

Summary of the 2025 Wash intertidal mussel surveys and fishing opportunities

Introduction

The 2025 Wash inter-tidal mussel surveys were conducted between September 20th and November 20th, during which 21 inter-tidal beds, plus the Welland Bank were surveyed. These included 3 small beds on the Ferrier, Wrangle and Blue Back that were surveyed for the first time this year. Two other small beds on the Roger and Pandora were not surveyed this year, having previously been removed from the survey programme due to their small stock size and general deterioration. Of these, the Pandora bed was observed in spring to support very few mussels, while the Roger bed was estimated in summer to support approximately 40 tonnes of mussels.

Figure 1 shows the beds that were surveyed during the 2025 programme.

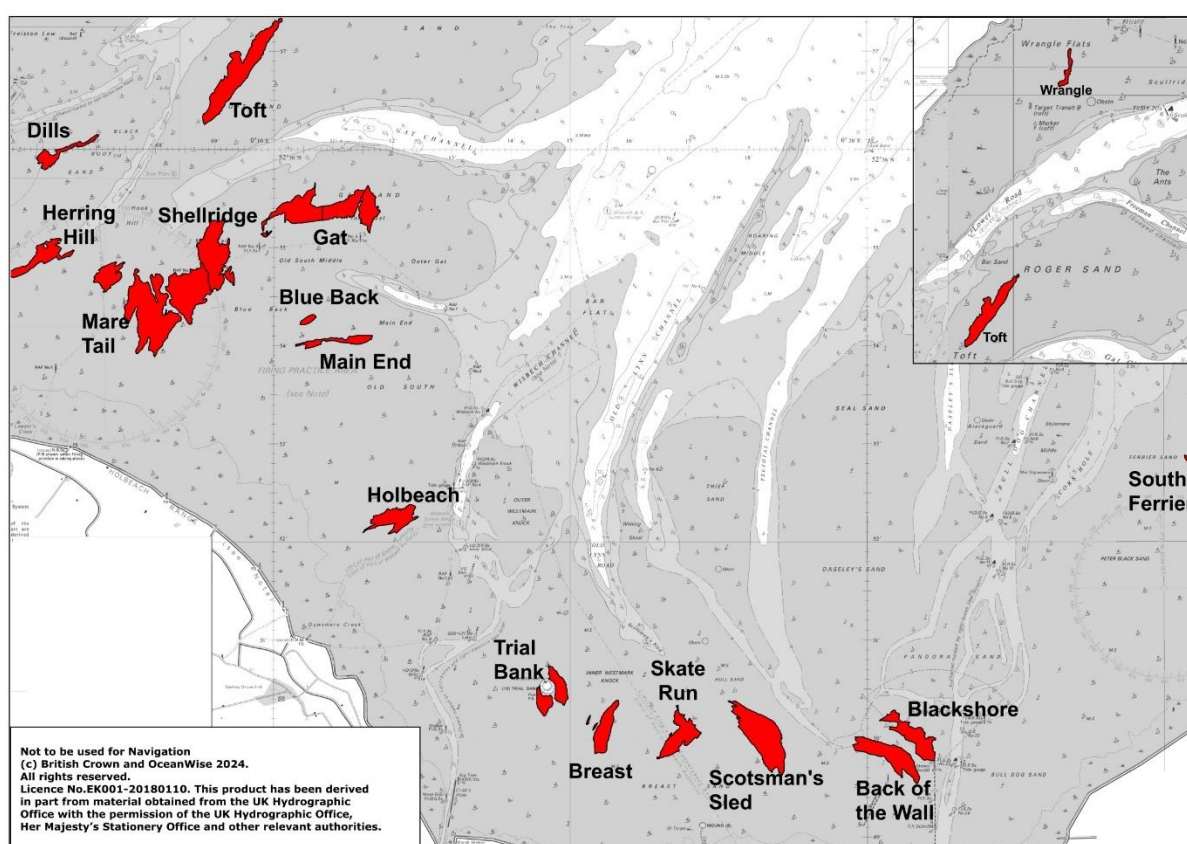


Figure 1 – Mussel beds surveyed during the 2025 inter-tidal surveys

Survey results

- Adult mussel ($\geq 45\text{mm}$ length) biomass – 15,373 tonnes
- Juvenile mussel ($< 45\text{mm}$ length) biomass – 10,889 tonnes
- Total mussel biomass – 26,263 tonnes

