Annex A - NWIFCA Morecambe Bay Chinese Mitten Crab

Surveillance Report February 2019

Mandy Knott - Senior Scientist

Morecambe Bay mussel beds are a valuable economic resource for NWIFCA stakeholders, particularly Byelaw 3 permit holders, and for aquaculture production businesses. There are a number of beds that regularly receive a spat settlement each year, while other areas can become covered in the shifting sands and the hard substrates are no longer available and so recruitment does not occur.

Morecambe Bay is known for its ephemeral mussel beds, described by Dare (1976), whereby dense recruitment occurs on the Bay's cobble and boulder skears. Mussel growth is rapid and deep layers of pseudofaeces or mussel mud is put down beneath the tightly packed mussel. When this occurs it can become very unstable, and the seed mussel sits unembyssed and loose on its surface. Under these conditions there is a high likelihood that storms and tides will wash the seed mussel away, and the NWIFCA may authorise removal of undersize mussel which is sent for relaying in aquaculture. Depending on location, extent and nature of the stock the fishery may be opened to mussel dredge.

Mussel in other parts of the Bay does persist but frequently does not grow through to size (>45mm). When it does it is fished by hand-raking by permit holders and may be sent to live market or for relaying as part-grown mussel.

Morecambe Bay bivalve fisheries are disease-free, and free of invasive non-native species. Prior to 2018 there have been two confirmed sightings of Chinese Mitten Crab in the Duddon Estuary (neighbouring Morecambe Bay connected water body) – one in 2006 and one in 2012. In May 2018 crab tilers in the Walney Channel (connecting Morecambe Bay to Duddon Estuary) reported to NWIFCA fishery officer that they had found three CMC within a few days of one another. Although they provided a photograph of one, it was not geo-located and was dead. The crab was disposed of and not seen by NWIFCA Officers.

There have been no further reports despite high awareness among fishers to report to NWIFCA, and a public awareness leaflet produced and distributed in the local area.

An email received from National Trust Area Ranger Neil Forbes from Sandscale Haws National Nature Reserve on the Duddon Estuary at the north of Walney Channel received 28th February 2019 states: "We have not come across any Chinese Mitten Crabs and have had no reports of them from the Duddon Estuary. We ran several children's / school events pond netting in the estuary at low tide last year and again no Chinese Mitten Crabs were found".

In order to provide confidence to regulators in relaying areas the NWIFCA instigated best practice by adopting established surveillance protocols and encouraging gatherers and buyers to follow good practice guidelines while harvesting the mussel. NWIFCA surveys carried out on the mussel beds at Heysham Flat skear and Foulney in Morecambe Bay in 2018, have been reported on.

For 2019 the NWIFCA has scheduled in quarterly surveys at both beds. The first of these was carried out in February - reports from which are provided below. In addition, other beds will be surveyed as and when mussel resource appears on them.

Reference:

Dare, P.J. (1976). *Settlement, growth and production of the Mussel, Mytilus edulis L. in Morecambe Bay, England.* Fishery Investigations. Series II. Vol. 28. No.1. Ministry of Agriculture, Fisheries and Food. London. UK.

Foulney Chinese Mitten Crab Survey 24-02-19

Officers Present: Four NWIFCA scientists
Tide LW 08:58 1.2m (Liverpool tides)

Reason for Survey: To survey the mussel bed for the presence of Chinese mitten crab after photographic records from May 2018 suggested that the species was present in the Walney Channel (North Morecambe Bay).

Survey methodology: As described in the SOP for screening seed mussel beds for Chinese mitten crab (*Eriocheir sinensis)* by Dr A Woolmer (2011).

- A total of 37 stations were surveyed across the mussel bed.
- At each station a 10 minute timed visual inspection of 10m by 10m area was completed.
- Of the 37 stations surveyed, samples were taken from 36 of the stations, targeting clumps of byssus attached mussel – including around 5cm of sediment. No sample was taken for Station 9 due to the lack of mussel.
- Between stations boulders were turned over and checked for adult crabs.

Processing of Mussel Samples:

- Samples were refrigerated overnight and processed the following day
- All samples sieved with a (1mm) mesh
- All crabs removed and identified under a dissecting microscope.

Maps

Maps have been produced below showing where the mussel bed is in relation to the other mussel beds in Morecambe Bay and the location of the tracks and where the samples were collected.

