NWIFCA Technical, Science and Byelaw Committee

3rd November 2020: 10:00 a.m.

AGENDA ITEM NO. 10

SURVEY AND INSPECTION REPORT - FOR INFORMATION

Purpose: **To provide information to members of the survey and inspections of the cockle and mussel stocks in the last quarter**

Recommendation: **That Members approve the report.**

TSB decided a review was needed following a month of seed mussel authorisation on South America. An interim report was circulated to members for decision-making. The purpose of including it here is to ensure consistency in reporting for record keeping and publication.

Leasowe Cockle Survey 06-08-20

Tides: LW 08:27 1.5m (Liverpool tides)

Survey method - Jumbo and 0.5m² quadrat

83 survey stations were sampled from a 250m grid with an additional 3 stations added to include a small area identified by IFCOs to hold a high density of cockles. Due 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 main bed area had decreased since the last survey in August 2019, and was situated in a similar area high up the beach in a band running along the bed on the upper shore as well as in the muddy area between the groynes. A small patch (approximately 100m x 50m) held a high density of cockles (Area 1), although this area has reduced in size from when last observed by officers in June.

Undersize cockle was distributed across the main bed area on the upper shore in relatively low densities. Area 1 held high densities of undersize cockle, and additionally held the only significant density of 2020 spat settlement. One sample was taken from a patch that appeared particularly dense (Area 2).

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.

Due to the distance from the main bed, Area 1 is presented separately, and to avoid over inflating means for this area the very dense patch (Area 2) is also presented separately.

Main bed area

Mean number of size cockle	23 per m²	(min 0, max 108)
Mean number of undersize cockle	14 per m²	(min 0, max 62)
Mean number of 0-5mm cockle	1 per m²	(min 0, max 16)

Area 1*

Mean number of size cockle	15 per m^2	(min 6, max 24)
Mean number of undersize cockle	139 per m^2	(min 84, max 194)
Mean number of 0-5mm cockle	45 per m^2	(min 0, max 90)

*2 survey stations included in calculations of means

Area 2*

Number of size cockle	290 per m^2
Number of undersize cockle	732 per m^2
Number of 0-5mm cockle	0 per m^2

*1 survey station in dense area

Biomass

Biomass was calculated for each of the areas as identified by the means calculations.

Biomass	**Area (ha)**	**Size Cockle (tonnes)[1]**	**Undersize Cockle (tonnes)[2]**
Main Bed Area	**183.2 ha**	**~560**	**~10**
Area 1	**15.9 ha**	**~32**	**~9**
Area 2	**0.4 ha**	**~15**	**~1**
Totals	**199.5**	**~607**	**~20**

[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.

