

2023 Wash intertidal mussel stock assessment surveys



Report by: Ron Jessop (Senior Marine Science Officer – Research)

Introduction

The 2023 Wash inter-tidal mussel surveys were conducted between September 16th and October 19th, during which 17 inter-tidal beds, plus the Welland Bank were surveyed. These surveys included all of the known inter-tidal beds apart from three of the smaller beds that had previously supported less than 50 tonnes of mussels. These included the Roger and Pandora sands which had previously been removed from the survey programme due to their small stock size and general deterioration, plus a small bed close to the Dills disposal site. The small East Mare Tail bed was not surveyed independently, but the mussels present at this site were incorporated into the adjacent North Mare Tail survey. Figure 1 shows the beds surveyed during the 2023 programme.

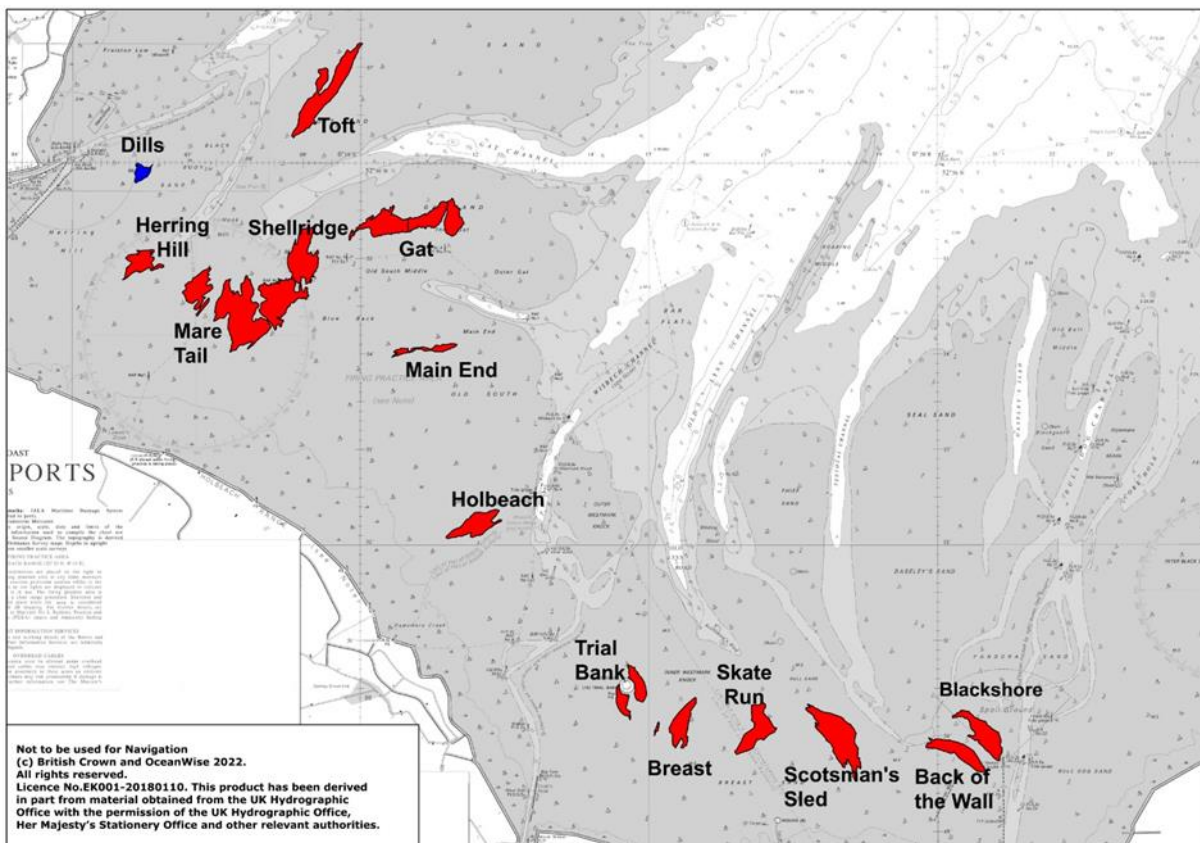


Figure 1 – Mussel beds surveyed during the 2023 inter-tidal surveys

Survey results

