

Annex A – Morecambe Bay Cockle Survey Report 2021

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.

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

Biomass, size cockle¹ defined as cockle which will not pass through a square gauge 20 x 20mm in size. The biomass of undersize cockle² does not include any estimates of cockle less than 5mm due to the high variability of survival of this size class.

Aldingham and Newbiggin Cockle Survey 20-05-21

LW 12:38 2.9m (Liverpool Tides)

Survey method - Jumbo and 0.5m² quadrat

63 stations were sampled, 56 from a 500m grid and 7 additional stations were added to ensure full coverage of the cockle bed. A number of stations, particularly in the North East section of the bed, could not be accessed due to changes in the Leven channel. There was a wide range of cockle sizes across the bed from less than 5mm to greater than 35mm cockle. Cockle densities were relatively low across the bed with higher densities of size and undersize cockles found on Newbiggin. Cockles from the 0-5mm class were not present across the majority of the bed and only found in very low densities at two stations which is likely due to the timing of the survey.

Mean number of size cockle	10 per m ²	(min 0, max 42)
Mean number of undersize cockle	7 per m ²	(min 0, max 62)
Mean number of 0-5mm cockle	<1 per m ²	(min 0, max 4)

Biomass	Area (ha)	Size Cockle (tonnes)¹	Undersize Cockle (tonnes)²
Aldingham and Newbiggin	1305	~1800-1900	~200-300

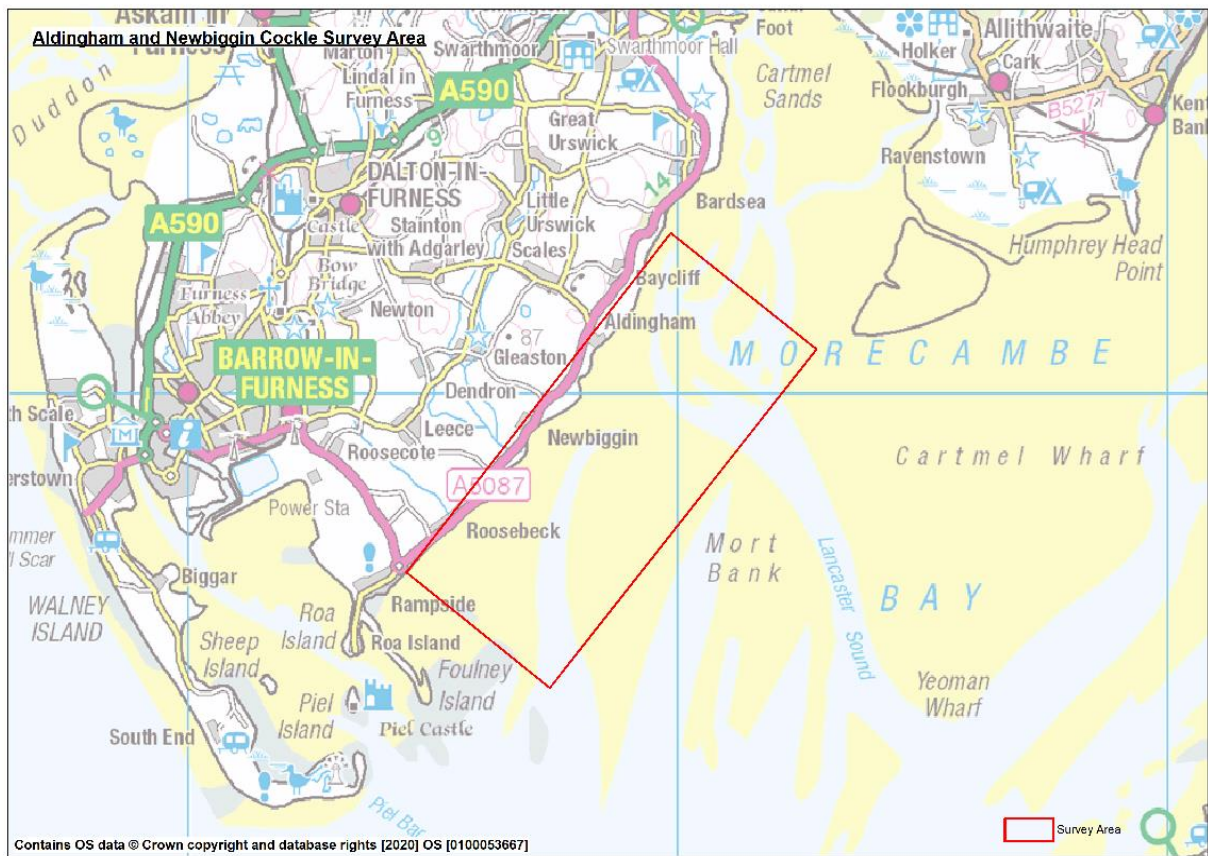
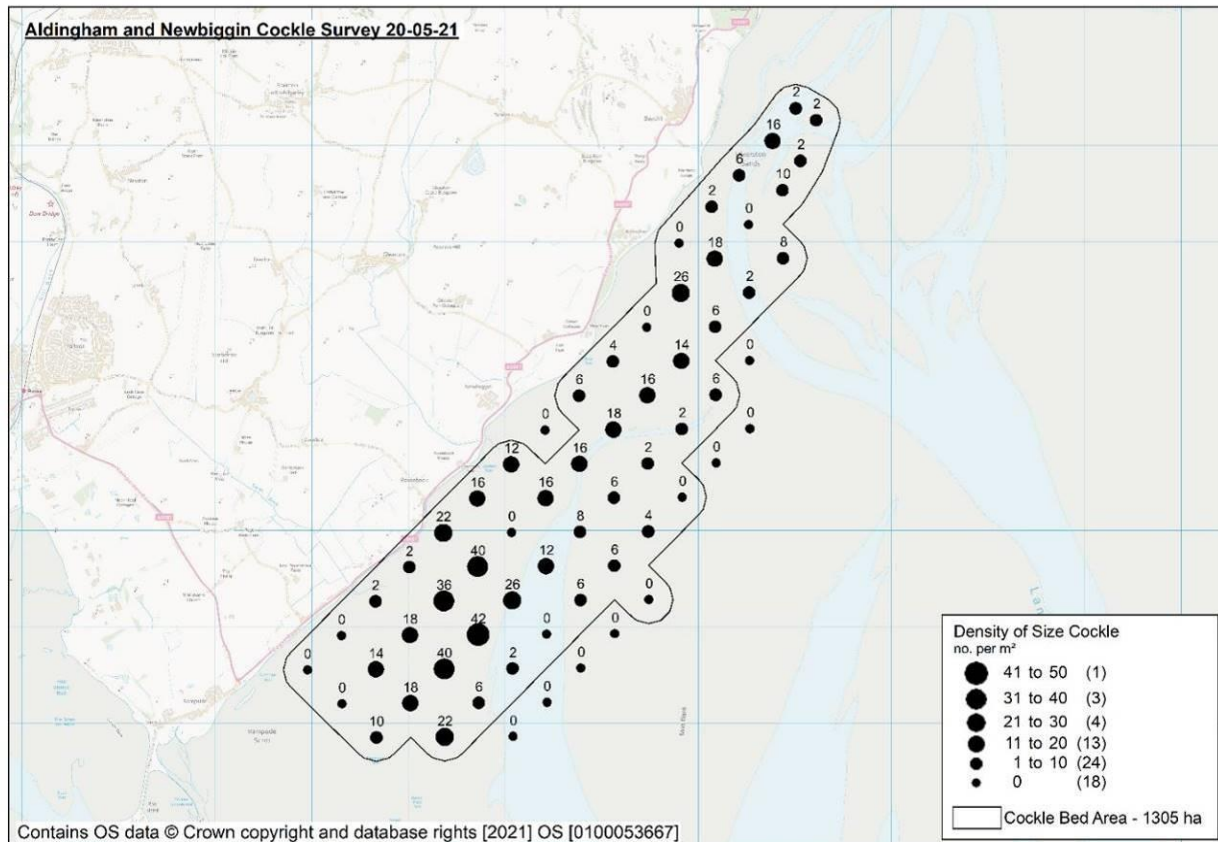
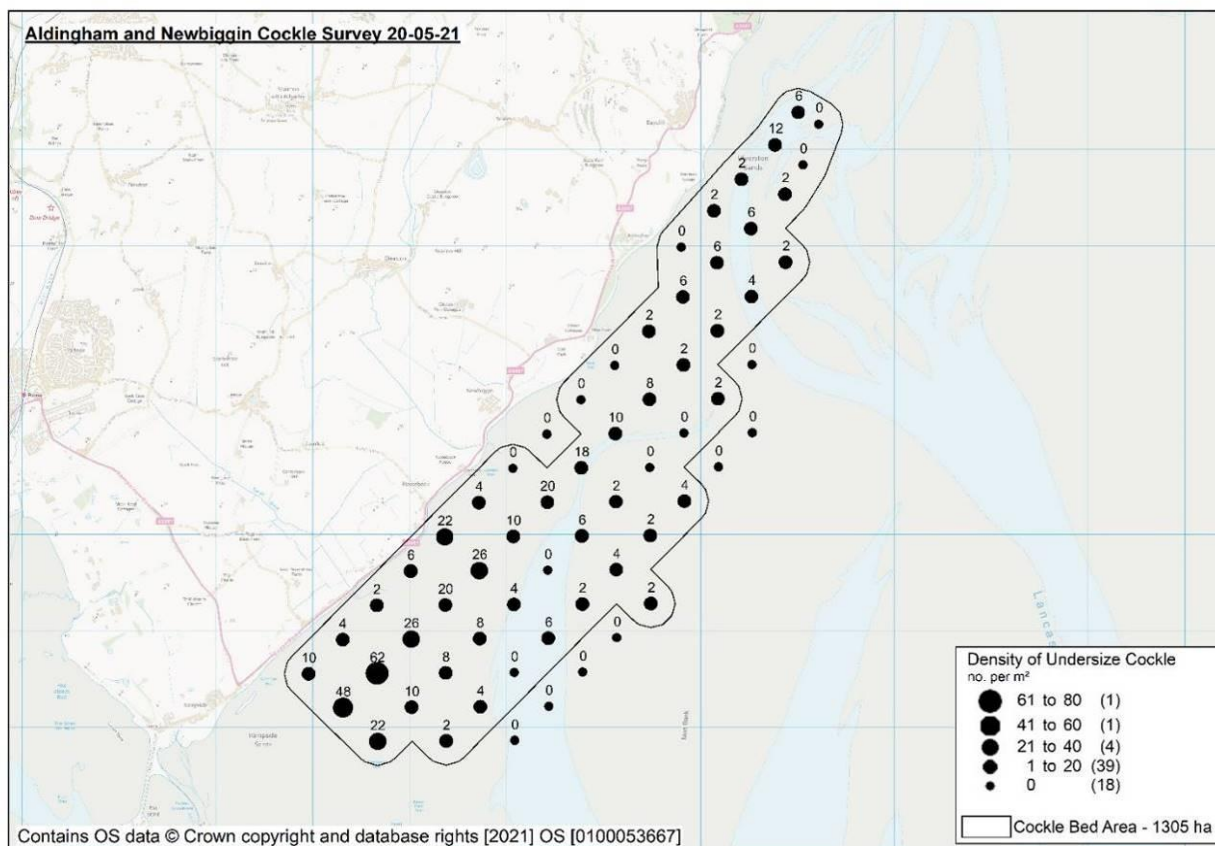