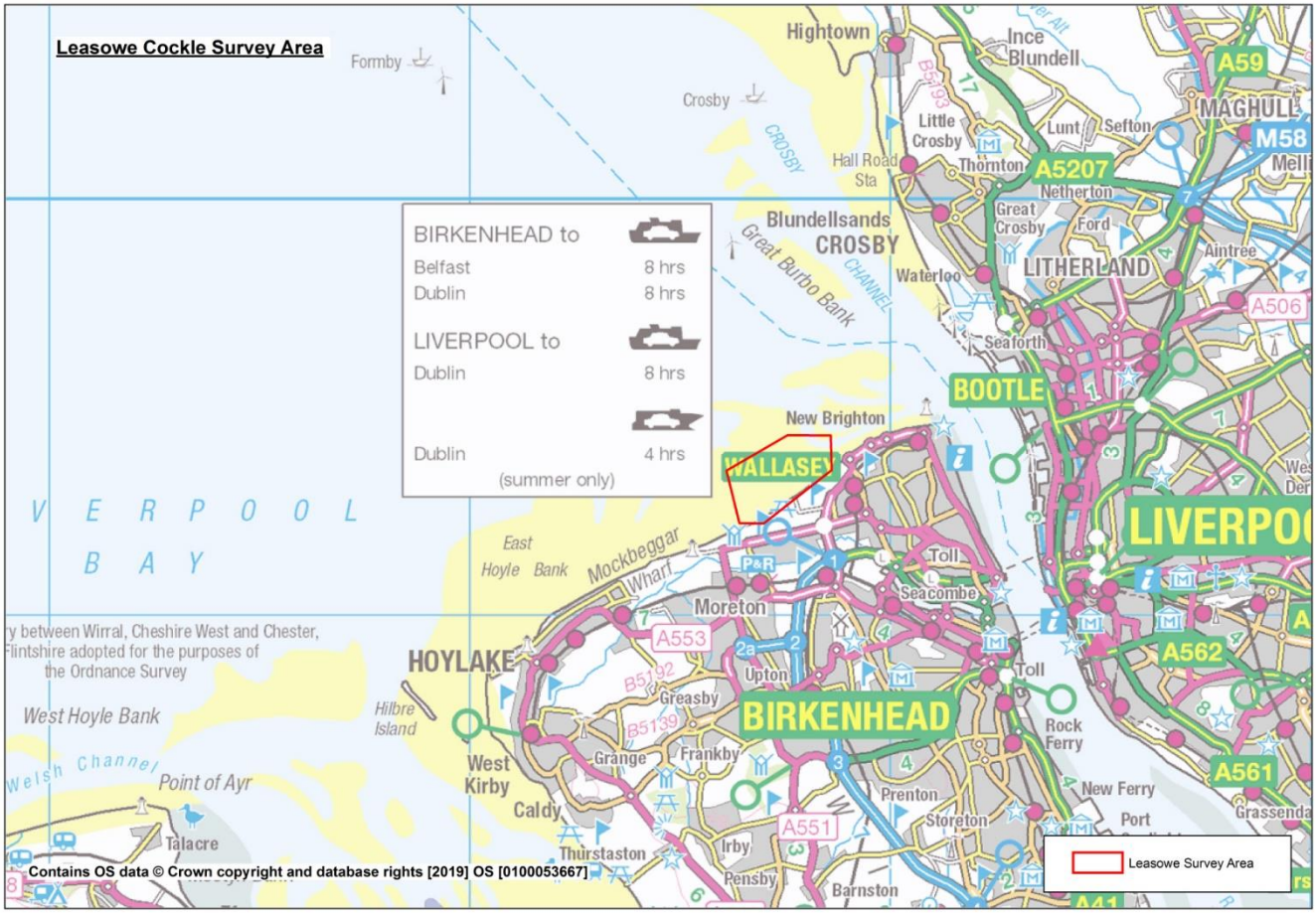

Illustration of position of Leasowe cockle bed

North, South and West Penfold and South Gut Cockle Inspection 15-09-20

LW 17:00 2.1m (Liverpool tides)

Officers conducted an inspection of the Marshside and Southport Cockle Beds.

The soft muddy area at North Penfold was still present but there were also areas with a mix of mud and coarse sediment. There was very little cockle present across the bed with occasional size cockle in the lower depressions in the sediment to an area to the south of the bed. There were signs of a 2020 spat settlement which were concentrated in the lower depressions in the sediment, and although in high densities in some areas, it was not consistent across the bed with many areas having no signs of a spat settlement. As seen previously there were large flocks of dunlin (tens of thousand) on the bed; on inspection of the areas favoured by these birds, there was no indication what the birds were feeding on.

Officers inspected South and West Penfold and South Gut where cockles have been present in the past and targeted areas of bird activity, in particular oystercatchers. Most areas had no cockle with the very occasional cockle being found. All areas had a significant bird presence, mainly a mix of gull species, dunlin and knot with the occasional oystercatcher.

Heysham Flat Mussel and *Sabellaria alveolata* Inspection 16-09-20

Tides LW 17:51 1.6m (Liverpool tides)

Perfect conditions for inspection with light cloud cover, warm air and light north easterly wind.

Despite the high winds and storms experienced over the last few weeks there is still abundant seed mussel across the skear. Where it has washed out it appears that *Sabellaria alveolata* has colonised in low but fast growing clumps. There is very little bare cobble - there are bands of either seed mussel (10-25mm) or *Sabellaria* alveolata and the skear is very mixed compared to what has been observed in the last decade.

The posts put in for the exclusion zone appear to still all be there. GPS positions for possible extended exclusion zone were taken on this inspection and during the CMC survey in August, should hand-gathering begin. There is still a fishable stock of loose mussel on muddy sand much of it shorewards of Conger Rock.

The area along Dallam Dyke and all round the edges of the skear are devoid of mussel and have *S. alveolata* growing. This appears to be extending at the present time. It appears that there is no mussel in between these clumps and so can be assumed that either there was no mussel originally or it had washed out before the worms settled.

Coming back eastwards, there was then a band of mussel some loose some hard-in stretching across the skear. The only size mussel that could be seen was on large boulders and barnacle encrusted.

There was then another band of very low-lying Sab, and then back to mussel which then extending quite high on the shore. This appeared to be the most fishable part of the stock.

