

Fisheries in EMS Habitats Regulations Assessment for Amber and Green risk categories

NWIFCA-MB-EMS-UNDERSIZE MUSSEL MORECAMBE BAY HANDGATHERING AND DREDGE FISHERY

August 2025

Site: Morecambe Bay and Duddon Estuary

European Designated Sites: UK0013027 Morecambe Bay Special Area of Conservation (SAC)
UK9020326 Morecambe Bay and Duddon Estuary SPA
UK11045 Morecambe Bay Ramsar
UK11022 Duddon Estuary Ramsar

European Marine Site: Morecambe Bay and Duddon Estuary

Qualifying Feature(s):

SAC and Ramsar

H1110. Sandbanks which are slightly covered by sea water all the time; Subtidal sandbanks
H1130. Estuaries

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1150. Coastal lagoons

H1160. Large shallow inlets and bays

H1170. Reefs

H1220. Perennial vegetation of stony banks; Coastal shingle vegetation outside the reach of waves (NON MARINE)

H1310. *Salicornia* and other annuals colonising mud and sand; Glasswort and other annuals colonising mud and sand; Pioneer saltmarsh

H1330. Atlantic salt meadows (*Glaucopuccinellietalia maritima*)

H2110. Embryonic shifting dunes (NON MARINE)

H2120. Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram (NON MARINE)

H2130. Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland (NON MARINE)

H2150. Atlantic decalcified fixed dunes (*Calluno-Ulicetea*); Coastal dune heathland (NON MARINE)

H2170. Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*); Dunes with creeping willow (NON MARINE)

H2190. Humid dune slacks (NON MARINE)

S1166. *Triturus cristatus*; Great crested newt (NON MARINE)

Natterjack Toad (NON MARINE)

SPA and Ramsar

A026 *Egretta garzetta*; Little egret (non-breeding)

A038 *Cygnus Cygnus*; Whooper swan (non-breeding)

A040 *Anser brachyrhynchus*; Pink-footed goose (non-breeding)

A048 *Tadorna tadorna*; Common shelduck (non-breeding)

A050 *Anas Penelope*; Wigeon - (non-breeding – Ramsar only)

A054 *Anas acuta*; Northern pintail (non-breeding)

A063 *Somateria mollissima*; Common eider (non-breeding – Ramsar only)

A067 *Bucephala clangula*; Goldeneye - (non-breeding – Ramsar only)

A069 *Mergus serrator*; Red-breasted merganser - (non-breeding – Ramsar only)

A130 *Haematopus ostralegus*; Eurasian oystercatcher (non-breeding)

A137 *Charadrius hiaticula*; Ringed plover (non-breeding)

A140 *Pluvialis apricaria*; European golden plover (non-breeding)

A141 *Pluvialis squatarola*; Grey plover (non-breeding)

A142 *Vanellus vanellus*; Lapwing - (non-breeding – Ramsar only)

A143 *Calidris canutus*; Red knot (non-breeding)

A144 *Calidris alba*; Sanderling (non-breeding)

A149 *Calidris alpina alpina*; Dunlin (non-breeding)

A151 *Calidris pugnax*; Ruff (non-breeding)

A156 *Limosa limosa*; Black-tailed godwit (non-breeding)

A157 *Limosa lapponica*; Bar-tailed godwit (non-breeding)

A160 *Numenius arquata*; Eurasian curlew (non-breeding)

A162 *Tringa totanus*; Common redshank (non-breeding)

A169 *Arenaria interpres*; Ruddy turnstone (non-breeding)

A176 *Larus melancephalus*; Mediterranean gull (non-breeding)

A183 *Larus fuscus*; Lesser black-backed gull (Breeding, non-breeding)

A184 *Larus argentatus*; Herring gull (Breeding)

A191 *Sterna sandvicensis*; Sandwich tern (Breeding)

A193 *Sterna hirundo*; Common tern (Breeding)

A195 *Sterna albifrons*; Little tern (Breeding)

Phalacrocorax carbo; Cormorant – (non-breeding – Ramsar only)

Podiceps cristatus; Great crested grebe - (non-breeding – Ramsar only)

Seabird assemblage

Waterbird assemblage

Site sub-feature(s)/Notable Communities:

SAC and Ramsar

Sandbanks which are slightly covered by sea water all the time – Subtidal coarse sediment, subtidal mixed sediments, subtidal sand, subtidal mud.

Estuaries - Intertidal mud, intertidal sand and muddy sand, intertidal mixed sediments, intertidal coarse sediment, intertidal rock, intertidal stony reef, intertidal biogenic reef: mussel beds, subtidal coarse sediment, subtidal mixed sediments, subtidal sand, subtidal mud, Salicornia and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritima*).

Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats – Intertidal mud, intertidal sand and muddy sand, intertidal mixed sediments, intertidal seagrass beds, intertidal coarse sediment.

Coastal lagoons

Large shallow inlets and bays – Intertidal mud, intertidal sand and muddy sand, intertidal mixed sediments, intertidal seagrass beds, intertidal coarse sediment, intertidal rock, intertidal stony reef, intertidal biogenic reef: mussel beds, intertidal biogenic reef: *Sabellaria* spp., subtidal stony reef, circalittoral rock, subtidal coarse sediment, subtidal mixed sediments, subtidal sand, subtidal mud, Salicornia and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritima*).

Reefs – Circalittoral rock, intertidal biogenic reef: mussel beds, intertidal biogenic reef: *Sabellaria* spp., intertidal rock, intertidal stony reef, subtidal stony reef.

Perennial vegetation of stony banks: Coastal shingle vegetation outside the reach of waves

Salicornia and other annuals colonising mud and sand: Glasswort and other annuals colonising mud and sand; Pioneer saltmarsh

Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) (referred to as Saltmarsh)

Embryonic shifting dunes

Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”); Shifting dunes with marram

Fixed dunes with herbaceous vegetation (“grey dunes”); Dune grassland

Atlantic decalcified fixed dunes (*Calluno-Ulicetea*); Coastal dune heathland

Dunes with *Salix repens* spp. *Argentea* (*Salicion arenariae*); dunes with creeping willow

Humid dune slacks

Great crested newt (*Triturus cristatus*)

Supporting habitat: Great crested newt (NON MARINE) – coastal sand dunes
Natterjack Toad (NON MARINE)- coastal sand dunes

SPA and Ramsar

Annual vegetation of drift lines, Atlantic salt meadows (*Glauco-puccinellietalia maritima*), coastal lagoons, freshwater and coastal grazing marsh, intertidal biogenic reef: mussel beds, intertidal coarse sediment, intertidal mud, intertidal rock, intertidal sand and muddy sand, intertidal seagrass beds, intertidal stony reef, Salicornia and other annuals colonising mud and sand, water column.

Generic sub-feature(s):

Intertidal mud and sand, Intertidal mud, Seagrass, Saltmarsh spp., Brittlestar beds, Subtidal muddy sand, Intertidal boulder and cobble reef, Subtidal boulder and cobble reef, *Sabellaria* spp. reef, Intertidal boulder and cobble reef, Surface feeding birds, Estuarine birds, Intertidal mud and sand, Intertidal boulder and cobble reef, Saltmarsh spp., Coastal lagoons.

High Level Conservation Objectives:

Morecambe Bay SAC

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the ‘Qualifying Features’ listed above), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and function of the habitats of qualifying species
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

Morecambe Bay SPA

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified and the Ramsar Site and the wetland habitats and/or species for which the site has been listed (the ‘Qualifying Features’ listed above), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive and ensure that the site contributes to achieving the wise use of wetlands across the UK, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

Duddon Estuary SPA

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified and the Ramsar Site and the wetland habitats and/or species for which the site has been listed (the 'Qualifying Features' listed above), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive and ensure that the site contributes to achieving the wise use of wetlands across the UK, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

Lune Marine Conservation Zone (MCZ)

The site is designated for smelt (*Osmerus eperlanus*) with a recover objective.

Updated conservation advice for Morecambe Bay and Duddon Estuary SPA.

Changes specific to this HRA:-

- Grey plover, dunlin, sanderling and turnstone have a restore target for population due to declines in population exceeding regional and national trends.

Fishing activities assessed:

Gear type(s):

Hand-gathered – Undersize Mussel (*Mytilus edulis*)

Vessel dredge - Undersize Mussel (*Mytilus edulis*)

1. Introduction

1.1 Need for an HRA assessment

Each year, NWIFCA officers inspect the main seed mussel beds in the NWIFCA District for their suitability for fishing. The criteria a fishery needs to meet to be considered for opening is detailed in section 4.4.

The fisheries considered here all fall within the Morecambe Bay and Duddon Estuary Special Protected Area (SPA) and the Morecambe Bay Special Area of Conservation (SAC). Any activity which takes place in the site which is not related to furthering the conservation objectives must undergo a habitats regulation assessment (HRA). As a competent authority under the provisions of the Habitats Regulations, the NWIFCA must undertake an Appropriate Assessment of the proposed fishery, in accordance with Regulation 61. Details of NWIFCA's inspections, along with advice from Natural England are used to inform the HRA. Natural England is a statutory consultee on the Appropriate Assessment stage of the Habitats Regulations Assessment process, and their advice is incorporated into this document.

1.2 Proposal

The NWIFCA proposes to authorise one undersize (less than 45mm) mussel fishery to hand-gathered fisheries within the protected site.

The proposed opened fisheries will be by authorisation issued under the flexible permit conditions of NWIFCA Byelaw 3, Cockle and Mussel Hand Fishing Permit (2019).

All potential fisheries are provisionally considered in this HRA subject to agreed conditions being met. The conditions are detailed in section 4.

The proposed opened fisheries will be by permits issued under NWIFCA Restrictions on the Use of a Dredge 2017, and by authorisation issued under NWIFCA Byelaw 3, Permit to Fish Cockles and Mussels (para 6.) by derogating against the minimum landing size for mussel for the hand gathered fishery.

The purpose of this site-specific assessment document is to assess whether or not, in the view of NWIFCA the proposed fishing activity of hand-gathering and vessel dredging of undersize mussel at the specified beds in Morecambe Bay, is likely to have a significant effect on the designated features of the site. This assessment will determine whether the proposed activities will have an adverse effect on the integrity of this European Site.

2. Information about the EMS

(See cover pages, where details of the designated features and sub-features are listed.)

3. Interest feature(s) of the EMS categorised as 'Red' risk and overview of management measure(s) (if applicable)

The Morecambe Bay and Duddon Estuary European Site interest features of; boulder and cobble reef, *Sabellaria alveolata* reef and Seagrass beds are protected from all bottom towed gears, in addition Seagrass beds are protected from bait collecting or working a fishery by hand or using a hand operated implement through a prohibition under [NWIFCA Byelaw 6](#), introduced in May 2014.

4. Information about the fishing activities within the site

4.1 Background

It is important to note that mussel beds in Morecambe Bay are almost exclusively found on hard substrate – post-glacial moraine skears – and consequently respond quite differently to fishing pressures than in other fisheries such as the Wash in the UK, and the Waddensee in the Netherlands, where mussel beds are on soft substrates. There are two distinct mussel resources in Morecambe Bay that can be highly variable in abundance and distribution. These are size mussel (>45mm), and undersize (seed and part-grown) mussel.

A feature of Morecambe Bay is the irregular, but frequent, occurrence of large and extensive mussel spat settlements. These settlements are usually very dense with little or no embayment to the underlying substrate and quickly build up large amounts of sediment and pseudo-faeces (mussel mud). Within a very short space of time (~4 to 6 months) these populations become unstable and vulnerable to erosion through weather and/or tide, or predation from vast numbers of starfish. They typically do not survive to winter. They are referred to as “ephemeral” beds (Dare, 1971 & 1976) and the Authority takes the line that although they are undersized they should be fished as early as possible as they would otherwise be washed out of the fishery and a valuable commercial resource lost. The mussel is fished, either by hand-raking or by specialised mussel dredgers, neither of which impact the cobble and boulder skears due to the deep soft mud layer on which the mussel sits. Removal of undersize has also been authorised over the years when huge swarms of common starfish (*Asterias rubens*) have been present on a bed, preying voraciously on mussel of varying sizes dependent on the size of the starfish and their ability to open the shells. The harvested mussel is re-deposited in other areas to grow on until of a commercially viable size. The number of mussel cultivation sites has grown in areas such as the Wash, Northern Irish and Irish loughs, and the Menai Strait, the latter of which is an MSC accredited sustainable fishery. Relaying in Morecambe Bay has been trialled unsuccessfully as the mussel, even though relaid in more sheltered areas, is unable to persist due to the prevailing environmental conditions.

4.2 Mussel Hand-gathering

Hand gathering of mussel has been a long-standing traditional fishery within Morecambe Bay and the Duddon Estuary. Methods have changed very little over the years, with a rake and net bag used to remove the mussel from the underlying muddy substrate. Hand gathers access the beds mainly by ATVs and occasionally tractors due to the soft sediment. Depending on the area being fished, fishing is often limited by the tides and can be severely restricted. There is little to no by-catch associated with this fishery as it is highly selective.

Hand gathering of seed mussel is by written authorisation to current NWIFCA Byelaw 3 permit holders only. As of the 1st of September 2022 this will be under the flexible permit conditions of the new NWIFCA Byelaw 3. Areas permitted for harvest are incorporated into the authorisation conditions, along with any other restrictions. Seed mussel is transported, usually by road-freight, to its relaying destination.

4.2.1 Regulation of Hand-gathering

NWIFCA regulates mussel hand-gathering fisheries in its District through a suite of byelaws. Regulations relating specifically to hand gathering of mussels in Morecambe Bay are listed below. The full text of the regulations available on the NWIFCA website (<https://www.nw-ifca.gov.uk/byelaws/>).

NWIFCA Byelaw 3	Cockle and mussel hand fishing permit (2019) (in force as of Sep 1 st 2022)
NWSFC Byelaw 13a	Cockles and mussels – management of the fishery
NWSFC Byelaw 16	Shellfishery – temporary closure

NWIFCA Byelaw 3 Permit to Fish for Cockles and Mussels was introduced in 2012 and succeeded in creating vastly improved management of the fisheries creating a more professional and responsible group of fishers. Under these regulations, the number of permit holders has reduced significantly. There are currently a maximum of 150 NWIFCA Byelaw 3 permits, that will be issued for the 2025-2026 season under NWIFCA Byelaw 3. Without a permit within the NWIFCA district it is still permissible when mussel beds are open for 5kg per person per day of size mussel to be collected for human consumption.

In the NWIFCA District, all mussel beds are open to hand gathered size mussel fishing for Byelaw 3 permit holders. However, if it is deemed that activities may impact the protected features of the site, a HRA is conducted, and management implemented if/where required.

4.3 Mussel Dredging

Dredging of undersize mussel for aquaculture has been a regular occurrence in Morecambe Bay since the 1960s. Dredging of mussel for aquaculture has developed significantly with technology concentrating on gear with low environmental impact. Seed mussel dredgers scoop up the top layer of loose mussel and mussel mud, bringing the catch through the water giving the mud a chance to flush through the netting, and depositing the catch in open holds on-board. There is little by-catch associated with this fishery, with starfish, shore crab, and the occasional flatfish found in the catch.

Mussel is typically transported by vessel to where it is going to be re-laid where it is flushed through the sides of the vessel and straight on to the bottom growing lays. In areas such as the Menai Strait where much of the Morecambe Bay mussel goes, operators work together to farm the mussel. Long-standing studies of what works in practice along with a wealth of research with Bangor University scientists has led to a method of moving mussel around to gain best growth potential and minimise losses from crab and starfish predation. Much of this depends on the size of mussel when wild caught and the strength of its shell.

4.3.1 Regulation of Dredge Fishery

Dredging of undersize mussel has been previously been managed by the North West and North Wales Sea Fisheries Committee (NW&NWSFC) under a 30 year Fishery Order - the Morecambe Bay Mussel Fishery Order (MBMFO) 1978, whereby fishing could only be carried out by licensees of the Order. The SFC was the holder of the MBMFO and also the Menai Strait Several Order where it leased out areas for aquaculture. The MBMFO expired in 2009, and the administrative area for NWIFCA changed, removing North Wales and adding Cumbria to the old NW&NWSFC boundaries. NWIFCA managed the fishery from 2009 - 2017 by written authorisation.

In 2017 NWIFCA introduced a dredge byelaw that prohibits dredge fishing of all types across the District unless specifically permitted by the Authority, in which case fishers must apply and pay for a permit, with a fee structure based on vessel length. Areas permitted for dredging are incorporated into permit conditions, along with any other restrictions. Dredge permits fluctuate each year depending on the seed mussel resource and since the byelaw NWIFCA have issued a maximum of three permits in one year.

4.4 NWIFCA Agreed Policy on Seed Mussel

In 2024, NWIFCA established an agreed definition of seed mussel and inspection criteria for determining it. This work was undertaken in order to clarify stakeholder's understanding of the term ephemerality, in relation to mussels, and provide a transparent evidence gathering method needed to support decision making. The definition of ephemerality is as follows:

'A seed mussel is defined as mussel that is less than 45mm in length AND less than 1 years of age.

Ephemerality (as it relates to seed mussel) is defined by NWIFCA as a high proportion of the seed mussel stock being lost to the fishery due to natural causes before it can reach a year post settlement.

All conditions listed below must be met for the NWIFCA to consider an area of seed mussel as ephemeral, these being:

- 1. A settlement of high abundance and density of seed mussel, that is*
- 2. depositing high amounts of pseudofaeces (mussel mud), and*
- 3. the settlement is at risk of being washed away before it can reach size.*

In addition, there are occasions where settlements are lost due to the presence of large numbers of star fish heavily predated the stock. In this scenario, the above conditions do not need to be met in order for the stock to be defined as ephemeral.'

A list of inspection criteria which officers assess when out on a inspection was also detailed, to demonstrate the method by which ephemerality is assessed. Further information on this can be found in Agenda Item 10 of the February 6th TSB meeting in 2024: [Agenda-Item-10-Seed-mussel-definition-of-ephemerality-TSB-February-2024.pdf](#)

In addition to the variables outlined above, there is still knowledge gaps with regards to the shellfish requirements of protected bird species in the designated sites.

4.5 Biosecurity

Morecambe Bay is currently shellfish disease free and the Authority considers it a priority to maintain this status. The non-native species Chinese Mitten Crab (*Eriocheir sinensis*), Wireweed (*Sargassum muticum*) and Leathery Sea-squirt (*Styela clava*) have previously been recorded within the area. In order to implement effective measures to prevent the introduction and / or spread of diseases or non-natives the Authority has developed and published a Biosecurity Plan, detailing controls and conditions that will be applied to all commercial shellfish activities. The Biosecurity Plan seeks to ensure that consignments and/or areas from which they come, are regularly and thoroughly checked for invasive non-native invasive species (INNS). NWIFCA now has firm evidence of Chinese mitten crabs in Morecambe Bay. In September 2020 two adult Chinese mitten crab were caught and retained and were subsequently confirmed by NWIFCA. Gatherers have been advised to inspect their catch for Chinese mitten crabs whilst fishing on mussel beds and a reporting system is in place in the NWIFCA biosecurity plan. Officers from the NWIFCA also completed quarterly monitoring and surveillance on Heysham Flat and Foulney mussel beds, producing report to assist other regulators between 2018 and 2020. Officers have produced informative posters for the general public in order to raise awareness of the risk of the Chinese mitten crab, and requirement to report sightings.

4.6 Variability of Stock and Conditions

Managing a resource such as mussel in Morecambe Bay is hugely problematic due to the highly dynamic environment in which it is found, the vagaries of mussel recruitment, changing weather patterns particularly associated with climate change, and variability of predator presence, particularly from common starfish. It is

impossible to predict what will occur from one year to the next, and in times and places from one month to the next. NWIFCA holds decades of reports, stock assessments and photographic evidence on this resource.

Morecambe Bay is characterised by vast areas of sand underlain by glacial moraine. The channels shift, sometimes hundreds of metres overnight. The sand also moves around, sometimes covering over the glacial moraine, sometimes leaving it exposed. There are a number of examples where large areas have been covered in sand overnight.

Some areas of exposed moraine are relatively static due to their height on the shoreline and presumably shelter - Heysham Flat main skear, and Foulney Twist (main skear). The bottom ends of both of these areas have been sand covered in the past decade. Other areas are highly changeable and can change month on month, with areas that have been exposed one month, observed buried by a sand covering a month later.

Mussel needs a hard substrate on which to recruit, and when the moraine is exposed it provides ideal conditions. Where the brood stock for the dense aggregations seen in the Bay is situated has not established. There are older mussel stocks positioned on the upper reaches of Foulney and Foulney Ditch in most years and these may act as breeding stock. However, some larval dispersal modelling by Bangor University, although not specifically focussed on Morecambe Bay mussel, has provided evidence to the hypothesis that brood stock actually lies much further south even within the Mena Strait.

When considering the data from Dr Dare that 0 - 25% of stock might remain following natural scour, wash out and predation, a fact also observed by NWIFCA scientists, and also that dredge fishing is never 100% efficient and that a percentage of stock will remain post-fishing, it is natural to assume that some of this remaining mussel may over-winter. Un-embryoned seed mussel has an ability to 'hunker down' into the sediment when space allows in order to avoid the elements, particularly the effects of wind. This is commonly observed on Morecambe Bay mussel beds and can occur in coarse ground as well as soft. This provides some protection against scour. A frequent occurrence in the following spring is the next cohort of dense spat settling on top of this remaining mussel and smothering it. As the new mussel grows (rapidly) and puts down high levels of mussel mud, the older mussel disappears under this accumulation and generally dies.

4.7 Current Status of Stock

The current stock status of Black Scar is detailed below. A brief overview of the condition of the other mussel beds within Morecambe Bay is also provided, with their respective detailed inspection notes included in Annex 1.

4.7.1 Status of the proposed bed:

Black Scar (Fleetwood)

Perch and Black Scar mussel beds at Fleetwood have been inspected three times this year in June, July and August. The nature of the beds can result in considerable changes over a short period.

The bed has had significant scouring since the inspection in July, likely due to storm Floris. The coverage of the remaining mussel is approximately 10% with large area of bare mussel mud. On the western edge of the bed the mussel persists in higher densities. The mussel is 20-30mm in length. The area of the bed is the same as previously mapped in July, approximately 10 hectares.

Black Scar has not had the same level of scour as Perch scar with more of the 2025 mussel persisting. The mussel density has reduced to 50-60% coverage and is smaller in size at 10-20mm. The mussel has formed small hillocks where the mussel is on 30-40cm of mud, in between the hillocks there is exposed stoney substrate or a thin layer of soft mud, less than 5cm. The area of mussel is the same as when previously mapped in July, approximately 7 hectares. As previously reported there is a strip of bare cobble on the channel edge.

The full inspection reports for the three months are provided in Annex 1. The inspection report includes images to evidence the description provided.

Recommendation: This year, due to the dense seed coverage, loose mussel, and mud and evidence of scouring, **Black Scar is proposed for a hand gathered seed mussel fishery** in the area detailed in Figure 2.

Though the area extends beyond the boundaries of the bed (outlined in red) the areas outwith of this are either bare cobble or sand which will not be targeted by fishers. Coordinates are simple to allow for ease of compliance and enforcement. Fishers will target the main central part of the bed where density is greatest and effort to return ratio will be highest.

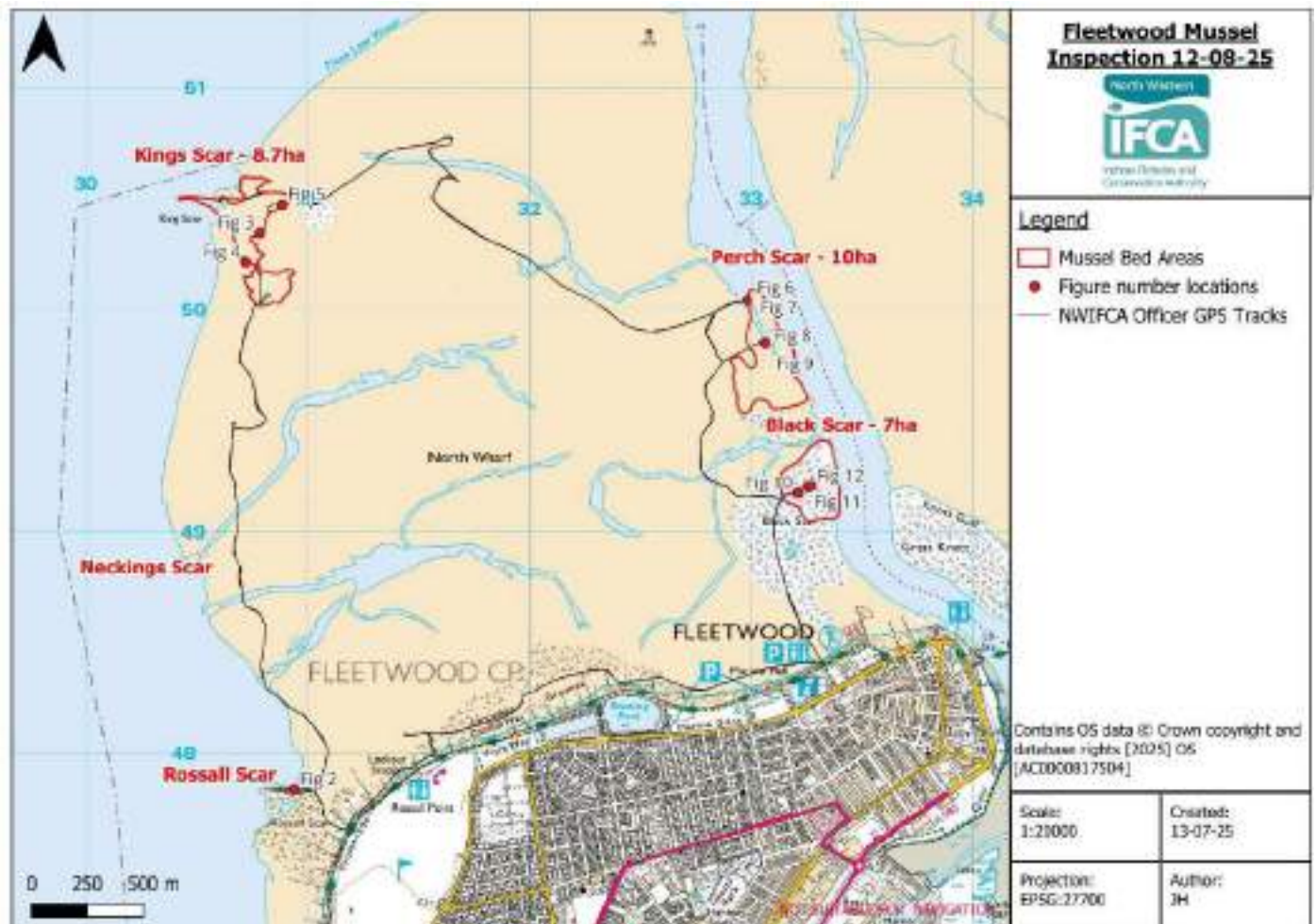


Figure 1. The location and extent of the Fleetwood mussel beds including the proposed Black Scar mussel bed – August 2025.

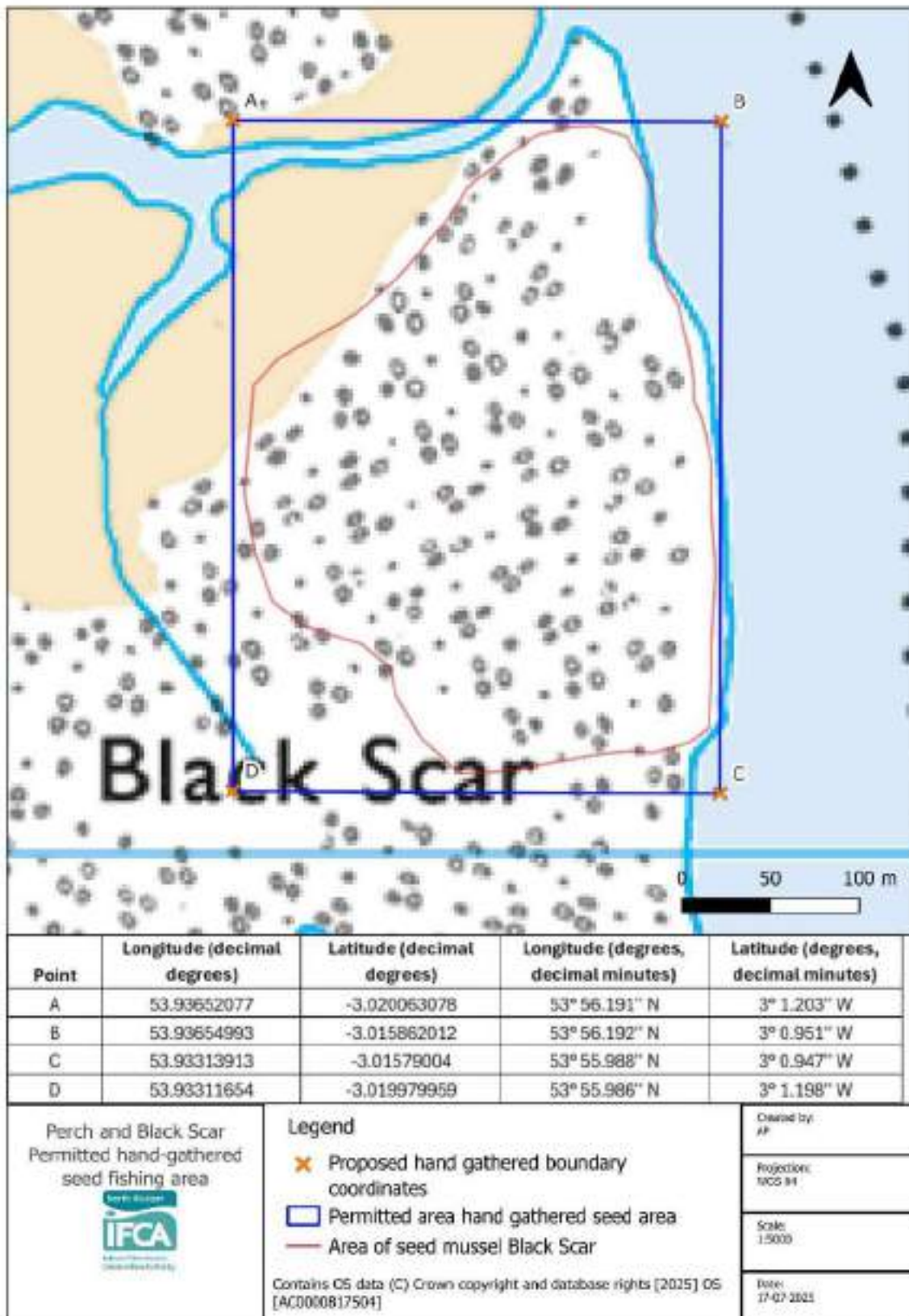


Figure 2. The proposed area permitted for hand-gathered seed mussel fishing on Black Scar – August 2025.

