Middleton Cockle Survey 20th and 25th July 2023

Officers present:	MT, AG, JH, MC		
Tides:	20-07-23	LW 20:08	2.2m (Liverpool tides)
	25-07-22	LW 11:04	2.7m (Liverpool tides)

Survey method - Jumbo and 0.5m^2 quadrat

78 stations were sampled from a 350m grid. There was a wide range of cockle sizes across the bed from < 5mm to 35mm. Size cockle is relatively low in density but present across most of the bed. There is evidence of a 2023 cockle settlement across a number of survey stations.

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	8 per m²	(min 0, max 42)
Mean number of undersize cockle	24 per m²	(min 0, max 212)
Mean number of 0-5mm cockle	29 per m²	(min 0, max 300)
Mean weight of size cockle kg/m²	0.064 kg/m²	(min 0, max 0.250)
Mean number of undersize cockle kg/m²	0.043 kg/m²	(min 0, max 0.173)

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]
Middleton Sands	**732**	**475**	**325**

[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.

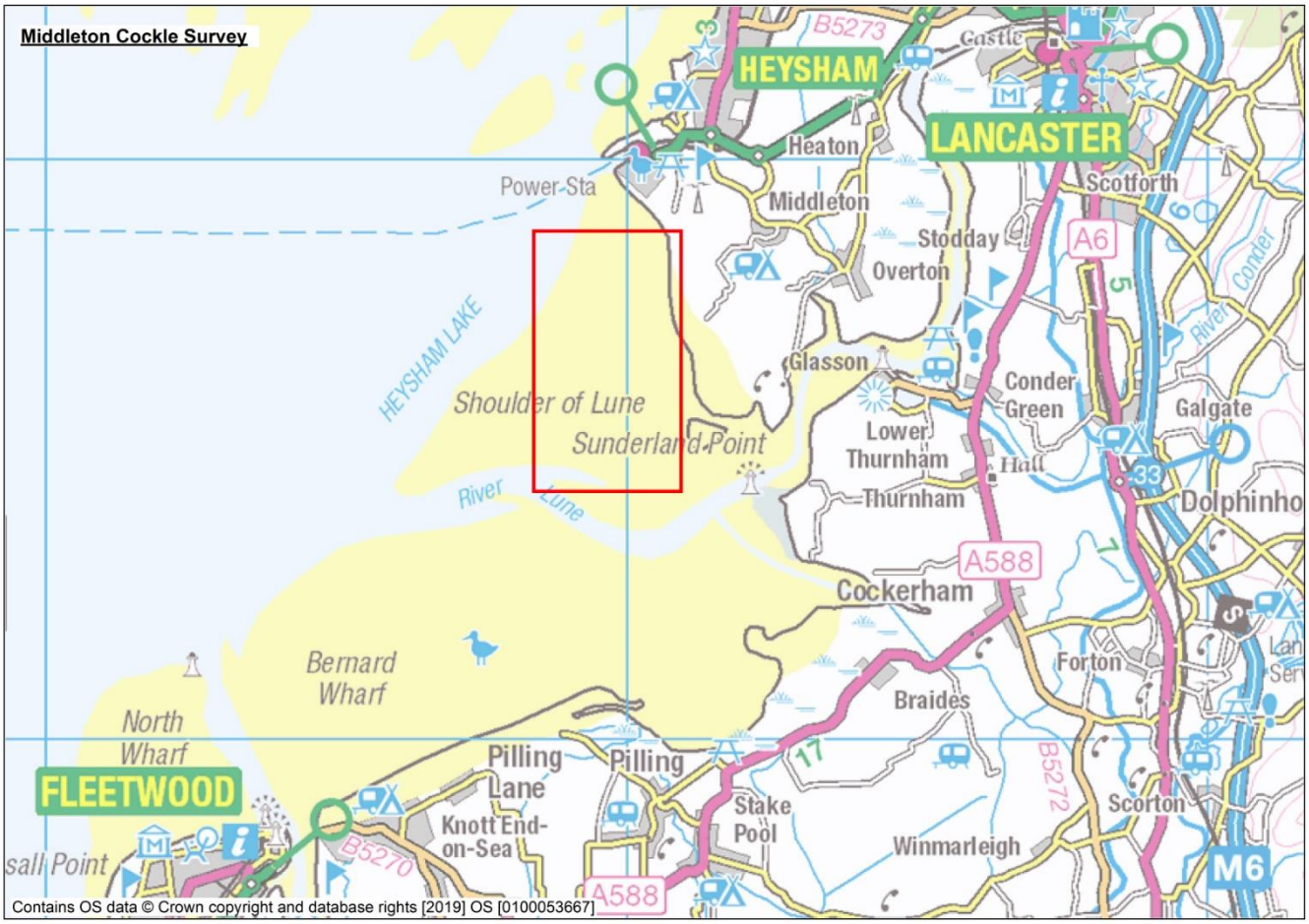

Figure 1. Illustration of position of Middleton Sands cockle bed

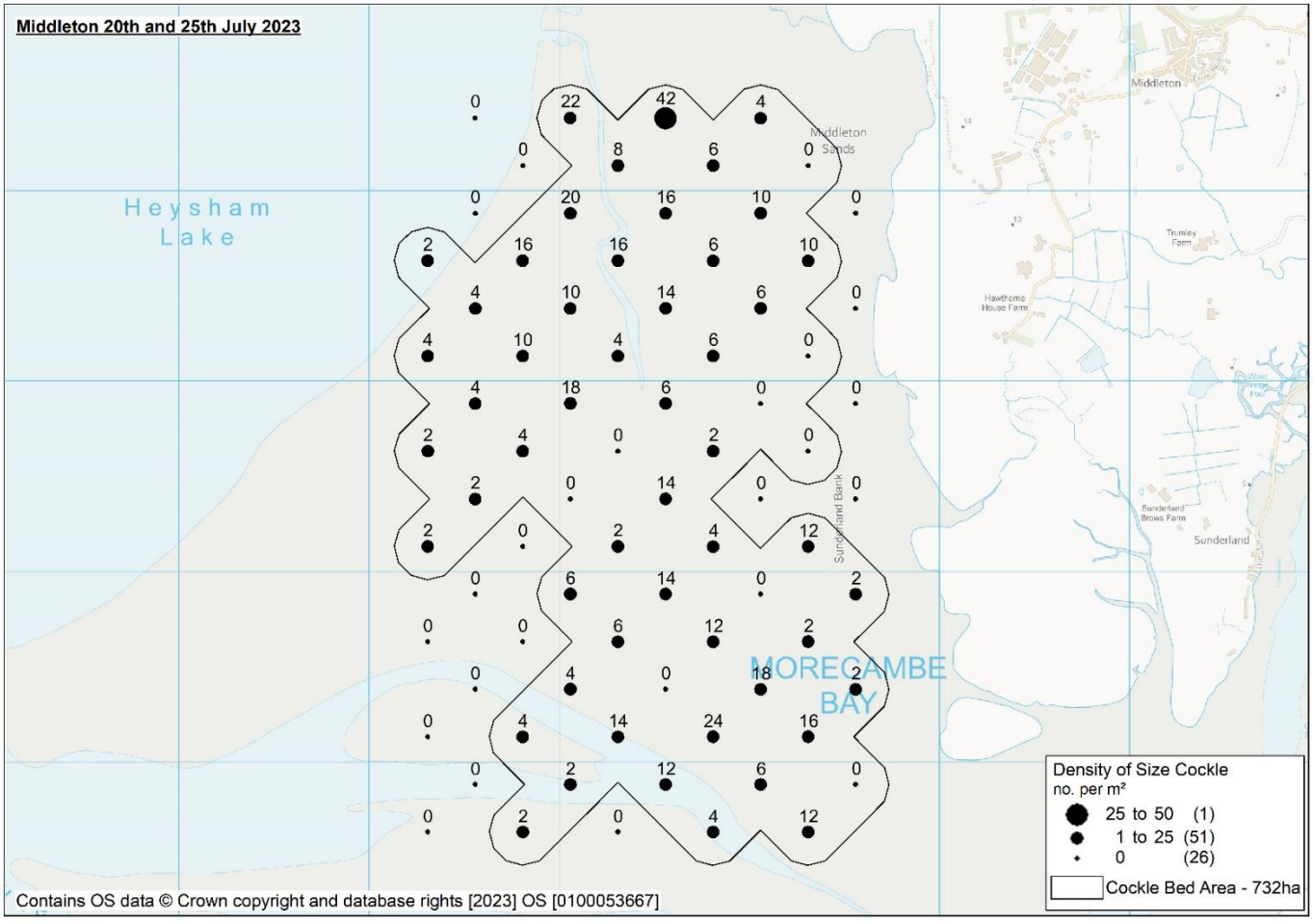

