# NWIFCA Authority meeting 22<sup>nd</sup> of June 2023: 10:00 a.m.

Agenda Item 12

#### SCIENCE REPORT FOR INFORMATION 23<sup>RD</sup> OF MARCH – 22<sup>ND</sup> OF JUNE 2023

## Purpose: To provide an update on the work of the Science Team in the quarter.

#### Recommendation: Report for information, Receive the report

This quarter, the main priorities of the science team have been to complete the whelk track record appeal, set up the summer whelk sampling program, progress with drone procurement, draft a cockle fisheries management plan, undertake mussel MLS work and develop the 2023 survey season schedule.

#### Key achievements since the previous meeting:

- 1) Completed the Cold Weather Protocol.
- 2) Carried out the first and second stage of the mussel MLS study mapping the extent of smaller mussel and collecting and analysing samples.
- 3) Completed Byelaw 4 track record appeals review.
- 4) Carried out ten mussel bed inspections and one cockle survey with associated reports.
- 5) Developed the 2023 survey schedule.
- 6) Five consultation requests and six dispensation requests provided and three dispensation requests provided.

#### ONGOING WORK STREAM UPDATES:

#### 1. POTTING PERMIT BYELAW

#### a) Permit database

The science team have been working to set up a database for the suitable logging and analysis of returns data. It is now agreed that a new database will be introduced in 2023, science officers will feed into the returns section to improve recording returns and new ways of analysing the data to help management.

#### b) Whelk track record appeal

The final appeals application for the whelk potting permit was finalised and completed end of March.

#### 2. COCKLE AND MUSSEL

#### a) Surveys and inspections

Survey and inspection reports are provided in Annex 1 of this report.

 Table 1. Survey and inspections this quarter.

Surveys and inspections this quarter	Date	
Mussels		
Morecambe Bay (Figure 1):		
Foulney stunted DW survey*	04-04-23	
Walney Channel DW	05-04-23	
Foulney stunted additional sample collection*	19-04-23	
South America inspection	20-04-23	
Heysham inspection	09-05-23	
Wyre End	06-06-23	
Fleetwood	07-06-23	
Solway (Figure 2):		
Ellison Scar	18-05-23	
Dee (Figure 3):		
West Kirby	23-05-23	
Thurstaston	23-05-23	
Cockles	_1	
Morecambe Bay:		
Warton Sands inspection	16-05-23	

 $^{\ast}$  The results of these surveys are provided in the preliminary report presented in Agenda item 8 at TSB on May 9th.



Figure 1. Surveyed and inspected beds in Morecambe Bay from 23<sup>rd</sup> March to 8<sup>th</sup> of June 2023.



Figure 2. Surveyed and inspected beds in the Solway from  $23^{rd}$  March to  $8^{th}$  of June 2023.



Figure 3. Surveyed and inspected beds in the Dee from 23<sup>rd</sup> March to 8<sup>th</sup> of June 2023.

#### a) Seed mussel fishery 2023

South America and the Falklands mussel beds are assessed each year to see if they can be opened as a hand gathered or seed dredge fishery. This year, between May and July, there will be no spring tides suitable to allow surveying of the South America and Falkland mussel beds. The earliest officers will be able to access the beds are the 6<sup>th</sup> of July and the 4<sup>th</sup> and 5<sup>th</sup> of August. There will be a short turnaround between the date of inspection and next suitable tides for fishing. Therefore, NWIFCA will submit a provisional HRA to Natural England with agreed criteria for the fishery to meet, for agreement subject to final inspection results. This will allow a decision on the HRA to be made shortly after inspection, and should a fishery be HRA compliant, it can be

taken to TSB for approval by email. NWIFCA are in the process of drafting the provisional HRA.

#### b) Dee cockle fishery order

The SS attended the Dee Estuary Cockle Fishery Meeting on the 11<sup>th</sup> of May. Members of NRW presented their survey results and total allowable catch estimates for the year. They also discussed potential avenues for the fishery regulating order (RO), with the Bury inlet becoming a public fishery, and the potential options for the renewal of the Dee cockle fishery order. This is still in a very early stage with many options still on the table. They also discussed increasing license fees and other potential fisheries. The SS will continue to keep updated on the progress of the RO.