Excluding the Welland Wall, which is managed separately to the other beds, the total inter-tidal mussel stock biomass was found to be 20,597 tonnes. Despite a small relaying fishery in 2023, this is a significant increase from recent years, and as can be seen from figure 2, is the highest recorded figure during the period from 2002 onwards. This is actually the highest recorded total stock since 1945, but it should be pointed out that there were few surveys conducted between 1955 and when a programme of annual surveys commenced in the early 1980s. It is possible, therefore, that higher stock levels went unrecorded during that period.

Of the total stock, 6,533 tonnes were found to have attained the adult size of 45mm length, the highest figure recorded since the mussel stocks crashed in 2010. However, while the total mussel stock easily exceeds the 12,000 tonnes Conservation Objective target required to open a relaying seed fishery, the current level of adult stock is still below the 7,000 tonnes threshold required to open a harvestable fishery. Figure 2 shows how the current stocks compare to those from 2002 onwards and against the conservation objective targets.

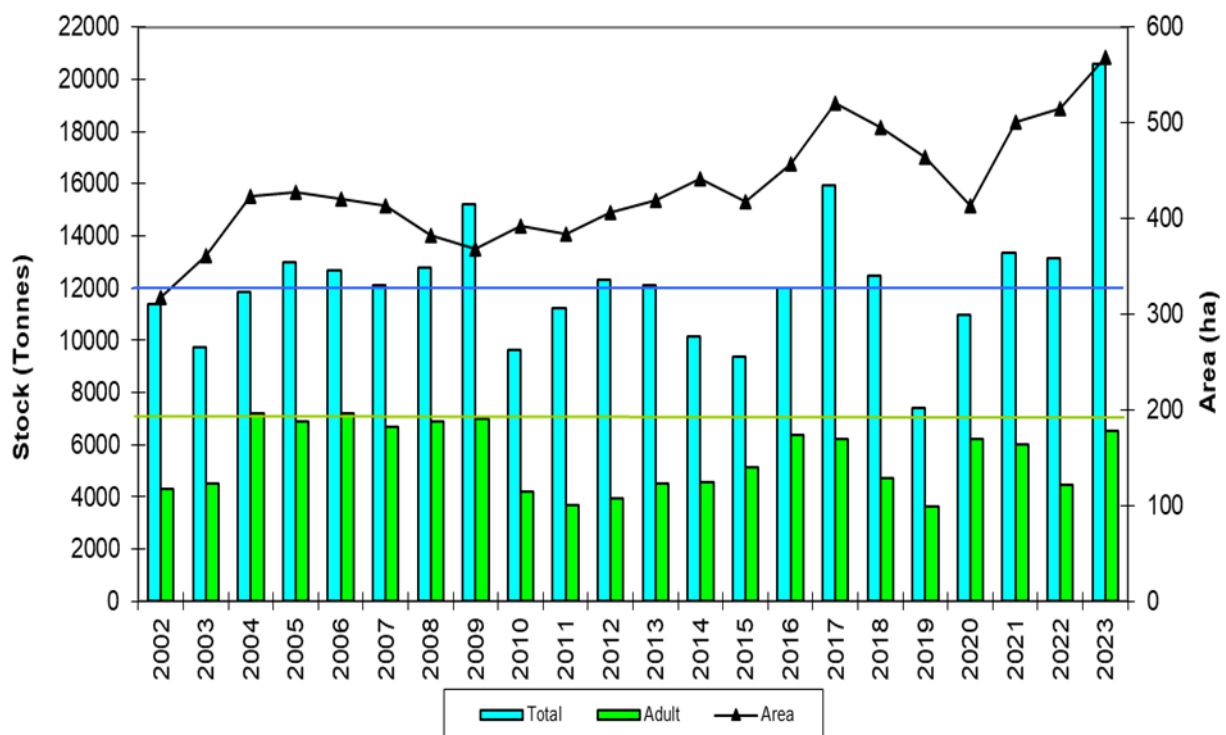


Figure 2 – Intertidal mussel stock levels in The Wash since 2002 and the Conservation Objective targets