Between 2009 and 2022, the mussels on the intertidal beds in The Wash suffered unusually high levels of annual mortality and poor recruitment. The cause of these die-offs has not been identified but they resulted in a steady deterioration of the beds and the decline in mussel stocks – particularly among the adult mussel populations. In 2023, however, the anticipated die-off did not occur and good growth on the majority of the beds resulted in the stock biomass increasing significantly to its highest level

since 2002. Since 2023, mortalities have remained low. Coupled with recruitment and good growth, this has enabled the stocks to increase further, to levels last recorded in 1945¹. Recovery has been particularly noticeable among the stocks of adult mussels. As the populations of 2-3 year-old juvenile mussels had been particularly vulnerable to the die-offs, disproportionate numbers of them had died before they reached the 45mm size at which they would have recruited into the “adult” population. Therefore, while occasional good recruitments had produced sufficient juvenile stocks for the total mussel biomass to achieve the 12,000 tonnes threshold required to open occasional relaying seed fisheries, the adult stock biomass had remained below the 7,000 tonnes Conservation Objective target required to open a harvestable fishery. The recent survival of the vulnerable 2-3 year-old mussels has enabled them to recruit into the adult population, which now exceeds 15,000 tonnes.

Figure 2 shows how the current stocks, including the total area of the beds, compared to those from 2002 onwards.

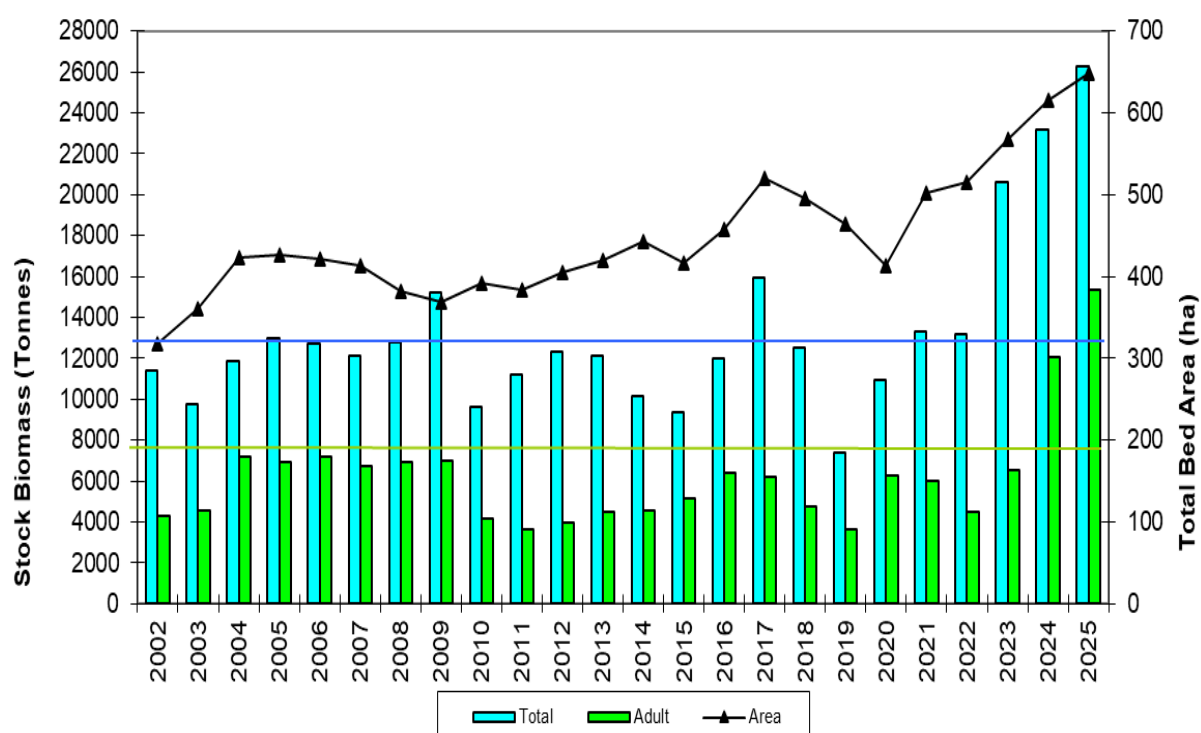


Figure 2 – Intertidal mussel stock levels in The Wash since 2002 and the Conservation Objective targets

Table 1 provides a summary of the stocks present on each of the beds at the time of the surveys.

