Annex A NWIFCA Cockle and Mussel Survey Report June 2019

For all surveys:

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.

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).

For biomass calculations - size cockle is defined as cockle which will not pass through a square gauge 20 x 20mm in size. 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.

Middleton Cockle Survey 05-06-19

Tides: LW 07:52 1.2m (Liverpool tides)

Survey method - Jumbo and 0.5m^2 quadrat

49 stations were sampled from a 250m grid. 4 additional stations were added to ensure full coverage. The density of size cockle across the bed was relatively low and the small area of high density size cockle in 2018 was no longer present. Some undersize cockle persisted from last year but not in significant densities. There were no signs of a 2019 cockle settlement but this is to be expected due to the time of year.

Mean number of size cockle	7 per m²	(min 0, max 52)
Mean number of undersize cockle	17 per m²	(min 0, max 142)
Mean number of 0-5mm cockle	0 per m²	(min 0, max 0)

	Area (ha)	Size Cockle (tonnes)[1]	Undersize Cockle (tonnes)
Middleton Sands	**461**	**~300-350**	**~80-100**

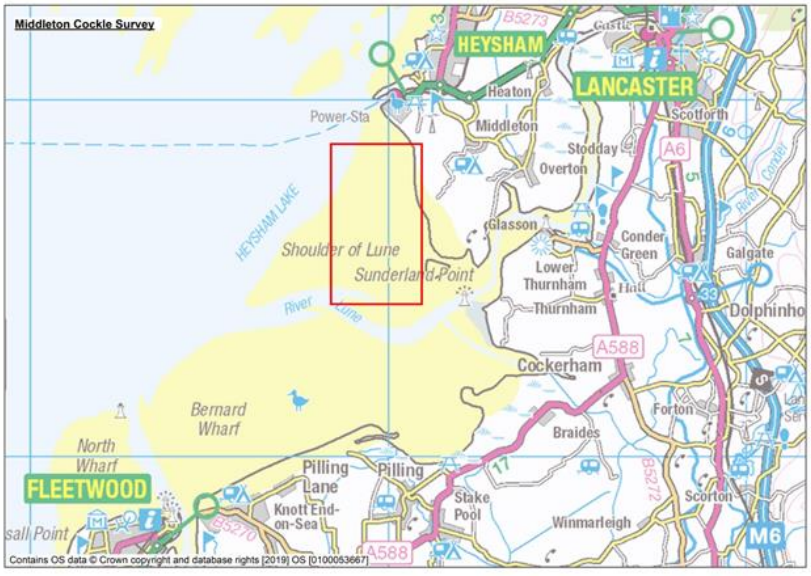
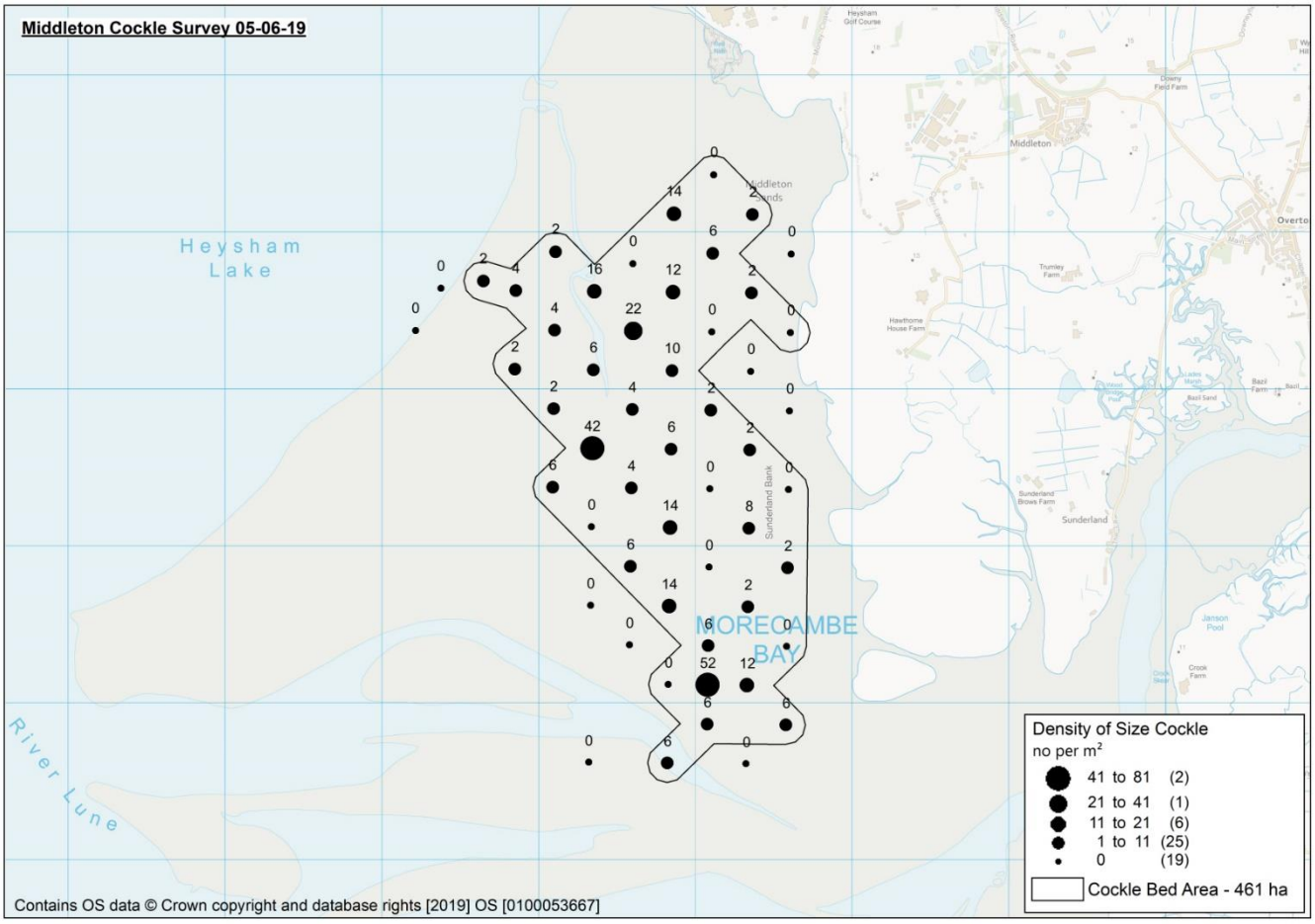
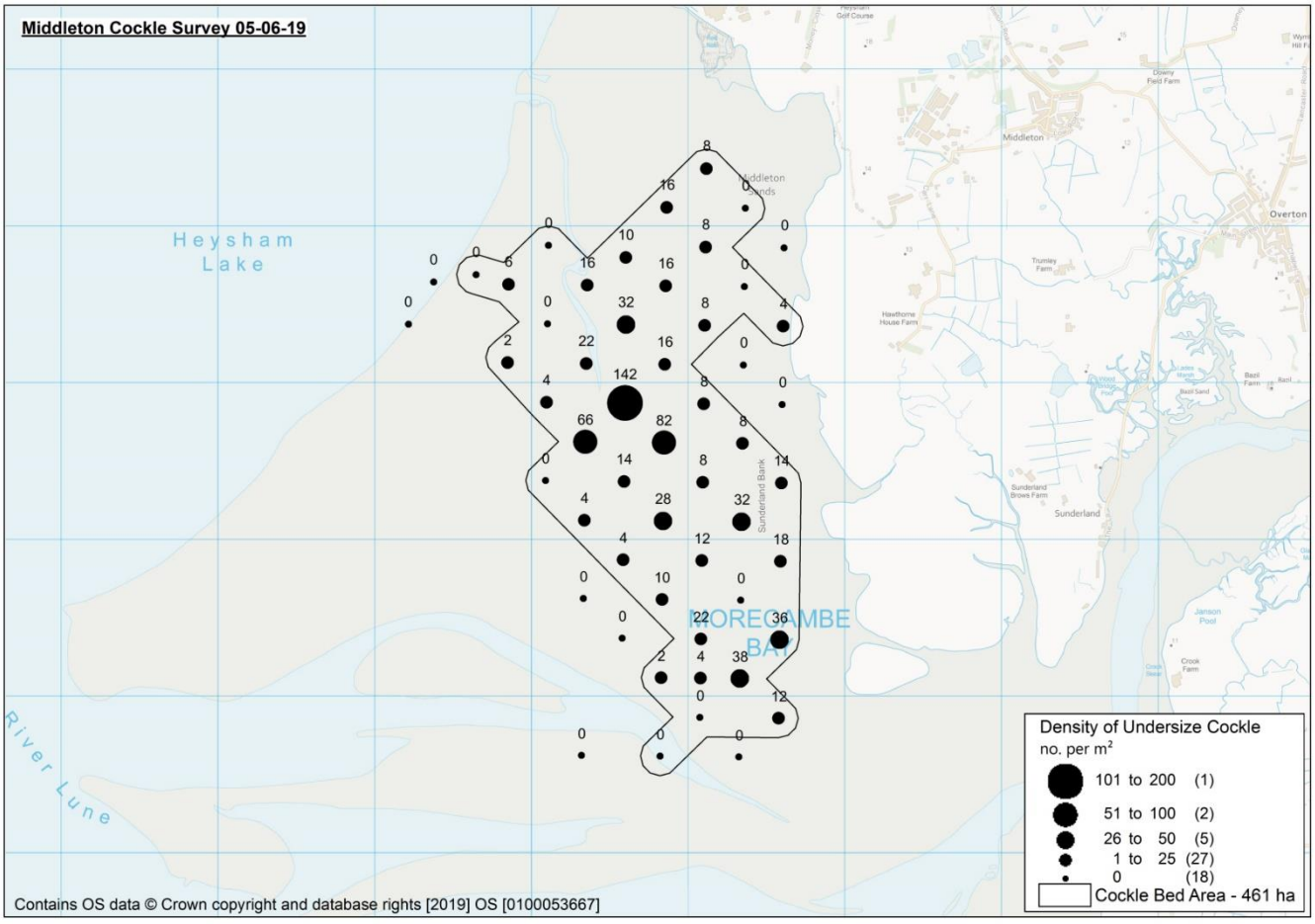