Across Dallam Dyje there was low lying Sab along the channel edge and then what looked to be mussel. As the channel was not crossed it is not possible to describe the mussel, but there were numerous birds active on this skear.

Bird numbers were no higher than seen during the summer so presumably the migrating birds have not returned here yet or were off feeding elsewhere in the Bay.

The *Sabellaria alveolata* reef that has been developing along the northern area (ie. off the main skear) was inspected along its southern edge. This is an extensive, large, healthy reef that represents a superb example of honeycomb worm reef, and it will be interesting to monitor whether this will start to degrade as is likely with the present understanding of the 10 year cycle of Sab reefs.

Solway Subtidal Mussels

Two attempts have been scheduled in to restart side scan sonar and grab surveying of the subtidal mussel in the Solway. Unfortunately both have been thwarted by the winds. A further attempt is planned for the last week in October.

A report on the work carried out in March is in draft. There has been a substantial delay in producing this caused by the difficulties of processing and analysing large amounts of data produced from the SSS work on home internet systems due to coronavirus restrictions and home working.

South America Mussel Inspection (Quad) 23/08/20

LW: 09:39 0.8m (Liverpool tides)

Officers accessed the previously mapped area of seed mussel on South America by quad bike, and carried out a foot inspection. The inspection followed storm Ellen; the worst of the storm hit on Friday 21st August where Morecambe Bay received strong southwesterly winds. This coincided with large spring tides, a combination which has the potential to severely impact mussel that is already loose and unstable.

After walking across the bed it was clear that there had been some significant scouring that had taken place and approximately 40-50% of the mussel had been washed away. Some areas had suffered greater scouring than others. The mussel that persisted was approximately 30mm in length.

Much of the area was dominated by mussel and bare mussel mud. To the southeast of the mussel the mussel mud had also been scoured leaving areas of hard substrate. Where the mussel persisted it was no longer on a deep layer of mud but instead on a thin layer (only a few centimetres) of sandy mud. The scouring had also revealed the smothered dead *Sabellaria alveolata* as previously reported, showing the depth of mud which had been washed away.