Visual Inspection

Table 1 shows the number of crabs that were identified during the visual inspection. Stations where no crabs were found have been omitted from the table. The survey recorded four species of crab; shore crab (*Carcinus maenas*), long-clawed porcelain crab (*Pisidia longicornis*), edible crab (*Cancer pagurus*), and spider crab (*Maja squinado*).

Table 1 - showing the species and number of individuals that were recorded at each station during the timed search.

Station Number	Species and no. of individuals
2	7 juvenile shore crabs
3	1 juvenile shore crab
4	2 long-clawed porcelain crabs
5	3 juvenile shore crabs
8	2 adult shore crabs (dead)
16	5 adult shore crabs (dead)
17	1 juvenile spider crab (dead)
27	2 shore crabs (dead)
28	3 shore crabs (dead), 1 edible crab (dead)
29	2 shore crabs (dead)
30	1 shore crab (dead)
Total	11 live shore crabs, 15 dead shore crabs, 2 long-clawed porcelain crabs, 1 dead spider crab, and 1 dead edible crab

Sample Results

Table 2 shows the number of each species of crab that were present in each sample. In Sample 3 a berried female hermit crab (*Pagurus* sp.) was recorded and a single long-clawed porcelain crab (*Pisidia longicornis*) was recorded in Sample 4. All other crabs were juvenile shore crabs (*Carcinus maenas*).

Table 2 - showing the species and number of individuals that were recorded in each sample.

Station Number	**Species and no. of individuals**
1	2 juvenile shore crabs
2	7 juvenile shore crabs
3	2 juvenile shore crabs & 1 hermit crab (berried)
4	5 juvenile shore crabs & 1 long-clawed porcelain crab
5	1 juvenile shore crab
6	2 juvenile shore crabs
7	3 juvenile shore crabs
8	No crabs recorded
9	No sample
10	1 juvenile shore crab
11	2 juvenile shore crabs
12	2 juvenile shore crabs
13	4 juvenile shore crabs
14	2 juvenile shore crabs
15	1 juvenile shore crab
16	1 juvenile shore crab
17	1 juvenile shore crab
18	4 juvenile shore crabs
19	2 juvenile shore crabs
20	2 juvenile shore crabs
21	2 juvenile shore crabs
22	1 juvenile shore crab
23	No crabs recorded
24	4 juvenile shore crabs
25	1 juvenile shore crab
26	2 juvenile shore crabs
27	No crabs recorded
28	3 juvenile shore crabs
29	2 juvenile shore crabs
30	6 juvenile shore crabs
31	1 juvenile shore crab
32	2 juvenile shore crabs
33	2 juvenile shore crabs
34	1 juvenile shore crabs
35	4 juvenile shore crabs
36	No crabs recorded
37	No crabs recorded
Total	76 juvenile shore crabs, 1 hermit crab, and 1 long-clawed porcelain crab

There was no recorded presence of Chinese mitten crab from the visual inspection, the mussel samples processed in the laboratory, or from under the boulders on the Foulney mussel bed on 24th February 2019.

Additional information

During the time of the survey, barometric pressure was high (1035 hPA) (www.weatheronline.co.uk for Barrow in Furness accessed 1st March 2019) resulting in a better ebb than expected, allowing surveyors to reach the lower extent of the mussel bed. Visibility during the survey was poor due to fog (<50m), which resulted in a reduced survey area over the main skear to ensure that the surveyors remained in sight of each other during the survey period. Survey effort was concentrated around the area of the active fishery.

The characteristic of the bed included loose mussel on the surface of the sediment.

