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

NWIFCA-MB-EMS-SIZE MUSSEL DUDDON ESTUARY HANDGATHERING FISHERY
29th October 2021 (amended 30th November 2021)

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 (*Glauco-Puccinellietalia maritimae)*
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 Communites:

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 maritimae).

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 maritimae).

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 maritimae*) (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 maritimae), 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.

Wyre - 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 – Size Mussel (*Mytilus edulis*)

1. Introduction

1.1 Need for an HRA assessment

The NWIFCA manages mussel fisheries within the NWIFCA district under a suite of byelaws. All mussel fisheries are open within the district but only a few have stock which is commercial viable. Some beds are historic and longstanding, while others appear and disappear as channels and sand moves. The main regulation is NWIFCA Byelaw 3, Permit to Fish for Cockles and Mussels. NWIFCA does not open and close size mussel fisheries as it does with cockles. All mussel fisheries are open and fishing is dependent on the presence of mussel above the minimum landing size, and that the mussels are in a condition that makes them commercially viable.

The mussel bed in the Duddon Estuary known as Hard Acre has not been present since 2015. The mussel bed exists when the underlying hard substrate is exposed, and receives a mussel settlement, conditions which have not existed since 2015 until recently. It is likely that there has been movement of sand in the main river channel, exposing hard substrate and the right environmental conditions for mussel to settle and persist on the substrate have occurred. From the size of the mussel present, it is likely that the area had a mussel settlement in late 2020 or early 2021.

The fishery has not occurred at Hard Acre for a number of years and commercial fishing is regulated by a permit scheme, NWIFCA has classed the fishery as a new plan or project. The area lies within a European designated site (also commonly referred to as Natura 2000 sites), and has the potential to affect the designated features. European sites are protected under the Conservation of Habitats and Species Regulations 2017(as amended). The proposal site is within the Morecambe Bay and Duddon Estuary Special Protection Area (SPA) and the Morecambe Bay Special Area of Conservation (SAC). The site also has the following designations: Morecambe Bay Ramsar site, and Morecambe Bay Site of Special Scientific Interest (SSSI).

As a competent authority under the provisions of the Habitats Regulations, the NWIFCA should have regard for any potential impacts that a plan or project may have. Under the provisions of the Habitats Regulations, NWIFCA has undertaken an Appropriate Assessment of the proposal, in accordance with Regulation 61. 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

Fishing can commence once the mussel is above the MLS (greater than 45mm) and the harvesting area has undergone the classified process by the Food Standards Agency, which is a requirement for gathering of Live Bivalve Molluscs from wild stock for human consumption.

The mussel in the Duddon Estuary can grow very quickly and is likely to make size prior to classification. The classification process requires ten samples one week apart. The fishery will likely be active 1st December 2021.

The purpose of this site-specific assessment document is to assess whether or not, in the view of NWIFCA, hand gathering of size mussel at Hard Acre in the Duddon Estuary is likely to have a significant effect on the qualifying features of the Morecambe Bay and Duddon Estuary European Site, and based on the assessment, whether or not it can be concluded the activities will not have an adverse effect on the integrity the Site.

2. Information about the EMS

(See cover pages).

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, 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. Some mussel beds are persistent such as Foulney, others are ephermeral such as Heysham, and some are more sporadic and reliant on exposed skears, which can be covered by sand and only exposed when channels move.

The mussel bed in the Duddon Estuary known as Hard Acre has not been present since 2015. The mussel bed exists when the underlying hard substrate is exposed, and receives a mussel settlement, conditions which have not existed since 2015 until recently. It is likely that there has been movement of sand in the main river channel, exposing hard substrate, and the right environmental conditions for mussel to settle and persist on the substrate have occurred. From the size of the mussel present, it is likely that the area had a mussel settlement in late 2020 or early 2021.

A brief overview of when the bed was last present is provided. The last time mussel was present was between 2013 and 2015. The bed was inspected in early 2014 and the mussel was part grown suggesting a settlement in late 2013. A fishery commenced in April 2014 and continued to August 2015. The mussel bed was accessed and fished at low water on spring tides. There was a spat settlement in 2015, but by spring 2016 the mussel bed had completely sanded over. An annual inspection has been undertaken since 2016 with no further records of mussel present until this year.

4.2 Mussel Hand-gathering

Hand gathering of mussel is 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 substrate. Hand gatherers 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.

4.3 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 in the list below. The full text of the regulations are available on the NWIFCA website (https://www.nw-ifca.gov.uk/byelaws/).

NWIFCA Byelaw 3	Permit to fish for cockles and mussels
NWSFC Byelaw 13a	Cockles and mussels – management of the fishery

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 137 NWIFCA Byelaw 3 permits, which could be issued for the 2021 – 2022 season. Without a permit within the NWIFCA district, it is still permissible to collect 5kg per person per day of size mussel for human consumption.

NWIFCA are currently in the process of replacing the current byelaw with a new byelaw NWIFCA Byelaw 3 (2020) which if it comes into force during the 2021 – 2022 fishery will replace the current management. There are no changes in the byelaw that need to be considered in the HRA as the byelaw will build on and improve the current ability to manage the fishery.

4.4 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 in Moreca,be Bay 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 reports 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 Current Status of Stock

Duddon Mussel Inspection 09/09/21

The area of mussel identified in June was inspected to assess the growth, condition and coverage of the mussel. The area was accessed by quad bike, and an inspection was carried out on foot. The area is in a main channel and even on a low water spring tide, some of the area remains under water.

There was an area of mussel present in the channel. The extent of the bed has been mapped below showing the boundary that was walked by officers (Figures 1 and 2). The majority of the area was exposed however a proportion of the bed remained under water during the inspection and an area on the Northern boundary could not be mapped due to depth of water. However, the water was very clear which enabled officers to assess where the edge of the bed was.

A large proportion of the mussel across the bed ranged in size from 35-45mm (Figure 3) at an overall coverage of approximately 75% bed area. Mixed in were patches of both size (45-55mm) and undersize (30-40mm) mussel. In the central area of the bed the mussels were on mussel mud to a depth of 20-30cm. Some areas of mussel were loose and some areas were hard into the sand substrate. Sand Mason were also prevalent on the bed, varying in density. At the South Western area of the bed, the mussel was patchy and

less dense than other areas of the bed, with larger patches of bare sand in between patches of mussel. High bird feeding activity was noticed, with Oystercatchers and Gulls in high numbers feeding in the area.

Fifteen mussel samples were taken across the bed using a 10cm diameter corer. The total weight of size and undersize mussel was recorded as well as the size frequency of each sample. No mussel under 10mm was found to be present. The mussel bed surveyed was approximately **8.27 hectares**.

Biomass - 512 tonnes size mussel and **1374 tonnes undersize mussel. Total mussel 1886 tonnes.**

Length Frequencies - The total length frequency for the surveyed bed is provided in Figure 3. From the length frequency data the mussel present on the Duddon bed ranged between 16-57mm, with the majority of mussel between 30-45mm.

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 class is similar across the bed, with the size mussel >45 mm predominantly on the Eastern half of the bed area and 25-45mm mussels widespread.

