# ANNEX D - SURVEY REPORT TO TSB FEBRUARY 2020

## 1. Solway mussel dredge survey 06-11-19

North Western protector crew and science officers

Low Water: 13:09 3.77m (Liverpool Tides)

Officers conducted a dredge survey in the Solway across the area of mussel previously surveyed by grab samples in February 2019. A total of 36 stations were sampled using a mini-dredge (1m), with tow lengths varying between 150m and 370m depending on the tidal flow. The amount of mussel, size of mussel, and other species present was recorded. Additionally, a drop-down Go Pro camera attached to a square frame was tested, but was found to not be suitable due to the turbidity of the water.

Sabellaria spp. samples were collected from across the surveyed area and taken back to the laboratory for formal identification.

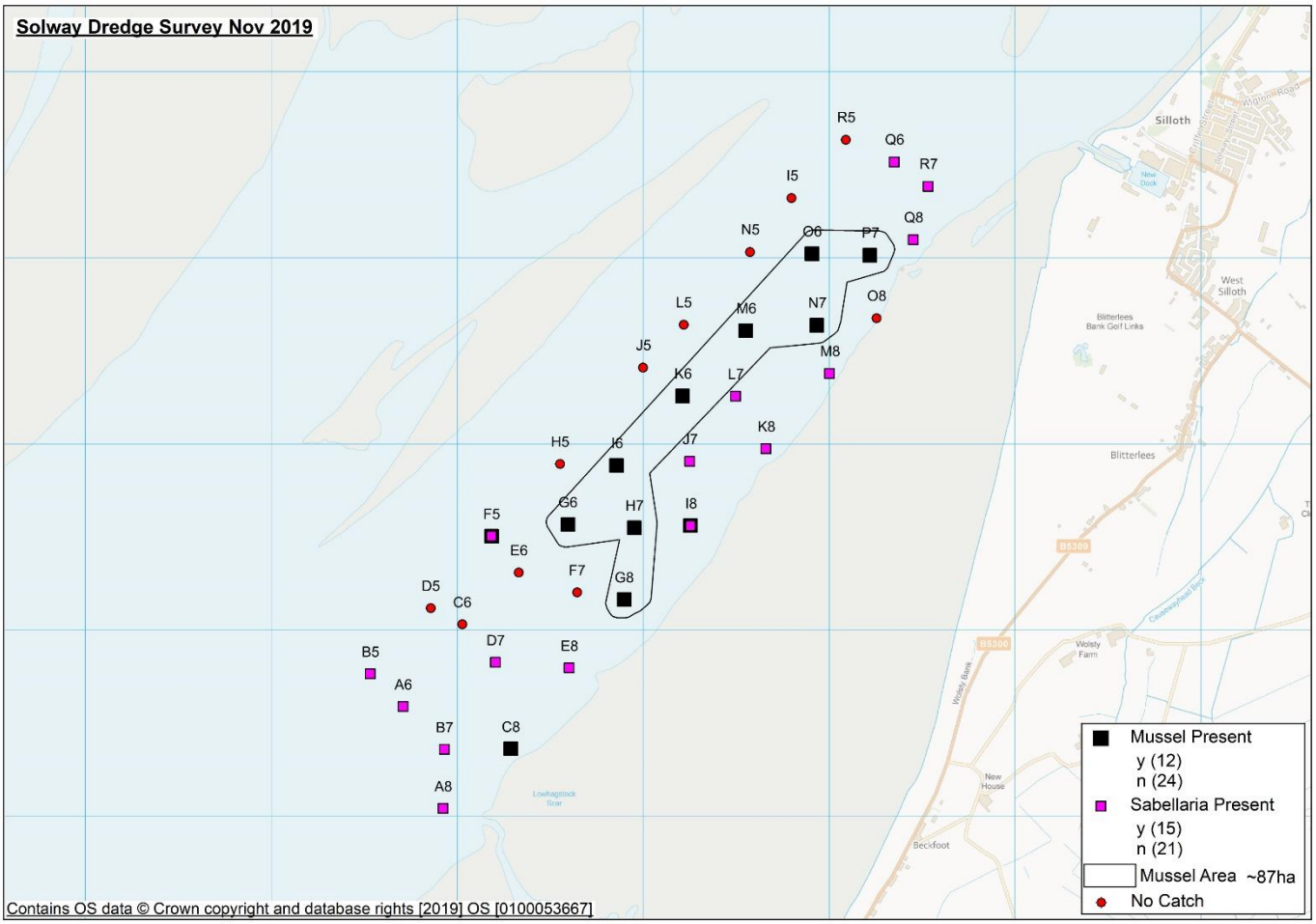



Figure 1. Mussel and Sabellaria spp. samples collected from the Solway – November 2019

Mussel was present in 11 dredges, 9 of which were comprised of unembyssed size mussel. The area containing size mussel was relatively consistent with the grab sample survey in February 2019. The mussel was found to have grown on, ranging between 45-60mm where it had previously been 30-45mm. The main area of mussel as indicated on the map was estimated to be 87ha, excluding sites where minimal mussel of mixed size was found (C8, F5, I8). However, exact quantification of mussel coverage across this area is not possible through the use of a dredge.

Sabellaria spp. fragments were found in 15 of the dredge tows, often in significant amounts as shown in the image below. A sample of these fragments were broken, individual worms removed, and viewed under a

dissection microscope at 200X magnification. The collected fragments were found to contain *Sabellaria alveolata*, as shown in the microscope images below.