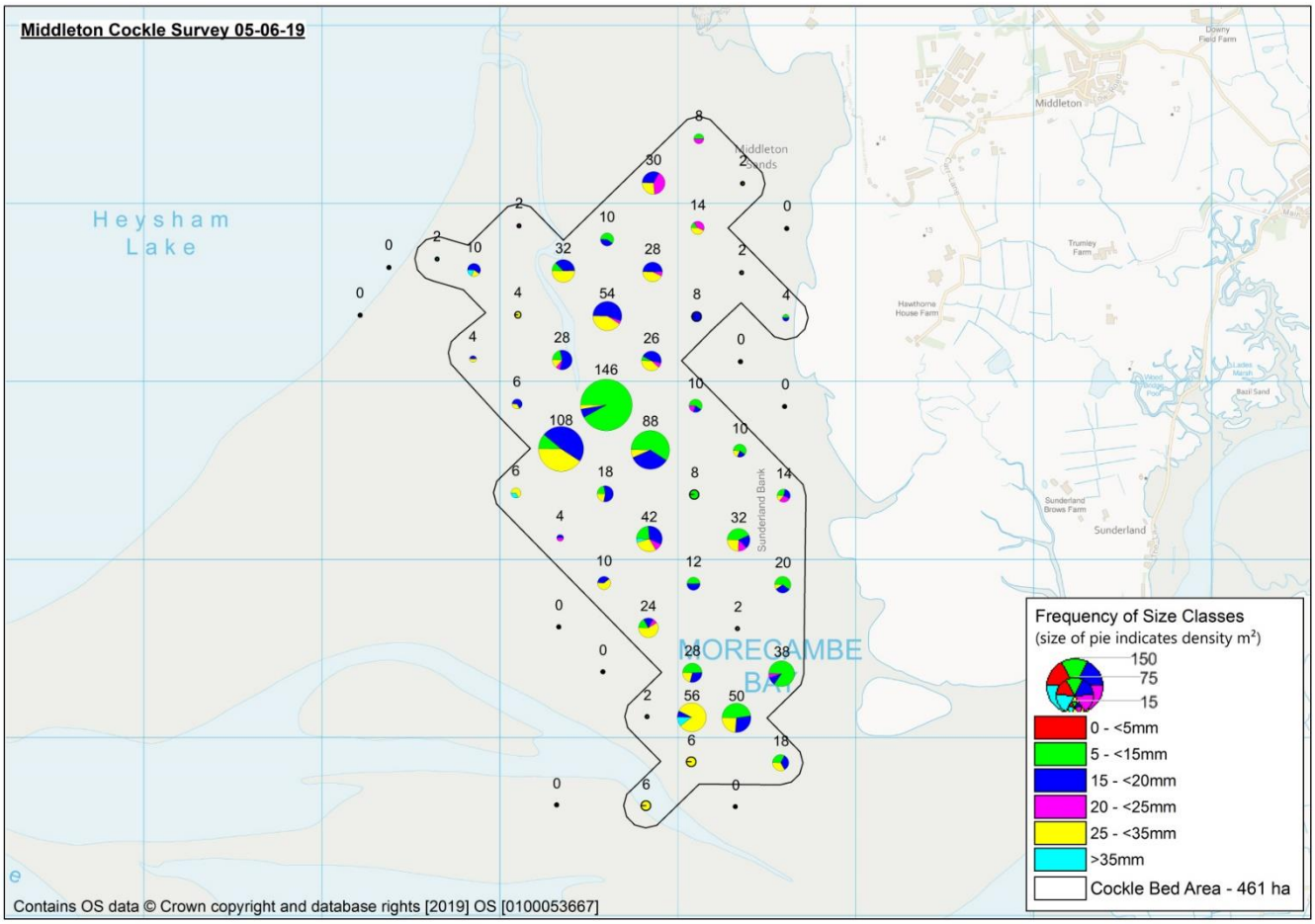
Illustration of position of Middleton Sands cockle bed



Density of size cockle per m² Middleton Sands June 2019



Density of undersize cockle per m² Middleton Sands June 2019



Frequency of size classes of cockle per m² Middleton Sands June 2019

Warton Sands Cockle Survey 06-06-19

Tides: LW 08:35 1.2m (Liverpool tides)

