NWIFCA Technical Science and Byelaw Meeting 9th of May 2023: 10:00 a.m.	Agenda Item 8

PROGRESS REPORT ON THE MUSSEL MINIMUM LANDING SIZE REDUCTION STUDY

Purpose: To provide a progress update on the proposal to reduce the minimum landing size of mussel from 45 mm to 40 mm in an area of the Foulney Mussel bed.

Recommendation: Receive the report

BACKGROUND

The purpose of this report is to give an update on the progress regarding the request from Members to reduce the mussel minimum landing size of 45 mm to 40 mm and present the preliminary results of surveys. Please note, information at this stage is for overview, a full report with analysis will be provided in due course. Table 1 provides a timeline of the workstream to date and the actions of officers.

Table 1. Timeline of the mussel MLS study to date

Date	Report	Action
TSB 10th May 2022	Agenda Item 8 Mussel MLS	Letter from Authority Members requesting a reduction in mussel MLS from 45 mm to 40 mm (Annex 1)
29th June 2022	n/a	NWIFCA issue a consultation to Industry to establish the consensus and obtain views on the proposal.
17th July 2022	n/a	Deadline for Industry consultation responses
TSB 2nd 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 1st 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.
26th 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.
13th February 2022	n/a	Officers map the 2.5m tide line on Foulney.
4th April 2022	n/a	12th and 14th of March officers scheduled in surveys but are unable to complete due to the weather. On the 4th of April officers complete a Dutch Wand survey of the upper area of Foulney mussel bed.
18th April	n/a	Officers collect samples for analysis of barnacles, pearling and age.

At the TSB meeting of November 1st 2022, NWIFCA presented a strategy for investigating the stunted mussels on Foulney mussel bed and the potential for a localised, temporary reduction in mussel MLS in this area. Officers visited Foulney in January to identify the area for study and speak to fishers about the area. On recommendation by fishers, officers returned on the 13th of February to map the 2.5 m tide contour of the bed, above which the mussel in question is located.

To identify the location, size distribution and abundance of mussel on upper portion of the bed, NWIFCA officers undertook a Dutch Wand survey in April. A description of the methodology used in a Dutch wand survey is provided in Agenda Item 6 – Survey and Inspection Report. Typically, Dutch Wand surveys obtain samples every 50 'hits', however, to ensure greater coverage and obtain a more detailed view of the bed, officers collected samples every 10 'hits' and split the bed into a larger number of transects to cover a greater area. In total, 83 samples of mussel were taken from across the bed. Officers also noted the presence or absence of barnacles on individual mussels sampled.

The main aim of the surveys were to identify:

1) The population structure of the bed,
2) Area of stunted mussel,
3) Proportion of barnacled mussel, and
4) the proportion of pearled mussel.

Further analysis is ongoing to identify the relationship between size of mussel and the likelihood of them becoming barnacled and pearled, and whether this relationship is different across the bed. Further samples have been taken from the full extent of the bed to analyse for pearling and potentially aging, as this would give good insight into the growth rate.

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.

Officers are continuing to follow the objectives set out in the Approach agreed at the TSB meeting on November 1st 2023 and detailed in Annex 1 of this report.

Preliminary Results

Figure 1 shows the size distribution of mussel across the upper portion of the Foulney mussel bed. The pie charts show the proportion of the mussels in a sample that fall within a size cohort. Darker blue colours represent mussels that are larger in size (≥35 mm) and lighter colours represent mussels that are smaller (<35 mm). The size of the pie chart is indicative of the weight of mussels per sample, larger pie charts demonstrate a greater overall biomass of mussel in a sample.