4.7.2 Status of all other mussel beds in Morecambe Bay:

The following section details the most recent stock status of mussel beds in Morecambe Bay, and Figure 3 shows their location and extent.

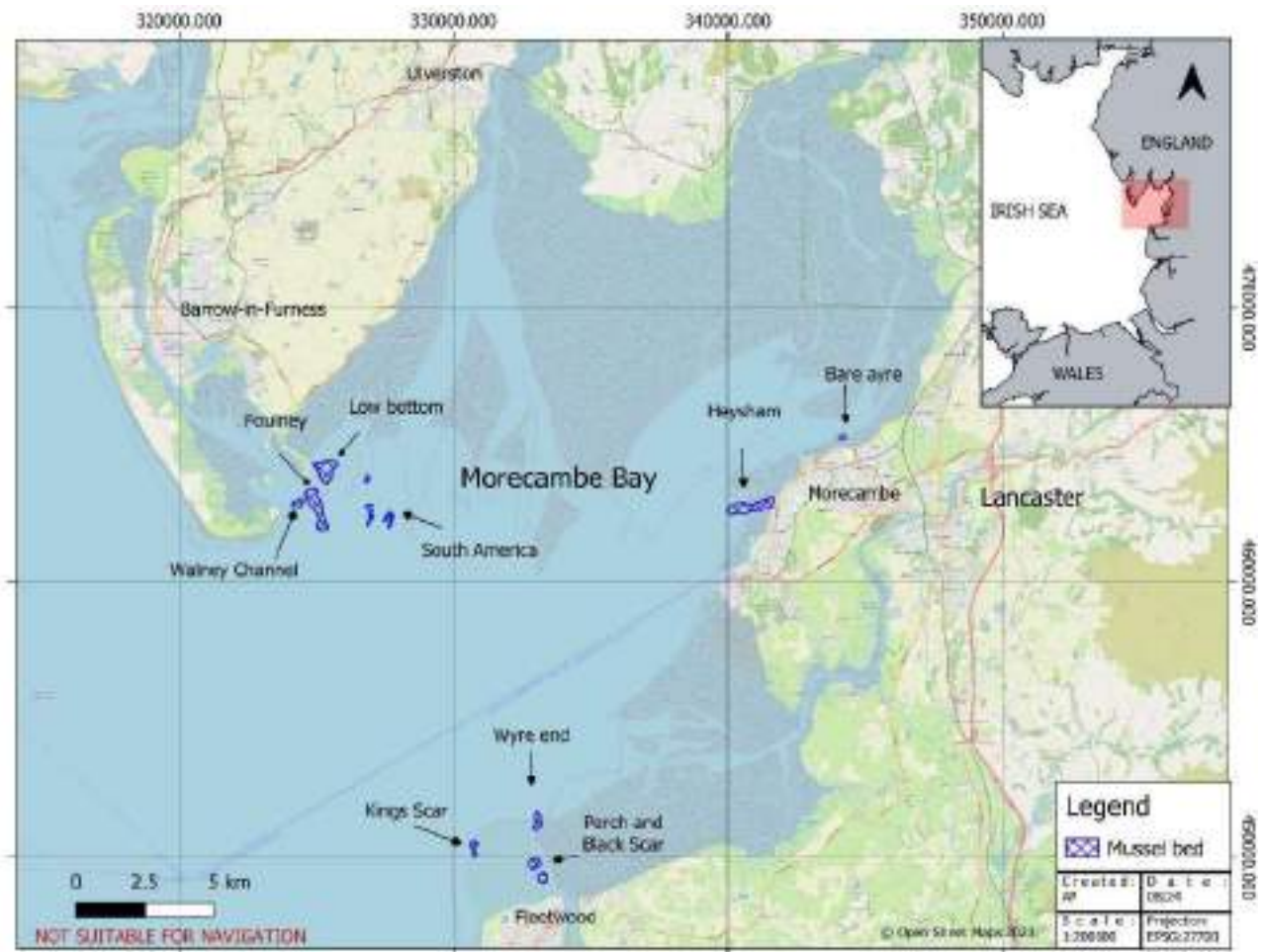


Figure 3. The location and extent of all inspected and surveyed mussel beds in Morecambe Bay 2025

1) Potentially ephemeral beds:

South America mussel bed

The South America mussel bed has undergone significant changes in the last year, with the area breaking up into several distinct sections and reducing in size. The overall bed area has reduced considerably from a combined 26.9 ha in 2024 to 7.7 hectares in 2025. In area 2, much of the mussel is size (45mm+), at low densities (10-20% coverage) and interspersed with large areas of exposed cobble. The mussel present is likely to be from the 2023/2024 settlement year. There are some small areas of seed on top of thin sand in the area, but these were very sparse in nature. The majority of mussel present is size mussel, of low density, and mixed in with dead shell on top of a thin layer of sand.

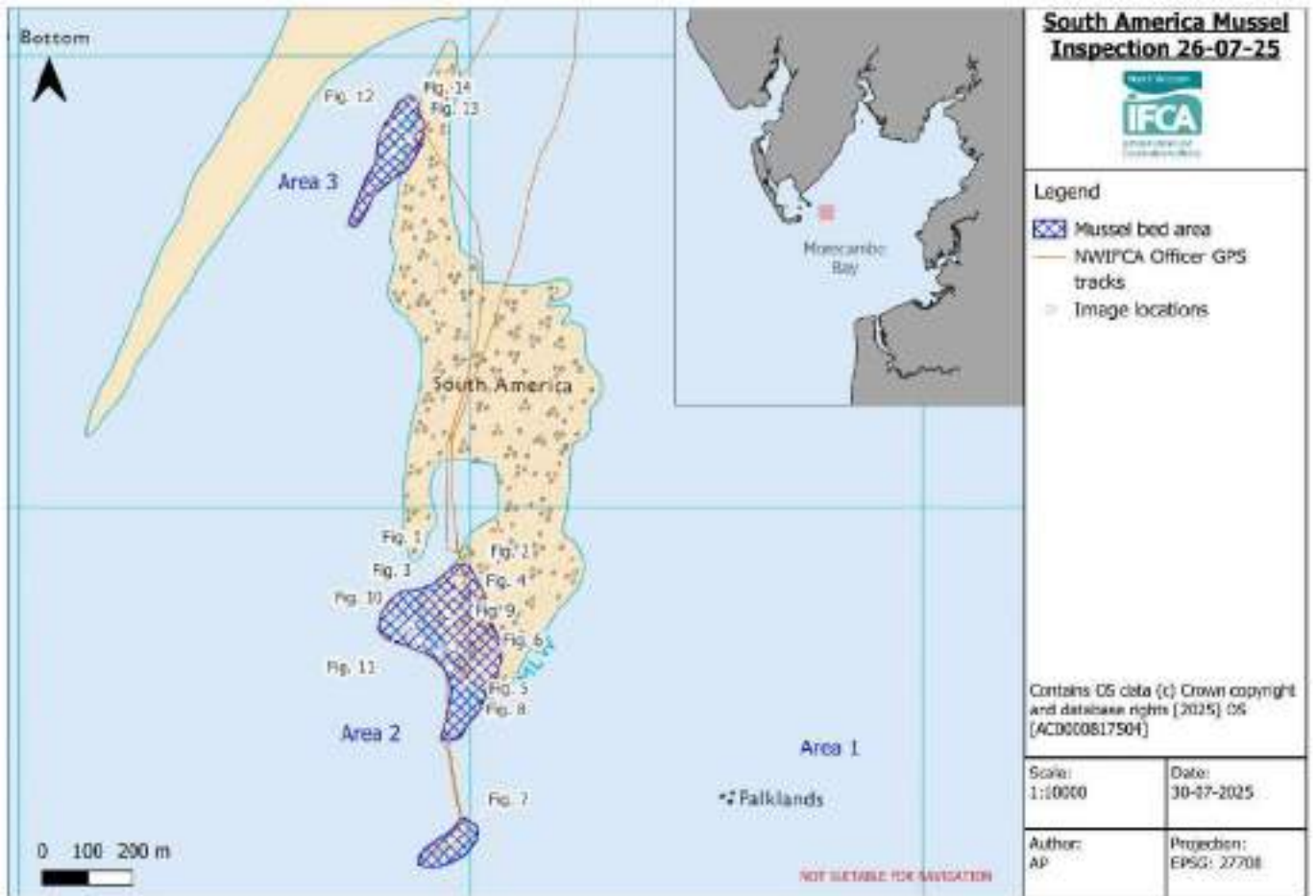


Figure 4. The location and extent of the South America mussel bed in Morecambe Bay July 2025.

Fleetwood mussel beds

In addition to Perch and Black Scar, there are three further small mussel beds in the vicinity of Fleetwood – Kings Scar, Neckings Scar and Rossal Scar (Figure 1). This year, Kings, and Rossal had received a 2025 settlement. It is highly likely that Neckings had also, however officers were unable to access the bed at this time.

Falklands mussel bed

Officers have been unable to access the Falklands mussel bed this year and so cannot provide information on the extent and coverage of mussel present on the bed.

Heysham

Heysham mussel bed has received a 2025 mussel settlement. Up until July, the bed had a substantial area of seed mussel extending from before Conger Rock, to the part way up the bed. Much of this was on mud and suitable for fishing, however as of August, it has undergone significant scouring. The bed beyond Conger Rock has significant volumes of mussel on the bed, however these are ontop of a historical Sabellaria reef. There was also the presence of size mixed in with seed. There are additional areas of mussel available over Dallam Dyke, however it was not possible for officers to cross this channel.

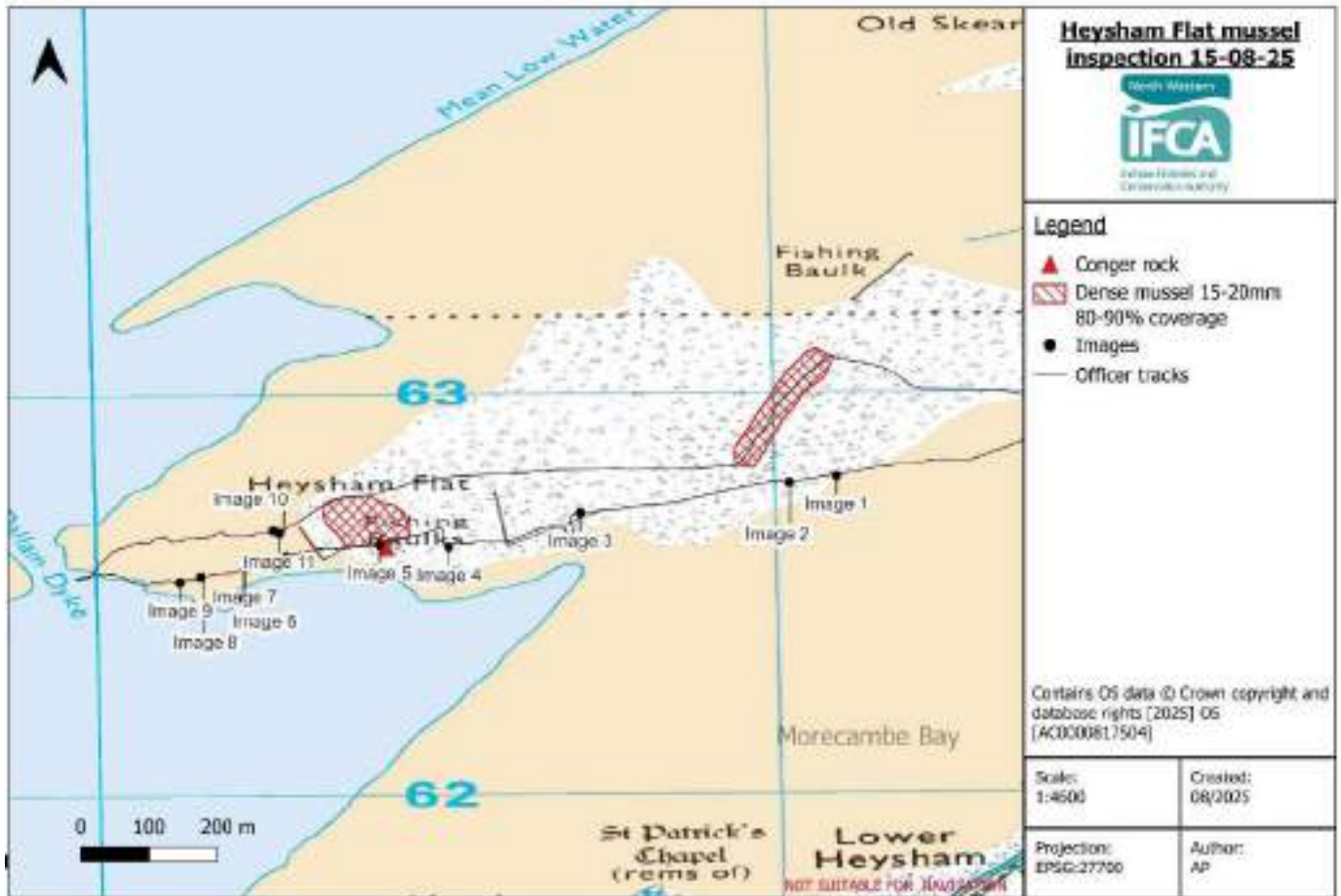


Figure 5. The location and extent of the Heysham flat mussel bed in Morecambe Bay August 2025, including areas of dense seed mussel.

Wyre end

Wyre end has received a 2025 mussel settlement. As of August the settlement was 90-100% coverage over much of the 14 hectares total area. The mussel had egun to put down mud but was still predominantly thin in places. Towards the edges of the bed were some exposures of cobble and evidence of the beginning of scouring. Some additional mussel patches were identified along the channel edges, but these were very small and of low density.

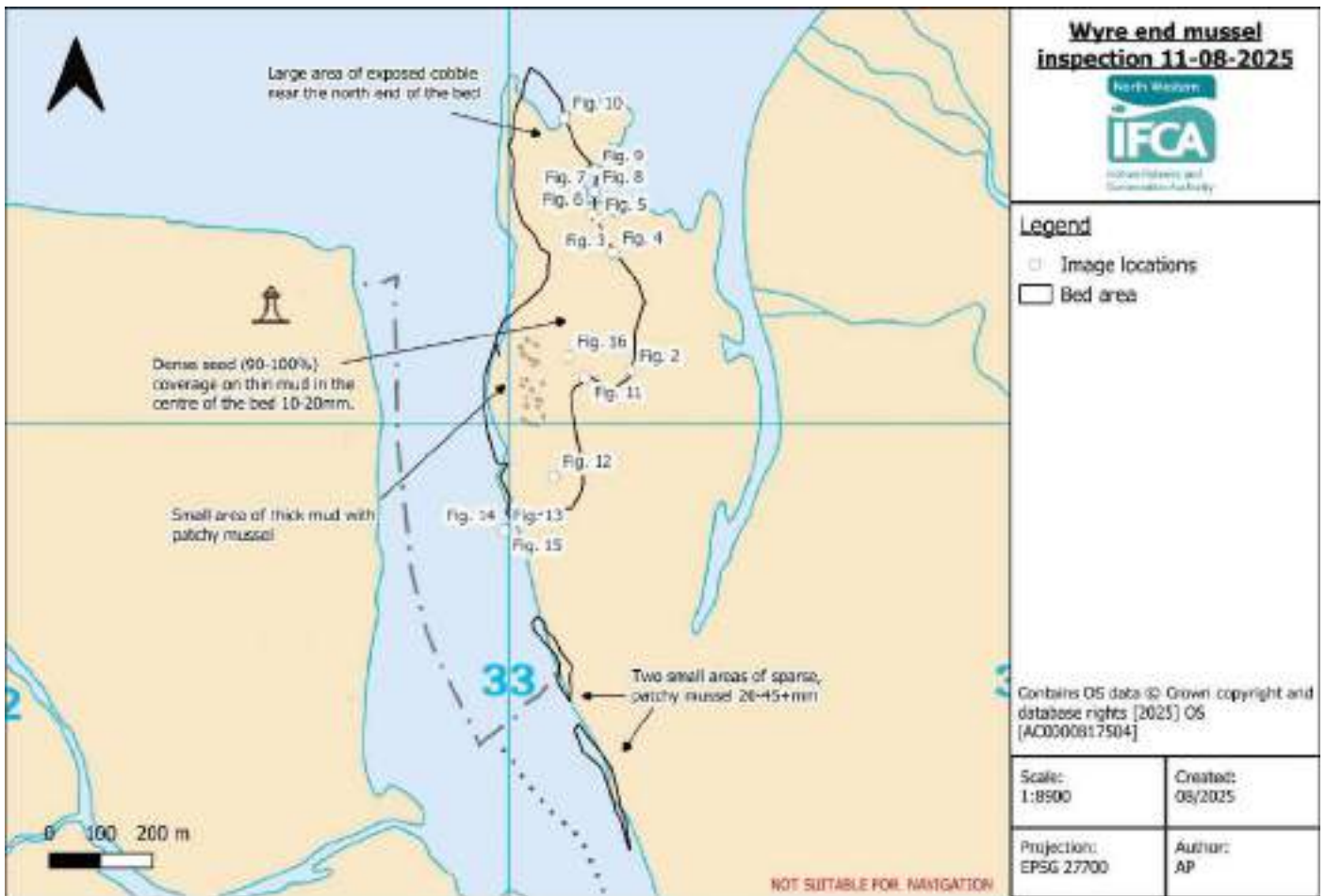


Figure 5. The location and extent of the Wyre End mussel bed in Morecambe Bay August 2025

2) Permanent mussel beds

Foulney

1961 tonnes of size mussel and 924 tonnes of undersize mussel was present across 39 hectares.

Wide spread of mussel sizes from 5mm to 73mm. size mussel >45 mm is predominantly on the lower half of the main skear and on the island. Undersize mussels were mainly congregated higher up the main skear with some mixed in with size mussel in the middle of the skear. Foulney has received a 2025 seed settlement which was thick in some areas and growing fast.

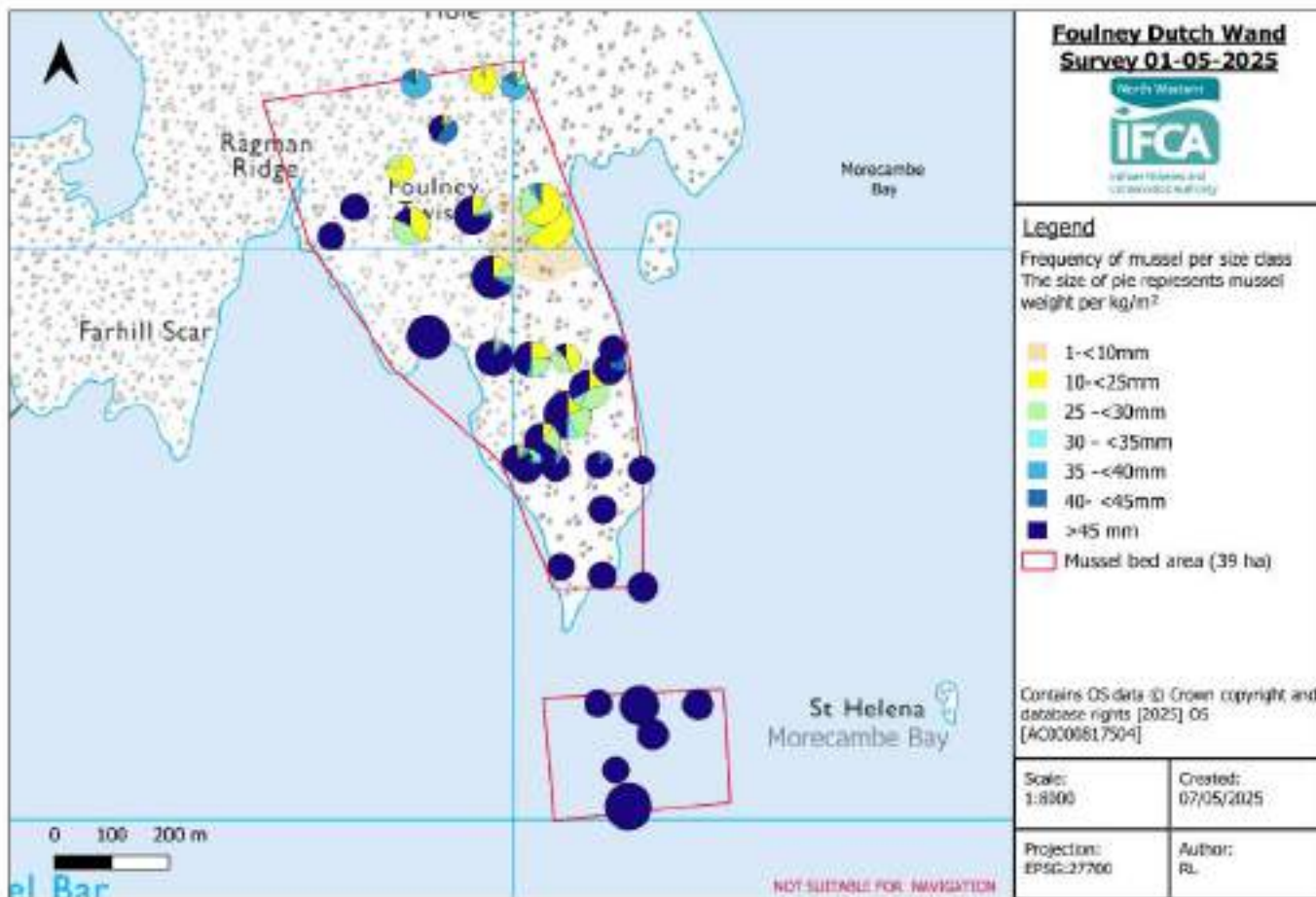


Figure 6. The location, extent, and size composition of mussel on the Foulney mussel bed in Morecambe Bay, May 2025

Low Bottom

1657 tonnes of size mussel and 397 tonnes of undersize mussel was present across 35 hectares

35 to >45mm mussel is found across the entire survey area with size mussel >45mm predominantly located on the southern area of the bed. A small amount of 10-25mm mussel is located in small areas across the bed.

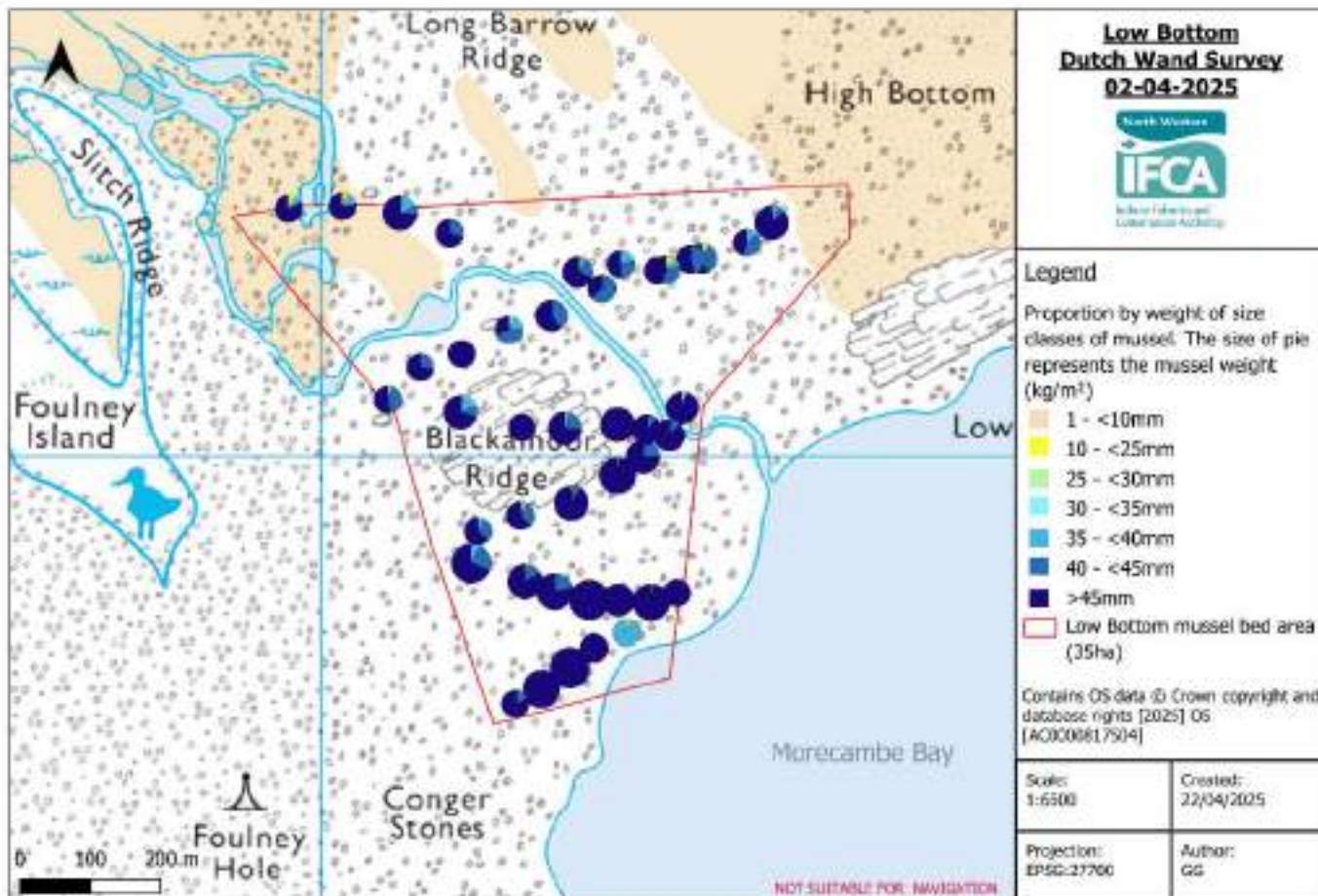


Figure 7. The location, extent, and size composition of mussel on the Low Bottom mussel bed in Morecambe Bay, May 2025

Walney Channel

445 tonnes of size mussel and 2 tonnes of undersize mussel was present over 9.25 hectares

>45mm mussel was found over the entire survey area

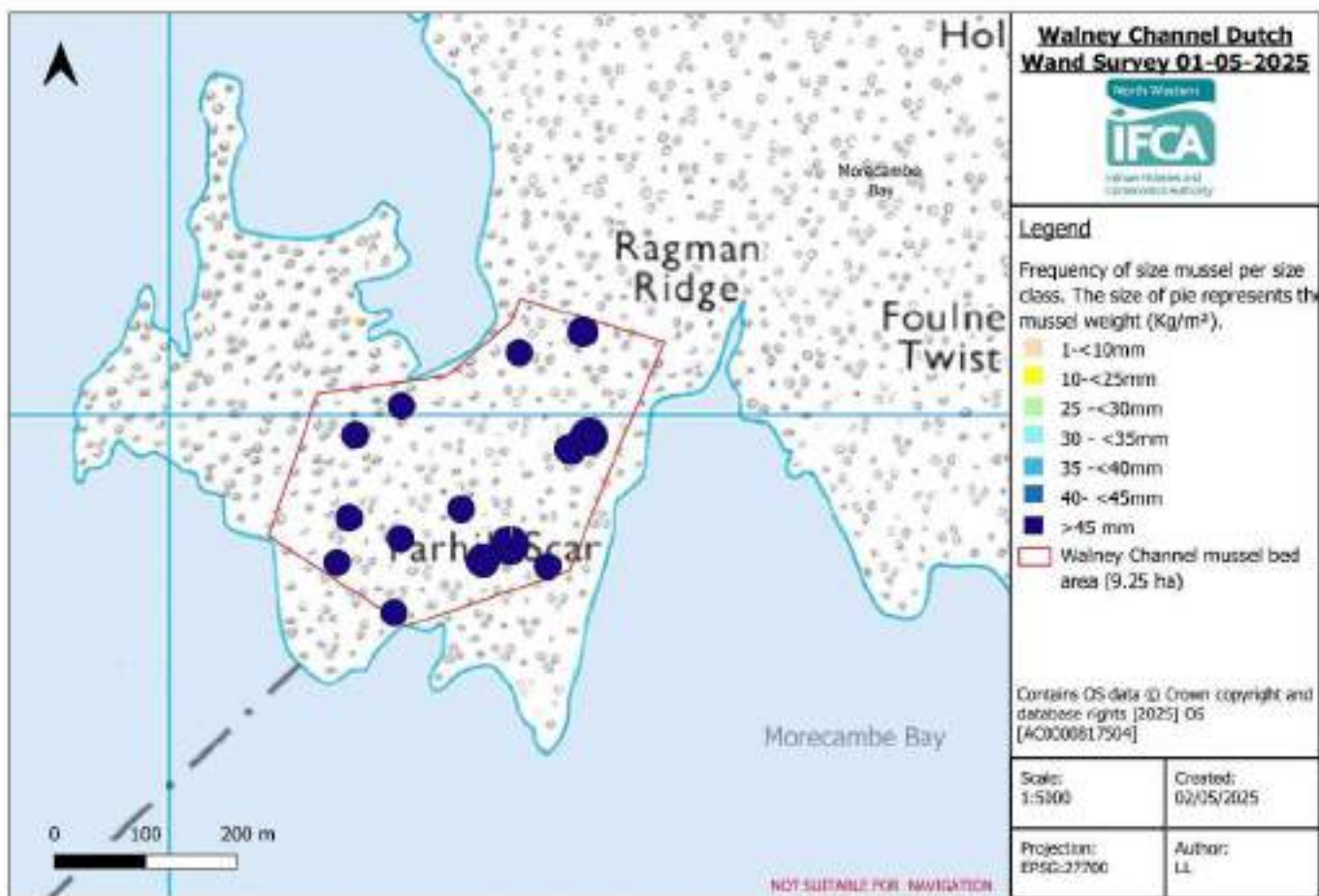


Figure 8. The location, extent, and size composition of mussel on the Walney channel mussel bed in Morecambe Bay, May 2025

4.8 Summary of proposed fisheries

Based on the information provided in the inspection reports, consideration of the key features of the beds (presence of mussel mud, bed extent, presence of *Sabellaria alveolata* etc.), and the condition of mussel settlements, the following fisheries (Table 1) are proposed for this year. The possible impact of these fisheries on the designated features of Morecambe Bay will be assessed further in this document. All other mussel beds will remain closed to seed fishing.

Table 1. Summary of proposed undersize fisheries to be opened in Morecambe Bay.

Mussel bed	Proposed fishery	Legislation	Open date
Black Scar (Fleetwood)	Hand gathered seed fishery	Byelaw 3 – Permit to fish for cockle and mussel	August/September

4.9 Information on fishing activity

4.9.1 Hand gathered seed

There are currently ~150 Byelaw 3 permit holders able to fish for mussel and cockle in the district and could, in theory, target the beds for seed mussel. However, out of these permit holders, landings from the past two years show that ~20 fishers target mussel, and out of these, there are approximately 3 to 10 fishers that fish for seed mussel across the district by way of hand gathering when authorised to do so.

Black Scar has been opened to seed mussel fishing several times since 2016. All previous HRA's are available here: <https://www.nw-ifca.gov.uk/marine-protected-areas/hra/>. Typically it has been fished via dredge, however has been opened to hand gatherers.

