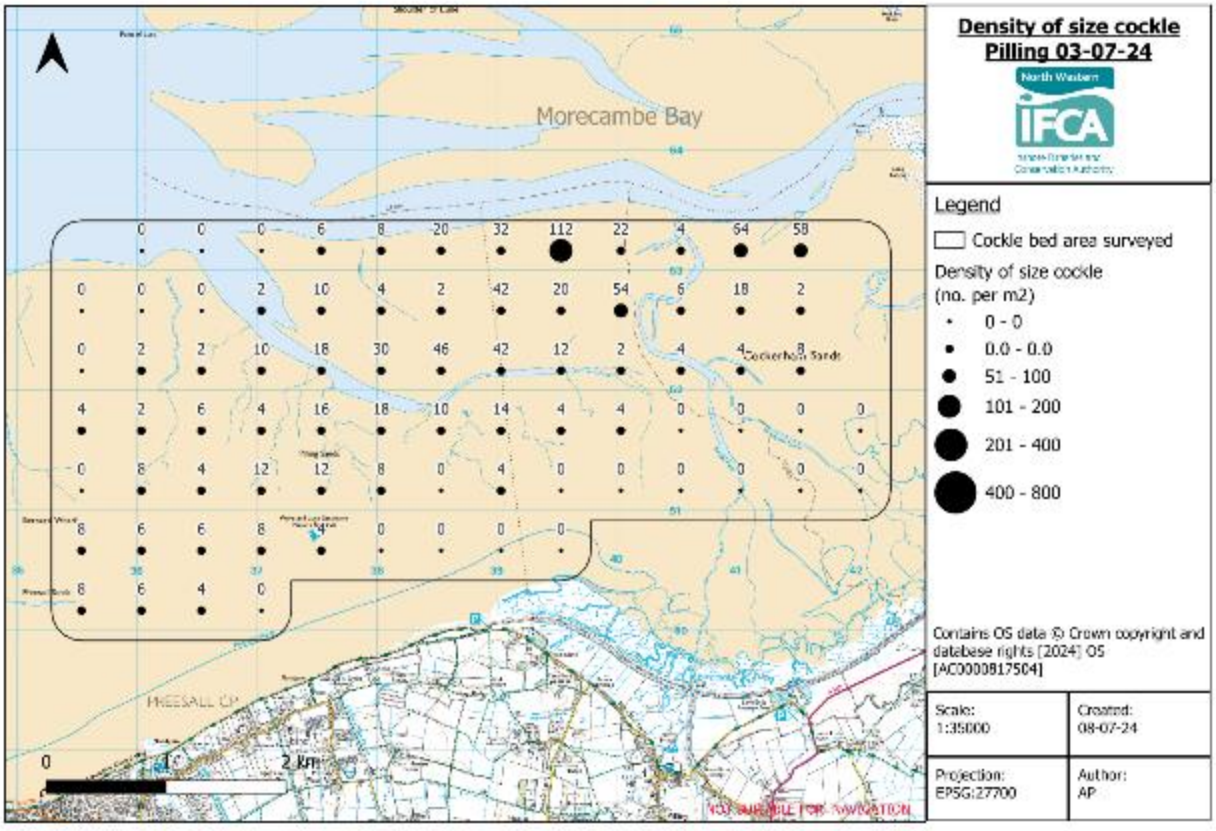

Figure 2. Density of size cockle per m² Pilling July 2024

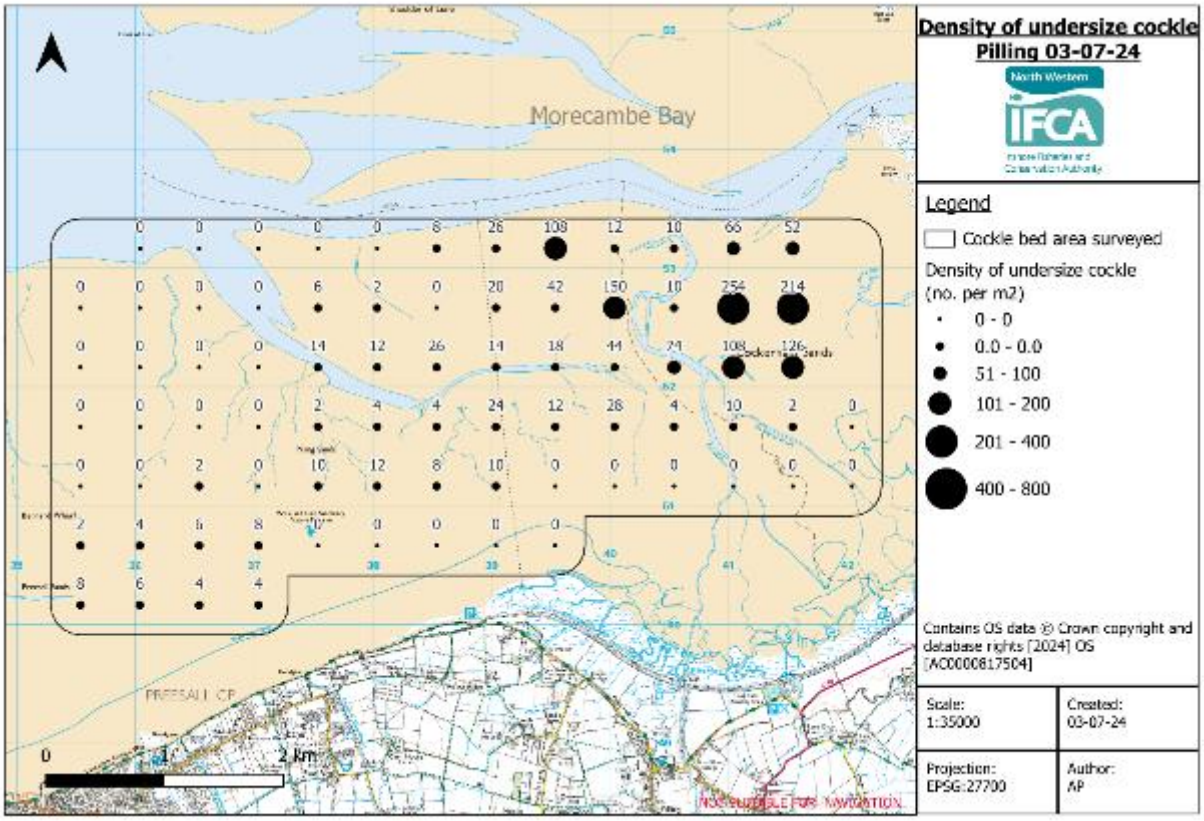

Figure 3. Density of undersize cockle per m² Pilling July 2024

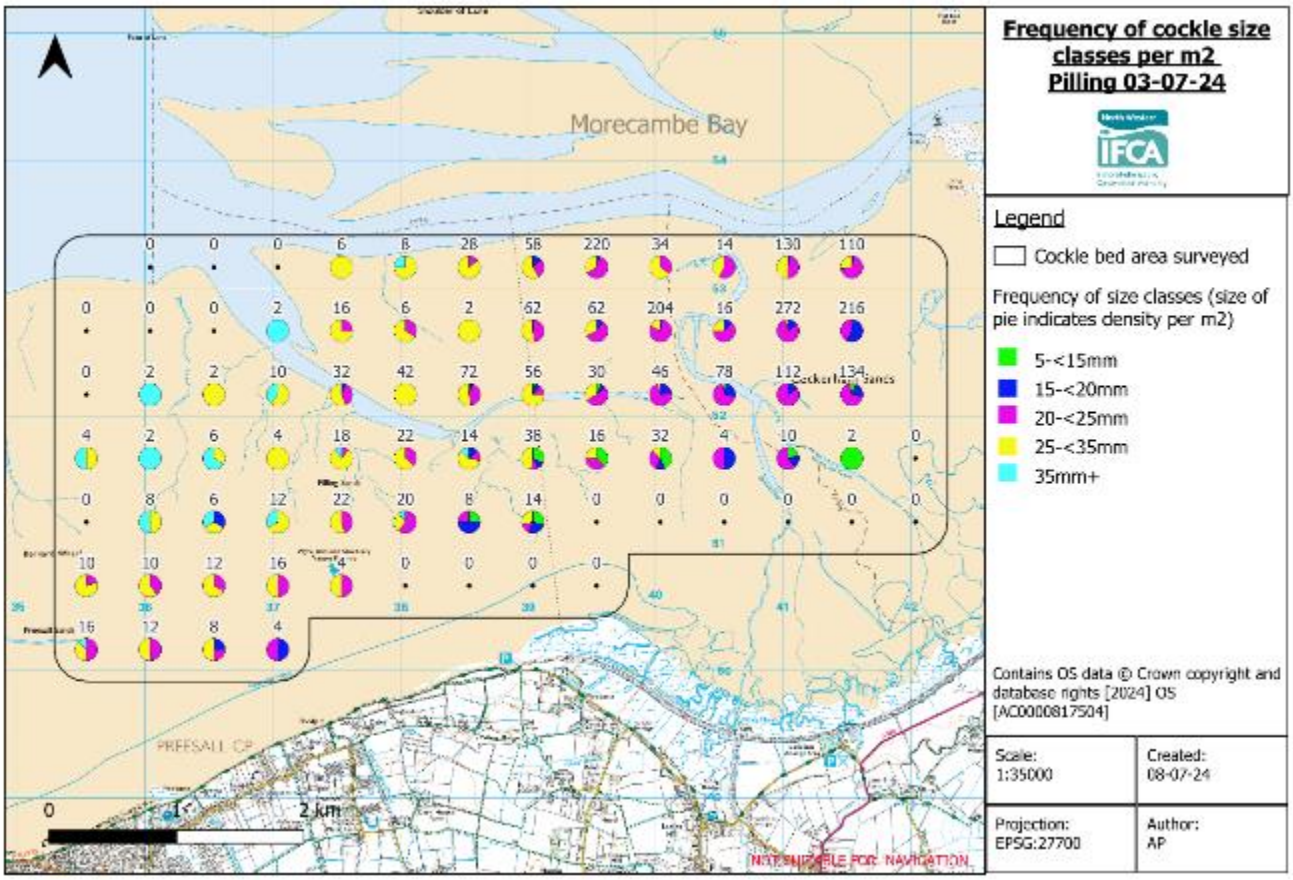

Figure 4. Frequency of size classes of cockle per m² Pilling July 2024

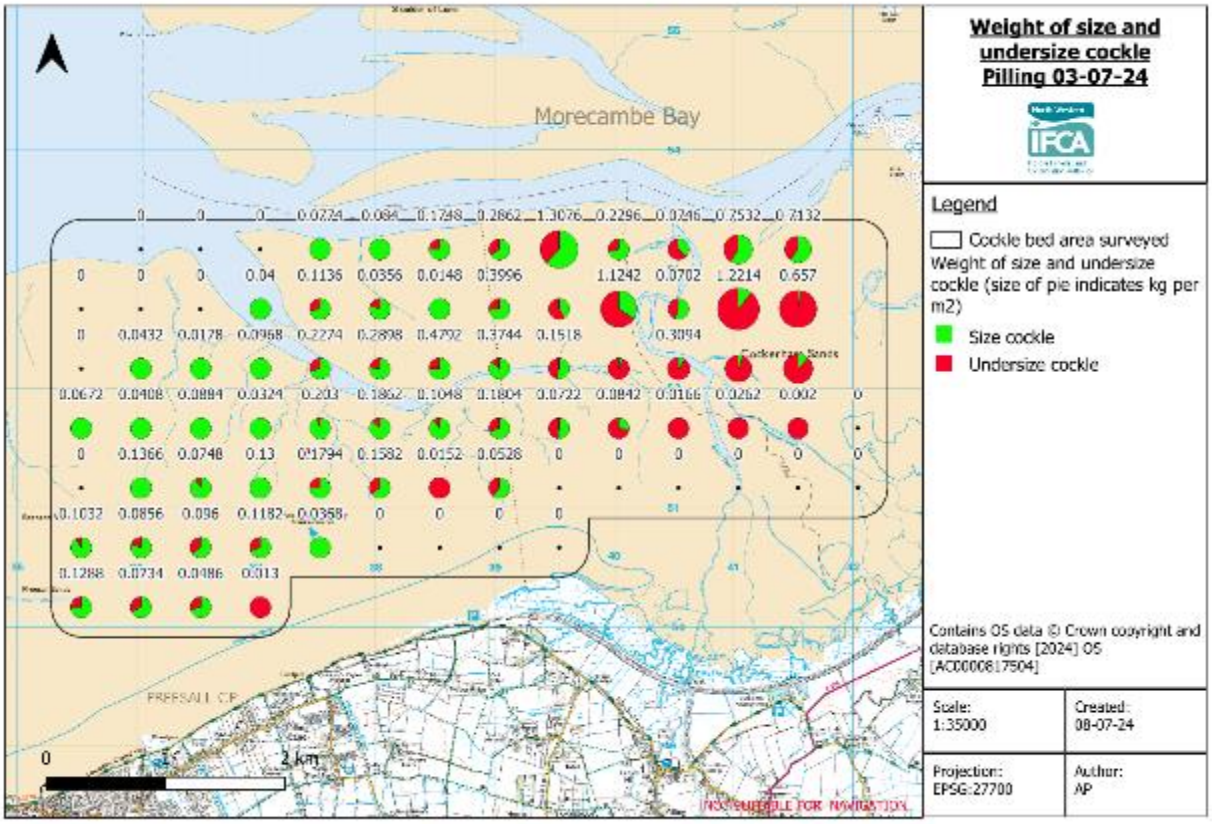

Figure 5. Weight of size and undersize cockle kg/m² at Pilling July 2024.

Leven Cockle Survey 10-07-2024

Officers present: GG, JH, ID, CT
Tides: LW 09:30 2.0m (Liverpool Tides)

Survey method - Jumbo and 0.5m^2 quadrat

70 stations were sampled from a 500m grid. There was a wide range of cockle sizes across the bed from < 5mm to > 35mm. Size cockle is relatively low in density across the bed. There does not appear to have been a significant 2024 cockle settlement.

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 but has been included as a separate figure.

Mean number of size cockle	5 per m^2	(min 0, max 34)
Mean number of undersize cockle	9 per m^2	(min 0, max 52)
Mean number of 0-5mm cockle	0 per m^2	(min 0, max 0)
Mean weight of size cockle kg/m^2	0.046 kg/m^2	(min 0, max 0.204)
Mean weight of undersize cockle kg/m^2	0.024 kg/m^2	(min 0, max 0.118)

Maps

Maps were created showing the overall survey area, density of size cockle, density of undersize cockle (excluding cockles in the 0-5mm size range) the density of the 0-5mm size class, 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 of cockle present (ha)	Size Cockle (tonnes)[1]	Undersize Cockle (tonnes)[2]
Leven	**1250**	**573**	**305**

5-15 Class (tonnes)	15-20 Class (tonnes)	20-25 Class (tonnes)	25-35 Class (tonnes)	>35 Class (tonnes)
14	**83**	**249**	**533**	**0**

[1]In regards to biomass size cockle defined as cockle which will not pass through a square gauge 20 x 20mm in size.
[2]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.