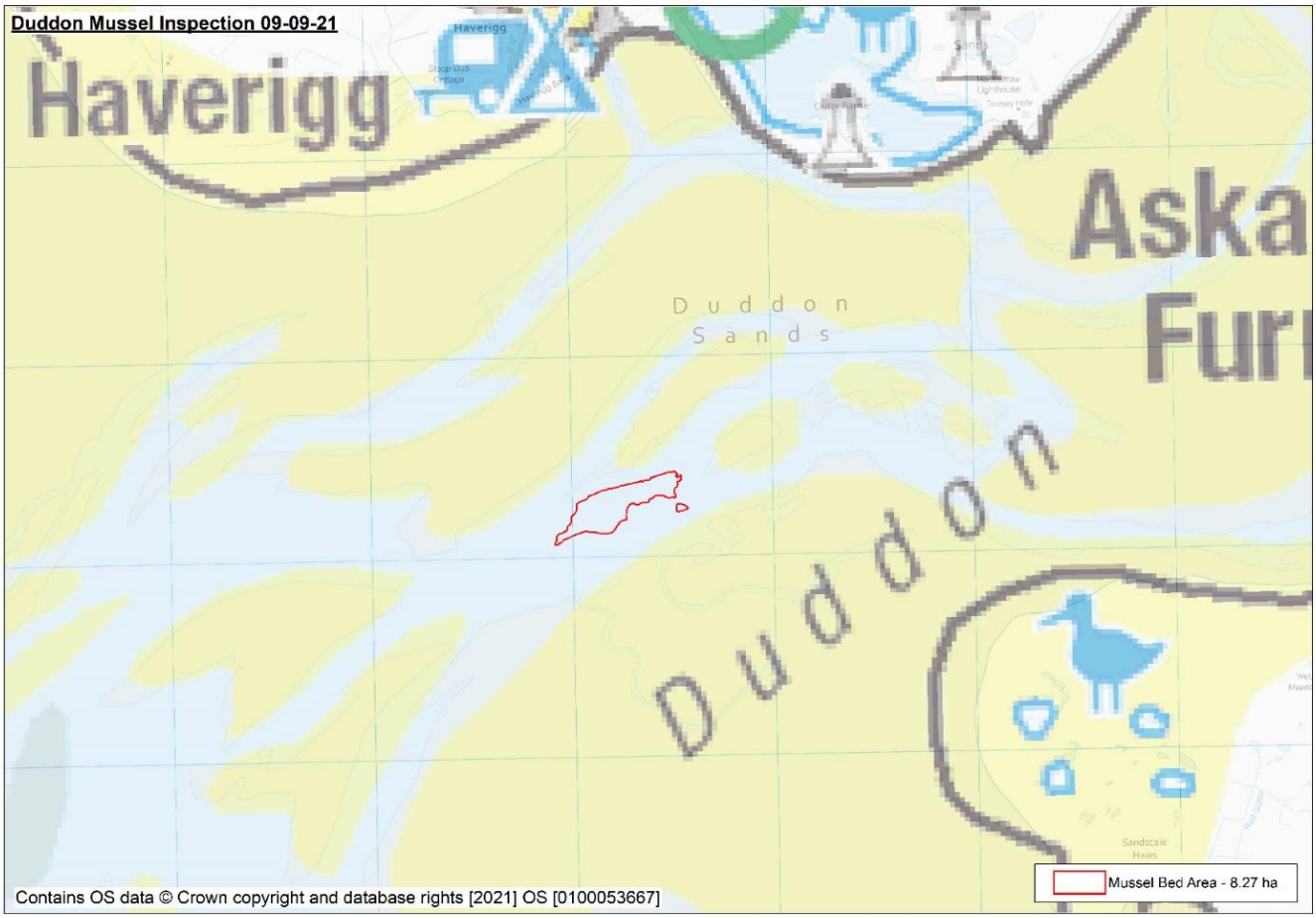


Fig 1 – Outline of mussel in the Duddon Channel 09-09-21.

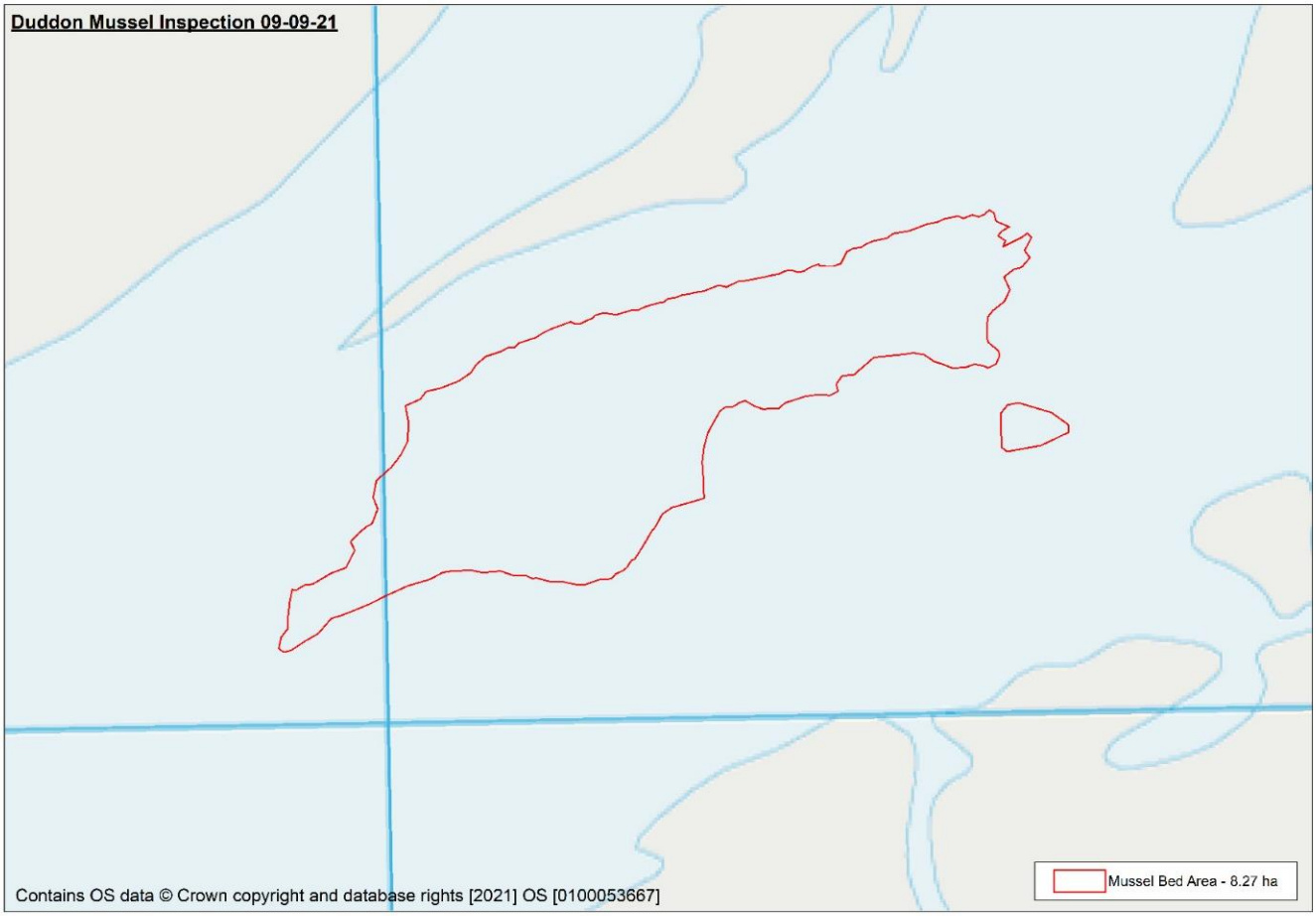


Fig 2 – Outline of bed Area for Duddon mussel inspection 09-09-21.

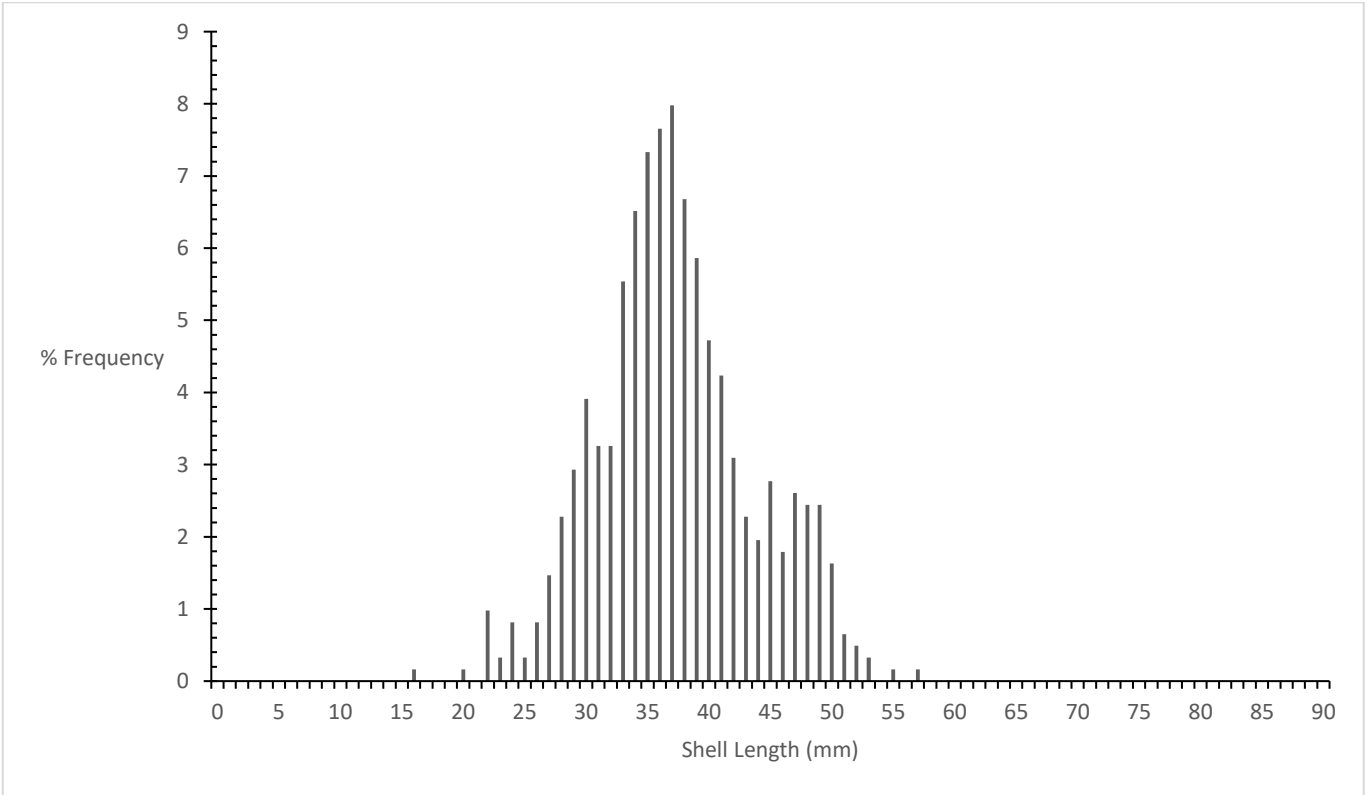


Fig 3 – Histogram showing size frequency of mussels from all samples from the Duddon 09-09-21.