5. Test for Likely Significant Effect (LSE)

The Habitats Regulations Assessment (HRA) is a step-wise process and is first subject to a coarse test of whether a plan or project will cause a likely significant effect on an EMS¹.

Is the activity/activities directly connected with or necessary to the management of the site for nature conservation? **NO**

5.1 Table 1: Assessment of LSE

Features: All qualifying features and sub-features that do not interact with the fishing activity have been **screened out**. Features and sub-features identified to interact with the fishing activity have been included table 1 below.

Pressures: All pressures from the Advice on Operations table provided in the Morecambe and Duddon Estuary Conservation Advice package (<https://designatedsites.naturalengland.org.uk/SiteList.aspx?siteName=morecambe&countyCode=&responsiblePerson=&DesignationType=All>) have been screened out, other than the pressures in the following table, due to the nature of the fishing activity.

Table 2. Designated features, their sensitivity to fishing activity and the potential for likely significant effect.

Qualifying Feature	Sub-feature	Potential pressure(s) from hand gathered and/or dredge fishing (where relevant)	Sensitivity	Potential for Likely Significant Effect?	Justification and evidence
H1130. Estuaries H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats H1160. Large shallow inlets and bays SPA Supporting Habitats	Intertidal mud	Abrasion/disturbance of the substrate on the surface of the seabed Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Sensitive Sensitive	No No	Activity does not occur within the vicinity of intertidal mud. Access to fishery will not be over the feature.
	Intertidal sand and muddy sand	Abrasion/disturbance of the substrate on the surface of the seabed Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Sensitive Sensitive	No No	Hand-gathered access to fishery will be over feature but unlikely to have any impact in such a highly dynamic site, due to low levels of effort and number of tides available for fishing. Hand-gathered access to fishery will be over feature but unlikely to have any impact in such a highly dynamic site, due to low levels of effort and number of tides available for fishing. Boat access over high water and no impact on intertidal sand and muddy sand features.
	intertidal/subtidal mixed sediments, intertidal coarse sediment	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Sensitive	Yes	Potential for interaction with mixed and coarse sediments. Feature and pressure taken through to AA.

¹ Managing Natura 2000 sites: http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm

	Intertidal / subtidal stony reef	Abrasion/disturbance of the substrate on the surface of the seabed	Sensitive	Yes	Hand-gathered fishing removes the mussel from the surface of the seabed and there is potential for abrasion / disturbance / penetration of the substrate on and below the seabed. Feature and pressures taken through to AA. The area is shellfish disease and INNS free. Industry are encouraged to use recognised procedures to ensure equipment is clean of INNS. Consignments are monitored closely through CEFAS shellfish hygiene inspections, and NWIFCA liaison with regulators in Ireland and North Wales to ensure risk of translocation is minimal Feature and pressure taken through to AA. There is little or no by-catch in this highly selective fishery. Feature and pressure taken through to AA. The proposal is to remove mussel from the skear. Mussel beds are a characteristic and fluctuating community of the intertidal boulder and cobble skear interest sub-feature.			
	Intertidal / subtidal biogenic reef: including mussel and Sabellaria communities	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Sensitive	Yes				
		Genetic modification & translocation of indigenous species	Sensitive	No				
		Litter	Sensitive	Yes				
		Removal of non-target species	Sensitive	No				
		Removal of target species	Sensitive	Yes				
A026 <i>Egretta garzetta</i> ; Little egret	Supporting Habitats assessed above	Removal of target species (Mussels)	Some species sensitive, others screened out	Yes	Species sensitive to removal of mussels: - Common eider - Eurasian oystercatcher - Red knot - Herring gull - All other shore feeding SPA feature which occasionally feed on infaunal molluscs.			
A038 <i>Cygnus Cygnus</i> ; Whooper swan								
A040 <i>Anser brachyrhynchus</i> ; Pink-footed goose								
A048 <i>Tadorna tadorna</i> ; Common shelduck		Removal of non-target species	Sensitive	No				
A050 <i>Anas Penelope</i> ; Wigeon								
A054 <i>Anas acuta</i> ; Northern pintail						Visual disturbance	Sensitive	Yes
A063 <i>Somateria mollissima</i> ; Common eider (Breeding)								
A067 <i>Bucephala clangula</i> ; Goldeneye								
A069 <i>Mergus serrator</i> ; Red-breasted merganser								
A130 <i>Haematopus ostralegus</i> ; Eurasian oystercatcher						Supporting Habitats assessed above	Removal of non-target species	Sensitive
A137 <i>Charadrius hiaticula</i> ; Ringed plover								
A140 <i>Pluvialis apricaria</i> ; European golden plover								
A141 <i>Pluvialis squatarola</i> ; Grey plover								
A142 <i>Vanellus vanellus</i> ; Lapwing								
A143 <i>Calidris canutus</i> ; Red knot								
A144 <i>Calidris alba</i> ; Sanderling								
A149 <i>Calidris alpina alpina</i> ; Dunlin								
A151 <i>Calidris pugnax</i> ; Ruff	Supporting Habitats assessed above	Removal of non-target species	Sensitive	Yes	All species taken through to AA			
A156 <i>Limosa limosa</i> ; Black-tailed godwit								
A157 <i>Limosa lapponica</i> ; Bar-tailed godwit								

A160 <i>Numenius arquata</i> ; Eurasian curlew A162 <i>Tringa totanus</i> ; Common redshank A169 <i>Arenaria interpres</i> ; Ruddy turnstone A176 <i>Larus melancephalus</i> ; Mediterranean gull <i>Phalacrocorax carbo</i> ; Cormorant <i>Podiceps cristatus</i> ; Great crested grebe A183 <i>Larus fuscus</i> ; Lesser black-backed gull (Breeding) A184 <i>Larus argentatus</i> ; Herring gull (Breeding)					
A191 <i>Sterna sandvicensis</i> ; Sandwich tern (Breeding)					
A193 <i>Sterna hirundo</i> ; Common tern (Breeding)					
A195 <i>Sterna albifrons</i> ; Little tern (Breeding)					
Seabird assemblage					
Waterbird assemblage					

Is the potential scale or magnitude of any effect likely to be significant?²	Alone Yes	OR In-combination³ Yes
	Comments :	Comments : These activities also occur at the site: <ul style="list-style-type: none"> • Beam Trawl (Shrimp) • Pots and Creels • Light otter trawl (Fish) • Drift and Fixed nets (including stake) • Hand working (size mussel) • Hand-working (cockles)
Have NE been consulted on this LSE test? If yes, what was NE's advice?	No - NWIFCA consider AA required	

² Yes or uncertain: completion of AA required. If no: LSE required only.

³ If conclusion of LSE alone an in-combination assessment is not required.

6. Appropriate Assessment

Potential risks to features

6.1 Potential risks to SAC habitat features of Morecambe Bay and Duddon Estuary from undersize hand gathered mussel or dredge seed fishery.

Features at risk of interacting with fishing activity:

- Intertidal / subtidal mixed sediments, intertidal / subtidal coarse sediment
- Intertidal / subtidal stoney reef
- Intertidal / subtidal biogenic reef: including mussel and *Sabellaria alveolata* communities

6.1.1 Pressures and Potential Impacts

The pressures that each Morecambe bay SAC feature and sub-feature are susceptible to are detailed in Natural England's 'Advice on Operations'. The key impacts that the relevant sub-features are vulnerable to are detailed below.

- i. Abrasion/disturbance of the substrate on the surface of the seabed
- ii. Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion.

i) and ii) assessed together - both hand-gathering and seed mussel dredge fishing remove the mussel from the surface of the seabed and there is potential for abrasion / disturbance / penetration of the substrate on and below the seabed from the use of rakes and dredges.

- iii. Litter

Past hand-gathered fisheries have had a poor reputation for large amounts of litter left deposited on the parking and access areas, and on the fishery. Items have included food and drink receptacles, net bags and sacks. Potential impacts could include entanglement of fish and birds in the bags and sacks, and swallowing / entanglement by / of birds and mammals (both marine and terrestrial) of other litter.

- iv. Removal of target species from biogenic mussel bed communities

Potential to affect the presence and spatial distribution of feature communities, the presence and abundance of typical species and the species composition of component communities.

As the provisional HRA was done prior to final inspection of these sites, the worst-case scenario will be considered here to ensure maximum extent of impact has been considered. However, post-survey, the scope of proposed activity is considerably lower than that considered in the early HRA. Information relating to the extent and location of the proposed fishery is detailed Section 4.

6.1.2 Exposure

In this section, the level of potential pressure caused by hand or dredge fishing on each sub-feature is considered, and a recommendation as to whether the activity is likely or not affect the integrity of the designated feature.

6.1.2.1 Abrasion and penetration

Pressure considered:

- i. Abrasion/disturbance of the substrate on the surface of the seabed
- ii. Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion

Interaction with feature:

- i. Intertidal / subtidal mixed sediments,
- ii. intertidal / subtidal coarse sediment; and
- iii. Intertidal / subtidal stoney reef

Hand-gathered seed Fishery: On Black Scar, the mussel sits on a layer of soft substrate (mixture of mud, sand and sandy mud) which in places is over a metre thick. Hand-raking skims the mussel from its underlying sediment, with little to no contact with the cobble and boulder reef beneath.

The extent of the proposed fishery will only take place where mud is deemed consistently thick over an area large enough area – large areas of exposed cobble are excluded from the proposed fishing areas to ensure the fishery has minimal interaction with the protected features.

Although there are patches of bare ground in between the hillocks where exposed cobble and boulder are present, these are not areas that will be targeted by hand-gatherers as they do not have mussel.

There is a history of both of these fishery activities occurring on these areas with no known impact to the underlying features.

The NWIFCA can conclude that due to the prevailing conditions of thick mud that abrasion and penetration on and below the surface of the seabed will have no risk of adverse effect on the integrity or conservation status of the designated features within the site.

Interaction with feature:

- iii. Intertidal / subtidal biogenic reef: *Sabellaria alveolata* communities

Black Scar

There is no evidence of *Sabellaria alveolata* on Black Scar, and therefore, there is no risk of this feature interacting with the proposed fishing activities at these sites.

Due to the absence of Sabellaria alveolata on Black Scar, NWIFCA can conclude that the proposed fisheries at these sites will have no risk of adverse effect on the integrity or conservation status of the designated features within the site.

6.1.2.2 Litter

Pressure considered:

- i. Litter

Since 2016 there have been a number of cockle fisheries in Morecambe Bay (Newbiggin, Flookburgh, Leven Sands and Pilling Sands) and in most years there has been a fishery on Black Scar for seed mussel as well as on-going size mussel fisheries around Morecambe Bay. There have only been a few reports of litter being an issue at any of these fisheries, which are regularly inspected by fishery officers. Where issues have been raised officers work with gatherers, buyers and the local authority to resolve the issues. A Code of Practice for Intertidal Hand-gathering includes responsibility for littering. NWIFCA takes a swift response to any alerts to littering issues.

The NWIFCA is confident that littering will be minimal and controlled and monitoring will be in place to identify quickly if litter is a problem. ***Therefore, the NWIFCA can conclude that litter will have no risk of adverse effect on the integrity or conservation status of the designated features within the site.***

6.1.2.3 Removal of target species

Pressure considered:

- i. Removal of target species*

Feature interaction:

- i. Intertidal biogenic reef: including mussel and Sabellaria alveolata communities*

The fisheries are being proposed due to:

- 1) The presence of thick mud on the majority of the bed,
- 2) Identification of large amounts of loose mussel, and
- 3) Evidence of scouring and the high likelihood that the mussel will wash off the bed imminently.

Based on these conditions, and historical trends in stock wash off, it is highly likely that the 2025 year class of mussel and mud on which it sits will be removed by natural events. Although attempts have been made over the years to identify *where* the mussel is washed to, it has never been found within the Bay and is believed to either wash into the wider Irish Sea or to die. Each year, there has been subsequent settlements, demonstrating the bed's ability to recolonise after natural scouring.

NWIFCA is confident that the removal of target species will have no risk of adverse effect on the integrity or conservation status of the designated features within the site.

6.2 Potential risks to SPA and Ramsar features of Morecambe Bay and Duddon Estuary from hand gathered mussel or dredge seed fishery.

Features at risk of interacting with fishing activity:

- SPA and Ramsar birds

6.2.1 Pressures and Potential Impacts

The pressures that each Morecambe bay SPA feature and sub-feature are susceptible to are detailed in Natural England's 'Advice on Operations'. The key impacts that the relevant sub-features are vulnerable to are detailed below.

- i) Removal of target species (mussels) for Common eider, Eurasian oystercatcher, Red knot, Herring gull, and those SPA features which occasionally feed on infaunal molluscs;

Mussels form part of an important prey resource for eiders, oystercatchers, knot and herring gull, as well as forming part of a wide variety of prey items for many of the designated species including grey plover, dunlin, sanderling and turnstone. If bird populations are to be maintained, or restored to healthy condition, sufficient shellfish to meet their demands must remain for them.

The impact of removal of essential prey resource by fishing activity varies at different times of the year. For example, prey resource requirements are far greater during autumn and at the beginning of winter than at other times of the year, as enough resource needs to be present for all the birds to feed through the cold months, when energy requirements are higher. Over-wintering waders require food to put on weight and get into best condition in the spring prior to migrations for the summer, or they will not survive long flight distances and suffer high mortalities. Equally, the breeding eider population of Morecambe Bay needs to get into prime condition prior to mating in order to reproduce successfully. This applies to both sexes but in particular to females who once on the nest do not feed again until ducklings have fledged, a period of up to three weeks. There have been concerns raised over the Bay's eider population, its sex ratio skew (3:1 males to females) and the lack of success in breeding.

Oystercatchers eat a range of sizes of mussels. Although the birds will eat alternative prey species when shellfish are scarce, these prey often are not as nutritious and do not enable birds to survive as well, and in such good body condition, as when shellfish are abundant (Atkinson et al 2003; Goss-Custard et al 2004).

Knot eat smaller bivalves with lower and upper size limits of around 5 and 12.5mm shell length respectively (Bell et al 2001).

Eiders generally feed on a mixed range of sizes of bivalves, although it is understood they will consume high quantities of small mussels when they are available.

Herring gulls fed on a range of sizes of bivalves with around 20mm thought to be the preferred size (Hilgerloh *et al*, 1997)

- ii) Visual disturbance - All SPA species within vicinity of fishery, on the saltmarsh access route and over the sandbanks.

Visual disturbance could impact on the condition of any of the listed bird species, by causing unnecessary energy expenditure if flushed and taking to flight. For birds feeding on the affected areas it could also reduce feeding times, and increase competition if birds are forced to concentrate into reduced feeding areas.

6.2.2 Exposure

In this section, the level of potential pressure caused by the proposed hand or dredge fishing on each feature is considered, and a recommendation as to whether the activity is likely or not to affect the integrity of the designated feature.

i) Removal of target species (mussels) for Common eider, Eurasian oystercatcher, Red knot, Herring gull;

The seed mussel on Black Scar is highly vulnerable to natural wash out and therefore is highly unlikely to be available to the birds through autumn or winter whether fished or not. Every year natural processes remove the majority of seed, and a new spat settlement takes place the following year. The size of the mussel removed by the fishing activity is in the 20 - 30mm size range and therefore outside of the typical feeding size range for knot, but within the feeding range for eider, oystercatcher and herring gull.

There are approximately 6 recognised cockle beds in the bay, and over 9 recognised mussel beds. NWIFCA survey or inspect all the beds annually. These inspections serve to provide estimates on the coverage and biomass of mussel and cockle in the bay, all of which contributes as a food source to protected bird species. Information on survey and Inspections of the mussels in Morecambe Bay is evidenced in Annex 1.

Although no specific figures have been given for the bird food requirements for bivalve eating birds, using the summary of the cockle (see Agenda Item 7 TSB August 5th 2025 [Annex-2-compressed.pdf](#)) and mussel bed surveys provided (Annex 1) and the reasons listed below, NWIFCA is confident that the bird food requirements are met for the site due to the following reasons:

- Fishing is never 100% efficient and neither method will remove all of the mussel from the bed. In addition, on all proposed beds, fishing will be limited to the restricted areas, and those accessible to fishers
- On the proposed beds, the seed does not typically survive the winter and is already showing signs of scouring; therefore, it will likely not be available as a resource to birds either as size, or as seed.
- Wader numbers are greatest during the winter months meaning feeding requirements are lower during the time of the fishery, which will take place between August and September.
- There are significant size and seed mussel stocks greater than those on the areas proposed for opening available on other mussel beds within the protected site (Annex 1).
- Out of a total 130 hectares of mussel available in the Bay, Black Scar constitutes 3% of the overall available area. This is also likely an under estimate, given the areas of the Duddon, Bare Ayre, Falklands and Heysham which remain unmapped.

Bed	Area (ha)	Date	Ephemeral / permanent
Kings Scar	8.7	August 2025	Ephemeral
Necking Scar	Unknown	August 2025	Ephemeral
Rossal Scar	Unknown	August 2025	Ephemeral
Perch Scar	10	August 2025	Ephemeral
Wyre end	14	August 2025	Ephemeral
South America	7.6	July 2025	Can be either
Falklands	Unknown	n/a	Unknown

Heysham	6.5	August 2025	Can be either
Foulney	39	May 2025	Permanent
Walney channel	9.25	May 2025	Permanent
Low bottom	35	May 2025	Permanent

NWIFCA is confident that the removal of target species (undersize mussel) will have no risk of adverse effect on the SPA features, which utilise mussel as a prey source and therefore have no risk of adverse effect on integrity or conservation status of the site.

ii) Visual disturbance - All SPA species within vicinity of the fishery, access route and over the sandbanks

Little egret have the potential to be disturbed when feeding. Little egret prefer to feed in shallow water 10cm to 20cm in depth (Kushlan & handcock 2005). There is potential for the birds to be disturbed by hand-gathering when tractors and quad bikes are travelling to and from the fishing areas and fishing. Little egret commonly feeds in solitary or in loose flocks (del hoyo et al. 1992), and therefore any disturbance is likely to affect only a few individuals.

Displacement will be temporary and short lived for the following reasons;-

- The gatherers will only travel once to and from the fishing area per tide
- The resource is imminently likely to wash away and so will not be present in quantities of interest to fishers for longer than a few months.
- Very few gatherers are likely to target the resource (5-20 maximum), given the availability of other fisheries in the Bay.

Golden plover are only likely to feed in the intertidal areas when weather conditions are harsh and the ground is hard from frost on their normal inland feeding areas. Due to the fishing activity occurring mainly in August - September it is unlikely that golden plover will be found near the fishery.

Dunlin, black tailed godwit, bar tailed godwits, curlew and redshank mainly target mudflats as their feeding grounds. Lapwing use a variety of habitats (marine and terrestrial), and when present on the intertidal they tend to target mudflats. The fishing activity does not occur on or near to mudflats. Redshank are found on saltmarsh and are known to nest on saltmarsh but the fishing activity does not occur on or near saltmarsh. There is no saltmarsh close to Black Scar mussel bed. All access to the fishing grounds by hand-gatherers is by established access routes.

Oystercatcher, ringed plover, grey plover, knot, sanderling and turnstone all feed on a variety of substrates in the intertidal area. Waders will move in and out with the tide feeding in and on the sediment, each wader will have a preferred prey source and size. Travel by hand-gatherers to and from the authorised area and fishing has the potential for disturbance. Visual disturbance to Oystercatcher, ringed plover, grey plover, knot, sanderling and turnstone will be minimal and any displacement temporary and short lived for the following reasons:

- the gatherers will only travel once to and from the fishing area per tide
- plentiful mussel stock present on other beds and some additional cockle stocks as alternative feeding (Annex 1) giving large areas of undisturbed feeding.
- there will be a limited number of hand-gatherers prosecuting the fishery with a maximum of 20 permit holders fishing over low water.

Shelduck, pintail and wigeon spend a proportion of their time feeding on intertidal mud. The fishing activity does not occur on or near to mudflats meaning disturbance is unlikely. Red breasted merganser, cormorant

and great crested grebe spend the majority of time on the water, so there will be minimal to no disturbance from an intertidal fishery accessed from the shore. Whooper swans and pink footed geese numbers are greatest during the winter, and as the fishery is in August to September and for a short period of time disturbance is likely to be minimal if any.

Eiders are known to feed on submerged mussels at shallow depths (2-3m) (Larsen & Guillemette 2000) and are regularly observed at or near to the Falklands beds, Foulney Island, Low Bottom, Morecambe and Fleetwood. Visual disturbance to Eiders by the fishing activity will be minimal and any displacement temporary and short lived for the following reasons:

Hand-gathering:

- no visual disturbance to feeding eiders from hand-gatherers as feeding on different tides to the fishing activity
- eiders loafing or resting on the exposed intertidal areas are mainly around Foulney and Walney Channel. The area between Black Scar and the shore is typically used by the public and dog walkers so is regularly disturbed by other activities. Eiders have not regularly been observed in the area.

Mediterranean gull, lesser black-backed gull, herring gull are present on both the intertidal and open water and therefore there is potential for visual disturbance from access and fishing to the authorised area. Visual disturbance to gulls will be minimal and any displacement temporary and short lived for the following reasons:

- The area that fishing will take place is comparatively small in comparison to the total area of mussel available to birds across Morecambe Bay.
- The gatherers will only travel once to and from the fishing area per tide
- Plentiful mussel stock present on other beds and some additional cockle stocks as alternative feeding (Annex 7) giving large areas of undisturbed feeding. Including the areas unlikely to be fished for cockle based on 2025 stock surveys is >80% of the total cocjle bed area in the Bay. In addition, Black Scar makes up only 3% of the total available area for mussel feeding, with much of the other ephemeral beds closed to fishing – and therefore available for undisturbed feeding.
- There will be a limited number of hand-gatherers prosecuting the fishery with a maximum of 20 permit holders fishing over low water.

Sandwich tern, common tern, and little tern rarely use the intertidal area at low water but will use the shallow areas covered by water. The tern species do nest in coastal areas but none of the known nest areas are access points for the fishery. The known nesting areas for terns in the European Site are Foulney and Hodbarrow. There is potential for fishing activity to disturb the terns while fishing in shallow water at low tide but terns have large foraging ranges and will not be displaced a large distance by the fishing activity. The main times of year when they are present are out with the time of these fisheries.

The NWIFCA is confident that visual disturbance to the SPA features will have no risk of adverse effect on the integrity or conservation status of the site.

7. Management and Mitigation to Ensure No Adverse Effect on the Integrity of the European Site:

In order for the NWIFCA to be fully confident of no risk of adverse effect on the integrity or conservation status of the sites a precautionary approach is being taken, and the following management measures implemented:

- a) Rigorous enforcement of the conditions set out in the authorisation and permit conditions including sensitive areas outside of the fishery;

- b) Monitored landings through:
 - i. Regular IFCO reporting of numbers fishing and estimates of quantities removed;
 - ii. Landings returns from Byelaw 3 permit holders and Dredge permit holders (required under both byelaws);
- c) Monitoring and inspection to inspect catch and ensure that there are no litter issues;
- d) NWIFCA enforcement officers will use intelligence and contacts with fellow enforcement agencies to pursue any suspicions of non-permitted or illegal gathering activity;
- e) A NWIFCA officer will be present on the dredge vessel to ensure activities take place within the restricted areas and can enforce a closure at any point should the activity extend beyond the specified boundaries.

Table 2: Summary of Impacts

Feature/Sub feature(s)	Conservation Objective	Potential pressure ⁴ (such as abrasion, disturbance) exerted by gear type(s) ⁵	Potential ecological impacts of pressure exerted by the activity/activities on the feature ⁶ (reference to conservation objectives)	Level of exposure ⁷ of feature to pressure	Mitigation measures ⁸
Intertidal mixed sediments, intertidal coarse sediment Intertidal biogenic reef: including mussel and Sabellaria alveolata communities	Maintain or restore the extent, distribution structure or function of the feature.	Abrasion/disturbance of the substrate on the surface of the seabed	Both hand-gathering and seed mussel dredge fishing remove the mussel from the surface of the seabed and there is potential for abrasion / disturbance / penetration of the substrate on and below the seabed from the use of rakes and dredges.	As in 6.1.2.1	None – no activity in areas where Sabellaria is present as there is no Sabellaria in the proposed location
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion			None – no activity in areas where Sabellaria is present as there is no Sabellaria in the proposed location
		Litter	Litter could pose potential threat to wildlife, especially birds through ingestion or entanglement	As in 6.1.2.2	None - current management measures sufficient with monitoring of the fishery
		Removal of target species	Potential to affect the:- - Presence and spatial distribution of the feature communities - Presence and abundance of typical species - The species composition of component communities	As in 6.1.2.3	None - current management measures sufficient with monitoring of the fishery
Somateria mollissima; Common eider Haematopus ostralegus: Eurasian oystercatcher Calidris canutus; Red knot	Maintain or restore the population of each of the qualifying features, and, the distribution of the qualifying features within the site	Removal of target species (mussels)	Potential to affect the:- - Food availability - Condition and survival of SPA species - Abundance of SPA species	As in 6.2.2 (i)	None - current management measures sufficient with monitoring of the fishery

⁴ Guidance and advice from NE.

⁵ Group gear types where applicable and assess individually if more in depth assessment required.

⁶ Document the sensitivity of the feature to that pressure (where available), including a site specific consideration of factors that will influence sensitivity.

⁷ Evidence based e.g. activity evidenced and footprint quantified if possible, including current management measures that reduce/remove the feature's exposure to the activity.

⁸ Detail how this reduces/removes the potential pressure/impact(s) on the feature e.g. spatial/temporal/effort restrictions that would be introduced.

<p><i>Larus argentatus</i>; Herring gull</p>					
<p>Common eider Eurasian oystercatcher Red knot Little egret Whooper swan Pink-footed goose Common shelduck Wigeon Northern pintail Common eider Goldeneye Red-breasted Merganser Eurasian oystercatcher Ringed plover European golden plover Grey plover Lapwing Red knot Sanderling Dunlin Ruff Black-tailed godwit Bar-tailed godwit Eurasian curlew Common redshank Ruddy turnstone Mediterranean gull Cormorant Great crested grebe Seabird assemblage Waterbird assemblage Lesser black-backed gull Herring gull Sandwich tern Common tern Little tern</p>	<p>Maintain or restore the population of each of the qualifying features, and, the distribution of the qualifying features within the site</p>	<p>Visual disturbance</p>	<p>Potential to affect the:- - Condition and survival of SPA species - Abundance of SPA species - Extent and distribution of supporting habitat available whilst a fishing activity is occurring</p>	<p>As in 6.2.2(ii)</p>	<p>None - current management measures sufficient with monitoring of the fishery</p>

7. Conclusion

The authorisation, permit, management and mitigation measures incorporated into this fishery, the use of an effective enforcement team of NWIFCA Officers with multi-agency support, the highly dynamic environment in which the fishery lies, and the recorded history of the resources in this area, allows the NWIFCA to conclude that:

- A hand gathered seed mussel fishery at Black Scar (Fleetwood) in August/September 2025.

will not have an adverse effect on the integrity of the designated features of Morecambe bay, Ramsar, SAC and SPA.

8. In-combination assessment

8.1 Other ongoing and Authorised Fisheries to be Included in the In-combination assessment:

- Size mussel fisheries – there is an active hand-gathered size mussel fishery in Foulney.

8.1.2 In-Combination Assessment

Low water intertidal fisheries:

The size mussel fishery is open throughout the District all year round for Byelaw 3 permit holders. Each fishery is rigorously monitored and enforced by warranted IFCOs. In reality each fishery is only prosecuted by low numbers and modest amounts of mussel removed. For example in the months of January 1st to July 15th 2025 landings reports for the north Morecambe Bay mussel beds, which include Low Bottom, Foulney Ditch, Walney Channel, Foulney and Foulney Island, came to 82 tonnes. Biomass estimates of size mussel made from Dutch Wand survey data in May came to a combined total of 4,063 tonnes of size mussel on the surveyed beds in North Morecambe Bay, and 1,323 tonnes of undersize (table 3) illustrating it is a low level fishery. These same gatherers will prosecute the undersize mussel if they chose and therefore in relative terms of resource removed and disturbance risk there is no effect.

Table 3. biomass of size and undersize mussel in North Morecambe and the volume removed from Jan-Jul of 2025.

Area	Biomass (tonne)		
	Size (≥45mm)	Undersize (≤	Size removed (2025)
Foulney	1961	924	82
Walney Channel	445	2	
Low Bottom	1657	397	

The location and extent of these beds is provided in Figure 3.

Considering cockle and size mussel fisheries in the Bay in combination with intertidal hand-gathering of seed mussel the NWIFCA can conclude no adverse effect on the integrity of the European Site providing the management measures of the authorised mussel fishery are implemented and enforced.

9. Summary of consultation with Natural England

Natural England were involved in discussions around the management of the fishery when discussed at TSB.

10. Integrity test

The NWIFCA concludes no adverse effect on the integrity of the European Site providing the management and mitigation measures of the undersize mussel fisheries 2025 are implemented and upheld.

Annex 1

Perch Scar and Black Scar Mussel Inspection 26-06-2024

Officers: JH, LL, GG

LW: 07:03 1.3m (Liverpool Tides)

Black Scar

There was a 90% coverage of seed mussel extending from the north and east edges of the bed towards the centre (figures 2 and 3). Across the middle of the bed mussel was on a thin layer of mussel mud with patches of cobble and dead shell present (figure 4). Along the channel edge there was exposed cobble (figure 5), mussel closest to the channel edge was on a 20cm thick layer of hard mussel mud. Along the west edge of the bed the mussel was less dense and cobble was present (figure 6). No size mussel was present.

Perch Scar

There was a 90% coverage of seed mussel from the centre of the bed towards the channel (figure 7). The west section of the bed had a coverage of approximately 60-70% trailing off to 30% at the back edge (figure 8). There is evidence of scour in the central part of the bed which extended from north to south (figure 9). It was not possible to walk the perimeter along the channel edge due to soft mussel mud that was approximately 30cm deep (figure 10). Perimeters from previous years were used to estimate the boundary. The north end of the bed extended into the channel; due to the depth of the water, officers could not access this so have estimated the area (figure 11). No size mussel was present.