¹ It should be noted that there were few surveys conducted between 1955 and when the current programme of annual surveys commenced in the early 1980s. It is possible, therefore, that higher stock levels went unrecorded during that period.

Table 1 – Summary of the stocks present on the inter-tidal mussel beds at the time of the 2025 autumn surveys.

BED	Summary of the Wash inter-tidal mussel stocks - 2025				
	AREA (ha)	COVERAGE (%)	DENSITY (t/ha)	TOTAL STOCK (tonnes)	STOCK >45MM (tonnes)
Mare Tail North	52.9	37	0.91	1790	989
Mare Tail Relay	0.5	62	0.93	32	17
Mare Tail South	86.4	28	1	2458	937
Mare Tail West	17.5	26	0.51	232	52
Shellridge	51.9	47	1.52	3686	2792
Wrangle	10.9	35	1.06	406	275
Toft	64.3	42	1.12	3023	2323
Gat, West	34.9	46	1.13	1828	1267
Gat, Mid	22.6	36	0.81	667	588
Gat, East	18.4	43	1.09	865	819
Main End	12.8	28	9.69	344	229
Blue Back	3.0	41	0.35	44	6
Holbeach	24.7	53	1.31	1710	738
Herring Hill	24.7	32	0.57	450	50
Trial Bank	22.1	41	1.53	1391	719
Breast, East	22.3	26	0.69	407	83
Scotsman's Sled, East	63.4	23	1.18	1718	824
Blackshore	31.2	26	1.37	1123	549
Back of the Wall	39.1	39	1.42	2180	1187
Dills	13.9	24	0.71	239	75
South Ferrier	2.9	29	0.57	48	7
Skate Run	28.3	33	1.71	1622	847
TOTAL	648.6			26263	15373
Welland Bank	2.1	72	2.28	339	282

Between the 2024 and 2025 surveys, there has been an overall increase in total mussel biomass of 3,114 tonnes and in adult mussel biomass of 3,324 tonnes. The changes seen in total biomass on individual beds is shown in figure 3. 12 beds have increased in biomass since the previous survey, and compared to a few years ago, now appear to be in good condition, with good mussel coverage and dense patches of clean mussels. During the year, 5 beds have declined in biomass. Four of these beds (the Tofts, West Gat, West Mare Tail and Herring Hill) are on the west side of The Wash and are older, established beds. The other bed that has shown a slight decline in stock biomass is the Back of the Wall bed. Unlike the others, this is a relatively young bed that has shown good recruitment and growth in recent years. This was one of the beds predominantly targeted during the 2025 fishery, however, and evidence of dredge tracks during the survey suggest its recent decline in biomass is due to fishing activity rather than natural mortality. It should be noted, that of all of the beds surveyed this year, only the West Mare Tail showed evidence of high natural mortality similar to that seen between 2009-2023 occurring (e.g. relatively high proportions of recently-dead 2-3 year-old mussels). While it is good that the mortalities have been limited to this one bed, it does highlight that the issue has not totally gone and could resurface in other beds in the future.

Three beds were surveyed for the first time this year. The Wrangle bed is the largest of these, supporting 406 tonnes. These mussels were first identified during the 2025 spring cockle surveys, but the size ranges of the mussels suggest the bed settled about 3 years ago. The Blue Back bed is in a similar location to a larger bed that used to be present there in the 1990s, and likewise, appears to have settled about 3 years ago. The majority of the mussels on the Ferrier beds are between 15-30mm, suggesting it settled last year.

