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

NWIFCA-MB-EMS-SEED MUSSEL HEYSHAM FLAT

11th July 2017 Completed by: Mandy Knott

Site: Morecambe Bay and Duddon Estuary

European Marine Site:	Morecambe Bay and Duddon Estuary
	Morecambe Bay and Duddon Estuary pSPA
	UK11022 Duddon Estuary Ramsar
	UK9005031 Duddon Estuary Special Protection Area (SPA)
	UK11045 Morecambe Bay Ramsar
	UK 9005031 Morecambe Bay Special Protection Area (SPA)
European Designated Sites	UK0013027 Morecambe Bay Special Area of Conservation (SAC)

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) -

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,
- $\hfill\square$ 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.

Fishing activities assessed:

Gear type(s):

Hand-gathered – Seed Mussel (Mytilus edulis)

1. Introduction

1.1 Need for an HRA assessment

THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2010 (AS AMENDED)

The NWIFCA proposes to authorise a seed mussel hand-gathered fishery at Heysham Flat, in Morecambe Bay by derogating against minimum landing size for mussel. This proposal is classed as a plan or project. The area lies within a European designated site (also commonly referred to as Natura 2000 sites), and therefore has the potential to affect its interest features. European sites are afforded protection under the Conservation of Habitats and Species Regulations 2010, as amended (the 'Habitats Regulations'). The proposal site is within the Morecambe Bay and Duddon Estuary SPA and the Morecambe Bay Special Area of Conservation (SAC) which are European sites. The site is also listed as Morecambe Bay Ramsar site and also notified at a national level as 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

The NWIFCA proposes to authorise a limited hand-gathered fishery for seed mussel in the area shown on the map at Annex G from (dates to be confirmed but likely from end of July to end of December), under written authorisation against NWIFCA Byelaw 3 para. 6, minimum landing size.

The purpose of this site specific assessment document is to assess whether or not in the view of NWIFCA the fishing activity of hand-gathering seed mussel at the Heysham Flat, Morecambe Bay, has a likely significant effect on the qualifying features of the Morecambe Bay and Duddon Estuary European Site, and on the basis of this assessment whether or not it can be concluded that hand-gathering seed mussel at Heysham Flat, Morecambe Bay will not have an adverse effect on the integrity of this European 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)

3.1 The Morecambe Bay and Duddon 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 <u>NWIFCA Byelaw 6</u>, introduced in May 2014 (Annex A2).

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 underlain by soft substrates. There are two distinct mussel resources in Morecambe Bay which 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 embyssment to the underlying substrate and quickly build up large amounts of sediment and pseudo-faeces (mussel mud). Within a very short space of time these populations become unstable and vulnerable to erosion through weather and/or tide, or predation from vast numbers of starfish. 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. The harvested mussel is redeposited in another area 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 loughs, and the Menai Strait, the latter of which is an MSC accredited sustainable fishery. Consultation via the Bivalve Mollusc Working Group, a multi-sectoral group facilitated by NWIFCA, is carried out with the industry and conservation interests prior to authorisations to fish being issued by the Authority.

Size mussel beds also develop in areas such as Heysham Flat (lowest skears), the bottom end of Foulney and rarely in the Duddon Estuary (Hardacre). However, these are not regular in their occurrence, and mussel at Foulney becomes 'pearled' at around 42mm and therefore not of great value commercially. Fishing effort for size mussel is low with only hand-gathering permitted and generally prosecuted by a maximum of 40 Byelaw 3 permit holders.

A map showing the distribution of these skears around the bay is shown in Annex D.

4.2 Management of Seed Mussel Stock

Certain conditions need to occur for the NWIFCA to authorise fishing of seed mussel, namely that the stock has been assessed as in imminent likelihood of being lost to the fishery through natural causes, and subsequently that a high proportion of it will not grow through to reach size; and that conditions pertain to fishing being possible without risk of damage to the cobble and boulder substrate conservation features. These include:

- settlement in high abundance and density, and;
- fast growing and high deposits of pseudofaeces (mussel mud), and;
- the mussel mud becoming very soft and loose and at risk of being washed out, taking the mussel with it;
- or dense settlement being heavily predated on by thousands of starfish.

The fishery is highly variable depending on the vagaries of the stock, and the changes in the dynamic environment of Morecambe Bay and have to be assessed on a year by year basis. The fishery has been subject to Habitats Regulations Assessments for many years. The history of this fishery can be found in past HRAs.

4.3 Seed Mussel Hand-gathering

Mussel aquaculture is an important contributor to the local economies of areas such as North Wales and Northern Ireland. Seed mussel that would be lost to commercial fishing in one area can be harvested, relaid in more stable areas and grown on, as in rotation farming, until of a marketable size. While on lays in these areas it provides a resource for the local bird and fish populations. If it survives it can provide a 3:1 return.

4.4 Hand-gathering

Mussel has been gathered from the shoreline by hand for centuries. 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.

Commercial activity is heavily regulated under Byelaw and policed by NWIFCA Enforcement Officers. It is carried out by using quad bikes, or very rarely tractors, to access the mussel beds and hand raking mussel into net bags (Annex E). These are then washed to remove mud and the clean mussel put into sacks, which are transported away from the bed by quad, and often sold to buyers at the top of the beach.

4.5 Regulation of Seed Mussel Hand-gathering

NWIFCA regulates fisheries in its District through a suite of byelaws. Regulations relating specifically to seed mussel hand-gathering are reproduced as annexes (Annex A)and are:

NWIFCA Byelaw 3 - Permit to fish for cockles and mussels NWSFC Byelaw 12 - Restrictions on fishing for bivalve Molluscan shellfish (in the southern part of the District including Morecambe Bay) NWSFC Byelaw 13a - Cockles and mussels – management of the fishery NWSFC Byelaw 16 - Shellfishery – temporary closure

4.6 Biosecurity

Morecambe Bay is currently shellfish disease free and the Authority considers it a priority to maintain this status. The non-native species Japweed (*Sargassum muticum*) and Leathery Sea-squirt (*Styela clava*) have previously been recorded in the north of the Bay around the Walney Channel. 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 the areas from which they come, are regularly and thoroughly checked for invasive non-native invasive species (INNS). The NWIFCA science team will monitor this fishery for any INNS.

4.7 Protection of Sabellaria alveolata reef

Historically NWIFCA (and its predecessors NW&NWSFC and NWSFC) have issued written authorisation to harvest undersize mussel at Heysham Flat with a set of conditions, including a demarcation line and exclusion zone in order to protect the *Sabellaria alveolata* reef feature on the site.