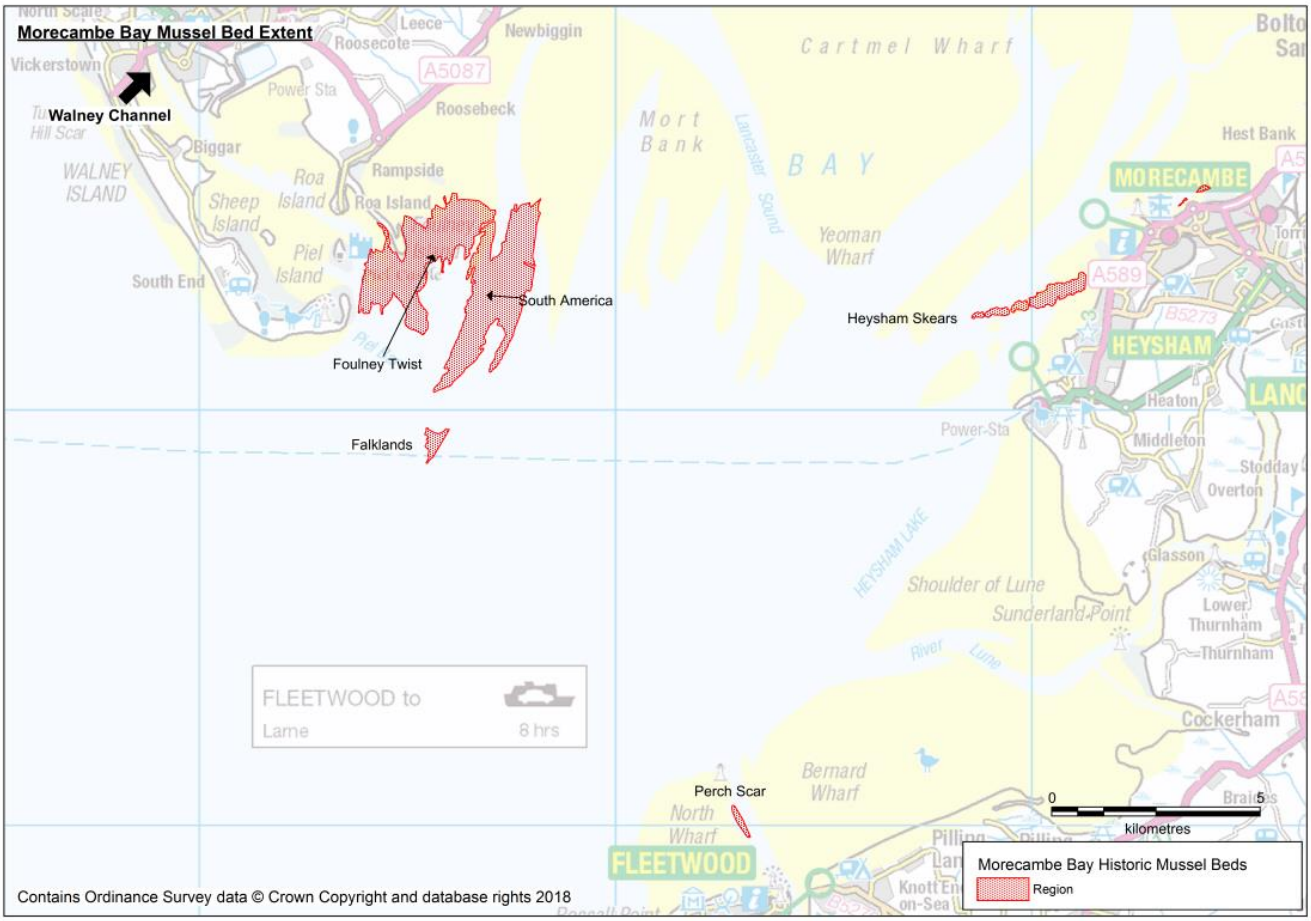

Fig. 1 - Map illustrating the position of Morecambe Bay mussel beds in relation to the Walney Channel.