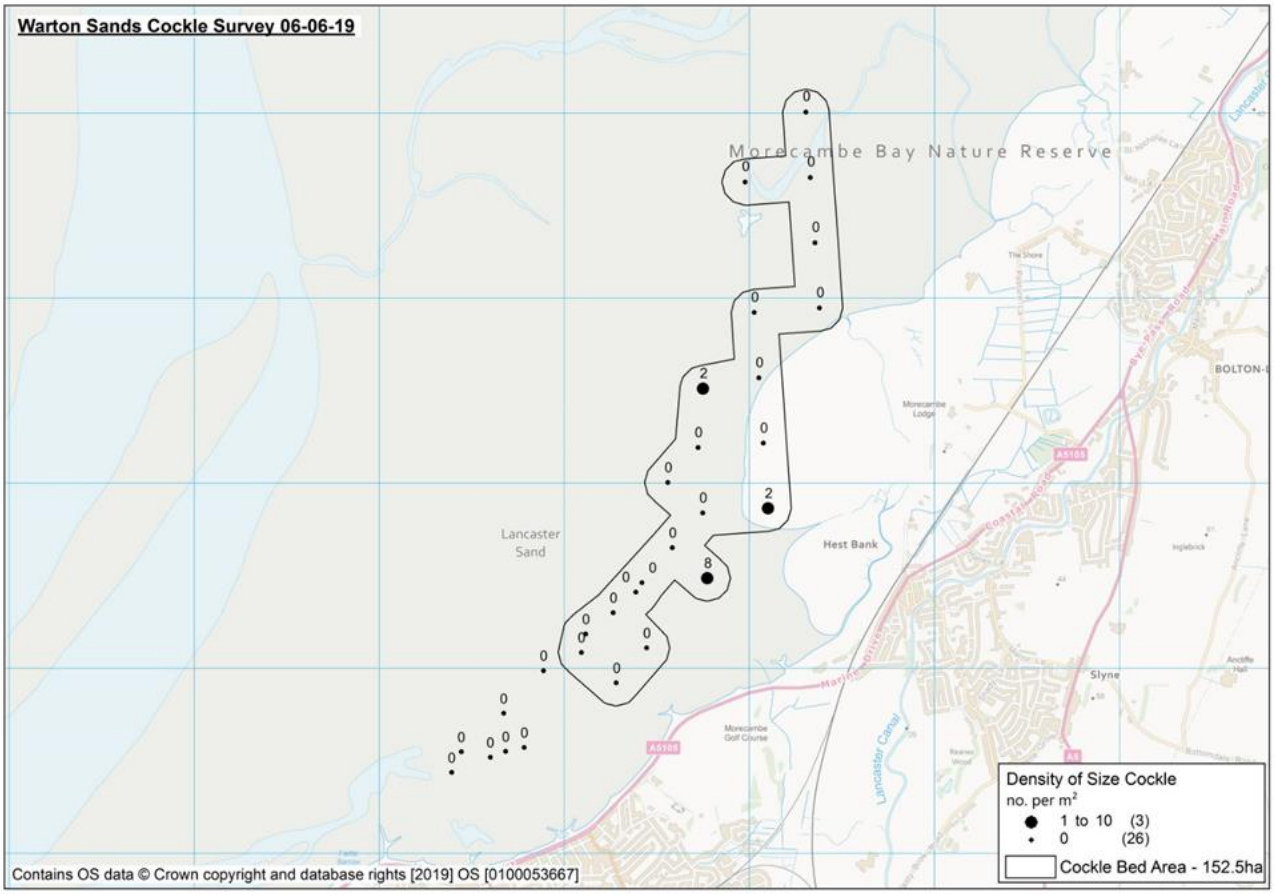
Survey method - Jumbo and 0.5m² or 0.1m² quadrat and sieve depending on cockle densities.

19 survey stations were sampled from a 250m grid with an additional 10 stations added to areas which could be accessed. Due to channels and very soft ground many of the survey stations from the grid could not be sampled. The density of size cockle across the bed was very low with only a couple of stations containing size cockle. There was a muddy band running parallel with the shore that contained a significant amount of undersize cockle in the 15-20mm size class. There were no signs of a 2019 cockle settlement but this is to be expected due to the time of year. There was a small area in the south of the survey area across a channel that contained low numbers of cockle but because it was only in low densities and away from the main area it has not been included in the means or biomass figures.

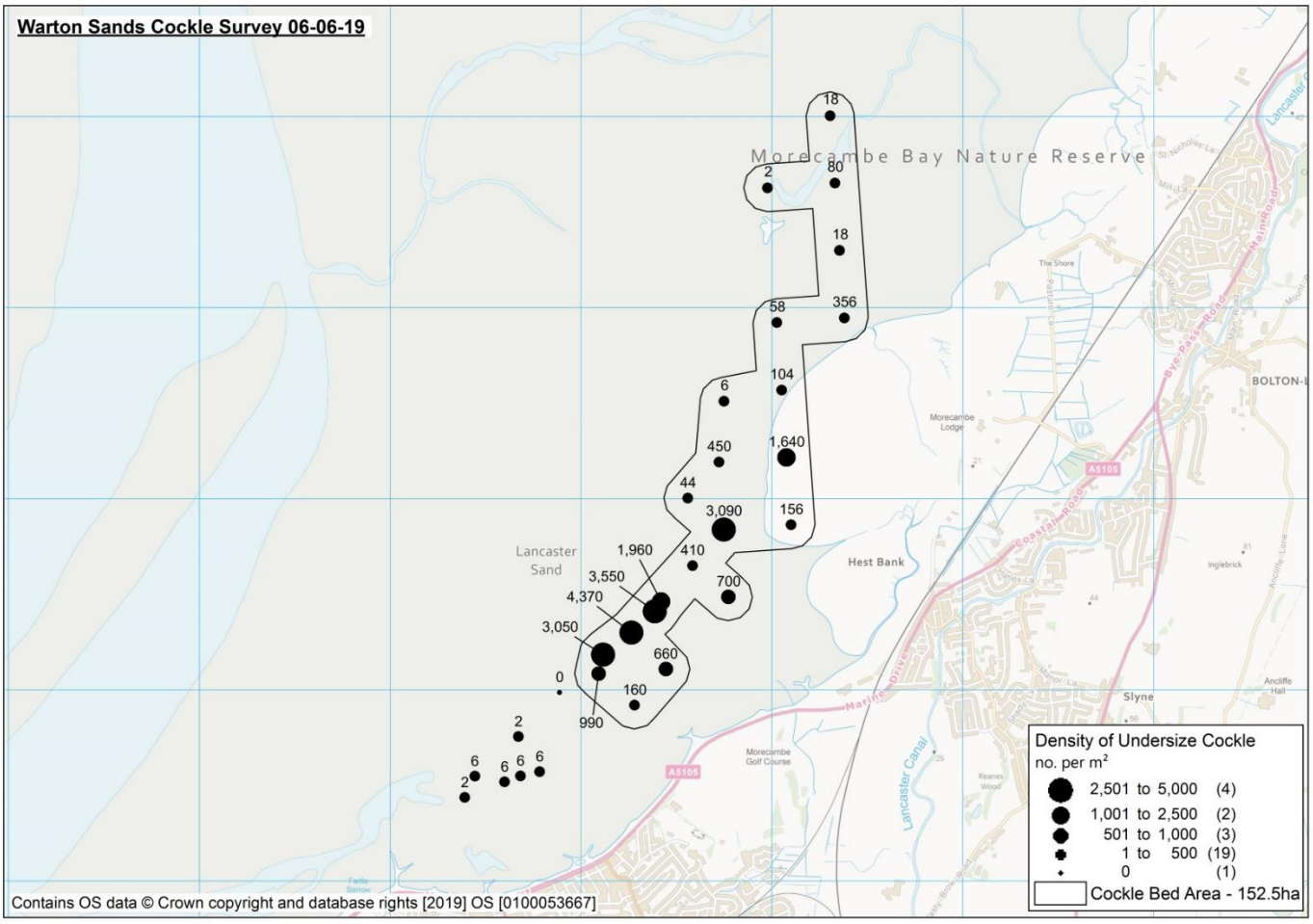
Mean number of size cockle	<1 per m²	(min 0, max 8)
Mean number of undersize cockle	994 per m²	(min 2, max 4370)
Mean number of 0-5mm cockle	0 per m²	(min 0, max 0)