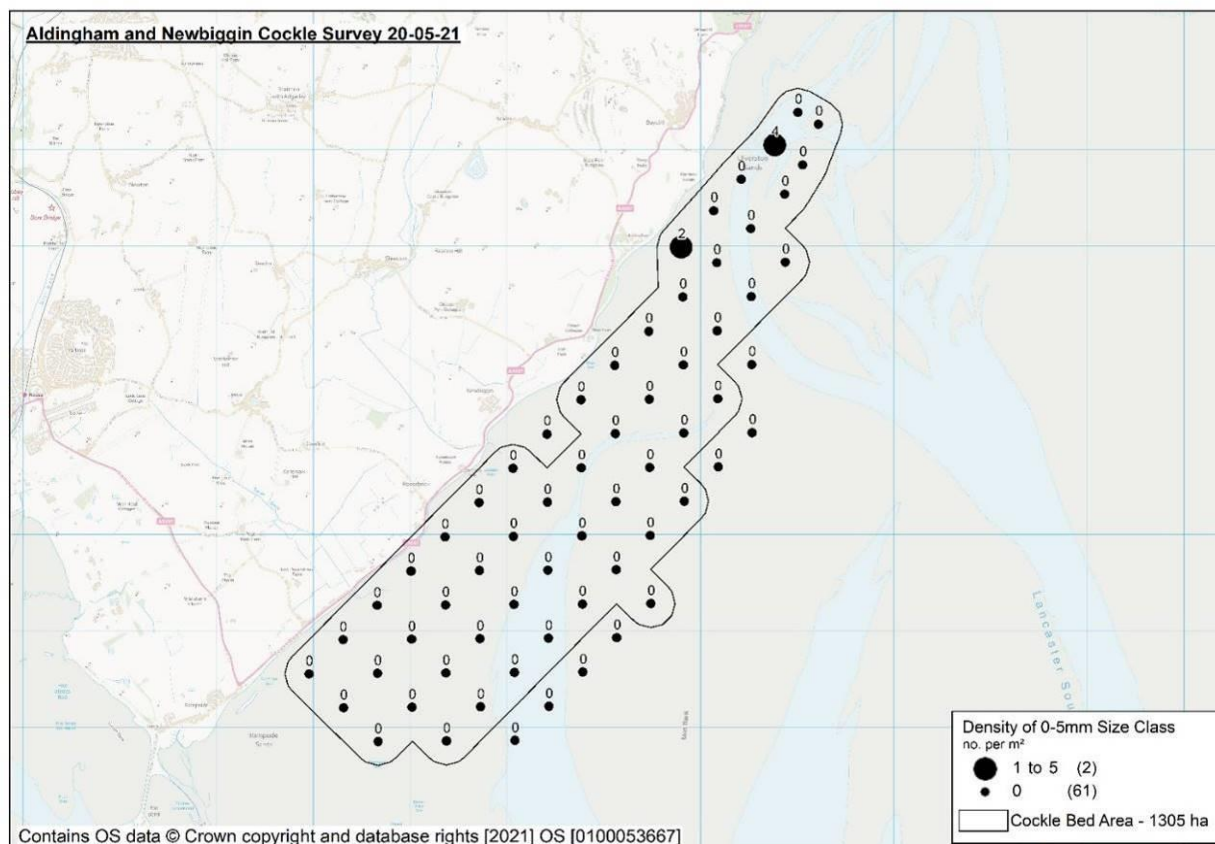
Illustration of position of Aldingham and Newbiggin Survey Area



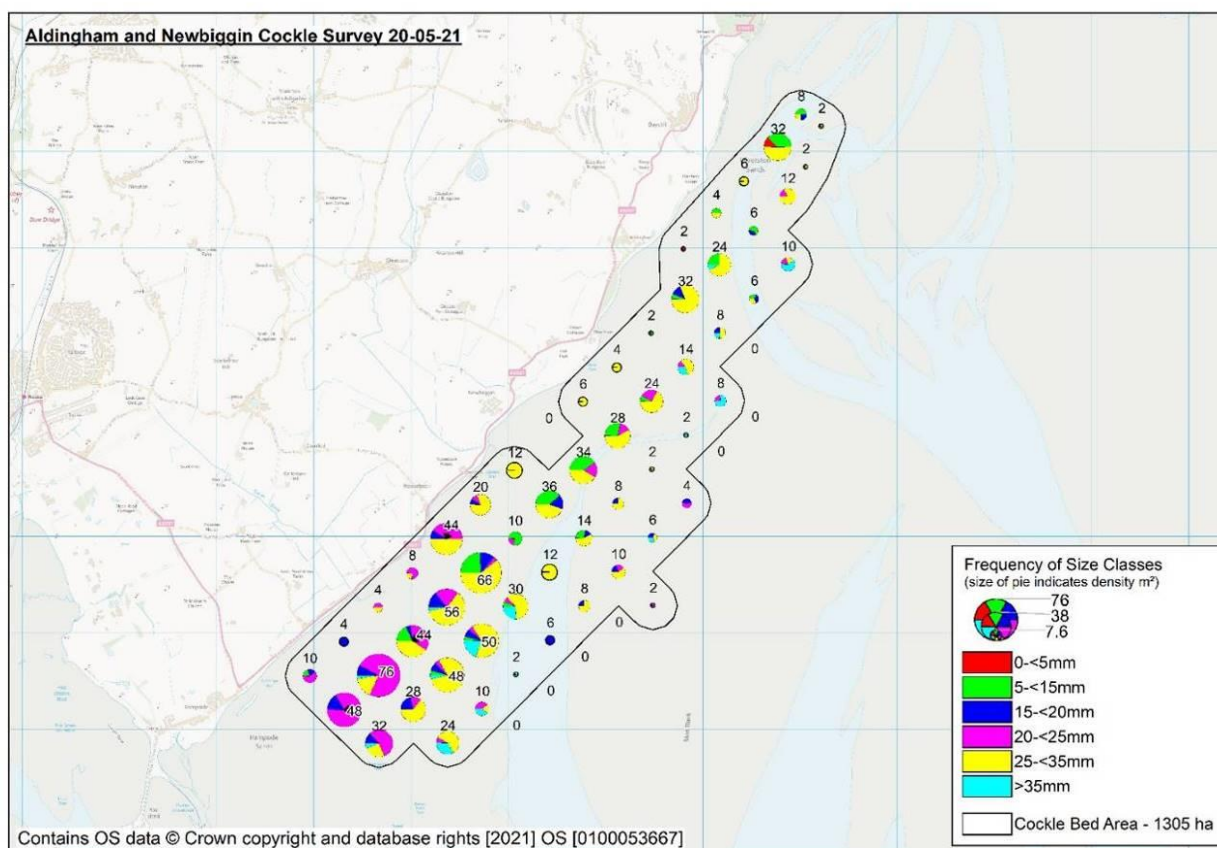
Density of size cockle per m² Aldingham and Newbiggin May 2021



Density of undersize cockle per m² Aldingham and Newbiggin May 2021



Density of 0-5mm cockle per m² Aldingham and Newbiggin May 2021



Frequency of size classes of cockle per m² Aldingham and Newbiggin May 2021

Leven Cockle Survey 12-05-21

LW 19:07 1.6m (Liverpool Tides)

74 stations were sampled from a 500m grid. There was a wide range of cockle sizes across the bed from less than 5mm to greater than 35mm cockle. The densities of both size and undersize cockle across the bed were relatively low. Size cockle were present across the surveyed area. Undersize cockle was present in higher densities with higher numbers found towards the south western part of the bed. Low densities of 2021 spat were found across the centre of the bed area but this was not consistent across the bed.

Mean number of size cockle	5 per m ²	(min 0, max 22)
Mean number of undersize cockle	11 per m ²	(min 0, max 58)
Mean number of 0-5mm cockle	3 per m ²	(min 0, max 30)

Biomass	Area (ha)	Size Cockle (tonnes) ¹	Undersize Cockle (tonnes) ²
Leven	1319	~600-700	~125-150

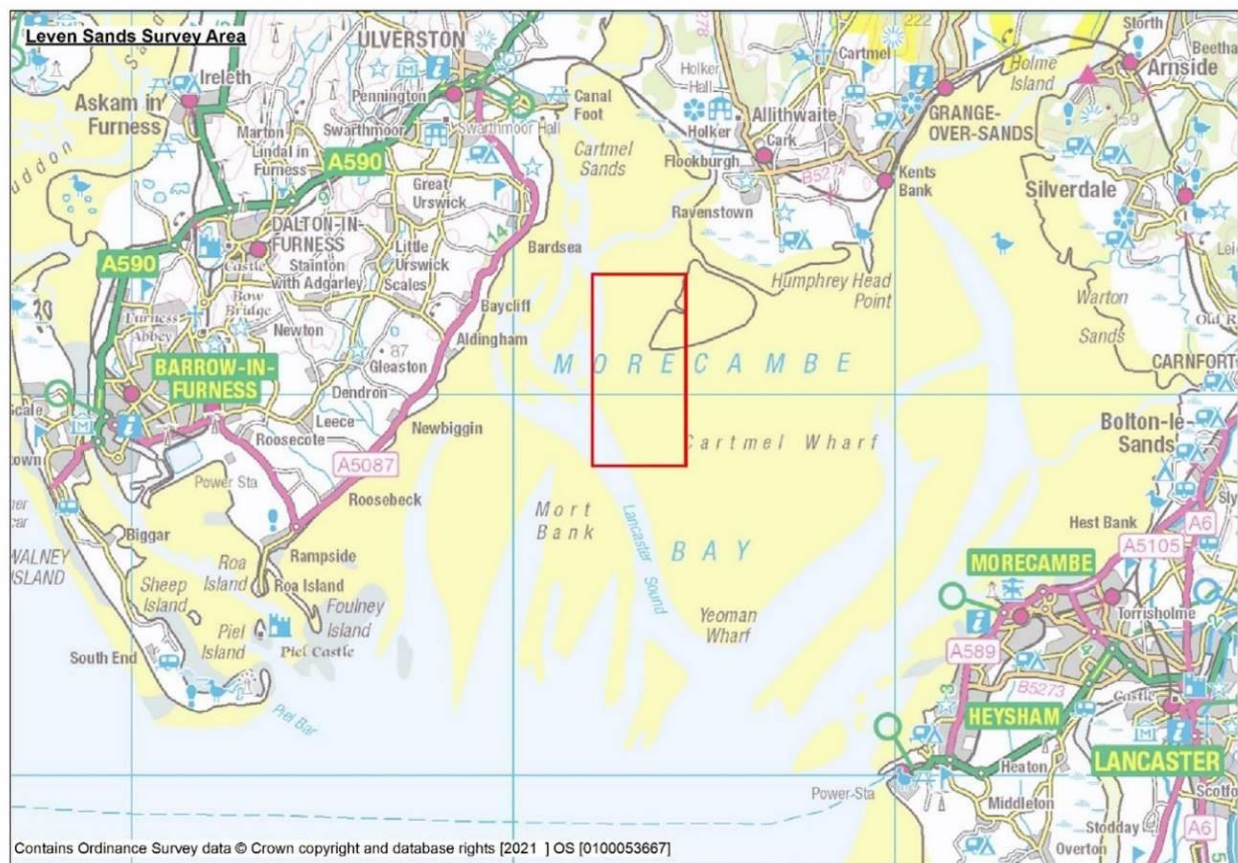
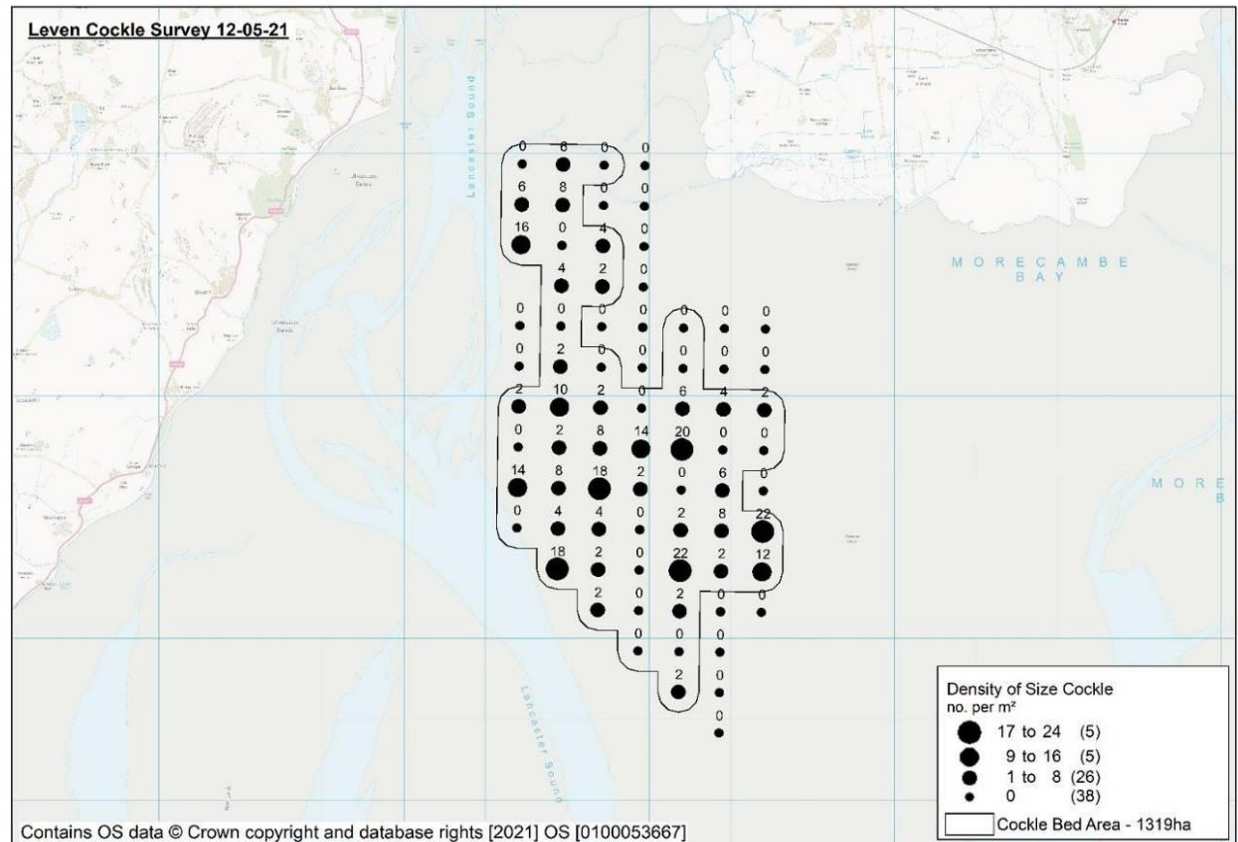
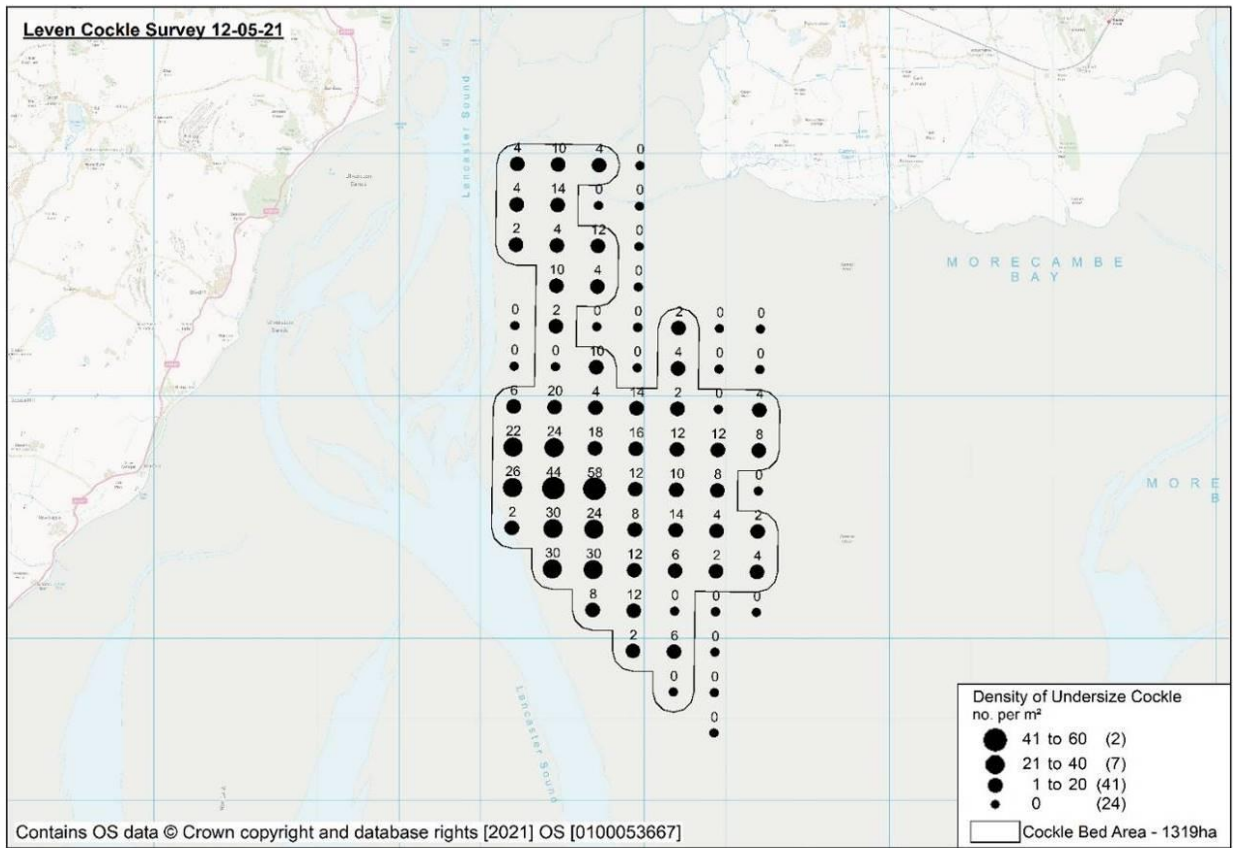