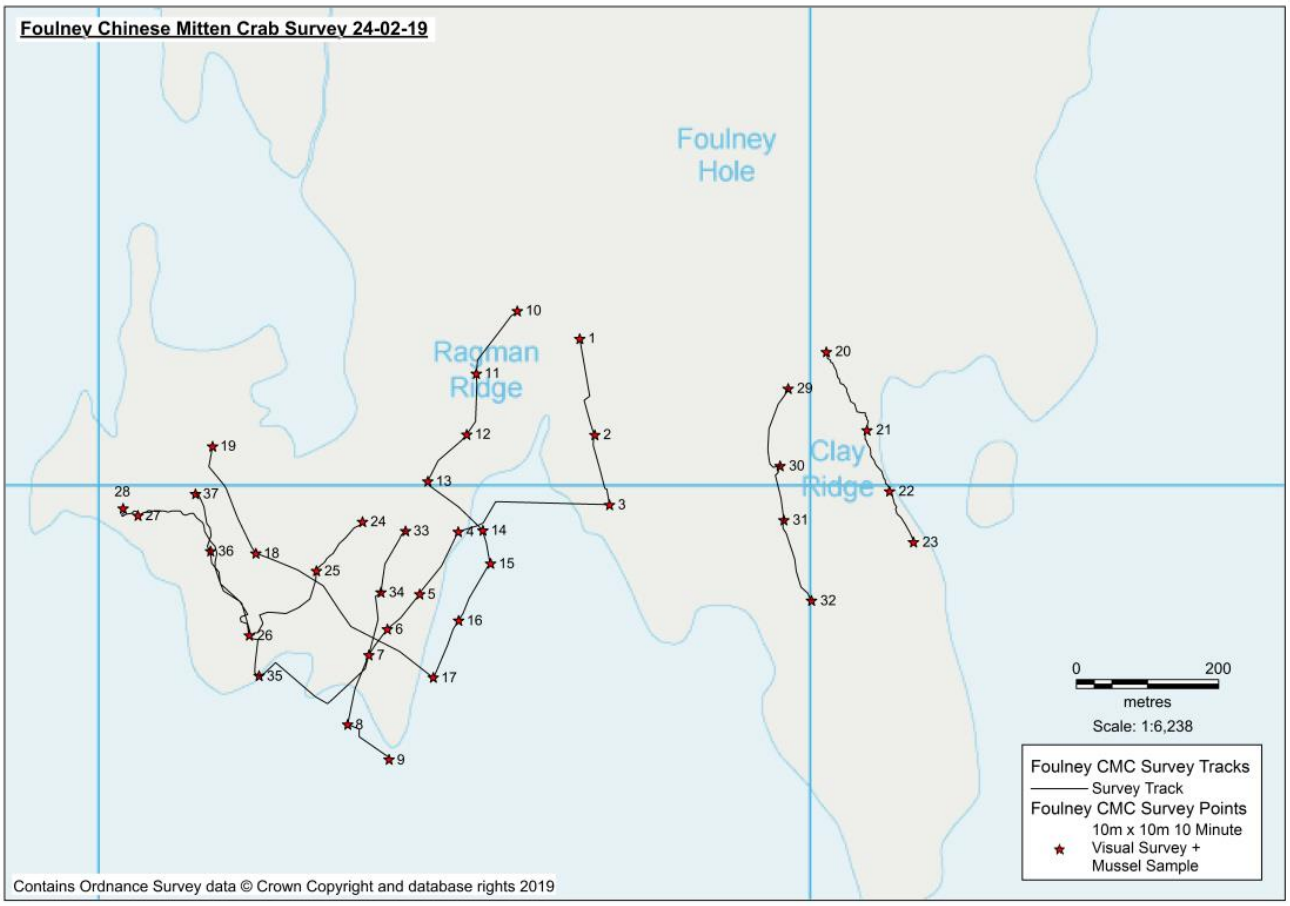

Fig. 2 - Map indicating the location of tracks and sampling points at Foulney from the 24th of February survey.

Fig. 3 - Foulney mussel bed 24th February 2019

Fig. 4 - the nature of the mussel and sediment. Foulney mussel bed 24th February 2019

Heysham Flat Chinese Mitten Crab Survey 25-02-19

Officers Present: Four NWIFCA scientists
Tide LW 09:39 1.77m (Liverpool tides)

Reason for Survey: To survey the mussel bed for the presence of Chinese mitten crab after photographic records from May 2018 suggested that the species was present in the Walney Channel (North Morecambe Bay).

Survey methodology: As described in the SOP for screening seed mussel beds for Chinese mitten crab (*Eriocheir sinensis*) by Dr A Woolmer (2011).

- A total of 31 stations were surveyed across the mussel bed.
- At each station 10 minute timed visual inspection of 10m by 10m area were completed.
- A mussel sample was taken from each station, which targeted clumps of byssus attached mussel (rather than the loose clean mussel) – including around 5cm of sediment.
- Between stations, boulders were turned over and checked for adult crabs.

Processing of Mussel Sample:-

- All samples sieved with a (1mm) mesh.
- All crabs removed and identified under a dissecting microscope.

Maps

Maps have been produced below showing where the mussel bed is in relation to the other mussel beds in Morecambe Bay and the location of the tracks and where the samples were collected.