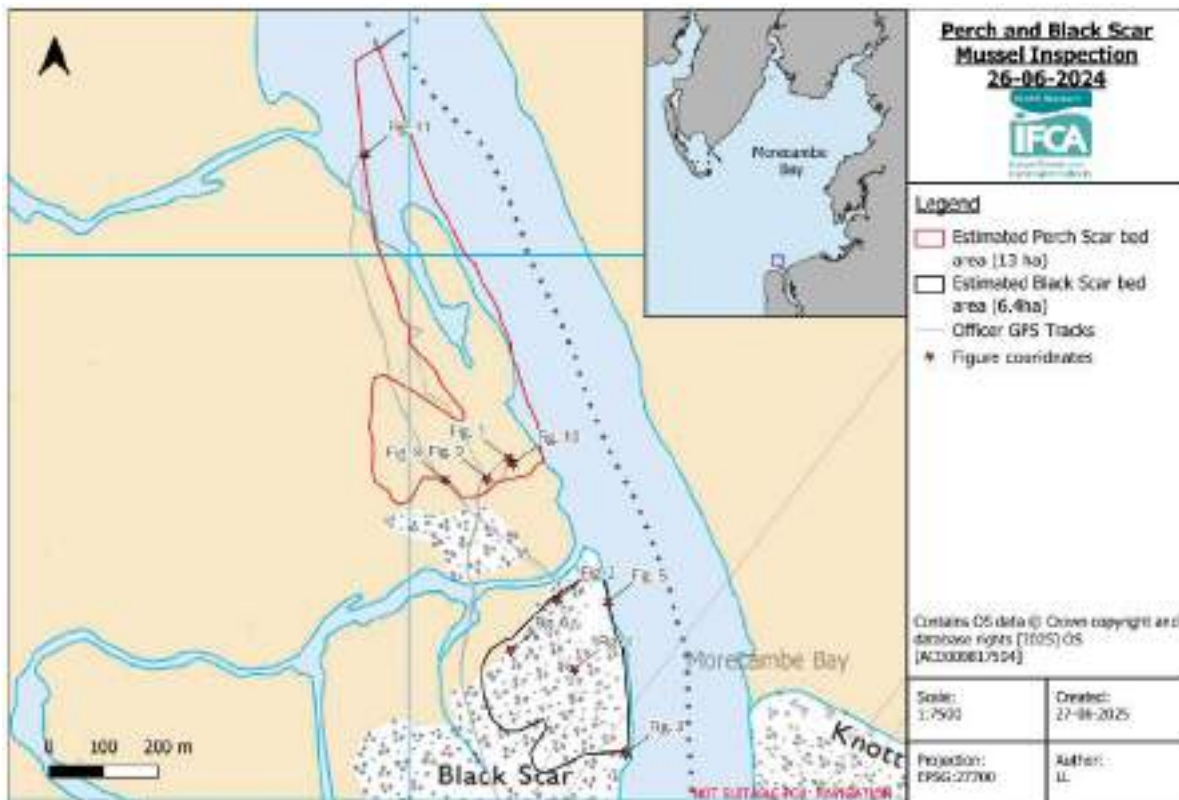


Figure 1: Map of Perch Scar and Black Scar with officer GPS tracks and figure locations June 2025

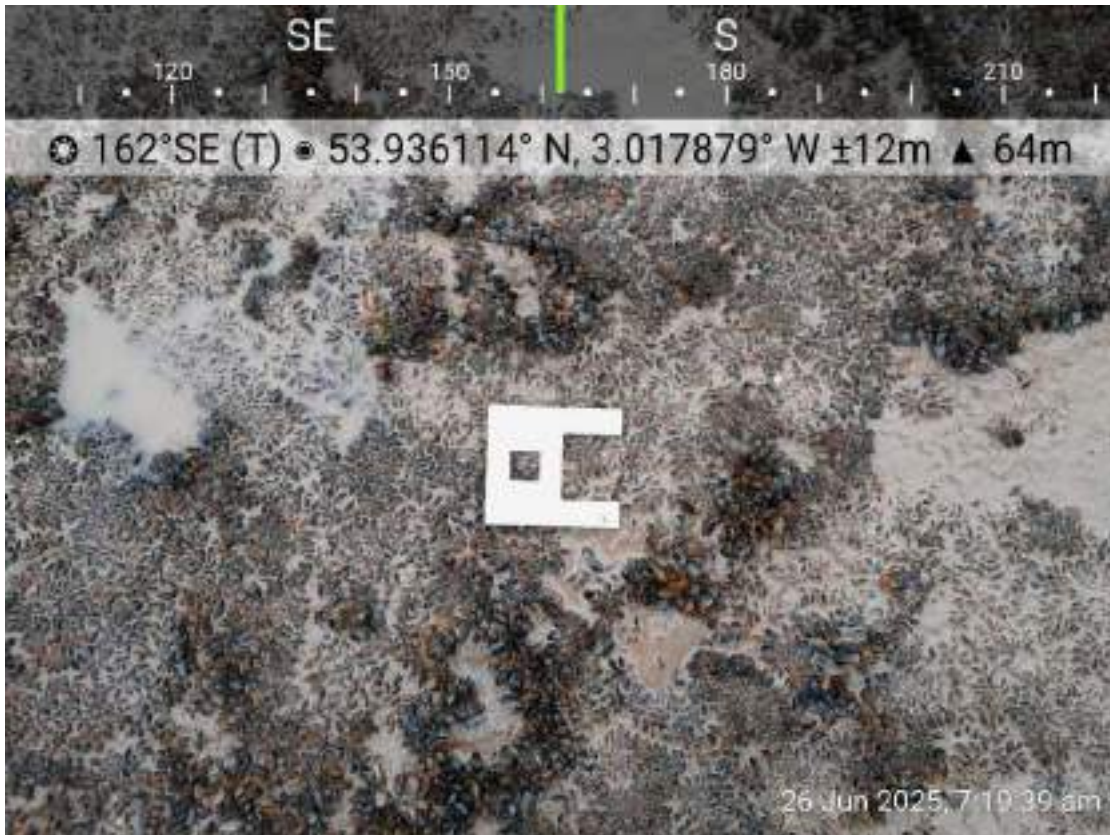


Figure 2: Seed mussel Black Scar June 2025



Figure 3: High coverage of seed mussel, Black Scar June 2025



Figure 4: Patches of cobble and dead shell, Black Scar June 2025



Figure 5: Bare cobble near the channel edge, Black Scar June 2025

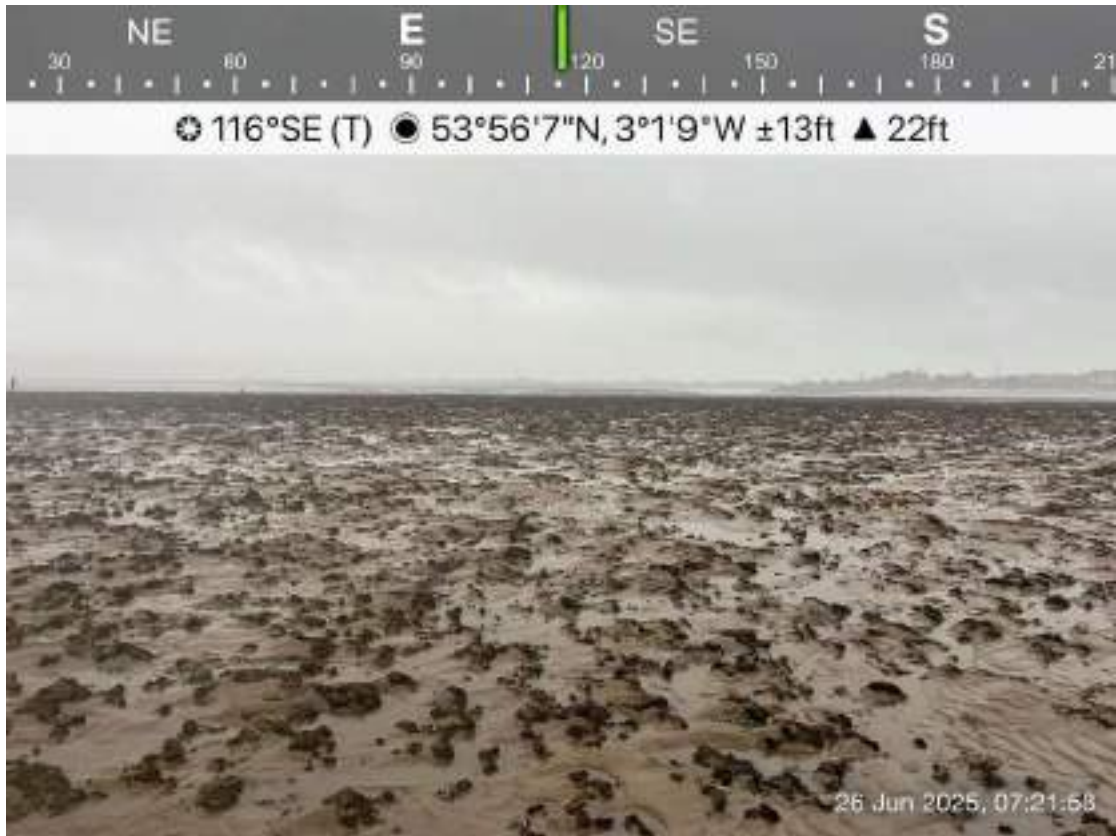


Figure 6: Low coverage of seed mussel with cobble on the west edge of Black Scar, June 2025

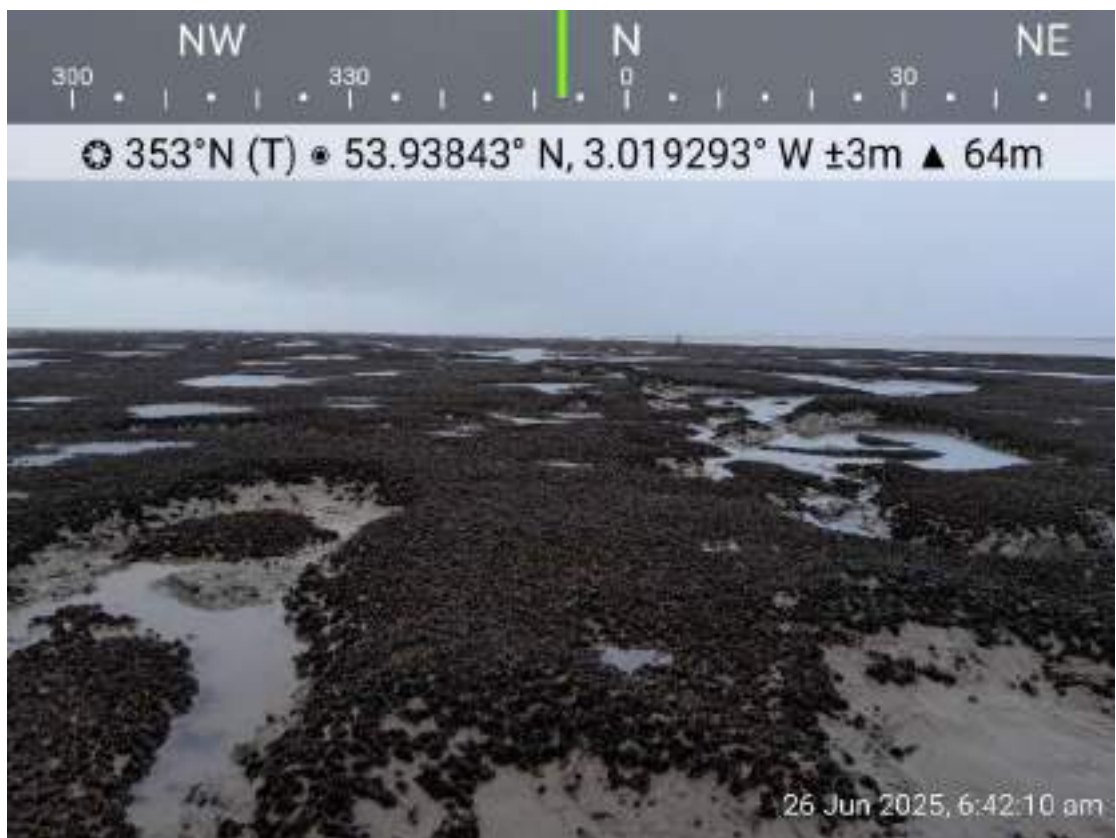


Figure 7: High coverage of seed mussel, Perch Scar June 2025.



Figure 8: Low seed mussel coverage on the back edge of Perch Scar, June 2025.



Figure 9: Evidence of scour in the centre of Perch Scar, June 2025.



Figure 10: Deep mussel mud at Perch Scar, June 2025



Figure 11: Mussel extending out northwards in the channel at Perch Scar, June 2025

Perch Scar and Black Scar Mussel Inspection 16-07-2025

Officers: GG AP

LW: 10:15 1.7m (Liverpool Tides)

Black Scar

There was a 80-90% coverage of seed mussel extending from the channel edge inwards towards the centre of the bed (Fig 1, 4, 5 and 6). Mussel was on a thick layer of mud (>30cm), with few patches of dead shell or cobble (Fig 1, 4, 8, 9 and 12). Mussel was uniform in size, and between 15-20 mm in size (Fig 5 and 11). Mussel was beginning to form clumps (Fig 4 and 5) . On the channel side of the bed, there was a strip of bare cobble and dead mussel shell with very few size mussel (>45mm) present running the extent of the bed (Fig. 2 and 3). To the west, the mussel was slightly less dense (60-70%) and on top of mud (15-20 cm deep) (Fig 7, 8 and 9). Small patches of cobble were present, and algae had begun to form in some areas (Fig 9). There were no size mussel present across the extent of the bed.

Perch Scar

There was a 60-70% coverage of seed mussel from the centre of the bed towards the channel (Fig 13 and 14), with mud hillocks forming beneath the mussel greater than 30 cm deep (Fig 17). Evidence of scour was showing across much of the bed, with a large proportion in the central section having been removed (Fig 15). Westward, the coverage of mussel declined, as the sediment become predominantly sandy (Fig 16) . Officers were unable to walk the perimeter of the bed on the western side due to tide constraints and difficult terrain, however, the conditions appeared to be similar (60% coverage, with evidence of mud and scour) towards the furthest part of the bed from the shore. Perimeters from previous years were used to estimate the boundary. The north end of the bed extended into the channel; due to the depth of the water, officers could not access this so have estimated the area (figure 11). No size mussel was present, and very little cobble was exposed.

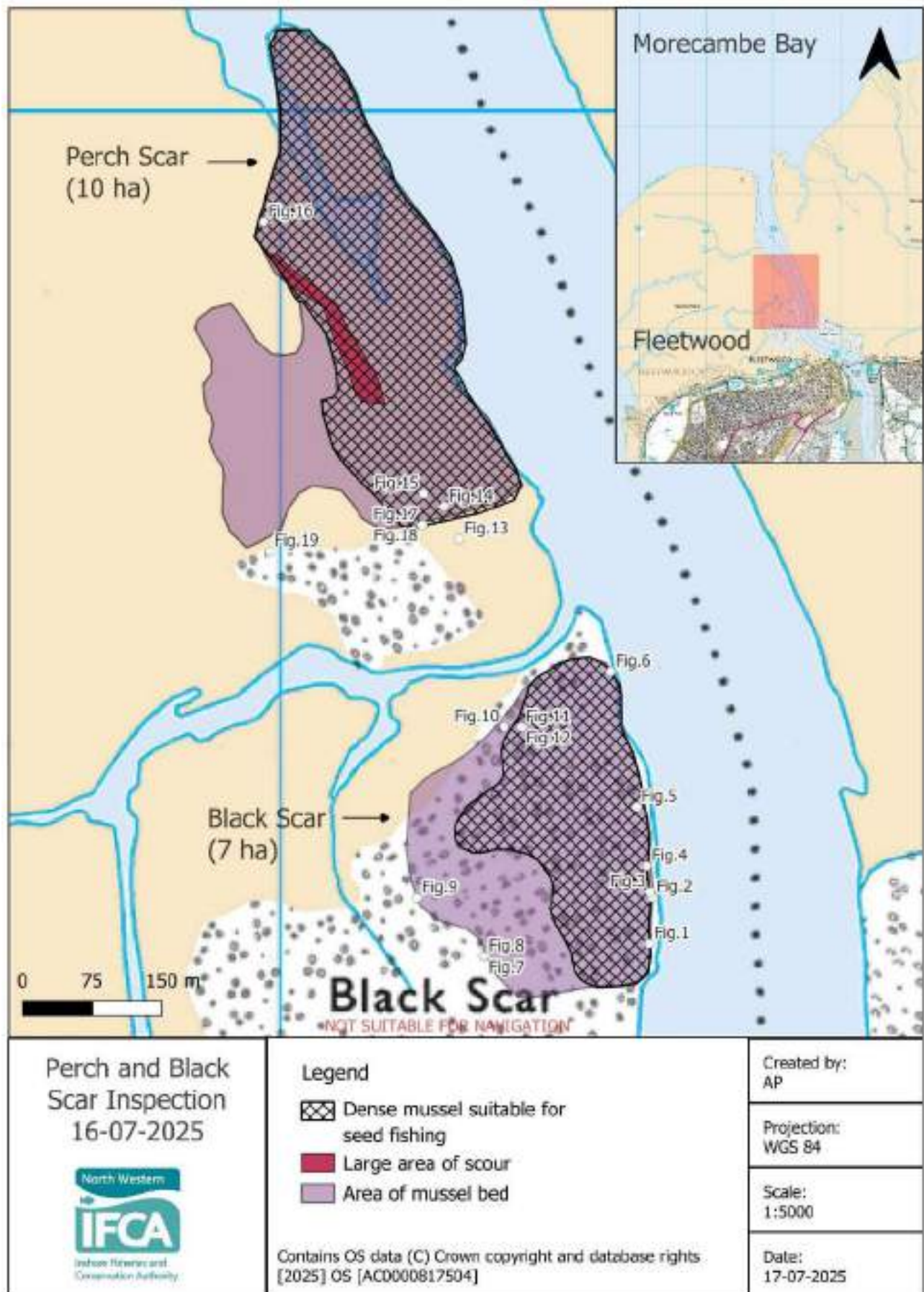


Figure 1: Map of Perch Scar and Black Scar and figure locations July 2025



Figure 1. Dense seed on mud on Black Scar mussel bed south.



Figure 2. Exposed cobble and dead shell on the channel edge of Black Scar



Figure 3. Exposed cobble and dead shell on the channel edge of Black Scar



Figure 4. Thick, uniform seed 80-90% coverage on Black Scar.



Figure 5. Thick, uniform seed mussel forming clumps over mud on Black Scar.



Figure 6. Mussel putting down thick mud on Black Scar.



Figure 7. The western edge of Black Scar showed thinner coverage.



Figure 8. Exposed cobble and thin sand veneer on the western edge of Black Scar.



Figure 9. Exposed cobble and algal growth on the western edge of Black Scar



Figure 10. Edge of mussel bed on the northern edge of Black Scar facing south.



Figure 11. Seed mussel on mud on Black Scar.

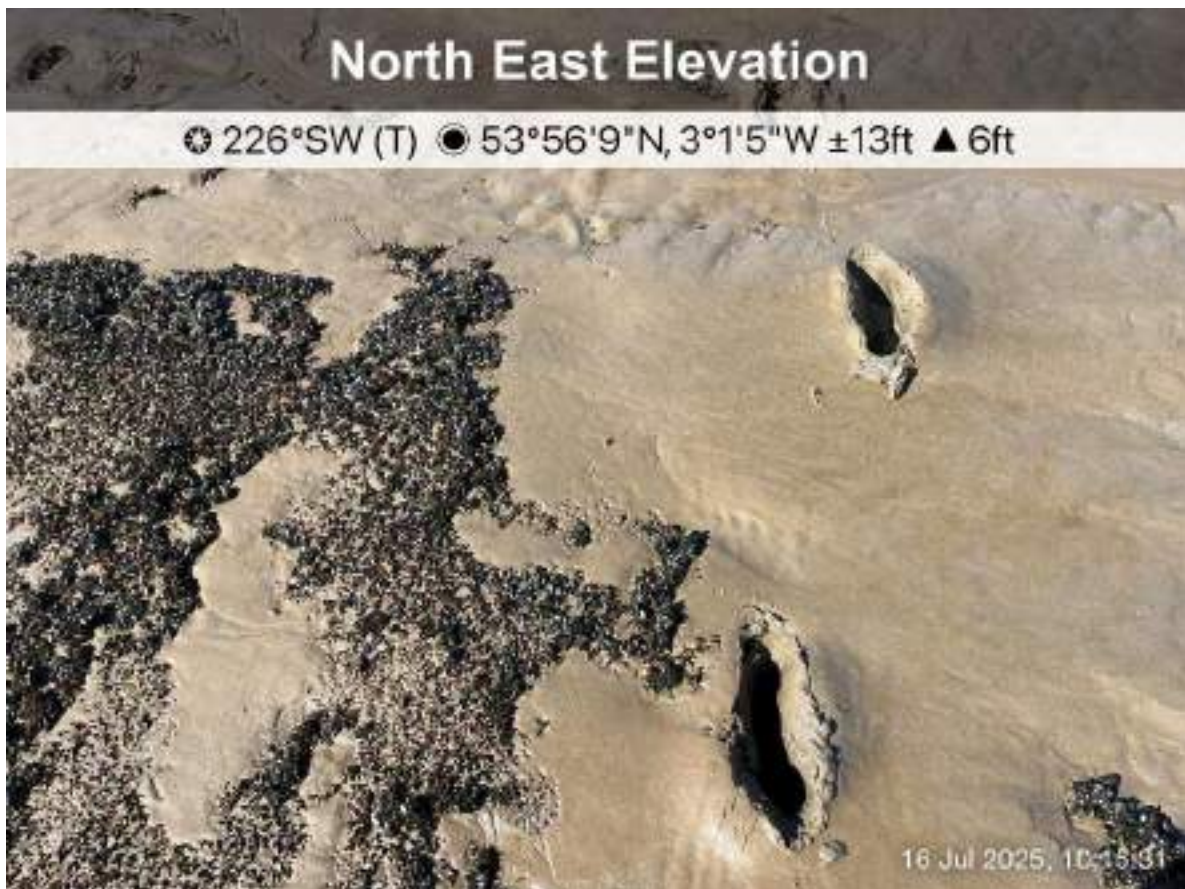


Figure 12. Thick mud present on the northern edge of Black Scar.



Figure 13. Thick mud and uniform seed with 70% coverage on Perch Scar.



Figure 14. Dense seed on mud on Perch Scar.

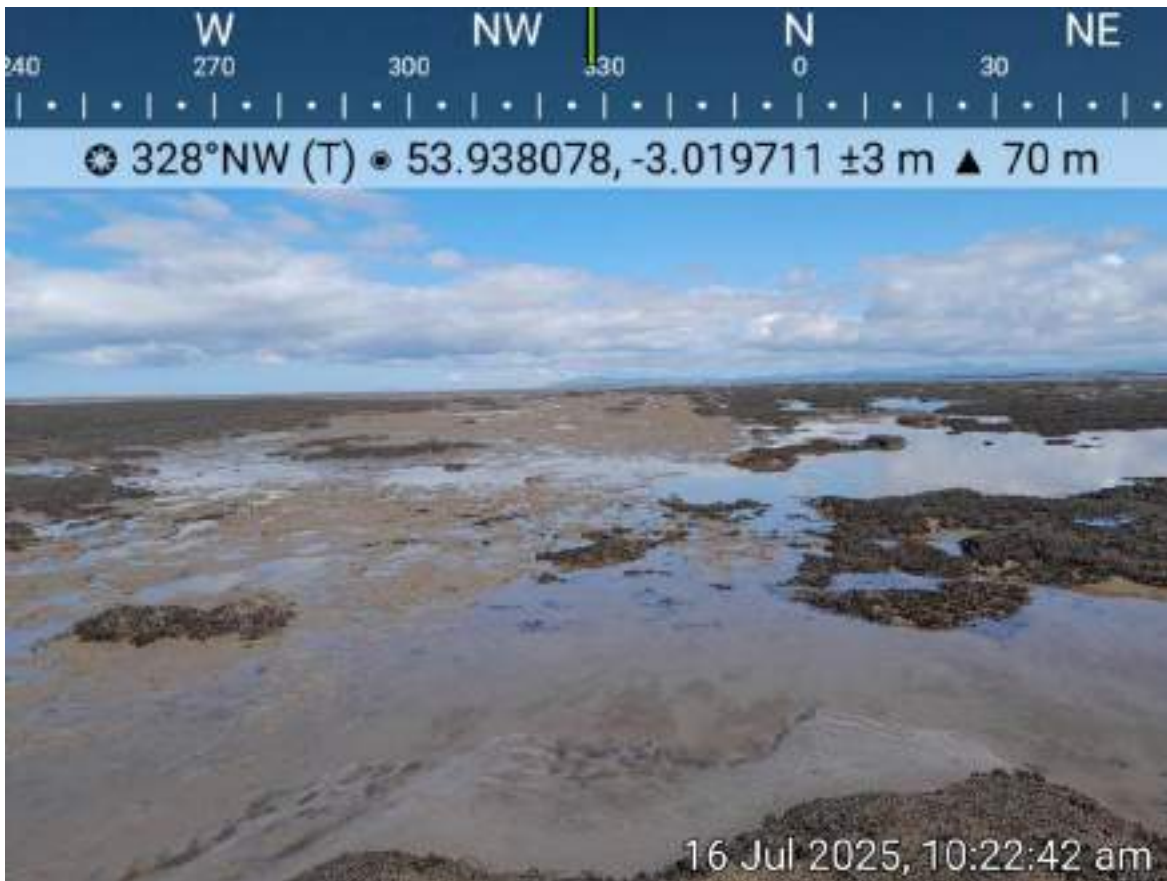


Figure 15. Evidence of scour in a large area of Perch Scar.



Figure 16. West edge of the bed running onto sand Perch Scar.



Figure 17. Southern edge of Perch scar facing North, showing dense mussel on mud.



Figure 18. The edge of Perch Scar at the Northern end.



Figure 19. Mussel on mud on Perch Scar.

Fleetwood Mussel Inspection 18-08-25

Officers: JH, GG

LW: 08:39 1.1m (Liverpool Tides)

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

Rossall Scar

The mussel on Rossall Scar was patchy and interspersed with cobble and small patches of dead *Sabellaria alveolata* (Figure 2). The mussel was all from a settlement in 2025, and 15-20mm in length. The full extent of the mussel was not mapped due to inspecting Rossall Scar first to ensure Perch and Black Scar were inspected at low water.

Neckings Scar

No scar was observed at Neckings Scar, this is possible due to the time before low water the area was inspected or that the scar has sanded over.

Kings Scar

The mussel on Kings Scar was patchy and varied across the bed in density, ranging from 20% coverage to 80-90%, most of the scar has had a 2025 mussel settlement, the mussel was 10-20mm and made up most of the mussel on the bed, where the mussel was at higher density it was on a layer of mud, and the areas where the mussel was at low density, it was on bare cobble (Figure 4 and 5). Kings Scar has a number of structures such as wrecks which have larger mussel which has persisted through the winter (Figure 3). The approximate area of the mussel bed was 8.7 hectares.

Perch Scar

The bed has had significant scouring since the inspection in July, likely due to storm Floris (Figures 6 to 9). The coverage of the remaining mussel is approximately 10% with large area of bare mussel mud. On the western edge of the bed the mussel persists in higher densities. The mussel is 20-30mm in length. The area of the bed is the same as previously mapped in July, approximately 10 hectares.

Black Scar

Black Scar has not had the same level of scour as Perch scar with more of the 2025 mussel persisting. The mussel density has reduced to 50-60% coverage (Figure 10) and is smaller in size at 10-20mm (Figure 12). The mussel has formed small hillocks where the mussel is on 30-40cm of mud, in between the hillocks there is exposed stoney substrate or a thin layer of soft mud, less than 5cm (Figure 11). The area of mussel is the same as when previously mapped in July, approximately 7 hectares. As previously reported there is a strip of bare cobble on the channel edge.

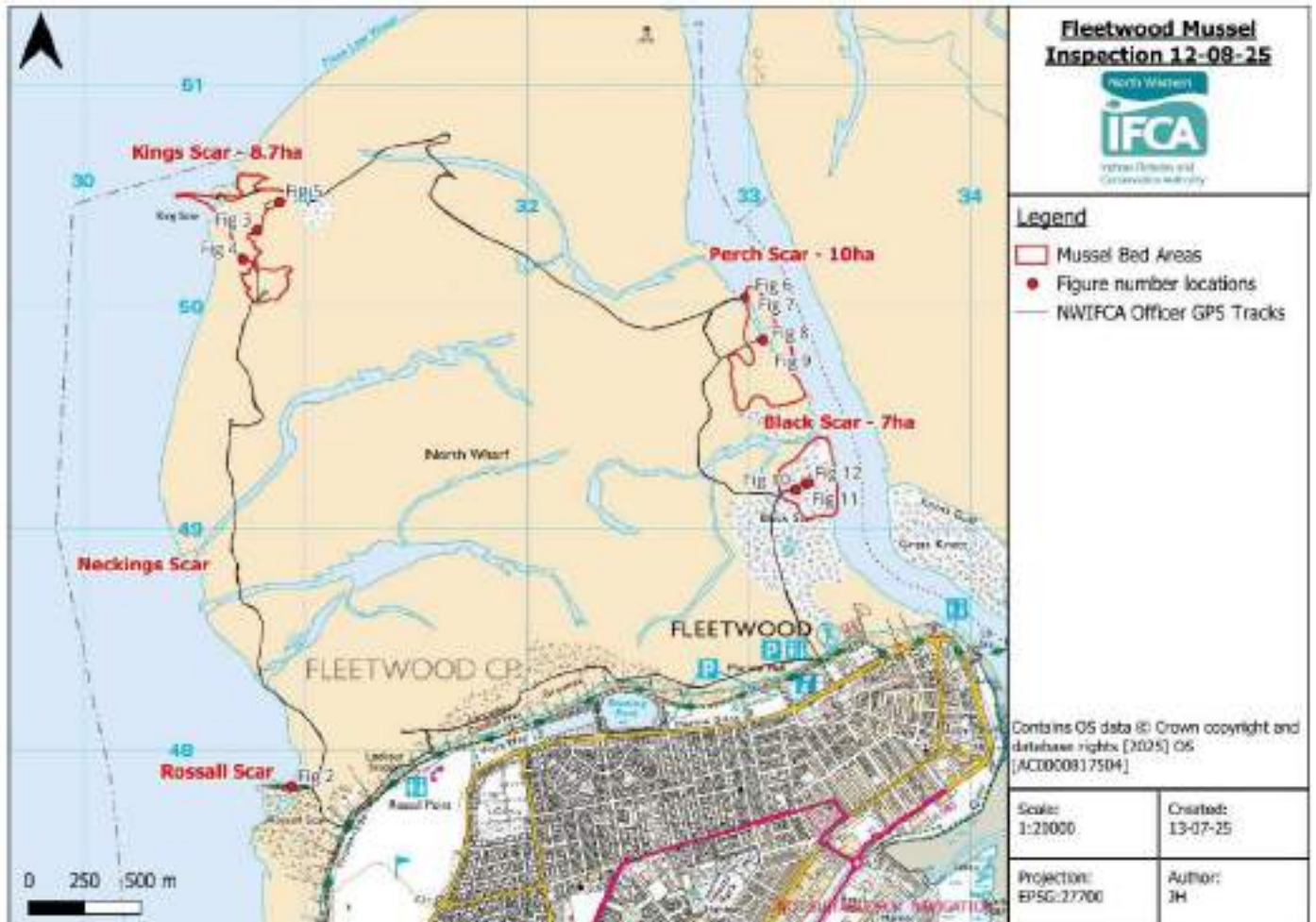


Figure 1. Overview of the mussel inspection 12-08-25.