#### c) Cold Weather Protocol

During periods of severe cold weather, the NWIFCA must assess whether fishing activities taking place within a Special Protection Area (SPA) pose a risk to the designated bird species. This requirement arises from the legal obligation upon the NWIFCA to carry out a Habitats Regulation Assessment (HRA) for activities it regulates and to implement any mitigation measures identified as necessary.

Following the suspension of the Penfold Fishery, officers deemed it important that a cold weather protocol be drafted to set out the criteria that must be met and the steps that NWIFCA will follow. The protocol sets out a definition of severe cold and the threshold that would trigger a suspension, agreed weather stations and criteria for lifting the suspension. The document also details how NWIFCA officers will communicate with Natural England, Industry and Authority Members during such an event. The protocol is now finalised and available on NWIFCA's website: <a href="https://www.nw-ifca.gov.uk/app/uploads/NORTH-WEST-IFCA-INTERTIDAL-FISHERY-COLD-WEATHER-PROTOCOL-WEBSITE-VERSION-1.pdf">https://www.nw-ifca.gov.uk/app/uploads/NORTH-WEST-IFCA-INTERTIDAL-FISHERY-COLD-WEATHER-PROTOCOL-WEBSITE-VERSION-1.pdf</a>

#### d) Survey drone procurement

Officers have almost completed the theory training and will be arranging for the practical and purchasing of the drone in the coming months.

#### 3. NWIFCA RESEARCH PROJECTS

#### a) Coastal Resilience

NWIFCA and Salford University were unsuccessful in attaining funding for the FISP project looking into the decline of shrimp across the NWIFCA District (detailed in previous reports). However, the University of Salford is putting together an expression of interest for a research bid looking into coastal resilience. This is a trans-disciplinary project looking at natural capital and ecosystem services of the bay. NWIFCA have been asked to participate as a stakeholder in this work.

#### b) Whelk Fisheries in the North West

A new sampling schedule for the summer of 2023 has been developed. The aim is to identify the size-at-maturity for whelks in the NWIFCA District. Previous work has not provided a consistent dataset from which to make accurate calculations on the size-at-maturity of whelks. Therefore, a 2023 summer sampling schedule has been developed. The plan is for whelk samples to be provided by fishers once per month

from May to September from the main fishing grounds. Once a size-at-maturity estimate has been identified, we can assess the appropriateness of the MLS flexible permit conditions. The project aims to be completed by winter 2023.

MMO dispensation for the works and all the necessary agreements and equipment for sampling have been provided to fishers. NWIFCA will expect to receive first lot of samples this month. The aim is to carry out analysis after the cockle survey season.

#### c) Mussel Minimum Landing Size

NWIFCA officers have been undertaking surveys of the Foulney mussel bed following the request from Members to reduce the mussel minimum landing size of 45 mm to 40 mm. Table 2 provides a timeline of the workstream to date and the actions of officers.

Date	Report	Action
TSB 10 <sup>th</sup> May 2022	Agenda Item 8 Mussel MLS	Letter from Authority Members requesting a reduction in mussel MLS from 45 mm to 40 mm
29 <sup>th</sup> June 2022	n/a	NWIFCA issue a consultation to Industry to establish the consensus and obtain views on the proposal.
17 <sup>th</sup> July 2022	n/a	Deadline for Industry consultation responses
TSB 2 <sup>nd</sup> August 2022	Agenda Item 12 Mussel MLS Consultation	Officers present the results of the consultation to TSB. Fourteen out of twenty to 30 mussel fishermen had responded to the consultation. The consensus from industry being a localised, temporary reduction subject to biological conditions is the desired option. Industry indicated that there are areas of 'stunted mussel' on Foulney which should be the focus of further study. Members vote for officers to put together a plan for undertaking this work.
TSB 1 <sup>st</sup> November 2022	Agenda Item 9 Mussel minimum landing size	Officers present the strategy for investigating the stunted mussel on Foulney mussel bed and the potential for a localised, temporary reduction in mussel MLS in this area.
26 <sup>th</sup> January 2022	n/a	Officers visit Foulney mussel bed to map the area and discuss with fishers their views on the area of stunted mussel. Fishers report that the 2.5m tide contour would be appropriate to map.
13 <sup>th</sup> February 2022	n/a	Officers map the 2.5m tide line on Foulney.
4 <sup>th</sup> April 2022	n/a	12 <sup>th</sup> and 14 <sup>th</sup> of March officers scheduled in surveys but are unable to complete due to the weather. On the 4 <sup>th</sup> of April officers complete a Dutch Wand survey of the upper area of Foulney mussel bed.