Visual Inspection

Before starting the timed search the officers conducted a targeted search by turning over and inspecting boulders along the skear as the tide ebbed. Over 82 boulders were overturned and inspected and a total of 26 live shore crabs (*Carcinus maenas*) were observed. During the 10 minute timed visual inspections no crabs were observed at any of the sample stations.

Sample Results

Table 1 shows the number of juvenile shore crabs that were present in each sample. No other species of crab were identified in the samples.

Table 1 - The number of individuals that were observed in each sample.

Station Number	No. of juvenile shore crabs (*Carcinus maenas*)
1	1
2	0
3	4
4	0
5	2
6	1
7	1
8	0
9	1
10	0
11	4
12	0
13	0
14	1
15	0
16	1
17	0
18	0
19	1
20	4
21	0
22	0
23	0
24	0
25	2
26	1
27	0
28	1
29	0
30	1
31	0
Total	26

There was no recorded presence of Chinese mitten crab from the visual inspection, the mussel samples processed in the laboratory, or from under the boulders on Heysham Flat on the 25th of February 2019.

Additional Information

The characteristics of the bed included mussel that were hard in to the sediment. The majority of the cobbles are embedded in the sediment leaving few crevices for anything to get underneath as shown in Figure 4.

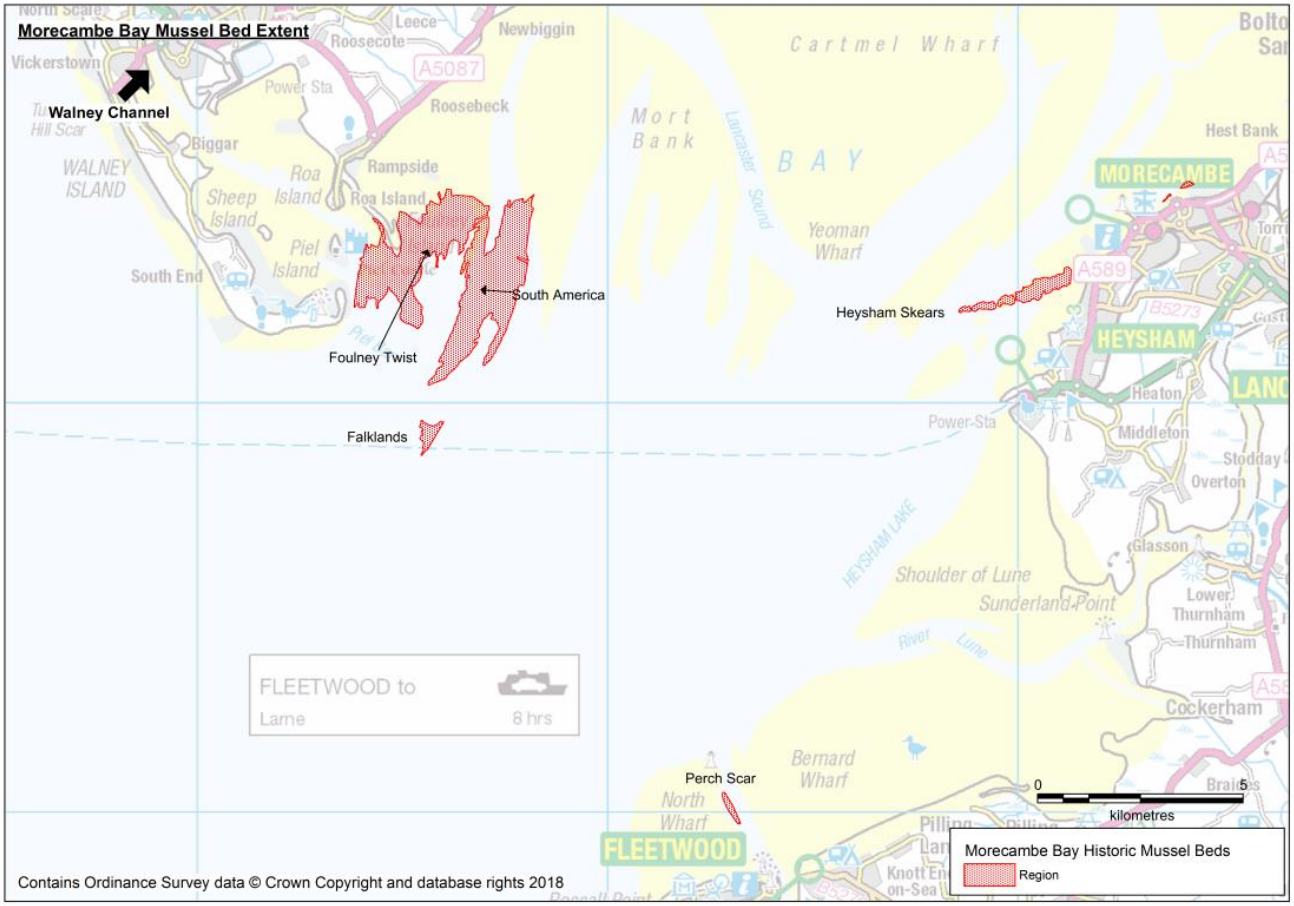

Fig. 1 – Map illustrating the position of Morecambe Bay mussel beds in relation to the Walney Channel.

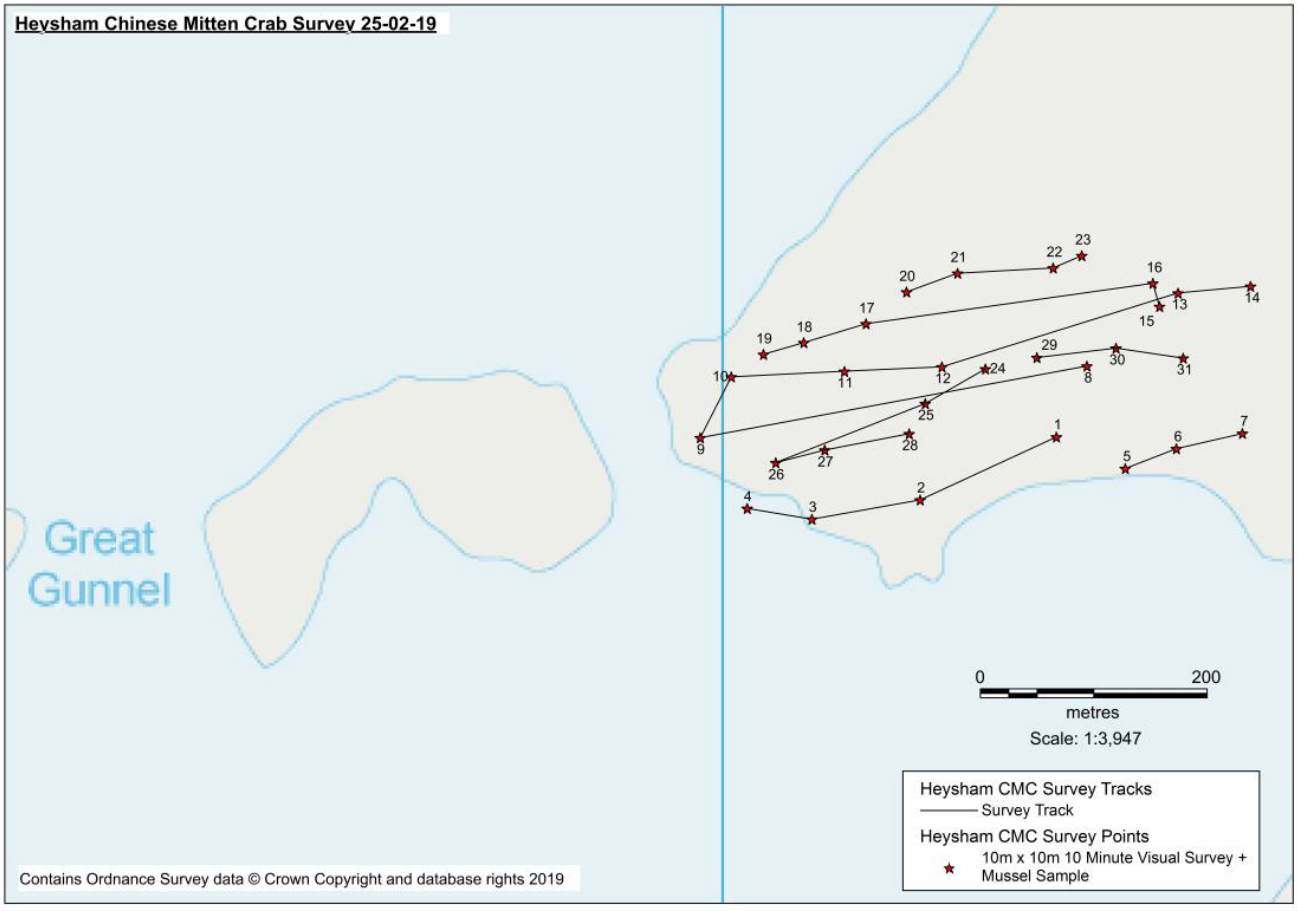

Fig. 2 - Map indicating the location of tracks and sampling points at Heysham from the 25th of February survey.