Figure 2. Rossall Scar mussel interspersed with cobble 12-08-25.

North

☉ 349°N (T) • 53.944568, -3.055989 ±20m ▲ 62m



12 Aug 2025, 7:19:33 am

Figure 3. Seed mussel on Kings Scar 12-08-25

Fleetwood, UK

☉ 267°W (T) • 53.943391, -3.05691 ±3m ▲ 49m



12 Aug 2025, 7:18:33 am

Figure 4. Larger mussels with barnacles on wreckage 12-08-25

North West

☉ 323°NW (T) • 53.945727, -3.054477 ±5m ▲ 44m



12 Aug 2025, 7:24:55 am

Figure 5. Kings Scar – 30mm mussel 26-06-24.

North

☉ 351°N (T) • 53.942137, -3.022438 ±6m ▲ 45m



12 Aug 2025, 7:52:51 am

Figure 6. Scoured mussel mud and remaining mussel on Perch Scar 12-08-25

South East

☉ 127°SE (T) • 53.94213, -3.022435 ±3m ▲ 42m



Figure 7. Scoured mussel mud and remaining mussel on Perch Scar 12-08-25

North West

☉ 347°NW (T) • 53.940418, -3.021165 ±12m ▲ 59m



Figure 8. Scoured mussel mud and remaining mussel on Perch Scar 12-08-25

South

📍 169°S (T) • 53.940424, -3.021165 ±4m ▲ 42m



Figure 9. Scoured mussel mud and remaining mussel on Perch Scar 12-08-25

E

SE



📍 120°E (T) • 53.934373, -3.018747 ±2m ▲ 63m



Figure 10. Seed mussel hillocks on Black Scar 12-08-25



Figure 11. Thin layer of mud with stony substrate visible on Black Scar 12-08-25

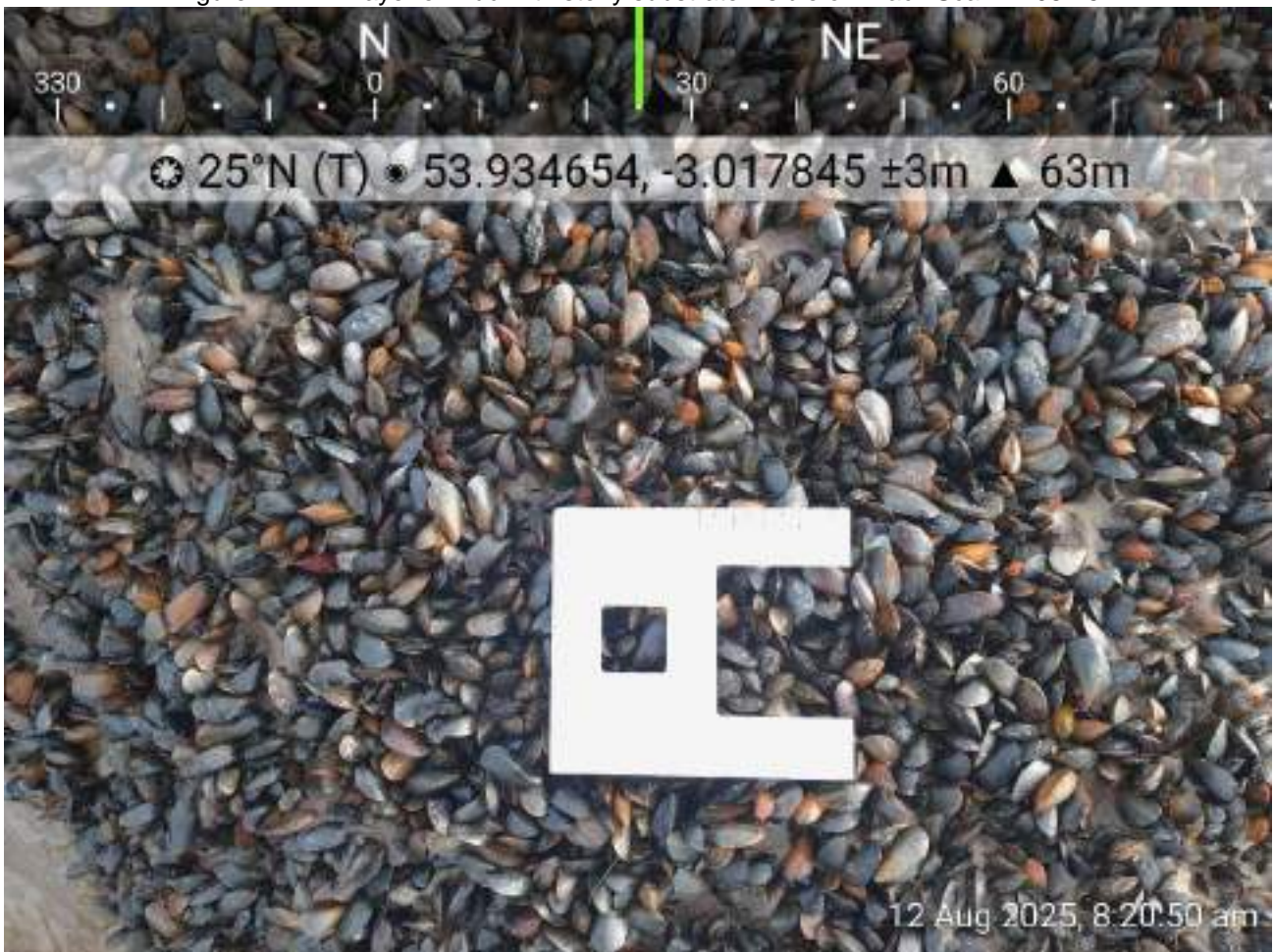


Figure 12. Black Scar 2025 mussel settlement 12-08-25.

Wyre End Mussel Inspection 11-08-2025

Officers present: JH, AP

Tides: LW 08:00 (1.4m) (Liverpool tides)

An inspection of Wyre End and channel areas of mussel was completed. The area of the main skewer was mapped to determine the area shown in Figure 1. The total area of the bed was 14 hectares, with two small areas along the channel edge. The patches of mud on the channel edge had been heavily scoured, leaving very patchy seed mussel of low coverage.

On the main area, there has been a 2025 settlement of seed mussel, varying in density across the main skewer. The raised portion of the bed had high density coverage over the majority of the area, at 90-100% coverage of seed 10-20mm in size (Image 5,6, and 7). Towards the end of the bed in the North, there was a large area of exposed cobble (Image 10). There was evidence along the western edge of significant scouring. Along the south west of the bed (Images 12,13,and 14) and south east (Images 1,2,3,and 4), mud was deep and had formed hillocks, however mussel was patchy and of lower density (50-60%) in comparison to the higher areas of the bed.

Eiders and gulls were present on the bed.

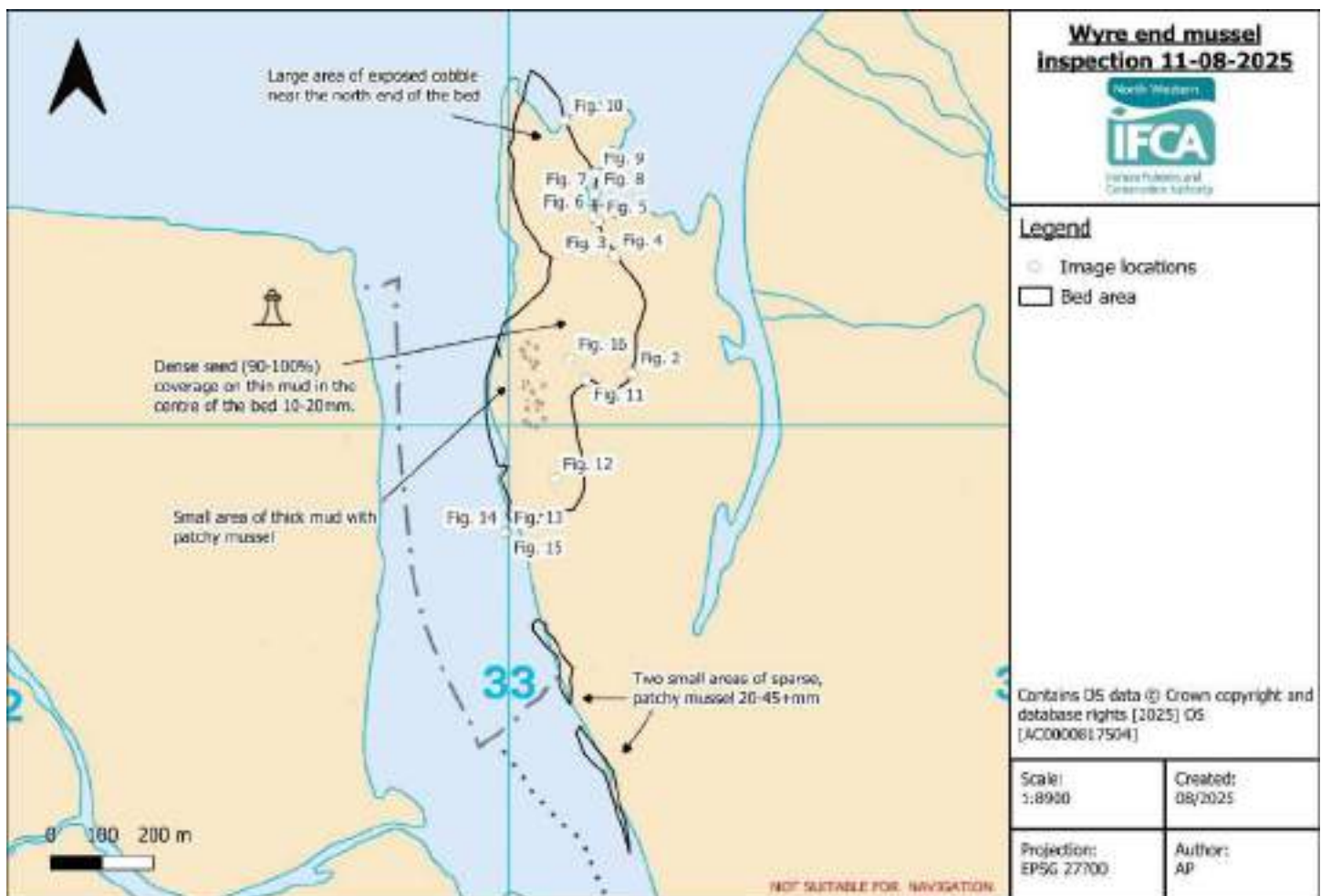


Figure 1: Approximate Wyre End bed area boundary and officer notes 11-08-2025

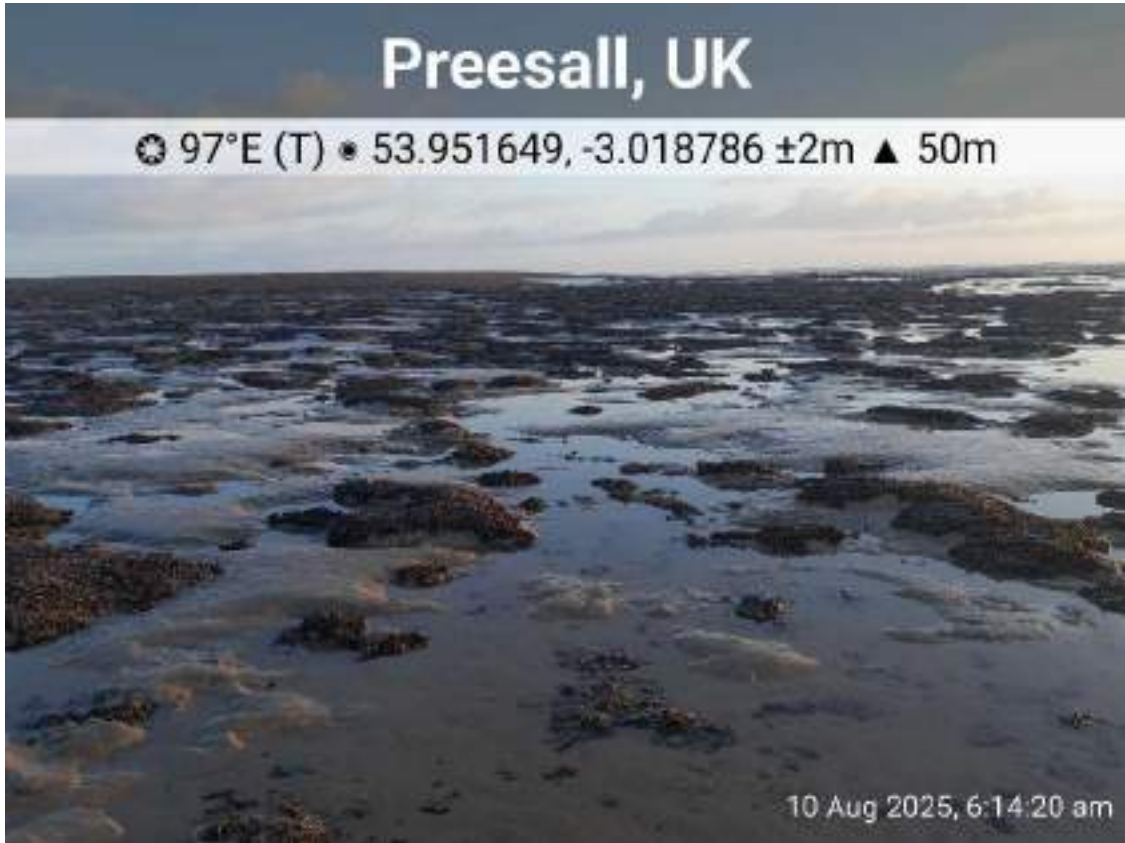


Image 1. Patchy mussel on mud hillocks on the eastern side of Wyre end

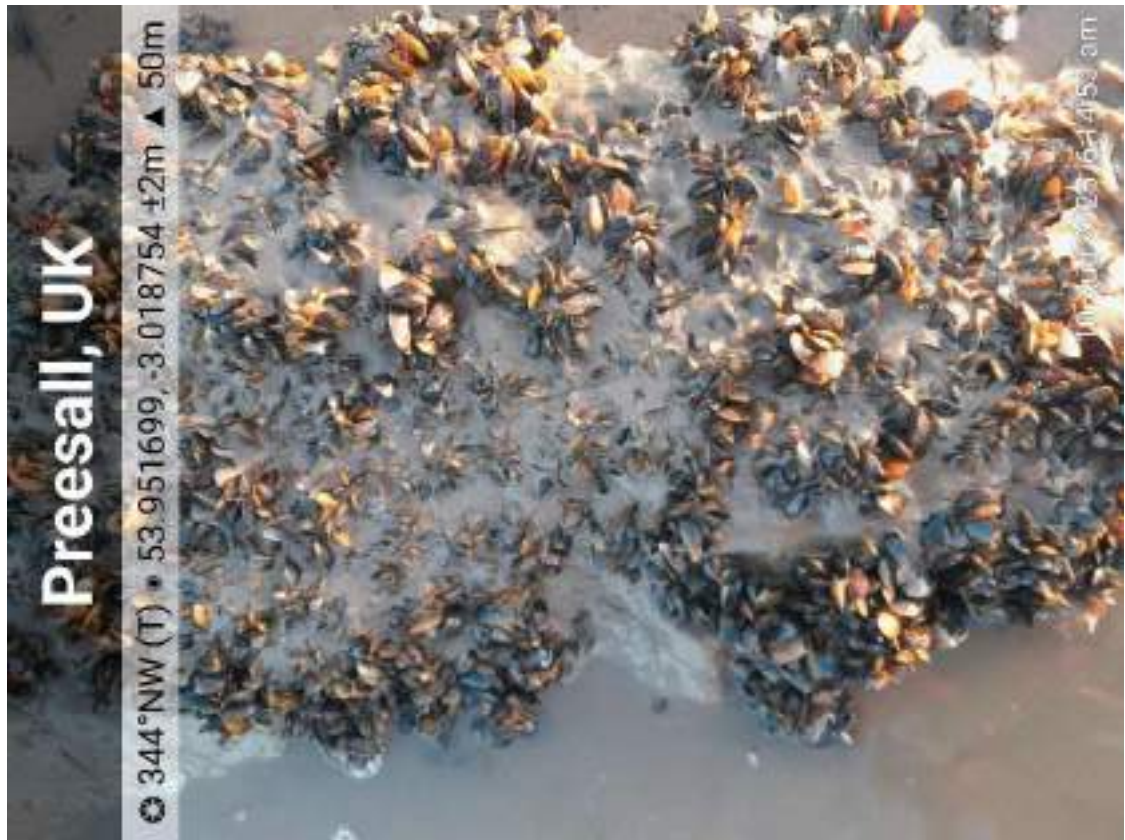


Image 2. Seed mussel present on hillocks on the eastern side of the bed

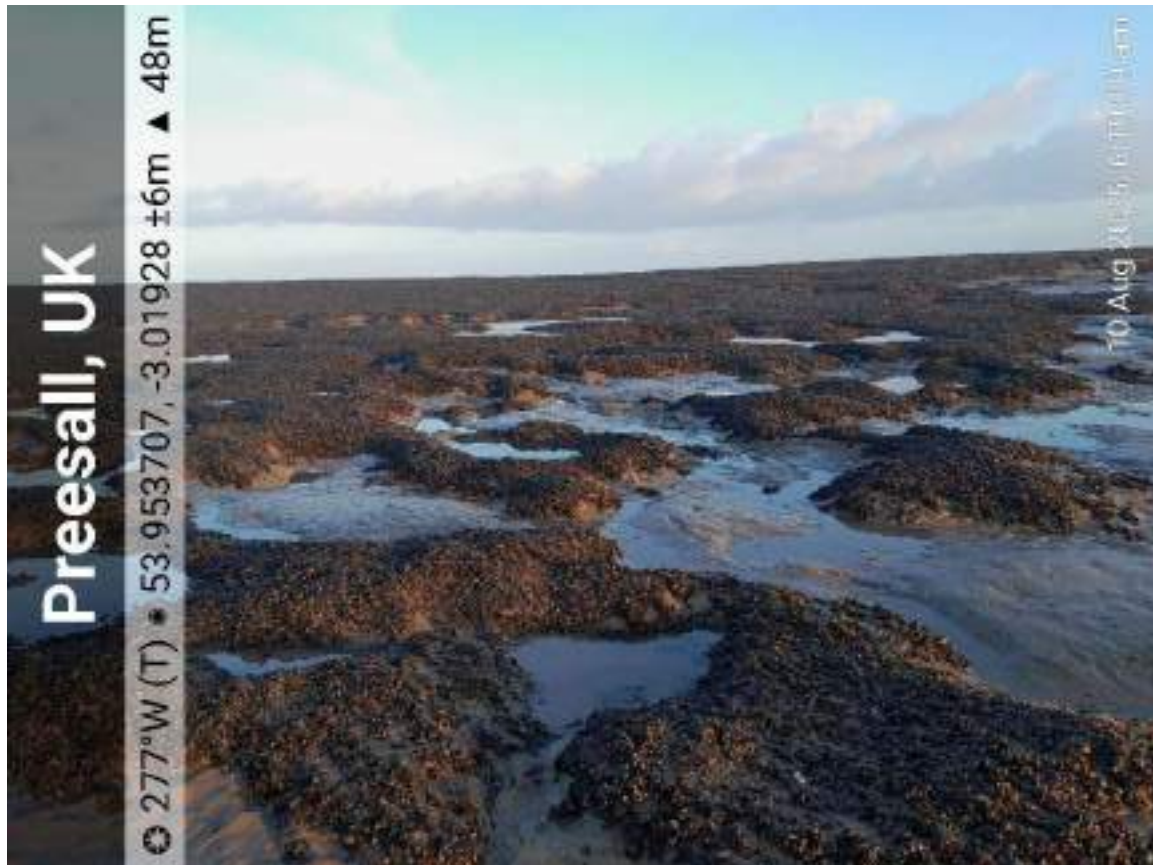


Image 3. Patchy mussel on mud hillocks on the eastern side of Wyre end



Image 4. Seed mussel at 60-80% coverage on the edge of the bed



Image 5. 90-100% coverage of seed mussel on the top of bed, above thin mud



Image 6. Dense seed on top of bed



Image 7. Small area of dense seed on thick mud



Image 8. Areas of dense seed facing North running onto cobble

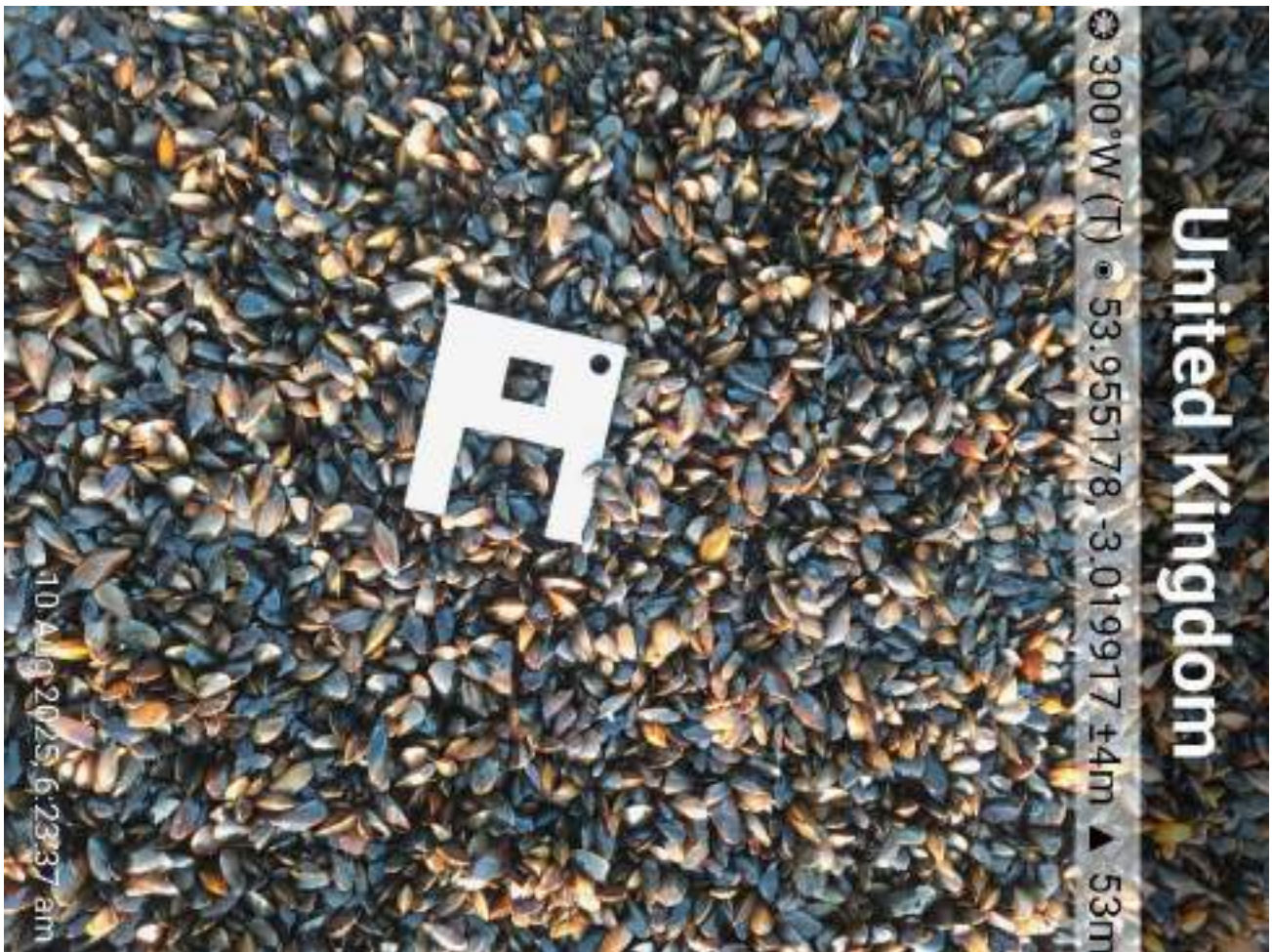


Image 9. Loose seed



Image 10. Large area of cobble at the end of the bed.