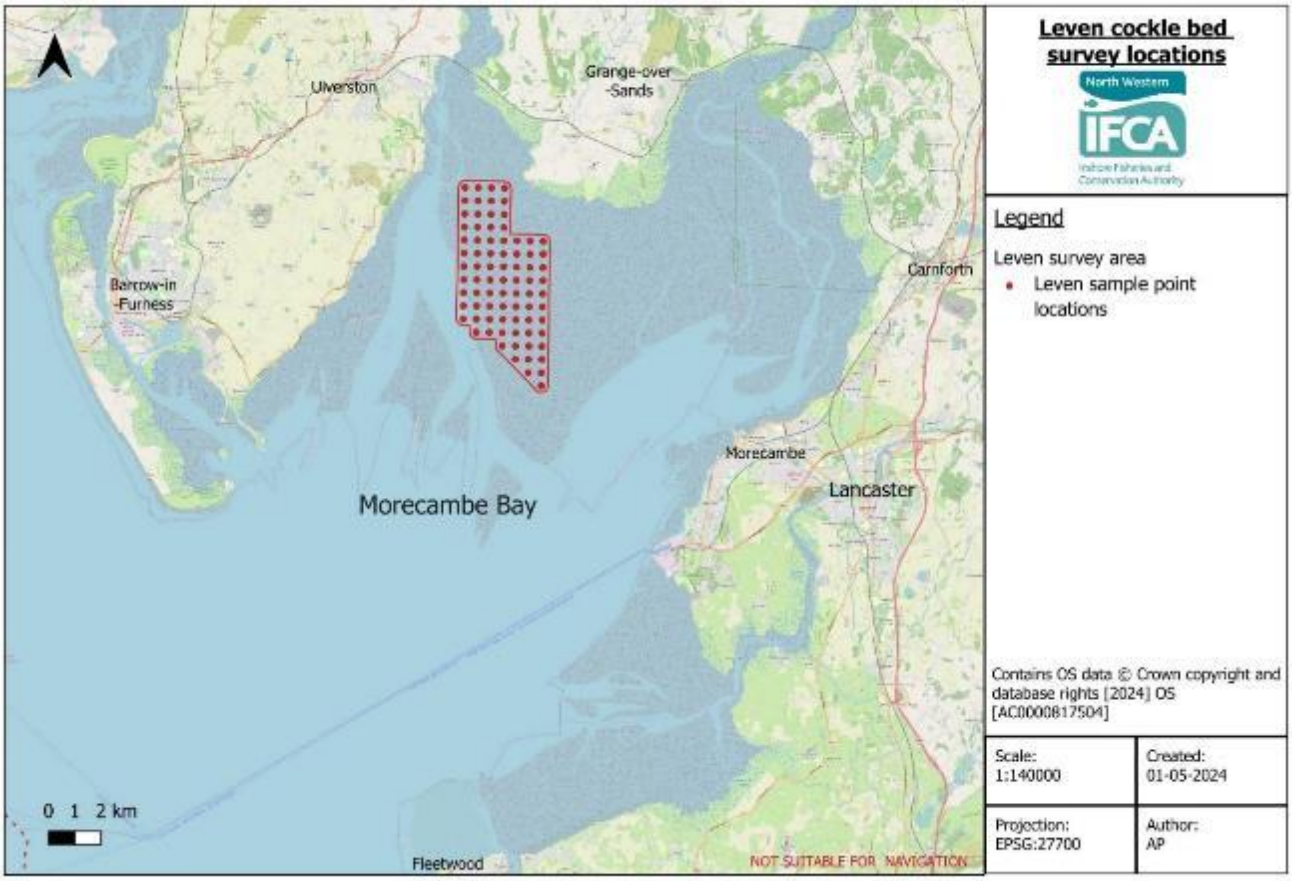

Figure 1. Illustration of position of Leven Survey Area

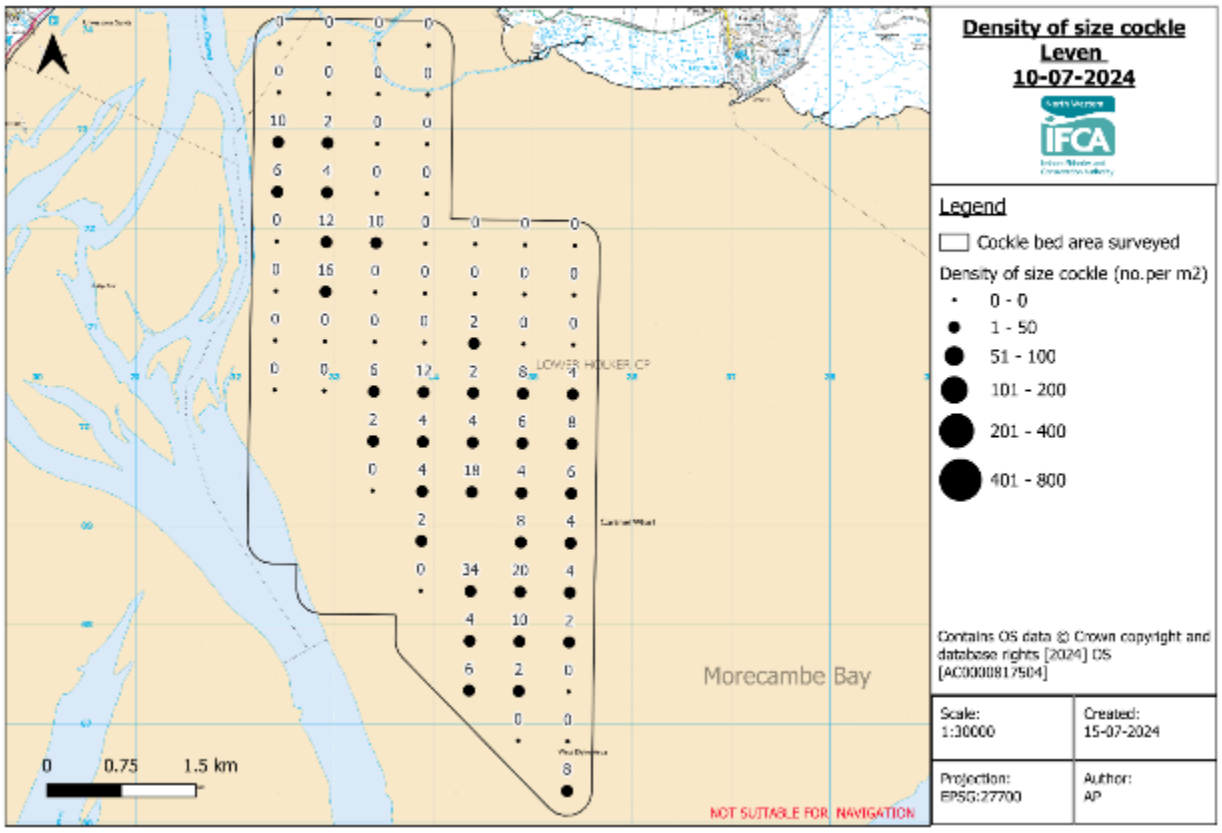

Figure 2. Density of size cockle per m² Leven July 2024

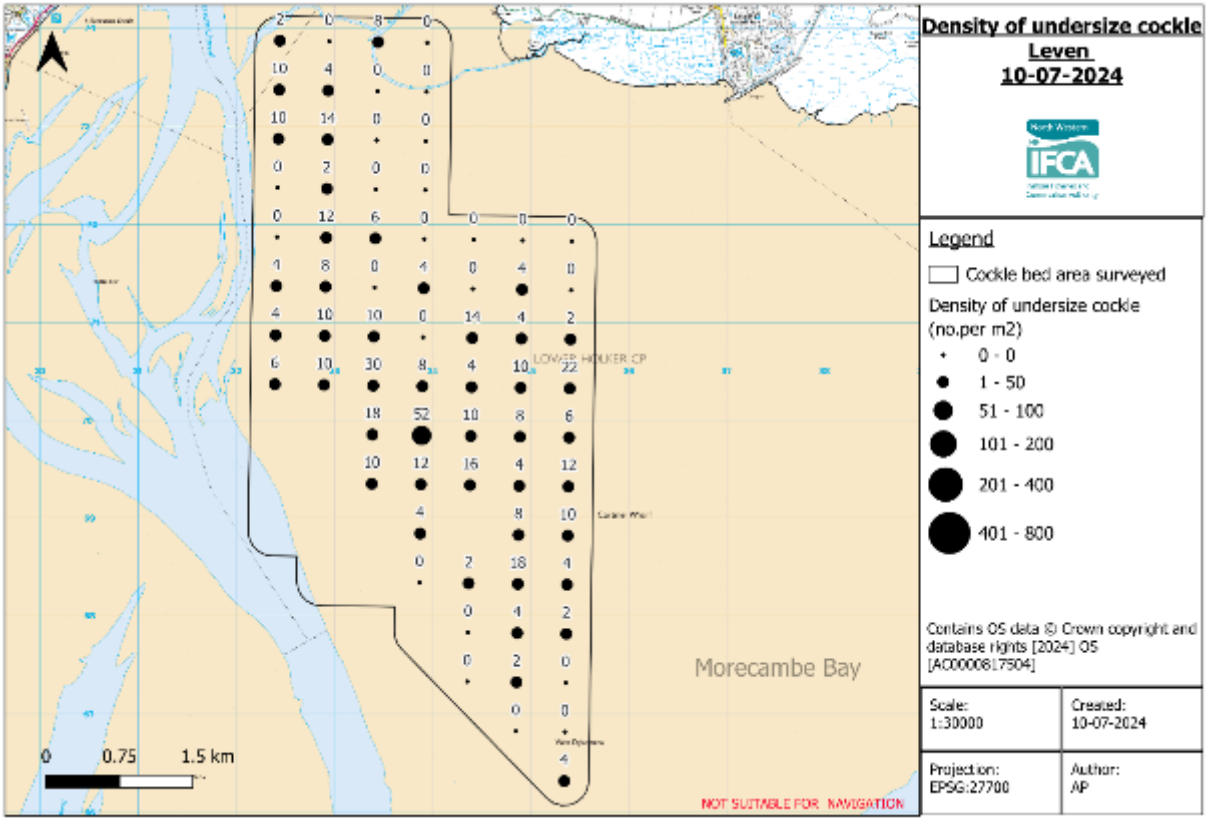

Figure 3. Density of undersize cockle per m² Leven July 2024

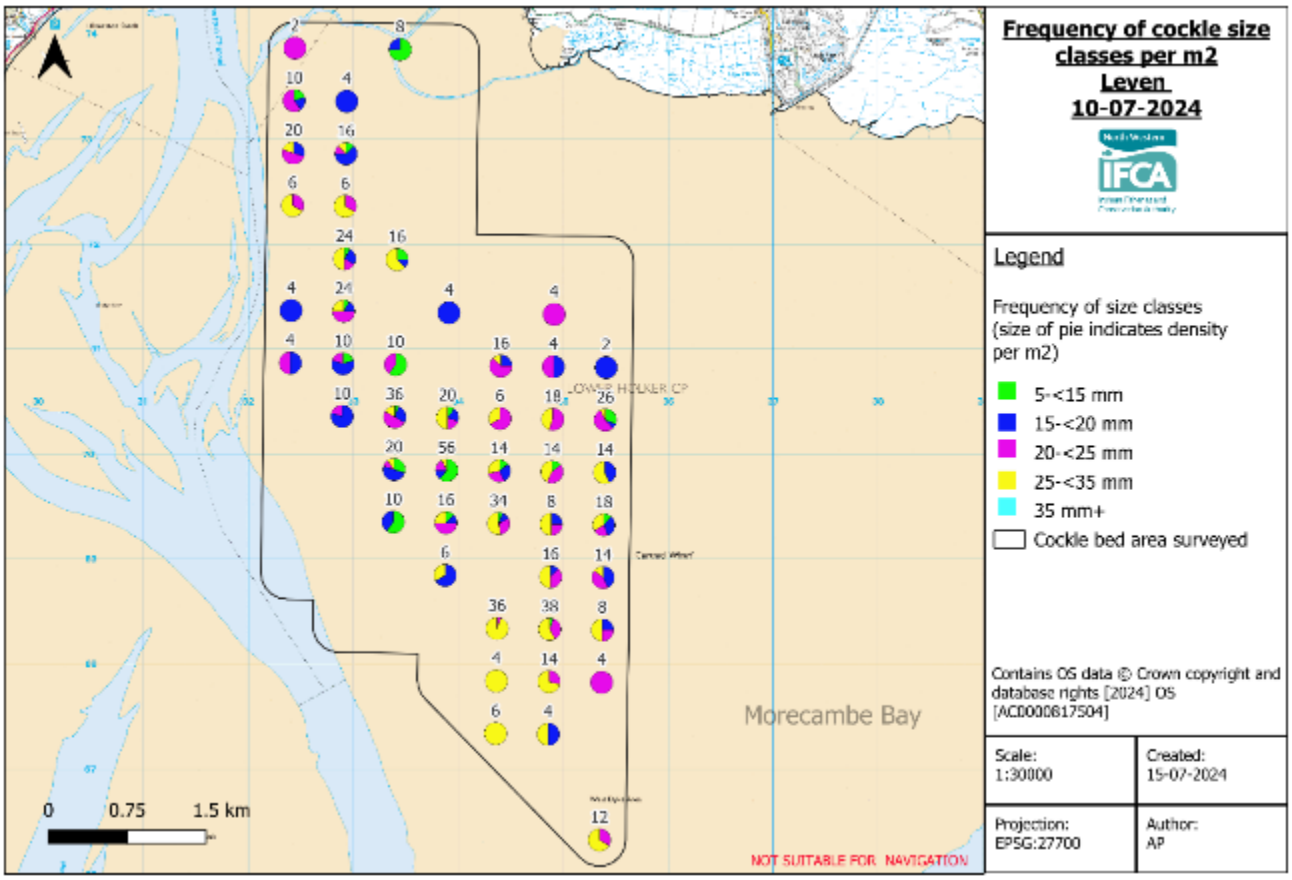

Figure 4. Frequency of size classes of cockle per m² Leven July 2024

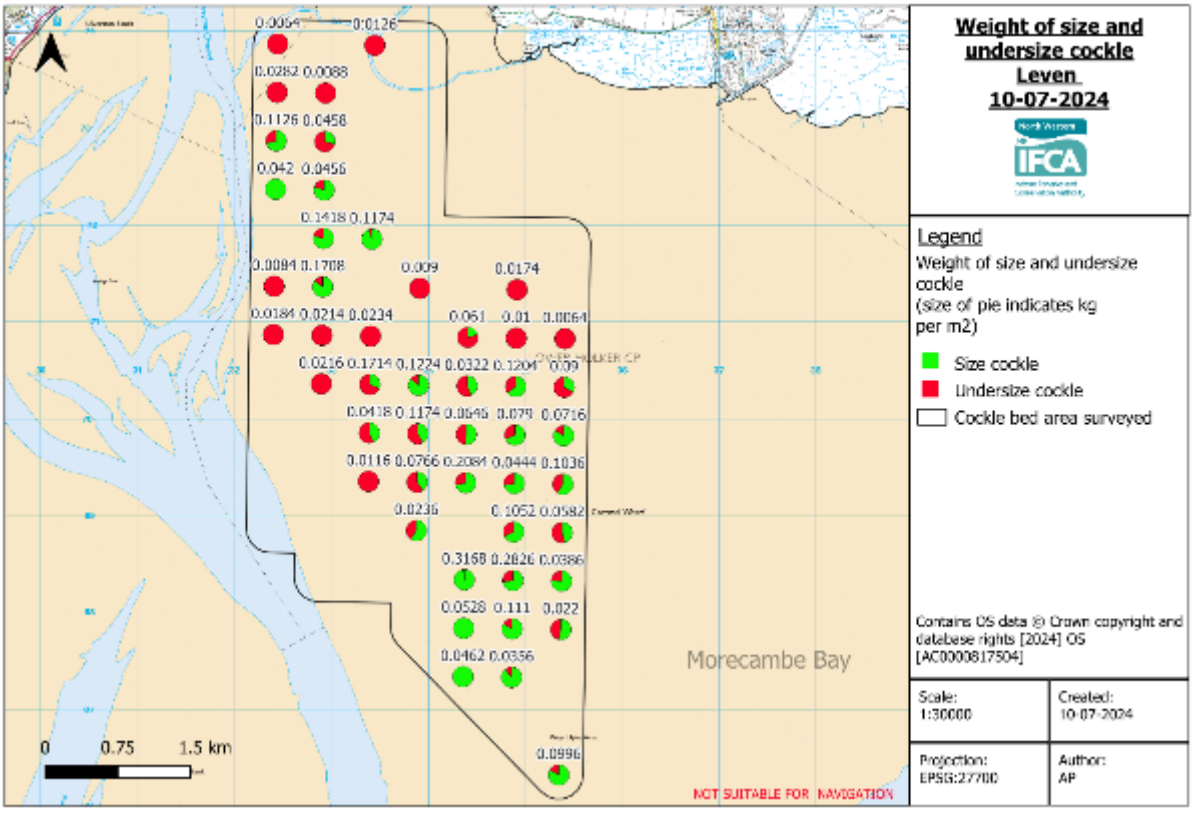

Figure 5. Weight of size and undersize cockle kg/m² at Leven July 2024

Flookburgh Cockle Survey 9th and 10th July 2024

Officers present: ID, RL, CT, AP, JH, GG, LL
Tides: 09-07-24 LW 08:55 1.8m (Liverpool Tides)
10-07-24 LW 09:30 2.0m (Liverpool Tides)

Survey method - Jumbo and 0.5m² quadrat

141 stations were sampled from a 500m grid, including the additional points added North East of the survey area last year to ensure full coverage of the bed. The cockle is mixed across the bed with many locations contain more than 50% undersize cockle. The area is broadly split by a channel running from Grange-over-sands and out from Humprey head. Size cockle has increased in density with the greatest density at 206. There is a large amount of cockle which is approaching size. There are several sites with a 2024 cockle settlement higher up the bed.