Figure 2. Density of size cockle per m² Middleton Sands July 2023

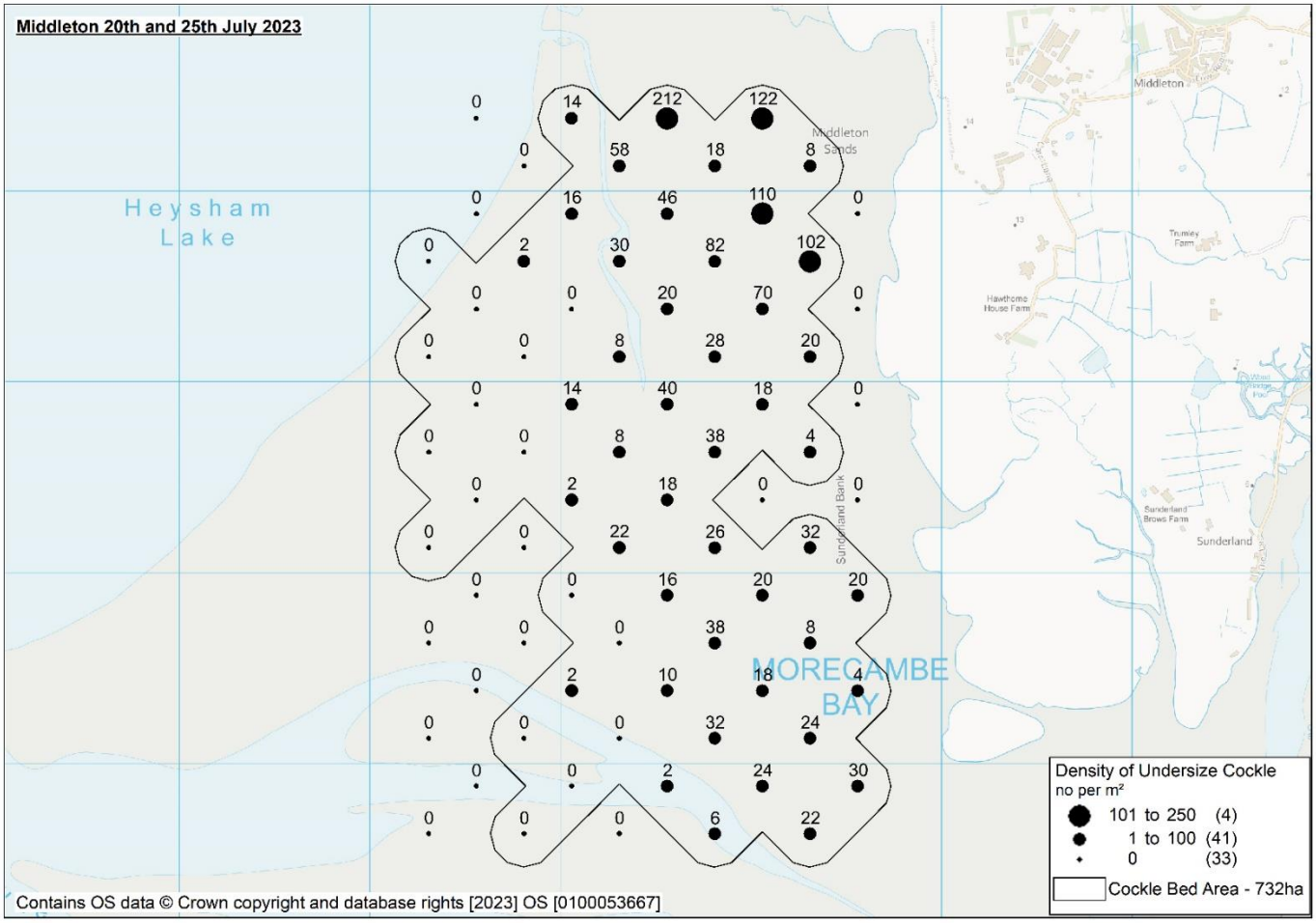

Figure 3. Density of undersize cockle per m² Middleton Sands July 2023

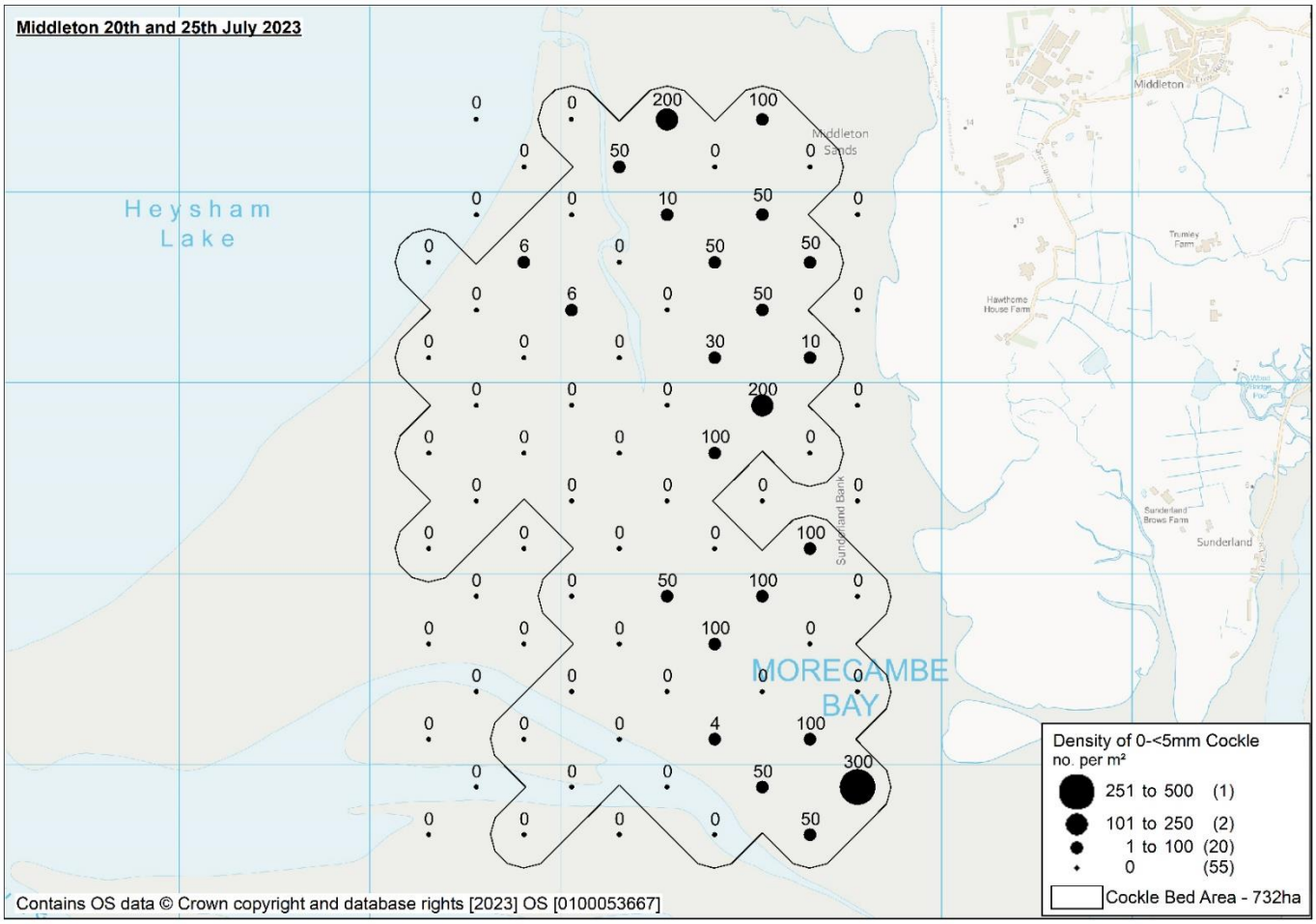

Figure 4. Density of 0-5mm cockle per m² on Middleton Sands July 2023