The NWIFCA have also worked in partnership with Cumbria Wildlife Trust to produce a five year time series of survey reports on the Condition and Distribution of the worm community (http://www.nw-ifca.gov.uk/policies-and-reports/scientific-reports-publications-archive/) The NWIFCA Senior Scientist also carried out a research project on the relationship between the mussel and the *Sabellaria alveolata* in 2008-09 (Knott, 2009). All this research provides evidence on the ephemeral nature of the honeycomb worm reef, and that there is a constant competition occurring between the mussel which settles in mass density, smothering the reef with its mussel mud and effectively killing the worms. These in turn recruit to new areas on the skear which at that time are devoid of mussel. Interestingly it has been observed over a number of years that sandmason worm (*Lanice conchilega*) are party to this process as they appear first, presumably stabilising the highly mobile sand and providing a firmer surface on which the *Sabellaria alveolata* larvae can settle. However it is not long before the mussel recruitment begins again, settling in the tubes of the worms and the cycle starts over again.

Conservation Advice from Statutory Nature Conservation Advisors, Natural England, is that the main historical reef area on the skear(Annex C), should be included in a fishery exclusion zone in order to protect the underlying 3-D reef structures to aid in future recruitment. This advice has been incorporated into management in years when the reef has appeared highly degraded by the mussel (eg. 2016), when exclusion zones have been implemented and enforced. Areas of live *Sabellaria alveolata* have also been included to protect potential adults.

The NWIFCA approved a long-term vehicular and fishing exclusion zone with regular monitoring and annual review of the main area of honeycomb worm reef at Heysham Flat in order to protect the reef features and to ensure the fishery is Habitats Regulations compliant (NWIFCA – TSB. 2016).

4.8 Current Status of Mussel Stocks in Morecambe Bay

The NWIFCA has carried out stock assessments and inspections of cockle and other mussel beds around Morecambe Bay over the spring low tides of May / June 2017 to provide data to inform this assessment. All data and mapping is provided in Annex F.

There is an estimated minimum biomass of 3911 tonnes on the skears at Heysham Flat at 30th June 2017 – the majority of which is seed mussel likely to wash out in autumn storms.

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 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.

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

Qualifying	Sub-feature	Potential	Sensitivity	Potential for	Justification and evidence
Feature		pressure(s)		Likely	
				Effect?	
H1130. Estuaries	Intertidal stony reef	Abrasion/disturbance of the substrate on the	Sensitive	Yes	Due to the nature of the mussel and mussel mud, hand-raking skims the seed
H1170. Reefs	Intertidal biogenic reef: including mussel and Sabellaria	surface of the seabed			mussel from its underlying layers of mussel mud, ensuring no contact with the cobble and boulder reef beneath. However vehicle access and hand raking may cause abrasion and disturbance to the underlying 3-D Sabellaria alveolata reef feature.
	communities	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Sensitive	No	Due to the nature of the mussel and mussel mud, hand-raking skims the seed mussel from its underlying layers of mussel mud, ensuring no contact with the cobble and boulder reef, and no penetration below it.
		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 Northern Ireland and North Wales to ensure risk of translocation is minimal.
		Litter	Sensitive	Yes	Up to 40 hand-gatherers could deposit litter.
		Physical change (to another seabed type)	Sensitive	No	Due to the nature of the mussel and mussel mud, hand-raking skims the seed mussel from its underlying layers of mussel mud, ensuring no contact with the cobble and boulder reef, and no penetration below it. The cobble and boulder substrate remains intact.
		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	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.
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SPA Features including Ramsar	Supporting Habitats assessed	Potential Pressure	Sensitivity	Potential for Likely Significant	Justification and Evidence
Egret <i>A026 Egretta garzetta;</i> Little egret	above	Visual disturbance	Sensitive	Yes	Egret feed intertidally on fish.
Waders A130 Haematopus ostralegus; Eurasian oystercatcher		Removal of non-target species (Non-retained Bycatch)	Sensitive	No	There is little or no by-catch in this highly selective fishery.
A137 Charadrius hiaticula; Ringed plover A140 Pluvialis apricaria; European golden plover A141 Pluvialis squatarola; Grey plover		Removal of target species (mussels)	Some species sensitive, others screened out	Yes	Species sensitive to removal of mussels as a food resource: Common eider Eurasian oystercatcher Red knot Herring gull
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;		Visual disturbance	Sensitive	Yes	Waders frequent the intertidal beds, and are within vicinity of this fishery.
Ruddy turnstone Dabbling Ducks A048 Tadorna tadorna; Common shelduck		Removal of non-target species (Non-retained Bycatch)	Sensitive	No	There is little or no by-catch in this highly selective fishery.
A050 Anas Penelope, Wigeon A054 Anas acuta; Northern pintail		Removal of target species (mussels)	No	No	N/A – not a food resource of dabbling ducks.
		Visual disturbance	Sensitive	Yes	Dabbling ducks feed in near shore areas in the vicinity of this fishery.
Diving Birds A063 Somateria mollissima; Common eider (Breeding) A067 Bucenhala		Removal of non-target species (Non-retained Bycatch)	Sensitive	No	There is little or no by-catch in this highly selective fishery.
clangula; Goldeneye A069 Mergus serrator; Red-breasted merganser <i>Phalacrocorax</i> , carbo;		Removal of target species (mussels)	Sensitive	Yes for eider	Species sensitive to removal of mussels as a food resource: Eiders may utilising the bed as a food resource. The other diving ducks feed
Cormorant (Ramsar only) Podiceps cristatus; Great crested grebe (Ramsar only)		Visual disturbance	Sensitive	Yes for eider	Goldeneye and Great Crested Grebe mainly found on inshore or freshwater areas but not on this skear. Main aggregations occur during winter. Red Breasted Merganser and Cormorant sometimes found on intertidal areas but this skear not considered important area for them. Eiders may be utilising the bed for feeding or loafing nearby at the time of fishing or loafing nearby at the time of
Terns		Removal of non-target	Sensitive	No	disturbance. There is little or no by-catch in this highly
A191 Sterna sandvicensis; Sandwich tern (Breeding) A193 Sterna birundo:		species (Non-retained Bycatch)			selective fishery.
Common tern		Removal of target species	No	No	N/A - mussels not a food resource of

(Breeding) A195 Sterna albifrons;	(mussels)			terns.
Little tern (Breeding)	Visual disturbance	Sensitive	No	It is understood that the fishable area is not an important area of the SPA for these bird species.
Gulls A176 Larus melancephalus; Mediterranean gull A183 Larus fuscus;	Removal of non-target species (Non-retained Bycatch)	Sensitive	No	There is little or no by-catch in this highly selective fishery.
Lesser black-backed gull (Breeding) A184 <i>Larus argentatus</i> ; Herring gull (Breeding)	Removal of target species (mussels)	Sensitive	Yes	Herring gulls are known to utilise the mussel beds for feeding – observations suggest they are feeding on crabs and starfish but literature suggests they utilise the mussel food resource.
	Visual disturbance	Sensitive	Yes	Gulls may be feeding on the skear.