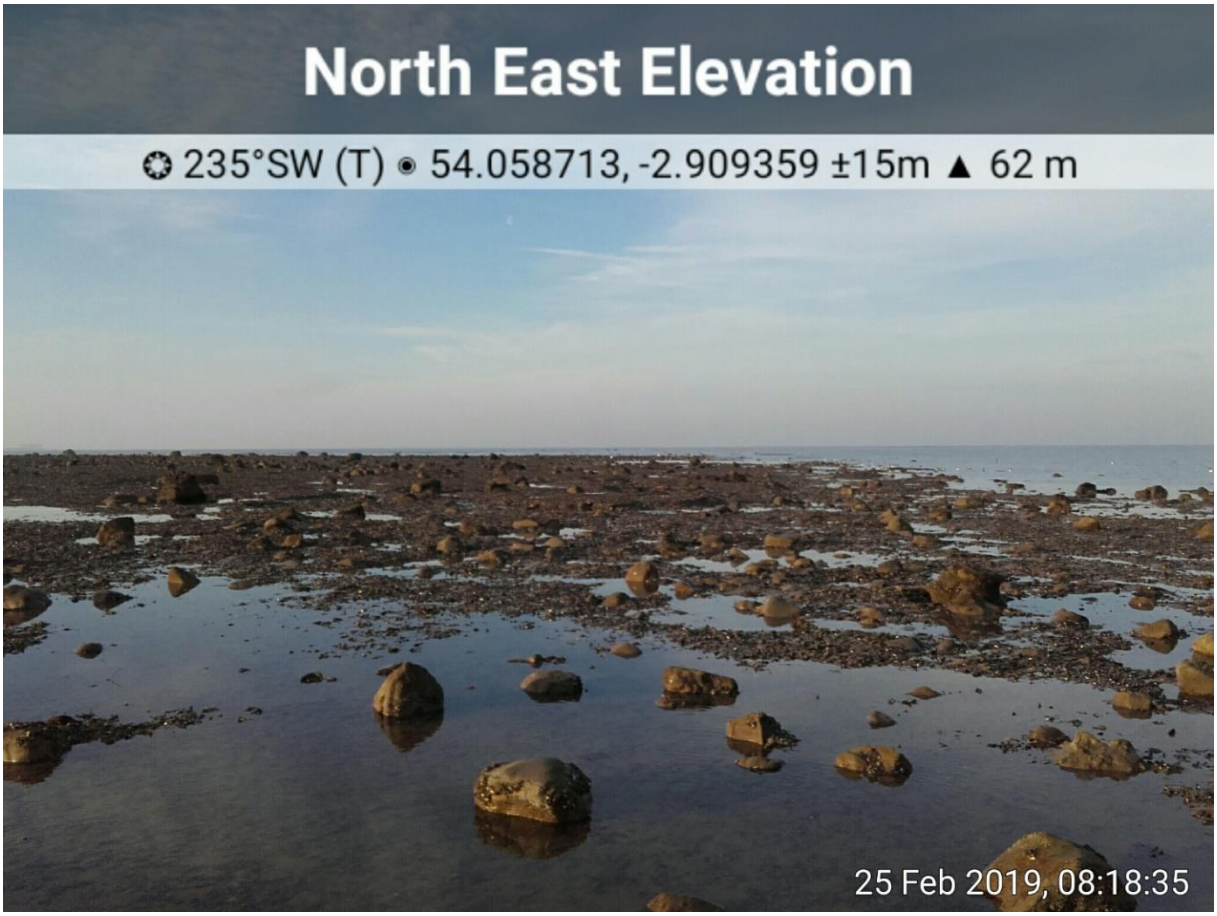

Fig. 3 - Nature of the cobble and boulder skear at Heysham Flat 25th February 2019