Table 1 provides a summary of the stocks present on each of the beds at the time of the surveys. Unlike most years in which some beds are found to have increased in mussel biomass while others have declined, this year the biomass on the Shellridge bed remained stable while all of the others increased. On several, these increases were quite large, boosting the stock biomass on individual beds by over 50% from

last year's figures, while the Main End, Holbeach and Blackshore beds more than tripled in biomass. As the majority of these mussels are still below 45mm width length, however, the adult stock is still relatively low.

Following over a decade of poor recruitment and high mortality, the majority of the beds had fallen into poor condition; typically supporting low densities of barnacle-encrusted mussels amidst lots of dead shell. This is still the case on several of the beds, particularly on the Gat and parts of the Mare Tail, but on many of the beds, there are now areas which appear to be rejuvenating, with patches of younger, clean mussels burying the dead shell beneath pseudo-faeces.

BED	AREA (ha)	COVERAGE (%)	DENSITY (t/ha)	TOTAL STOCK (tonnes)	STOCK >45MM (tonnes)
Mare Tail North	47.8	35	1.19	1984	1127
Mare Tail Relay	0.5	39	0.91	38	11
Mare Tail South	78.8	26	0.84	1700	296
Mare Tail West	24.9	29	0.79	575	102
Shellridge	41.1	31	0.78	976	205
Toft	55.3	37	0.97	1998	313
Gat, West	31.7	51	1.12	1792	950
Gat, Mid	20.4	31	1.24	793	527
Gat, East	17.3	40	1.07	745	346
Main End	9.1	26	1.22	290	67
Holbeach	27.1	43	1.09	1273	268
Herring Hill	19.8	41	1.13	913	136
Trial Bank	22.1	39	1.29	1125	242
Breast, East	23.9	18	0.63	264	11
Scotsman's Sled, East	58.3	24	1.35	1925	755
Blackshore	32.1	29	1.58	1482	483
Back of the Wall	26.7	44	1.5	1746	339
Skate Run	31.3	22	1.4	978	355
TOTAL	568.3			20,597	6,533
Welland Bank	2.4	60	2.6	382	225

Table 1 – Summary of the stocks present on the inter-tidal mussel beds at the time of the 2023 autumn surveys.

An increase in stock biomass of this magnitude was not anticipated. In fact, past trends of 2-3 year-old mussels being particularly vulnerable to die-offs, had suggested that some of the younger beds such as Back of the Wall and Skate Run would have suffered from high mortalities this year. The surveys picked up very little evidence of mortalities this year, however, either in the overall stock figures or physical evidence of recently dead mussels within the beds. The cause of the past die-offs has yet to be determined but is likely to be a combination of factors. If a pathogen is involved, it is unlikely that the mussel stocks will have become immune to its effects so suddenly, suggesting other environmental factors are also at play. Whilst the strength of the juvenile stock could result in significant recruitment next year, given the instability of the stock over the past two decades and the uncertainty surrounding the cause of the die-off and poor recruitment, this may not be the case. As highlighted in figure 2 (below), peaks in biomass have recently preceded

significant declines (for example in 2009 and 2017) and a failure of juvenile mussel to recruit into the adult fishery. This should not prevent a relaying fishery from benefitting from this year's success, however.