Means

Means were calculated from all stations with zero counts on the edge of the bed removed. Less than 5mm cockle was not used in the undersize figures due to the high variable survivability of cockle at this small size but has been included as a separate figure.

Mean number of size cockle	16 per m²	(min 0, max 206)
Mean number of undersize cockle	24 per m²	(min 0, max 268)
Mean number of 0-5mm cockle	19 per m²	(min 0, max 400)
Mean weight of size cockle kg/m²	0.136 kg/m²	(min 0, max 1.600)
Mean number of undersize cockle kg/m²	0.095 kg/m²	(min 0, max 1.198)

Maps

Maps were created showing the overall survey area, density of size cockle, density of undersize cockle (excluding cockles in the 0-5mm size range) the density of the 0-5mm size class, 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)[1]	Undersize Cockle (tonnes)[2]
Flookburgh	**2675**	**3629**	**2551**

5-15 Class (tonnes)	15-20 Class (tonnes)	20-25 Class (tonnes)	25-35 Class (tonnes)	>35 Class (tonnes)
30	**193**	**2360**	**3574**	**23**

[1]In regards to biomass size cockle defined as cockle which will not pass through a square gauge 20 x 20mm in size.
[2]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.

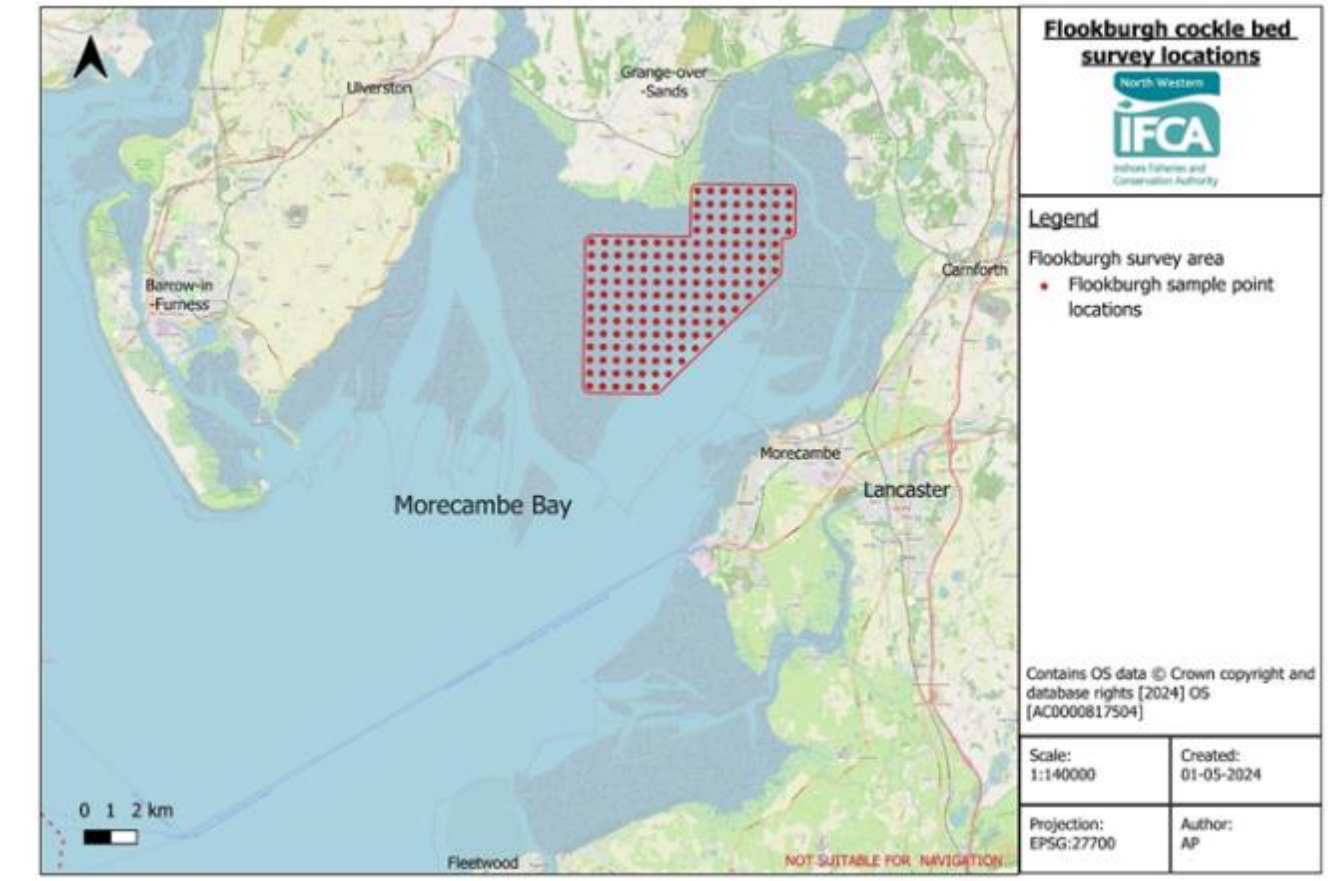

Figure 1. Illustration of position of Flookburgh survey area

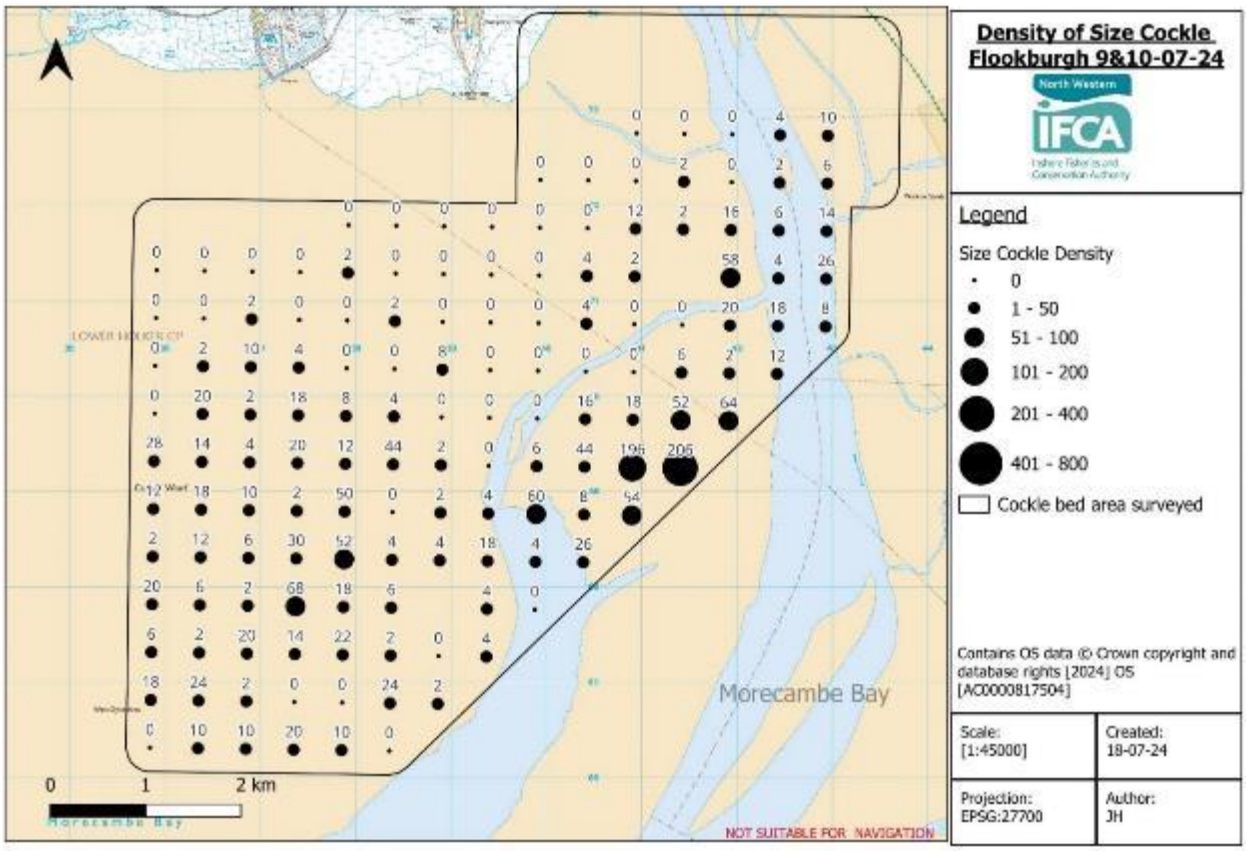

Figure 2. Density of size cockle per m² Flookburgh July 2024.

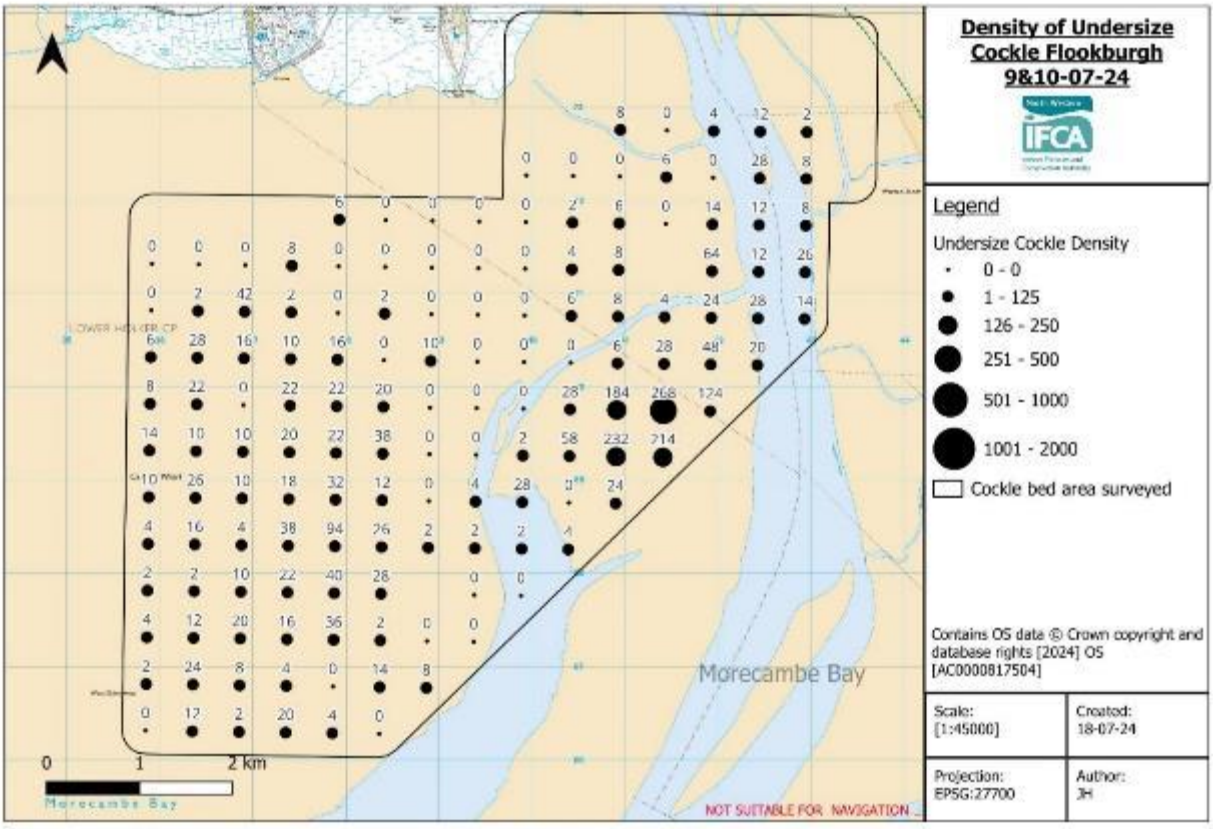

Figure 3. Density of undersize cockle per m² Flookburgh July 2024.

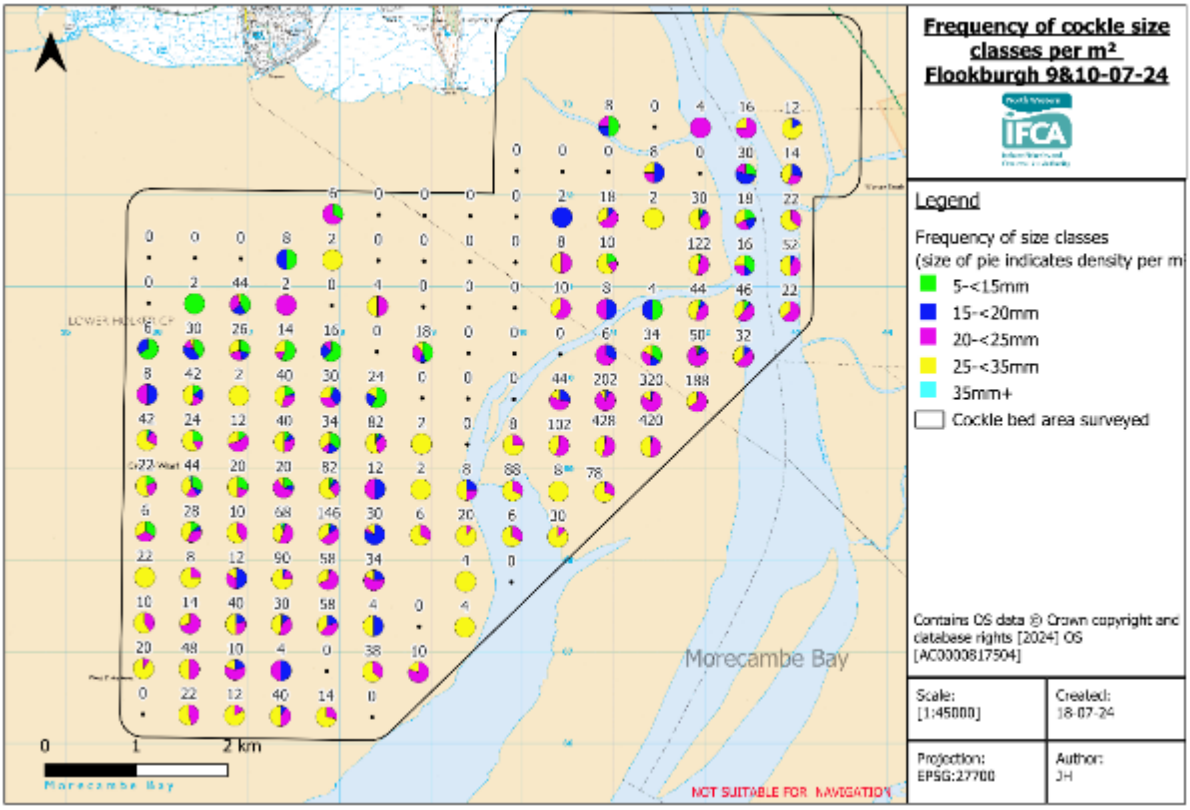

Figure 4 Frequency of size classes of cockle per m² Flookburgh July 2024.

