NWIFCA Morecambe Bay Chinese Mitten Crab Surveillance Report March 2020

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Morecambe Bay mussel beds are a valuable economic resource for NWIFCA stakeholders, particularly Byelaw 3 permit holders, and for aquaculture production businesses around the UK and Eire. 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 have been carried out quarterly since August 2018 on the mussel beds at Heysham Flat skear and Foulney in Morecambe Bay, and reports have been circulated.

A size mussel fishery has been prosecuted on the Foulney skear throughout the winter 2019-20. Surveillance surveys have been carried out in March 2020 and reported below. As in all previous surveys no Chinese Mitten Crabs were found.

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.

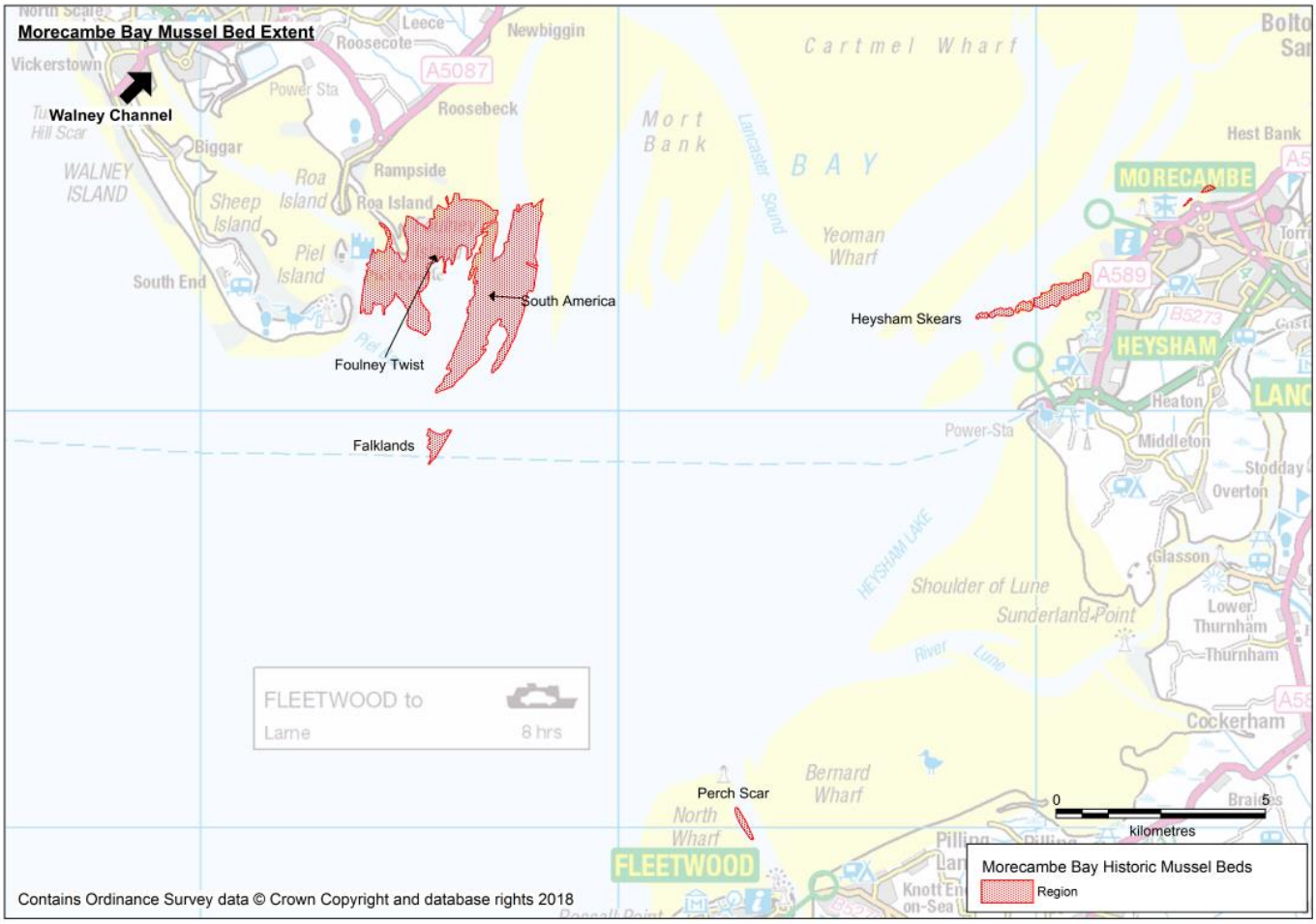

Fig. 1 – Map illustrating the position of Morecambe Bay mussel beds in relation to the Walney Channel

Heysham Flat Chinese Mitten Crab Survey / Mussel Inspection 12-03-20

Officers Present: 2 NWIFCA officers - qualified marine biologists
Tide LW 07:30 0.4m (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).