	Area (ha)	Size Cockle (tonnes)[1]	Undersize Cockle (tonnes)
Warton Sands Dense Area	**152.5**	**<10**	**~2300**

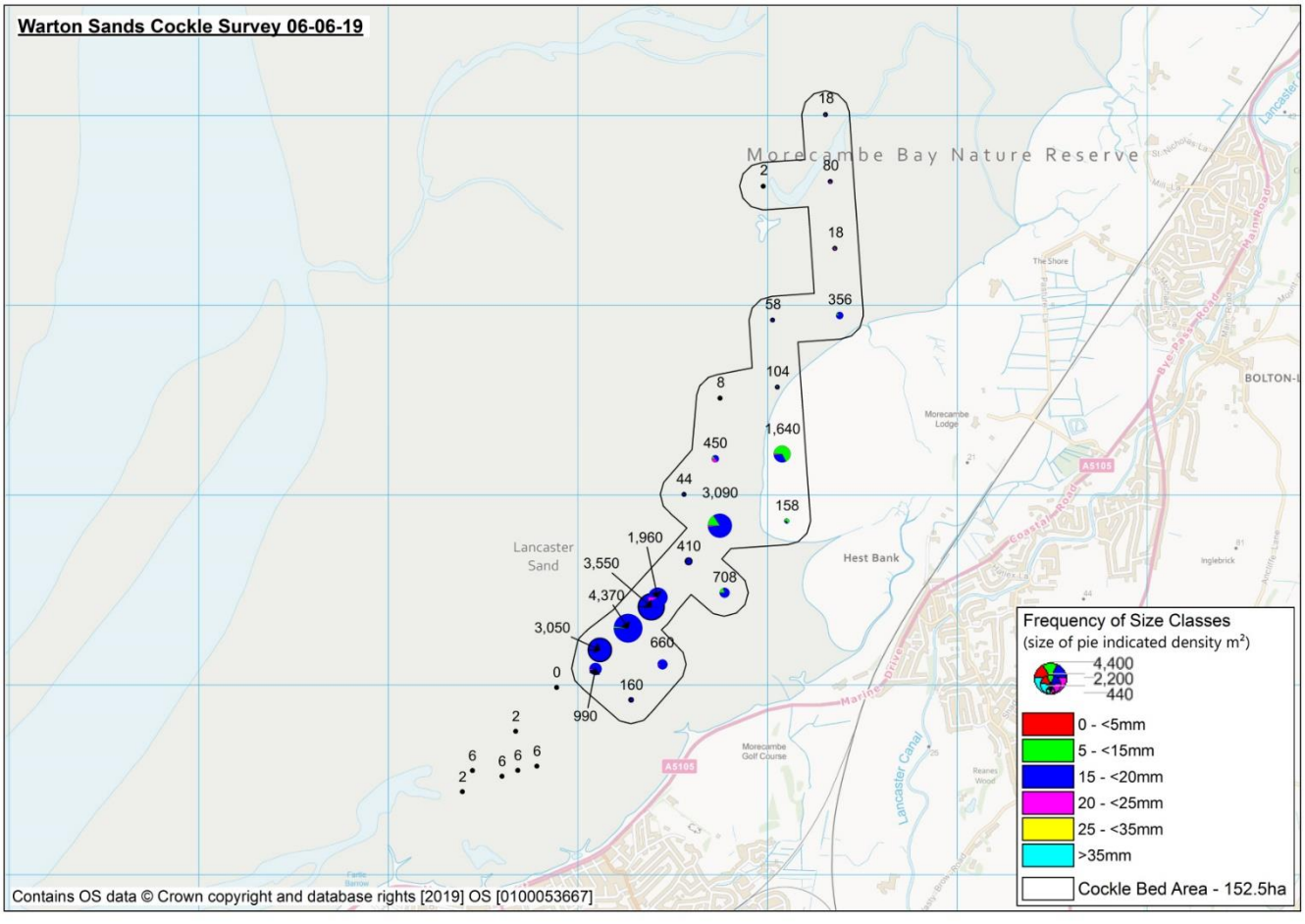
Illustration of position of Warton Sands cockle bed



Density of size cockle per m² Warton Sands June 2019



Density of undersize cockle per m² Warton Sands June 2019



Frequency of size classes of cockle per m² Warton Sands June 2019

Image of the extent of the muddy area where the cockles are concentrated - Warton Sands June 2019

Image of the extent of the muddy area where the cockles are concentrated - Warton Sands June 2019

Image of 15-20mm cockles from a 0.1m² quadrat - Warton Sands June 2019

Leasowe Cockle Survey 07-06-19

Tides: LW 09:20 1.3m (Liverpool tides)

Survey method - Jumbo and 0.5m² or 0.1m² quadrat and sieve depending on cockle densities.

46 survey stations were sampled from a 250m grid with an additional 6 stations added to areas that could not be accessed. Due to very soft ground and the location of the tide at low water several of the survey stations from the grid could not be sampled. The density of size cockle across the bed appeared lower than when last inspected early in 2019, and was situated higher up the beach in a band running along the bed on the upper shore as well as in the muddy area between the groynes. The undersize cockle was distributed more widely across the bed, although with the greatest densities on the upper shore and in the muddy area between the groynes. There were no signs of a 2019 cockle settlement but this is to be expected due to the time of year. A flock of ~30-50 oystercatchers were observed feeding on the bed during the survey.

Mean number of size cockle	9 per m²	(min 0, max 30)
Mean number of undersize cockle	74 per m²	(min 0, max 350)
Mean number of 0-5mm cockle	0 per m²	(min 0, max 0)

	Area (ha)	Size Cockle (tonnes)[1]	Undersize Cockle (tonnes)
Leasowe	**210.8**	**~310-340**	**~400**