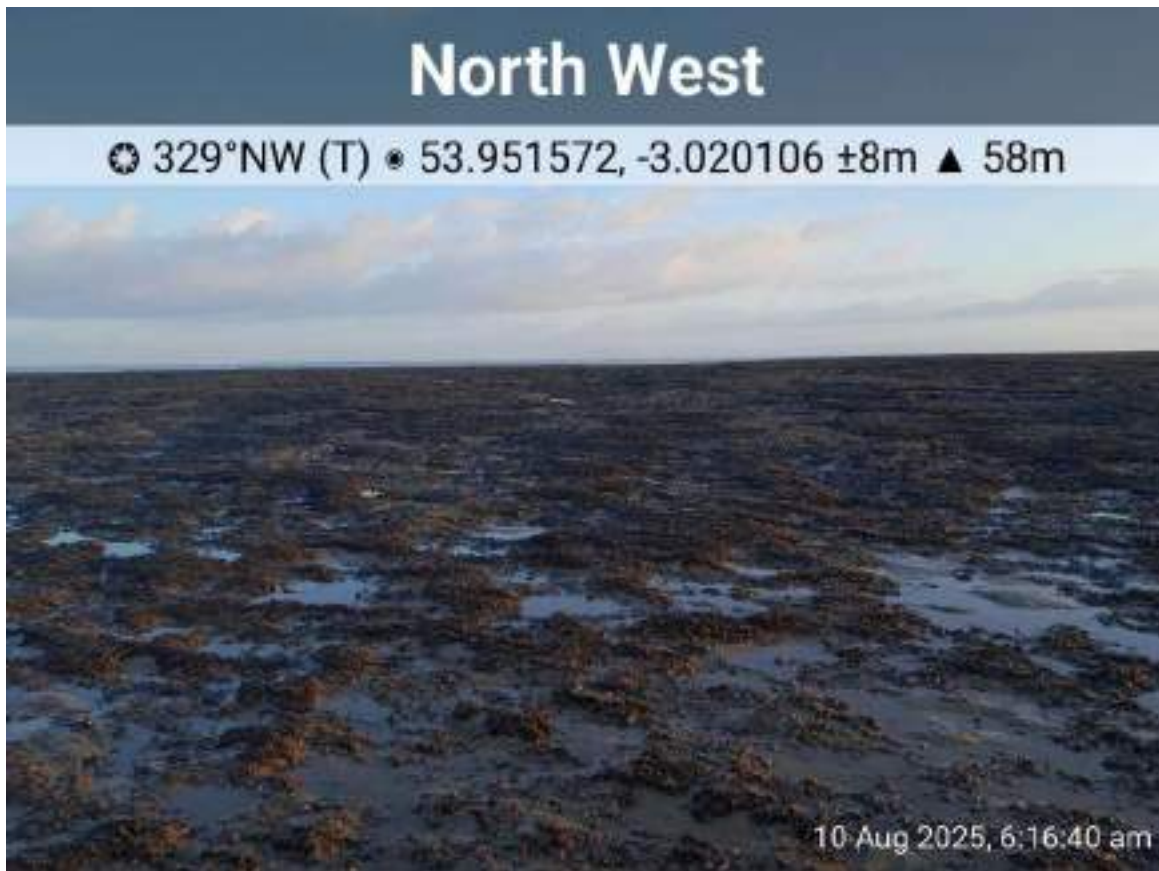


Image 11. Patchy mussel at the edge of the bed running onto sand

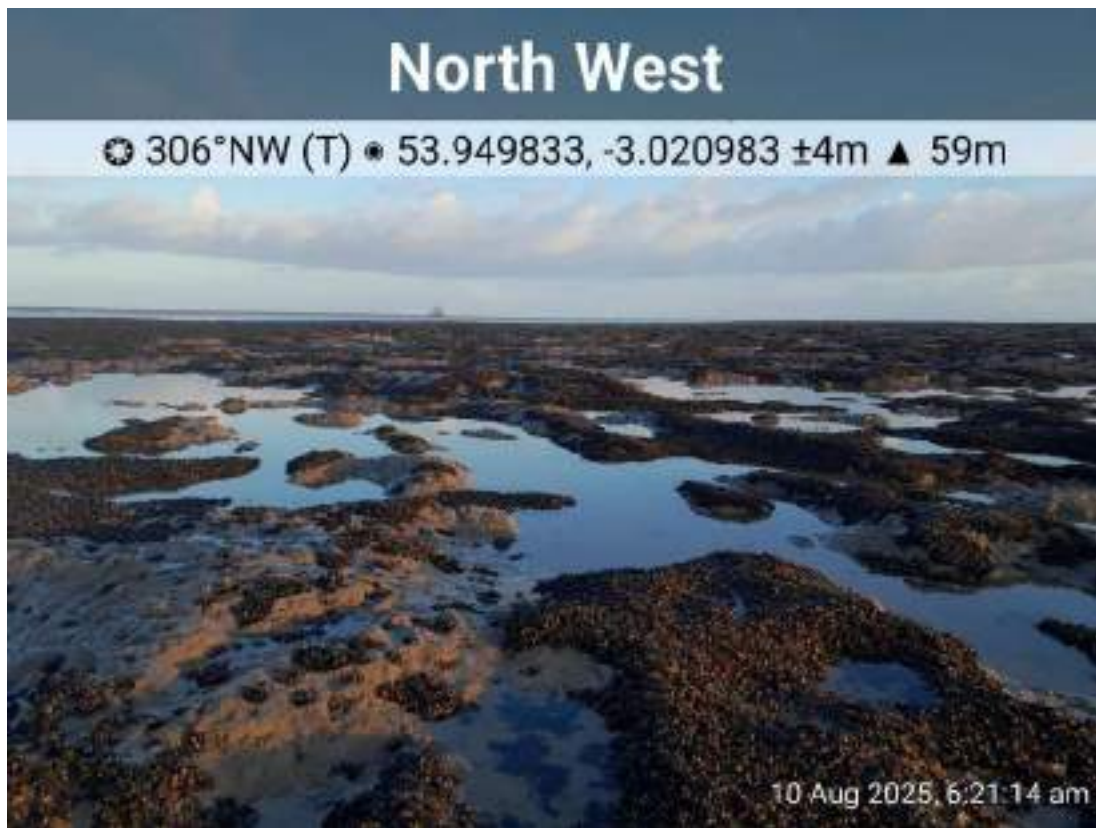


Image 12. Patchy mussel on thick mud

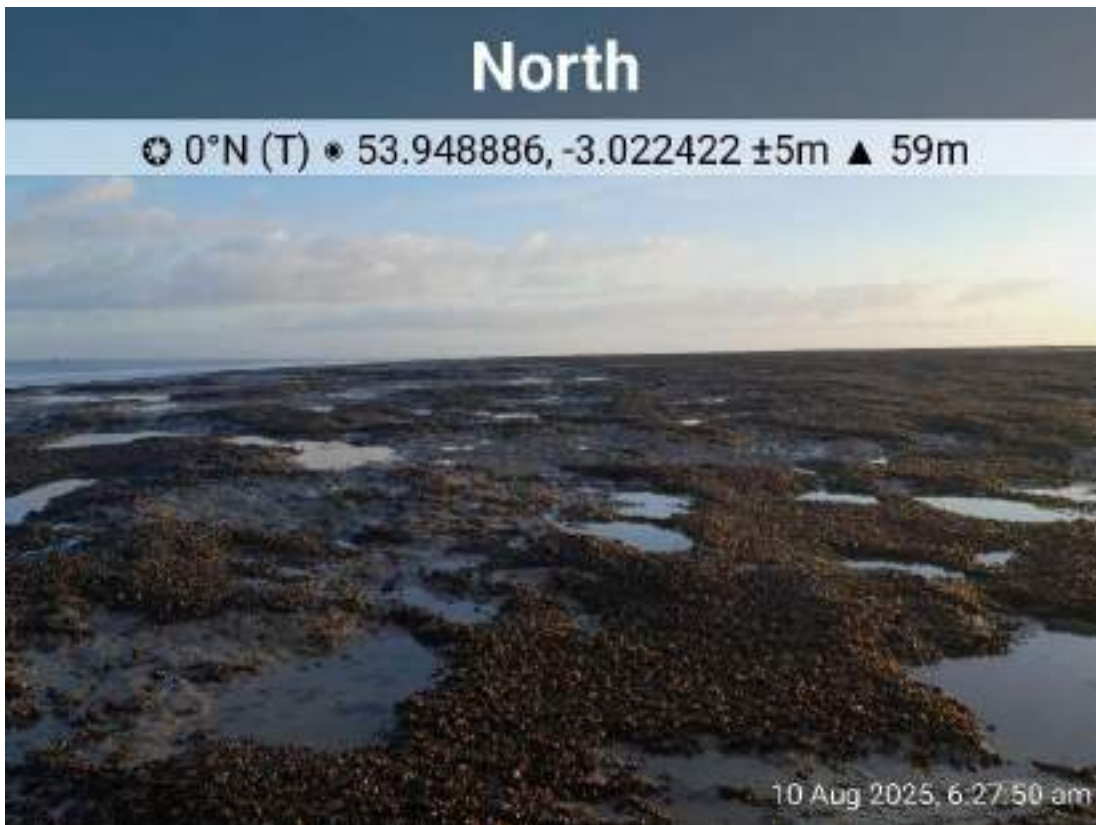


Image 13. Evidence of scour

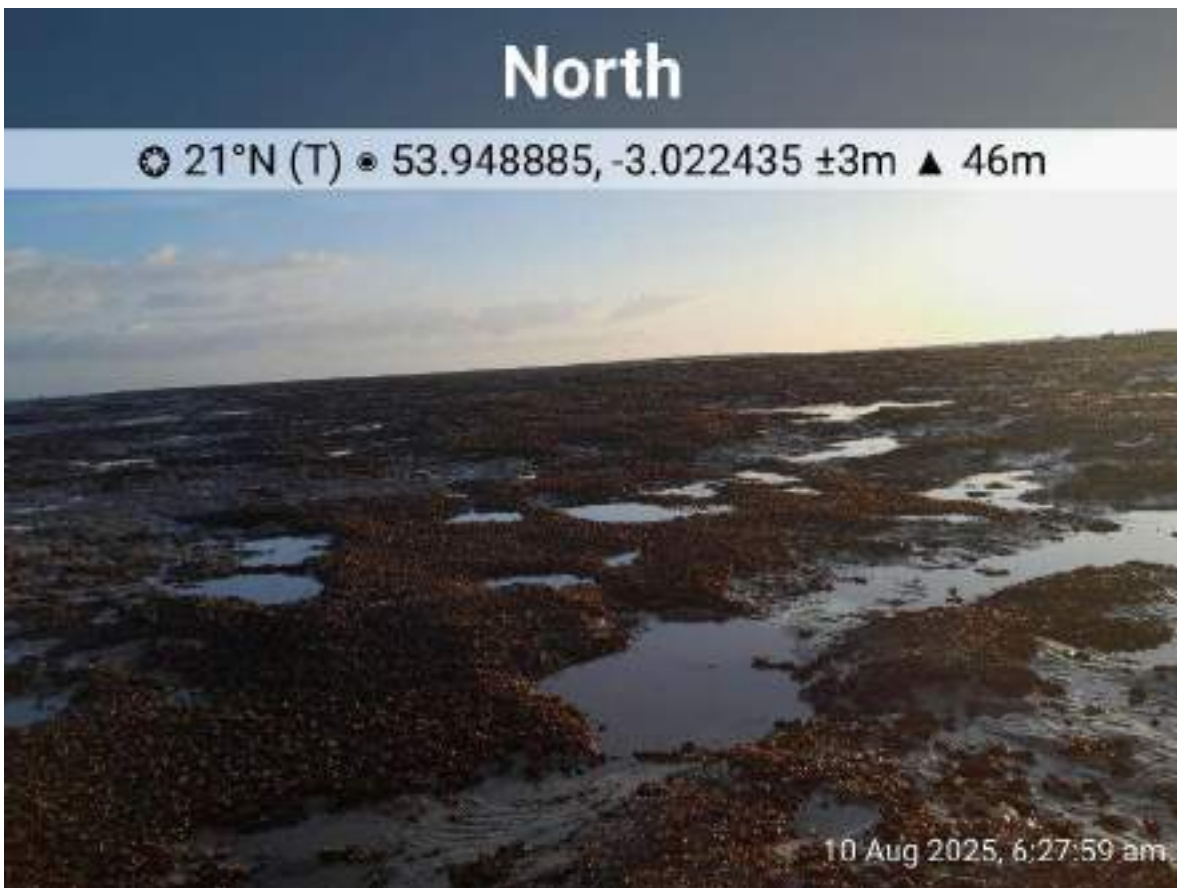


Image 14. Patchy mussel near the edge of the bed



Image 16. Dense seed mussel

Bare Ayre Mussel Inspection 27-03-2025

Officers present: GG, LL, AG, GE

Tides: LW 16:25 1.4m (Liverpool tides)

Officers inspected the mussel on Bare Ayre in Morecambe Bay to get an understanding of the state and extent of the mussel bed. The mussel runs along the edge of the channel; the main strip was approximately 200m by 50m. At low water an outer skear was visible however, access to the outer skears was not possible due to the depth of the channel. Officers tracks and notes are mapped in figure 1.

Live mussel was patchy with approximately 20-30% coverage across the area (figure 2); the mussel was loose on newly forming mussel mud or around cobble (figure 3). There were dense patches of 45-55mm size mussel (figure 4) and dense patches of 25-35mm underside mussel (figure 5). Throughout the areas there were patches of cobble and dead shell mixed in with live mussel (figure 6). Some larger mussel close to the groyne at the west of the area inspected were heavily barnacled (figure 7). There was mussel visible on the outer skear although closer inspection was not possible (figure 8).

Sabellaria alveolata was present in small patches along the north edge of the bed. The largest patch was at the west end of the area (figure 9). The part of the reef that was accessible was mapped by officers and is shown in red in figure 1. The *Sabellaria* was interspersed by size and underside mussel.

Oystercatchers and Herring gulls were present in the area

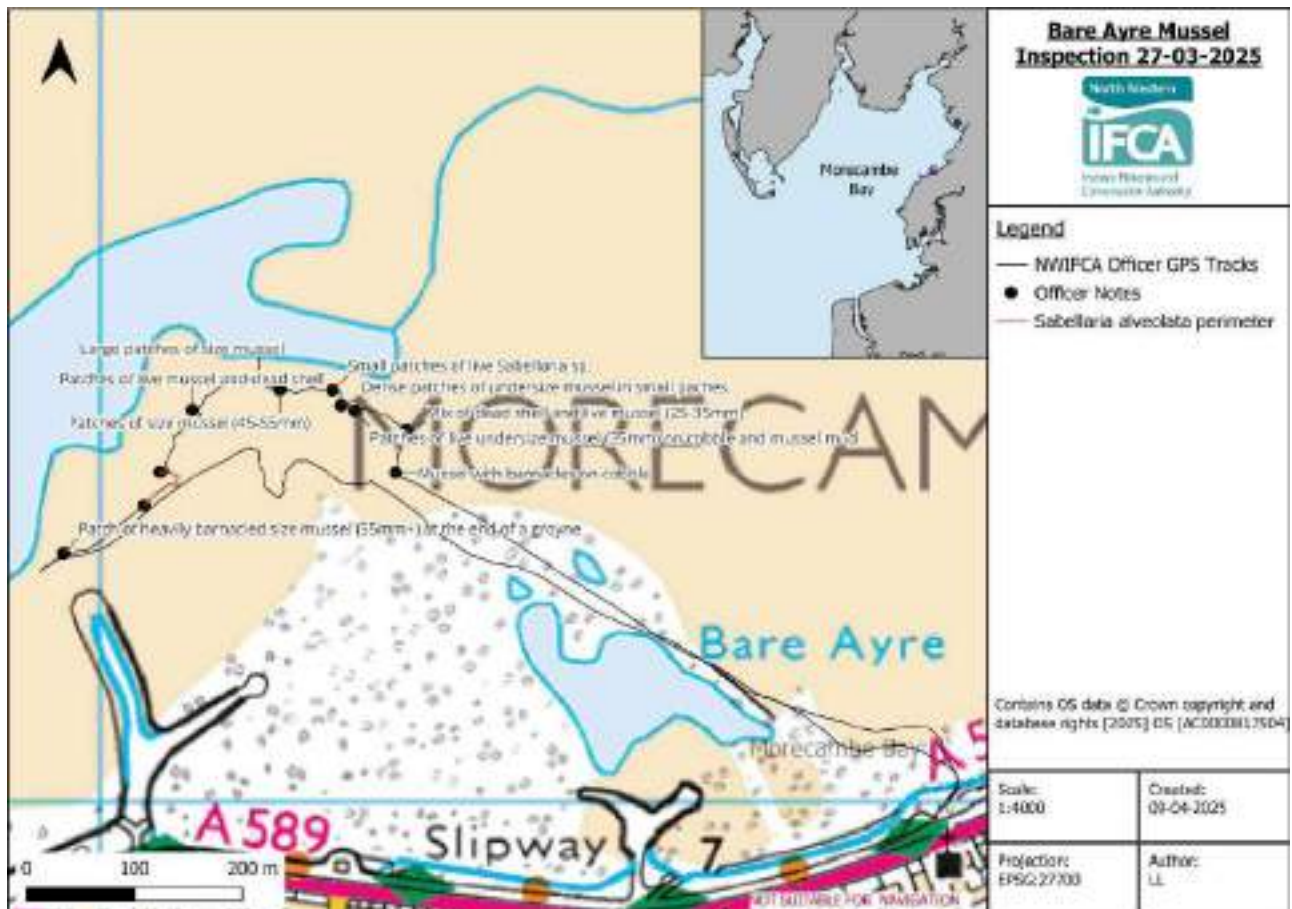


Figure 1: Map showing officer tracks and notes on Bare Ayre mussel inspection 27-03-2025.



Figure 2: Overview of the mussel at Bare Ayre 27-03-2025.

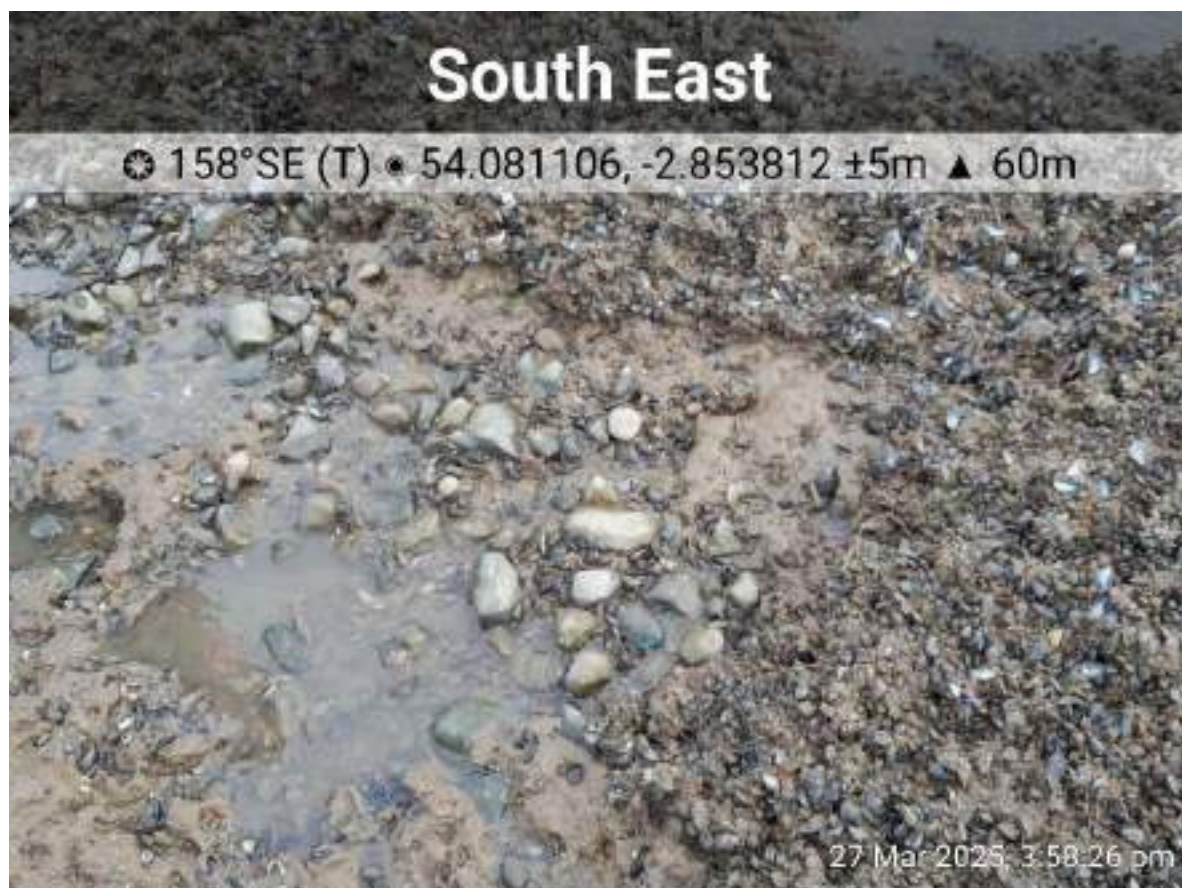


Figure 3: Exposed cobble around live mussel, Bare Ayre 27-03-2025.



Figure 4: Dense patch of size mussel Bare Ayre 27-03-2025.



Figure 5: Dense patch of 25-35mm undersize mussel Bare Ayre 27-03-2025.



Figure 6: Dead shell and live mussel Bare Ayre 27-03-2025



Figure 7: Large 55m+ mussel with barnacles Bare Ayre 27-03-2025.

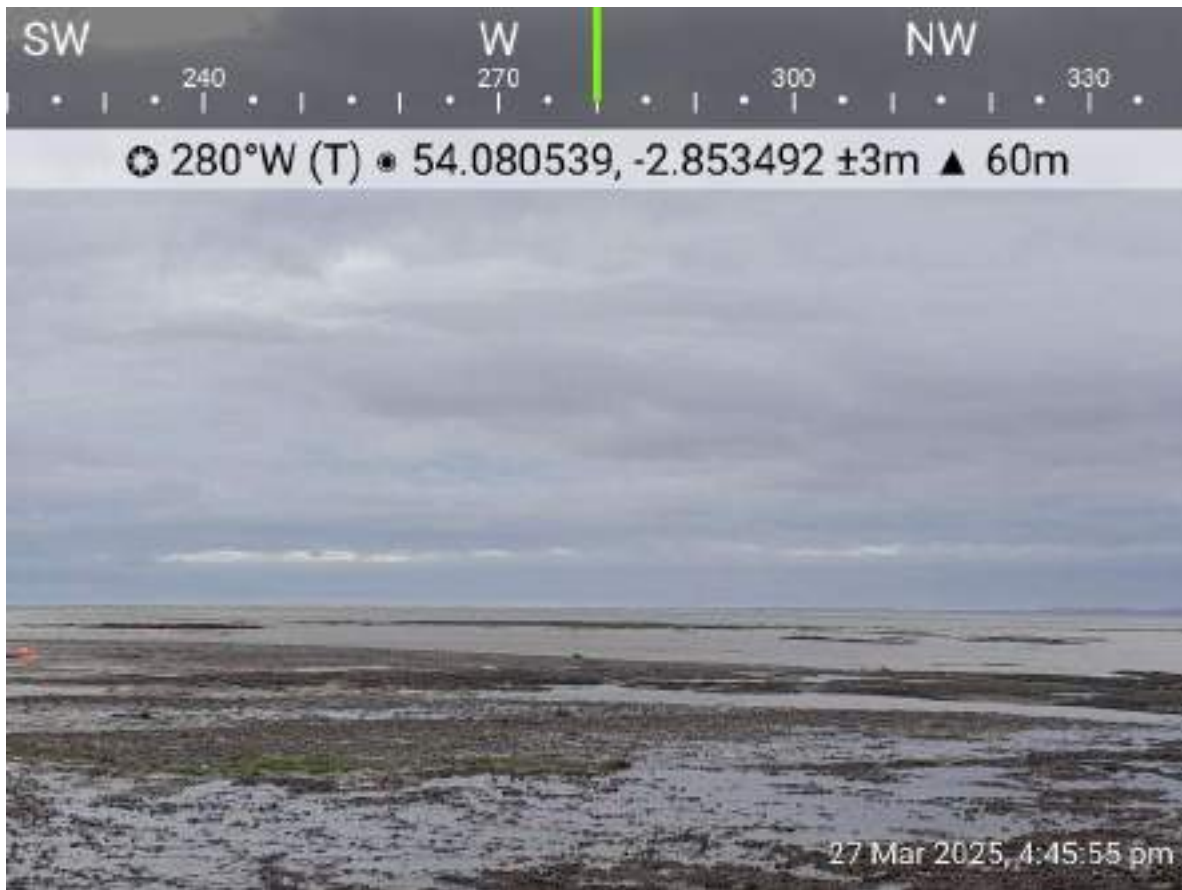


Figure 8: Outer skears visible at low tide Bare Ayre 27-03-2025.



Figure 9: *Sabellaria alveolata* interspersed with live mussel Bare Ayre 27-03-2025.

Heysham Flat Mussel Inspection 15-08-2025

Officers present: RL, AP

Tides: LW 10:29 1.8m (Liverpool tides)

Officers inspected the mussel on Heysham Flat to assess the development and growth of seed mussel noted from the previous inspection. Access to the outer skears was not possible across Dallam Dyke due to the height of the tide. Officer tracks and notes are mapped in figure 1.

The area of dense seed identified on the 27 of July had undergone significant scouring (Image 4). A small area of seed (20-30mm in size) (see red hash close to conger rock) remained, however, this strip had been partially scoured, leaving sections of exposed cobble and bare mud. The depth of mud as noted from the previous survey (~90 cm) was no longer present, and had in parts been replaced by sand. Much of the area leading up to Conger rock and beyond was patchy (20-40% coverage) with layers of mussel over sand, and areas of historical sabellaria reef structure becoming exposed beneath the seed mussel (Image 7, 10 and 11).

The area along the seaward edge from conger rock to Dallam Dyke was predominantly mixed size mussel with seed (Image 6). Large areas of exposed cobble were seen throughout the bed, with some small strips of seed identified (Image 8), over thin mussel mud.

The edge of the South reef was not mapped by officers. Smaller patches of live and dead *Sabellaria alveolata* were found throughout the area, some of which was covered by mussel.

Closer to shore to the north, a strip of loose seed, of uniform seed (~20mm) was present over approximately one hectare was present. The mussel was over loose mud and no sabellaria was present.

Oystercatchers, gulls, knots and eiders were all present in the area concentrated to the east of the bed.

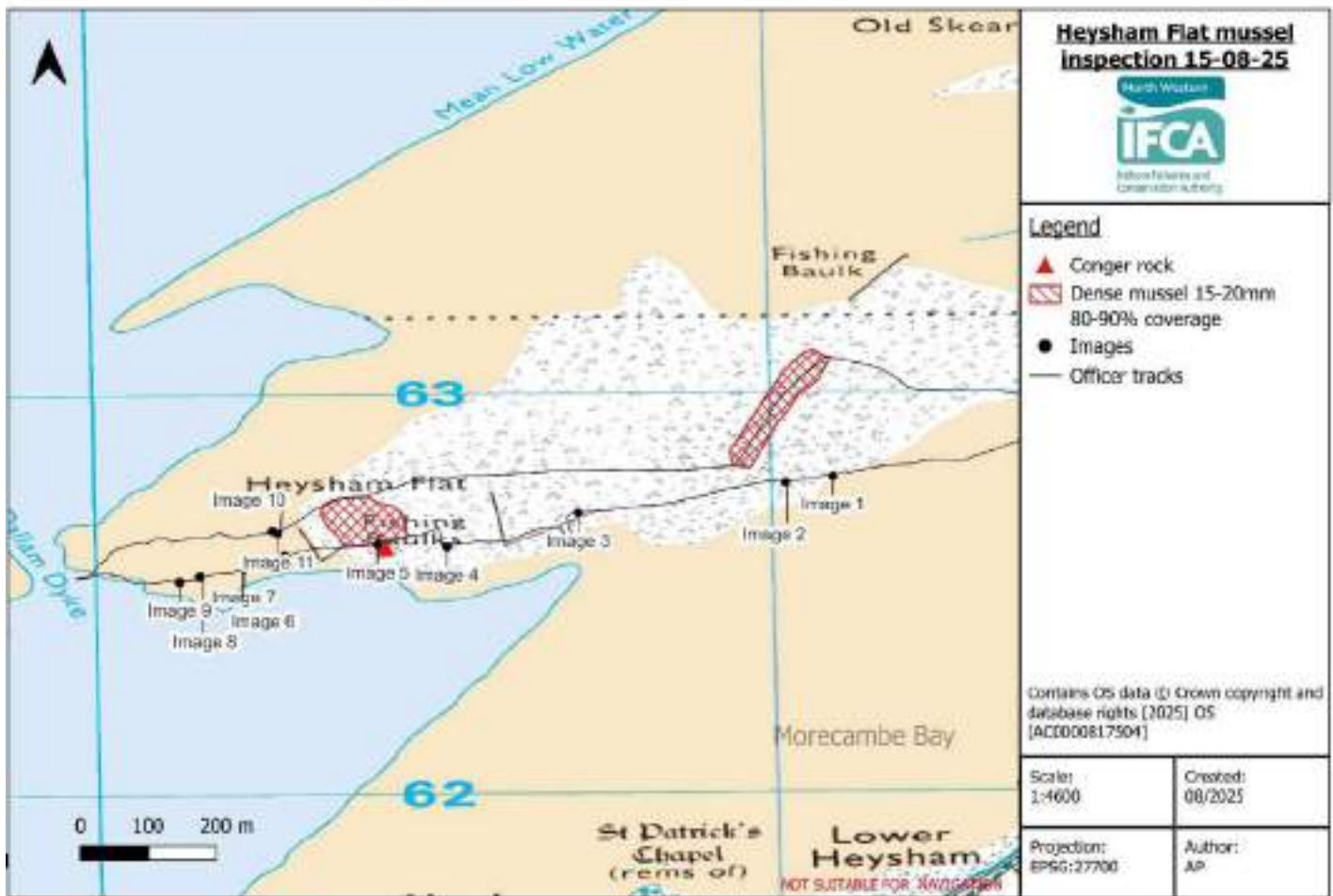


Figure 1. Heysham mussel bed inspection showing the location of seed (red hash) on 15-08-25

Lancaster District, UK

☉ 334°NW (T) • 54.057685, -2.901393 ±3m ▲ 61m



Image 1. Small area of seed settlement among cobble and sand

Lancaster District, UK

☉ 336°NW (T) • 54.057541, -2.902466 ±3m ▲ 67m



Image 2. Thick layer of mussel and dead shell over sand and cobble

Lancaster District, UK

☉ 338°NW (T) • 54.056851, -2.907147 ±3m ▲ 61m



Image 3. Area of patchy, low density mussel on sand and cobble

Lancaster District, UK

☉ 350°N (T) • 54.056081, -2.910106 ±3m ▲ 61m



Image 4. Large area of scoured mussel



Image 5. Seed and size mussel mixed in over sand along edges of the bed



Image 6. Mix of size and seed mussel embysed



Image 7. Exposed dead sabellaria structure and mussel shell



Image 8. Small patch of size mussel on thin mud layer.



Image 9. Low density seed coverage on sand



Image 10. Exposed Sabellaria structure beneath the mussel

Lancaster District, UK

☉ 204°S (T) • 54.056378, -2.913918 ±2m ▲ 70m



Image 11. Patch of seed with exposed sabellaria behind it.

South America Mussel Inspection (Quad) 26-07-25

LW: 07:48 1.2 m (Liverpool tides)

An inspection of South America was completed to assess if the mussel inspected in April 2025 was still present, and if there were signs of a 2025 settlement.

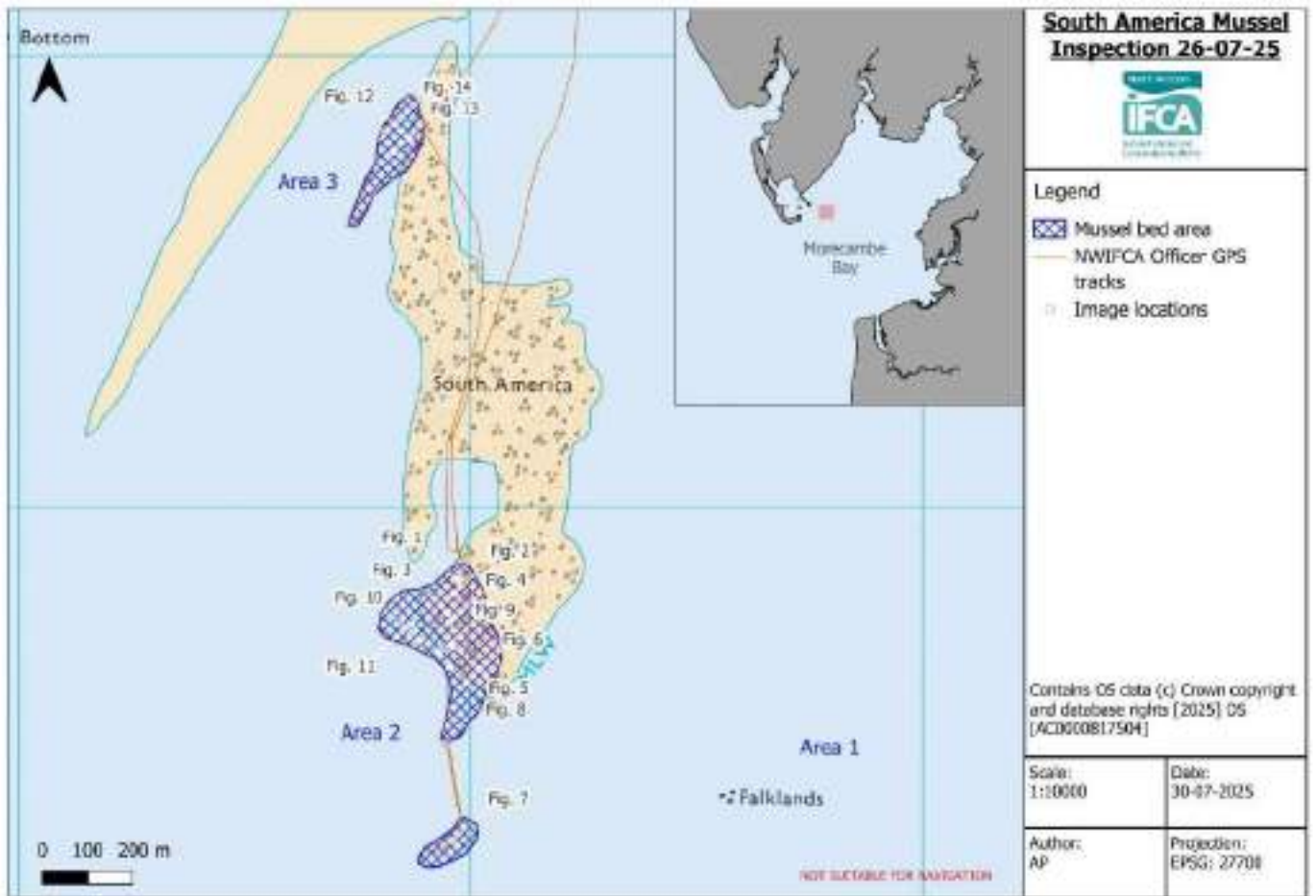
Access was possible by crossing the Leven channel closer to Aldingham than in April. Map 1 shows officer tracks (orange), the estimated area of mussel (blue), and the geolocations of the photographic evidence provided below.

In April, the mussel was split into three main areas, the location of these areas has been identified in figure 1, however, Area 1 was not able to be accessed during the inspection on the 26th of July. Area 1 corresponded with the South America area previously seen in 2023 and 2024. This year the main extent of mussel is in Area 2 and 3.

The overall bed area has reduced considerably from a combined 26.9 ha in 2024 to 7.7 hectares. In area 2, much of the mussel is size (45mm+), at low densities (10-20% coverage) and interspersed with large areas of exposed cobble (Figures, 1,2,4, and 6). The mussel present is likely to be from the 2023/2024 settlement year. There are some small areas of seed on top of thin sand in the area (Figure 5 and 9), but these were very sparse in nature. The majority of mussel present is size mussel, of low density, and mixed in with dead shell on top of a thin layer of sand (Figure 3, 8, 10 and 11).

A small area of seed was present lower down the main bed (Area 2) and separated by a stretch of bare sand. This mussel was on a thin layer of mud (Figure 7), was uniform in size and was approximately 30% coverage.

Further up the bed, closer to shore, another small area of mussel was mapped (Area 3). This mussel was predominantly size (45mm+), thinly covering an area of cobble and sand (Figure 12 and 13). There was little seed present here, and on the landward edge, there was Sabellaria present (Figure 14).