Survey Note

The extent of dense 2019 seed mussel had been scoured to bare cobble with dead mussel shell. This could be due to the seed mussel becoming very unstable in summer of 2019 as it had been seen to have started washing out in August (NWIFCA scientists). It could also be attributable to the severe winter storms, in particular storm Ciara and Dennis in February 2020.

Due to the lack of mussel a survey of the mussel for the presence of Chinese Mitten Crab this quarter could not be completed. The compacted nature of the cobbles made it difficult to complete a search by inspecting under rocks. The Chinese Mitten Crab survey was therefore aborted.

There was some evidence of a small 2020 mussel spat settlement.

Fig. 2 - Heysham Flat 12-03-20 - looking northwest over Dallam Dyke with evidence of bare cobble substrate.

Fig. 3 -Heysham Flat 12-03-20 - main skear showing cobble substrate washed bare of mussel.

Foulney Chinese Mitten Crab Survey 14-03-20

Officers Present: 2 NWIFCA scientists - qualified marine biologists
Tide LW 08:50 1.1m (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 25 stations were surveyed across the mussel bed.
- At each station a 10 minute timed visual inspection of 10m by 10m area was completed.
- Samples were taken from all stations, targeting clumps of byssus attached mussel – including approximately 5cm of sediment.
- Between stations, boulders were turned over and checked for adult crabs.

Processing of Mussel Samples:

- Samples were washed, separated and then refrigerated. They were processed 3 days later.
- All samples sieved with a (1mm) mesh.
- All crabs removed and identified under a dissecting microscope.

Visual Inspection at survey stations

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 2 x whole dead adult shore crabs, 2 x live adult shore crabs, 1 x live hermit crab, 2 x dead juvenile shore crabs, 1 shore crab claw and 1 x parts of an adult shore crab (*Carcinus maenas*).

Station Number	Species and no. of individuals
J3	1 x dead shore crab
J8	2 x live shore crab
J9	1 x live hermit crab
J12	1 x dead shore crab
M1	1 x dead juvenile shore crab
M9	1 x dead juvenile shore crab + 1 x shore crab claw
M10	1 x parts adult shore crab

Table 2 shows the number of crabs that were present in each sample. Samples with no crabs have been omitted. There was one species of crab identified from the samples shore crab (*Carcinus maenas*).

Station Number	Species and no. of individuals
J2	1 x juvenile shore crab
J3	2 x juvenile shore crab
J6	2 x juvenile shore crab
J7	3 x juvenile shore crab
J8	1 x juvenile shore crab
J10	1 x juvenile shore crab
J11	1 x juvenile shore crab
J12	1 x juvenile shore crab
M2	4 x juvenile shore crab
M3	1 x juvenile shore crab
M4	4 x juvenile shore crab
M5	6 x juvenile shore crab
M6	1 x juvenile shore crab
M8	5 x juvenile shore crab
M9	1 x juvenile shore crab
M10	4 x juvenile shore crab
M11	2 x juvenile shore crab
Total	**40 juvenile shore 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 14th March 2020.

Additional information

Visibility during the survey was very good, survey effort covered the main skear and on to the island where dense size mussel was being gathered by permit holders. Mussel of varying sizes was abundant across most of the skear with occasional scoured out areas. Mussel spat settlement was consistently dense across the skear.

There were occasional starfish. Shore crab abundance was low, especially along the eastern part of the skear, suggesting that main settlement from the water column had not yet occurred.

A sample of size mussel was taken for consumption and one juvenile crab found within the sample. This was examined under hand held digital microscope and found to be a shore crab - images below showing lack of 4 x 4 x 4 pattern of teeth around front of shell, and lack of notch between the eyes.