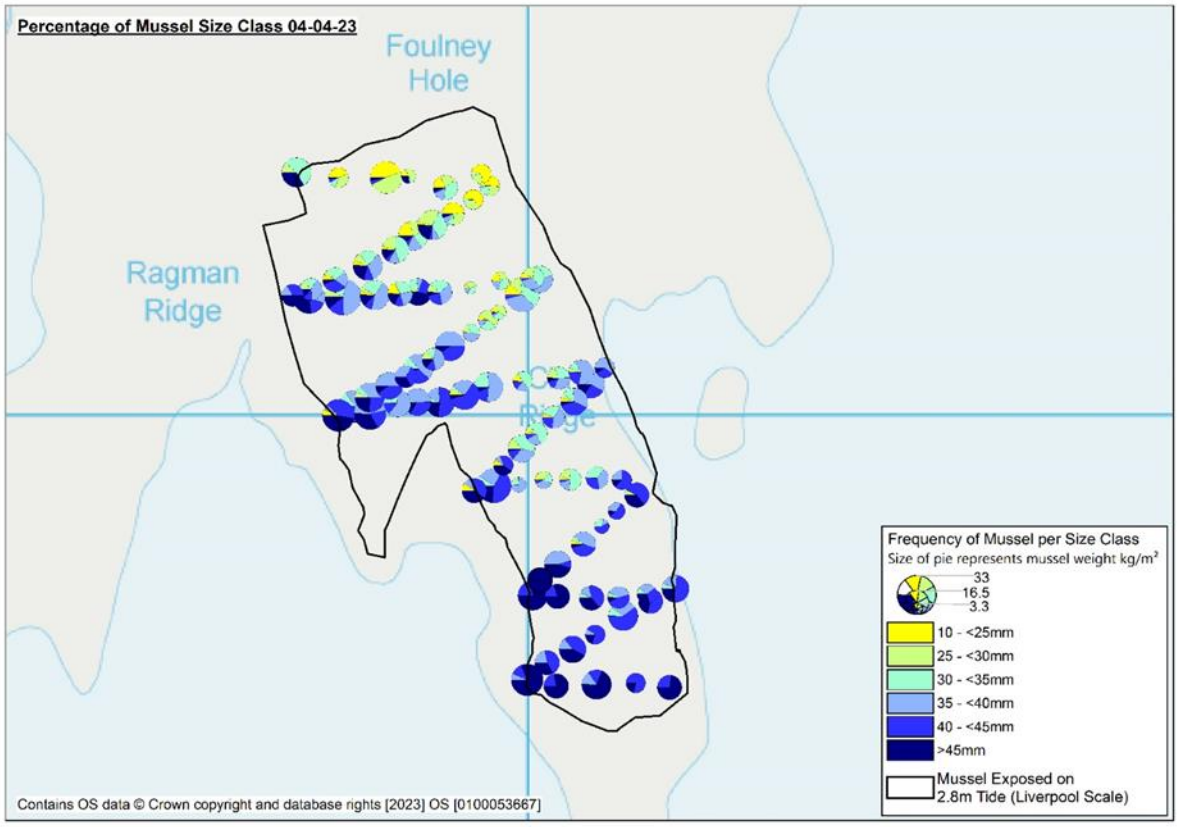

Figure 1. The frequency and distribution of mussels per size class and biomass per sample point.

The figure shows that mussel higher up the bed, closer to shore, are typically smaller than that lower down the bed. This is likely due to the longer periods of exposure from tides which reduces the time mussels can feed in comparison to those lower down the bed. In addition, the results show a band of mussel running lengthways down the middle of the bed that is also smaller in both size and overall weight of mussel. In comparison, larger mussel is found along the edges near the channel. The ground in this central portion of the bed is higher than the surrounding edges, and the increased submersion time of the mussel at the edges of the bed is likely the reason for its increased size and total weight in comparison to the proportion in the upper, middle part of the bed.

Similarly, looking at a simplified figure of the proportion (by weight) of size and undersize mussel across the bed (Figure 2), there is typically smaller mussel on the inner, upper portion of the bed, with larger mussel on the edges and lower down.