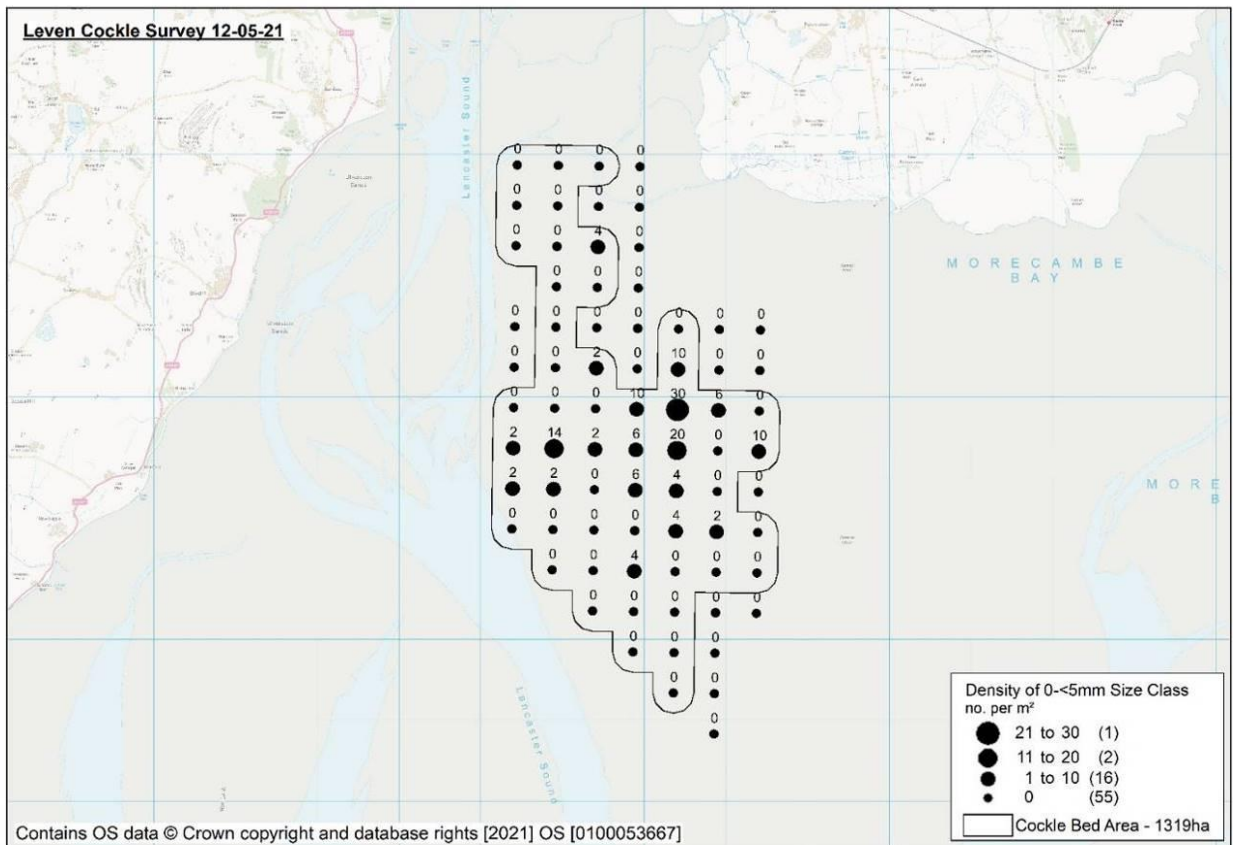
Illustration of position of Leven Survey Area



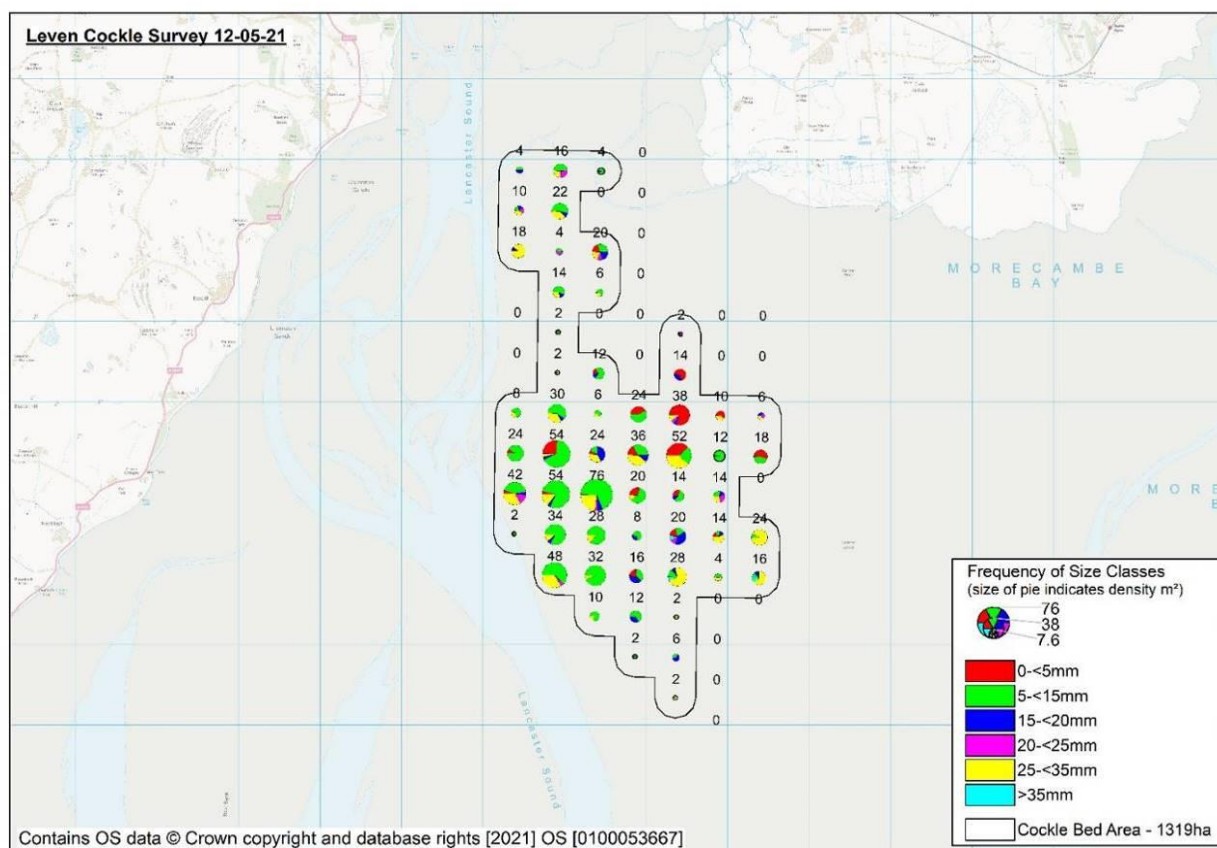
Density of size cockle per m² Leven May 2021



Density of undersize cockle per m² Leven May 2021



Density of 0-5mm cockle per m² Leven May 2021



Frequency of size classes of cockle per m² Leven May 2021

Flookburgh Cocker Survey 11/12-05-21

11-05-21 LW 18:39 1.6m (Liverpool Tides) and 12-05-21 LW 19:07 1.6m (Liverpool Tides)

Survey method - Jumbo and 0.5m² quadrat

123 stations were sampled from a 500m grid. A number of sample points within the grid were unable to be sampled due to changes in the channels on the bed. There was a wide range of cockle sizes across the bed from < 5mm to > 35mm. Cockle density was inconsistent across the bed and relatively low in comparison with recent years. There was little evidence of any 2021 settlement which is to be expected due to the timing of the survey. A denser area with a variety of size classes was evident in the North West of the survey grid.