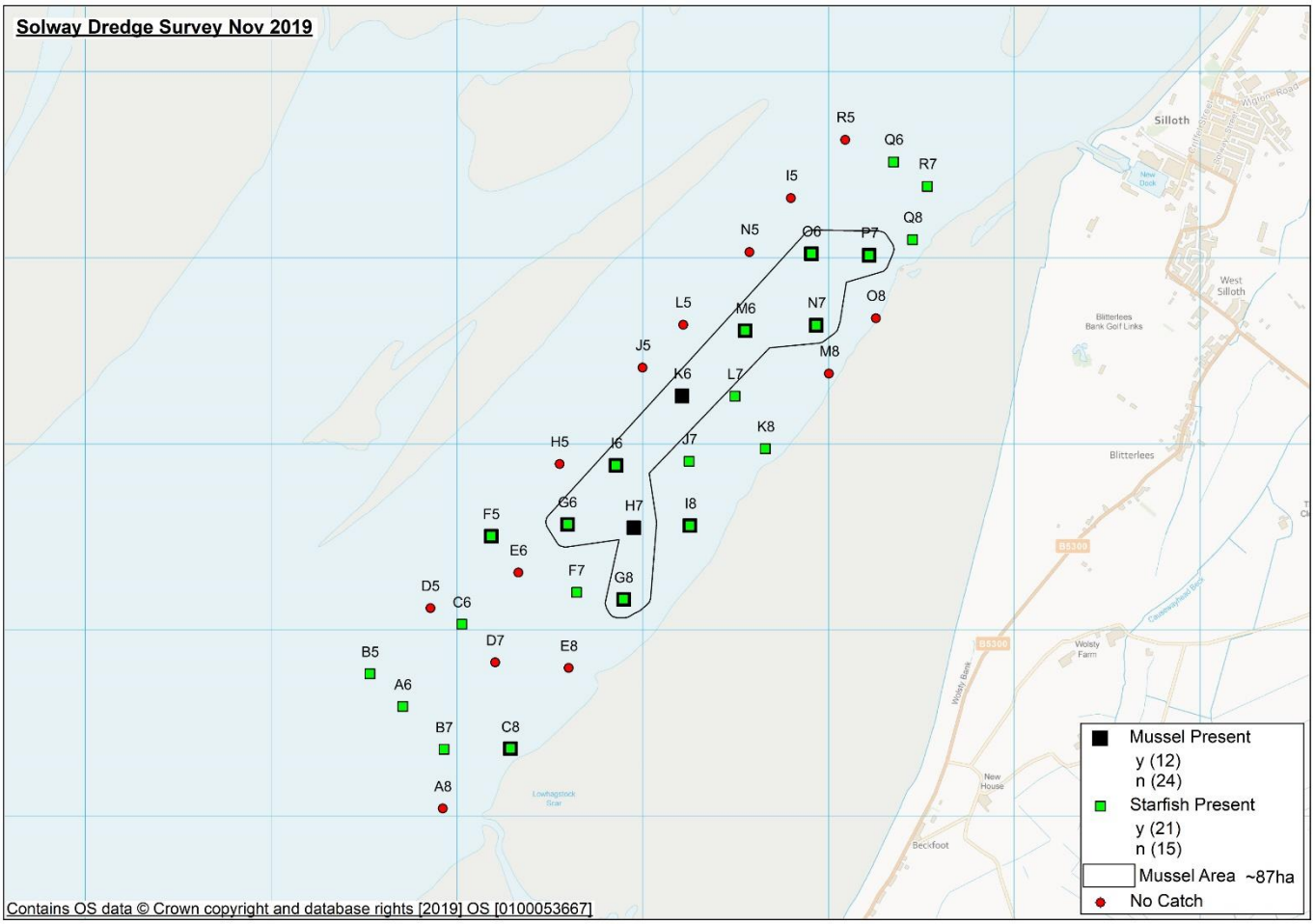



Figure 2. Dredge samples containing starfish in the Solway – November 2019.

Starfish were prevalent across the survey area and were collected with large amounts of recently predated mussel. They were found in concentrated numbers as shown in the image below, with both large and small starfish recorded throughout the survey. Other species present throughout the survey include dab, plaice, flounder, rockling, pogge (hooknose), sea-scorpion, sandeel, dogfish, spider crab, shore crab, edible crab, and pink shrimp.

An unidentified sea-squirt was also found sporadically throughout the survey as shown in the images below. One sample, B5, was comprised primarily of this species that was found in a total of seven dredges. Additionally, many of the samples found this species clumped together in small groups, although the majority had been separated by dredging action. Species level identification has not yet been possible.


Figure 3. Unembyssed size mussel found in the Solway – November 2019.


Figure 4. Size mussel found with significant ‘mussel mud’ in the Solway – November 2019.


Figure 5. Starfish presence noted on size mussel found in the Solway – November 2019.


Figure 6. Sabellaria spp. fragments retrieved from the dredge survey in the Solway – November 2019.


Figure 8. Unidentified sea squirt species retrieved from the dredge survey in the Solway – November 2019.