Prospects for the 2023-2024 mussel fishery

The stock assessment is considered in the context of the 2008 Wash Shellfish Policies which guides management decisions to ensure mussel fisheries are managed within environmental parameters. These include measures that aim to:

- Maintain stocks above the Conservation Objective targets of 12,000 tonnes total stock and 7,000 tonnes adult stock,
- Limit the Total Allowable Catch of the dredged harvestable fishery to 20% of the "adult" stock biomass, and the dredged relaying fishery to 20% of the juvenile stock biomass, with an additional 2% added to each for the hand-worked fisheries.
- Restrict exploitation so that fisheries do not reduce stock densities on individual beds below a minimum density of 25 tonnes/hectare (Note – this measure does not apply to vulnerable/ephemeral beds).
- Protect adult stocks from the relaying fishery and juvenile stocks from the harvestable fishery by opening the most appropriate beds for each fishery based on their stock composition.

Harvestable and relaying fisheries

If the stocks allow, the inter-tidal beds support two fisheries; a harvestable fishery, in which adult (≥ 45 mm length) mussels are landed directly for market, and a relaying fishery, in which seed (< 45 mm length) mussels are re-laid onto private lays for growing-on.

Given that the adult biomass was, at the time of the survey, below the target of 7,000 tonnes, removal of such via a harvestable fishery would further hinder achieving the conservation objectives of the site and would impact site integrity. As such, it is recommended that a harvestable mussel fishery is not opened.

The total stock biomass is 8,597 tonnes above the 12,000 tonnes Conservation Objective target and the juvenile stock biomass exceeds the 5,000 tonnes threshold required to open a seed fishery. A seed relaying fishery can, therefore, be opened with an appropriate Total Allowable Catch (TAC) without hindering the conservation objectives of the Wash MPAs.

Total Allowable Catch (TAC) for relaying fishery

The mussel stock would support a TAC of 3,031 tonnes with 2,813 allocated to a dredge fishery and 218 tonnes allocated to a hand-worked fishery in accordance with the Wash Shellfish Policies. A fishery of this size would not reduce total mussel biomass or juvenile mussel biomass below the Conservation Objective targets (of 12,000 and 5,000 tonnes respectively).

Because both cockles and mussels contribute towards the calculations used in the Bird Food Model when determining food availability for the over-wintering wader populations, many industry members have raised concerns in recent years about the size of the proposed mussel relaying fisheries, fearing they could impact on the size of the subsequent cockle fisheries. It is, therefore, recommended that the TAC for the relaying mussel fishery should be determined after consultation with the fishing industry.

Beds to be opened to relaying fishery

To minimise disturbance to adult stocks, the Wash Shellfish Management Policies limits beds open to a relaying fishery to beds that are composed predominantly of juvenile mussels. To prevent over-fishing occurring on individual beds, average mussel densities should also be maintained above 25 tonnes/hectare within each bed (consequently excluding beds where density is below 25 tonnes/hectare).

Taking into account the above conditions, 10 beds could potentially be opened to the 2024 relaying fishery. These are listed in table 2, which also shows the maximum mussel harvest that could be taken from each without their average densities falling below the 25 tonnes/hectare threshold. A total of 4,993 tonnes could potentially be removed from these beds, sufficient to satisfy the maximum available TAC of 3,031 tonnes (should both the dredge and hand-worked TACs be fully exploited). Charts highlighting the areas proposed to be opened to the relaying fishery are shown in Appendix 1.

Table 2. Beds that could be opened to the 2024 relaying seed fishery and the maximum harvest rates that the policies would allow

Bed	Maximum Harvest (t)
Tofts	615
East Gat	312
Main End	62
Holbeach	595
Herring Hill	418
Trial Bank	572
Scotsman's Sled	467
Back of the Wall	1,078
Skate Run	195
Blackshore	679
TOTAL	4,993

Fishing methods

While both dredging and hand-working methods can be used for prosecuting the mussel fishery, the majority of the fishery is usually targeted using dredges with a minority favouring hand-working. Ordinarily, the TAC for the dredge fisheries has been set at 20% of the stock biomass, with an additional 2% reserved for the hand-worked fisheries. In recent years, however, there has been a preference from those targeting the fishery for a larger hand-worked TAC than the usual 2%. Therefore, it is recommended that the allocation of the TAC between the two fisheries is determined following consultation with the industry and could be varied during the fishery depending on uptake of either method.