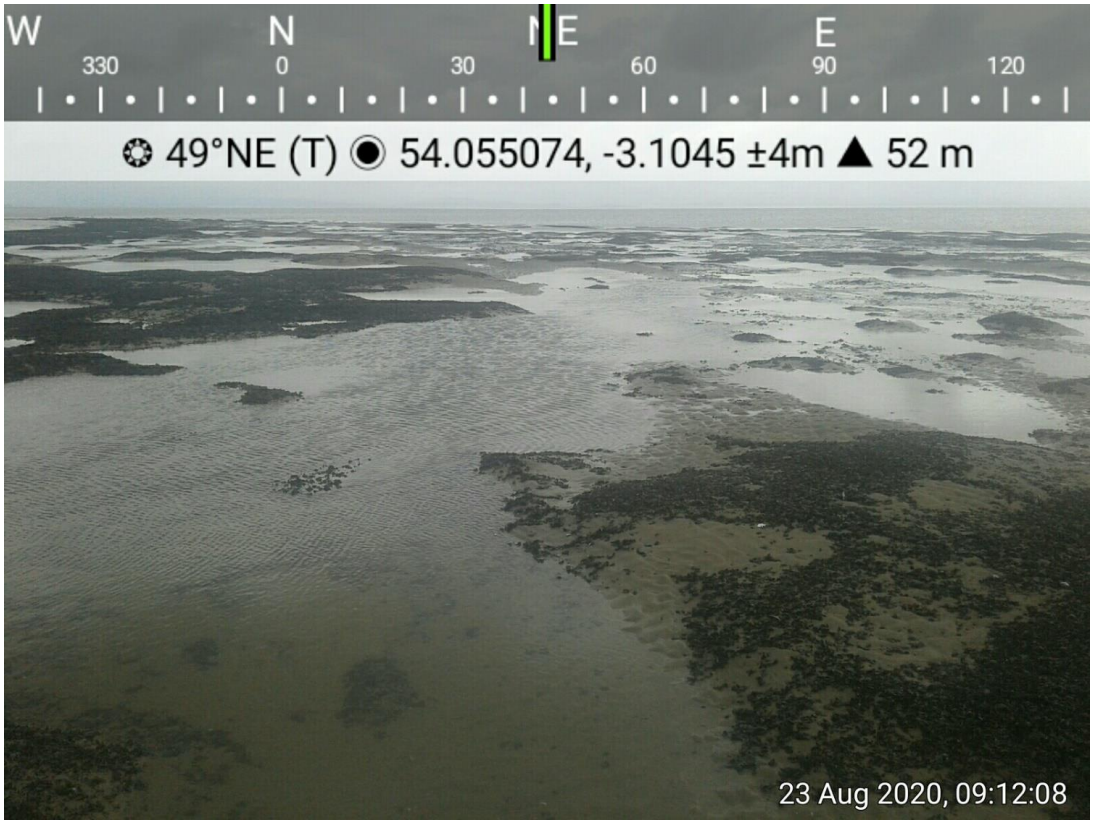

Fig. 1 - area of scoured mussel 23rd August 2020

Fig 2 – Area of scoured mussel 23-08-20

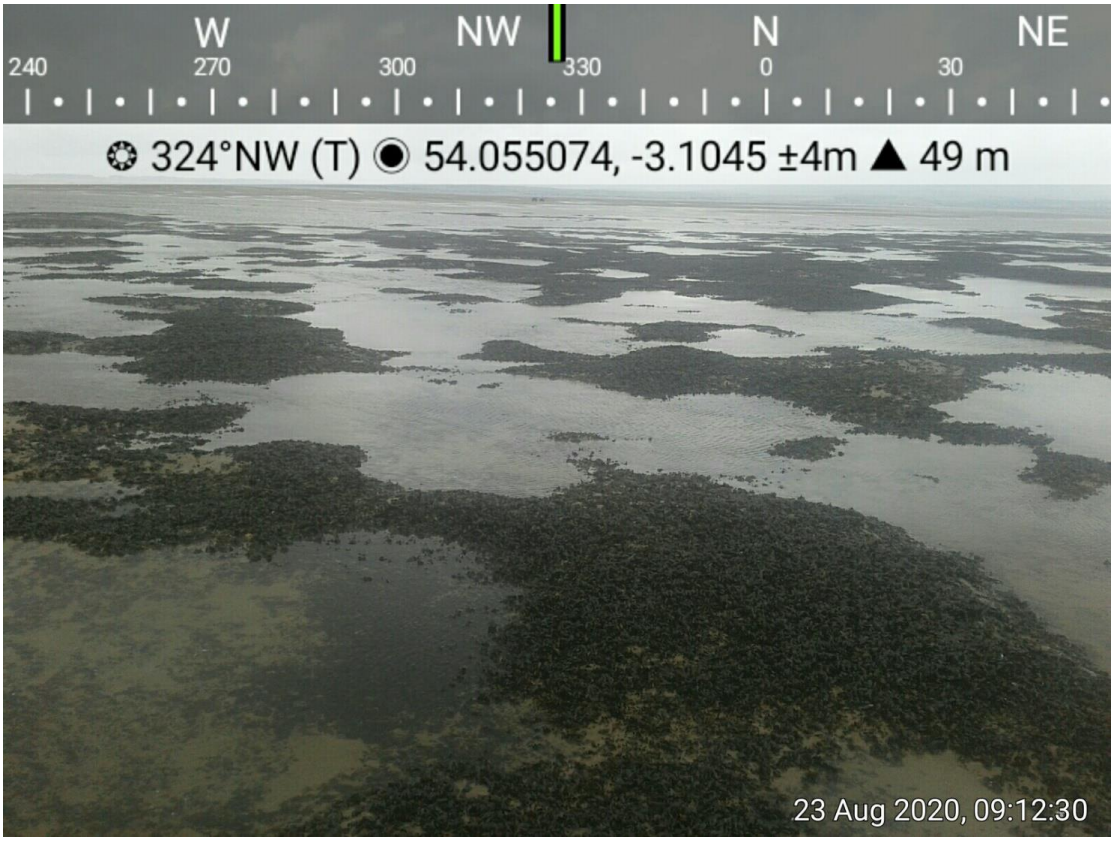

Fig 3 – Area of mussel 23-08-20

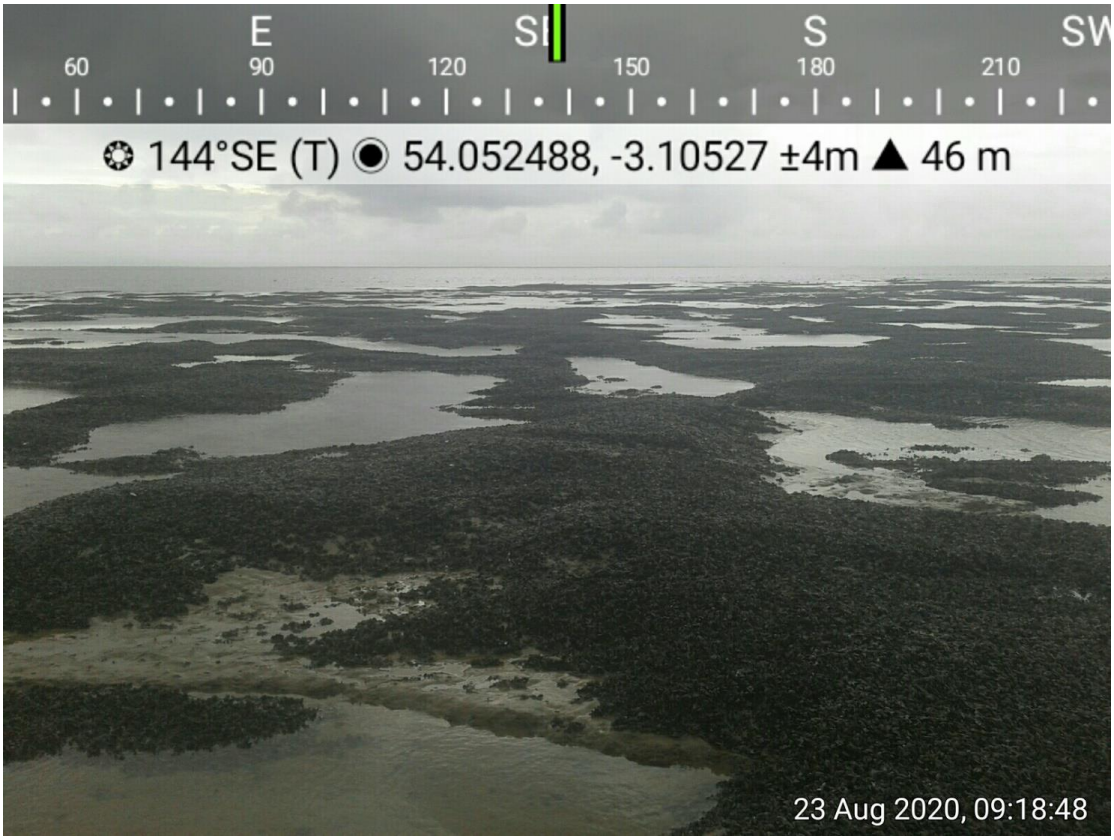

Fig 4 – Area of mussel 23-08-20

Fig 5 - Area of scoured mussel 23-08-20

Fig 6 – Area of previously smothered *Sabellaria alveolata* with hard ground exposed in background of image

Fig 7 - Area of scoured mussel 23-08-20

Fig 5 - Area of mussel 23-08-20

South America hovercraft inspection 18th September and quad inspection 20th September 2020

An interim report was emailed to TSB on 29th September with full information on the state of the stock - this is appended as Annex A.

South America Mussel Inspection (hovercraft) 18/10/20

LW: 07:30 0.4m (Liverpool tides)

Trevor Jones supplied officers with a partial track of his hovercraft inspection of the north Morecambe Bay mussel beds and geo-referenced photos of South America from his trip on an exceptional ebb. He reported that the areas at Small Island and Trailer Bank 'were barely distinguishable from their surrounding areas. Both features and parts of the surrounding areas were heavily colonised with starfish. There was very little live mussel left in these areas'. Mr Jones also commented on the extent of *Sabellaria alveolata* appearing on the sands to the east of Small Island.

South America Mussel Inspection (quad) 19/10/20

LW: 08:12 0.6m (Liverpool tides)

The Senior Scientist and IFCO Dixon access the South America mussel bed by quad bike on the morning tide just as it was getting light. The ground was very mixed, with loose clean unembyssed mussel in one swathe on the western edge, hard-in mussel in cobbly ground, some areas where the mussel was bunched in short 'ropes', areas that had clearly washed out leaving ridges of smooth soft mud, dead shell and large patches of bare cobble. Within all of these different mussel conditions were

some gaping mussel. None of the mussel had reached size - the maximum size of those sampled was 43mm.

The area to the west that had looked likely to wash out in September appeared to have gone and mapping from foot tracking around the extent of the mussel area revealed illustrates this in Fig. 6 below. An estimate of area change was made giving 16.52 ha in September reduced to 7.63 ha in October.

It is difficult to make any estimate of coverage due to the mixed ground and patchiness of the area. Methods used on other beds to assess biomass, such as the Dutch Wand survey methodology, are not possible here partly due to the lack of time the area is uncovered and accessible, and also due to the highly patchy and variable nature of the remaining bed.