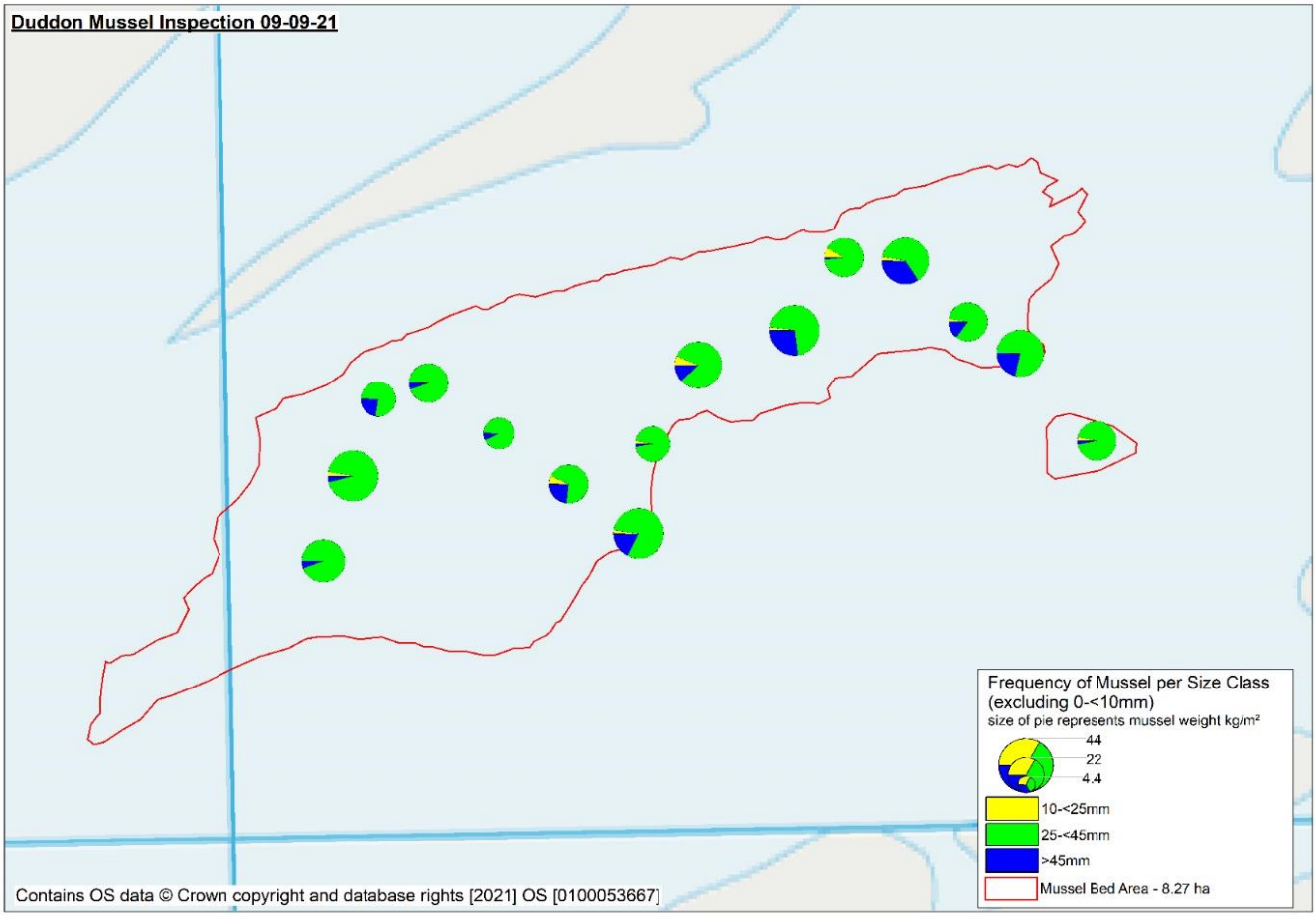


Fig 4 – Frequency of mussel by size class.

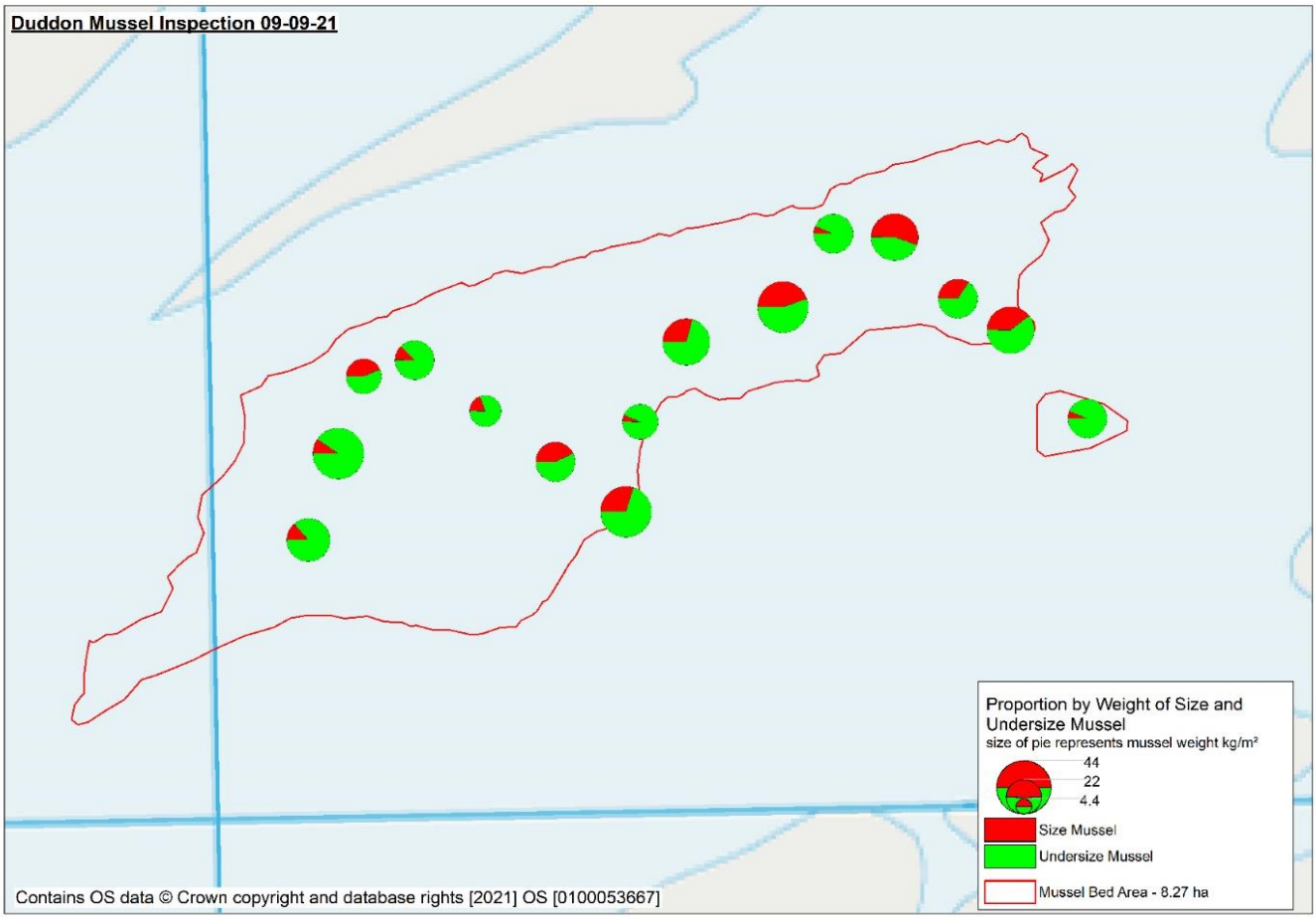


Fig 5 – Proportion of size and undersize mussel by weight kg/m^2.

Fig 6 – Mussel on sand substrate 09-09-21.

Fig 7 – Mussel on mussel mud 09-09-21.