Mean number of size cockle	4 per m ²	(min 0, max 28)
Mean number of undersize cockle	7 per m ²	(min 0, max 36)
Mean number of 0-5mm cockle	2 per m ²	(min 0, max 40)

Biomass	Area (ha)	Size Cockle (tonnes) ¹	Undersize Cockle (tonnes) ²
Flookburgh	2240	~900-1000	~175-225

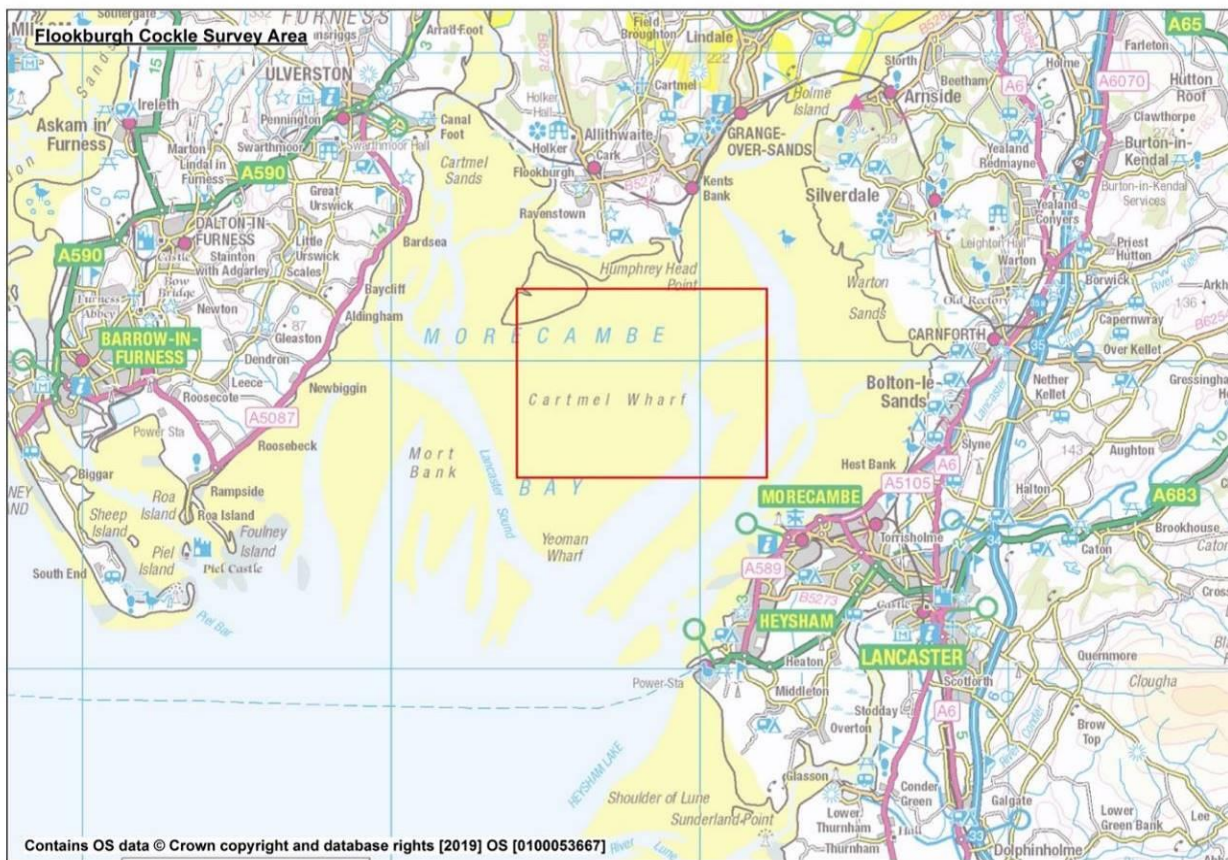
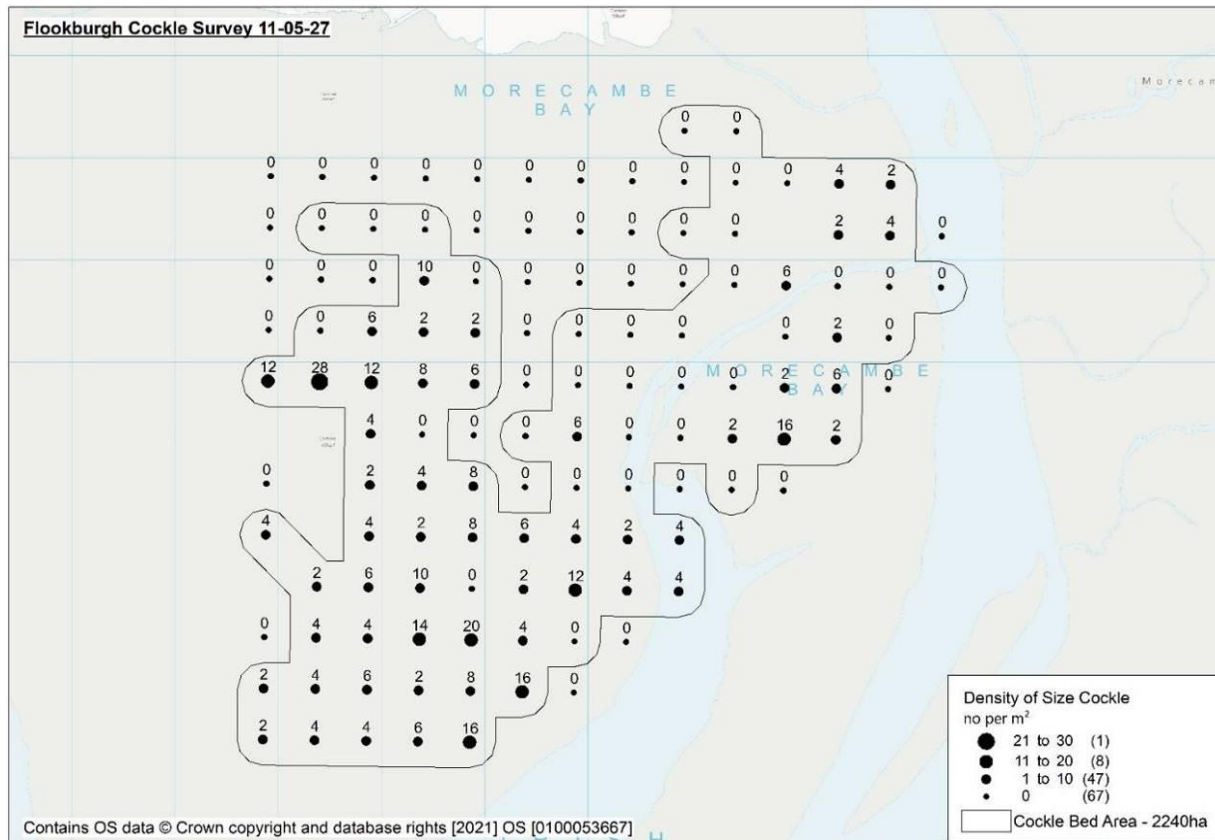
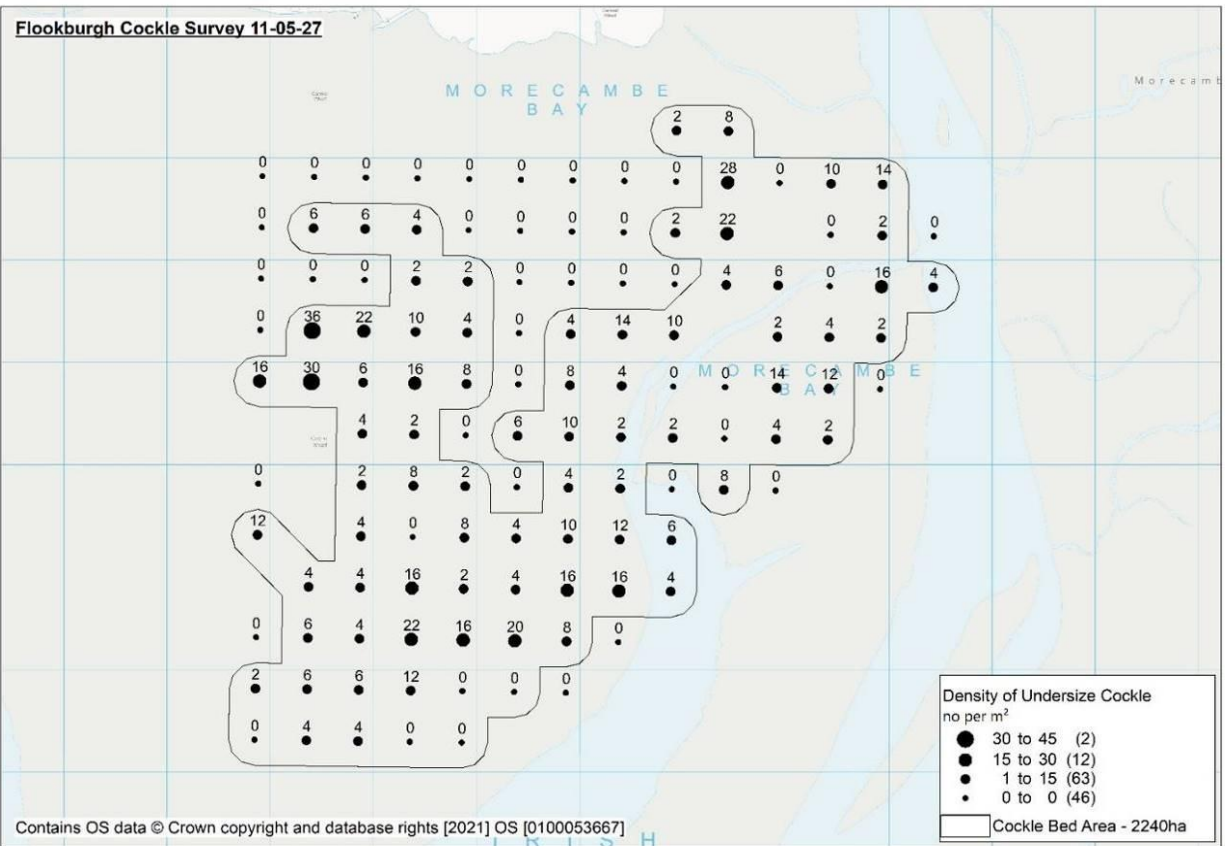


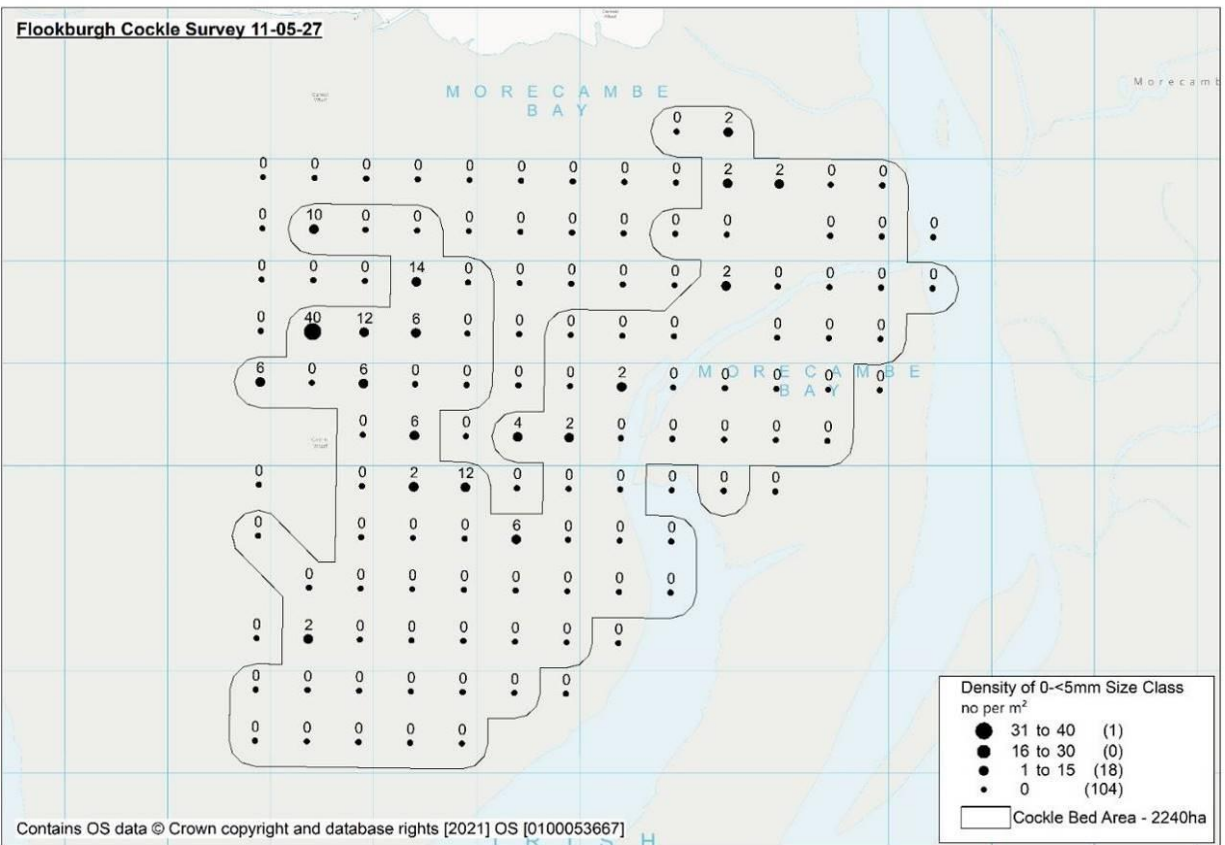
Illustration of position of Flookburgh Survey Area