Map 1. The extent of the South America mussel beds in Morecambe Bay 26-07-25



Figure 1. - Patchy size mussel 26-07-25

United Kingdom

☉ 174°S (T) • 54.056062, -3.117206 ±3m ▲ 47m



26 Jul 2025, 7:18:55 am

Figure 2. Exposed cobble and dead shell 26-07-25

United Kingdom

☉ 232°SW (T) • 54.055668, -3.117387 ±3m ▲ 49m



26 Jul 2025, 7:20:12 am

Figure 3. Low density coverage of size mussel 26-07-25



Figure 4. Exposed cobble 26-07-25



Figure 5. Small area of seed mussel on thin mud 26-07-25

United Kingdom

☉ 206°S (T) • 54.054292, -3.116722 ±3m ▲ 49m



Figure 6. Low density coverage of mussel and exposed cobble 26-07-25

United Kingdom

☉ 254°SW (T) • 54.051125, -3.117129 ±3m ▲ 47m



Figure 7. Area of seed on thin mud 26-07-25



Figure 8. Area of size mussel mixed with dead shell 26-07-25



Figure 9. Small patch of seed 26-07-25



Figure 10. Exposed cobble and thin sand 26-07-25



Figure 11. Mix of size mussel and dead shell 26-07-25

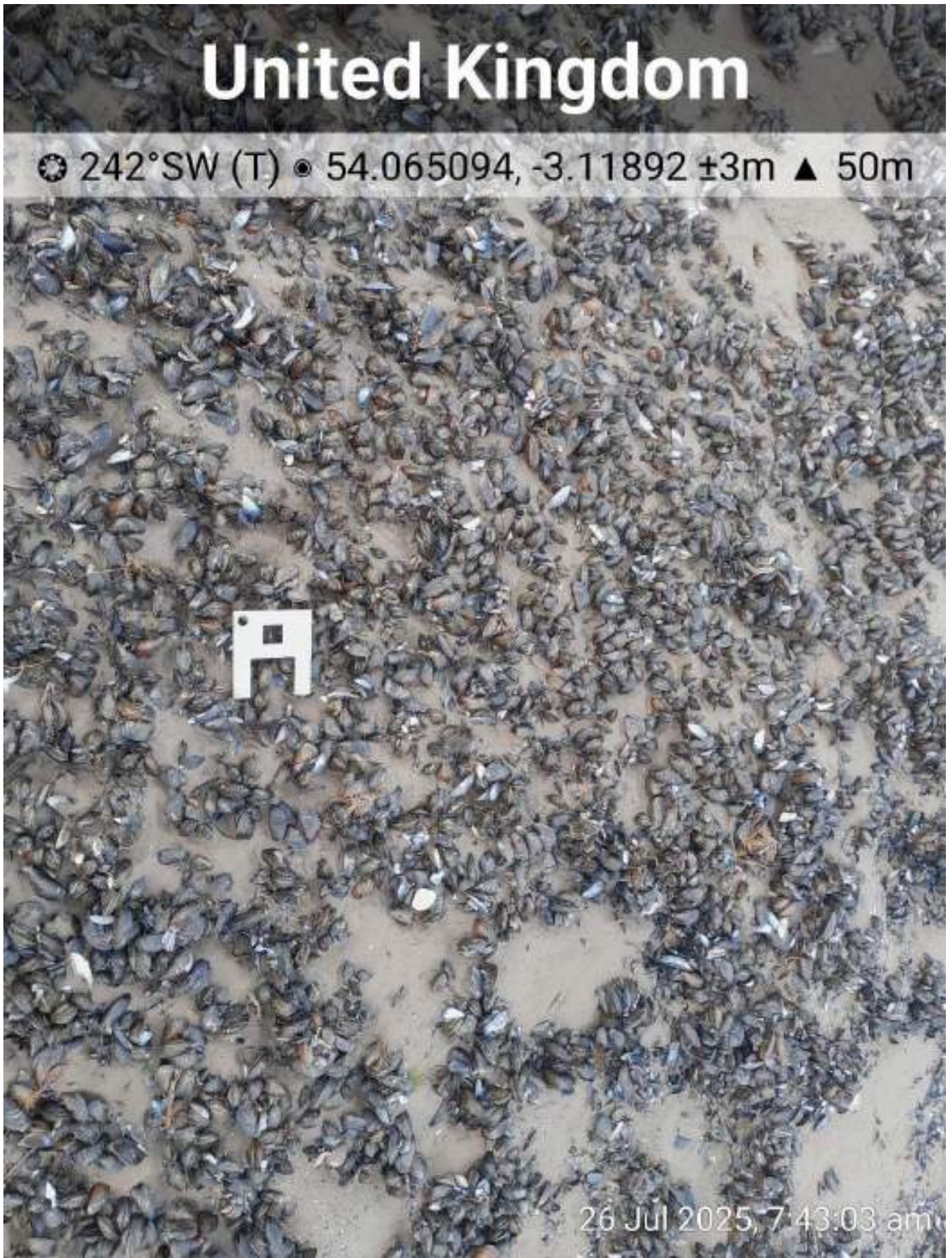


Figure 12. Large area of size mussel 26-07-25



Figure 13. Size mussel on sand 26-07-25



Figure 14. Sabellaria extent along the edge of Area 3 26-07-25

Foulney Dutch Wand Mussel Survey 01-05-2025

Officers present: AP, LL, JH, ID, RL, CT

Low water: 08:57 1.1m (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 25 hits using a 10 cm diameter corer. 12 transects were completed and 36 samples collected. The total weight of live undersize and size mussel was recorded as well as the size frequency of each sample.

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. Algae growth with present across a portion of the mussel bed.

From the transect and sample data the total mussel bed surveyed was **39 hectares**. A separation was made between the main Foulney bed and Foulney Island. Transect ten was omitted because no mussel was present.

Biomass

1961 tonnes size mussel and 924 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 Foulney Skear is currently a mix of size and undersize with a wide spread of mussel from 5mm to 73mm but mainly between 19mm and 27mm.

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/m². The weight of the size and undersize mussel has been mapped and represented in Figure 5.

It can be seen in Figures 4 and 5 that the size mussel >45 mm is predominantly on the lower half of the main skear and on the island. Undersize mussels were mainly congregated higher up the main skear with some mixed in with size mussel in the middle of the skear.

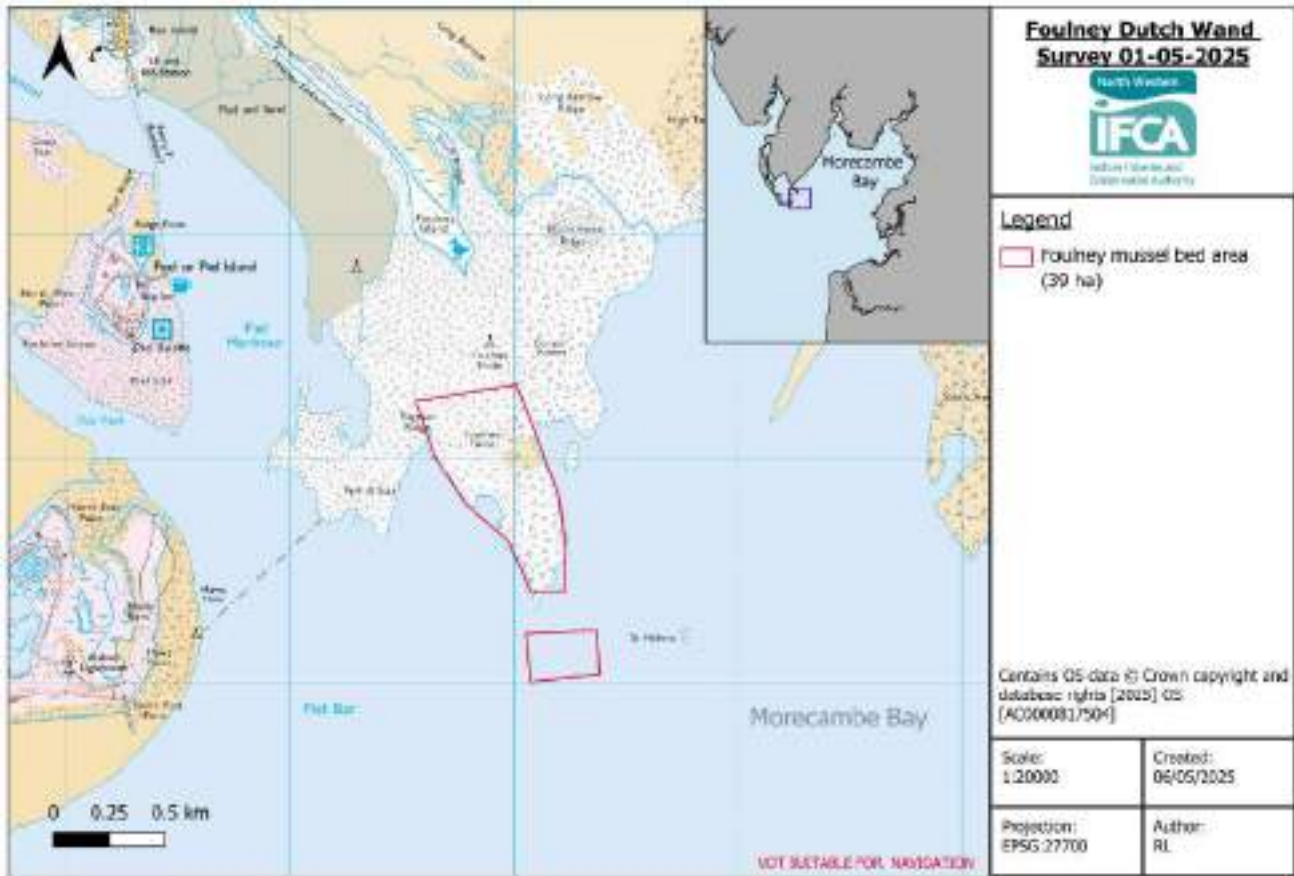


Figure 1: Location of Foulney mussel bed 01-05-2025

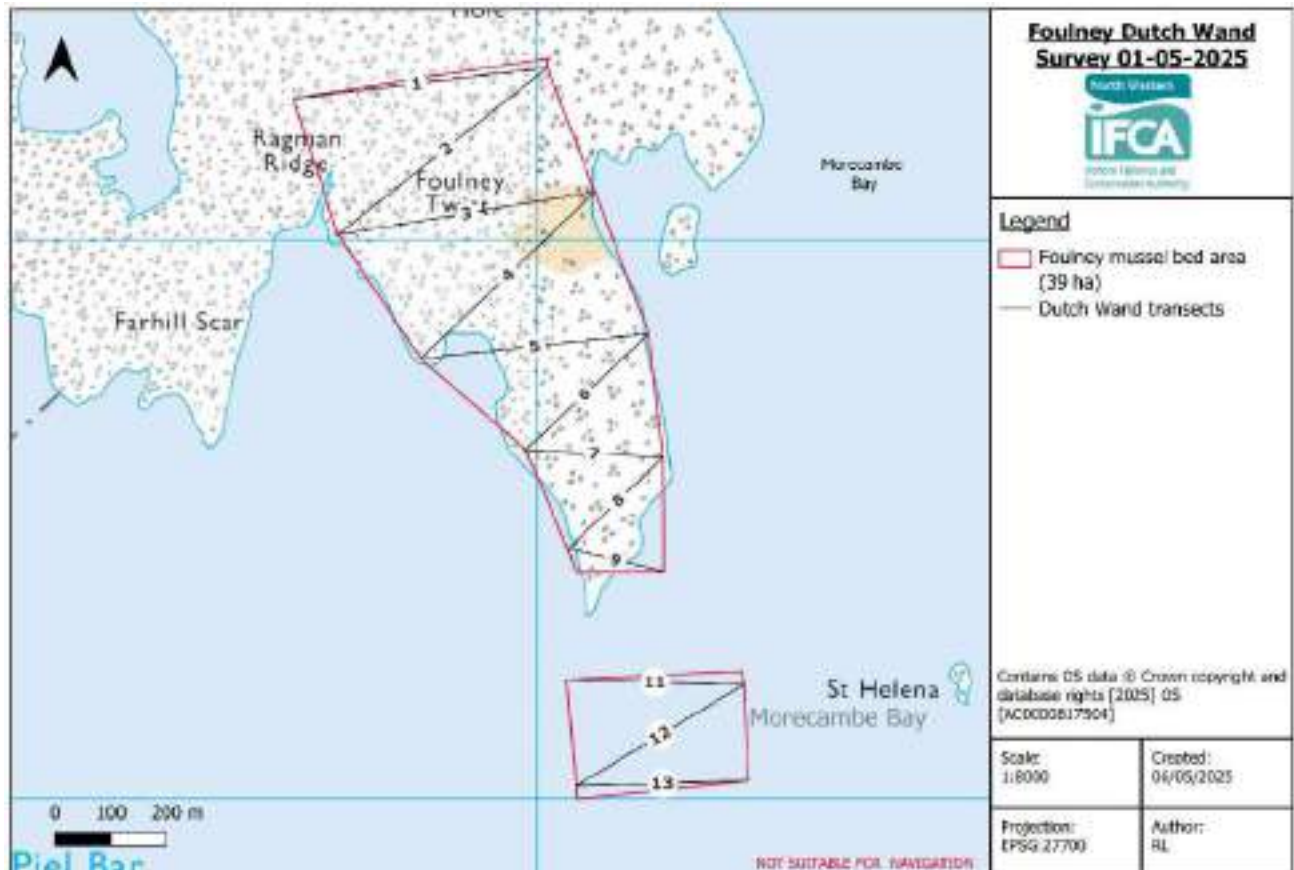


Figure 2: Foulney Dutch Wand survey transects and estimated bed area

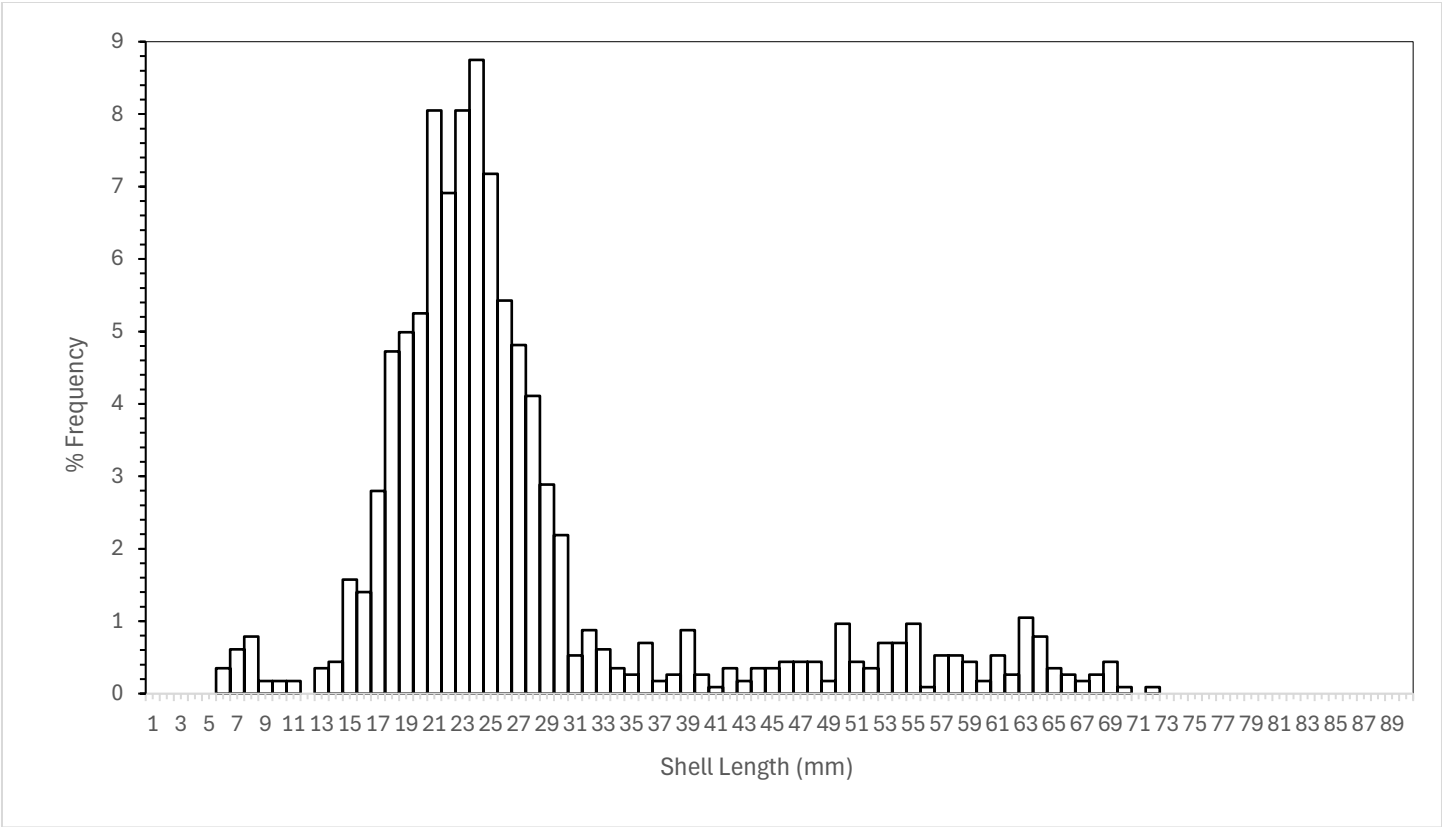


Figure 3: Histogram showing size frequency of mussels from all samples on Foulney

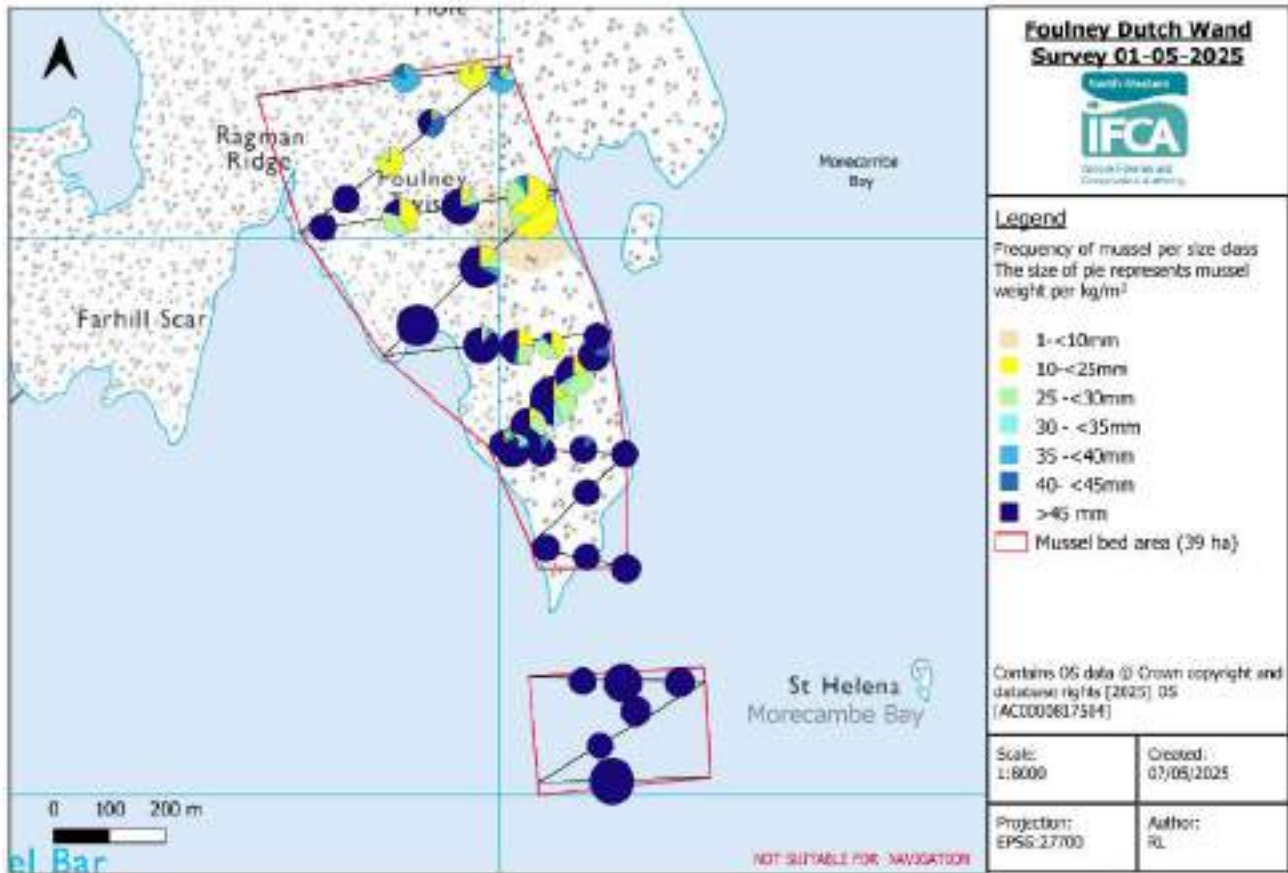


Figure 4: Frequency of mussel by size class

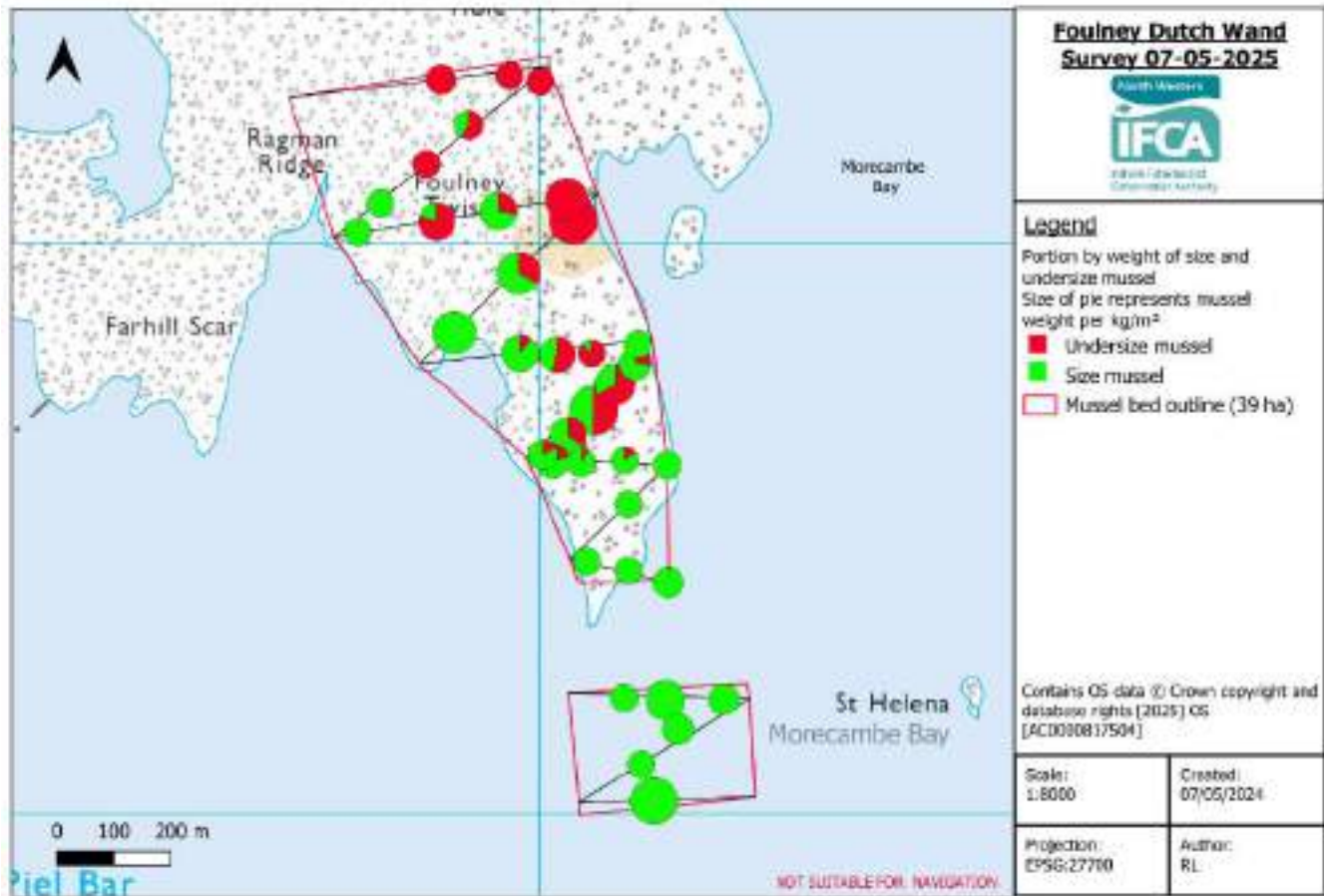


Figure 5: Proportion of size and undersize mussel by weight represented as kg/m²

Low Bottom Dutch Wand Mussel Survey 02-04-25

Officers present: GG, LL, CT

Low water: 09:09 1m (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 25 hits using a 10 cm diameter corer. 6 transects were completed and 42 samples collected. The total weight of live undersize and size mussel was recorded as well as the weight for each size category of each sample. 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. Some size mussel on this bed were fouled with barnacle.

From the transect and sample data the total mussel bed surveyed was **35 hectares**.

Biomass

1657 tonnes size mussel and 397 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 Low Bottom bed is currently a mix of size and undersize mussel ranging from 13mm to 68mm with the majority size between 45mm and 54mm.

Maps

The proportion by weight of each size class of mussels per sample has been mapped in Figure 4 with the size of pie representing mussel weight standardised to kg/m². 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 35 to >45mm mussel is found across the entire survey area with size mussel >45mm predominantly located on the southern area of the bed. A small amount of 10-25mm mussel is located in small areas across the bed.

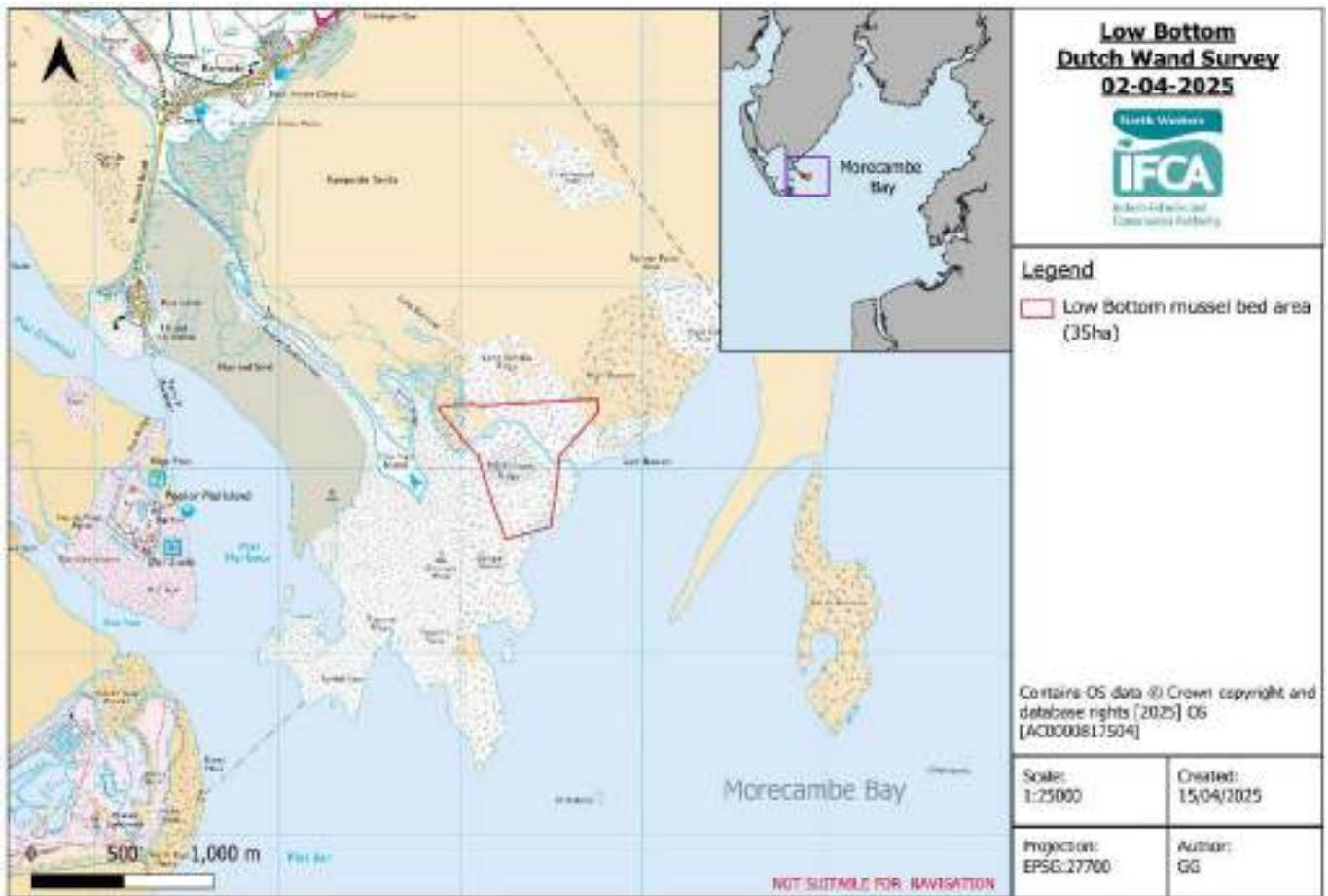


Figure 1 – Location of Low Bottom Mussel Bed surveyed 02-04-25.

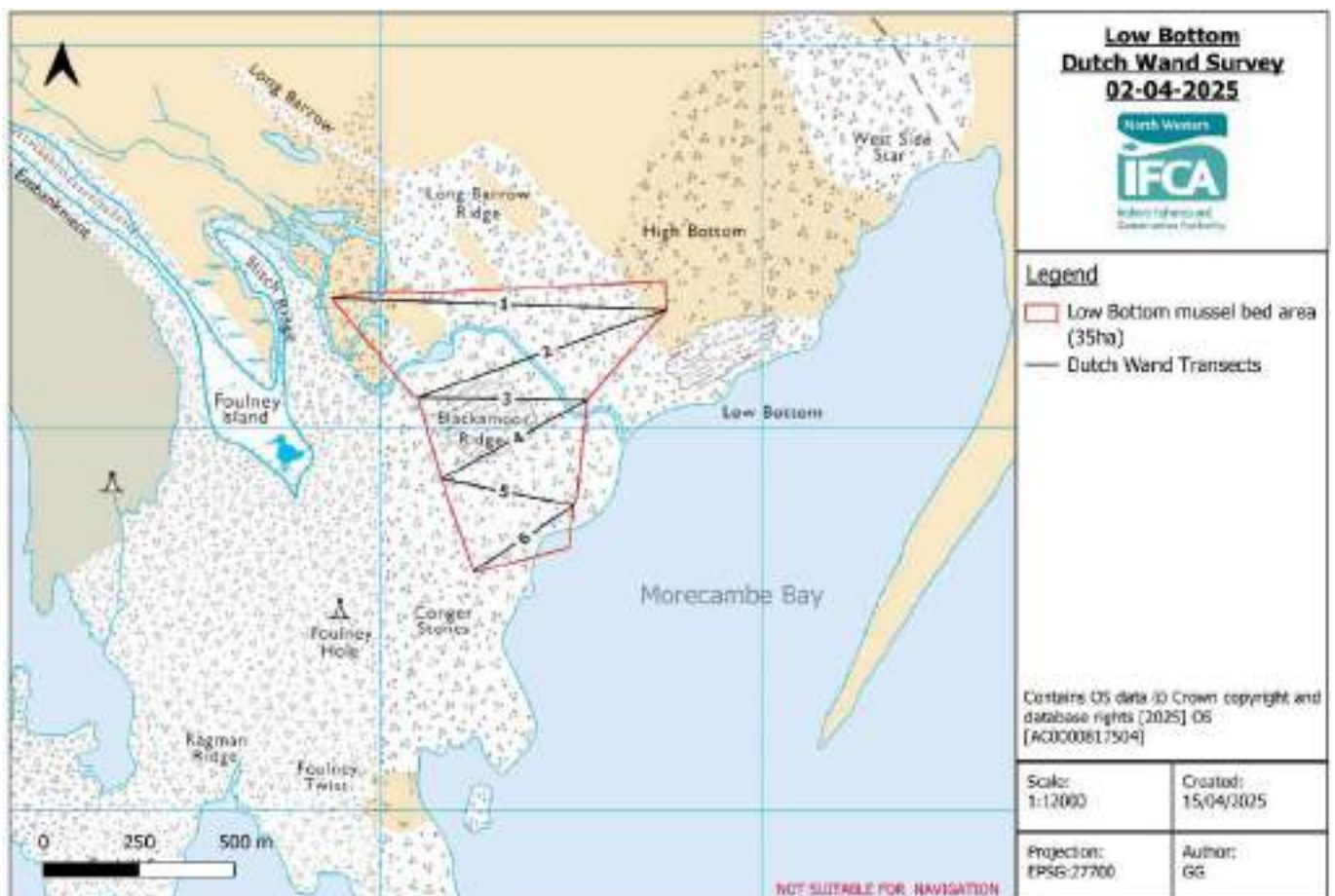


Figure 2 – Low Bottom Dutch Wand survey transects and estimated bed area 02-04-25.