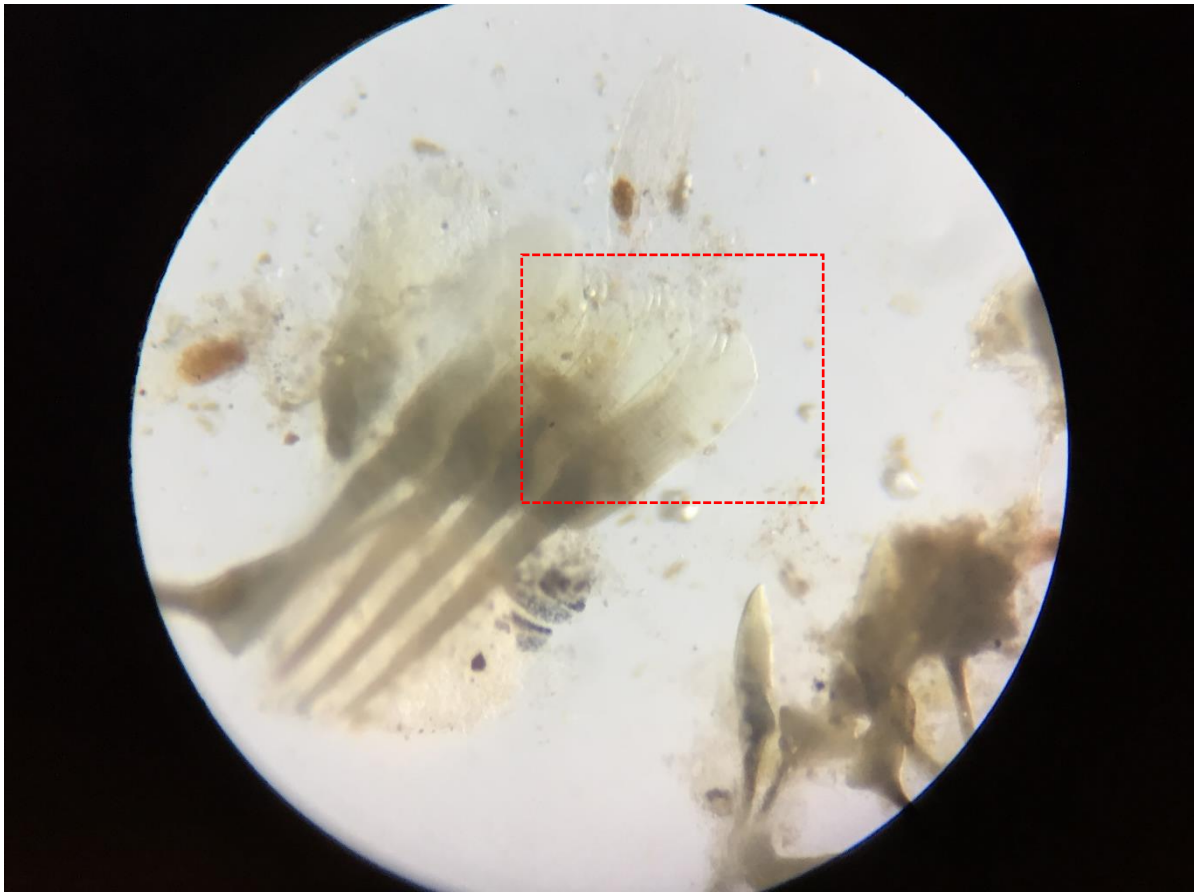


Figure 8. *Sabellaria alveolata* from the Solway identified under a dissection microscope at 200X magnification. The area outlined in red highlights the opercular chaetae used to distinguish the species.