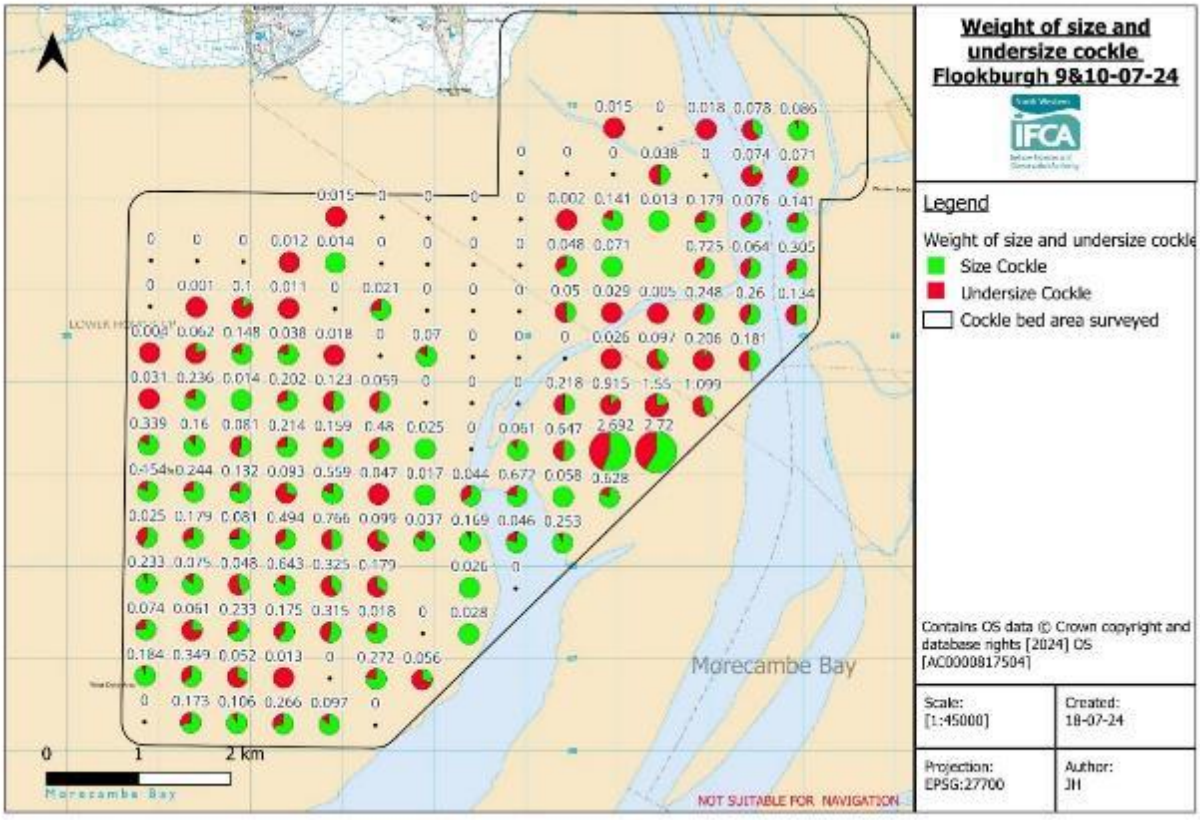

Figure 5 Weight of size and undersize cockle kg/m² at Flookburgh July 2024.

Aldingham and Newbiggin Cockle Survey 11-07-2024

Officers present: AP, GG, ID, RL
Tides: LW 10:02 2.2m (Liverpool Tides)

Survey method - Jumbo and 0.5m^2 quadrat

50 stations were sampled from a 500m grid. Most of the Aldingham survey location could not be accessed due to the Leven channel being closer to the shoreline. There was a wide range of cockle sizes across the bed from <5mm to >35mm. The majority of the cockle is between 20-35mm in length. The biomass of size cockle has increased by 500 tonnes since the previous survey in May 2024, however the mean density is still low across the bed, with an average of 9 size cockle per m². There were a few sites with a 2024 cockle settlement.

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 but has been included as a separate figure.

Mean number of size cockle	9 per m²	(min 0, max 60)
Mean number of undersize cockle	24 per m²	(min 0, max 180)
Mean number of 0-5mm cockle	10 per m²	(min 0, max 50)
Mean weight of size cockle kg/m²	0.081 kg/m²	(min 0, max 0.401)
Mean weight of undersize cockle kg/m²	0.083 kg/m²	(min 0, max 0.748)

Maps
Maps were created showing the overall survey area, 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)[1]	Undersize Cockle (tonnes)[2]
Aldingham and Newbiggin	**1050**	**846**	**874**

5-15 Class (tonnes)	15-20 Class (tonnes)	20-25 Class (tonnes)	25-35 Class (tonnes)	>35 Class (tonnes)
7	**144**	**693**	**842**	**34**

[1]In regards to biomass size cockle defined as cockle which will not pass through a square gauge 20 x 20mm in size.
[2]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.

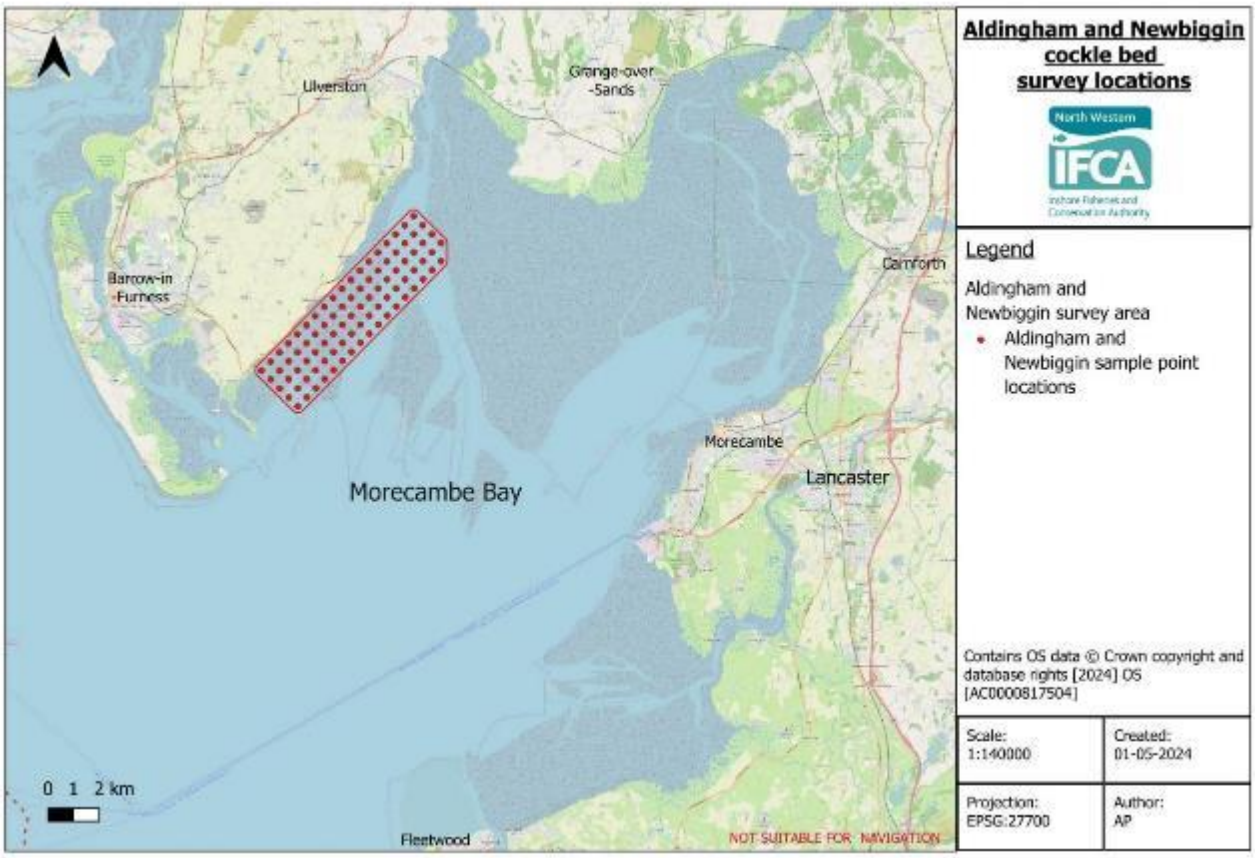

Figure 1: Illustration of position of Aldingham and Newbiggin Survey Area.

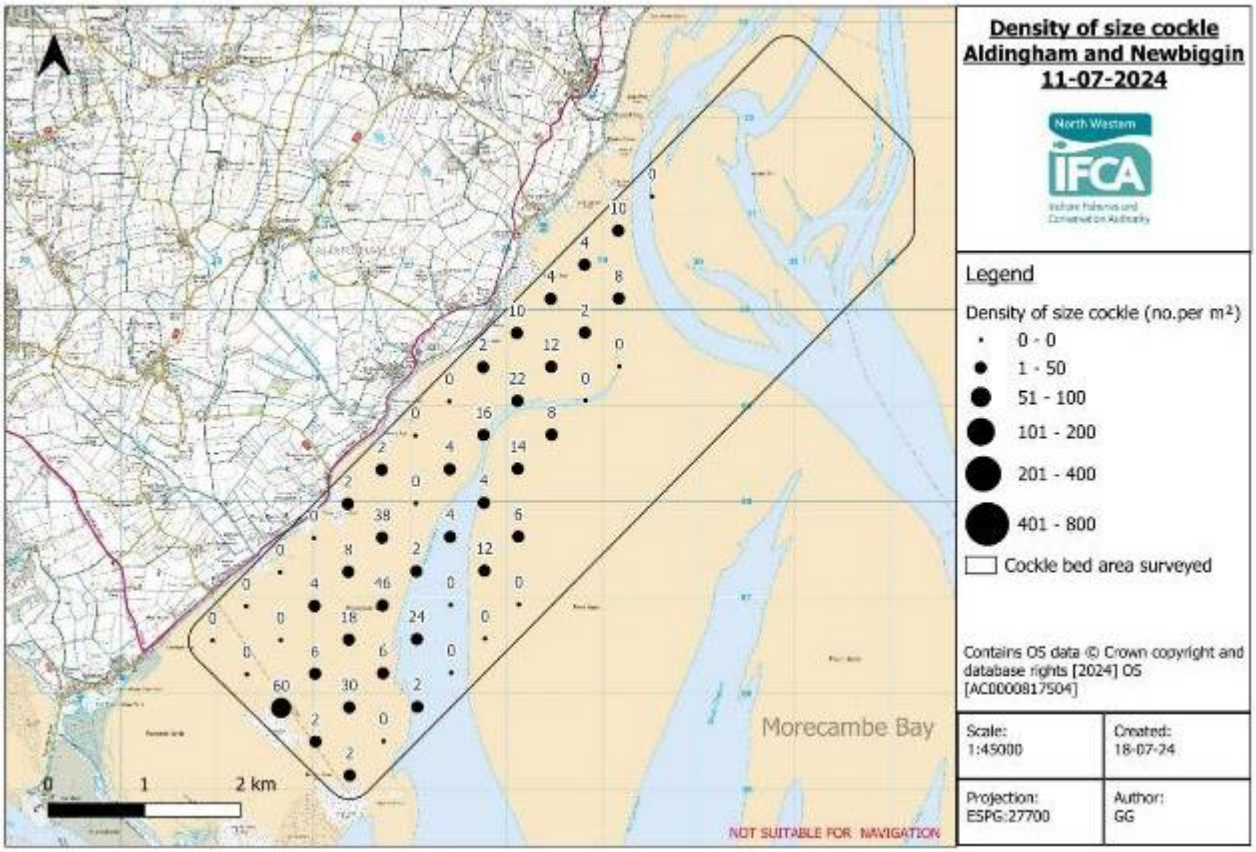

Figure 2: Density of size cockle per m² at Aldingham and Newbiggin July 2024.

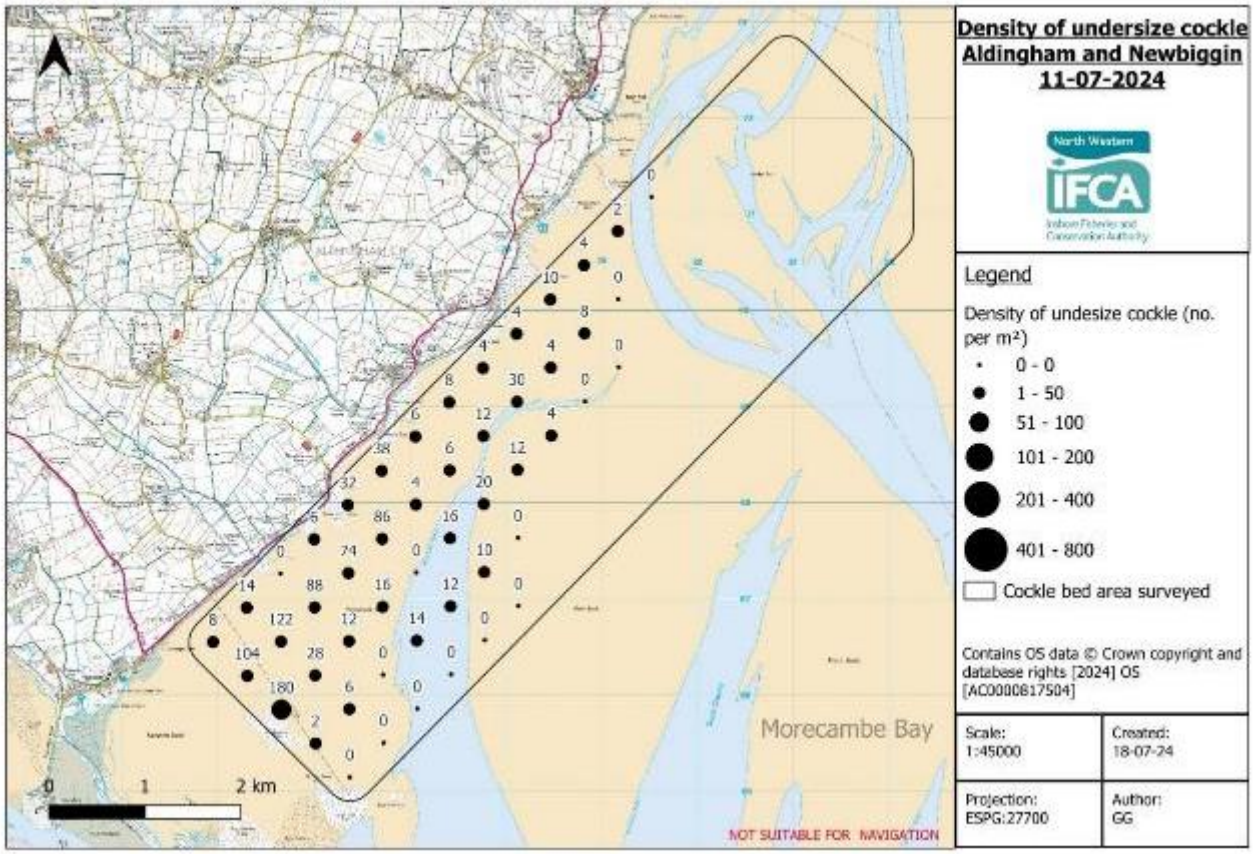

Figure 3: Density of undersize cockle per m² at Aldingham and Newbiggin July 2024.

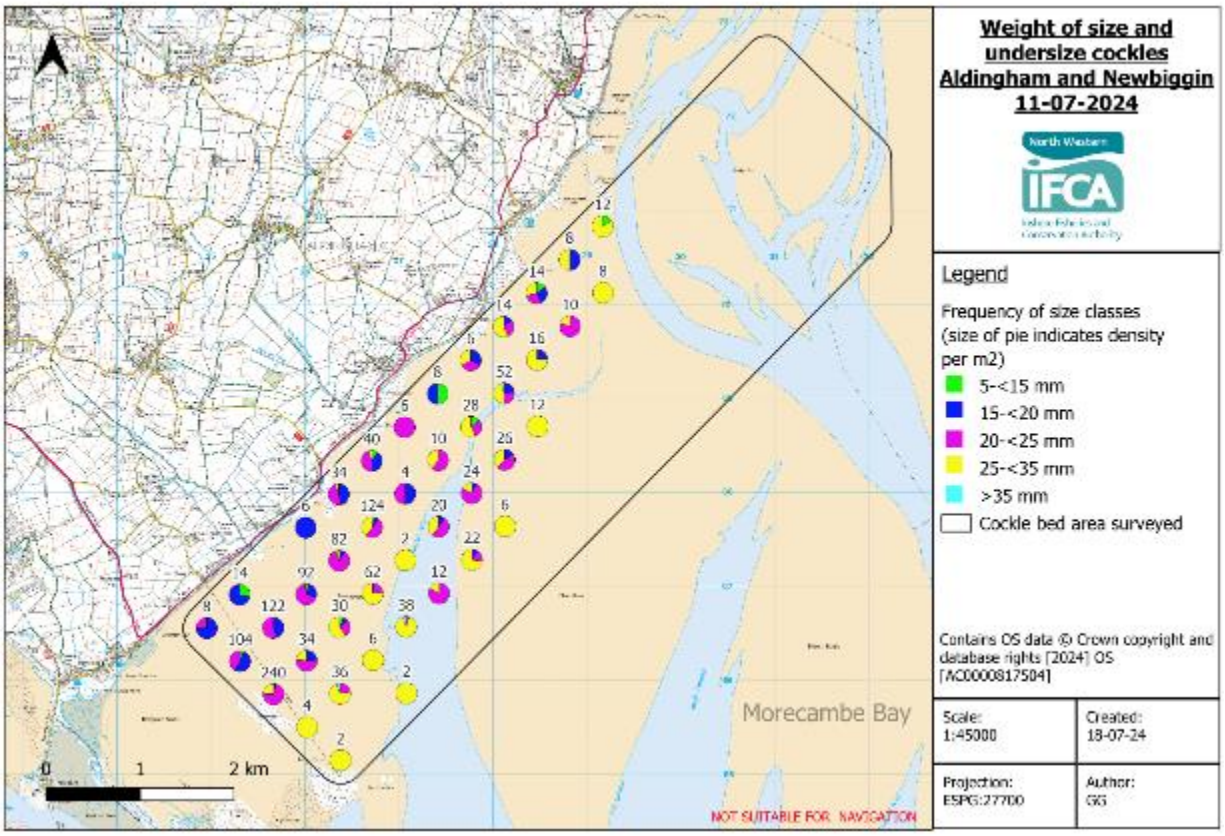

Figure 4: Frequency of size classes of cockle per m^2 at Aldingham and Newbiggin July 2024.