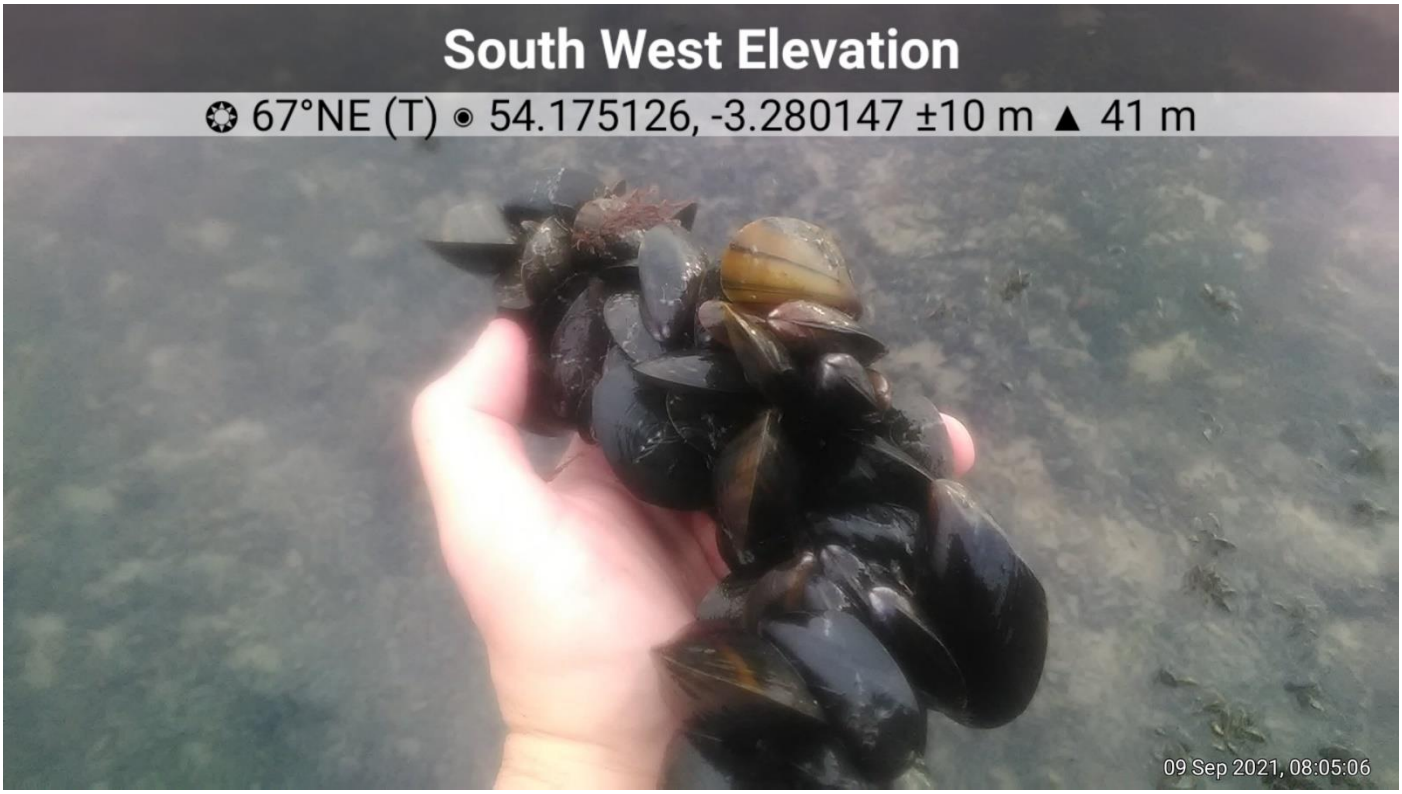


Fig 8 – 30-45mm mussel from the Duddon channel 09-09-21.

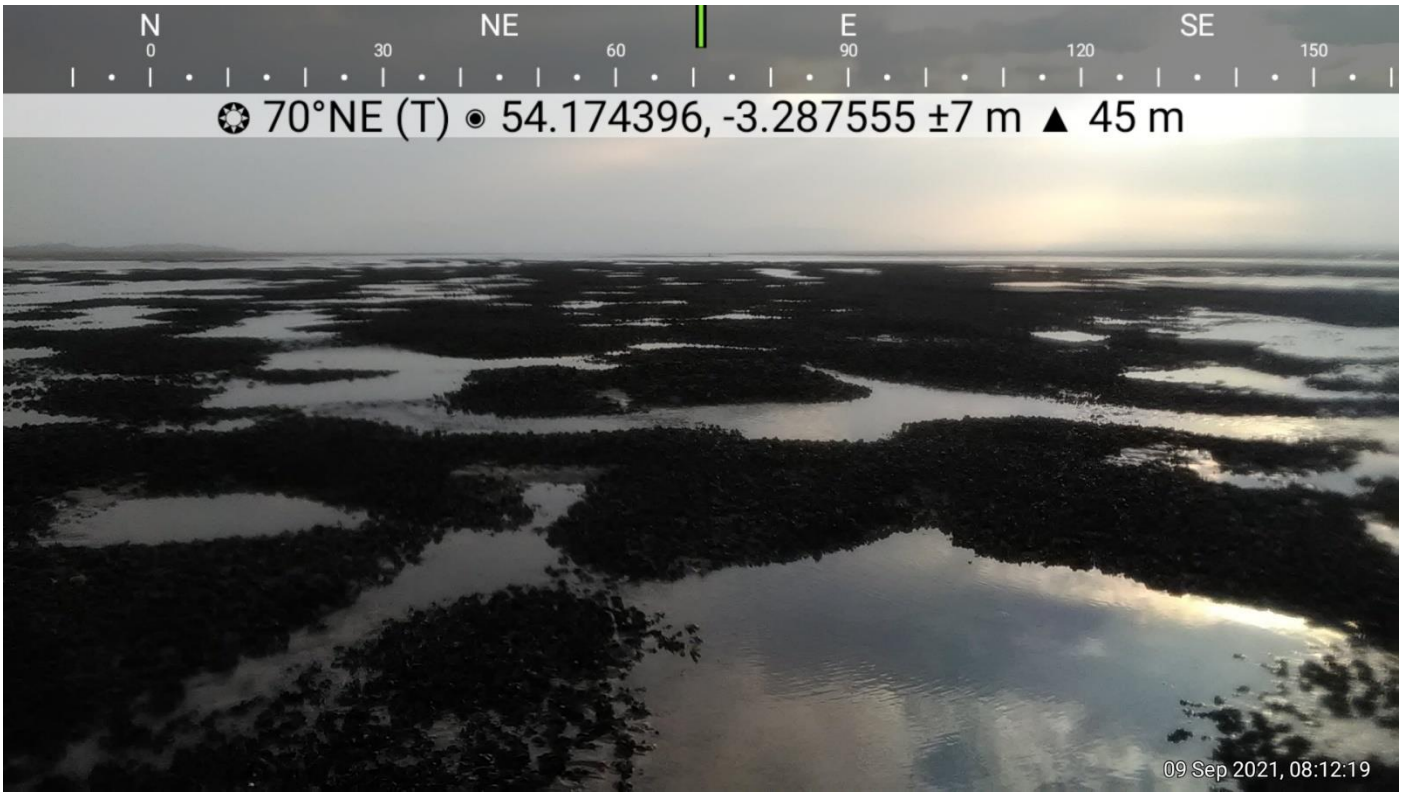


Fig 9 – Duddon Mussel Bed 09-09-21.

Fig 10 – Patchy mussel at furthest point down the channel 09-09-21.

Fig 11 – Mussel mixed in with Sand Mason on a separate island in the Duddon channel 09-09-21.

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 EMS[1].

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 have been screened out other than those in the table below, due to there being no interaction between the fishing activity and the qualifying features and sub-features.

Pressures: All pressures from the Advice on Operations table provided in the Morecambe and Duddon Estuary Conservation Advice package have been screened out, other than the pressures in the following table, due to the nature of the fishing activity.

Qualifying Feature	Sub-feature	Potential pressure(s)	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.
	intertidal mixed sediments, intertidal coarse sediment	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Sensitive	No	Hand-gathered access to fishery could be over a small amount of the feature but unlikely to have any impact in such a highly dynamic site, due to low levels of effort.

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

	Intertidal / stony reef	Abrasion/disturbance of the substrate on the surface of the seabed	Sensitive	Yes	Hand-gathering will 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. Feature and pressures taken through to AA.
	Intertidal / subtidal biogenic reef: including mussel and Sabellaria communities	Genetic modification & translocation of indigenous species	Sensitive	No	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
		Litter	Sensitive	Yes	Feature and pressure taken through to AA.
		Removal of non-target species	Sensitive	No	There is little or no by-catch in this highly selective fishery.
		Removal of target species	Sensitive	Yes	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.
Natterjack Toad (NON MARINE)	Sand dune scrapes	Disturbance to species in particular during the breeding season	Sensitive	Yes	Feature and pressure taken through to AA. Access is potentially through important Natterjack Toad breeding area in the Duddon Estuary.
		Removal of non-target species	Sensitive	Yes	Feature and pressure taken through to AA. Access is potentially through important Natterjack Toad breeding area in the Duddon Estuary
A026 Egretta garzetta; 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 *Cygnus Cygnus*; Whooper swan					
A040 *Anser brachyrhynchus*; Pink-footed goose					
A048 *Tadorna tadorna*; Common shelduck					
A050 Anas Penelope; Wigeon		Removal of non-target species	Sensitive	No	Highly selective fishery. No by-catch or discards of non-target species.
A054 *Anas acuta*; Northern pintail		Visual disturbance	Sensitive	Yes	All species taken through to AA
A063 *Somateria mollissima*; Common eider (Breeding)					
A067 Bucephala clangula; Goldeneye					
A069 Mergus serrator; Red-breasted merganser					
A130 *Haematopus ostralegus*; Eurasian oystercatcher					
A137 *Charadrius hiaticula*; Ringed plover					
A140 *Pluvialis apricaria*; European golden plover					
A141 *Pluvialis squatarola*; Grey plover					
A142 *Vanellus vanellus;* Lapwing					
A143 *Calidris canutus*; Red knot					

A144 *Calidris alba*; Sanderling A149 *Calidris alpina alpina*; Dunlin *A151 Calidris pugnax;* Ruff A156 *Limosa limosa;* Black-tailed godwit A157 *Limosa lapponica*; Bar-tailed godwit A160 *Numenius arquata*; Eurasian curlew A162 *Tringa totanus*; Common redshank A169 *Arenaria interpres*; Ruddy turnstone *A176 Larus melancephalus;* Mediterranean gull *Phalacrocorax carbo;* Cormorant *Podiceps cristatus;* Great crested grebe A183 *Larus fuscus*; Lesser black-backed gull (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)					
Seabird assemblage					
Waterbird assemblage					

Is the potential scale or magnitude of any effect likely to be significant?[2]	**Alone** Yes **Comments :**	**OR In-combination[3]** Yes **Comments :** These activities also occur at the site: • 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 and SPA supporting habitat features

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

6.1.1 Pressures and Potential Impacts

i. Abrasion/disturbance of the substrate on the surface of the seabed

Hand gathering removes the mussel from the surface of the seabed and there is potential for abrasion / disturbance of the substrate on the seabed from the use of rakes and vehicles.

ii. Litter

Historic hand-gathered fisheries have had a poor reputation for large amounts of litter being disposed of on the parking and access areas, and on the intertidal. 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.

iii. 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.

iv. Disturbance to Natterjack Toads during the breeding season and potential removal of non-target species (Natterjack Toads)

Potential to disturb and damage Natterjack toads, toad spawn and Toadlets during the breeding cycle and early life stages of the species.