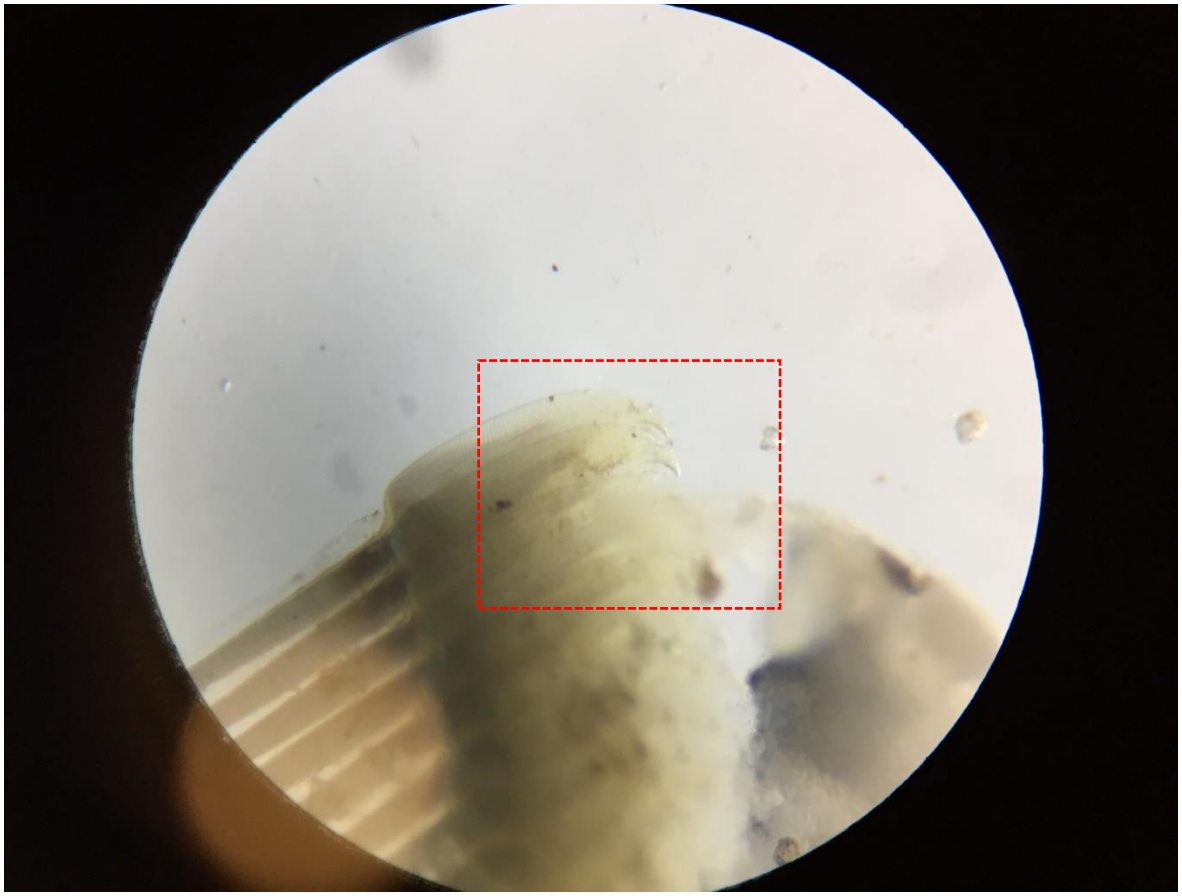


Figure 9. *Sabellaria alveolata* from the Solway identified under a dissection microscope at 200X magnification. The area outlined in red highlights the