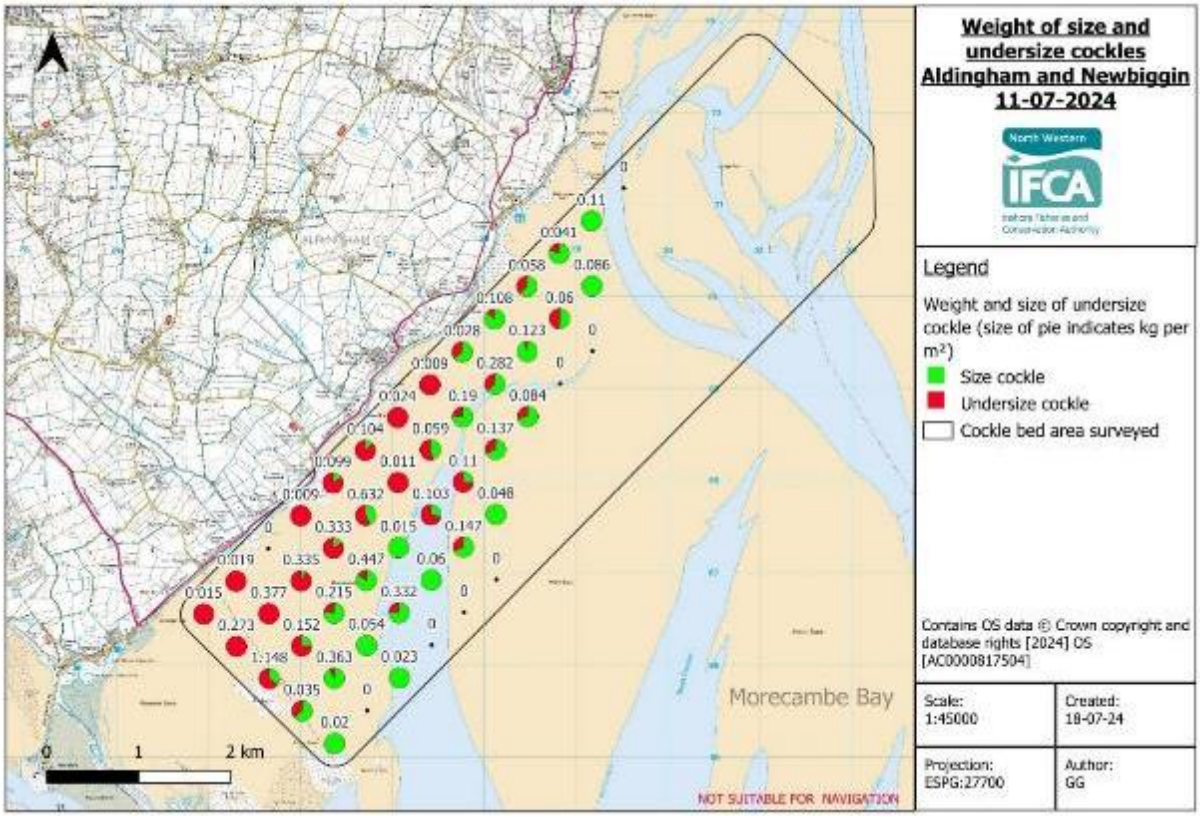

Figure 5: Weight of size and undersize cockle kg/m^2 at Aldingham and Newbiggin July 2024.

Middleton Cockle Survey 2nd July 2024

Officers present: JH, AP, AG, LL
Tides: LW 15:22 2.4m (Liverpool tides)

Survey method - Jumbo and 0.5m^2 quadrat

75 stations were sampled from a 350m grid. There was a wide range of cockle sizes across the bed from 5mm to >35mm. The biomass of size cockle has increased to 518 tonnes however the mean density is still low across the bed with an average of 8 size cockle per m^2. There was little evidence of a 2024 settlement with very little spat seen.

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	8 per m²	(min 0, max 36)
Mean number of undersize cockle	9 per m²	(min 0, max 42)
Mean number of 0-5mm cockle	0 per m²	(min 0, max 4)
Mean weight of size cockle kg/m²	0.069 kg/m²	(min 0, max 0.333)
Mean weight of undersize cockle kg/m²	0.029 kg/m²	(min 0, max 0.192)

Maps

Maps were created showing the overall survey area, 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)[1]	Undersize Cockle (tonnes)[2]
Middleton Sands	**747**	**518**	**216**

5-15 Class (tonnes)	15-20 Class (tonnes)	20-25 Class (tonnes)	25-35 Class (tonnes)	>35 Class (tonnes)
2	33	187	491	21

[1]In regards to biomass size cockle defined as cockle which will not pass through a square gauge 20 x 20mm in size.
[2]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.