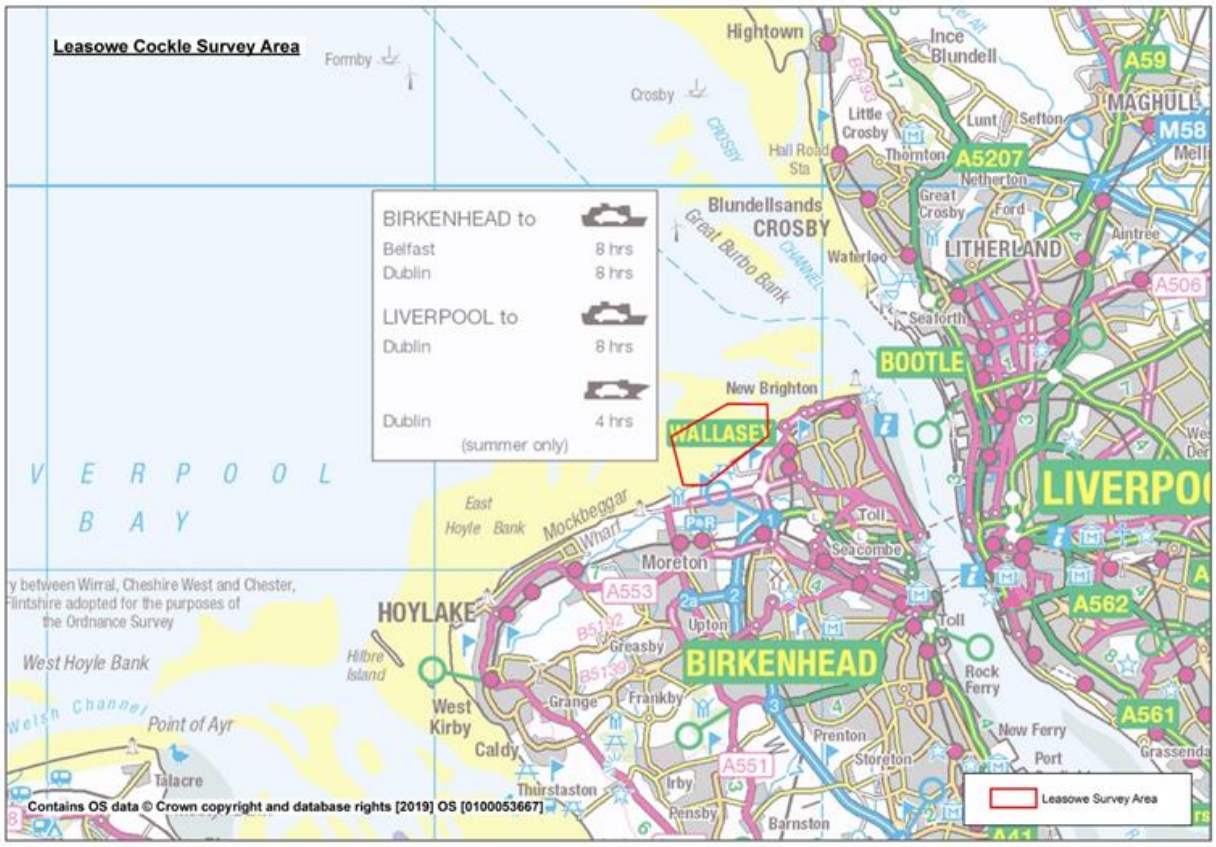
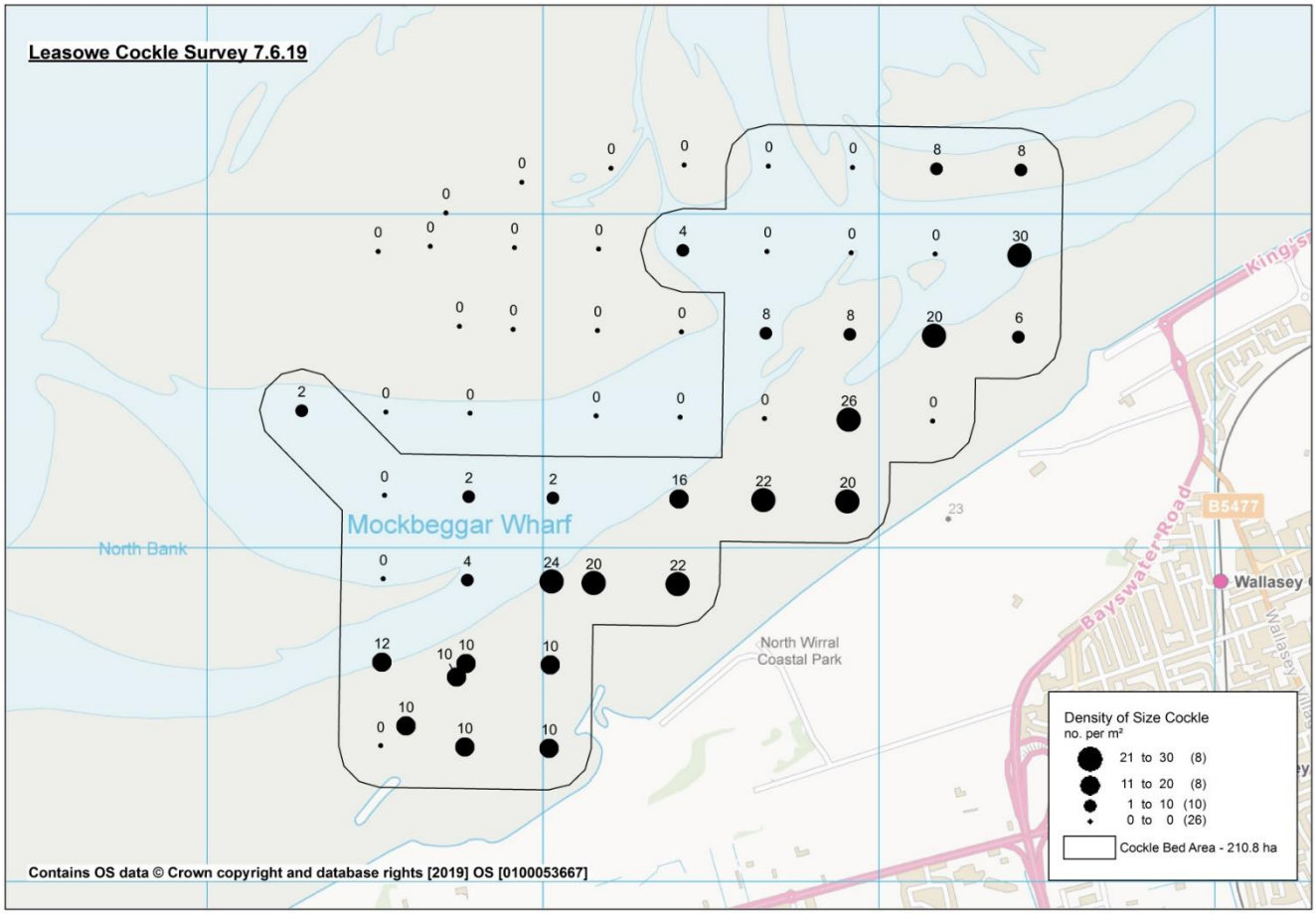
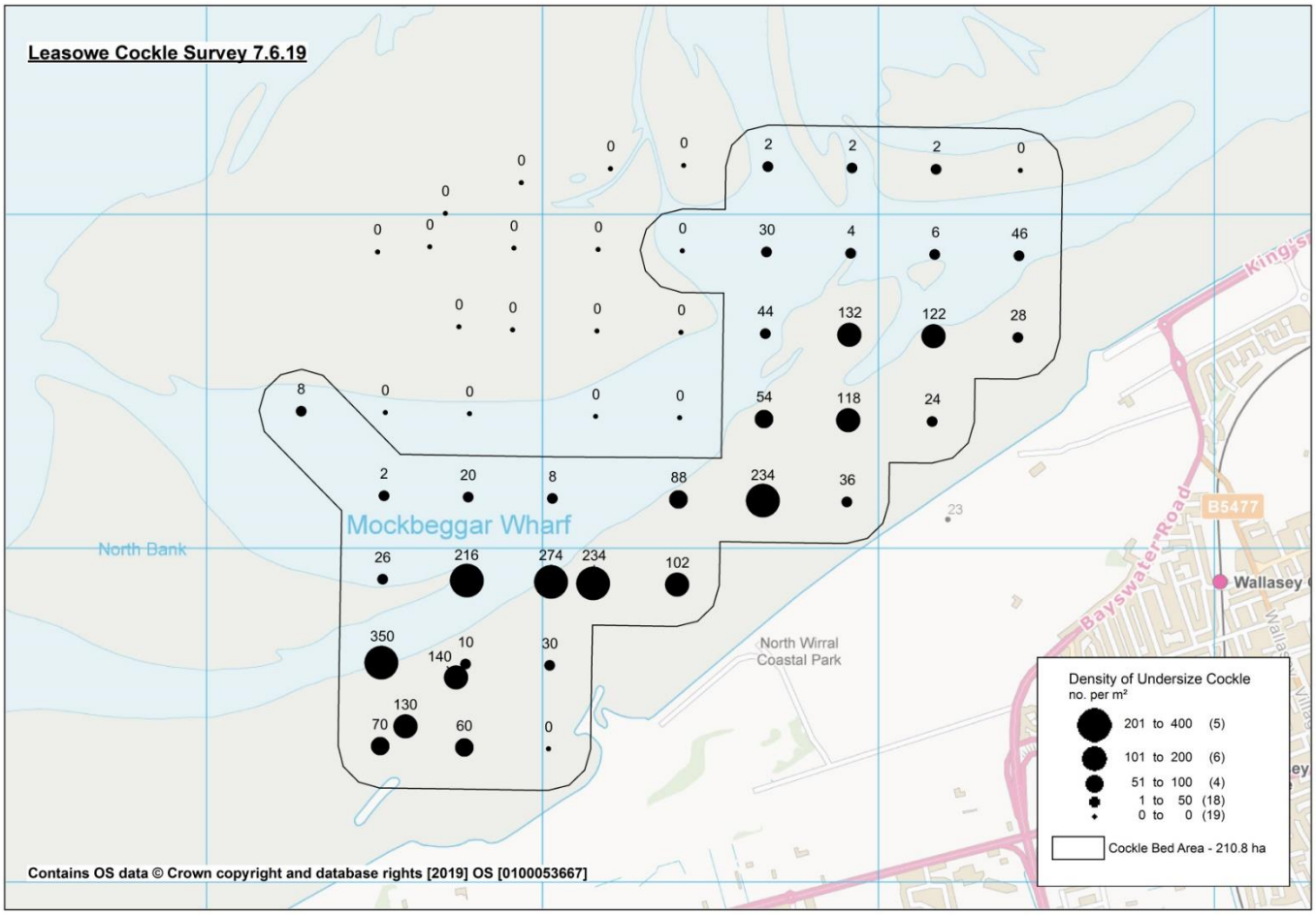