6.1.2 Exposure

i. <u>Abrasion/disturbance of the substrate on the surface of the seabed</u>

Intertidal / subtidal stoney reef and Intertidal / subtidal biogenic reef: including mussel and *Sabellaria alveolata* communities

Although the initial settlement of mussel was on skear the majority of the mussel is now on a layer of sandy substrate. Hand-raking skims the mussel from its underlying sediment, with no contact with the cobble and boulder skear beneath. There has been no *Sabellaria alveolata* recorded on any of the inspections carried out this year.

The NWIFCA can conclude that due to the method of fishing, the history of the mussel bed, no Sabellaria alveolata is present, and the condition of the underlying substrate that abrasion and disturbance on 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.

ii. 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 Heysham Flat 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 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.

iii. Removal of target species - Intertidal biogenic reef: including mussel and *Sabellaria alveolata* communities

The mussel bed in the Duddon Estuary known as Hard Acre has not been present since 2015. The mussel bed exists when the underlying hard substrate is exposed, and receives a mussel settlement, conditions which have not existed since 2015 until recently. It is likely that there has been movement of sand in the main river channel, exposing hard substrate, and the right environmental conditions for mussel to settle and persist on the substrate have occurred. From the size of the mussel present, it is likely that the area had a mussel settlement in late 2020 or early 2021.

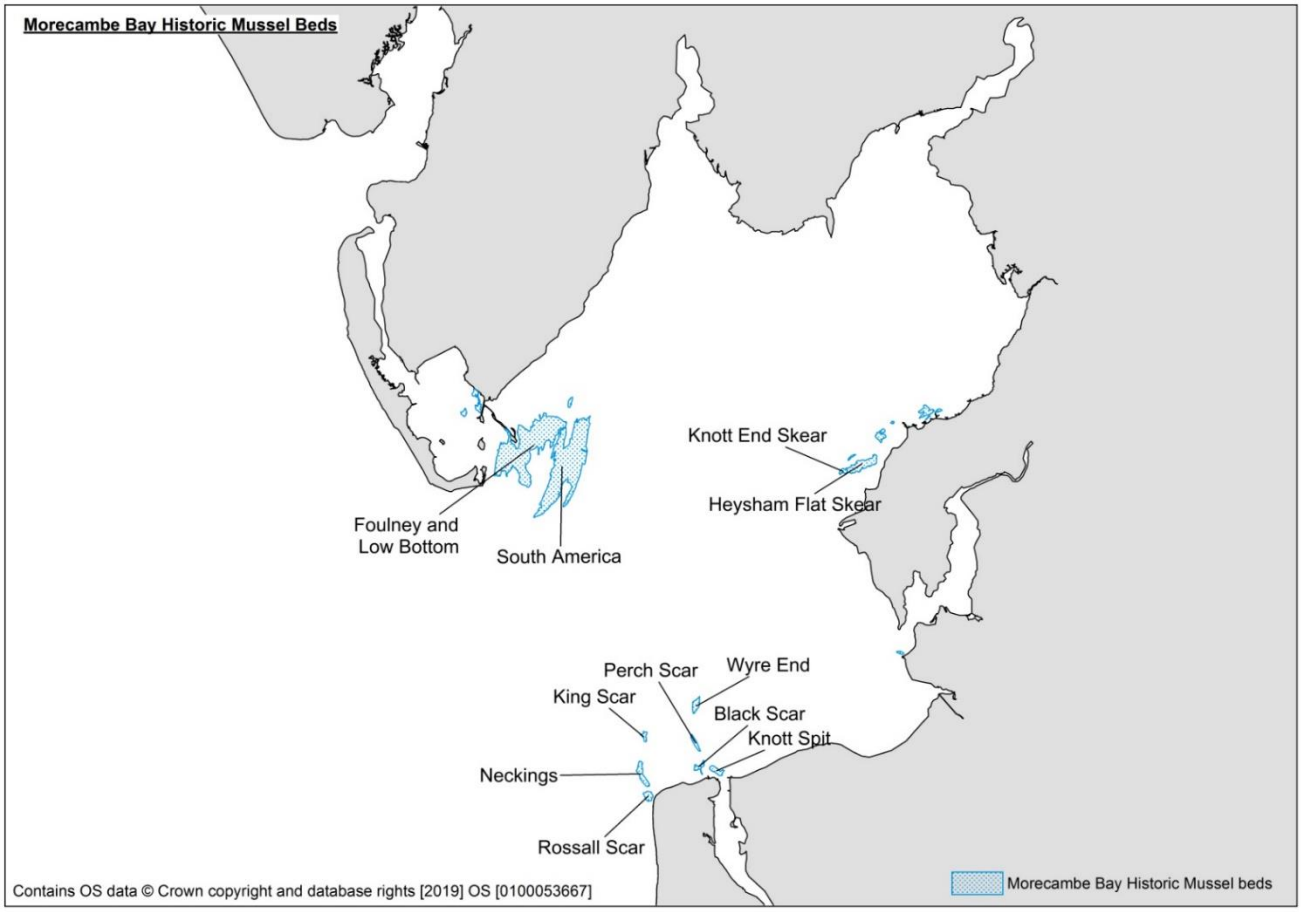
The last time the mussel present was between 2013 and 2015. The bed was inspected in early 2014 and the mussel was part grown suggesting a settlement in late 2013. A fishery commenced in April 2014 and continued to August 2015. The mussel bed was accessed and fished at low water on spring tides. There was a spat settlement in 2015, but by spring 2016 the mussel bed had completely sanded over. An annual inspection has been done since 2016 with no further records of mussel present until this year.

An inspection In March 2014 estimated 4692 tonnes of mussel on the bed prior to the fishery opening. The fishery commenced in April 2014 and ran to August 2015. Landing returns are a requirement of the permit. 279 tonnes of mussel was landed between June 2014 – December 2014, and 170 tonnes was landed between January 2015 and August 2015. Unfortunately, landings from April and May are not available. The mussel in the Duddon Estuary was reported to grow very quickly and therefore the biomass could have potentially been greater than the initial assessment. The relative low landings from fishery compared to the total estimated biomass of the mussel bed indicated that the effect of changing environmental conditions play a greater role than the fishing pressure in the presence and persistence of the mussel bed within the Duddon Estuary.

Although the biomass is lower this year, it is expected that the effort will be similar or less than the previous fishery, therefore landings will be of a similar amount. Only size mussel can be removed from the bed.

The majority of the other mussel beds in Morecambe Bay currently hold an abundant stock of mussels. The Duddon mussel bed is relatively small at 8.27ha when compared to other mussel beds, for example Foulney, which is 56.8ha. As seen in the last couple of years, this year there has seen a significant increase in the biomass of size mussel within Morecambe Bay, some of which has reached greater than 60mm in shell length.

A summary of the surveys and inspections carried out is in Table 3, showing the coverage and density of mussel. Table 4 provides an assessment of mussel that is likely to persist through to 2022 based on NWIFCA historical knowledge of the mussel beds gained from surveying the same area year on year.



Location of the historic mussel beds in Morecambe Bay

Table 3 – Summary of Dutch Wand surveys, industry reports and NWIFCA inspections in Morecambe Bay and Fleetwood

Date	Location	Skear	Survey Method	Tide Height (m)	Description
29/04/21	North Morecambe Bay	Foulney	Dutch Wand	0.6	6332 tonnes of size mussel and 1919 tonnes of undersize mussel over 56.8 hectares. There was a range of shell lengths across the bed, with the end of the mussel bed (Foulney Island) consisting of size mussel >45 mm predominantly and the middle section of the main bed consisting of mussel between 25-45mm mussels in length. There is evidence of multiple 2021 settlements.
30/04/21	North Morecambe Bay	Walney Channel	Dutch Wand	0.8	2671 tonnes of size mussel and 410 tonnes of undersize mussel over 18.67 hectares. There was a range of shell lengths across the bed from 10mm to 60mm, with size mussel being most abundant toward the edge of Walney Channel at low tide. The mussel along the channel edge was present in banks of mussel with bare cobble in between.

25/05/21	Knott End	Wyre End	Inspection	0.9	There was a dense 2021 settlement of spat across approximately two thirds of the main skear, with the northern edge being bare. Along the eastern edge of the skear the 2021 mussel settlement was mixed with areas of 15-40mm mussel.
28/05/21	Fleetwood	Rossall skear	Inspection	0.7	Rossall Scar has had a 2021 mussel settlement of approximately 40-50% coverage. The mussel was 5-10mm and was mixed in with some 25-35mm 2020 mussel. Some live *Sabellaria alveolata* was present and covered in seed.
28/05/21	Fleetwood	Neckings	Inspection	0.7	There was mussel (35-50mm) which had persisted through the winter on the scar with the majority being size. Some area had received a 2021 settlement but it was inconsistent with a dense band of 2021 seed.
28/05/21	Fleetwood	Kings Scar	Inspection	0.7	Kings Scar has had a 2021 mussel settlement, which varied in density across the skear. There were some small areas of *Sabellaria alveolata* on the northern edge of the mussel.
28/05/21	Fleetwood	Perch Scar	Inspection	0.7	Perch Scar has had a dense 2021 mussel settlement of approximately 90% coverage across the hard substrate. The settlement was less dense on the bed edges. The mussel was 8-10mm. There were occasional small areas of 30-45mm mussel mixed in with the seed along the channel edge. There was mussel mud present from 2020 in areas.
28/05/21	Fleetwood	Black Scar	Inspection	0.7	Black Scar has had a dense 2021 mussel settlement of approximately 80-90% coverage. The mussel was 2-4mm and had settled on the hard substrate. There were small areas of 2020 size mussel mixed along the channel edge.
25/06/21	North Morecambe Bay	South America	Inspection	1.1	Only the northern end of the bed was inspected due to access issues and timings. The mussel at this end appeared to be washing out in comparison to the previous visit, with larger patches of sand. The majority of mussel present at this end was 15-20mm in size and sitting loosely on top of sand.
26/06/21	Heysham	Heysham Flat	Inspection	1.1	Due to an extensive settlement of mussel seed which is putting down mussel mud, the coverage of *Sabellaria alveolata* visible has drastically reduced since the previous inspection. It is now confined to the Northern and Southern edges of the main skear. There was evidence of a 2021 mussel settlement which was constant across the majority of the main skear. The mussel had a dense coverage of 70-100% at a size of 10-20mm, with some smaller mussel of 8-10mm higher up the shore. There were some small patches of 20-30mm mussel mixed in with the settlement.