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Is the potential scale or magnitude of any effect	Alone	OR In-combination [°]
likely to be significant? ²	Yes	Yes
	Comments :	Comments :
		 These activities also occur at the site: Beam trawl (whitefish) Beam Trawl (Shrimp) Pots and Creels Light otter trawl Fixed nets (gill, trammel, entangling) Longlines Shrimp push-net Fyke and stakenet Hand working (size mussels) Dredge (seed mussels) In combination effects of seed mussel dredge fishery included. In combination effects of all other fishery activities will be assessed when all initial HRAs for a site are completed.
Have NE been consulted on this LSE test? If yes, what was NE's advice?	Yes – see belo	w

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 SAC Features / sub-features / SPA supporting habitats

Intertidal biogenic reef: including mussel and Sabellaria alveolata communities

6.1.1 Potential Impacts

- i) Abrasion/disturbance of the Sabellaria alveolata reef feature;
- ii) Litter;
- iii) Removal of target species from biogenic mussel bed communities

6.1.2 Exposure

- i) Abrasion/disturbance of the *Sabellaria alveolata* reef feature could damage the reef building capacity on the skear;
- ii) Litter could pose potential threat to wildlife, especially birds through ingestion or entanglement;
- iii) Removal of target species could change the invertebrate community composition of the skear.

6.2 SPA and Ramsar Features

SPA and Ramsar birds – little egret, Common eider, Eurasian oystercatcher, Red knot, Herring gull – other birds frequenting the intertidal area: Ringed plover, European golden plover, Grey plover, Lapwing, Sanderling, Dunlin, Black-tailed godwit, Bar-tailed godwit, Eurasian curlew, Common redshank, Ruddy turnstone, Common shelduck, Wigeon, Northern pintail, Gulls.

6.2.1 Exposure

- i) Removal of target species (mussels) as prey resource for Common eider, Eurasian oystercatcher, Red knot, Herring gull;
- ii) Visual disturbance little egret, Common eider, Eurasian oystercatcher, Red knot, Herring gull other birds frequenting the intertidal area: Ringed plover, European golden plover, Grey plover, Lapwing, Sanderling, Dunlin, Black-tailed godwit, Bar-tailed godwit, Eurasian curlew, Common redshank, Ruddy turnstone, Common shelduck, Wigeon, Northern pintail, Gulls.

6.2.3 Potential Impacts – SPA Features

i) Removal of target species (mussels)

Mussels form part of an important prey resource for eiders, oystercatchers and knot. Gulls are opportunistic scavengers and may utilise any mussel resource. If bird populations are to be maintained in healthy condition, sufficient shellfish to meet their demands must remain for them.

If fisheries remove essential prey and there is a lack of food, the impacts on these species will vary at different times of year. For example, prey resource requirements will be 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 arriving from summer breeding grounds needing to get into condition to survive the winter when energy requirements are higher. Over-wintering waders require to put on weight and get into best condition in spring prior to migrations north 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.

ii) Visual disturbance

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

7 EXPOSURE TO PRESSURES

SAC Features

7.1.1 Abrasion/disturbance of the Sabellaria alveolata reef feature;

The adult sabellarid polychaete *Sabellaria alveolata* lives inside self-constructed tubes made from sand grains, which are cemented together with an organic cement (Wilson. 1968b. Gruet. 1984. Porras et al. 1996). The species is highly gregarious, and juxtaposed tubes are packed in tightly formed masses with a distinctive honeycomb-like appearance to create biogenic reefs in the form of hummocks, sheets or massive formations (Dubois et al. 2005. Dubois et al. 2007. Gruet. 1986. UKBAP. 2008. Wilson. 1971). As such, *Sabellaria alveolata* is classed as an ecosystem engineer (Dubois et al. 2006b) and may be associated with greater species richness and biodiversity (Mettam et al. 1994. Dubois et al. 2002), although some researchers maintain the level of biodiversity varies with the condition of the reef (Porras et al. 1996). Reefs are found on the western Mediterranean and the eastern Atlantic coasts (particularly the Bay of Mont Saint-Michel, France), the English Channel and the Scottish coast of the Solway Firth (Gruet. 1986. Wilson. 1971. UKBAP 2008). The British Isles represents the most northern extent of its range.

An inter-tidal active suspension-feeding species, (Dubois et al. 2006a) large *Sabellaria alveolata* reefs are found mainly on the bottom third of the shore (Dubois et al. 2006b), although they may extend to mean high water neaps or into shallow subtidal areas. Low salinity areas seem to be avoided (UKBAP. 2008). The worms require a hard substrate, from pebbles to bedrock, on which to attach, and a good supply of suspended sediment for tube formation, and particulate organic matter (POM) for feeding. The cobble skear at Heysham Flat and the hydrodynamic regime of Morecambe Bay provide ideal conditions.

Wilson (1971) reported that the worms have few natural enemies, and that most damage and destruction to colonies is caused by wave action. However, although they can survive burial for weeks or even months, they are killed by prolonged smothering by sand or mussels. With the tube openings covered they are unable to extend the cilia for particle capture and feeding, or sand-grain capture for tube building (Gruet. 1984). Spawning may occur biannually and mainly in summer (Gruet. 1986) – at Duckpool, Cornwall July was the major spawning time (Wilson. 1974). Larval recruitment is stochastic. The pelagic planktonic larvae

require the presence of adult cement for settlement to occur, although they are able to postpone metamorphosis and remain suspended in the water column for weeks until favourable conditions return (Wilson. 1968a). It has been reported that settlement may occur as late as November, December or even January (Wilson. 1974). Recovery of a reef depends on new settlement, and settlement will be adversely affected if the adults are covered (Dubois et al. 2006a). However, Wilson (1974) does assert that the presence of a single worm could lead to the establishment or rebuilding of a colony.

Gruet"s (1986) work in Mont Saint-Michel provided evidence of the cyclical nature of the morphology of the reef, in that case covering a ten-year cycle. Five stages were identified: primary settlement, growth, secondary settlement, a platform phase and a destruction phase, which provides dead eroded reef on which new settlement can occur.

Cook (2008) and Woombs (1999) both comment on the appearance of the *Sabellaria alveolata* reef here as a fairly recent occurrence (since 1995), possibly due to the erection of the new sea defences at Morecambe and consequent hydrodynamic changes. Prior to this the area was classed as a mature mussel bed. It is clear that *Mytilus edulis* and *Sabellaria alveolata* co-exist on Heysham Flat Skear. Whether they are in direct competition for space or food, or whether there is a degree of mutualism is not clear.