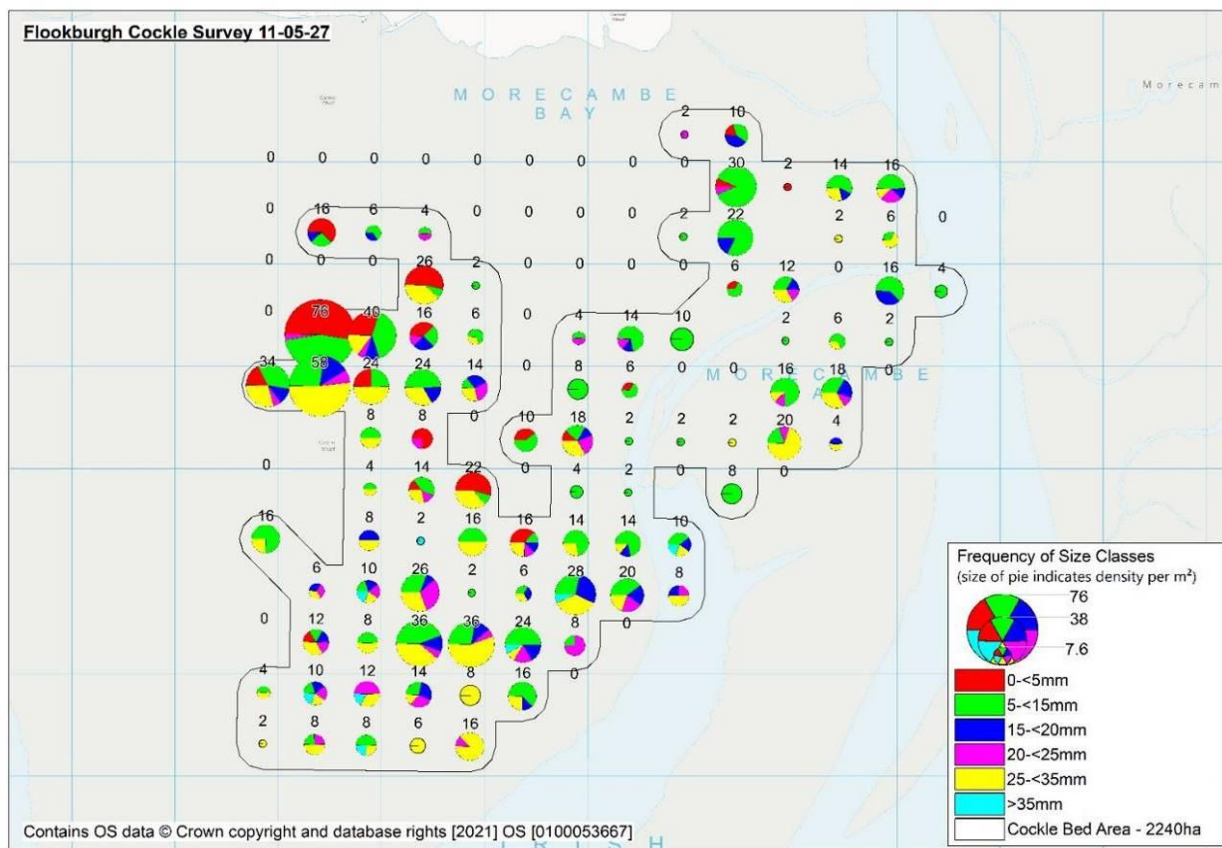
Density of size cockle per m² Flookburgh May 2021.



Density of undersize cockle per m² Flookburgh May 2021.



Density of 0-5mm cockle per m² Flookburgh May 2021.



Frequency of size classes of cockle per m² Flookburgh May 2021.

Warton Sands Cockle Survey 01-06-21

LW 11:10 2.1m (Liverpool tides)

Survey method - Jumbo and 0.5m² quadrat.

49 survey stations were sampled from a 250m grid. Sample density was increased to include an additional 6 stations where there was a previously known area of dense cockle. The majority of the survey area was accessible with some survey stations being cut by channels and soft areas. The high density area that was surveyed in 2019 and 2020 was present over a slightly smaller area with lower densities of size and undersize cockle. Size cockle was in low density across the main surveyed bed area and the majority of the dense area had grown to size. 2021 spat was not present across the bed which is likely due to the timing of the survey. No cockles larger than 35mm were found.

Main Area:

Mean number of size cockle	3 per m ²	(min 0, max 34)
Mean number of undersize cockle	5 per m ²	(min 0, max 14)

Dense Area:

Mean number of size cockle	73 per m ²	(min 0, max 230)
Mean number of undersize cockle	17 per m ²	(min 6, max 38)

Biomaas	Area (ha)	Size Cockle (tonnes) ¹	Undersize Cockle (tonnes) ²
Warton Sands Main Area	181.8	~55	~15-20
Warton Sands Dense Area	8.4	~50-55	>5

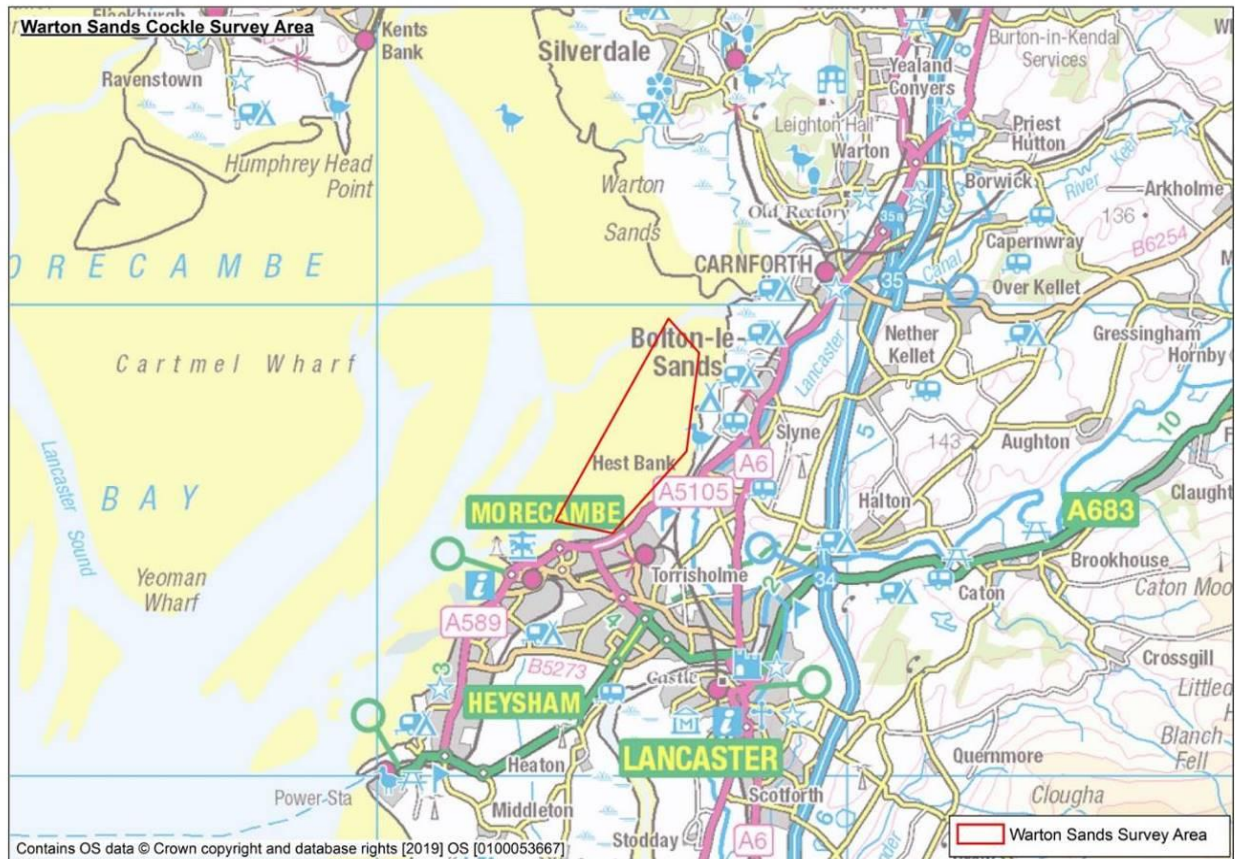
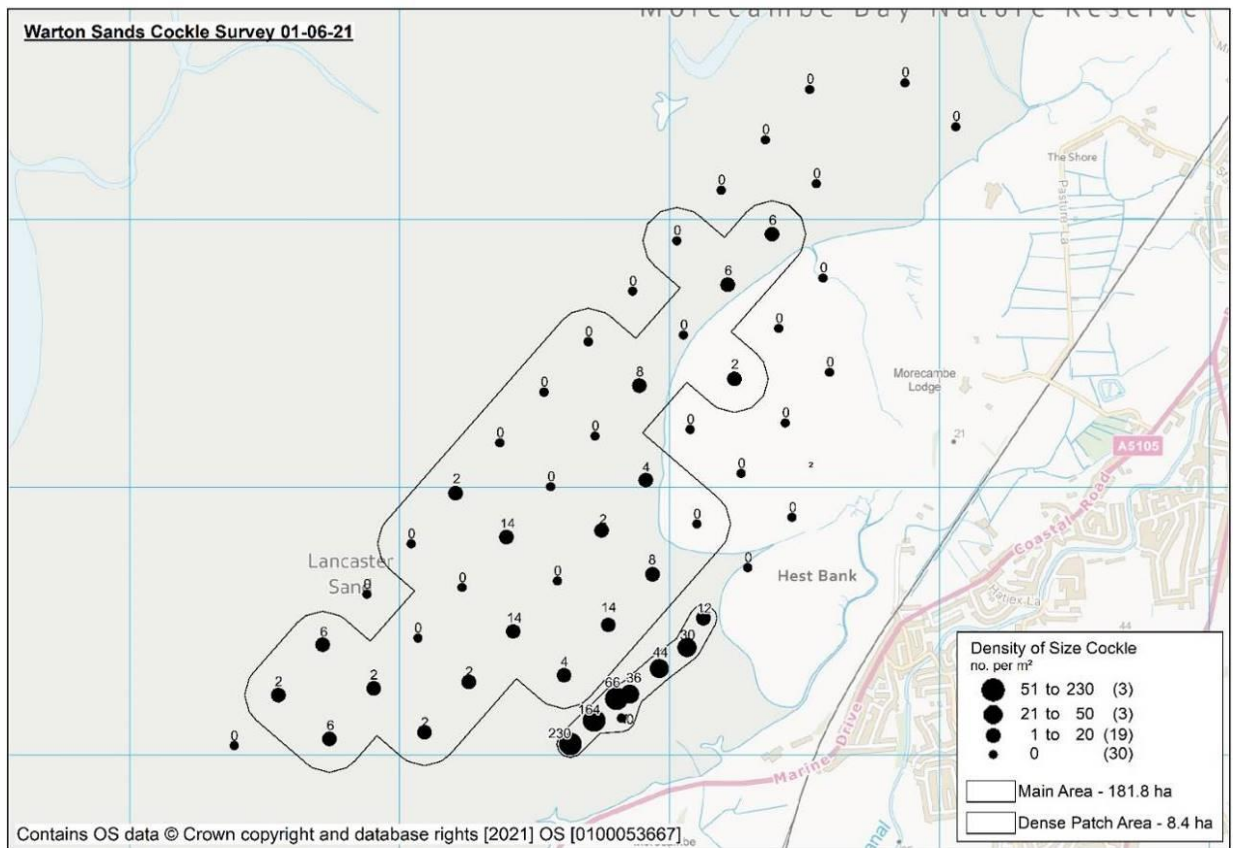
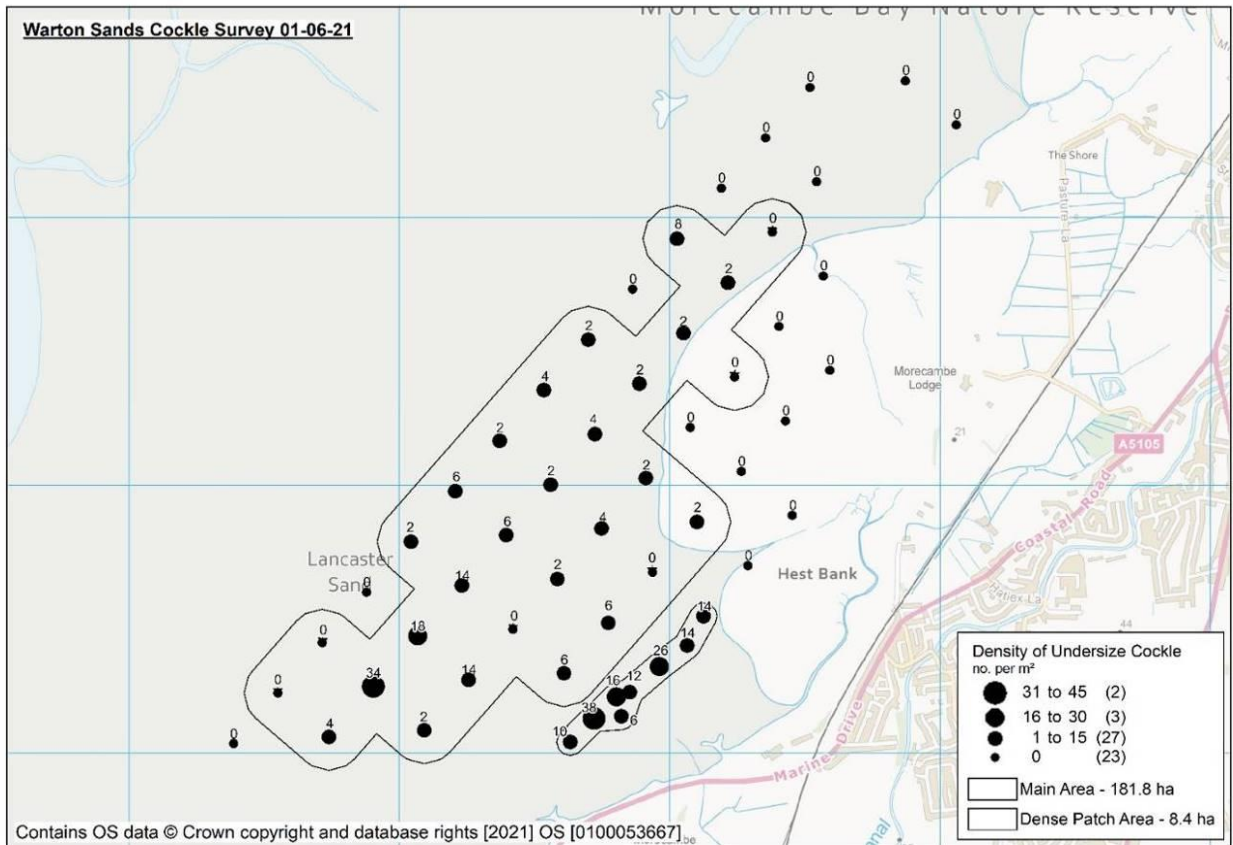