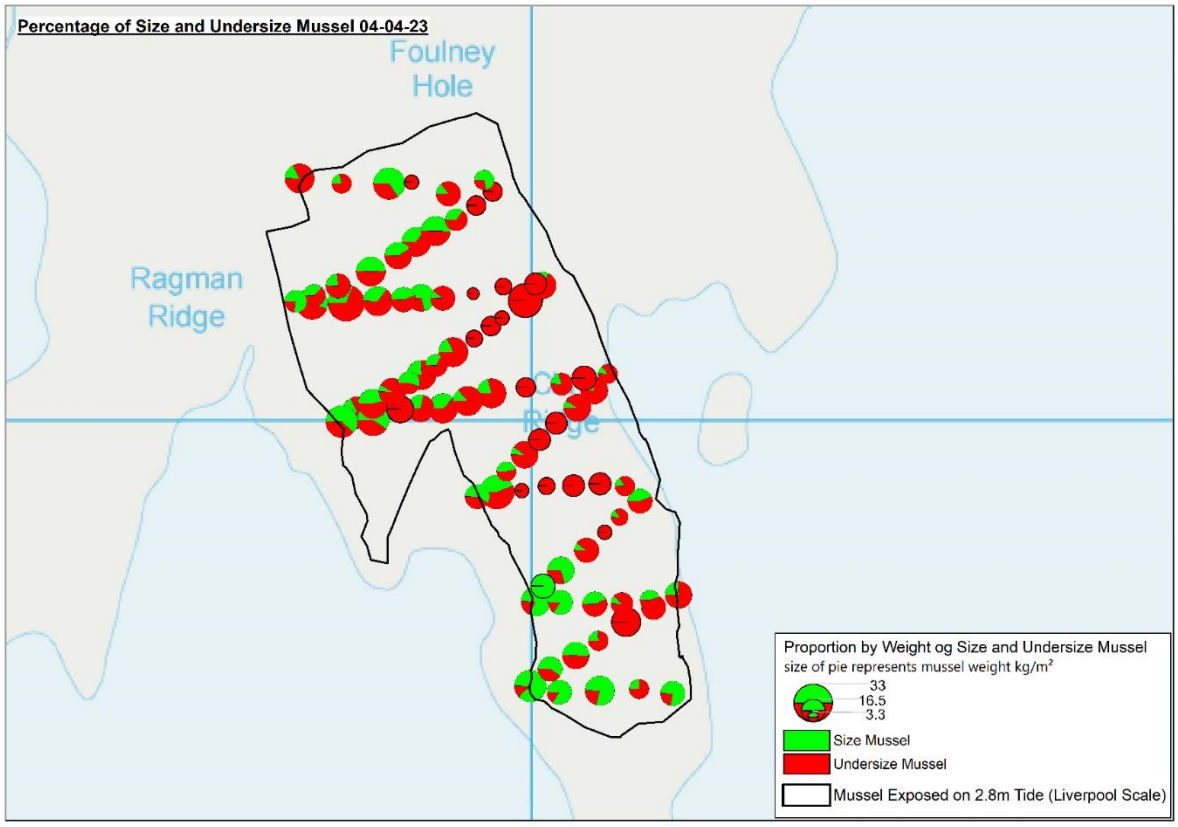

Figure 2. The frequency and distribution of size (≥45mm) and undersize (<45mm) mussel per sample point.

Officers also noted the presence and absence of barnacles on mussel samples, which will be analysed to see the correlation between size and likelihood of being barnacled by area of the bed. The initial figures (Figure 3 and 4) indicate that much of the size mussel higher up the bed is barnacled, in comparison to the lower down (~3 metre range) where the frequency of barnacled size mussel is lower.

On completion of this work and preliminary analysis of the results, it was thought sensible to collect further samples from across the entirety of the site to enable a comparison of the fished area (<2.5m) with the non-fished (>2.5m) areas of the bed. In doing so, officers would be able to compare the condition, size frequency and weight of mussels commercially viable to industry with that of the 2.5m area. Officers returned on the 18th of April to collect samples of 30 mussels from 39 additional sample sites (Figurer 5) to analyse for pearl, weight, length and presence of barnacles. Shell samples from this survey have been retained, and investigation is ongoing as to whether these can be used to undertake successful age-determination studies.