Trample Damage by Mussel Fishermen:

The preceding data suggests that colonies of *Sabellaria alveolata* will be inundated by mussel mud during a dense mussel recruitment season and therefore allowing hand-harvesting of mussels may not further damage the worms. It is useful to look at research already conducted on anthropomorphic pressures on *Sabellaria alveolata* reefs. In particular CCW's (Countryside Council for Wales) report argues that any access to fishing grounds across intertidal benthic habitats must be managed to minimise impacts (Tyler-Walters & Arnold. 2008). They report that *Sabellaria alveolata* reefs have intermediate intolerance to trampling, where as long as the trampling is not continuous and non-vehicular, they are able to repair and stabilise relatively quickly. Continuous trampling tends to form gaps, which increase through wave action, becoming non-repairable.

Four-wheel ATVs were found to create a net land impact of ca 400 times the relative impact of a walker, as might be expected. Add to that the weight of bags of mussels loaded on to an ATV and it becomes sensible when managing the fishery to restrict access on to any areas containing *Sabellaria alveolata* to foot traffic only to minimise the impact.

NWIFCA Management of the Fishery to Protect the Reef:

The NWIFCA has undertaken HRAs of the seed mussel fishery for many years, and in order to ensure the fishery is Habitats Regulations compliant an exclusion zone has been implemented and closely enforced to keep fishing activity, including access, off the main reef area (as mapped from historic data and shown in Annex C).

The heavy inundation and smothering of the reef by dense mussel and mussel mud in recent years has seen the reef become highly degraded and in poor condition. Annual recruitment of worms in late winter / early spring has occurred on exposed old reef, but growth and development has soon been thwarted by subsequent settlement of young mussel. Numerous inspections are made by NWIFCA scientists each year, and provide evidence of the succession occurring on the skear, whereby i) as the channel in the north shifts, areas of sand are colonised and apparently stabilised by sandmason (*Lanice conchilega*); ii) *Sabellaria alveolata* subsequently settles and grows rapidly with healthy looking hummock formations; iii) mussel moves on to the forms, whether as newly settled individuals or juvenile mussel moving from other areas on the skear, and iv) the worms become overcome by them.

In 2016, Natural England provided clear Conservation Advice (Annex G) for the honeycomb worm reef, even in degraded state, that the underlying 3-D reef should be protected. An exclusion zone was implemented for the fishery even though the reef appeared to be almost destroyed. The same approach was intended for 2017. However an inspection of the skear on 24th May provided clear evidence that across the majority of the reef there were no underlying reef structures remaining. Mussel was settled on

bare cobble – possibly for the first time in over a decade – and is growing on rapidly, putting down its mussel mud.

Natural England representatives inspected the site on 12th June and confirmed that other than around the fringes of the skear where some remains of old worm mounds were still present, there was little or no remaining reef. Their advice for 2017 has consequently changed (Annex G), and the exclusion zone changed. Harvesting of seed mussel will be approved on much of the skear with the fringes being protected. This will be physically marked out on the skear as well as represented in maps within the authorisation conditions provided to permitted hand-gatherers.

A Byelaw 13a closure is also proposed to protect the fringes of the reef from size mussel gathering.

By way of interest, there is are healthy areas of *Sabellaria alveolata* on the skears at Fleetwood particularly Rossall and Neckings scars – and it might be reasonable to assume that this may supply larvae to rejuvenate the Heysham reef in future years.

Consequently the NWIFCA is confident that the harvesting of the seed mussels by hand at Heysham Flat will have no risk to the conservation feature, and therefore no risk of adverse effect on the integrity or conservation status of the SAC or SPA features of Morecambe Bay and the Duddon Estuary.

7.1.2 Litter

The NWIFCA has years of experience of policing this fishery, being present on the skear when fishing is being conducted and is confident that litter levels are very low. Fishing occurs around four hours around low water, and the fishery is within 1.5km from the shore, and the town of Morecambe with its facilities and amenities. The tonning up area and buyers are positioned either at the top of the beach or in the Battery car park. The most likely form of litter, if any, is discarded and full mussel sacks which fall off quads and trailers. These are often recovered on the following tide, or if observed by NWIFCA officers cut open, the mussels returned to the beach, and the net bags removed. The fact IFCOs are present during most tides of fishing means that litter levels are monitored and any potential issues highlighted and dealt with.

Consequently the NWIFCA is confident that litter from the harvesting of the seed mussels by hand at Heysham Flat will have no risk of adverse effect on the integrity or conservation status of the SAC or SPA features of Morecambe Bay and the Duddon Estuary.

7.1.3 Removal of target species from biogenic mussel bed communities

The proposal is to harvest seed mussels by hand from a bed which has been described as ephemeral (Dare. 1976) that is habitually subject to extensive mussel settlement that is unstable, lying on soft mud and which recurrently gets scoured out by autumn / winter storms. This description has been borne out through a time series of survey work (MAFF and NW&NWSFC Surveys. 1968 – 2001. NWIFCA 2011 - 16). Experience suggests that if left un-fished, these mussels may be subject to rapid loss through erosion or predation.

The site inspections and surveys in May and June showed the main skear, Knott End skear and the bottom skears are all carpeted in dense, fast growing mussel putting down mud in the habitual way. Once this becomes soft and loose that there is a short window of opportunity for the resource to be harvested and used for relaying in other areas or subject to more or less total loss.

NWIFCA Officers have records of the spatfall, and survival of mussels in Morecambe Bay over many years. Mortality of first-year mussels is usually very high. If they are not harvested when small in many years virtually the entire stock of mussels has been lost in the autumn and winter storms of their first year, due to erosion of the soft mussel mud put down by the mussels. Even when a proportion of the stock has survived this winter period, such as 2014-15 it is rare for it to grow through to size as the following year's spatfall and resulting mussel mud smoothers it.

Therefore the physical removal by harvesting will not result in a significant difference in remaining stock than natural processes.

Consequently the NWIFCA is confident that the harvesting of the seed mussels by hand from Heysham Flat skear will have no greater effect on the mussel communities on intertidal boulder and cobble skears than natural processes, and will have no risk of adverse effect on the integrity or conservation status of the SAC or SPA features of Morecambe Bay and the Duddon Estuary.

SPA Features

NB. Assessment of Mussel Biomass

Although the NWIFCA utilises survey methodologies such as the 'Dutch Wand' methodology to assess mussel biomass, enormous questions remain over the validity of such data for more than a few days after the survey time in an area such as Morecambe Bay, and its application to management decisions over mussel resource.