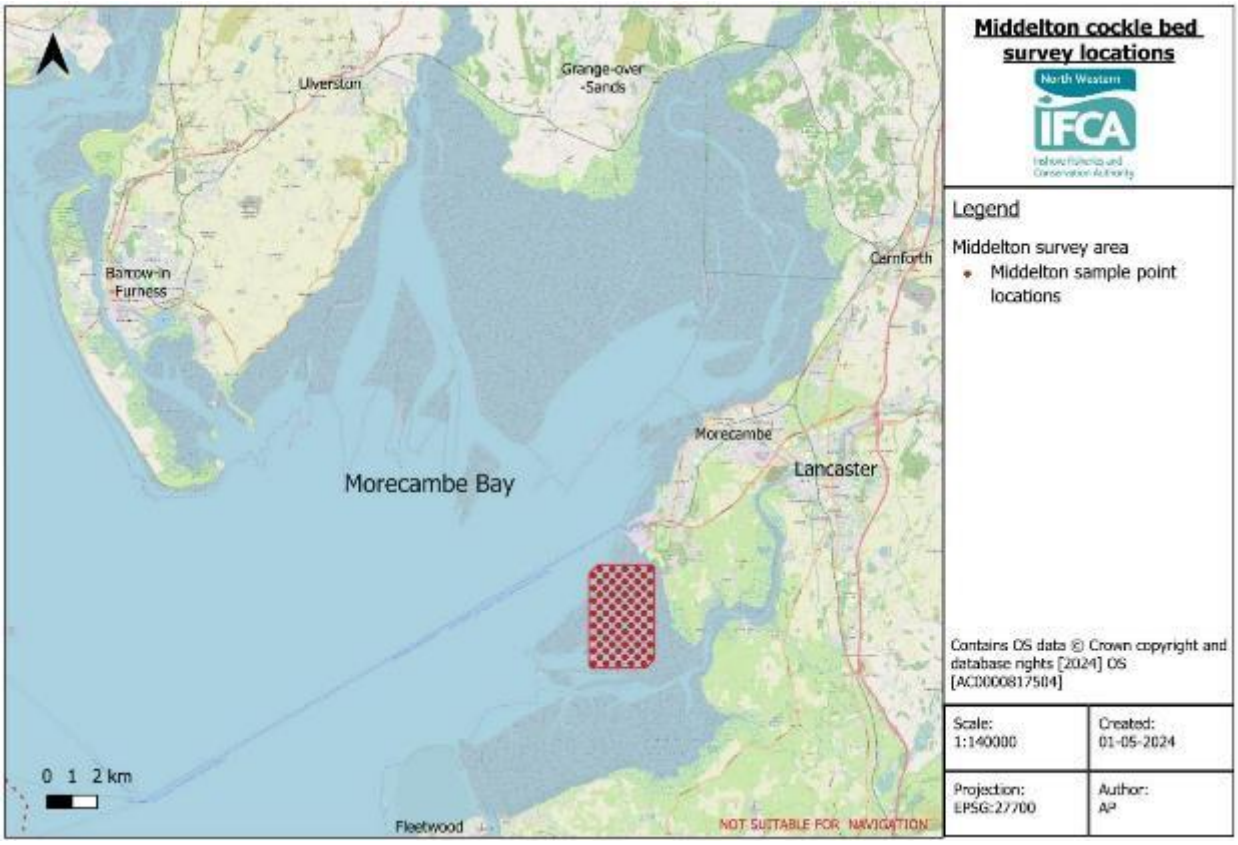

Figure 1: Illustration of position of Middleton Survey Area

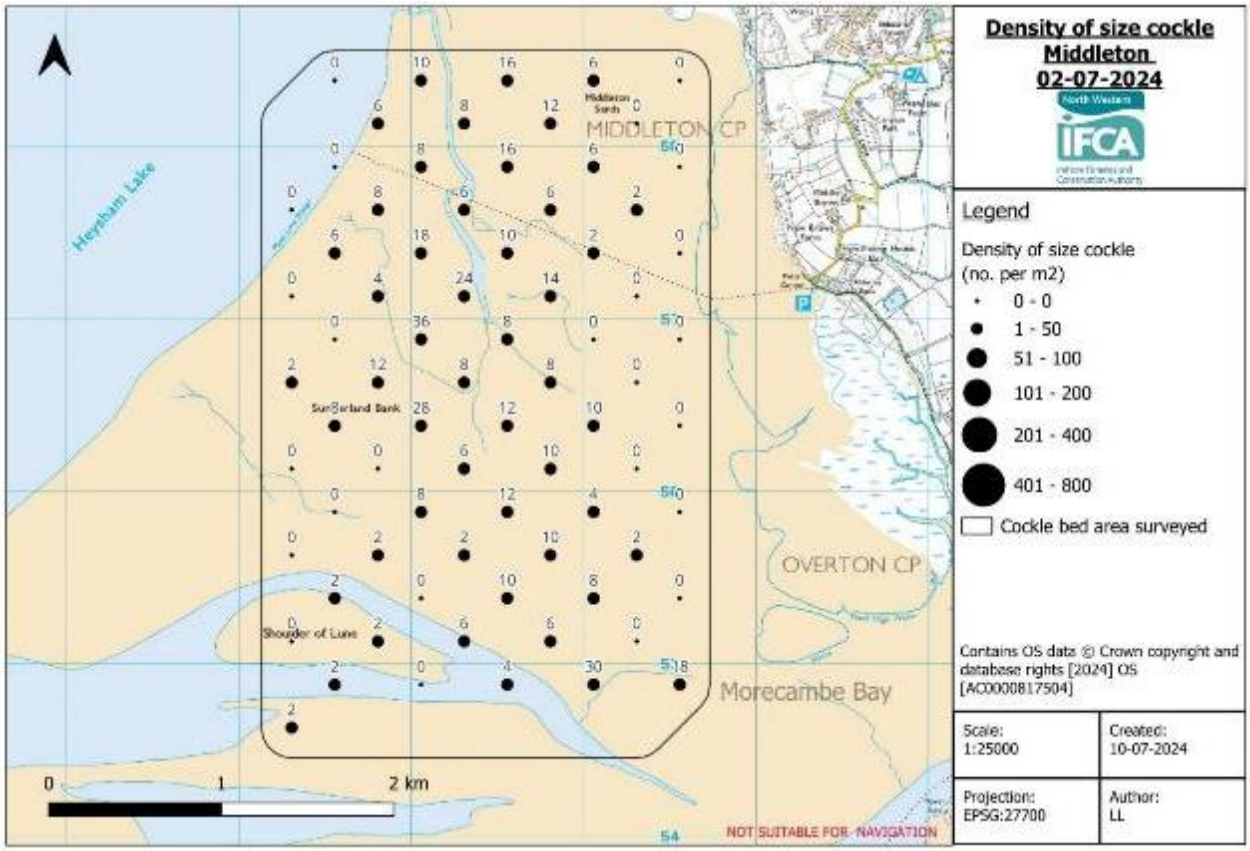

Figure 2: Density of size cockle per m^2 at Middleton July 2024

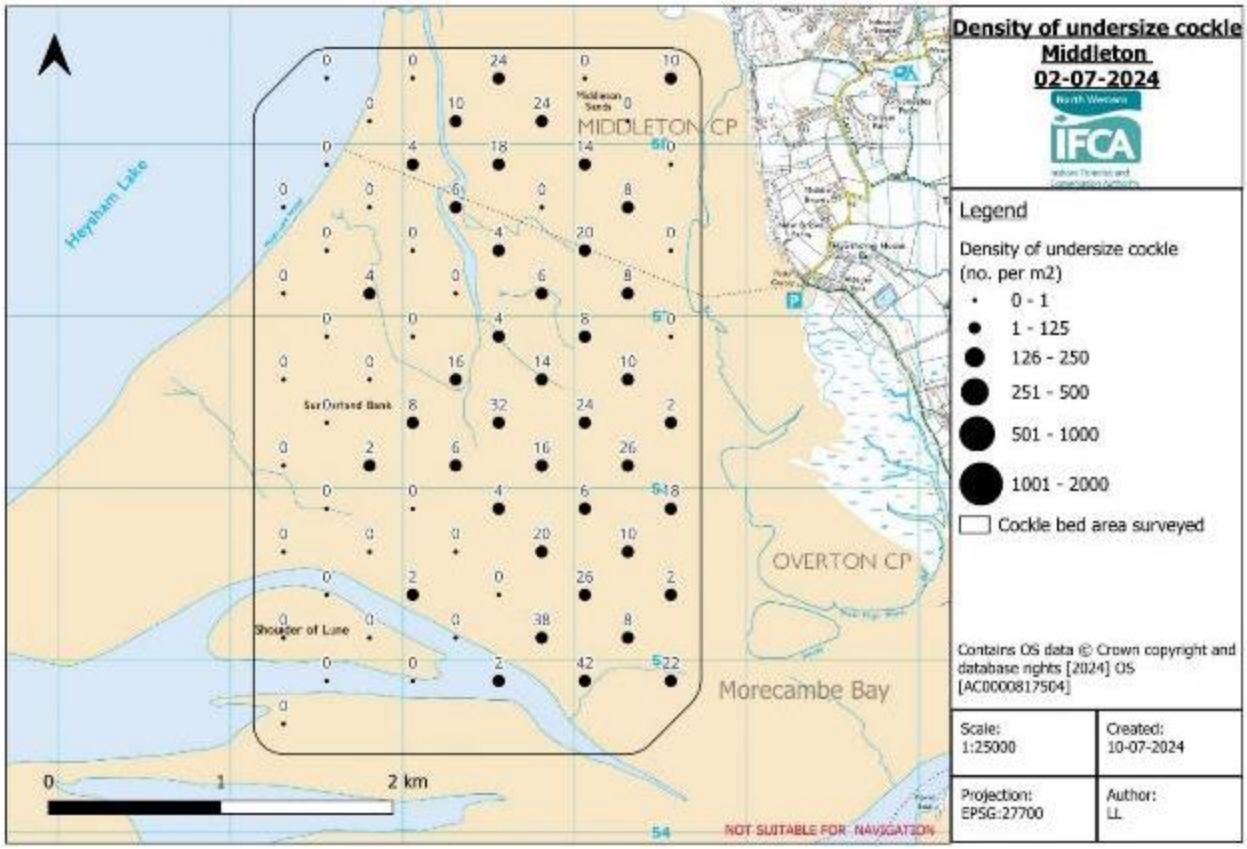

Figure 3: Density of undersize cockle per m^2 at Middleton July 2024

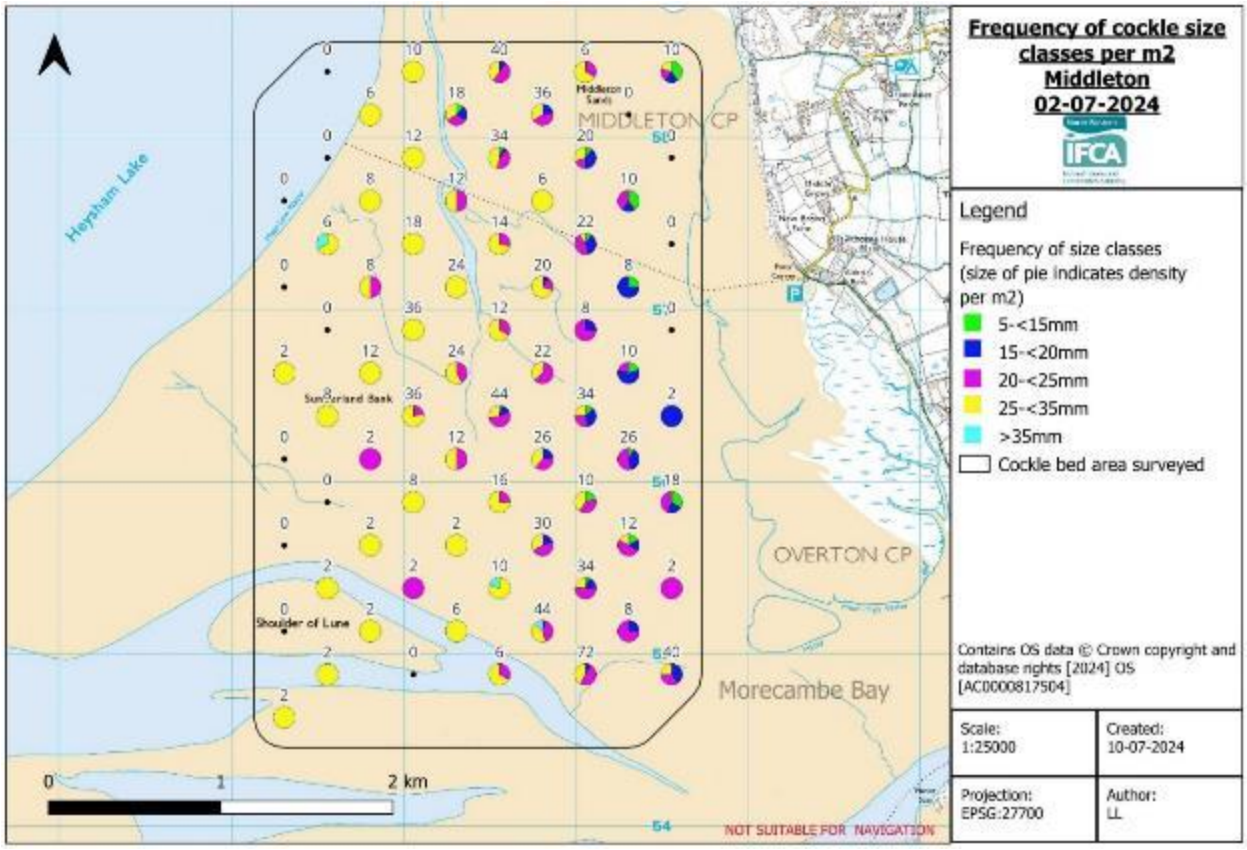

Figure 4: Frequency of size classes of cockle per m^2 at Middleton July 2024

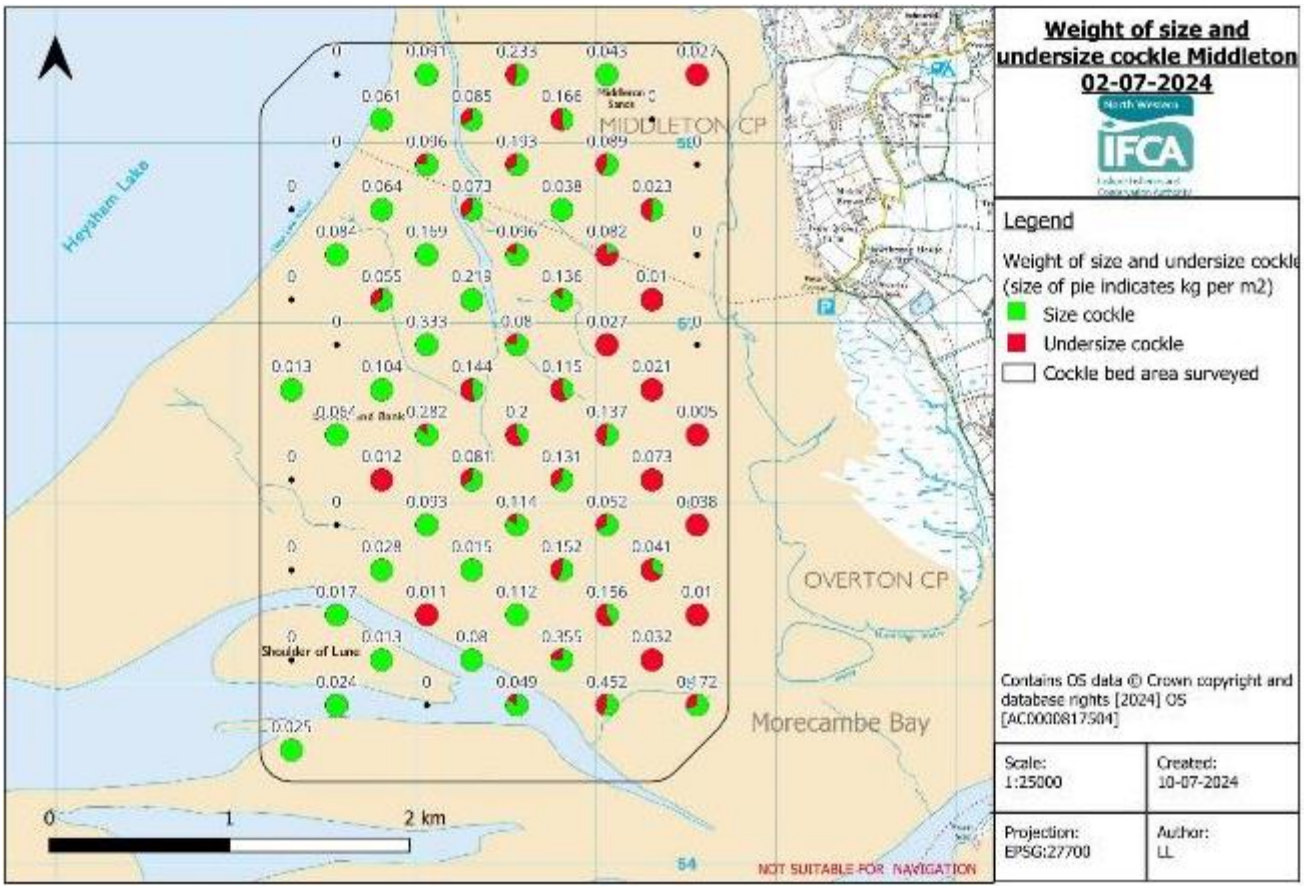

Figure 5: Weight of size and undersize cockle kg/m^2 at Middleton July 2024

Cockle Surveys – RIBBLE

Southport Cockle Survey 27-06-2024

Officers present: AB, MT, GG, LL
Tides: LW 10:27 1.7m (Liverpool Tides)

Survey method - Jumbo and 0.5m^2 quadrat

68 stations were sampled from a 350m grid. The survey grid location was based on the 2023 cockle surveys. There has been a significant decrease in density of size cockle across the bed which is expected to be due to fishery and natural mortality over winter. There was a large proportion of cockles in the 25-35mm size class. There was little evidence of a 2024 cockle settlement as very little spat was seen.

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	5 per m²	(min 0, max 32)
Mean number of undersize cockle	6 per m²	(min 0, max 32)
Mean number of 0-5mm cockle	0 per m²	(min 0, max 0)

Mean weight of size cockle kg/m²	0.063 kg/m²	(min 0, max 0.421)
Mean weight of undersize cockle kg/m²	0.014 kg/m²	(min 0, max 0.072)

Maps

Maps were created showing the overall survey area, density of size cockle, density of undersize cockle (excluding cockles in the 0-5mm size range), 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 of cockle present (ha)	Size Cockle (tonnes)[1]	Undersize Cockle (tonnes)[2]
Southport	**600**	**380**	**87**

5-15 Class (tonnes)	15-20 Class (tonnes)	20-25 Class (tonnes)	25-35 Class (tonnes)	>35 Class (tonnes)
3	**34**	**68**	**357**	**6**

[1]In regards to biomass size cockle defined as cockle which will not pass through a square gauge 20 x 20mm in size.

[2]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.

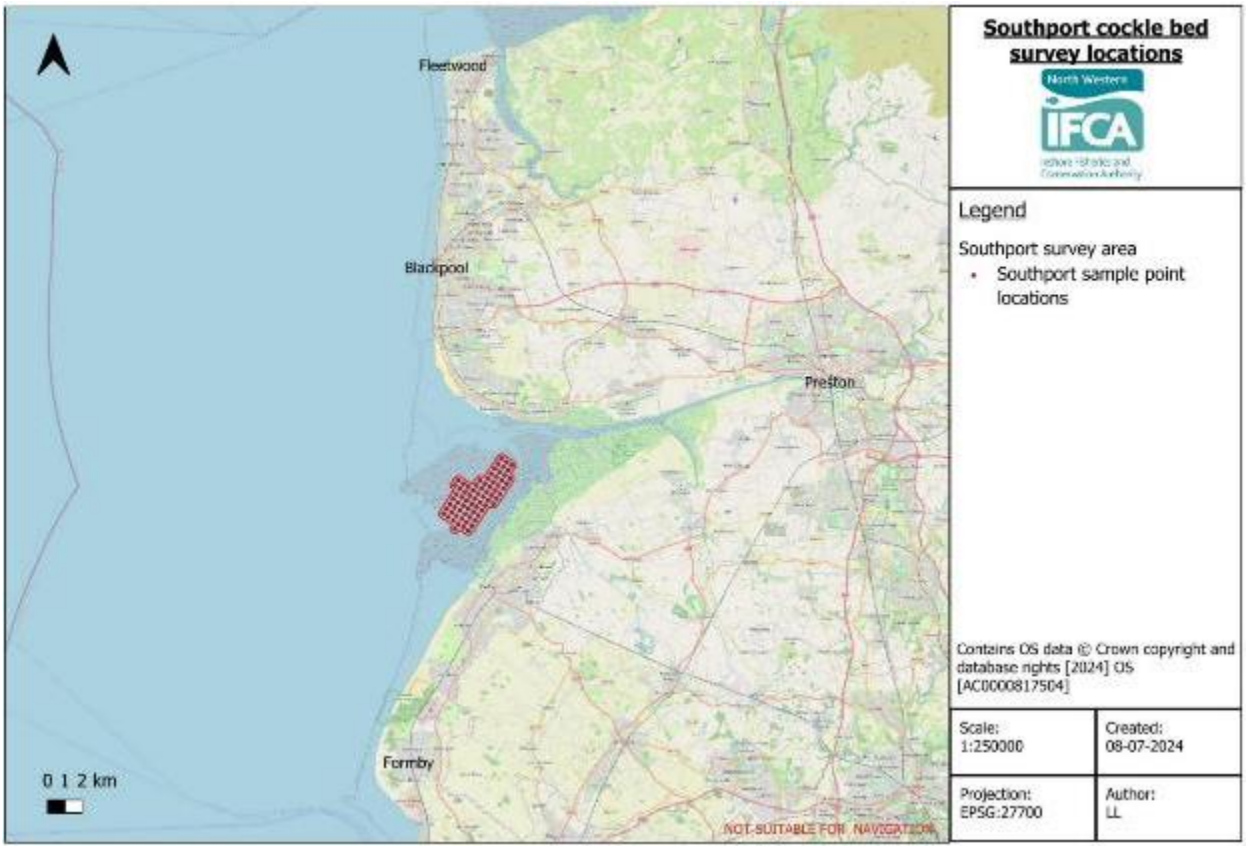

Figure 1. Illustration of position of Southport Survey Area

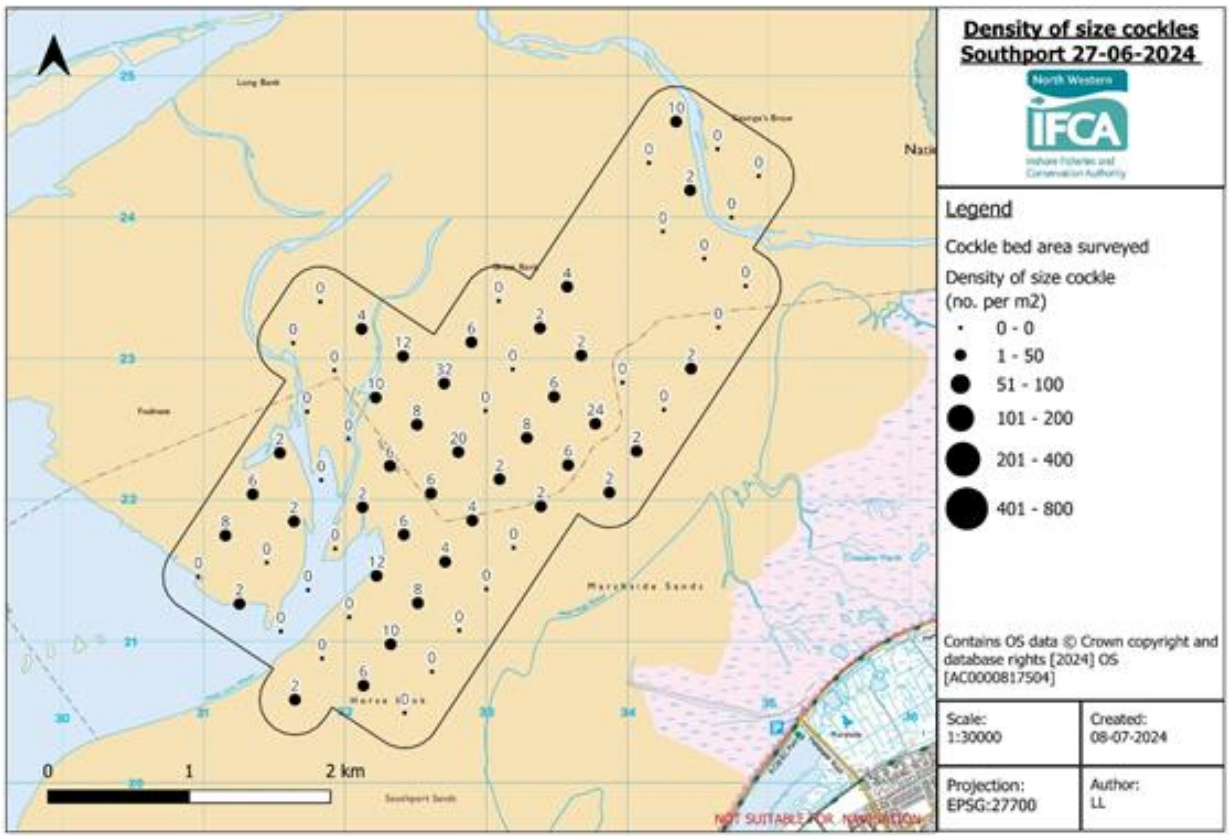

Figure 2: Density of size cockle per m^2 at Southport June 2024.