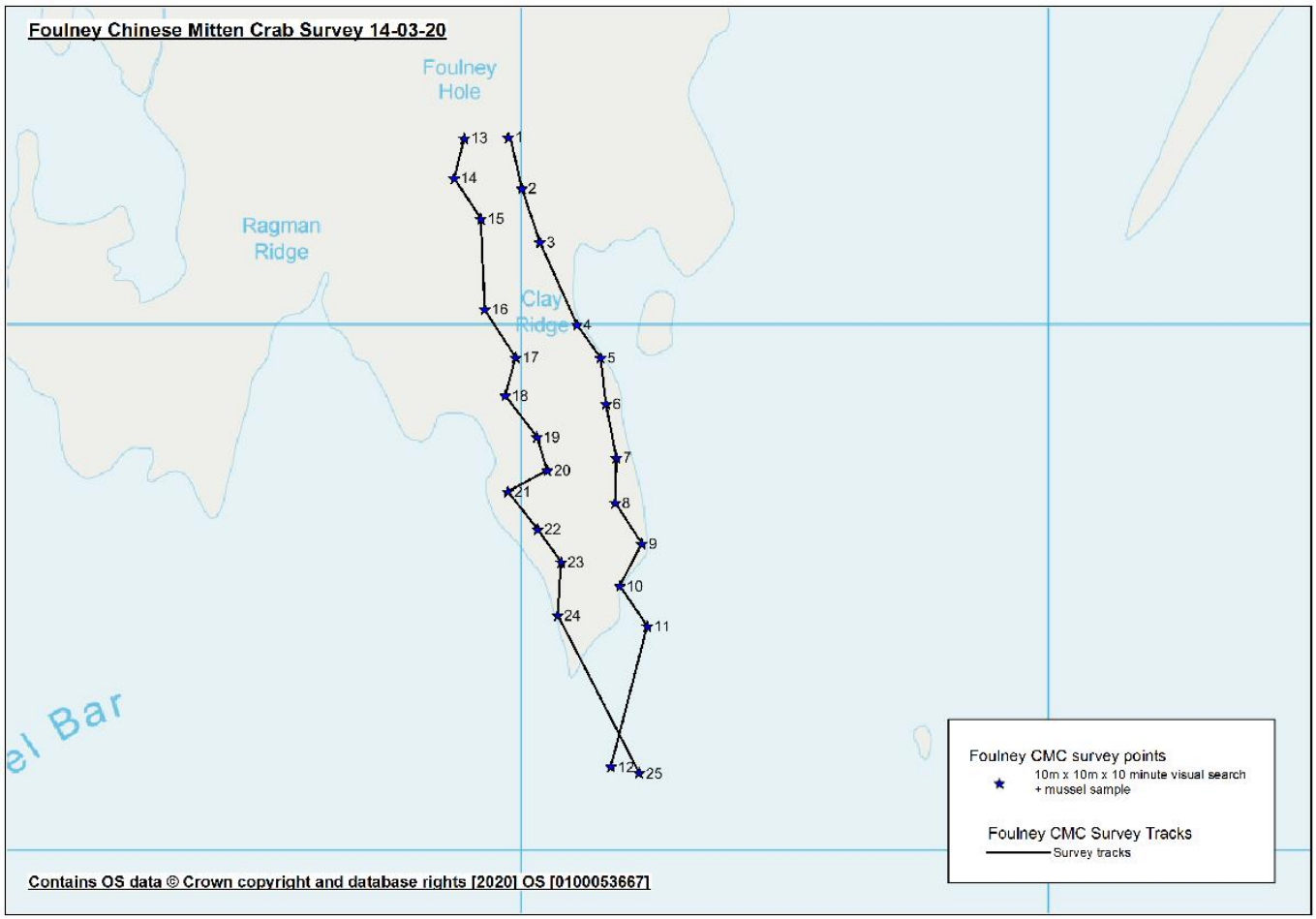

Fig. 4 - Map indicating the location of tracks and sampling points at Foulney from the 14th March 2020 survey.

Fig. 5 - juvenile shore crab right side of carapace found in sample of size mussel Foulney 14-03-20

Fig. 6 - juvenile shore crab between the eyes found in sample of size mussel Foulney 14-03-20

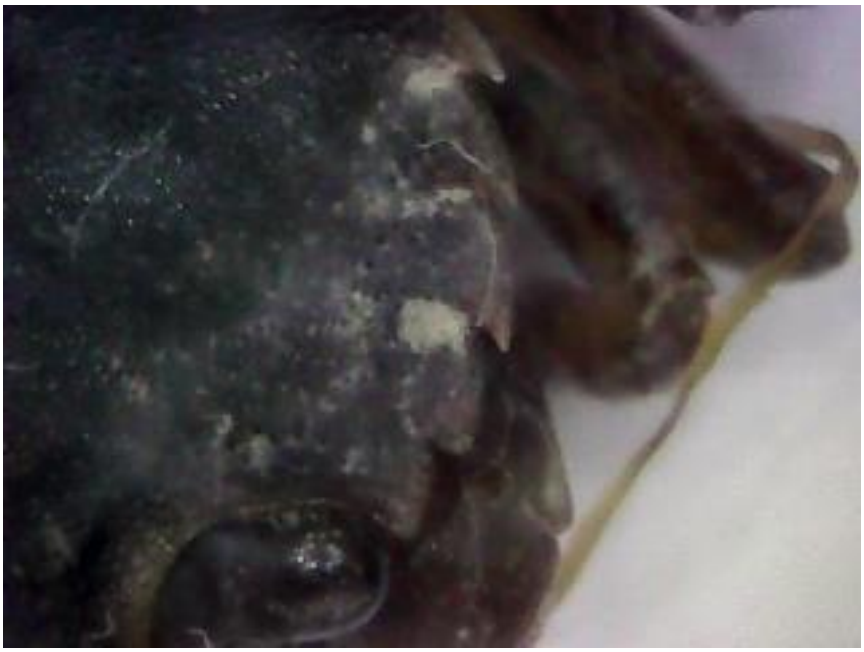

Fig. 7 - juvenile shore crab left side of carapace found in sample of size mussel Foulney 14-03-20