opercular chaetae used to distinguish the species.

Jon Haines

NWIFCA Deputy Senior Scientist

November 2019

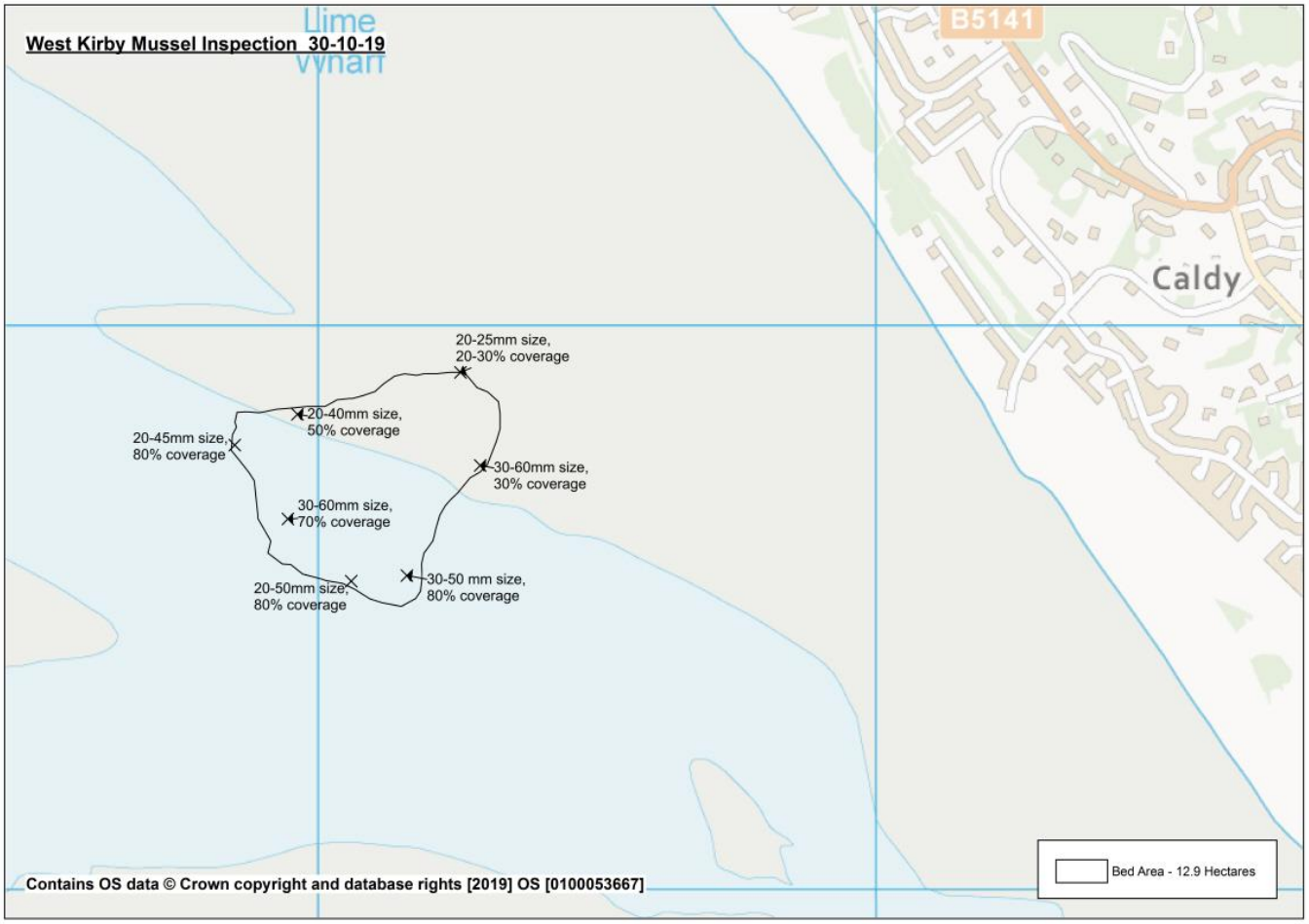
## 2. West Kirby Mussel Inspection 30-10-19