Mussel can and does recruit to skears in the Bay in extraordinarily dense aggregations, and depending on tidal height and period of inundation, as well as sea temperature and chlorophyll levels, can put on growth exceedingly fast, thus increasing biomass equally rapidly. On the contrary, the highly dynamic environment and the process of mussel putting down deep levels of soft mud in pseudofaeces, can also lead to rapid erosion, scour and wash out so that biomass can be diminished overnight. Dense recruitment also results in high levels of competition for food and space, and the act of fishing can have a 'thinning' effect which can actually lead to an increase in biomass.

Cockles stocks in the Bay have also been surveyed and data provided in Annex F. Cockles are an important resource for oystercatchers, but in light of the fact cockle stocks are highly naturally variable, and there was a period from 2008 – 2015 with very few cockles present, it is more probable that oystercatchers are more reliant on mussels and other food sources than cockles. However, the fact there are stocks present in summer 2017 indicates an additional provision.

The NWIFCA is working with Natural England, the RSPB and Cumbria Wildlife Trust to agree a pragmatic approach to ensuring sufficient bird food resource is available in the Bay at all times of year for SPA species. The NWIFCA is currently maintaining up-to-date 'stock status' records of all cockle and mussel beds within the Bay (and the rest of the NWIFCA District) to provide a readily available overview of abundance of the resource. Should partner agencies or NWIFCA scientists trigger concern over lack of resource, a change in management will also be triggered.

7.2.1 Removal of target species (mussels) for Common eider, Eurasian Oystercatcher, Red Knot and Herring Gull

Oystercatcher and Knot

a) Natural England have provided the following on the importance of the EMS to oystercatcher:

'The non-breeding population of Eurasian oystercatchers (hereafter oystercatchers) in Great Britain is estimated to be 320,000 individuals; the 820,000 biogeographic estimate relates to the *ostralegus* population. Oystercatchers are widespread but slowly declining nationally since the 1990s.

WeBS data show the pSPA held a five year peak mean value of 55,888 individuals (2009/10 - 2013/14), representing 6.8% of the biogeographic population. Oystercatchers were part of the original citation for Morecambe Bay SPA, and the site ranks consistently first for oystercatcher abundance in the UK. However, the Duddon Estuary also supports several thousand individuals, meaning the combined pSPA holds a substantial proportion of both British (17.5%) and biogeographic (6.8%) totals.

Condition Assessment: Not Assessed

No WeBS alert. The number of oystercatcher overwintering in Morecambe Bay has remained stable at the site, NW and GB levels but the increasing proportion of regional numbers supported by this site suggests that the environmental conditions remain relatively favourable and site is becoming increasingly important on a regional scale'.

b) Natural England have provided the following on the importance of the EMS to knot:

'The non-breeding population of knots in Great Britain is estimated to be 320,000 individuals; the 450,000 biogeographic estimate relates to the *islandica* race thought to winter in Britain. Knots are widely distributed throughout Britain in the winter and numbers have been largely stable over the past 30 years. Morecambe Bay consistently ranks amongst the sites holding the greatest number of knots in the UK.

WeBS data show the pSPA held a five year peak mean value of 32,739 individuals (2009/10 - 2013/14), representing 7.3% of the biogeographic population. Knots were part of the original citations for Morecambe Bay SPA and Duddon Estuary SPA, reflecting the importance of both areas; the former holds larger numbers than the latter, which has undergone some recent declines in numbers.

This species (*islandica* subspecies) migrates from breeding grounds in north eastern Canada, Greenland and Iceland to winter on this SPA and other sites within the UK and Europe. Migration starts in August with peak numbers recorded in September and October. The birds return to their breeding grounds from March with very few individuals remaining into May.

Condition Assessment: Not Assessed

Medium alert, medium term but treat with caution. Numbers overwintering in Morecambe Bay have fluctuated making interpretation of the underlying trend difficult. Numbers at NW and GB levels have remained relatively stable long term'.

Young mussels are a key food resource for waders such as oystercatchers and knot in particular. However, the mussels that will be harvested are not attached to the hard substrate, and are likely to be lost through erosion. Observations over many years indicate that this process will accelerate through the autumn period, and that the harvestable stock may not persist, and will not remain available as prey for birds.

The current stock on the Heysham Flat bed have been assessed as ephemeral and subject to loss by natural processes if left un-fished. Observations over the last few years have substantiated that mussels remaining from unfished areas can sometimes overwinter but have then been smothered by a new recruitment and its associated unstable mussel mud before reaching size.

Assessments of all the cockle and mussel beds within Morecambe Bay and the Duddon Estuary have been made to inform this HRA, and the likely impacts on bird prey resource. Details are given in Annex F. Additional undisturbed mussel resource which will not be fished is situated on the two adjacent skears – Knott End skear (~5ha) and a smaller skear of around 1.27ha, which are inundated with seed mussel. There is also a substantial volume on Foulney, with varying size classes, and a minimum estimated biomass of 4611 tonnes. This bed is open as a size mussel fishery to hand-gatherers at the present time, but is unlikely to see much activity as much of the size mussel is 'pearled' as is usual on this skear one it reaches around 42mm, and the majority of the mussel on the bed is undersize.

Other undisturbed areas with lesser amounts are situated along the foreshore between Foulney Ditch and at Low Bottom in North Morecambe Bay, with estimated biomass of 3888 tonnes and 2935 tonnes respectively. There is also limited but not insignificant resource at Kings Scar and Black Scar, Fleetwood.

Hand-gathering is not 100% efficient and may even serve to thin out the mussel on the rest of that skear, improve the bed's stability and allow it to grow on. The level of activity predicted (based on recent years fishing) indicates that around 40 hand-gatherers maximum will prosecute the fishery and that only a

proportion of this mussel will actually be fished (expected maximum 1000 tonnes from 2014, 2015 and 2016 returns, 503, 684 and 268 respectively), therefore leaving a large resource for birds.

Consequently the NWIFCA is confident that the harvesting of the seed mussels by hand from Heysham Flat skear will not affect the feeding of oystercatchers and knot as alternative areas holding mussel within their size preference are available and are not being fished. There will therefore be no risk of adverse effect on the integrity or conservation status of the SAC or SPA features of Morecambe Bay and the Duddon Estuary.

Herring Gull

Natural England have provided the following on the importance of the EMS to herring gull:

'The breeding population of European herring gulls in Great Britain is estimated to be 130,000 pair. This estimate relates to the race *argenteus*, which all breeding birds in GB are considered to belong to. Herring gulls have declined markedly in recent years (-30% in the UK between 2000 and 2013), and are now on the 'red list' of Birds of Conservation Concern because of longer-term declines.