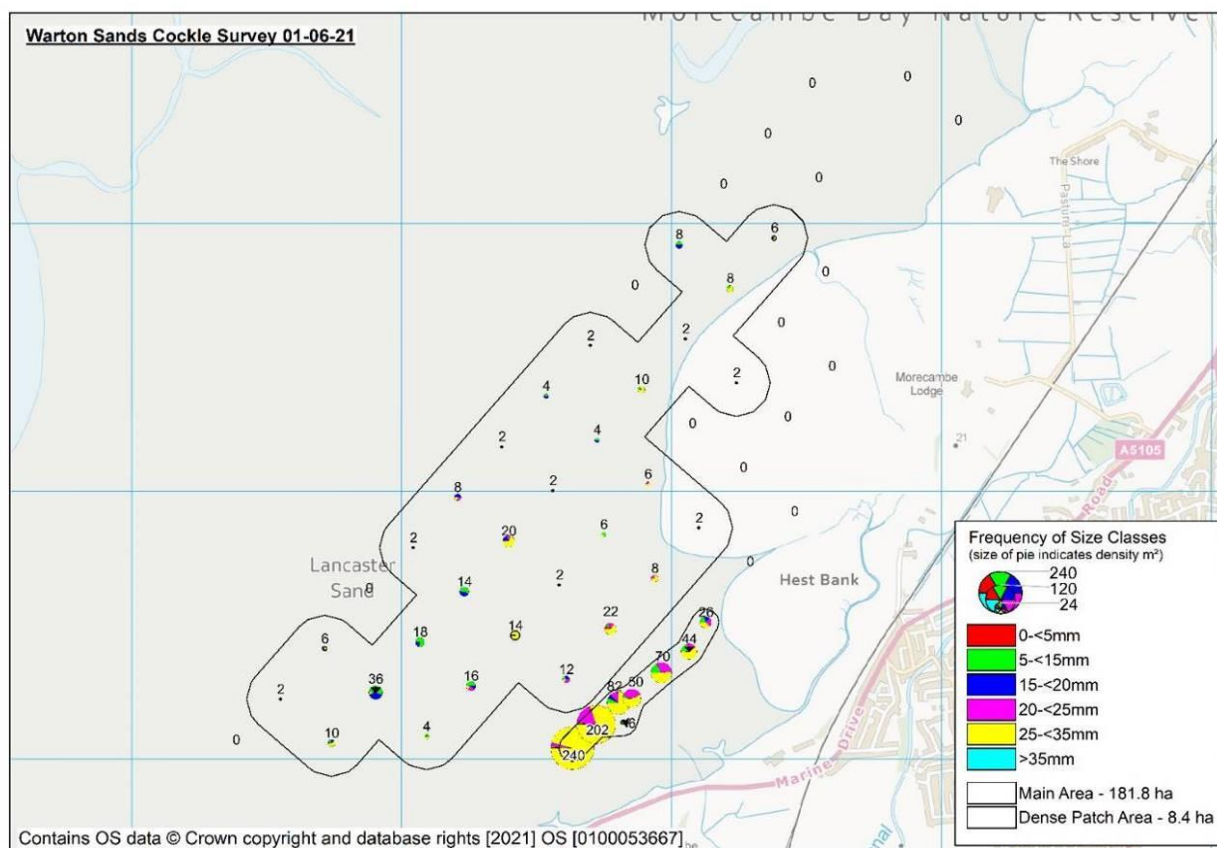
Illustration of position of Warton Sands cockle bed



Density of size cockle per m² Warton Sands June 2021



Density of undersize cockle per m² Warton Sands June 2021



Frequency of size classes of cockle per m² Warton Sands June 2021

Pilling Sands Cockle Survey 19-05-21

LW 11:25 2.9m (Liverpool tides)

Survey method - Jumbo and 0.5m² quadrat

69 stations were sampled from a 500m grid. Three additional stations were added to ensure full coverage of the cockle bed. There was a relatively low density of size cockle across much of the bed with an areas of higher density size cockle in the centre of the bed. There were low densities of undersize cockle across the majority of the bed. There were no signs of a 2021 cockle spat which is likely due to the timing of the survey.

Mean number of size cockle	17 per m²	(min 0, max 120)
Mean number of undersize cockle	5 per m²	(min 0, max 44)
Mean number of 0-5mm cockle	0 per m²	(min 0, max 0)

Biomass	Area (ha)	Size Cockle (tonnes) ¹	Undersize Cockle (tonnes) ²
Pilling Sands	1434	~2200-2300	~150-200

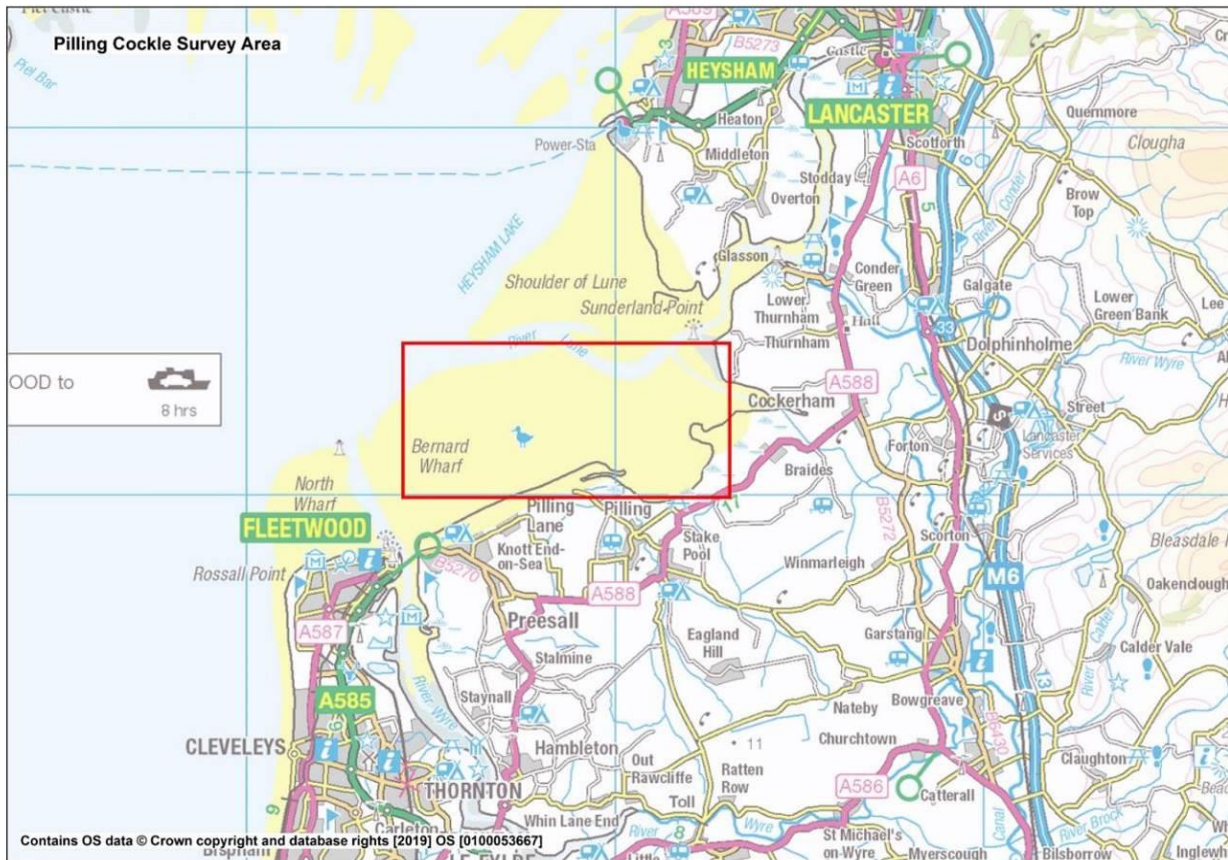
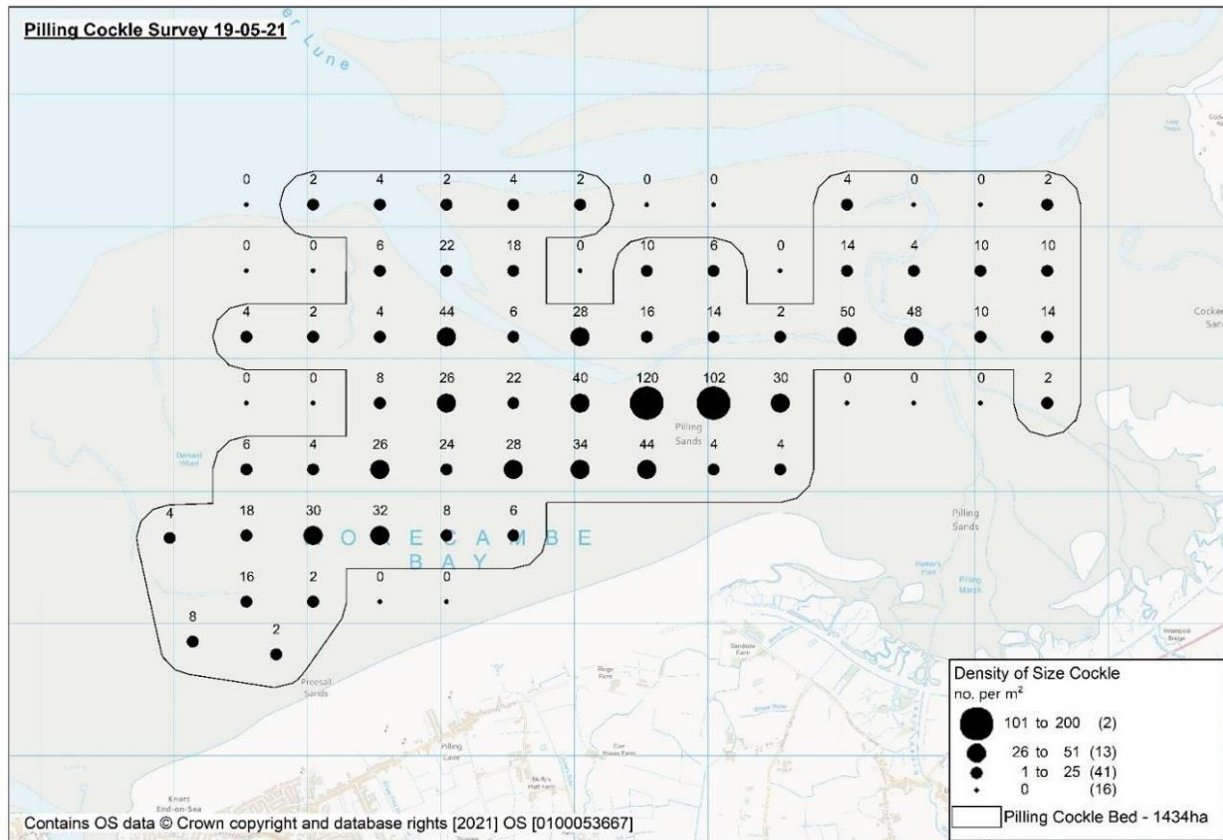
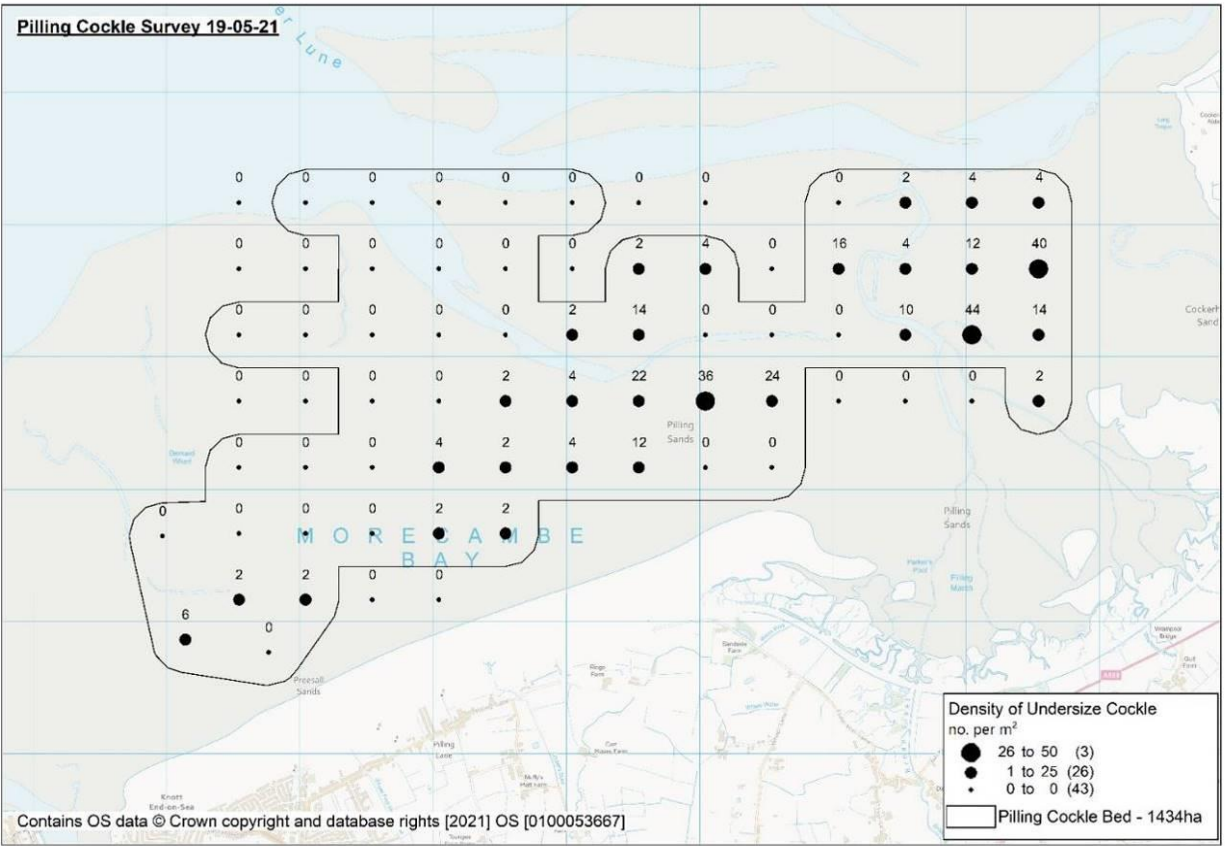