Table 2. Timeline of the mussel MLS study to date

18 <sup>th</sup> April	n/a	Officers collect samples for analysis of barnacles, pearling and age and initiate
		analysis.

Mussels are a protected feature of the Morecambe Bay SAC under 'Intertidal biogenic reef mussel bed' features. They are also a supporting habitat of the Morecambe Bay and Duddon Estuary SPA designated to protect specified bird species. Any activity that has the potential to impact the feature which is not directly linked to its management has to undergo a habitats regulation assessment (HRA). The information gathered in this study will help inform a decision on management, and a potential HRA. Once analysis has been completed, and a plan proposed for how a trial removal and reduction in MLS may work in practice, a HRA will be completed to assess the impact on the protected features.

Preliminary results were presented at the May TSB and can be found in the associated TSB report.

#### 4. MARINE PROTECTED AREAS IN THE NWIFCA DISTRICT:

#### a) Highly Protected Marine Areas (HPMAs)

NWIFCA have been in discussions with Natural England regarding establishing a baseline monitoring program for assessing the changes in Allonby Bay HPMA alongside local fishers. The research project is currently in the early stages of development.

#### b) Marine Natural Capital

NWIFCA officers have been engaging with local Natural England intertidal surveys in the Solway and Morecambe Bay. The surveys look to gather information on prey availability for protected bird species and will help to contribute to our understanding of bird food requirements. NWIFCA are also in contact with the AIFCA Natural Capital technical officer who is feeding back information from the national level, to help inform our fisheries management plans and potential work on coastal resilience.

#### 5. FISHERIES MANAGEMENT

#### a) Fisheries Management Plans

Update provided in Agenda Item 13.

#### b) Cockle management plan

A first draft of the NWIFCA cockle fisheries management plan (CMP) is being developed to provide a framework for future decision making and management. This plan is being informed by the ongoing national FMP work and developed in line with the current guidance available. It is also necessary in the light of the upcoming national FMPs to have a clear framework which we can put forward during the data collection phase.

#### 6. MMO MARINE LICENCE AND OTHER CONSULTATIONS FOR THE QUARTER

#### a) Morecambe Bay Offshore Wind

Officers responded to the most recent consultation request on the works and discussed issues of concern with local stakeholders which were submitted in our formal response.

#### b) Mersey Tidal Power Project

NWIFCA officers had a meeting with consultants on the 27<sup>th</sup> of March to get an update on the project and provide information necessary to the Impact Assessment.

#### c) Geological Disposal Facility (GDF)

No further update

#### **Consultations this quarter:**

- Walney Extension Offshore Windfarm: Maintenance works
- Mona Offshore Trials (Suction bucket foundation trials)
- Heysham Power Station Routine Marine Structure Maintainence
- Maintenance Dredging and Disposal of Garston Approach Channel and Garston Docks
- Deganwy Marina Maintenance Dredge and Disposal, Conwy
- Morecambe Offshore Wind Farm Generation Assets Consultation
- Morgan and Morecambe Offshore Wind Farms: Transmission Assets Consultation
- Jetty Repair Works at Cemex Raynes Quarry

#### **Dispensations this quarter:**

- CEFAs Nephrops Catch Sampling 2023
- CEFAS Irish Sea Beam Trawl Surveys 2023

#### 7. WORKING GROUPS AND MEETINGS

#### a) Technical Advisory Group

The SS attended the TAG working group meeting on the 19<sup>th</sup> of May. The group discussion focused around: the MMO's management success review of MPA's, the introduction of Natural Capital, exploring the problems with the crab and lobster decline in the North East, and the introduction of the new permit database system.