Fig. 4 - Indication of how the cobbles are embedded in the sediment leaving few crevices

at Heysham Flat skear 25th February 2019

Fig. 5 - Current condition of the mussel bed (pre recruitment) at Heysham Flat skear 25th February 2019

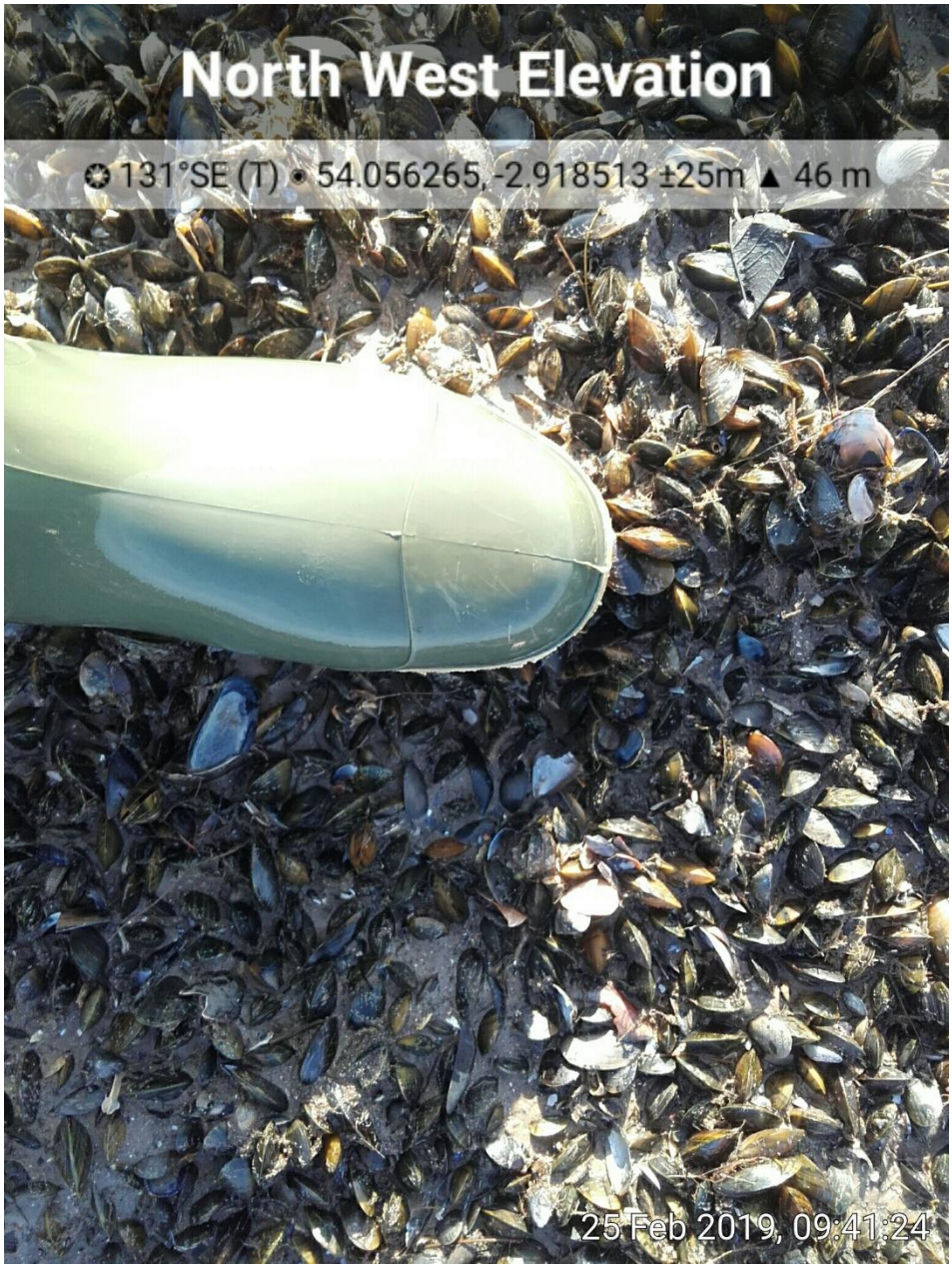

Fig. 6 - Illustration of hard in mussel at Heysham Flat skear 25th February 2019