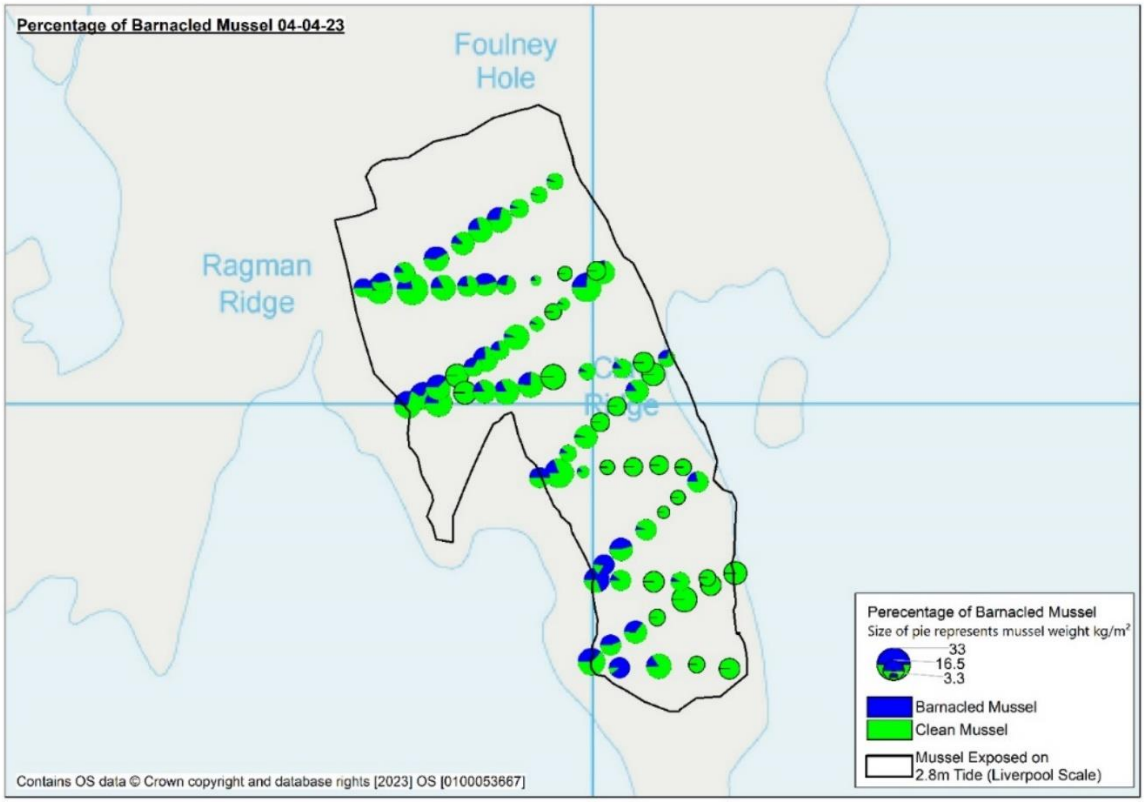

Figure 3. The proportion of mussels (all size classes) that are barnacled. Green indicates clean mussel, and blue indicates barnacled mussel.