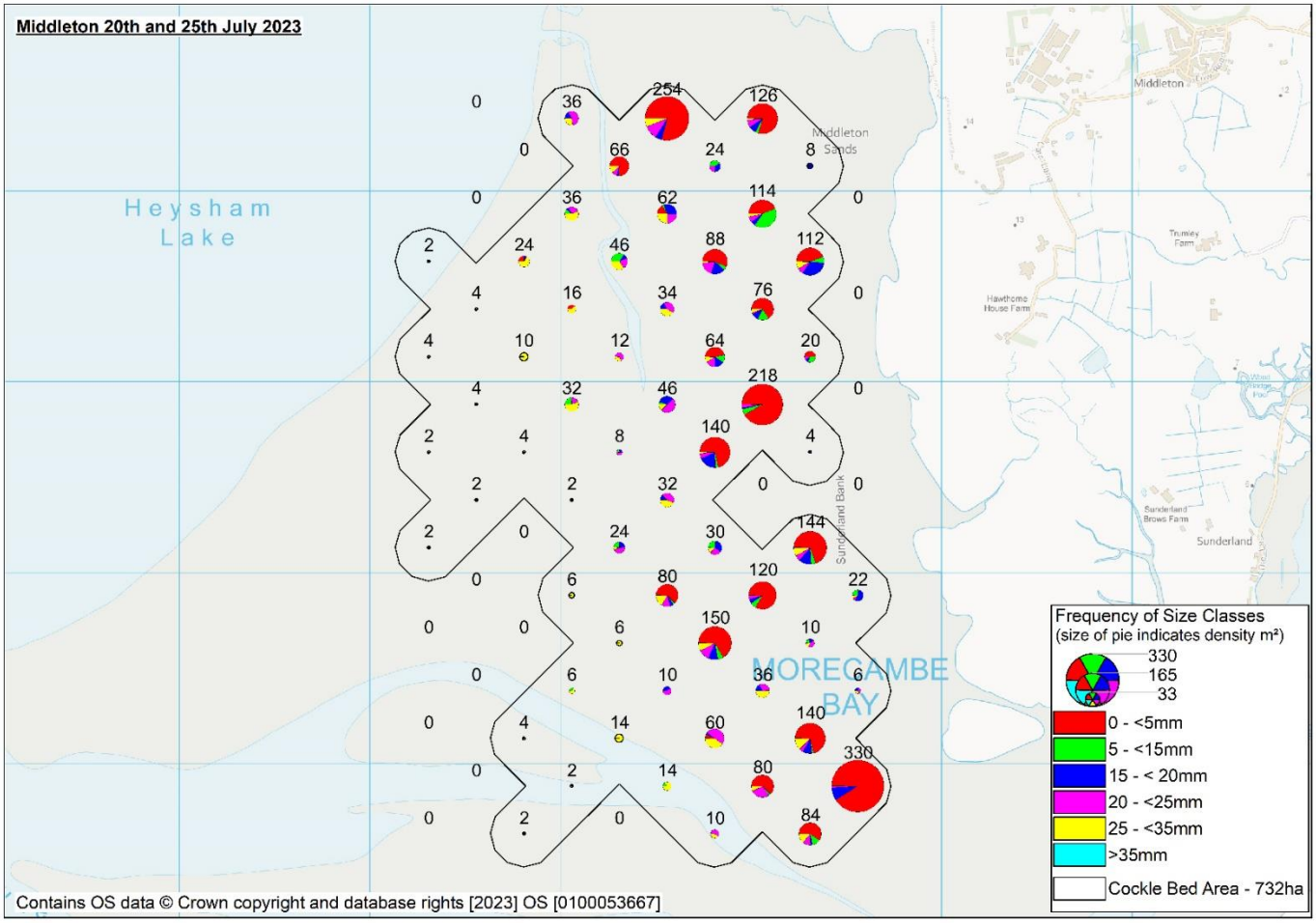

Figure 5. Frequency of size classes of cockle per m² Middleton Sands July 2023

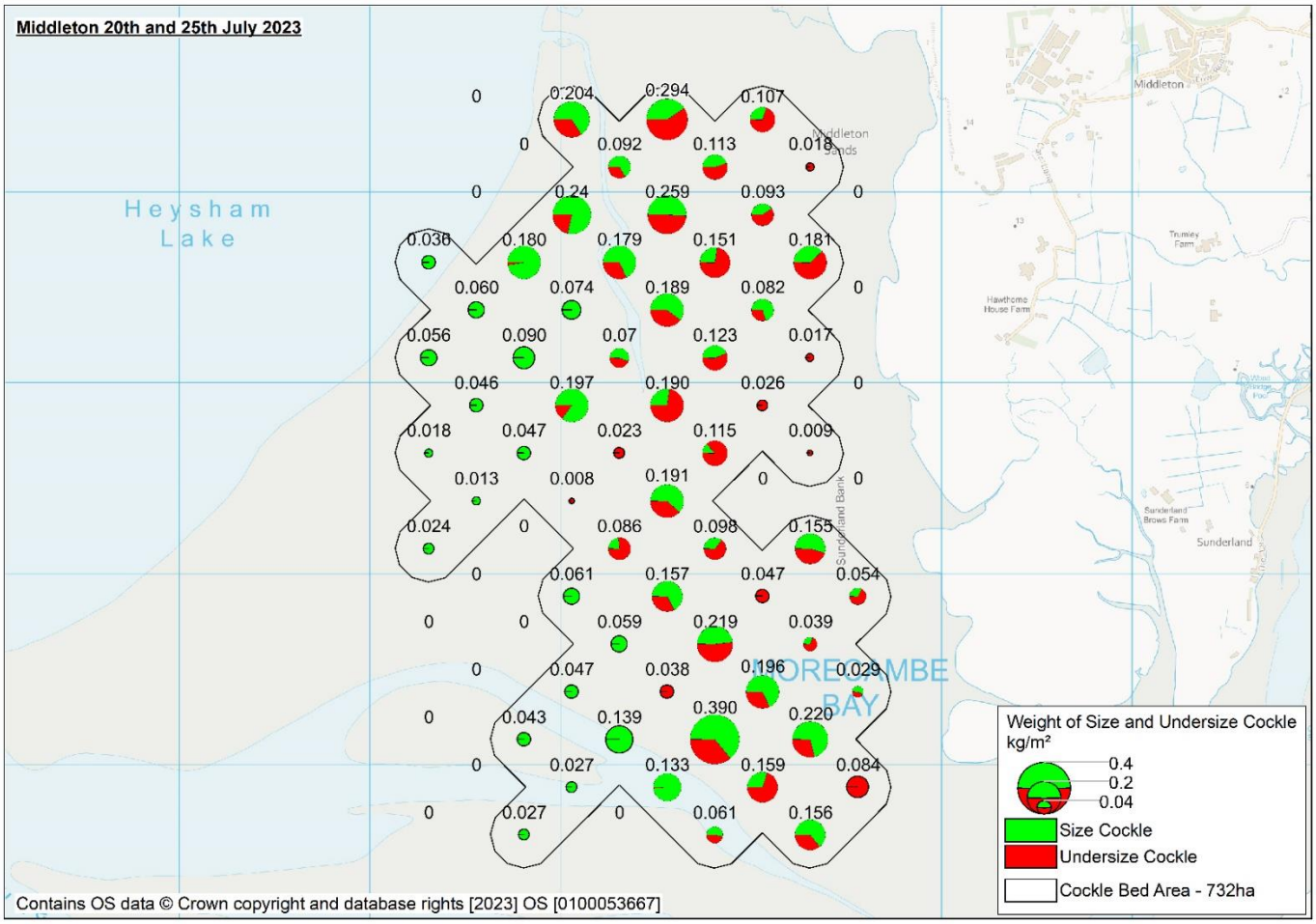

Figure 6. Weight of size and undersize cockle kg/m² at Middleton Sands July 2023.