#### c) Whelk Working Group

NWIFCA attend, and contribute to, the biannual Whelk working group (WWG). The group brings together members of all IFCA's, NE, relevant stakeholders, researchers and government bodies (Welsh government, cefas etc.) from across the UK to share research and current management strategies in order to learn from one another. Next meeting TBC.

#### 8<sup>th</sup> of June 2023

### Annex 1 Mussel surveys and inspections:

#### Walney Channel Dutch Wand Mussel Survey Note 05-04-23

Officers present: MC, JH

Low water: 18:39 1.4m (Liverpool Tides)

Survey method: Dutch Wand

Line transects were completed across the mussel bed using a Dutch Wand, transects start and finish at the edge of the bed as shown in Figure 2. The number of hits and misses of live mussel were recorded to give percentage cover. The bed area was calculated from the start and end of transects and from observations of officers whilst surveying. It was not possible to walk the perimeter of the bed due to time and tide restraints. A mussel sample was taken every 50 hits using a 10 cm diameter corer. 6 transects were completed and 7 samples collected. The total weight of live undersize and size mussel was recorded as well as the size frequency of each sample. No seed settlement was observed during the survey. Note, not all size mussel is fishable due to the presence of fouling species on slower growing individuals or the mixing of undersize and size in close proximity that prevents the removal of sizeable mussel without removing undersize.

From the transect and sample data the total mussel bed surveyed was 8.05 hectares.

#### Biomass

#### 510 tonnes size mussel and 138 tonnes undersize mussel

#### **Length Frequencies**

The total length frequency for the surveyed bed is provided in Figure 3. From the length frequency data the majority of mussel present on the Walney channel bed is currently a mix of size and undersize mussel mainly between 42mm and 54mm.

#### Maps

The frequency of each size class of mussels per sample has been mapped in Figure 4 with the size of the pie adjusted for sample weight standardised to kg/m<sup>2</sup>. The weight of the size and undersize mussel has been mapped and represented in Figure 5.

It can be seen in Figure 4 and Figure 5 that the size mussel >45mm is present across the entire bed, and 25-45mm mussel in the central region of the survey area. Very little <25mm mussel was present in the survey area.



Figure 1 – Location of Walney Mussel Bed surveyed 05-04-23.



Figure 2 – Walney Dutch Wand survey transects and estimated bed area.



Figure 3 – Histogram showing size frequency of mussels from all samples on Walney Channel.



Figure 4 – Frequency of mussel by size class.



Figure 5 – Proportion of size and undersize mussel by weight represented as  $kg/m^2$ .

#### South America Mussel Inspection (Quad) 20-04-23

LW: 19:06 0.7m (Liverpool tides)

An inspection of South America was completed to assess the condition of the mussel previously inspected in February. Although tide and conditions were good, access remains limited to a short period over low water due to the depth and size of the channel needing to be crossed.

NWIFCA Track data has been provided in Figure 1. There are three distinct areas, an area of *Sabellaria alveolata*, an area of stoney substrate with a new 2023 mussel settlement, and the area which has previously had mussel present on it.

As previously reported there is a large area of *Sabellaria alveolata* which has colonised the stoney substrate along the channel edge as highlighted in Figure 1. There was no observed mussel settlement on the area of *Sabellaria alveolata*.

The area highlighted in blue on figure 1, has received a 2023 mussel settlement since the last inspection in February. Figure 1 show the extent of the mussel. The mussel coverage is patchy with it only being present on the exposed hard substrate (Figure 3 and 4). There is the occasional small hummock of *Sabellaria alveolata*.