Table 4 – Assessment of the mussel which is likely to persist through to 2022

Location	Skear	
North Morecambe Bay	Foulney	Although the biomass on Foulney will fluctuate due to growth, natural mortality, wash out and new settlement, the bed is relatively stable and a consistent feature within Morecambe Bay that holds a significant biomass of mussel in a variety of size classes throughout the year.
	Walney Channel	Although the biomass on Walney Channel will fluctuate due to growth, natural mortality, wash out and new settlement the bed is relatively stable and a consistent feature within Morecambe Bay that holds a significant biomass of mussel in a variety of size classes throughout the year.
	South America	South America was open as a dredge mussel fishery and hand gathered seed mussel fishery and the majority of the mussel has been removed through fishing and natural mortality as expected on a seed mussel bed. Some mussel may persist through the winter.
	Falklands	There was a significant amount of seed mussel present over a large area, which had decreased in density and had evidence of dense starfish presence. It is probably that the mussel resource will decrease further during the winter months but some mussel may persist through the winter.
Heysham	Heysham Flat	The majority of the seed mussel on Heysham flat will wash away but some areas will persist of the winter months.
	Outer Skears	The outer skears have not been inspected by foot, but the areas look black from the Heysham Skear and by Heliflight, indicating the presence of mussel. Some of the mussel on the outer skears are likely to persist through the winter,
Knott End	Wyre End	The area receives a dense settlement of mussel each year with the majority washing away but areas of mussel persist through the winter.
	Knott End Spit	The area typically consist of patchy mussel that persist through the winter.
	Sea Centre	The area typically consist of patchy mussel that persist through the winter.
Fleetwood	Rossall skear	Receives a dense settlement of mussel each year with the majority, washing away but areas of mussel persist through the winter.
	Neckings	Receives a dense settlement of mussel each year with the majority, washing away but areas of mussel persist through the winter.
	Kings Scar	Receives a dense settlement of mussel each year with the majority, washing away but areas of mussel persist through the winter.
	Perch Scar	Perch Scar was open as a dredge mussel fishery and the majority of the mussel has been removed through fishing and natural mortality as expected on a seed mussel bed. Some mussel may persist through the winter.
	Black Scar	Receives a dense settlement of mussel each year with nearly 100% washing away each year.

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.

iv. Disturbance to Natterjack Toads during the breeding season and potential removal of non-target species (Natterjack Toads)

Natterjack toads are known to breed in the temporary pools and scraps at Sandscale haws. Sandscale is one of the largest natterjack toad populations in the UK. The breeding season is typically between April and July, and is dependent on the water temperature of the temporal pools and scraps. In spring, the toads mate and lay spawn, toadlets hatch and develop in the pools. By July, the toadlets are ready to disperse from the pools.

The access route at Sandscale haws is via a river stream that leads onto the upper shore. Since the last fishery in 2014/15, a large shingle bank has developed along the top of the shoreline, which has allowed a

large shallow pool of fresh water to develop on the shoreward side of the shingle bank. The toads use this pool during the breeding season. As the access route would involve transiting through the pools and the fishery has potential to occur during the breeding season, NWIFCA cannot be confident that there would be no disturbance or potential damage to the adult toads, spawn or toadlets.

To ensure the fishery remains HRA compliant further mitigation is required. There are likely access routes to the fishery, one at Sandscale Haws and one at Lowsy point. Access will be restricted from March until July inclusive to Lowsy point to ensure no damage to the Natterjack toads. The timings of the restriction may be amended as the breeding season is triggered by temperature, any amendments to the timing of the restrictions will be agreed with Natural England and the National Trust (site managers) before they are implemented. Consultation with permit holders on access will be undertaken.

NWIFCA is confident that the with the additional mitigation (seasonal restriction of the access route) disturbance to Natterjack Toads during the breeding season and potential removal of non-target species (Natterjack Toads) will have no risk of adverse effect on the Species, and therefore have no risk of adverse effect on integrity or conservation status of the site.

6.2 SPA and Ramsar Features

- SPA and Ramsar birds

6.2.1 Potential Impacts

During the 2020/2021 winter wetland bird survey carried out by the BTO a number of bird species in Morecambe Bay have had low population counts. Natural England in the 2021 /2022 Morecambe Bay Cockle Fishery HRA raised this as a concern. Due to the low count numbers, a more detailed assessment specific to the following species will be included for each of the pressures:

- Pink footed goose
- Knot
- Herring Gull
- Bar tailed godwit
- Grey plover

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

i) Removal of target species (mussels) for all shore feeding SPA features that feed on infaunal molluscs including Common eider, Eurasian oystercatcher, Red knot, Herring gull;

A summary table of the mussel stocks is in section 3 and section 6.1.2 (iii) above and gives detailed information about the amount of mussel that will be left on the other mussel beds, which will be available for bird food requirements. It is likely that the permit holders that typically fish Foulney will fish the Hard Acre, reducing the fishing effort on Foulney and increasing the area of undisturbed mussel bed available.

The mussel at Hard Acre is only accessible on spring tides, therefore the mussel will be available to Eider on tides when the mussel is not being fished. Therefore the birds will be able to dive down on to the mussel on neap tides and before and after the fishing on spring tides.

Further to the above, there are numerous small areas of mussel around Morecambe Bay that contain mussel year round that are not inspected or surveyed by NWIFCA, such as around Row Island, further up the Walney Channel, and areas around Morecambe and Heysham. This mussel will be available as a food resource and is likely to contain mussel in a range of size classes to suite all of the preferred prey size for each of the species of bird that utilise mussel.

Further to the mussel stock, many of the cockle beds, which are currently closed within Morecambe Bay, hold stock. Survey data from the summer for Flookburgh, Leven, Middleton, Warton, Aldingham and Newbiggin is below:

Cockle Bed	Bed Area (ha)	Estimated Biomass of Size Cockle (tonnes)	Estimated Biomass of Undersize Cockle (tonnes)
Aldingham	306	250-300	25-50

Newbiggin	999	1600-1700	200-300
Leven	1319	600-700	125-150
Flookburgh	2240	900-1000	175-225
Warton	190	105-110	15-25
Middleton	601	400-450	40-55
TOTAL	**4656**	**3855-2560**	**580-805**

Further to the stock on the closed cockle beds there will be cockle stock available on the open cockle bed. Pilling sands was opened in September 2021 and although open, not all cockle will be removed from the bed. The undersize will remain on the bed, which is estimated at 150-200 tonnes and there will also be size cockle at low densities which is not commercially viable.

NWIFCA is confident that the removal of target species (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 fishery, access route and over the sandbanks

The fishery at Hard Acre will likely start once the bivalve hygiene classification has been completed which at the earliest will be the 1st December; the fishery will be prosecuted throughout the winter and into the summer. Morecambe Bay is a vital over-wintering area for waders including mussel-predating species such as oystercatcher and knot. There is subsequently a risk of disturbance to these birds during fishing activity, which will be focussed on spring tides at low water.

Disturbance to high tide roosting birds is very unlikely due to the timing of the fishery – ie. permit holders will access the beach around three to four hours after high water and will have left the area around three hours before high water. Disturbance to birds utilising the top of the beach will be limited by only having two access routes on the bed. These access routes are habitually used by dog walkers, other members of the public who walk out over the sands and by other fishing activities such as bait digging. Birds are therefore likely to be habituated to a certain level of disturbance.

Disturbance will be minimised by vehicles only travelling to and from the fishery once each way per tide and via two access points. There are also large areas of the Bay that hold cockle and mussel of varying size ranges which will either not be open to fishing or will not be targeted by gatherers. These will provide alternative area for birds to remain undisturbed.

The number of byelaw 3 permit holders fishing Hard Acre is anticipated to be low with a maximum of 30 fishing. Although there are two access points the mussel bed is relatively small at 8.27ha. This small area will be where all of the fishing occurs. Previous fisheries have shown that birds follow the tide out and when ‘put up’ they typically settle again rapidly and continue to feed (pers. observation. IFCA officer during Leasowe cockle fishery and on Foulney Mussel bed).

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 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 and any displacement to be temporary and short lived.

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. On all bivalve fisheries, NWIFCA will carry out an assessment of risk in conjunction with Natural England during periods of cold weather and may close the fishery if cold weather is predicted to be below zero for more than 12 hours a day for 5 consecutive days and advice is that fishing poses a risk to SPA features.

Dunlin, 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. All access to the fishing grounds by hand-gatherers is by established access routes.