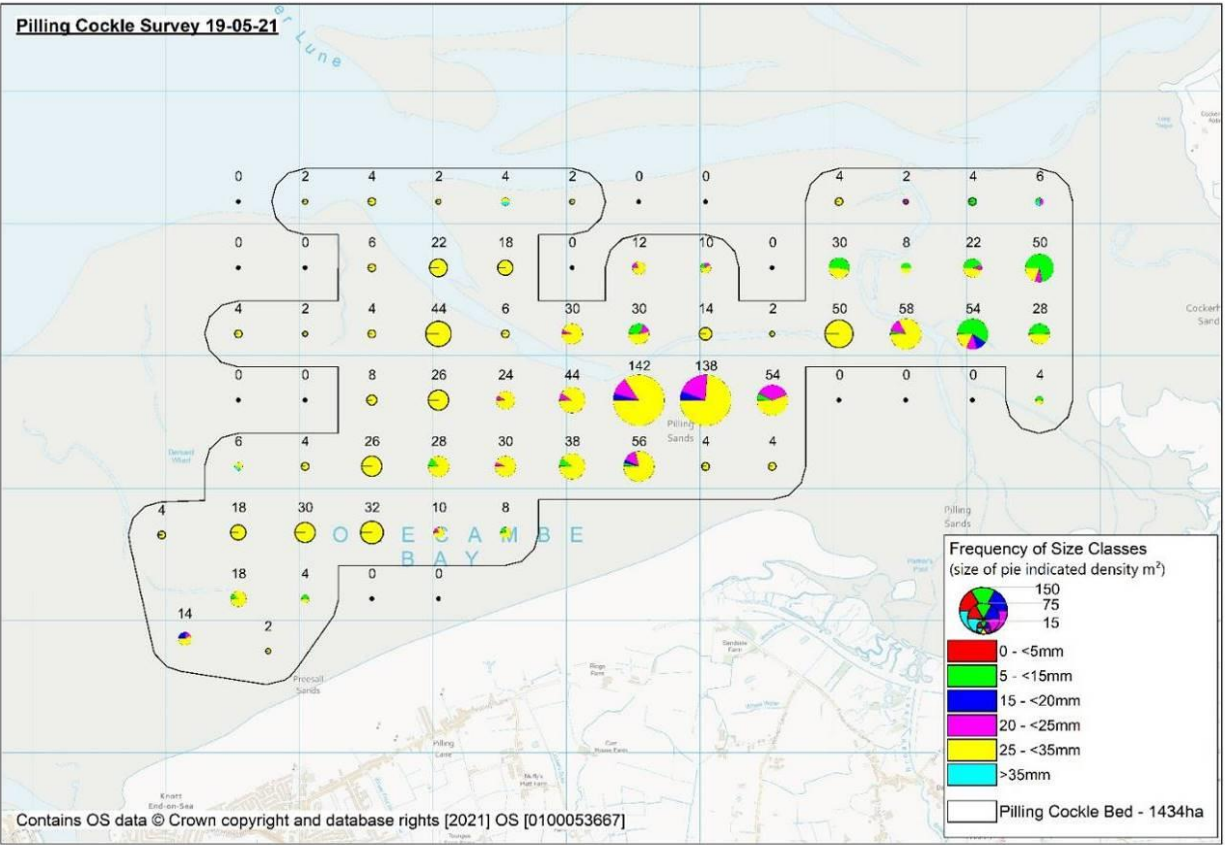
Illustration of position of Pilling Sands Survey Area



Density of size cockle per m² at Pilling Sands July 2021



Density of undersize cockle per m² at Pilling Sands July 2021



Frequency of size classes of cockle per m² at Pilling Sands July 2021

Middleton Cockle Survey 21-05-21

LW 13:54 2.6m (Liverpool tides)

Survey method - Jumbo and 0.5m² quadrat

78 stations were sampled from a 350m grid. The densities of both size and undersize cockle across the bed were relatively low. Cockle from the 0-5mm size class was only found at 3 stations which is likely due to the timing of the survey.

Mean number of size cockle	7 per m ²	(min 0, max 44)
Mean number of undersize cockle	4 per m ²	(min 0, max 22)
Mean number of 0-5mm cockle	<1 per m ²	(min 0, max 4)

Biomass	Area (ha)	Size Cockle (tonnes) ¹	Undersize Cockle (tonnes) ²
Middleton Sands	601	~400-450	~40-55