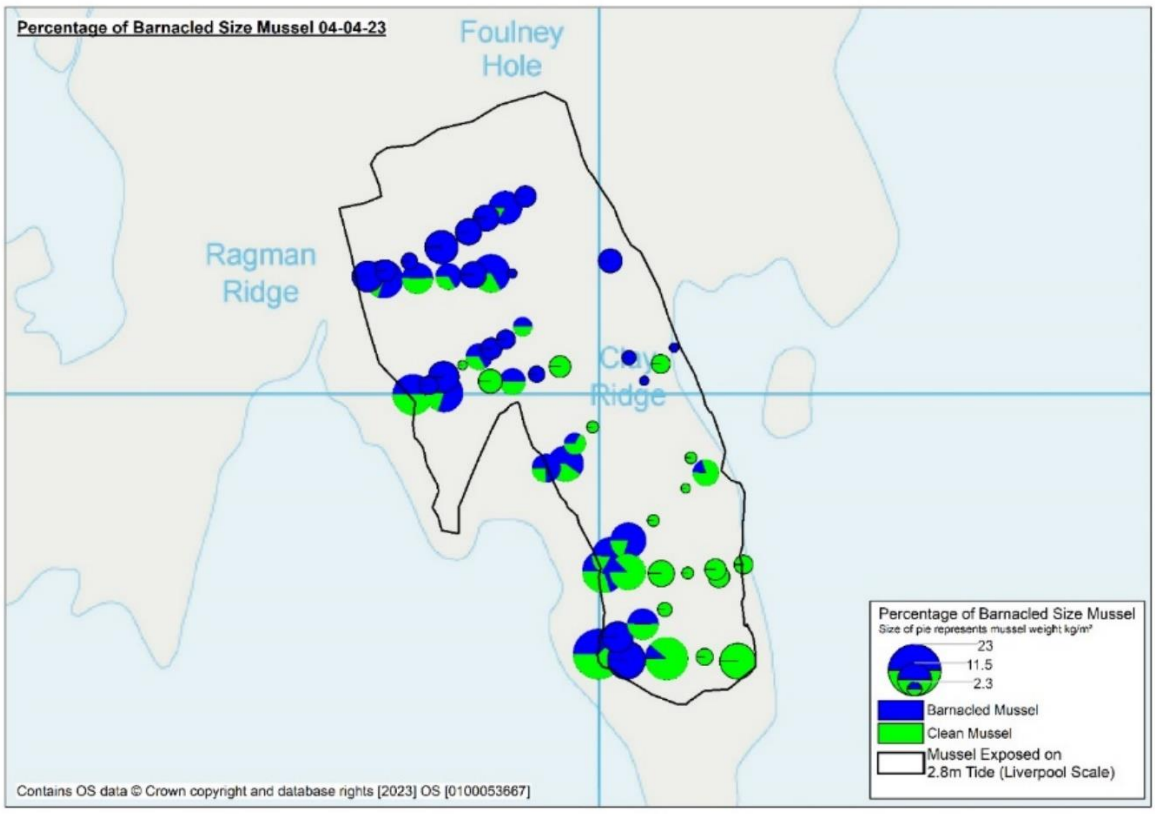

Figure 4. The proportion of size mussel (≥45mm) that are barnacled. Green indicates clean mussel, and blue indicates barnacled mussel.