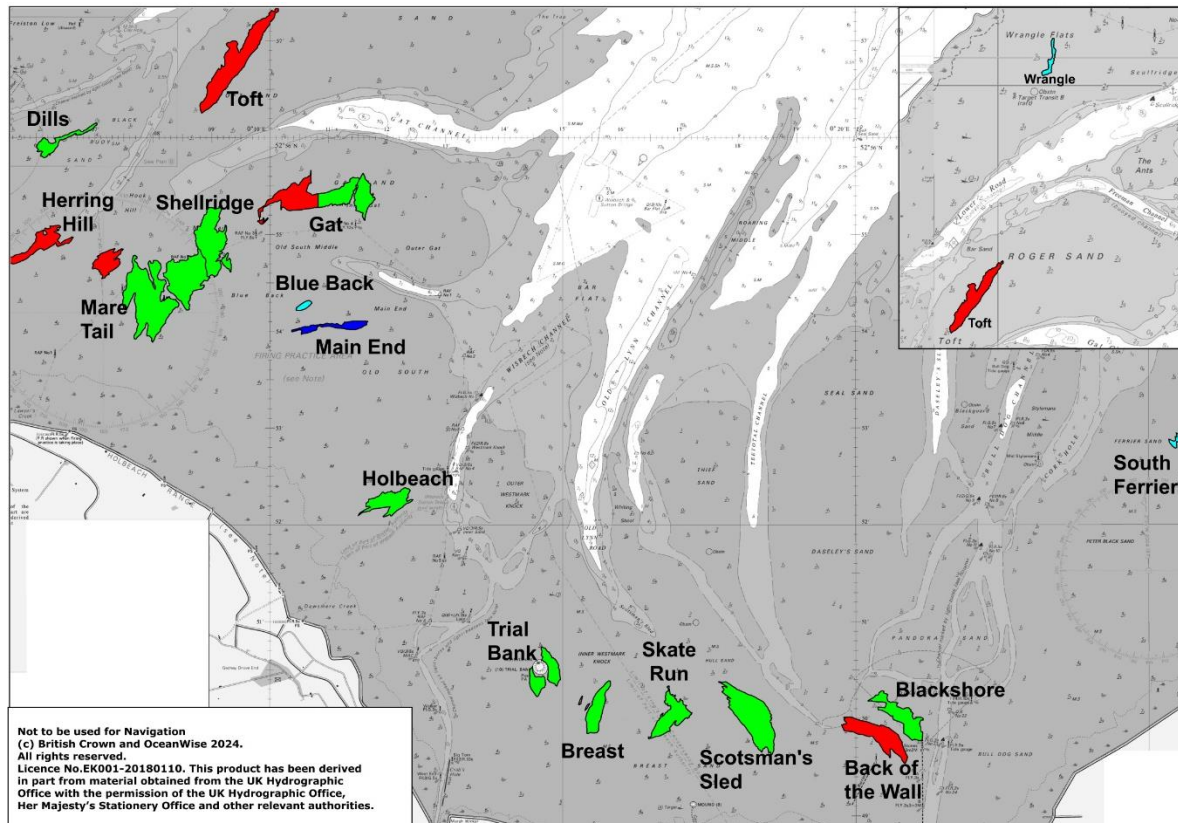


Figure 3 – Changes in mussel biomass found between 2024 and 2025 surveys – Increased biomass (green), decreased biomass (red), unchanged (dark blue), new beds (light blue)

The high mortalities and poor recruitment that occurred between 2009-2022 had left the majority of the mussel beds in poor condition, typically supporting low densities of barnacle-encrusted mussels amidst lots of dead shell and bare patches. The sparsity of mussels on several of these beds meant little pseudo-faeces was being produced to replace sediment being scoured from the beds. This had resulted in areas on several of the beds becoming sandy. The improved survival of the mussels seen in the past three years, particularly among the vulnerable 2-3 year-old cohorts has helped many of the beds to rejuvenate. This has not only been evident in the stock biomass figures, which have increased significantly, but has been evident within the beds, where the mussel coverage and patch densities have visibly improved and the layer of pseudo-faeces has thickened. On some of the beds, particularly the younger ones (e.g. Back of the Wall and Skate Run), or where recruitment has been high (e.g. Shellridge), the mussels are mostly clean and appear good quality. On the older, more established beds, however, that had deteriorated more badly to begin with, survival of new settlements have started to rejuvenate the beds but it will require further surviving

settlements to properly restore their condition to the quality seen prior to the start of the die-offs.

While the overall condition of the mussel stocks has greatly improved over the past three years, the high numbers of dead 2-3 year-old mussels witnessed on the West Mare Tail bed this year suggest the problem might still persist in The Wash and that all of the beds could still be vulnerable to future losses.

Fishery Opportunities

When determining appropriate management measures for the mussel fisheries, the stock assessment is considered in the context of the 2008 Wash Shellfish Policies² which provides guidance 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 ($\geq 45\text{mm}$ length) mussels are landed directly for market, and a relaying fishery, in which seed ($< 45\text{mm}$ length) mussels are re-laid onto private lays for growing-on.

The current stocks are:

Adult mussel – 15,373 tonnes

Juvenile mussel – 10,889 tonnes

Total stock – 26,263 tonnes

Because both the adult stock and the total stock exceed their respective 7,000 tonnes and 12,000 tonnes thresholds, there is an opportunity to open both fisheries.