Low Water: 06:54 0.7m (Liverpool Tides)

Mussels were present at West Kirby suggesting that the last inspection of the Dee mussel beds in July 2019 was during a period that the beds were obscured by mud.

Officers were able to walk the full perimeter of the mussel as large amounts of washed out cockle shell made usually very soft ground firm enough to walk on. The area of the mussel bed was 12.9 hectares - slightly larger than when last fully inspected in April 2019. This is possibly due to being able to walk the whole bed, and the overall density of mussel had increased.

There were two distinct size classes of mussel on the bed, 20mm and 30-60mm. At the north-eastern edge of the bed the mussel was mainly 20mm and very patchy. Moving to the middle of the bed the mussel got less patchy and was more mixed from 20-60mm. The southern edge of the bed was much more dense and included more size mussel, although undersize mussel was present throughout the bed.




Map showing the area of West Kirby mussel bed 30-10-19

Patchy mussel at north eastern edge of West Kirby mussel bed 30-10-19

More dense mussel towards the southern edge of West Kirby mussel bed 30-10-19

Looking north across West Kirby mussel bed, bare areas may be due to fishing activity. 30-10-19

## 3. Warton Sands Cockle Inspection 01.11.19

Tides: LW 08:10 1.64m (Liverpool tides)

An inspection of the bed was carried out to find out if the area of cockle previously surveyed on the 27th September 2019 was still present and in a similar density and if the cockles had grown. The bed was accessed by quad but soft muddy areas where the greatest densities of cockles were found was walked. There appears to be no change in the area or density of cockle. Minimal growth was documented across the bed with the majority of cockles being between 15-20mm. Moving north off of the main dense area there was a significant reduction in density, with size cockle sparsely distributed across this portion of the bed. A noticeable amount of washed out cockle was found along the channel edge as shown below.

There was evidence that oystercatchers had been feeding on the cockle with broken shell dispersed across the bed. Roughly 500 oystercatchers were seen during the survey, mainly on the southern portion, interspersed with other species.

Waypoints and notes on the size of cockle have been recorded and saved but have not been mapped. As with previous surveys and inspections, the bed was accessed from Morecambe Lodge Holiday Park.

Image of washed out cockle on the channel edge at Warton Sands – November 2019

Images of size cockle density (0.1 $m^2$ quadrat) on the southern portion of Warton Sands - November 2019

Images of typical cockle density on the northern portion of the inspected area - Warton Sands November 2019