However both officers who had observed the bed throughout the season agreed that around 70 - 75 % of mussel cover had gone since the July inspection, leaving around 25 - 30% of the original stock. When considering that mussel in this area grows fast and that each individual mussel in October takes up a larger area than an individual mussel in July, the number of mussels lost to natural forces could possibly extend to around 80 - 85 % of the July stock.

Large eroded and degraded mounds of *Sabellaria alveolata* were revealed but on inspection did not appear to be live. The new colonies observed around the western edge in September did not appear to have survived.

The quality of photographs taken by the Senior Scientist is unfortunately not good due to malfunction of camera phone. A digital camera was substituted which does not produce geo-referenced images. Images are captioned below each to show the source.

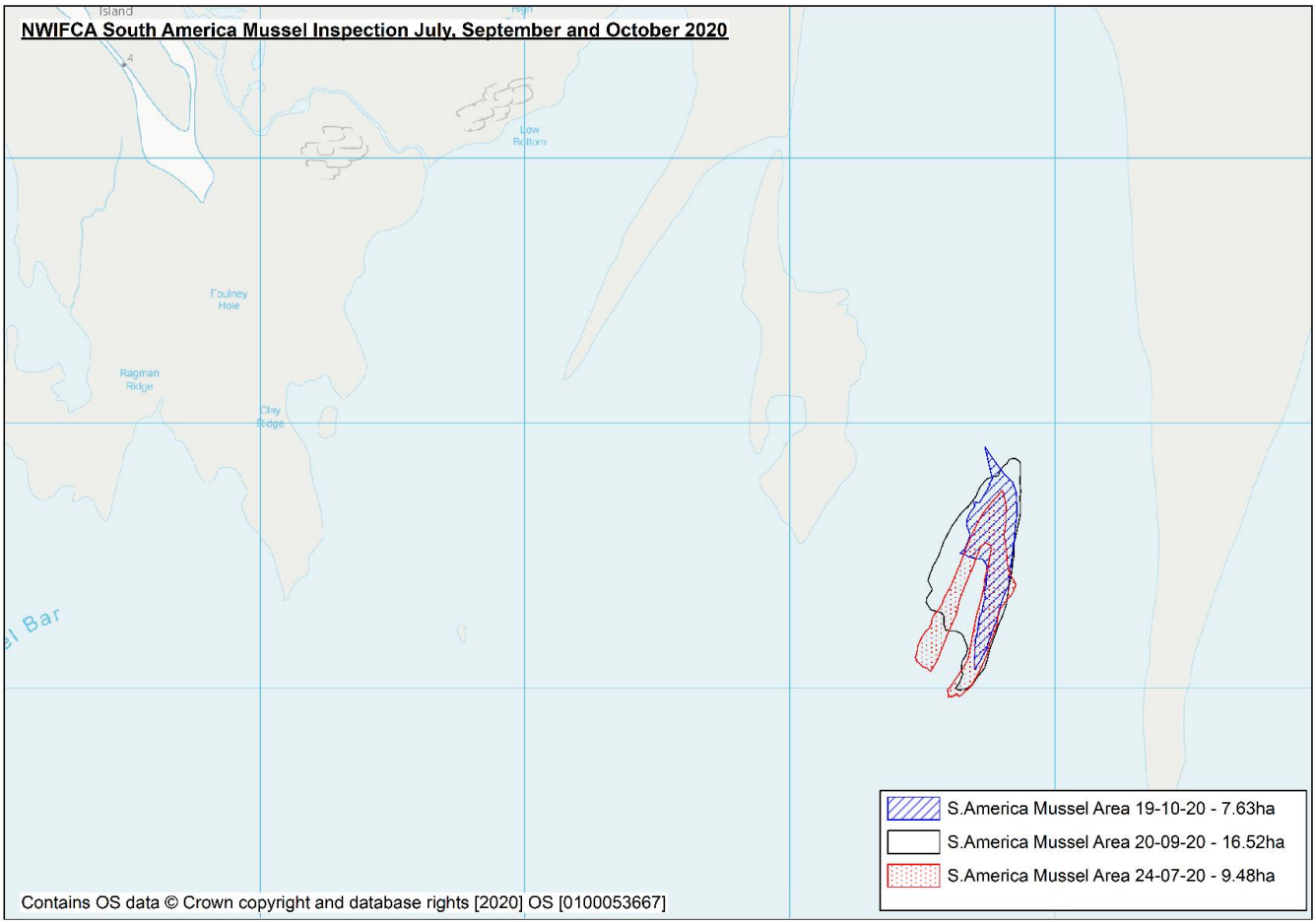

Fig. 6 - illustration of tracking around the area holding mussel at South America - July, September, October 2020