The area highlighted in red on Figure 1 and 2, show the area which has been present for a number of years. The perimeter of the exposed bed was walked. The mapping to the North and East is the extent of the mussel bed, but the bed likely extends into the water to the South and Southwest direction. Figure 2 provides an annotated map. The area is a mix of cobble and, newly settled mussel, and mussel which has persisted since 2022, some of which has reach size. To the North of the bed there are patches of *Sabellaria alveolata*.



Fig 1. Map of South America and surrounding areas of interest



Fig. 2 Map of South America with additional comments



Figure 3. Overview of the new area of 2023 mussel settlement 20-04-23



Figure 4. 2023 mussel settlement 20-04-23



Figure 5. 2023 mussel settlement with a small hummock of Sabellaria alveolata 20-04-23



Figure 6 - Overview of South America 20-04-23



Figure 7 – 2023 mussel settlement mixed with 2022 size mussel 20-04-23



Figure 8 – 2023 mussel settlement mixed with 2022 size mussel 20-04-23

#### Heysham Flat Mussel Inspection 09-05-23

Officers present:MC, GGTidesLW 08:48 1.6m (Liverpool tides)

Officers inspected the mussel on Heysham Flat to assess if mussel was present and if seed settlement had occurred. Access to the outer skears was not possible across Dallam Dyke due to depth of water and timings.

There is a significant historic *Sabellaria alveolata* reef extending across the skear from close to Conger Rock to Dallam Dyke (Figure 2 and 3). The reef is a mixture of remnant, dead reef and new live reef structures. The reef is in a similar location to last year, and the extent of the *Sabellaria alveolata* has been mapped from this survey (Figure 1).

There was very little mussel persisting from last year, but there was an extensive seed settlement across the majority of the skear. The seed coverage over the entire skear was predominantly 70-80%. The seed ranged in size from 2-3mm to 10mm, and covered all substrates, including cobble, dead shell, remnant and live *Sabellaria* sp. Knott End skear also appeared to have a seed settlement.





Figure 1. Map showing the extent of Sabellaria sp. on Heysham Flat survey 09-05-23.



Figure 2: Remnant Sabellaria sp. covered in seed 09-05-23.



Figure 3: Seed settlement at Heysham 09-05-23.



Figure 4: Mixed seed, mussel and dead shell 09-05-23.



Figure 5: Live Sabellaria alveolata covered in dense seed settlement 09-05-23.

#### Ellison Scar Mussel Inspection 18-05-23

Officers: AP, JH, GG, MC, ET

LW: 17:54 1.4m (Liverpool Tides)

The Ellison Scar mussel beds were inspected starting at Inner Ellison, then proceeding to Middle Ellison and Stinking Crag as shown in Figure 1. Due to limitations with the tide and ground conditions, officers were unable to reach outer Ellison.

#### Inner Ellison

Inner Ellison has had a sparse mussel settlement of approximately 50% coverage (Figure 2). The mussel was less than >10mm and has put down shallow mussel mud (Figure 3). The area closer to shore and further south was flat with uniform undersize mussel (Figure 4), with large boulders in the northern portion (Figure 4). There is an area of Sabellaria extending in patches from the outer area of Inner Ellison (Figure 1) towards Middle Ellison. The approximate area of the mussel was 10 hectares.

#### Middle Ellison

Middle Ellison has had a sparse mussel settlement of approximately 40-50% coverage (Figure 8), closer to the centre of the bed this is mixed in with mussel approximately 30mm in length which is hard in sand substrate (Figure 7). The area has a large number of boulders (Figure 5 & 6), and some shallow mussel mud. There is a large strip of Sabellaria extending out 20 m from the shoreward side of the bed towards the south (Figure 9). The approximate area of the mussel was 6 hectares.

#### Stinking Crag

Stinking Crag also had a large number of boulders and had received a 2023 mussel settlement though with sparse coverage. Sizable (>45mm), clean mussel was present in areas close to the offshore portion of the bed (Figure 10). Mussel in most areas was hard in and there was not much mud (Figure 10). There was evidence of previous scouring and resettlement (Figure 11). The approximate area of the mussel was 2.6 hectares.