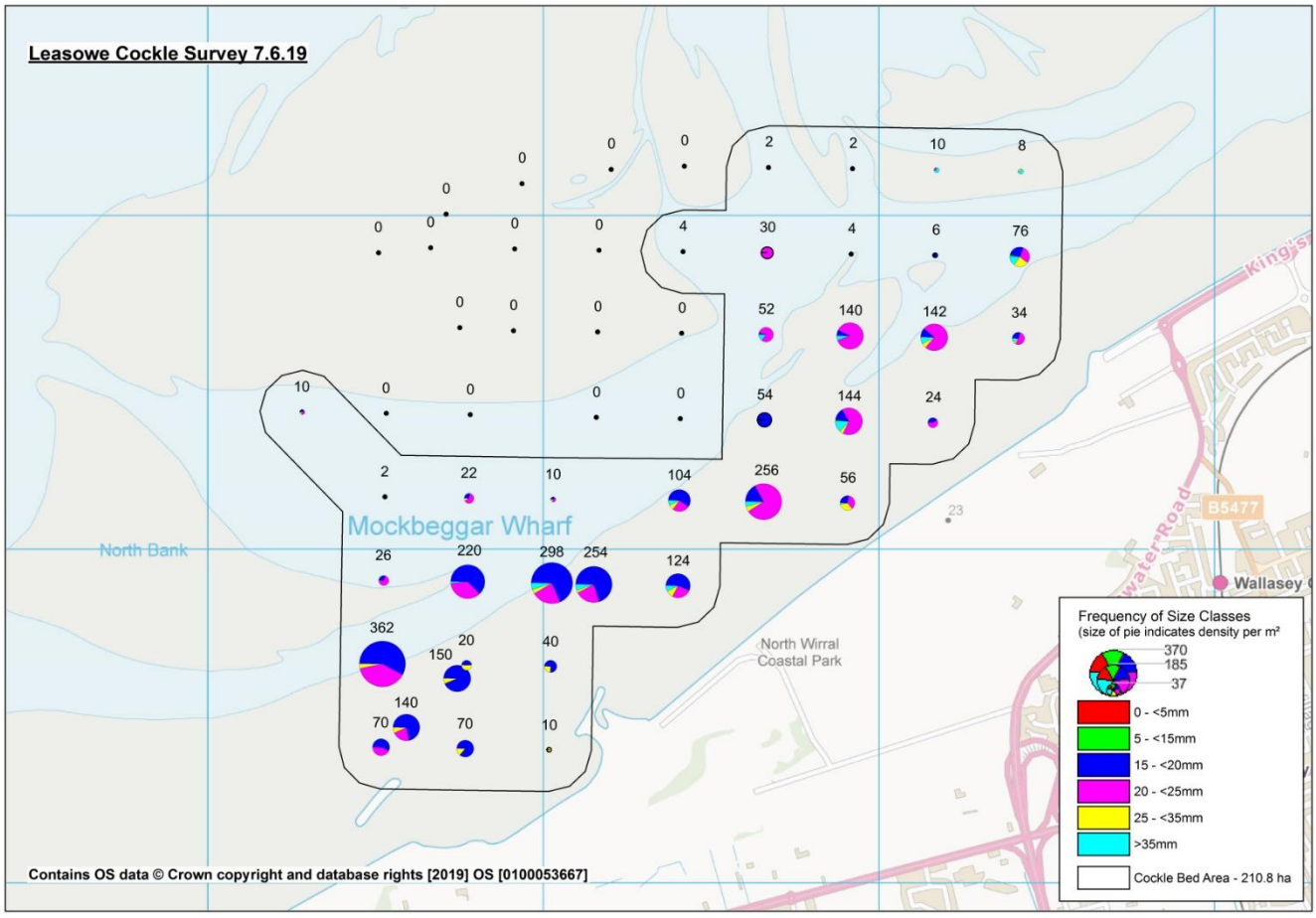
Illustration of position of Leasowe cockle bed



Density of size cockle per m² Leasowe June 2019



Density of undersize cockle per m² Leasowe June 2019



Frequency of size classes of cockle per m² Leasowe June 2019

Heysham Flat Inspection 20-05-19

There had been a significant spat settlement across the skear. Some 2018 was still present towards the bottom of the skear and mixed in with the new settlement.

Very little honeycomb worm remained in the main historic area, the few small areas of which were heavyily settled on by mussel spat. Main areas of the Sabellaria reef are to the north and south of the main skear. GPS tracks and waypoints were taken for mapping to go into the authorisation or flexible permit conditions (dependent on whether the new cockle and mussel byelaw is in place at the time of the opening of the fishery).

Dallam Dyke was easy to get across on the southern end an hour before low water. A sand bank has come up at the southern end of the channel leaving deep water close to the edge of the skear.

Knott end has a similar mix of 2019 spat and patchy 2018 mussel. It also has a healthy area of Sabellaria alveolata.

Heysham Outer Skears Mussel Inspection 17-05-19

Tides LW 17:47 1.0m (Liverpool tides)

Access was by zodiac from Plover Scar five hours before low water following the Lune and then the Heysham Port navigational buoys. The purpose of the inspection was to assess the mussel on the Heysham outer skears to determine if there was a new settlement of mussel spat and any remaining stock from last year's settlement.