Oystercatcher, ringed plover, 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, with each wader species having a preferred prey source and size. Travel by hand-gatherers to and from the fishing area and fishing has the potential for disturbance. Visual disturbance to Oystercatcher, ringed plover, sanderling and turnstone will be minimal and any displacement temporary and short lived due to the following reasons:

- the fishing can only occur over low water and on large spring tides.
- the gatherers will only travel once to and from the fishing area per tide.
- the fishing area is small, 8.27ha concentration the effort in a confined area.
- plentiful mussel stock present on other beds and some additional cockle stocks as alternative feeding giving large areas of undisturbed feeding.
- there will be a limited number of hand-gatherers prosecuting the fishery with a maximum of 30 permit holders fishing over low water. While they fish Duddon mussel bed they will not be fishing other beds.

Bar-tailed godwit: The Lune Estuary is known to be a key area for bar-tailed godwit on passage as well as the overwintering population, with at times the majority of the individuals present within Morecambe Bay being within the Lune estuary, which is not in the vicinity of the fishery. Main locations for roosting are noted as Conder Estuary Marsh, Glasson Marsh and Middleton. Otherr important locations include West Plain, Potts Corner, Ocean Edge, Plover Scar and North and South Walney. It is unlikely that either of the access routes would disturb any of the roosts as they are far enough away not to be disturbed and access to and from the fishery will be 3 hours either side of low water.

Grey Plover: The main roost site includes the South End and Western Shore of Walney, and Middleton with Fluke Hall providing a refuge roost on high spring tides when other roost sites are inundated with water. There will be no disturbance to grey plover roosting sites are the fishery is not within the vicinity of the roosting sites.

Herring gull (Breeding): Herring gulls breed within Morecambe bay between May and July at colonies on Walney and Hodbarrow. The fishery is not within the vicinity of the breeding colonies.

Herring gull (as part of the waterbird assemblage): Herring gulls will be found within the site but there is no evidence they would favour the Duddon Estuary mussel bed over any of the mussel beds. The majority of permit holders who will fish Hard Acre would typically be the same permit holders who fish Foulney, therefore an increase in fishing in the Duddon will result in a decrease on Foulney mussel bed.

Knot: The roost sites within the Duddon Estuary are at Dunnerholme and Roanhead and are key high tide sites. Both of the access routes to the fishery are within the vicinity of Roanhead. Access to and from the fishery will be 3 hours either side of low water and therefore there will be no disturbance to high tide roosts.

Pink-footed goose: The Wyre Estuary contains the main concentration of the species and therefore there will be no interaction between the fishery and the species.

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.

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:

- 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 which is not part of the access route. Those resting on the sands may be minimally disturbed as the quad bikes pass once on the way to the fishery and once on the way back over a low number of tides.

There is therefore no reason to suggest that disturbance to birds would be damaging unless weather was exceptionally severe. NWIFCA will carry out an assessment of risk in conjunction with Natural England during periods of cold weather and may close the fishery if cold weather is predicted to be below zero for more than 12 hours a day for 5 consecutive days and advice is that fishing poses a risk to SPA features. If there is evidence of high levels of disturbance and a risk of adverse effect identified to the European Site then the NWIFCA Authority will close the bed.

NWIFCA is confident that the risk of visual disturbance is low and that the fishery will have no risk of adverse effect on the SPA features, which utilise cockle as a prey source and therefore have no risk of adverse effect on 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 minimum landing size;
b) Monitored landings through:

   i. Regular IFCO reporting of numbers fishing and estimates of quantities removed;

   ii. Landings returns from Byelaw 3 permit holders (required under NWIFCA byelaw 3);

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;

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 Stony Reef 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	Hand gathering removes the mussel from the surface of the seabed and there is potential for abrasion / disturbance of the substrate on the seabed from the use of rakes and vehicles.	Mussel is present on a layer of sediment protecting the underlying hard substrate.	None - current management measures sufficient with monitoring of the fishery
		Litter	Litter could pose potential threat to wildlife, especially birds through ingestion or entanglement	View little record issues with litter in recent intertidal bivalve fisheries.	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	The mussel bed is not a permanent feature of the Duddon and is reliant on the hard substrate and a stable the river channel. No *Sabellaria alveolata* recorded on inspection.	None - current management measures sufficient with monitoring of the fishery
Natterjack Toad	n/a	iv. Disturbance to Natterjack Toads during the breeding season and potential removal of non-target species (Natterjack Toads)	Access to the fishery through waterbody, which is utilised by the species during the breeding season.	Potential for damage	Restriction in access route during breeding season.

[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.

- *Somateria mollissima*; Common eider - *Haematopus ostralegus*: Eurasian oystercatcher - *Calidris canutus*; Red knot *Larus argentatus*; Herring gull	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	There are significant other areas available for feeding including closed cockle beds. Fishery potentially will divert effort from other intertidal bivalve fisheries within the district.	None - current management measures sufficient with monitoring of the fishery
- 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	Maintain or restore the population of each of the qualifying features, and, the distribution of the qualifying features within the site	Visual disturbance	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	Disturbance to high tide roosting birds is very unlikely due to the timing of the fishery Disturbance will be minimised by vehicles only travelling to and from the fishery once each way per tide and via a low number of access points. Cold weather closure in place	None - current management measures sufficient with monitoring of the fishery

7. Conclusion[9]

The 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 size mussel fishery at Hard Acre in the Duddon Estuary will not have an adverse effect on the integrity of the European Site.

8. In-combination assessment[14]

8.1 Other ongoing fisheries to be Included in the In-combination assessment:

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

Size cockle fishery – potential opening of Pilling sand and Newbiggin, HRA currently with Natural England.

8.1.2 In Combination Assessment

Low water intertidal fisheries:

The size mussel fishery at Foulney is open 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 of permit holders and small amounts of mussel removed. For example between January 2021 and September 2021 landings reports for the north Morecambe Bay mussel beds, which include Low Bottom, Foulney Ditch, Walney Channel, Foulney and Foulney Island, came to 304 tonnes. Biomass estimates made from Dutch Wand survey data in May came to 3081 tonnes for Walney Channel and 8251 tonnes for Foulney and Foulney Island, illustrating what a low level and sustainable fishery it is. These are the same gatherers who will prosecute the size mussel fishery in the Duddon Estuary therefore in relative terms of resource removed and disturbance risk there is no effect.

The cockle fishery effort at Pilling has dropped after the initial opening to 10-15 gathers per tide. The Duddon fishery may reduce the effort at the cockle fishery.

Considering cockle and size mussel fisheries in the Bay in combination, all the fisheries are relatively small and small scale and therefore the NWIFCA can conclude no adverse effect on the integrity of the European Site providing the management measures are implemented and enforced.

9. Summary of consultation with Natural England

Natural England have been involved in discussions around the management of the fishery and attended a site visit to discuss access with NWIFCA and the National Trust.

10. Integrity test

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

[9] If conclusion of adverse effect alone an in-combination assessment is not required.

Annex 1: Reference list

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Woolmer, A.P. 2011a*. Standard Operating Procedure for screening seed mussel beds for the Chinese mitten crab (Eriocheir sinensis)*. Report to Bangor Mussel Producers Association. pp 11.

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Woolmer, A.P. 2011c. *Chinese mitten crab (Eriocheir sinensis) Assessment Salisbury Bank Seed Mussel Bed (Dee Estuary): Timed Search Foot Survey*. Report to Bangor Mussel Producers Association. pp 8

Woombs, M. (1999). *Monitoring of Biotopes on Rocky Skears in Morecambe Bay, European Marine Site. A Report for English Nature.* W.A. Marine & Environment.

Annex 2: Natural England's consultation advice and further correspondents between NWIFCA and NE

Date: 23 November 2021
Our ref: 372786
Your ref: Duddon Estuary Mussel Fishery HRA

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VIA WEBSITE ONLY

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Dear Jon Haines

Duddon Estuary Mussel Fishery HRA
Thank you for your consultation dated 29 October 2021 The following constitutes Natural England's formal statutory response.

The Conservation of Habitats and Species Regulations 2017 (as amended) and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended)

We can confirm that the proposed works are located within Morecambe Bay SAC, Morecambe Bay & Duddon Estuary SPA and Duddon Estuary Ramsar.

General Comments

- Natural England notes that the HRA is sub-titled "NWIFCA-MB-EMS-UNDERSIZE MUSSEL MORECAMBE BAY HANDGATHERING AND DREDGE FISHERY", whereas the assessment considers only the removal of size mussel. Natural England advises that this is corrected before the HRA is finalised.
- "Lune Marine Conservation Zone" should be Wyre-Lune Marine Conservation Zone

Assessment of likely significant effect
Natural England's advice is that this proposal may contain (or require) measures intended to avoid or reduce the likely harmful effects on a European Site, which cannot be taken into account when determining whether or not a plan or project is likely to have a significant effect on a site and requires an appropriate assessment (noting the recent People Over Wind Ruling by the Court of Justice of the European Union).

For this reason, we advise that on the basis of the information supplied that the application may have a likely significant effect on these sites. The application requires an appropriate assessment in accordance with the Conservation of Habitats & Species Regulations 2017 (as amended).

Appropriate assessment
We note that your authority, as competent authority under the provisions of the Habitats Regulations, has undertaken an Appropriate Assessment of the proposal in accordance with Regulation 63 of the Regulations.

Natural England is a statutory consultee on the Appropriate Assessment stage of the Habitats Regulations Assessment process.