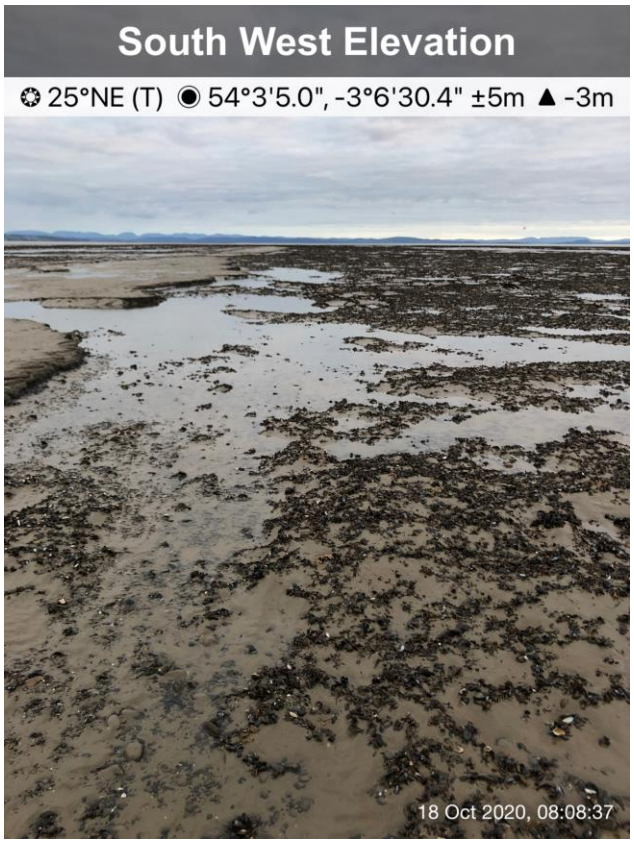

Fig. 7 - the western area South America showing patchiness and wash out 18-10-20 - photo Trevor Jones

Fig. 8 - the western area South America showing dense loose mussel 19-10-20 - photo NWIFCA

Fig. 9 - the western area South America showing dense loose mussel 19-10-20 - photo NWIFCA

Fig. 10 - the western area South America looking east 19-10-20 - photo NWIFCA

Fig. 11 - hard in mussel South America 18-10-20 - photo Trevor Jones

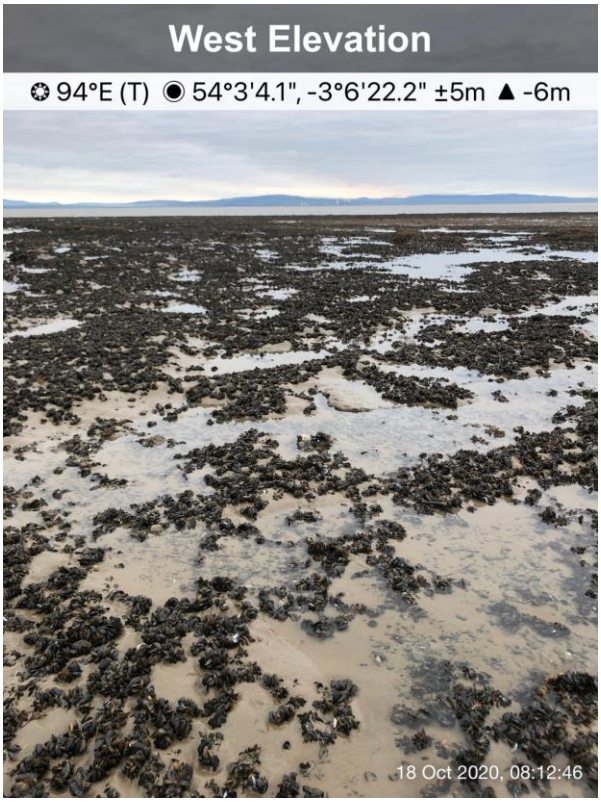

Fig. 12 - patchiness and roped up mussel South America 18-10-20 - photo Trevor Jones