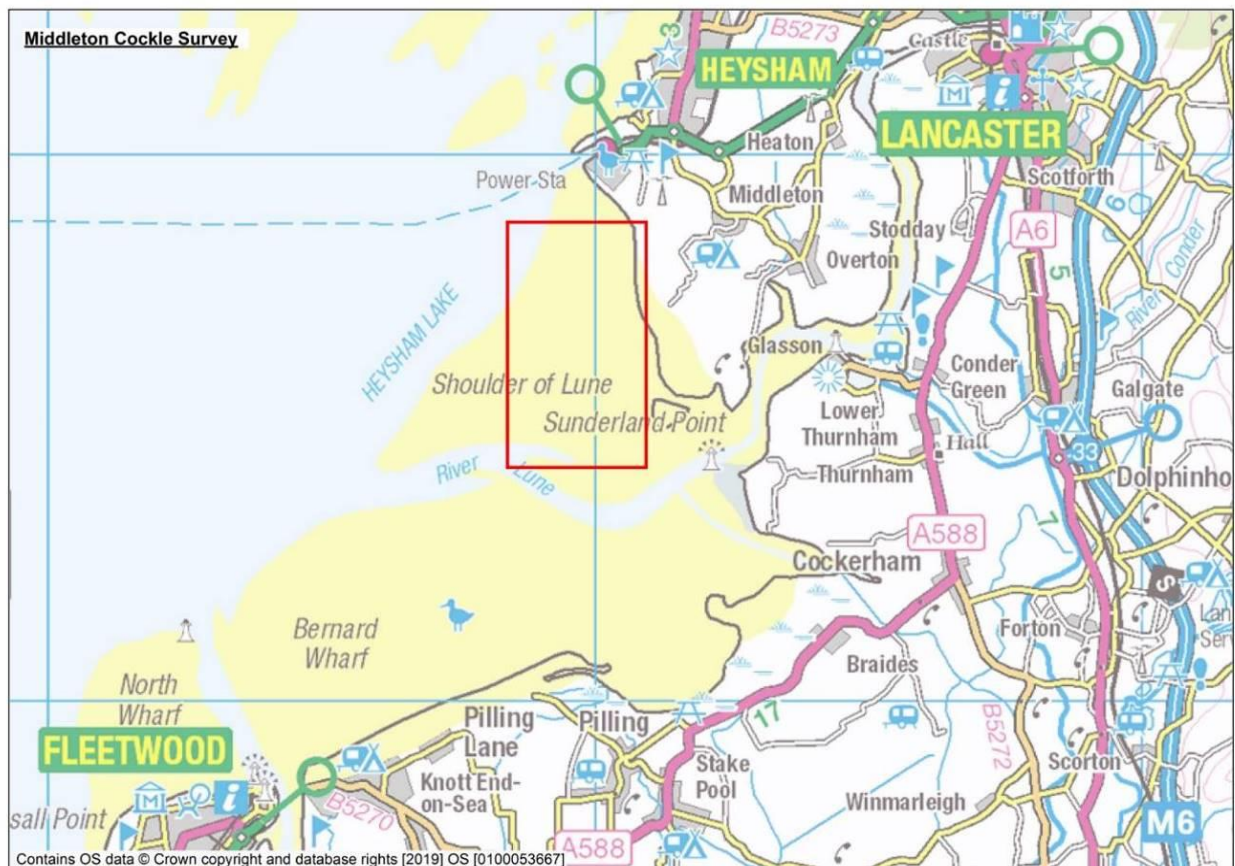
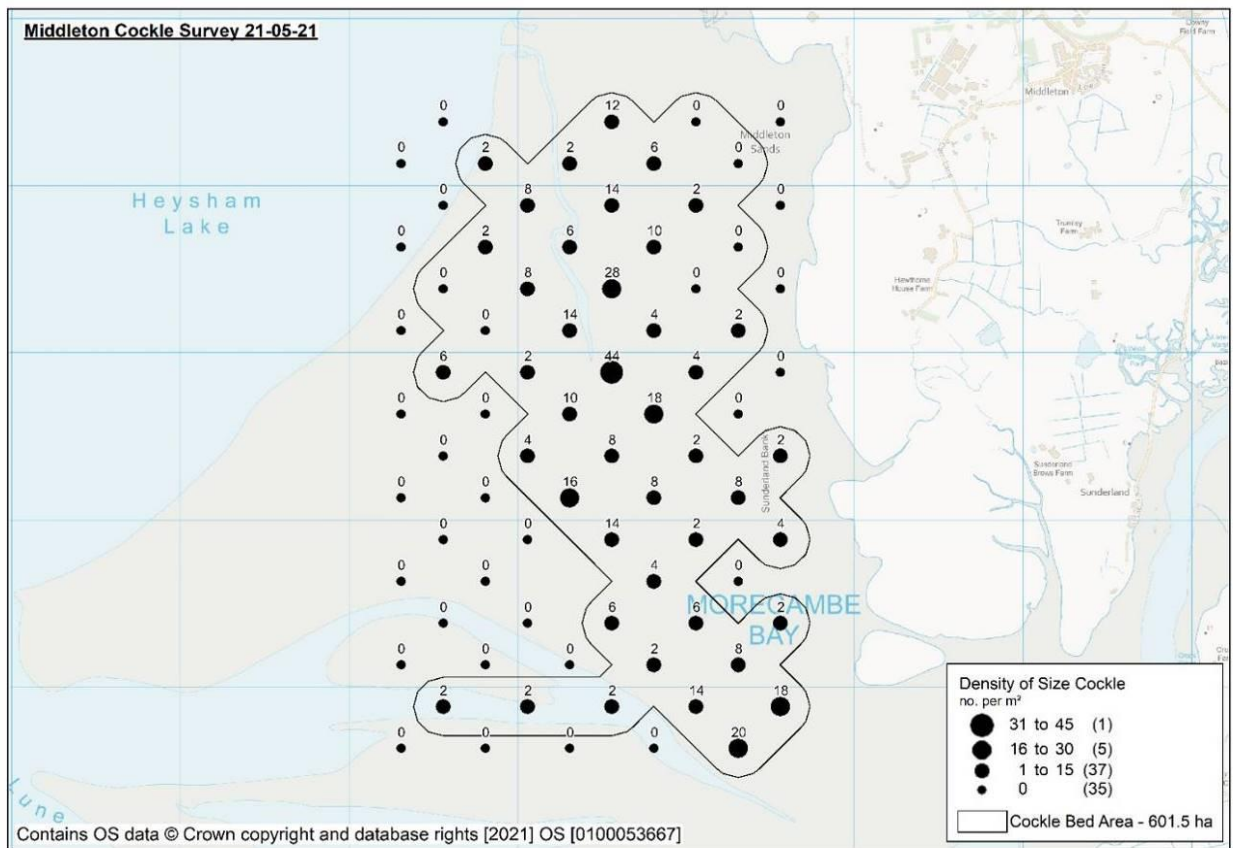
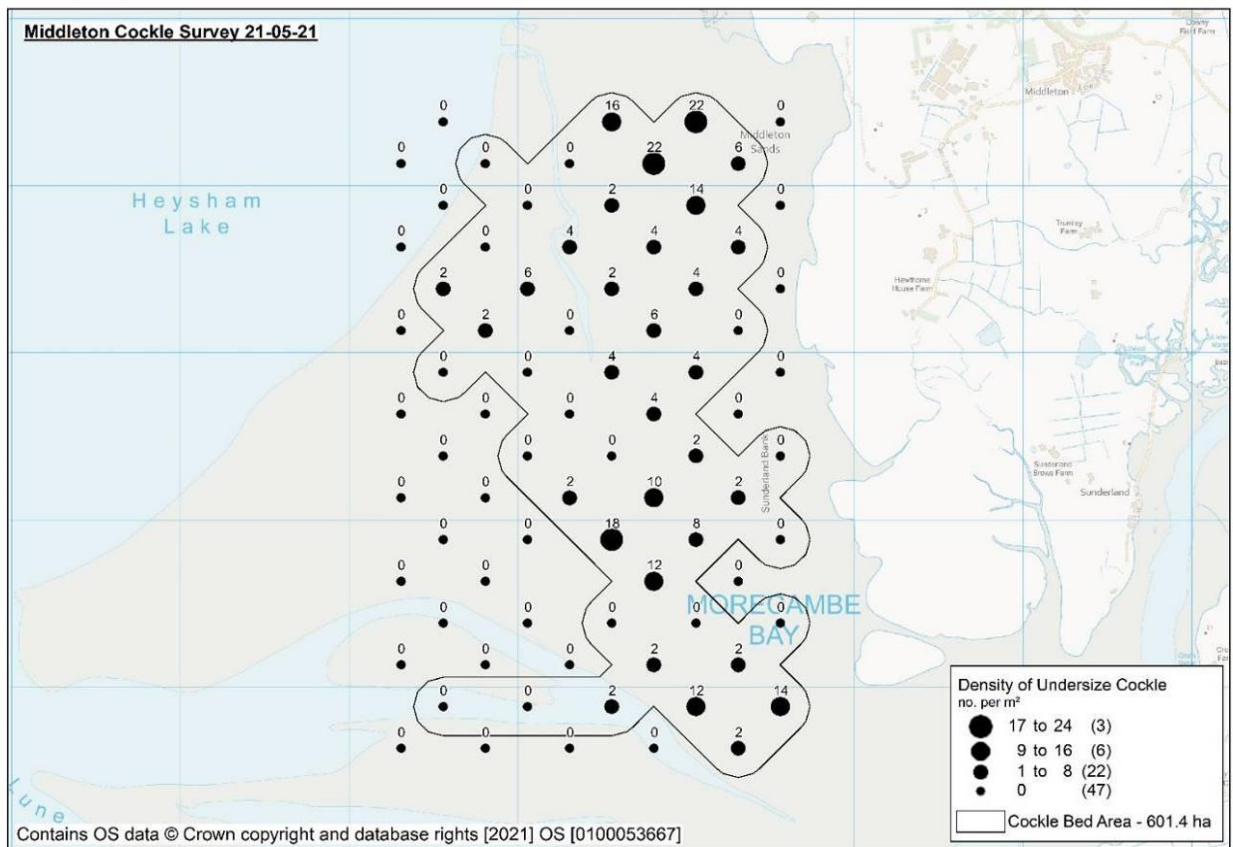


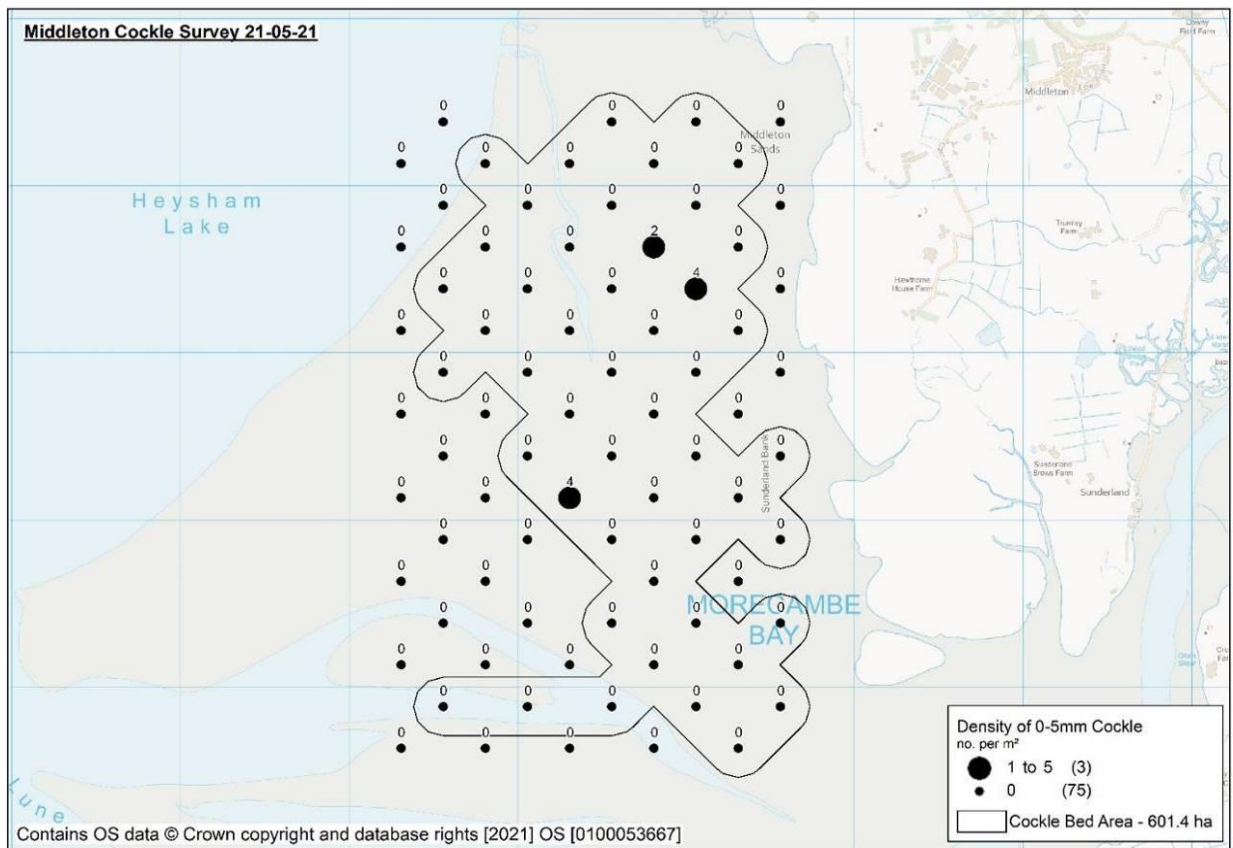
Illustration of position of Middleton Sands cockle bed



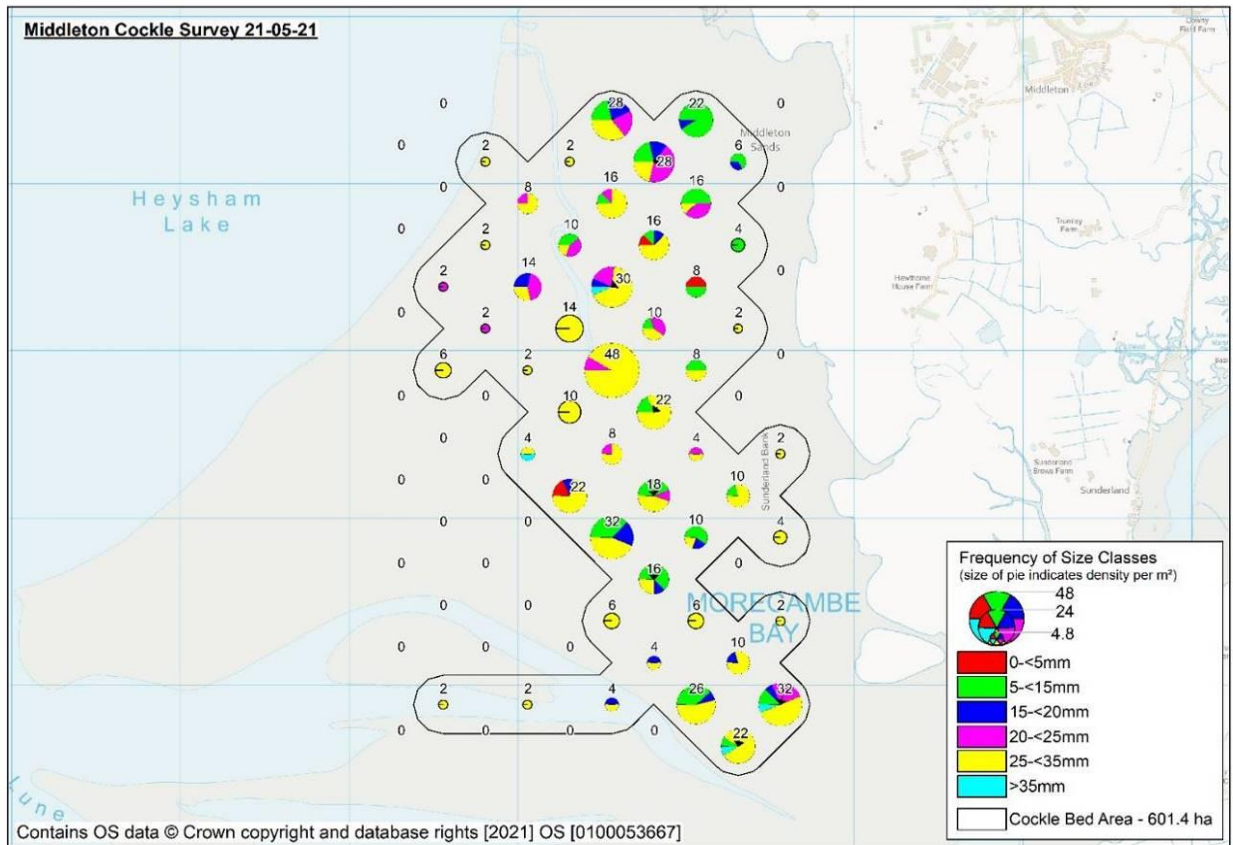
Density of size cockle per m² Middleton Sands May 2021



Density of undersize cockle per m² Middleton Sands May 2021



Density of 0-5mm cockle per m² on Middleton Sands May 2021



Frequency of size classes of cockle per m² Middleton Sands May 2021