There were large areas of Great Out skear that were bare cobble with sand and dead mussel shell, mainly to the northern side of the skear. Across most of the skear there were occasional boulders with the northern extent of the skear having a higher concentration of exposed boulders. The area where mussel was present extended to approximately 3.8 hectares, much of this area was sparsely covered (~10%) with 2-5mm spat. However two distinct areas of dense 2-5mm spat settlement (~70-90%) were present on the southern extent of the skear. Only a small area of last year's settlement remained with areas of scouring and bare cobble visible. This mussel was 25-30mm in length and very hard in and a covering of sand and the current years spat settlement. The approximate areas of mussel described above is shown in figure 1.

It was not possible to cross the channel to Little Out skear; however from the channel side it was clear that there has been a settlement of spat on the skear, but the density of coverage could not be assessed from distance. Large numbers of birds were observed feeding on all the Heysham skears throughout the survey.

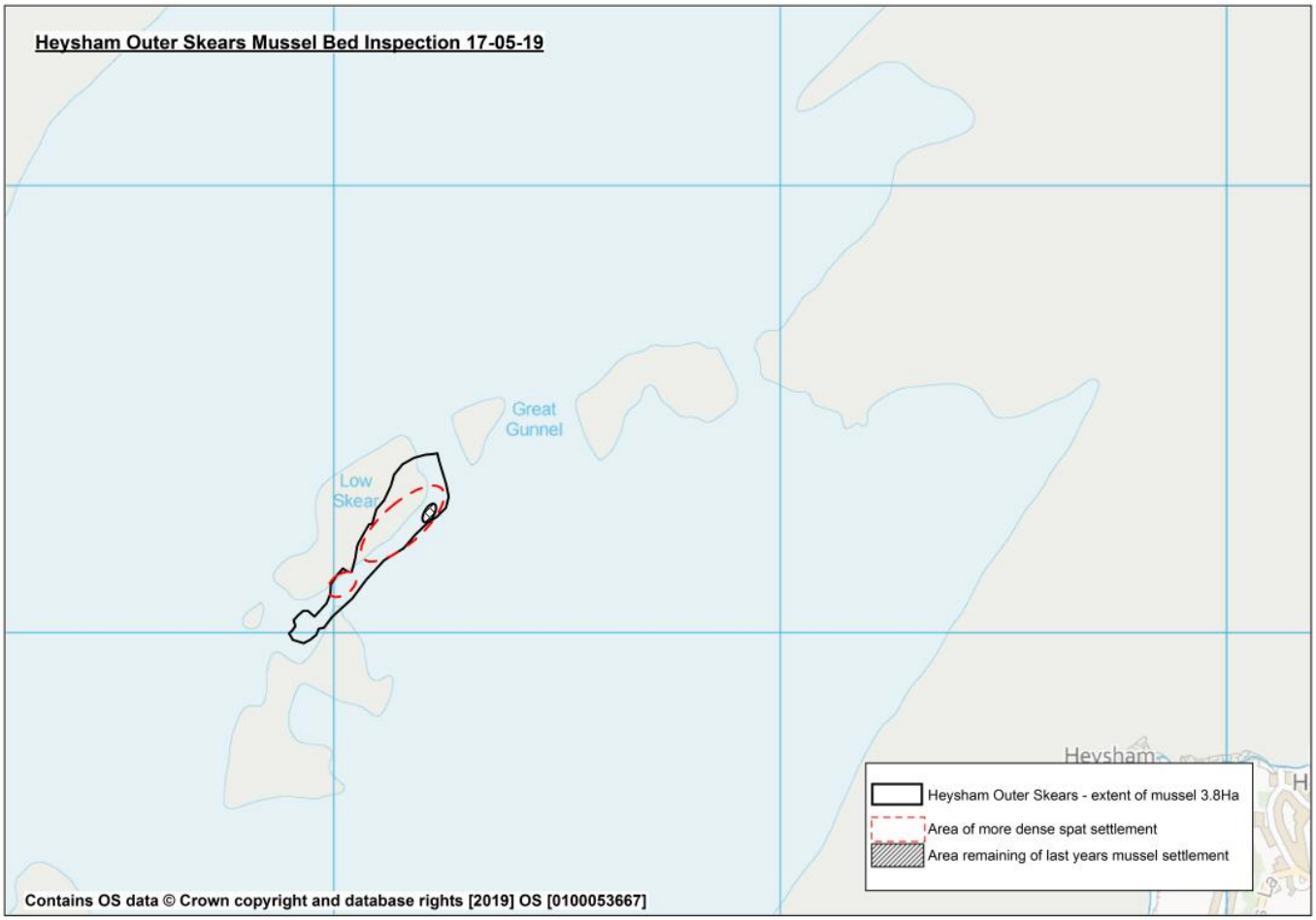


Illustration of the approximate areas of mussel on Great Out skear.

Area of last year's mussel and covering of sand, with 2019 spat settlement present on Great Out skear

Last year’s mussel with spat settlement and areas of bare cobble on Great Out skear

Distinct areas of more dense spat settlement on Great Out skear

Looking across to Little Out skear with settlement of mussel and birds visible.

South America and Falklands Mussel Inspection (Quad) 20/03/19

LW: 17:35 0.4m (Liverpool tides)