Your appropriate assessment concludes that your authority is able to ascertain that the proposal, with mitigation measures, will not result in adverse effects on the integrity of any of the sites in question. Having considered the assessment, and the measures proposed to mitigate for all identified adverse effects that could potentially occur as a result of the proposal, Natural England advises that we concur with the assessment conclusions, providing that all mitigation measures are appropriately secured in any permission given. We offer the following advice pursuant to ensuring the mitigation is effective and can be secured:

- Natural England advises that the seasonal closure of access from Sandscale Haws (6.1.2 iv) is in place from March to July inclusive.
- Natural England recognises the potential for variation in the timings of natterjack toad breeding and advises that any proposed amendments to the timing of the closure on this basis should be discussed and agreed with NE and the National Trust before they are implemented.
- Natural England requests clarification on the actions that will be taken in the following scenarios (compare with 6.2.2 (ii) in which it is stated that risk of adverse due to disturbance of birds effect would result in closure of the bed):
    - Breach of the seasonal access restriction
    - Evidence of damage or disturbance to natterjack toads or their supporting habitats
    - Number of fishers or expected landings from the fishery significantly exceeds the figures anticipated in this assessment.

Marine and Coastal Access Act 2009

The proposal, as set out in the information provided, is sited adjacent to a Marine Conservation Zone (MCZ). Wyre-Lune Estuary has been designated due to the presence of:

- Smelt *Osmerus eperlanus*

Having reviewed the evidence relating to the site we believe that the works will not hinder the conservation objectives of this site.

Wildlife and Countryside Act 1981 (as amended)

We can confirm that the proposed works are located within Duddon Estuary SSSI. Natural England advises that the proposal, if undertaken in strict accordance with the details submitted, is not likely to damage the interest features for which the site has been notified.

For any queries relating to the content of this letter please contact me using the details provided below.

Yours sincerely,

Laurence Browning
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NORTH WESTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

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Duddon Estuary Mussel Fishery (via email only) 2nd December 2021

Dear Laurence Browning,

Thank you for providing Natural England's formal statutory response to the Duddon Estuary Mussel Fishery HRA. Please find below how each of the comments have been addressed. The amended HRA has been attached.

General Comments

- The sub-title of the HRA and the name of the Wyre-Lune Marine Conservation Zone has been amended within the HRA.

Appropriate Assessment Comments

- Additional text has been added to section 6.1.2 iv to include that prior agreement would be sort before any amendment to the restriction of access from Sandscale Haws between March and July, with Natural England and National Trust.
- Clarification on the actions which will be taken by NWIFCA for each of the scenarios highlighted in Natural England's response are provided below. Some actions have been split into two, one for actions under current management and one for actions under the anticipated management. This is due to NWIFCA Byelaw 3 – Cockle and Mussel Hand Fishing Permit 2019 which has been submitted to the Secretary of State for confirmation. The new byelaw is a flexible permitting byelaw which will allow NWIFCA to manage fisheries more effectively.

  1. Breach of the seasonal access restriction

  Under existing management:
  If the access route at Sandscale Haws is used between March and July with no evidence of disturbance to the natterjack toads and / or supporting habitat, NWIFCA would warn all permit holders of the severity of the breach and should there be any further breaches, the fishery will be closed as it would be considered non-HRA compliant. The fishery would be closed under NWIFCA Bylaw 13a – Cockle and Mussels – Management of the Fishery. NWIFCA would consider the possibility of re-opening the fishery,

only under an authorisation against the closure. As part of the authorisation, conditions can be imposed by stating the access route that could be used for the fishery. This would make it an offence to use the access route at Sandscale Haws between March and July, and a breach of the condition would result in enforcement action.

Under anticipated management:
It is anticipated that NWIFCA Byelaw 3 – Cockle and Mussel Hand Fishing Permit 2019 will be in inforce by March. This byelaw is a flexible permitting byelaw allowing NWIFCA to prescribe an access route. This would make the use of the access route at Sandscale Haws between March and July an offence under the byelaw and therefore would lead to enforcement action.

2. Evidence of damage or disturbance to natterjack toads or their supporting habitats.

Under existing management:
If there is evidence of damage or disturbance to natterjack toads and / or their supporting habitats caused by NWIFCA byelaw 3 permit holders then the fishery would be non-HRA compliant and would have to be closed immediately under NWIFCA Bylaw 13a – Cockle and Mussels – Management of the Fishery. NWIFCA would consider the possibility of re-opening the fishery, only under an authorisation against the closure. As part of the authorisation, conditions can be imposed by stating the access route that could be used for the fishery. This would make it an offence to use the access route at Sandscale Haws between March and July, and a breach of the condition would result in enforcement action.

Under anticipated management:
It is anticipated that NWIFCA Byelaw 3 – Cockle and Mussel Hand Fishing Permit 2019 will be in inforce by March. This byelaw is a flexible permitting byelaw allowing NWIFCA to prescribe an access route. This would make the use of the access route at Sandscale Haws between March and July an offence under the byelaw and therefore would lead to enforcement action.

3. Number of fishers or expected landings from the fishery significantly exceeds the figures anticipated in this assessment.

NWIFCA will keep Natural England updated on the activity levels and should there be an increase in the number of fishers or expected landings form the fishery that is of concern it will trigger a review and reassessment of the HRA. Landings and attendance will be monitored by NWIFCA enforcement officers that will have a regular presence at the fishery, especially at the beginning of the fishery between March and July at Sandscale Haws when access is restricted, thus enabling NWIFCA to react quickly. The reassessment of the fishery will likely take place while the fishery remains active unless NWIFCA has specific concerns about stock and / or the designated conservation species.

Please let me know if you require any further clarification.

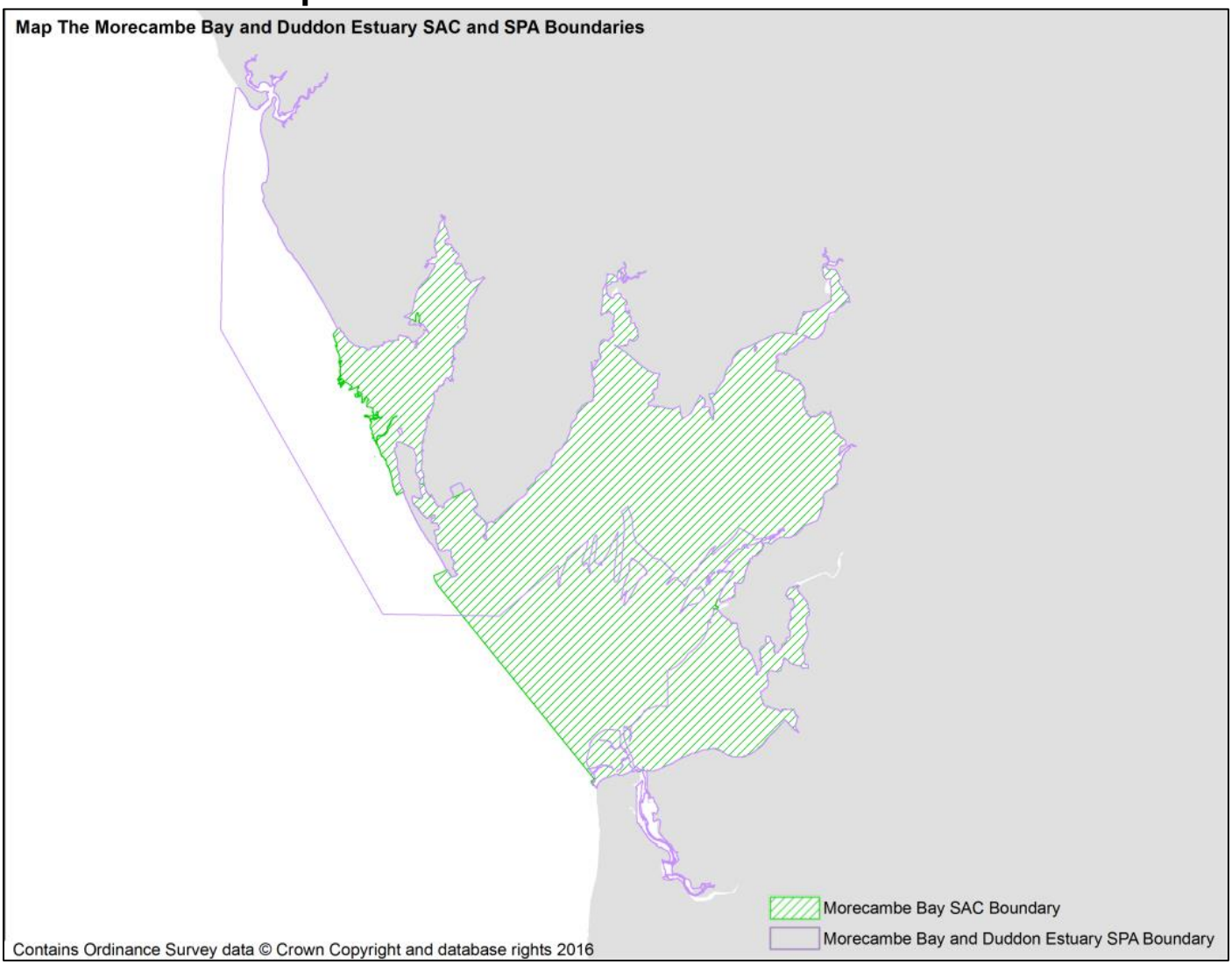
Yours Sincerely,

Jon Haines

NWIFCA Deputy Senior Scientist

Confirmation received via email on 3rd December from Natural England that they are content that the HRA is adequate and the measures outlined in the letter are sufficient to ensure the fishery remains within the envelope of the HRA.

Annex 3: Site Map



Annex 4: Broad Scale Habitat Map