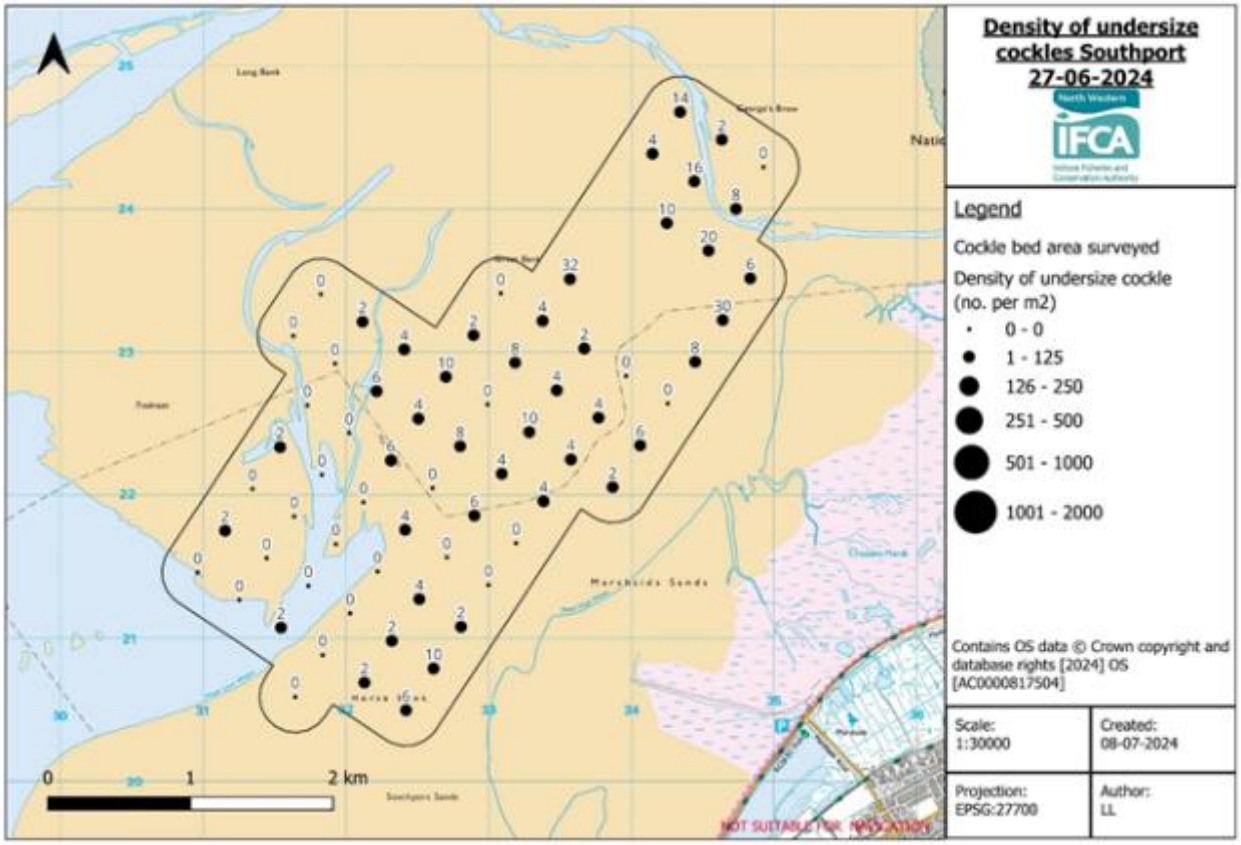

Figure 3: Density of undersize cockle per m^2 at Southport June 2024.

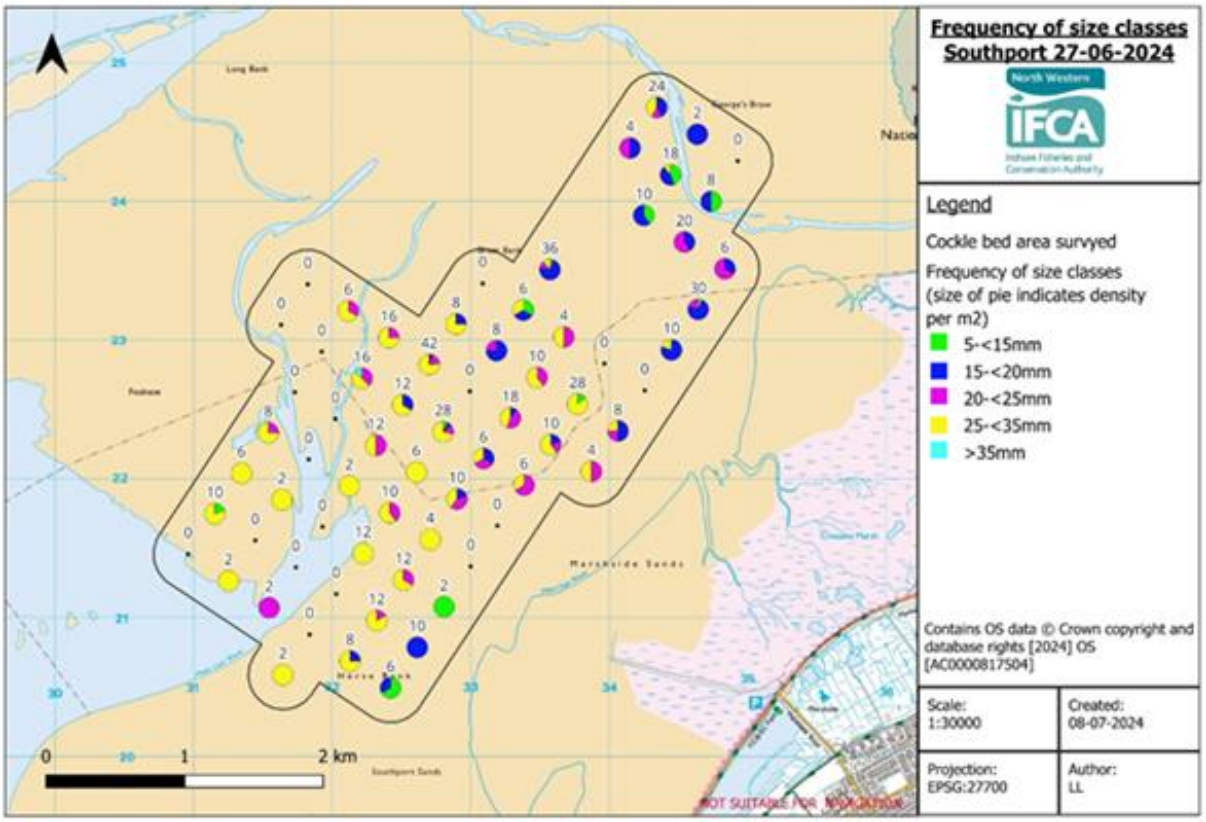

Figure 4: Frequency of size classes of cockle per m^2 at Southport June 2024.

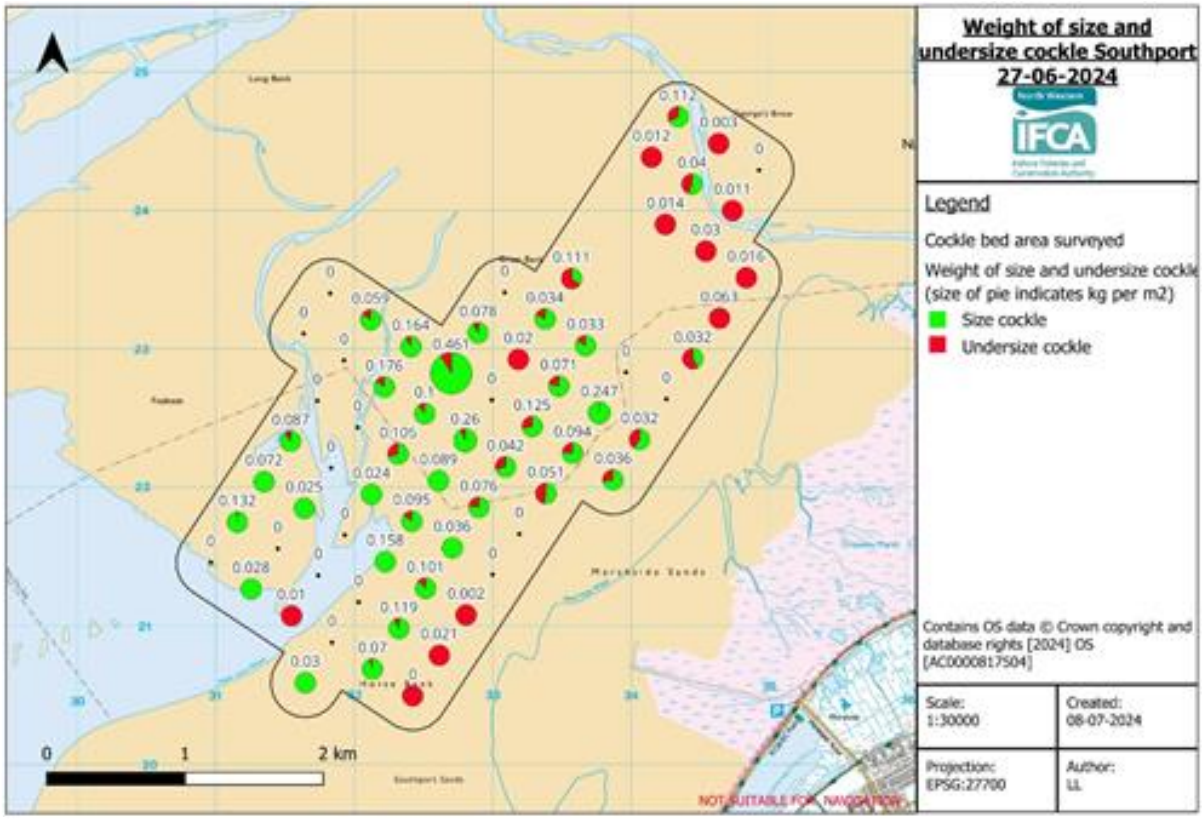

Figure 5: Weight of size and undersize

Cockle Surveys – WIRRAL COAST

Leasowe Cockle Survey 25-07-2024

Officers present: JH, AP, AB, MT
Tides: LW 09:29 1m (Liverpool Tides)

Survey method - Jumbo and 0.5m² quadrat

32 stations were sampled from a 250m grid. Two additional points were added to the East of the survey grid to ensure full coverage of the bed. 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. The density of size and undersize cockle is fairly even. A dense 2024 settlement of cockle was only observed in the area between the two additional points to the West of the survey area outside of the grid highlighted red (Figure 2).

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	45 per m²	(min 0, max 264)
Mean number of undersize cockle	66 per m²	(min 0, max 494)
Mean number of 0-5mm cockle	1 per m²	(min 0, max 20)
Mean weight of size cockle kg/m²	0.033 kg/m²	(min 0, max 0.249)
Mean weight of undersize cockle kg/m²	0.083 kg/m²	(min 0, max 0.793)

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)[1]	Undersize Cockle (tonnes)[2]
Leasowe	**213**	**799**	**751**

5-15 Class (tonnes)	15-20 Class (tonnes)	20-25 Class (tonnes)	25-35 Class (tonnes)	>35 Class (tonnes)
1	**14**	**595**	**919**	**21**

[1]In regards to biomass size cockle defined as cockle which will not pass through a square gauge 20 x 20mm in size.
[2]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.

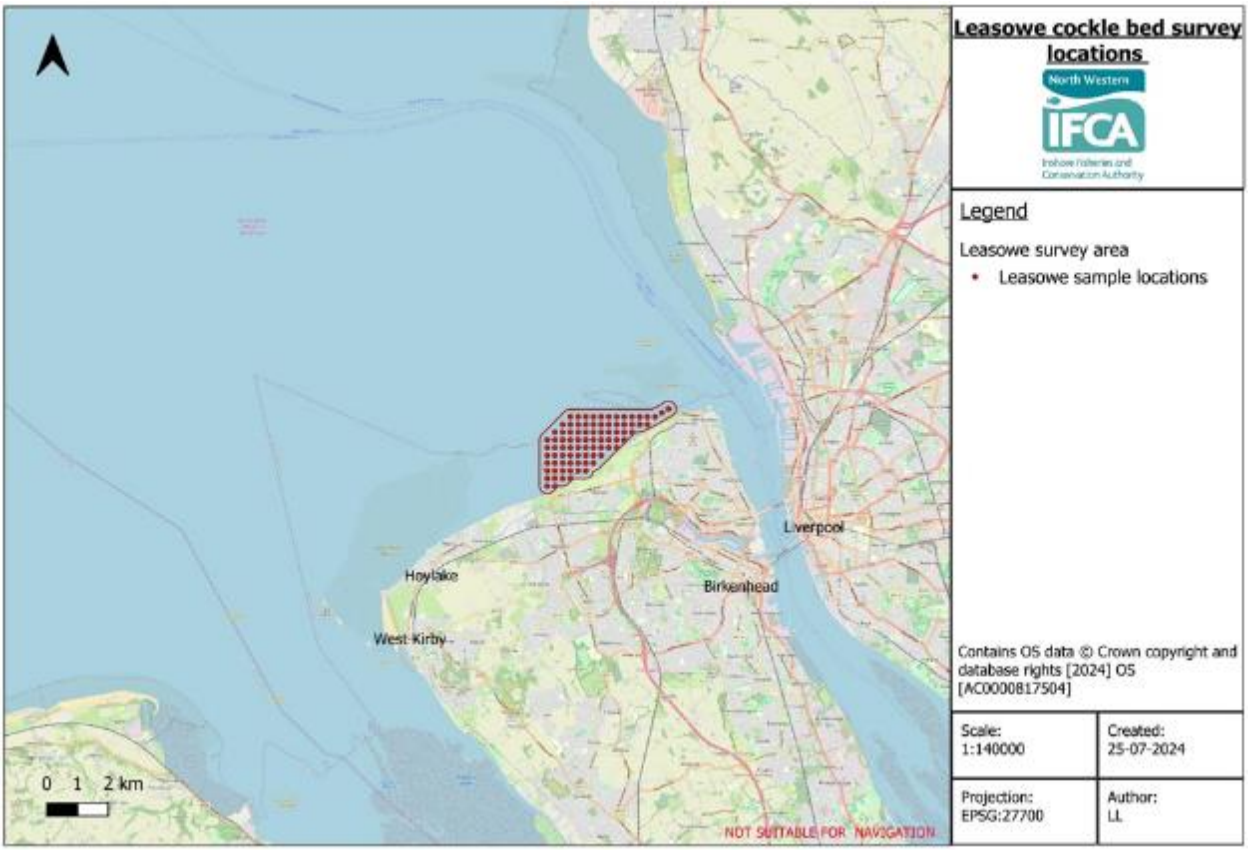

Figure 1: Illustration of position of Middleton Survey Area

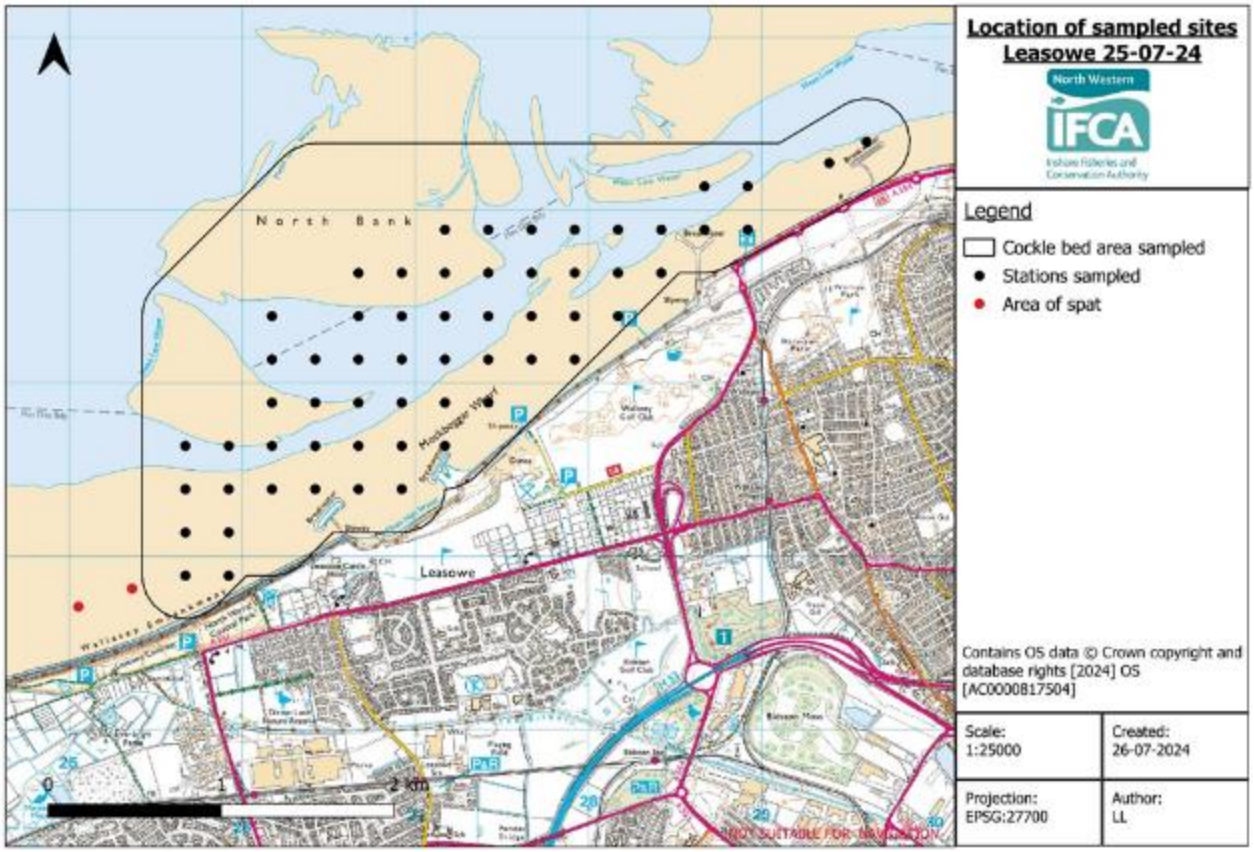

Figure 2: Map of points sampled including two extra points (red) in a low channel which contained small patches of spat