Total Allowable Catch (TAC) for fisheries

Harvestable Fishery

The biomass of adult mussels was found to be 15,373 tonnes. A TAC based on 20% of this would be **3,075 tonnes** (plus **308 tonnes** for the hand-worked fishery). A harvestable fishery of this size would still allow the 7,000 tonnes Conservation Objective target to be achieved, so would not need to be capped.

² https://www.eastern-ifca.gov.uk/wp-content/uploads/2016/03/WFO_Shellfish_management_policies_2008.pdf

Relaying seed fishery

The biomass of juvenile mussels was found to be 10,889 tonnes. A TAC based on 20% of this would be **2,178 tonnes** (plus **218 tonnes** for the hand-worked fishery). A relaying fishery of this size would still allow the 12,000 tonnes Conservation Objective target to be achieved, so would not need to be capped.

If both fisheries were opened to their maximum potential, their combined TAC's would be **5,779 tonnes** (including hand-worked components). Even with this quantity of mussels removed, the total mussel biomass would still exceed its 12,000 tonnes Conservation Objective target.

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 fisheries, fearing they could impact on the size of the subsequent cockle fisheries. It is, therefore, recommended that the size of the TAC for the relaying mussel fishery should only be determined after consultation with the fishing industry.

Beds to be opened to fisheries

To prevent over-fishing occurring on individual beds, average mussel densities should be maintained above 25 tonnes/hectare within each bed. The following beds support mussel densities that are below this minimum threshold, so should not be opened to either the relaying or harvestable mussel fisheries:

- West Mare Tail
- Blue Back
- Herring Hill
- East Breast
- Dills
- South Ferrier

The 15 beds that do currently satisfy this criterion are listed in Table 2. This table also shows the proportion of the mussel biomass that have attained 45mm length and the maximum permissible TACs that would enable the average density of each bed to remain above 25 tonnes/hectare.

Table 2. Beds that could be opened to the 2025 mussel fisheries and the maximum harvest rates that the policies would allow

Bed	% adult biomass	Maximum TAC
North Mare Tail	55.3	486
South Mare Tail	53.3	298
Shellridge	75.7	2390
Wrangle	67.7	134
Tofts	76.8	1416
West Gat	69.3	956
Mid Gat	88.2	102
East Gat	94.7	406

Main End	66.6	24
Holbeach	43.2	1093
Trial Bank	51.7	839
Scotsman's Sled	48.0	133
Blackshore	48.9	343
Back of the Wall	54.4	1203
Skate Run	52.2	914

The following factors, listed in the 2008 shellfish policies, need to be considered when determining which beds should be opened to each of the fisheries.

- ***Selection of mussel beds to be opened to the fishery (according to stock composition and bed vulnerability):*** *Mussel bed areas containing a significant proportion of juvenile stocks will not be opened to the harvestable fishery. Usually, ESFJC requires that mussel beds contain at least 70% adult stock, but this level can be varied where it can be shown to benefit the stock.*
- *Beds containing <70% adult stock may be opened to the relaying fishery.*

The above measure provides a cut-off, whereby only the beds supporting $\geq 70\%$ adult mussel biomass can be opened to a harvestable fishery, while all beds with under this amount can be opened to the relaying fishery. Importantly, the measure recognises that this level can be varied when doing so will benefit the stock. Prior to 2008, when these measures were being developed, the beds had not been subjected to a long period of high die-offs, so were in much better condition than post-2009. As such, more of the beds supported high proportions of adult mussels than currently. Since 2009, however, the low stocks of adult mussels have prevented any harvestable fisheries from opening and have required those surviving adults to be protected more stringently from the relaying fisheries. To achieve this greater protection, in recent years the Authority has varied the proportion described above so that the relaying fisheries have only been able to target beds that have been composed predominantly ($>50\%$) of juvenile mussels. With only a relaying fishery to consider, this has been a simple solution. The opportunity to open a harvestable fishery in addition to the relaying fishery makes the situation more complex this year, for while there are some beds that are $>70\%$ either adult or juvenile stock, there are several that are more mixed and could support either fishery. It is recommended, however, that the following beds should only be opened to the harvestable fishery:

- Shellridge
- Tofts
- West Gat
- Mid Gat
- East Gat

The remaining beds listed in Table 2 could be opened to either fishery. How the TAC should be allocated between the two fisheries is more complex, however, and requires careful consideration and consultation with the industry.

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, the allocation of the TAC between the two fisheries should be determined following consultation with the industry.