Fig. 13 - hard in mussel South America 19-10-20 - photo NWIFCA

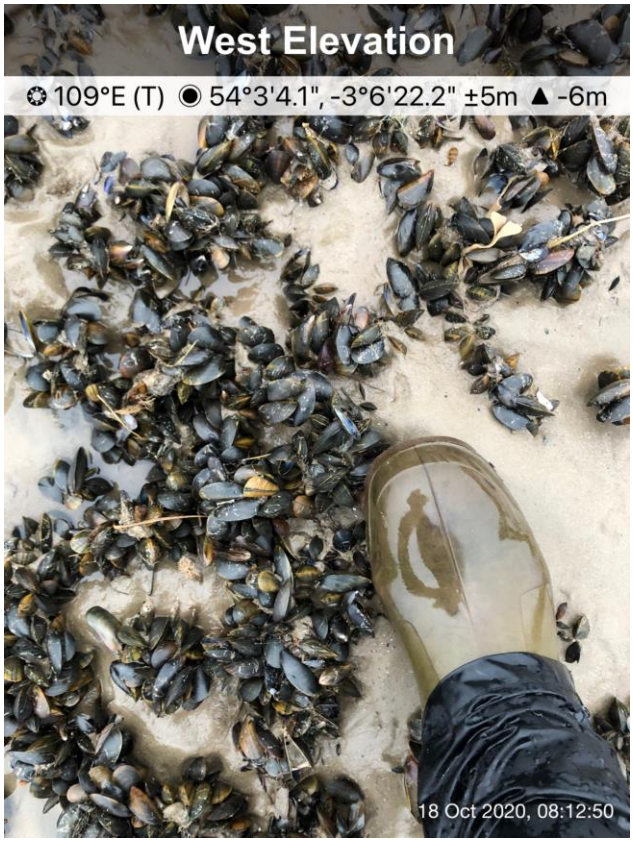

Fig. 14 - roped up mussel South America 18-10-20 - photo Trevor Jones

Fig. 15 - eroded *Sabellaria alveolata* mound South America 18-10-20 - photo Trevor Jones

Fig. 16 - the scoured out western corner South America 18-10-20 - photo NWIFCA

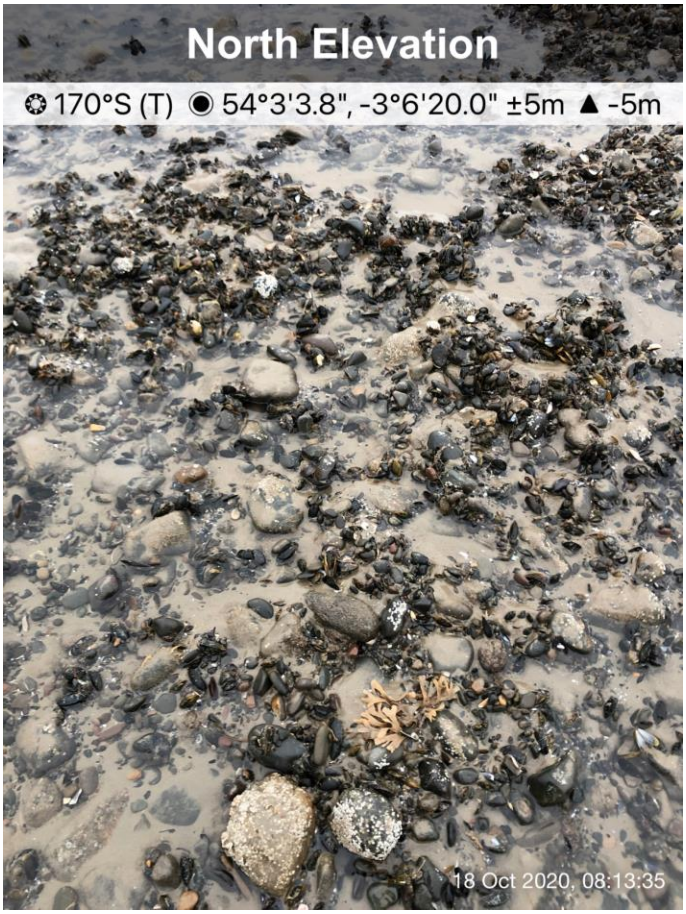

Fig. 17 - illustration of bare cobble amongst patches of mussel South America 18-10-20 - photo Trevor Jones


Fig. 18 - mussel with bare patches between southeastern tip South America 19-10-20 - photo NWIFCA

Fig. 19 - mussel with bare patches between eastern area South America 19-10-20 - photo NWIFCA

Fig. 20 - illustration of bare ground amongst mussel and shell South America 19-10-20 - photo NWIFCA

Fig. 21 - bare ground exposed between mussel patches South America 19-10-20 - photo NWIFCA

Mandy Knott
Senior Scientist

20th October 2020