Herring gulls were a qualifying feature of the original Morecambe Bay SPA, holding 10,000 pairs according to the citation (1991). This represented 7% of the GB population at time of classification, though the proportion of the biogeographic population is not given (retrospectively this has been calculated as 1.0%). It was not a feature of the Duddon Estuary SPA, as only very small numbers of pairs breed at Hodbarrow. Latest data (2011-2015) show the five year peak mean to have declined to 1,588 pairs (0.5% biogeographic population of 340,000 pairs); this value includes birds nesting at South Walney (within Morecambe Bay SPA) and Hodbarrow (within Duddon Estuary SPA).

The original baseline citation (1991) value of 10,000 pairs has been retained for the new pSPA.

Condition assessment: Unfavourable or unfavourable recovering

Herring gulls are omnivorous, feeding on fish (marine and freshwater), crabs, cockles and mussels in tidal flats but also on terrestrial prey items such as earthworms and beetles, and garbage. They are opportunists and take advantage of any available food resource. When seen on mussel beds it is regularly observed that they are feeding on starfish, which in turn are predating on the mussel.

Mussel prey:

The mussels that will be harvested are not attached to the hard substrate, and are likely to be lost through erosion. Observations over many years indicate that this process will accelerate through the autumn period, and that the harvestable stock may not persist, and will not remain available as prey for birds.

The current stock on the Heysham Flat bed have been assessed as ephemeral and subject to loss by natural processes if left un-fished. Observations over the last few years have substantiated that mussels remaining from unfished areas can sometimes overwinter but have then been smothered by a new recruitment and its associated unstable mussel mud before reaching size.

Assessments of all the cockle and mussel beds within Morecambe Bay and the Duddon Estuary have been made to inform this HRA, and the likely impacts on bird prey resource. Details are given in Annex F. Additional undisturbed mussel resource which will not be fished is situated on the two adjacent skears – Knott End skear (~5ha) and a smaller skear of around 1.27ha, which are inundated with seed mussel. There is also a substantial volume on Foulney, with varying size classes, and a minimum estimated biomass of 4611 tonnes. This bed is open as a size mussel fishery to hand-gatherers at the present time, but is unlikely to see much activity as much of the size mussel is 'pearled' as is usual on this skear one it reaches around 42mm, and the majority of the mussel on the bed is undersize.

Other undisturbed areas with lesser amounts are situated along the foreshore between Foulney Ditch and at Low Bottom in North Morecambe Bay, with estimated biomass of 3888 tonnes and 2935 tonnes respectively. There is also limited but not insignificant resource at Kings Scar and Black Scar, Fleetwood.

Hand-gathering is not 100% efficient and may even serve to thin out the mussel on the rest of that skear, improve the bed's stability and allow it to grow on. The level of activity predicted (based on recent years fishing) indicates that around 40 hand-gatherers maximum will prosecute the fishery and that only a proportion of this mussel will actually be fished (expected maximum 1000 tonnes from 2014, 2015 and 2016 returns, 503, 684 and 268 respectively), therefore leaving a resource for birds.

Consequently the NWIFCA is confident that the harvesting of the seed mussels by hand from Heysham Flat skear will not affect the feeding of herring gull as alternative areas holding mussel within their size preference are available and are not being fished. There will therefore be no risk of adverse effect on the integrity or conservation status of the SAC or SPA features of Morecambe Bay and the Duddon Estuary.

<u>Eiders</u>

Natural England have provided the following on the importance of the EMS to eiders:

'Eider (breeding) are considered to be non-migratory and hence not covered by the Birds Directive and SPAs. Breeding eider are a designated feature of South Walney & Piel Channel Flats SSSI (baseline population 950 prs).

Eider (non-breeding) are a main component of the SPA qualifying waterbird assemblage feature, present in numbers exceeding 1% of the GB total and exceeding 2,000 individuals. Eider are a Ramsar qualifying feature.

When the site was first classified the site supported nationally important numbers of this species (4,800 individuals: 1984/5 - 1988/9). It regularly supports over 6,000 (>8% of UK non-breeding population with 12,000 recorded in the 1990s. An aerial survey of eider by APEM commissioned by Natural England estimated a population size of 6,389 in March 2011. Current 5yr mean peak (2009/10 - 2013/14) is 5886 birds.

Condition Assessment: Not Assessed

Eiders remained relatively stable in Morecambe Bay throughout the 1990s but have declined sharply since 2000. Morecambe Bay supports a substantial proportion of the regional total of eiders, but this has fallen from over 95% in the mid-1990s to less than 40% in the most recent winters. The regional decline in eider numbers can therefore be largely traced back to the decline in the SPA. In contrast, at the national scale, numbers have remained relatively stable throughout this period, which suggests that the decline has been driven by site-specific pressures. These issues could be due to a number of different factors.

The wintering population currently exceeds the SPA baseline but Morecambe Bay has shown greater decline from the post-designation increase regionally and nationally in wintering eider population than at the national scale, suggesting site specific pressures'.

There have been concerns about the eider population and its breeding success in Morecambe Bay, and in particular those nesting on the nearby site at Walney Island, although investigations into reasons for lack of breeding success are inconclusive. There are many potential contributory factors suggested for this decline including and significantly predation by land mammals. However, one factor identified by Natural England may be the removal of seed mussel, and this factor has been fully considered in undertaking this Appropriate Assessment.

From the literature, mussels have been shown to constitute between 68% and 80% of eider diets depending upon mussel spatfall (Hilgerloh 1997). Seed mussels may be a potential food resource for eider, although there are conflicting opinions on the importance of their size preference. Goss-Custard *et al.* (2004) report that eiders mainly eat larger size mussels; while elsewhere eiders have been shown to preferentially target mussels in the small to intermediate size (1-40mm, generally selecting for sizes under 30mm) ranges (Bustnes 1998; Hamilton et al. 1999) and at shallow depths (Larsen & Guillemette 2000).

Both these factors would increase energetic profitability with a reduced shell mass to flesh ratio and a reduced amount of energy lost to diving activity.

There is also evidence to support the claim that fishing thins the mussel out and can actually increase biomass until such time as natural processes remove it (Frenchette et al. 1992. Gascoigne et al. 2007. Cook. 2008).

The current stock on the Heysham Flat bed have been assessed as ephemeral and subject to loss by natural processes if left un-fished. Observations over the last few years have substantiated that mussels remaining from unfished areas can sometimes overwinter but have then been smothered by a new recruitment and its associated unstable mussel mud before reaching size.