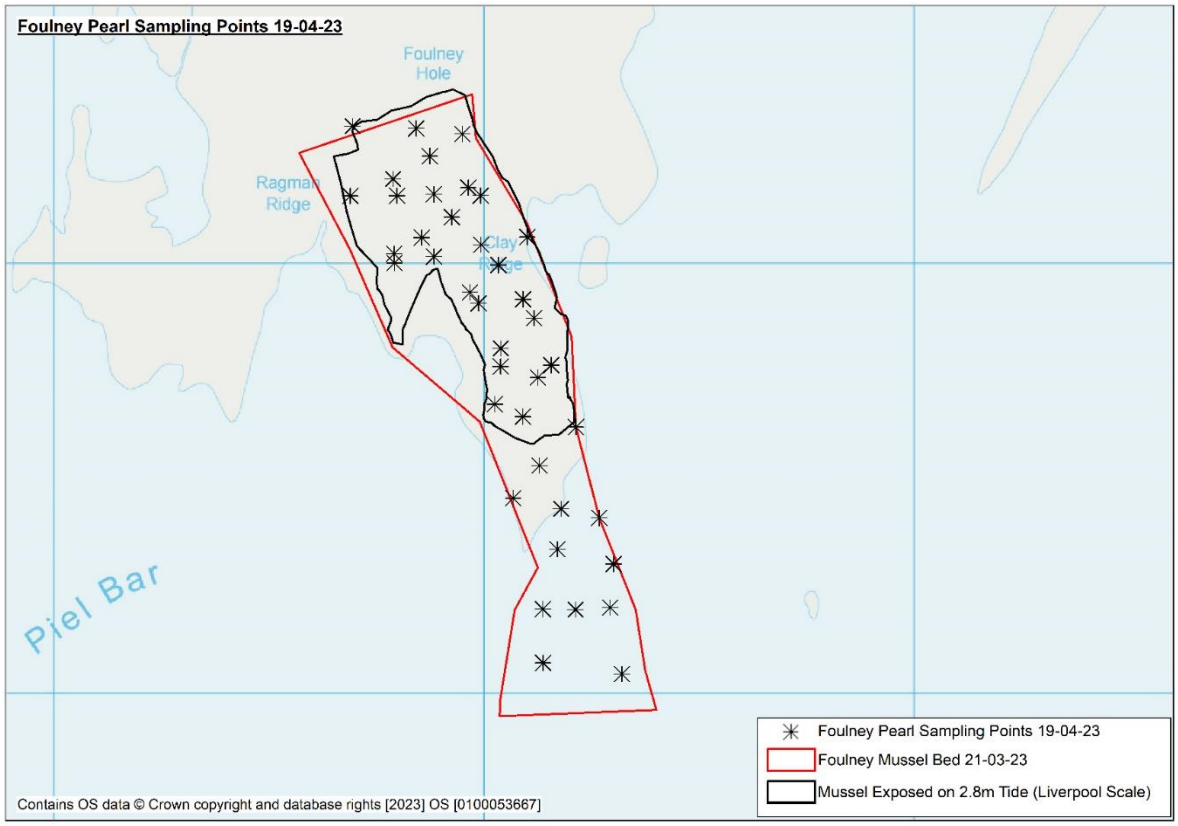

Figure 5. Sample locations for further study on the presence of pearl, age and size across the fished and non-fished areas.

Next steps:

1) Analyse the 39 samples for pearl, barnacle and weight
2) Compare results of the fished and non-fished areas.
3) Present results along with a literature review on the minimum landing size of mussels and consideration as a biogenic reef feature (as detailed in the proposed strategy outlined in Annex 1) in a report for discussion at the following meeting.
4) Identify and propose a possible trial removal area in consultation with fishers,
5) Identify a method for analysing age of mussels sampled.

Annex 1

Action	Aim	Completed
1) Conduct surveys	Identify the extent of the 'stunted area' – produce maps	Complete
	Collect samples for age and population structure analysis. Potential look at breeding condition	Complete
	Undertake a trial removal in a specific area to understand how the removal of 'stunted' mussel effects the bed and potential re-settlement of mussel – re-survey throughout the following year to	A suitable area for removal is TBC – and any additional monitoring plans which may be required to identify the changes in spat settlement and growth etc.
2) **Literature review**	Research current understanding of mussel MLS	Ongoing
	Research the biological function of mussel in biogenic reef systems	Ongoing
	If possible, use our own data (returns and survey notes) to identify patterns of seasonal fishing behaviours and mussel growth on the bed	
3) **In-person industry engagement**	Identify the time of year most likely a reduction in MLS will be of interest or under what circumstances	Complete
	Discuss potential changes in activity should a reduction in MLS be applied	Complete
	Discuss the impact on different sectors of the industry	Complete
4) Enforcement considerations	Discuss possible ways of effectively managing such a fishery and what management measures are required	To be completed prior to HRA draft
5) Consult with Natural England	Identify key concerns regarding the function of biogenic reef features, and bird requirements	Ongoing

	Draft HRA	