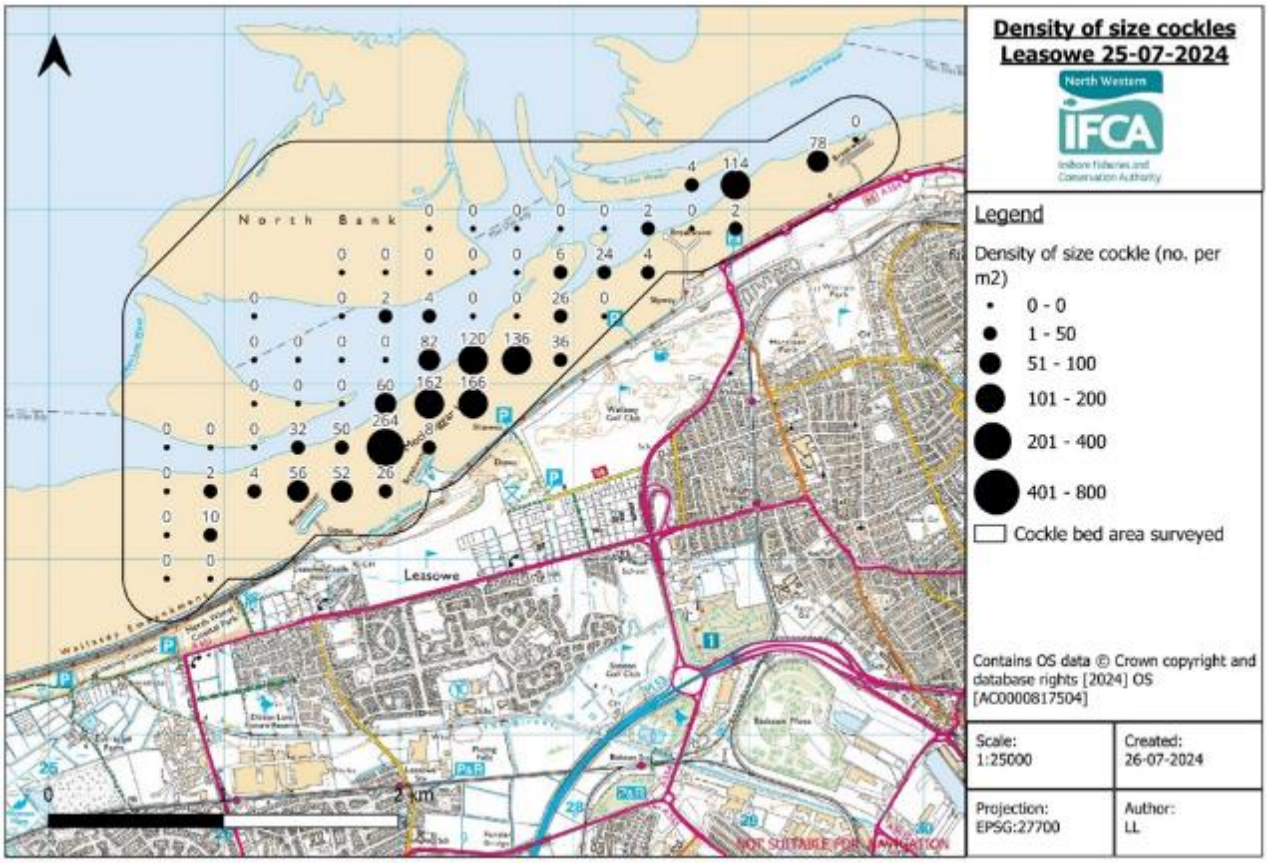

Figure 3: Density of size cockle per m² at Leasowe July 2024

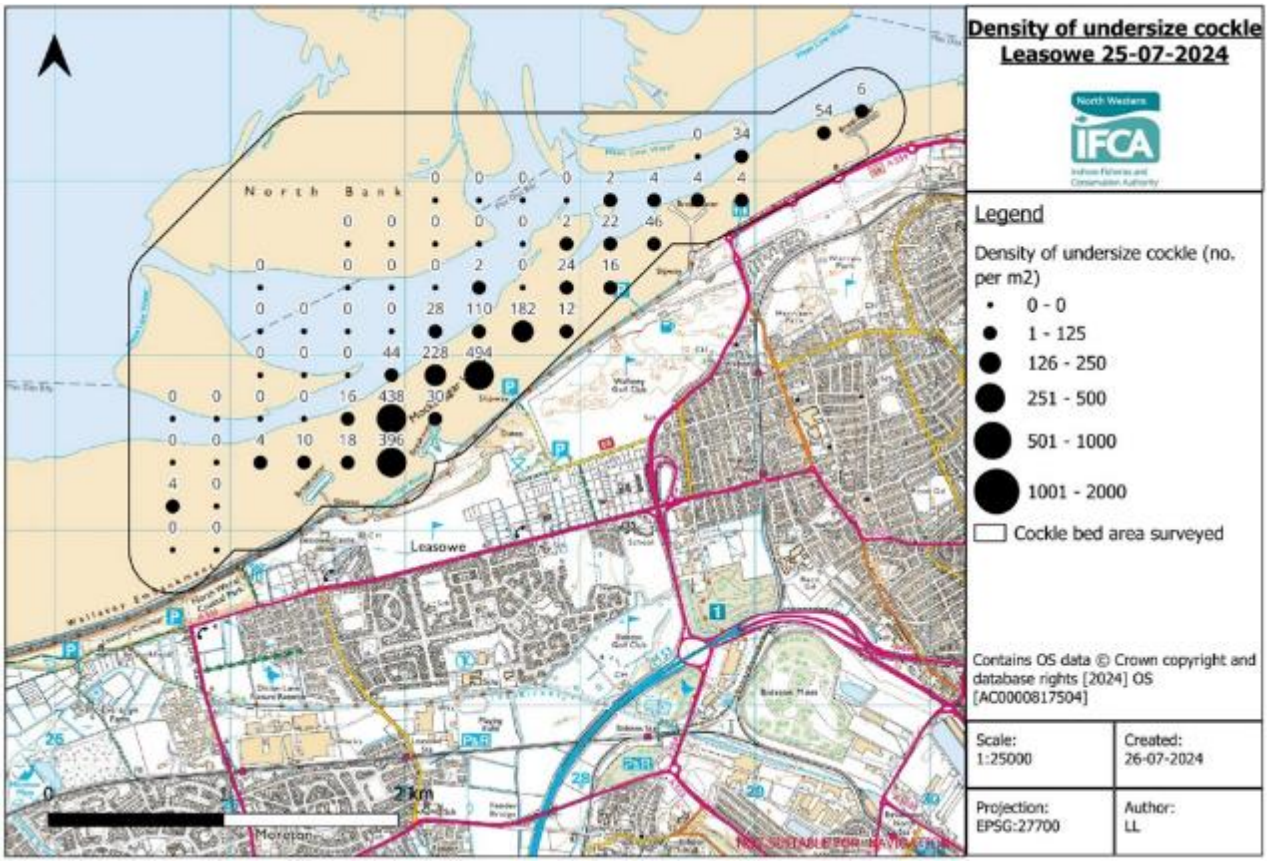

Figure 4: Density of undersize cockle per m² at Leasowe July 2024

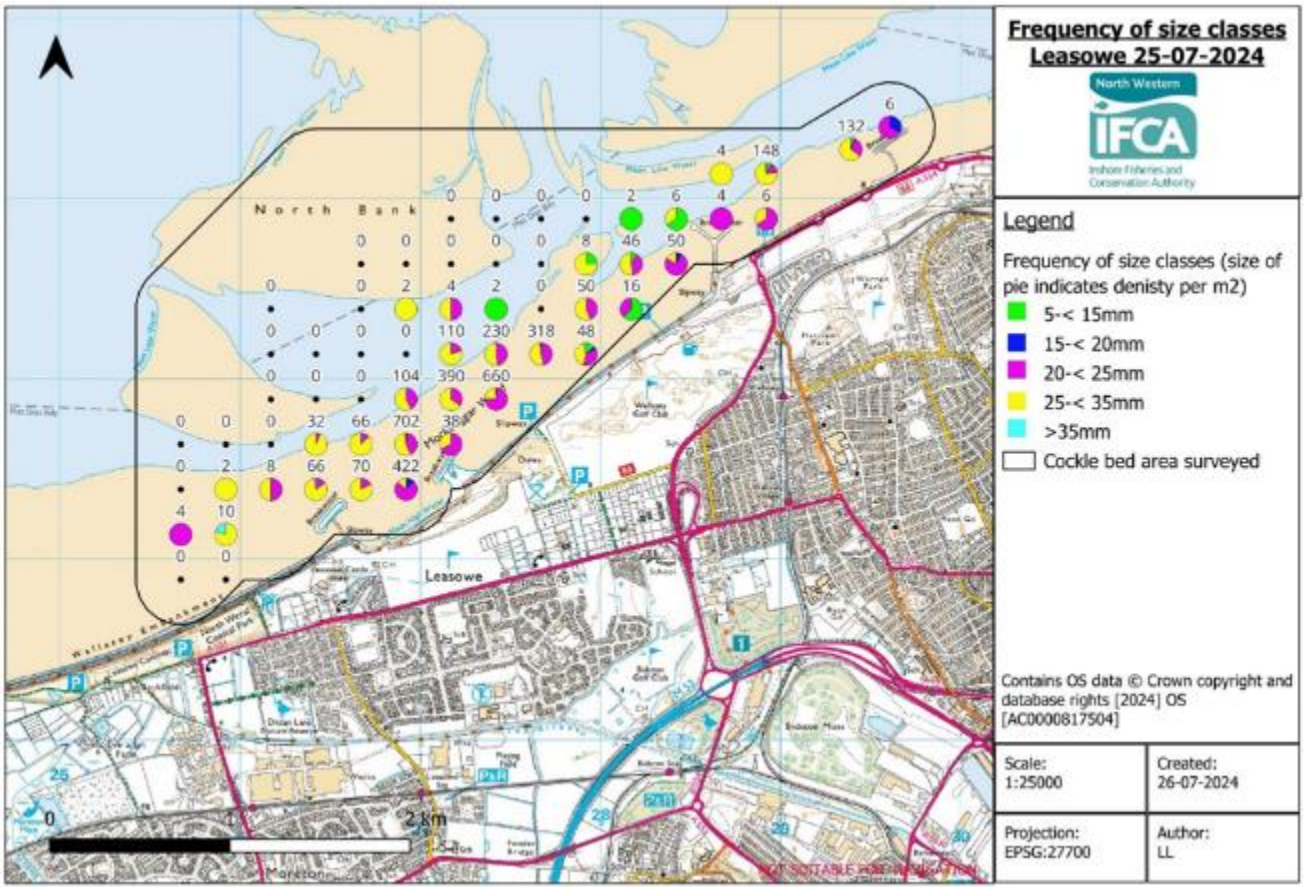

Figure 5: Frequency of size classes of cockle per m² at Leasowe July 2024

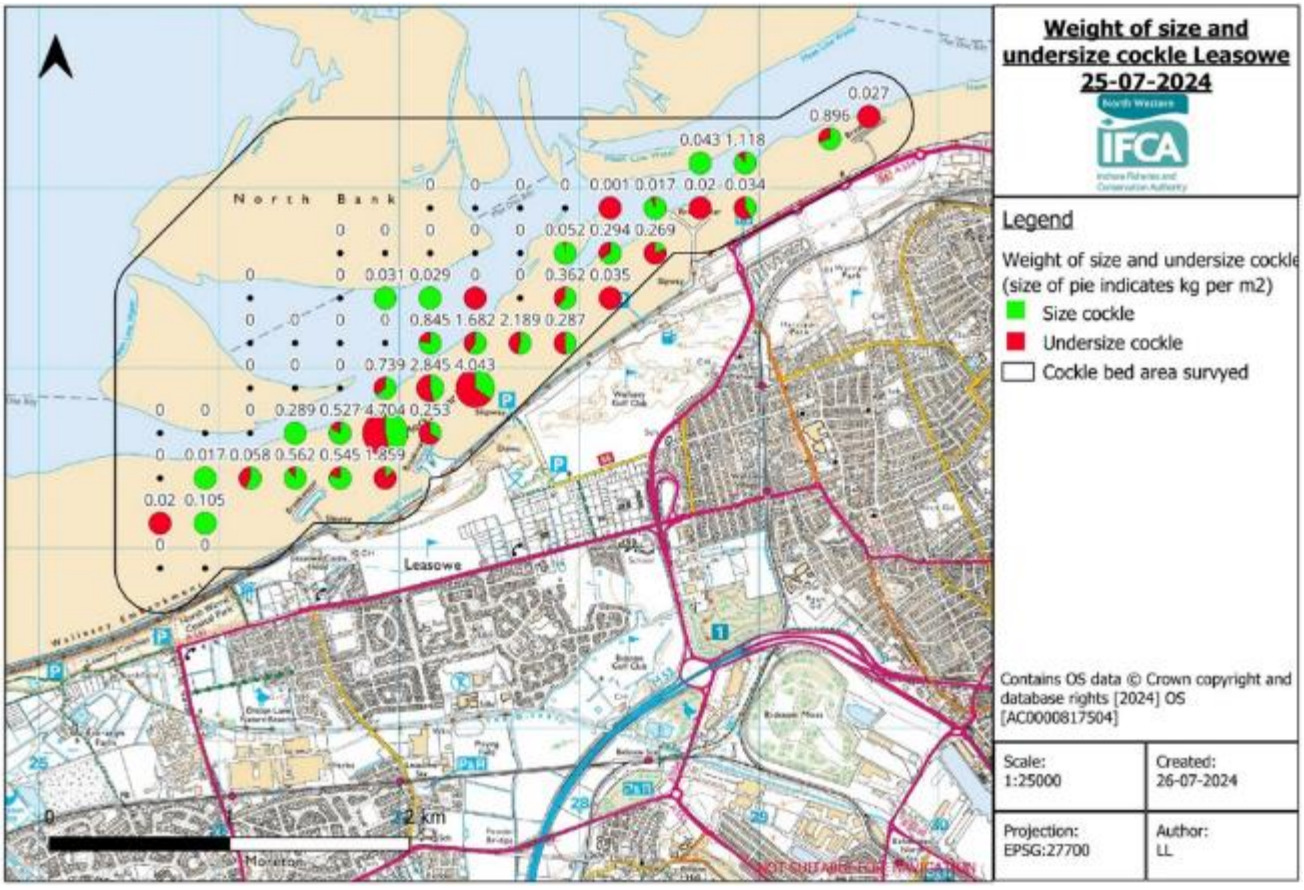

Figure 6: Weight of size and undersize cockle kg/m² at Leasowe July 2024