Assessments of all the cockle and mussel beds within Morecambe Bay and the Duddon Estuary have been made to inform this HRA, and the likely impacts on bird prey resource. Details are given in Annex F. Additional undisturbed mussel resource which will not be fished is situated on the two adjacent skears – Knott End skear (~5ha) and a smaller skear of around 1.27ha, which are inundated with seed mussel. There is also a substantial volume on Foulney, with varying size classes, and a minimum estimated biomass of 4611 tonnes. This bed is open as a size mussel fishery to hand-gatherers at the present time, but is unlikely to see much activity as much of the size mussel is 'pearled' as is usual on this skear one it reaches around 42mm, and the majority of the mussel on the bed is undersize.

Other undisturbed areas with lesser amounts are situated along the foreshore between Foulney Ditch and at Low Bottom in North Morecambe Bay, with estimated biomass of 3888 tonnes and 2935 tonnes respectively. There is also limited but not insignificant resource at Kings Scar and Black Scar, Fleetwood.

Hand-gathering is not 100% efficient and may even serve to thin out the mussel on the rest of that skear, improve the bed's stability and allow it to grow on. The level of activity predicted (based on recent years fishing) indicates that around 40 hand-gatherers maximum will prosecute the fishery and that only a proportion of this mussel will actually be fished (expected maximum 1000 tonnes from 2014, 2015 and 2016 returns, 503, 684 and 268 respectively), therefore leaving a resource for birds.

Consequently the NWIFCA is confident that the harvesting of the seed mussels by hand from Heysham Flat skear will not affect the feeding of eiders as alternative areas holding mussel within their size preference are available and are not being fished. There will therefore be no risk of adverse effect on the integrity or conservation status of the SAC or SPA features of Morecambe Bay and the Duddon Estuary.

<u>Additional Note</u>: despite the excellent work carried out during the Eider Risk Review many questions still remain around the eider population of Morecambe Bay, reasons for the apparent decline in its breeding success, predation pressures, feeding preferences and relation to the mussel fisheries. Shellfish harvesting is an important economic activity in the Bay and many of these questions have been circulating around the fisheries for many years. The NWIFCA fully supports the proposals for a full-time 3 year PhD studentship as a cost-effective way to attaining a more in-depth understanding of these issues and ideally to provide some conclusive research so that a consensus can be reached. This would facilitate a faster, more efficient HRA for each year's fishery.

7.2.2 Visual Disturbance - Eiders

The mussel beds in north Morecambe Bay are in close proximity to South Walney and Foulney Islands, which are the centre of the Morecambe Bay eider breeding colonies. Current Natural England advice states that the wintering population of eider currently exceeds the SPA baseline but Morecambe Bay has shown a greater decline from the post-designation increase regionally and nationally in wintering eider population than at the national scale, suggesting site specific pressures (Thaxter et al. 2010). This requires further investigation but suggests a precautionary approach should be adopted.

Table 1. BTO eider annual peak data for eiders in Morecambe Bay

Years	Annual Peak
2006/07	3374
2007/08	2138
2008/09	5534
2009/10	4248
2010/11	6151
2011/12	7121
2012/13	5608
2013/14	6303

As diving ducks, 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.

The harvesting of mussels by hand-gatherers occurs over low water and is unlikely to disturb eiders feeding. However it has the potential to disturb eiders loafing around the area of the beds. There is also the potential for red breasted merganser and cormorant to be loafing in the area.

The area to be fished is restricted temporally by tides to around 1.5 hours either side of low water on tides of less than 2.0m. The area of the fishery is also limited – an estimated 14 ha. thus meaning any potential impact of disturbance is minimal.

Visual Disturbance - Eurasian oystercatcher, Red knot, Herring gull and other birds frequenting the intertidal area, including:

Ringed plover, European golden plover, Grey plover, Lapwing, Sanderling, Dunlin, Black-tailed godwit, Bartailed godwit, Eurasian curlew, Common redshank, Ruddy turnstone, Common shelduck, Wigeon, Northern pintail, Little egret.

The harvesting of seed mussels and the access to and from the mussel beds has the potential to affect birds feeding on the mussel beds themselves, on other parts of Heysham Flat Skear, and on the intertidal sediments adjacent to the skear or access route.

Mussels are a key food resource for oystercatchers, knot and herring gull for which Heysham Flat is considered to be an important area. The harvesting operation has the potential to disturb birds feeding on the skear and to impair their feeding over fishable periods of low water. There is also potential for disturbance to other feeding wading birds.

The inspections of Heysham Flat skear indicate that fishing activity is likely over around 14 hectares of the bed on the majority of tides below around 2.0m. The total area of skear holding mussel is estimated to be approximately 42 ha. Knott End skear covers around 5ha and a smaller skear to the west another 1.27ha, and these will always remain undisturbed and accessible to oystercatchers and other birds utilising the mussel seed (knot and herring gull). Knott End skear and the more westerly skears uncover about an hour and a half before low water on the large tides and will provide a resource for the birds during this time on all but the largest tides.

Activity is likely to be focussed to the 'best' areas at any one time – ie. where the mussel is loosest and densest, and subsequently disturbance affects a relatively restricted area during the uncovering period. This potentially also leaves a large area higher up the skear available to birds feeding on the smaller mussel.

The harvesting and access operations may result in disturbance to bird species feeding on intertidal sediments. The sediments in this area are relatively sandy and observed to be of lower value to birds than muddy sediments elsewhere in the Bay, and therefore the likely effects are considered not significant. The location of the fishery centrally in the skear and the direct access route proposed between the skear and shore access will maximise the distance between sources of disturbance and the low water mark where potentially vulnerable birds such as bar-tailed godwit and curlew are most likely to be feeding.

The fishery is also restricted temporally to weekdays and daylight hours, thus reducing further any potential impact of disturbance.

Consequently the NWIFCA is confident that the harvesting of the seed mussels by hand from Heysham Flat skear will not cause disturbance to SPA bird species and there will therefore be no risk of adverse effect on the integrity or conservation status of the SAC or SPA features of Morecambe Bay and the Duddon Estuary.

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

Due to the potential impacts outlined above, management and mitigation measures are necessary in order to ensure effects are prevented before authorising the fishery.

Measures to be Included in the Authorisation to Fish Undersize Mussel Include:

An exclusion zone to protect the *Sabellaria alveolata* on the fringes of the reef, restricted access to the fishery (Byelaw 3 permit holders only), and fishery restricted temporally by tides, weekdays and daylight hours only. Full details and map of exclusion zone given in Annex H.

In order to ensure full confidence in measures to protect the Sabellaria fringing the skear, a Byelaw 13a Closure will also be implemented to include gathering of size mussel.