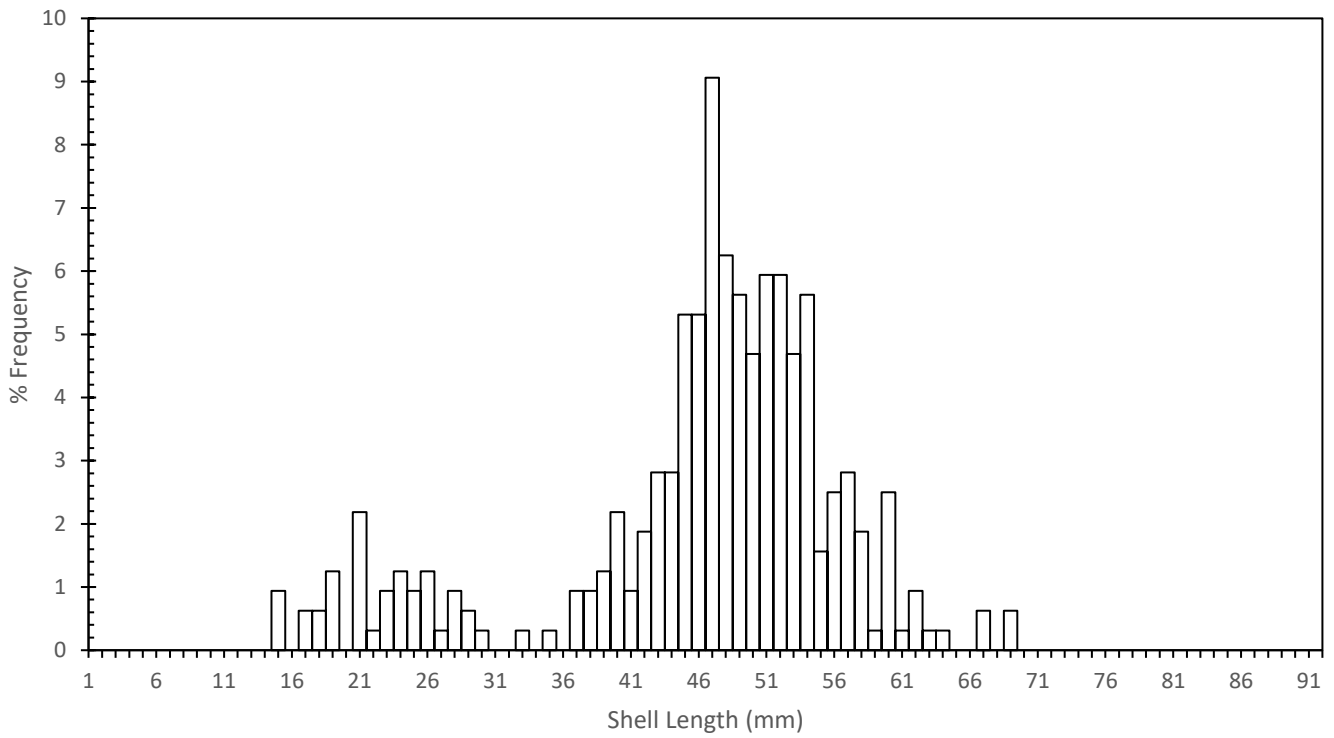


Figure 3 – Histogram showing size frequency of mussels from all samples on Low Bottom mussel Bed.

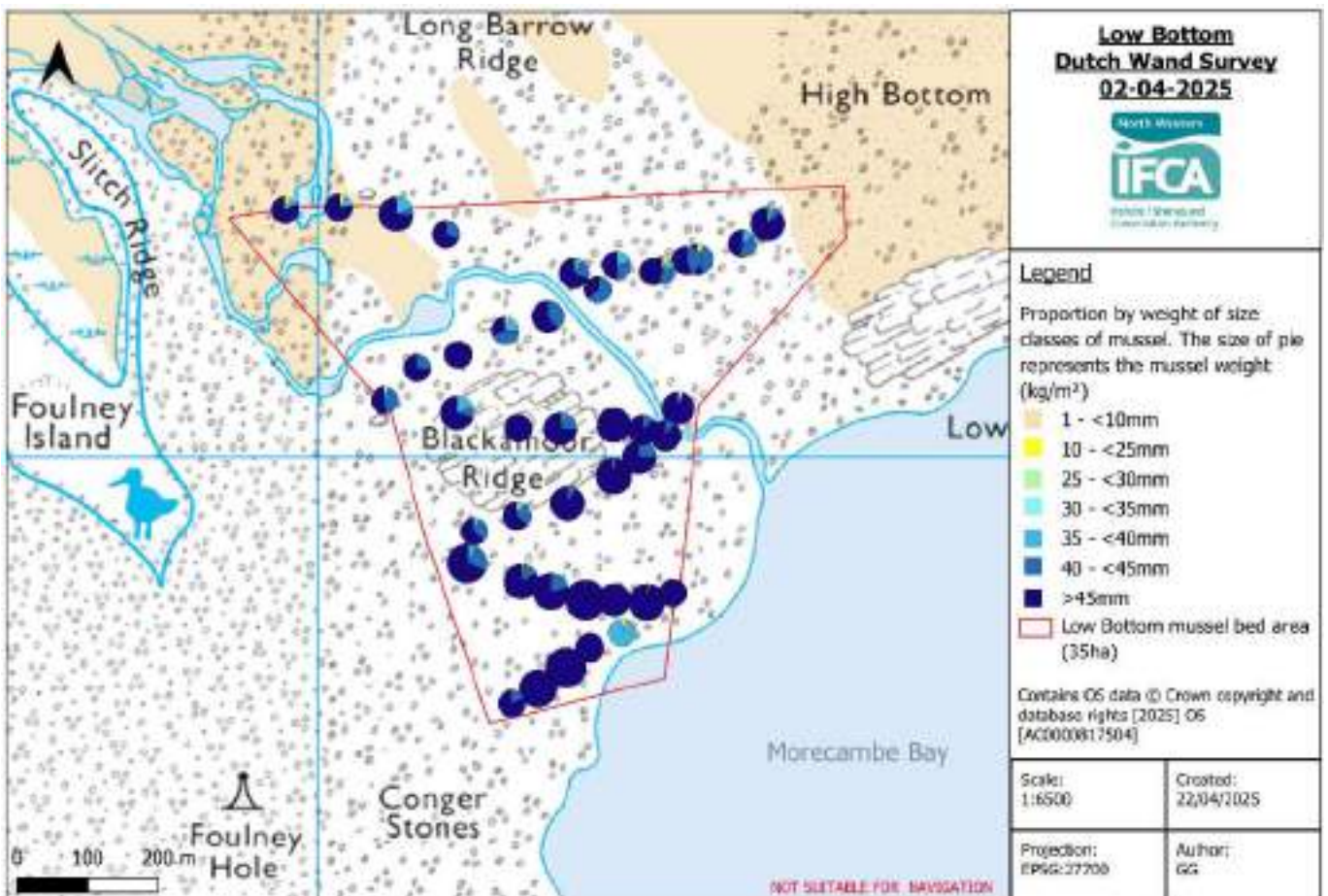


Figure 4 – Proportion by weight of size classes of mussel.

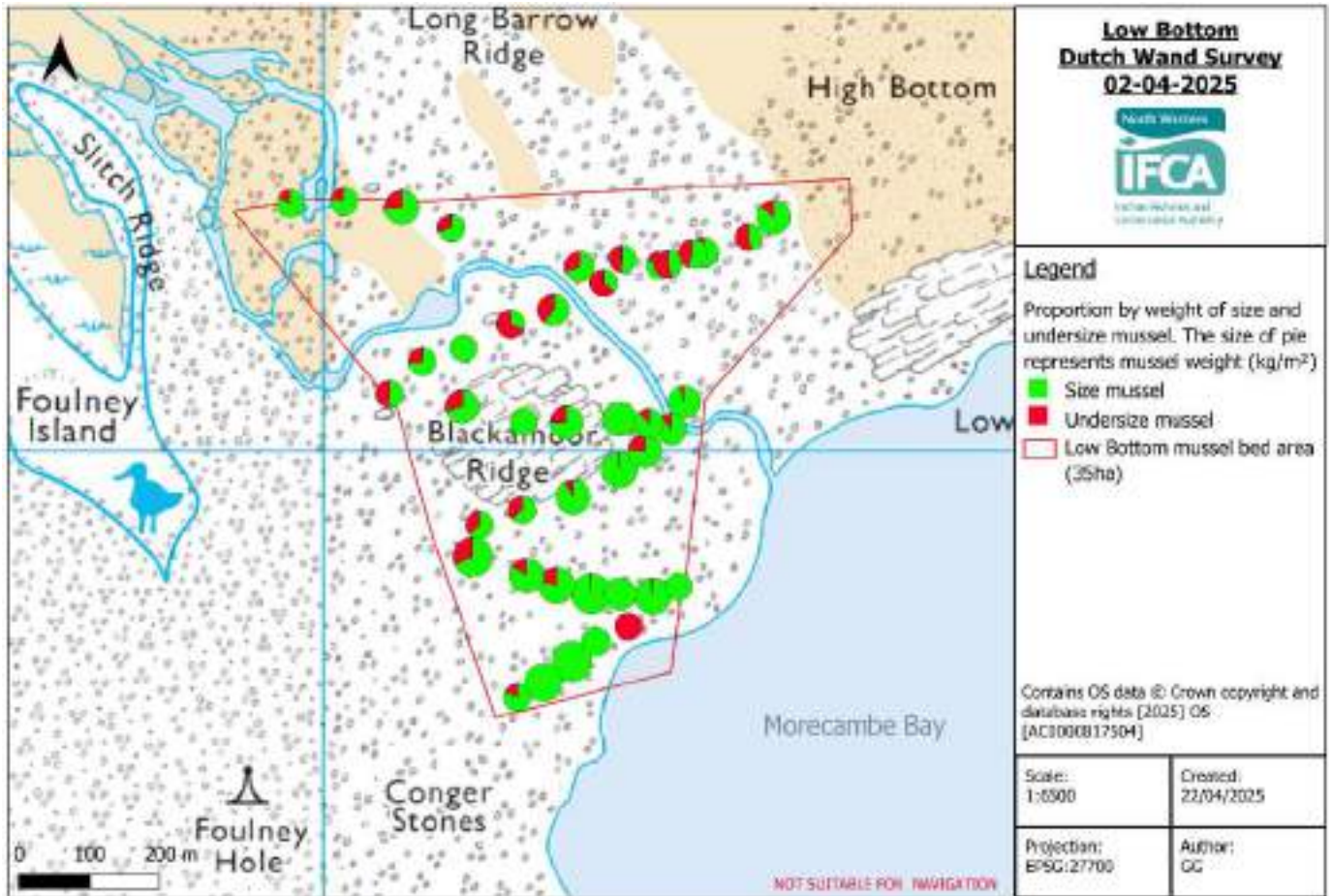


Figure 5 – Proportion by weight of size and undersize mussel represented as kg/m^2 .

Walney Channel Dutch Wand Survey 01-05-2025

Officers present: JH, ID

Low water: 08:57 1.1m (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 25 hits using a 10 cm diameter corer. 6 transects were completed and 14 samples collected. The total weight of live undersize and size mussel was recorded as well as the weight for each size category of each sample. 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. Most size mussel on this bed were fouled with barnacle. A large area at the top of the bed has flattened off with mainly dead shell remaining, some live mussel was present at the edge of the bed. Officers walked to the edge of Walney Channel where there was previously a fishery but no mussel was present. This area was not included in the bed area.

From the transect and sample data the total mussel bed surveyed was **9.25 hectares**.

Biomass

445 tonnes size mussel and 2 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 size mussel ranging from 46mm to 75mm with the majority size between 53mm and 62mm. The smallest mussels sampled were 32mm.

Maps

The proportion by weight of each size class of mussels per sample has been mapped in Figure 4 with the size of pie representing mussel weight standardised to kg/m². 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 >45mm mussel is found across the entire survey area.

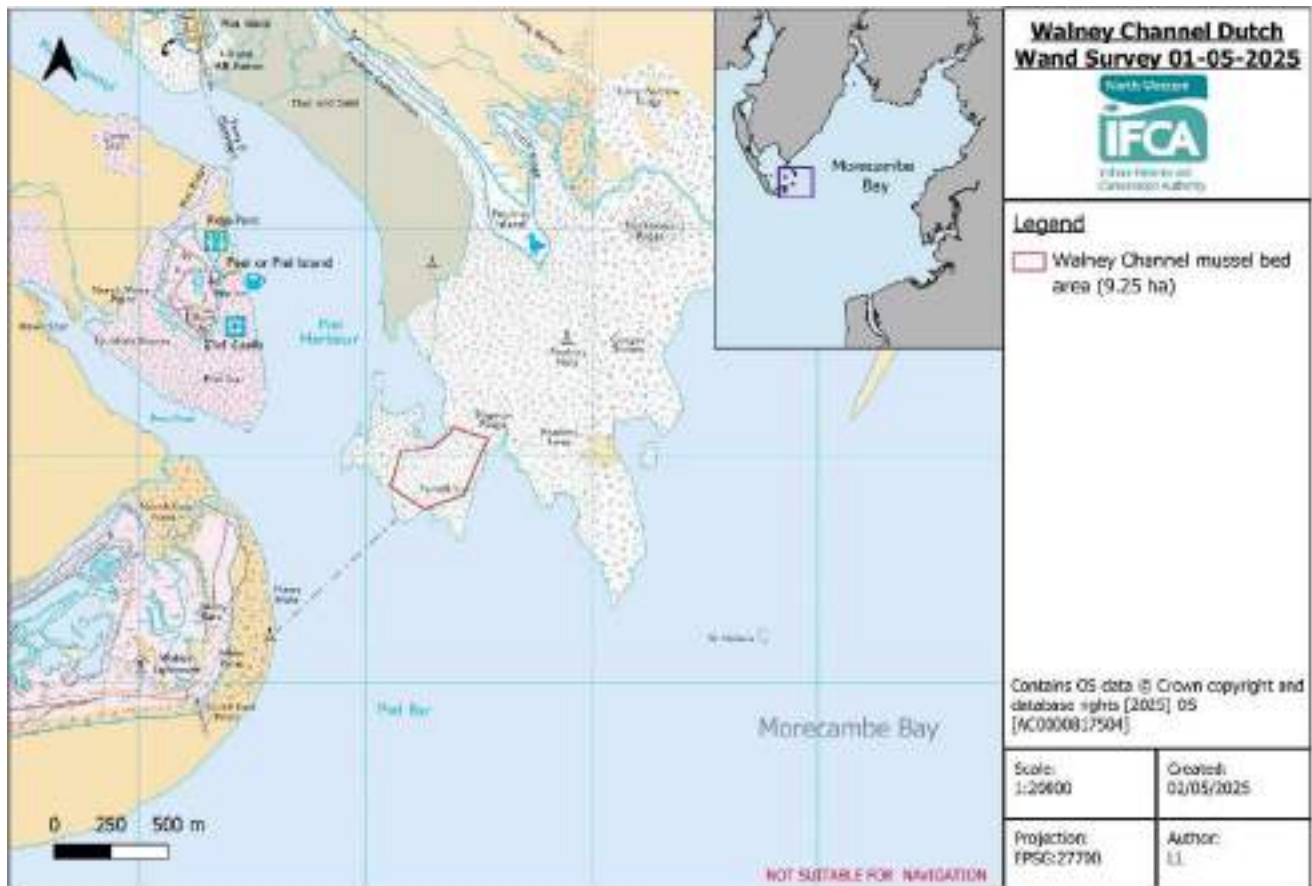


Figure 1: Location of Walney Channel mussel bed 01-05-2025.

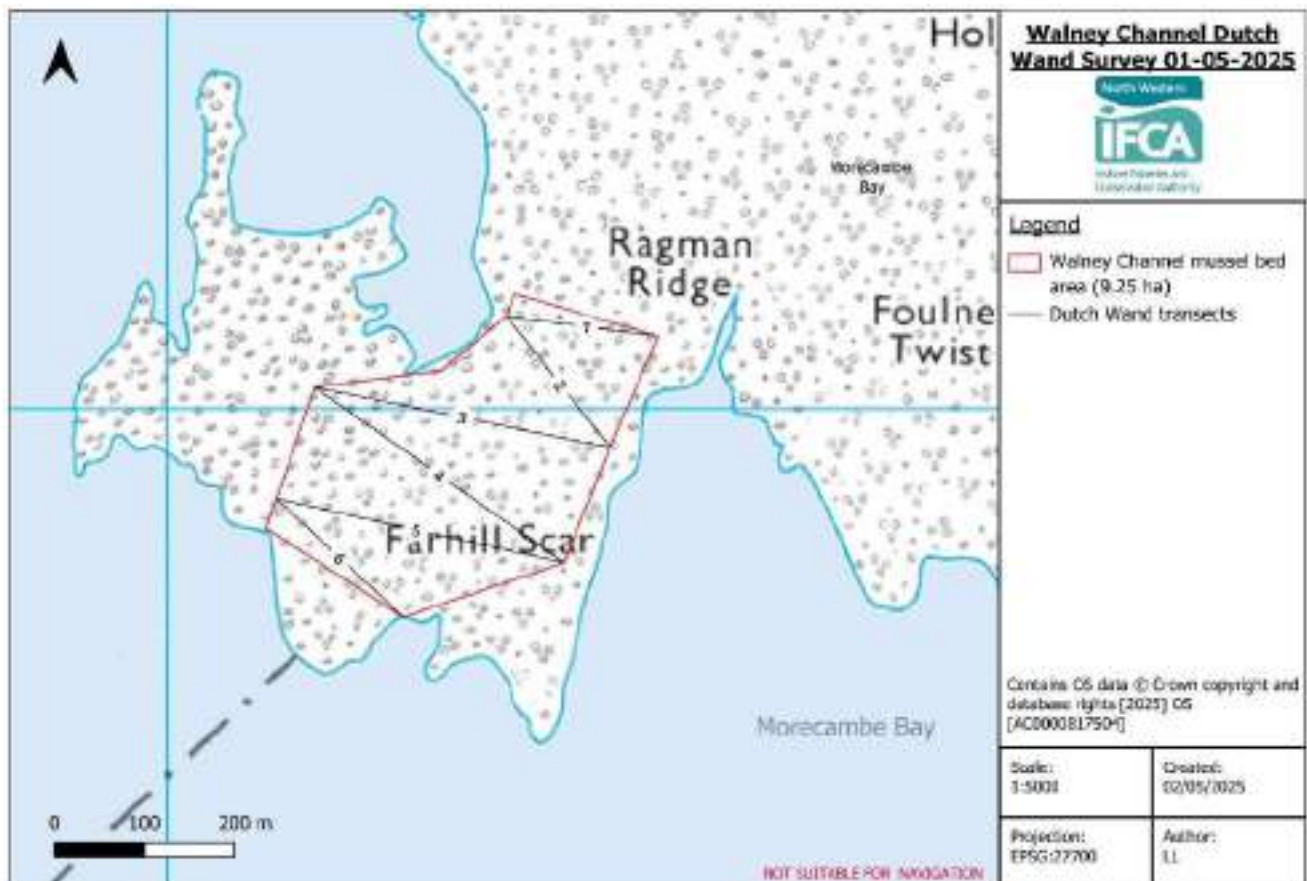


Figure 2: Walney Channel Dutch wand transects and estimated bed area 01-05-2025.

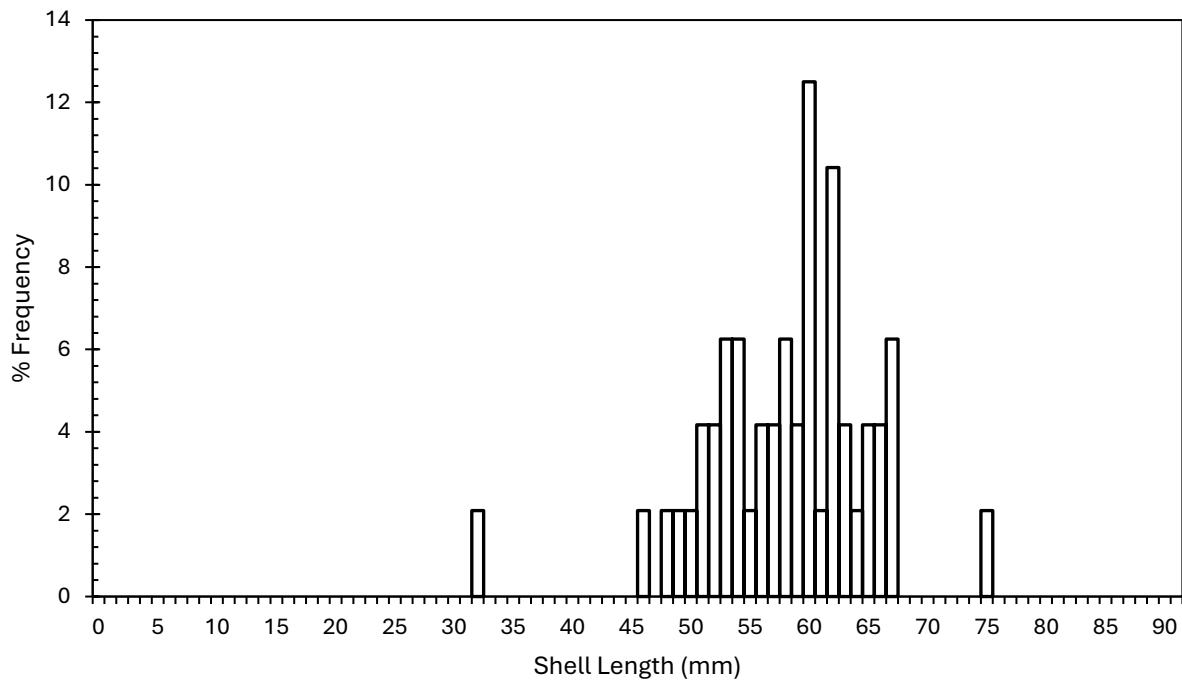


Figure 3: Histogram showing size frequency of mussel from all samples on Walney Channel mussel bed.

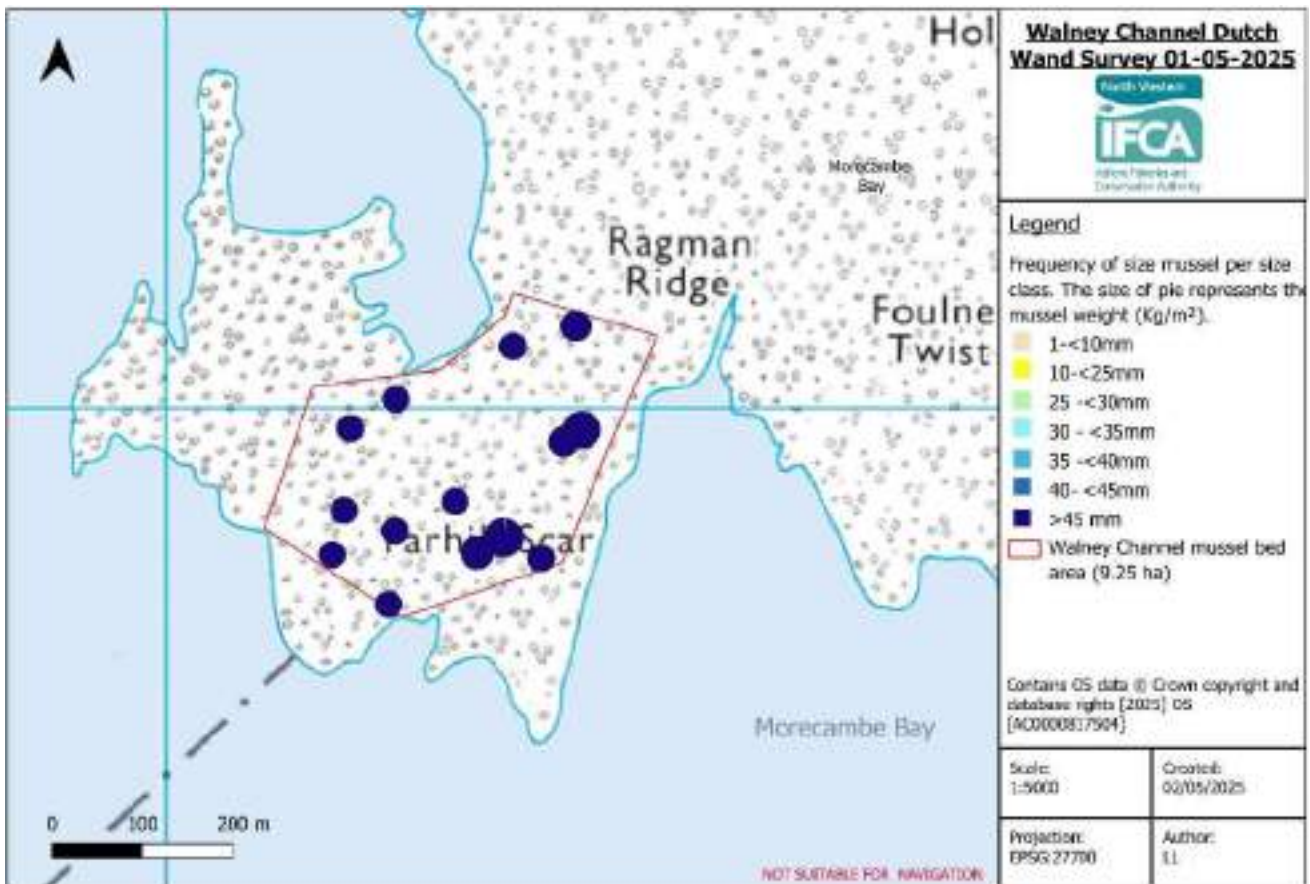


Figure 4: Proportion by weight of size classes of mussel represented as kg/m².

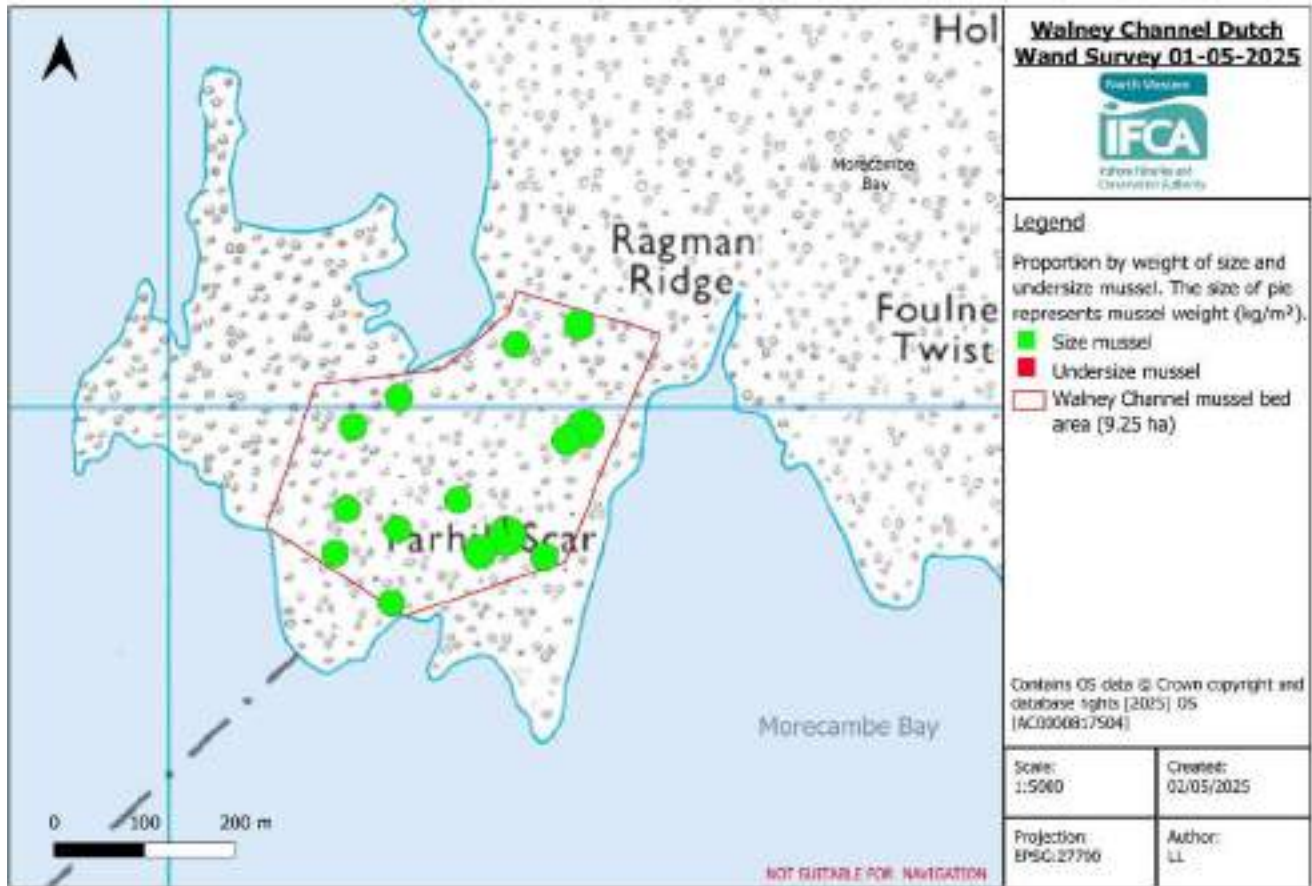


Figure 5: Proportion by weight of size and undersize mussel represented as kg/m².