Figure 1. Overview of the mussel inspection 18-05-23

Inner Ellison:



Figure 2. Large area of boulder on Inner Ellison



Figure3. Undersize mussel on Inner Ellison



Figure 4. Flat area of mussel with some mussel mud to the north of Inner Ellison

Middle Ellison:



Figure 5. Boulders on Middle Ellison



Figure 6. Boulders and mix of mussel sizes with sparse coverage on Middle Ellison



Figure 7. Undersize mussel hard in



Figure 8. Mix of size classes on Middle Ellison and evidence of 2023 settlement



Figure 9. Extensive Sabellaria field on Middle Ellison

Stinking crag:



Figure 10. Clean size mussel on stinking crag



Figure 11. Evidence of scour and re-settlement on Stinking Crag

#### Wyre End Mussel Inspection 06-06-23

Officers present:MC, JHTidesLW 07:59 (1.4m) (Liverpool tides)

An inspection of Wyre End and channel areas of mussel was completed. The area of the main skear and patches of mussel on the channel edge were mapped to determine areas shown in Figure 1. Observations of mussel and substrate were made across the skear and channel edge areas (Figure 2). There has been a 2023 settlement of seed mussel, varying in density across the main skear. An area of raised cobble/pebble was observed running along the Eastern section of the surveyed area, which was predominantly bare, with some small patches of seed. Eider were observed on the bed.

Seed coverage over the majority of the bed was high, at approximately 80%, and in areas was beginning to put down mussel mud. Some areas had lower patchy density of around 40-50% cover on the channel side. Seed was observed of two different size classes of 5-8mm and 8-12mm. No larger or size mussel had persisted from last year, with only occasional size mixed in with the seed on the channel edge.

The two channel edge areas had seed coverage of 70-80% cover, but the channel edge was not fully visible due to tide constraints.



Figure 1. Approximate bed area boundaries 06-06-23.



Figure 2. Approximate bed area boundaries and observations of the bed made by officers.



Figure 3: Wyre End Mussel Bed 06-06-23.



Figure 4: Seed settlement Wyre End 06-06-23.



Figure 5: Occasional Size mussel mixed in with seed on channel edge.



Figure 6: Channel edge area with seed settlement 06-06-23.

#### Fleetwood Mussel Inspection 07-06-23

Officers: AP, JH, AG, GE

#### LW: 08:45 1.4m (Liverpool Tides)

The Fleetwood mussel beds were inspected starting at Rossall Scar, then proceeding to Necking, Kings and finishing on Perch and Black Scar as shown in Figure 1.

#### Black Scar

Black Scar has had a 2023 mussel settlement of approximately 80-90% coverage (Figure 2). The mussel was less than 10mm and has started to put down mussel mud. The settlement was absent along the Eastern edge of the scar (Figure 3). There were small areas of size mussel along the channel edge. The approximate area of the mussel was 4.5 hectares.

#### Perch Scar

Perch Scar has had a 2023 mussel settlement of approximately 80-90% coverage (Figure 4). The mussel was less than 12mm and has started to put down mussel mud (Figure 5). There were small patches of size mussel along the channel edge. The approximate area of the mussel was 8.4 hectares.

#### Kings Scar

Kings Scar has had a 2023 mussel settlement of approximately 60-80% coverage (Figure 6). The mussel was less than 10mm and has started to put down mussel mud. There were small patches of 30-40mm mussel mixed in. The approximate area of the mussel was 6 hectares.

#### Neckings Scar

As officers are restricted on tide this year the inspection was carried out on a lesser spring tide and therefore the ebb was not a big as it would normally be, restricting the area of neckings scar which could be inspected. No new settlement was observed. Some 30-50mm mussel persists and the area appears to be sanding over compared to previous years (Figure 7).

#### Rossall Scar

The mussel on Rossall Scar was patchy and interspersed with cobble and live Sabellaria alveolata (Figure 8).