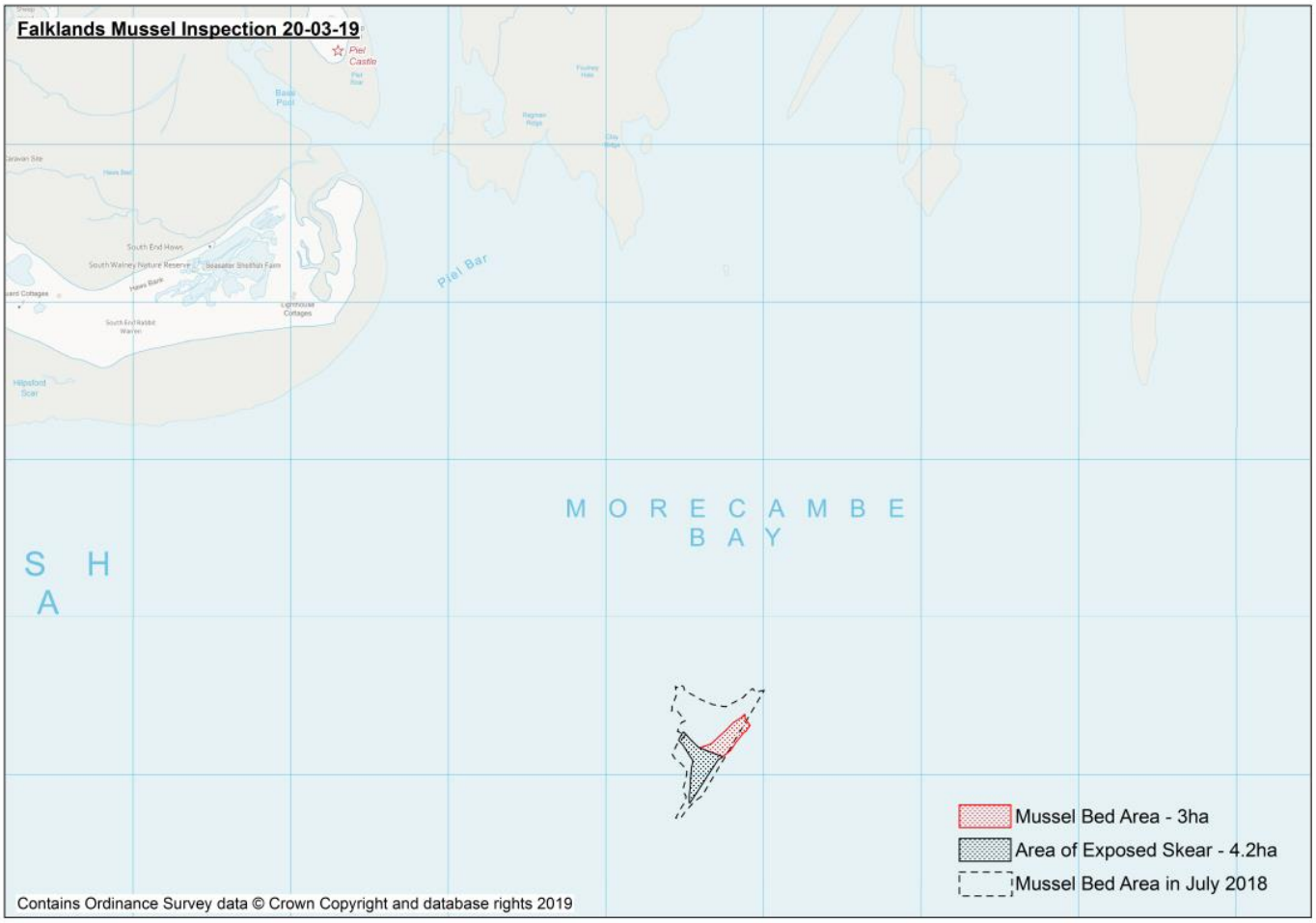
South America

The area of mussel fished in 2018 had gone and the hard substrate that was present was no longer exposed and had sanded over.

Falklands

Access to the mussel bed was relatively easy and was accessed 50 minutes before low water. The area of mussel had decreased since last inspected in July 2018. The area of mussel, the area of exposed skear and the area of mussel in July 2018 was mapped. The area of mussel was 3 hectares and the area of exposed skear was 4.2 hectares although the full extent of the exposed skear was not mapped as it extended into the water in a south-westerly direction. The area to the north of the mussel and exposed skear had sanded over. On the east side of the mussel bed the mussel was being heavily predated on by starfish with a thick band of starfish and empty mussel shell present. There was an abundance of gulls present on the mussel bed which were predominately herring gulls.

The mussels varied in size from 25mm to 50mm with the majority of mussel being between 35mm and 40mm. The area of mussel was made up of areas of mussel on sand and areas of exposed skear. The mussel was hard in at the time of inspection which could be due to the recent strong winds. There was very little mussel mud across the bed. Below are images of the mussel, the starfish and the exposed skear.

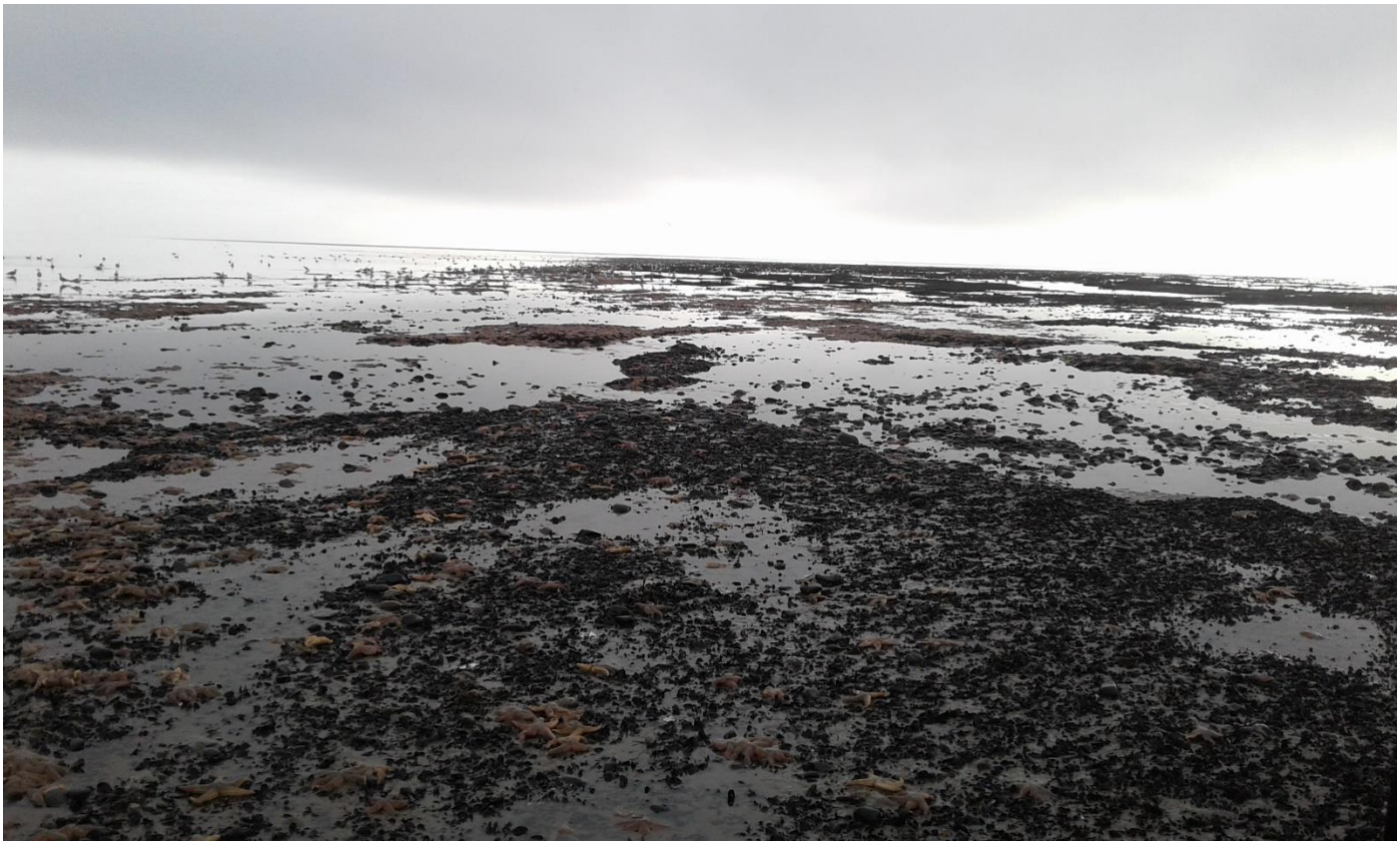


Map show the area of mussel and exposed skear compared with the area of mussel inspected in July 2018

Overview of the area of mussel on Falklands 20/03/19

Falklands mussel on layer of sandy substrate and hard in 20/03/19

Empty mussel shell and starfish on the eastern edge of the mussel bed 20/03/19



Starfish on live mussel on the eastern edge of the mussel bed 20/03/19

Exposed skear on the south west side of the area 20/03/19

Exposed skear on the south west side of the area 20/03/19

North Morecambe Bay mussel beds including Foulney and Low Bottom (around oyster frames)

Observations from the mussel stock during the Chinese Mitten Crab survey carried out on 17th May together with IFCO and industry reports are that there has not been any settlement this year to date. This is highly unusual, and considering the fact that spat arrived on Heysham in the spring.

Mussel at Foulney has grown to a good size and is being hand-gathered by a low level of Byelaw 3 permit holders.

The situation will be monitored and NWIFCA welcome further reports from industry of how the mussel stock is progressing.

NWIFCA Science Officers

14th June 2019