Opening date

Because mussels tend to partially bury themselves and form a firmer attachment to the substrate in winter, relaying activities usually take place between March-May once the sea temperatures increase. It is intended that the opening date is determined following feedback from industry via a consultation but is anticipated to open around the 'normal' time.

Closing date

Mussel surveys ordinarily commence in September each year at which time the fishery will need to be closed if any quota remains. It is recommended, therefore, that the fishery closes on the exhaustion of the TAC or on 31st August 2024 whichever is soonest.

If it is judged necessary for the protection of the Marine Protected Area or for fisheries management purposes, the fishery may be closed prior to the exhaustion of the TAC as per the 2008 Shellfish Management Policies.

The Welland Wall Mussel Fishery

The cracks and crevices between the rocks of the man-made Welland Bank training wall provide shelter for mussel seed to settle and protection for juveniles. This protection, and the fact that the rocks cannot be dredged mean overfishing is unlikely to occur. Differences in habitat mean the mussels growing on the Welland Wall are considered to be discrete and independent to those on the inter-tidal beds and, as such, are managed separately. The mussels on the Welland Wall do not contribute towards the Conservation Objective targets so are not constrained by them. Because there is a very low risk of overfishing occurring, the Welland Wall mussel fishery is usually left open.

The 2023 survey found that while the mussel biomass on the wall had decreased slightly from the previous year, their mean density was 159 tonnes/hectare; the highest in The Wash, so supporting the continued opening of the fishery and to maintain the management measures currently in place for this fishery.

Habitat Regulation Assessment

Natural England will be formally notified of the Authority's intentions through the submission of a Habitats Regulation Assessment detailing the proposed mussel

fishery activities. The opening date for the fishery may depend on the time taken for Natural England to provide a response to the Authority's proposals and whether Natural England agrees that the proposal would not have an adverse effect on the integrity of the Marine Protected Area. Additional management measures may be required to facilitate a fishery which does not adversely impact the conservation objectives of the Wash MPAs.

Mechanism for managing the 2024 fisheries

Action Item 10 of this meeting deals with delegating authority sufficient to implement required management measures for the mussel fisheries (i.e. through issuing exemptions to the temporary closure and attaching conditions). Management measures for re-laying mussel fisheries are well established and those applied this year are intended to be consistent with those in previous years and be the subject of consultation with fishery stakeholders. These include for example, restrictions imposed previously through the WFO Regulations and Licence Conditions.

In the event that the Wash Cackle and Mussel Byelaw comes into effect prior to or during mussel relaying fisheries it is recommended that the CEO is delegated authority, in consultation with the Chair or Vice-Chair, to implement the same management measures as permit conditions using the provisions of that byelaw. This will ensure business continuity and avoid disruption to fishing operations through the transition.

Financial Implications

The interim measures currently being used to manage Wash bivalve fisheries do not facilitate charging fees and therefore none of the cost to the Authority in managing this fishery can currently be recovered. In the event that the Wash Cackle and Mussel Byelaw 2023 comes into effect prior to the closure of the fishery, up to 50% of the cost can be recovered via permit fees. The financial implications of this are considered in Action Item 10 of this meeting.

Legal Implications

Given the scrutiny on the protection of Marine Protected Areas (particularly the Wash and North Norfolk Coast) and the high-risk associated with the primary fishing gear (i.e. dredges) mitigation is required to ensure that the conservation objectives of the Wash MPAs are furthered to avoid legal challenge.

Legal risk is further mitigated through the recommendation that the CEO is delegated authority to implement management measures to ensure that site integrity is not significantly impacted during the fishery.