Figure 1. Overview of the mussel inspection 07-06-23. NE 60 90 120 SE 150 180 210 © 124°SE (T) LAT: 53.935300 LON: -3.018531 ±13ft ▲ 3ft

Figure 2. Black scar 2023 mussel 07-06-23.



Figure 4. Perch Scar 2023 mussel settlement 07-06-23.



Figure 6. Kings Scar 2023 mussel settlement 07-06-2023.



Figure 8. Rossall Scar, mix of mussel and Sabellaria alveolata 07-06-23.

#### Thurstaston Mussel Inspection 23-05-23

Officers present: MC, JH

Low Water: 08:44 2m (Liverpool Tides)

Officers walked one side of the perimeter of the mussel, and bed extent was seen to be similar to the 2022 inspection and mapped as such. Soft ground prevented a full perimeter being taken. However, changes in ground conditions did allow officers to walk further along the bed at the Northern extent and identify patches of mussel not previously inspected. Bed Area from the 2022 inspection and notes from this inspection have been mapped in figure 1.

The Thurstaston bed is made of up one large bed area and a number of smaller areas separated by channels. The main bed area, of a similar size and shape to that shown in figure 1 from 2022, has approximately 20% coverage of patchy, barnacled mussel between 35-40mm, with some occasional size mixed in. To the West of the main bed area a number of mussel patches were discovered along both sides of a channel edge. These ranged in size as described in figure 1, with bare patches of substrate between them. These patches contained cleaner size mussel up to 60mm. Other mussel patches of undersize mussel were located to the North-East of the main bed area, at lower coverages. No other spat settlement was observed. Oystercatcher were present in large numbers.



Figure 1. Map showing the area of Thurstaston mussel beds and observations of officers on 23-05-23.



Figure 2. Thurstaston Mussel Bed 23-05-23.



Figure 3. Mussel on Thurstaston bed 23-05-23.



Figure 4: Thurstaston Mussel Bed 23-05-23.



Figure 5: Mussel patch Thurstaston 23-05-23.



Figure 6: Mussel on other side of channel at Thurstaston 23-05-23.

#### West Kirby Mussel Inspection 23-05-23

Officers present: GG, AP

Low Water: 08:44 2m (Liverpool Tides)

Officers were able to walk the permitter of the mussel bed which covered 6.8 hectares, this is 0.7 hectares smaller than when the perimeter was last walked in July 2021. Figure 1 shows the map of the bed.

The bed area had 40-50% coverage of mussels across the main extent (Figure 2). The mussel was uniform in size with the majority of the mussel between 45-60mm meaning it had remained and grown on since the previous winter (Figure 3). No spat settlement was observed. The substrate of the bed was thick mud, over half a metre deep in the central part of the bed, and the mussel present was partly buried (Figure 4). There was little evidence of scouring, and the mussel remained in similar condition to the previous year. There were large areas of barnacled mussels and a large presence of cockle shell amongst the mussel (Figure 5). A patch of sand mason worms was found on the bed (Figure 6).



Figure 1. Map showing the area of West Kirby mussel bed on 23-05-23.



Figure 2. West Kirby Mussel Bed 23-05-23.



Figure 3. Size Mussel Patch West Kirby 23-05-23.



Figure 4. Mussel patch West Kirby 23-05-23



Figure 5. Barnacled Mussels West Kirby 23-05-23



Figure 6. Sand Mason Worms at West Kirby 23-05-23

#### Warton Sands Cockle Inspection 15-06-22

Officers Present: JH, GG

Tides: LW 16:18 1.7m (Liverpool Tides)

An inspection of the cockle bed at Warton Sands was undertaken to monitor presence and density of cockle in the area which had previously been surveyed and assess if a full survey is required. Much of the area is inaccessible due to a change in the Keer channel. There has been considerable scouring with previously buried object 2.5m above the surface (Figure 1). As such there is very little cockle present. Due to the small area, limited access to areas, and lack of cockles a return survey is not planned in 2023.



Fig 1 - Previously buried structure, now 2.5m above surface