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 biogenic reef: including mussel and Sabellaria	Maintain or restore the extent, distribution structure or function of	Abrasion/disturbance of the substrate on the surface of the seabed	Abrasion/disturbance of the Sabellaria alveolata reef feature could damage the reef building capacity on the skear	As in 7.1.1	As detailed in 7.1.1
alveolata communities (Reefs)	the feature.	Litter	Litter could pose potential threat to wildlife, especially birds through ingestion or entanglement;	As in 7.1.2	As detailed in 7.1.2
Intertidal biogenic reef: including mussel and Sabellaria alveolata communities (Reefs)	Maintain or restore the extent, distribution structure or function of the feature.	Removal of target species	Removal of target species could change the invertebrate community composition of the skear.	Target species is classed as ephemeral and likely to wash out by autumn and therefore no likelihood of change to community composition occurring than through natural events. See 7.1.3 It is therefore unlikely to have a significant effect on the extent, distribution, structure or function of the features.	As detailed in 7.1.3

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.

Common eider, Eurasian oystercatcher, Red knot, 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)	Removal of food source / prey items has the potential to affect condition, productivity and survival of species, as detailed in 6.2.3	The level of exposure depends on time of year of fishery, availability of alternative food resources, stock status and level of effort. There are large areas of mussel ground within the Bay that hold a further resource of both size and undersize mussel which knot and oystercatcher may utilise. Target species is classed as ephemeral and likely to wash out by autumn and therefore no likelihood of change to bird food resource occurring than through natural events. See 7.2.1	As detailed in 7.2.1
Common eider, Eurasian oystercatcher, Red knot, Herring gull	Maintain or restore the population of each of the qualifying features, and, the distribution of the qualifying features within the site	Visual disturbance	Visual disturbance could impact on condition of birds feeding or loafing in the area, by causing unnecessary energy expenditure if flushed and taking to flight. For birds feeding near the affected areas it could also reduce feeding times, and increase competition if birds are forced to concentrate into reduced feeding areas. See 6.2.3	Footprint of activity is limited and impact likely to be minimal. Alternative feeding areas available. See 7.2.2	As detailed in 7.2.2
Birds frequenting the intertidal area: little egret, ringed plover, European golden plover, Grey plover, Lapwing, Sanderling, Dunlin, Black-tailed godwit, Bar-tailed godwit, Eurasian curlew, Common redshank, Ruddy turnstone, Common shelduck, Wigeon, Northern pintail, Gulls	Maintain or restore the population of each of the qualifying features, and, the distribution of the qualifying features within the site	Visual disturbance	Visual disturbance could impact on condition of birds feeding or loafing in the area, by causing unnecessary energy expenditure if flushed and taking to flight. For birds feeding near the affected areas it could also reduce feeding times, and increase competition if birds are forced to concentrate into reduced feeding areas. See 6.2.3	Footprint of activity is limited and impact likely to be minimal. Alternative feeding areas available. See 7.2.2	As detailed in 7.2.2

8. Conclusion⁹

The natural condition of the stock being ephemeral, plus the management and mitigation measures incorporated into this fishery, and the use of an effective enforcement team of NWIFCA Officers allows the NWIFCA to conclude that the seed mussel hand-gathered fishery at Heysham Flat, Morecambe Bay during August to November will not have an adverse effect on the integrity of the European Site.

9. In-combination assessment¹⁴

9.1 In Combination Assessment of seed mussel dredge fishing in the site:

There is currently a proposal to authorise a seed mussel dredge fishery on ephemeral stock on the two furthest west skears at Heysham, covering a total area estimated from helicopter tracking of 6.3ha. This fishery will be subject to a separate HRA. The In Combination effects have been assessed here:

9.1.1 SAC Features / sub-features / SPA supporting habitats

H1130. Estuaries and H1170. Reefs

Intertidal biogenic reef: including mussel communities

The dredge fishery will only be authorised if the conditions outlined in 4.2 above are operating on the stock on the outer skears, in which case the mussel will be lost to natural processes. There are therefore no in combination effects.

Removal of Target Species

The dredge fishery will only be authorised if the conditions outlined in 4.2 above are operating on the stock on the outer skears, in which case the mussel will be lost to natural processes. There are therefore no in combination effects.

9.1.2 SPA and Ramsar Features

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

The dredge fishery will only be authorised if the conditions outlined in 4.2 above are operating on the stock on the outer skears, in which case the mussel will be lost to natural processes. As detailed above, there are alternative sites for birds to be feeding. There are therefore no in combination effects.

Visual disturbance - little egret, Common eider, Eurasian oystercatcher, Red knot, Herring gull – other birds frequenting the intertidal area: Ringed plover, European golden plover, Grey plover, Lapwing, Sanderling, Dunlin, Black-tailed godwit, Bar-tailed godwit, Eurasian curlew, Common redshank, Ruddy turnstone, Common shelduck, Wigeon, Northern pintail, Gulls

The fisheries operate at different times, with the dredging occurring over high water on neap / neap-ish tides, and the hand-gathering operating at low water on spring / spring-ish tides. There will be no overlap in relation to disturbance of birds. There are therefore no in combination effects.

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

10. Summary of consultation with Natural England

Natural England representatives attended the heliflight on 25th May, and carried out field inspections with NWIFCA scientists in May and 12th June 2017. They provided written confirmation of agreed management in relation to *Sabellaria alveolata* this year.

11. Integrity test

The NWIFCA concludes no adverse effect on the integrity of the European Site providing the management and mitigation measures of the Heysham Flat seed mussel fishery 2017 are implemented and upheld.

Annex A1: NWIFCA Existing Mussel Hand-gathering Regulations

a) NWIFCA Byelaw 3 – Permit to Fish for Cockles and Mussels

The North Western Inshore Fisheries and Conservation Authority in exercise of its powers under Section 155 of the Marine and Coastal Access Act 2009 has made the following new byelaws:

BYELAW 3 - PERMIT TO FISH FOR COCKLES (Cerastoderma edule) AND MUSSELS (Mytilus edulis). Byelaw confirmed 23.08.12

Interpretation

- In this byelaw:
 - a. "cockles" means the species Cerastoderma edule;
 - b. "mussels" means the species Mytilus edulis;
 - "fishery" means an area of sea, seabed, exposed estuary, seashore, or other marine environment in any part of the District;
 - d. "the NWIFCA" means the North Western Inshore Fisheries and Conservation Authority and is defined in articles 2 and 4 of the North Western Inshore Fisheries and Conservation Order 2010 (S.I. 2010 No. 2200);
 - e. "the District" means North Western Inshore Fisheries and Conservation District and is defined in articles 3 and 4 of the North Western Inshore Fisheries and Conservation Order 2010 (S.I. 2010 No. 2200);
 - "full gathering permit" means a permit which authorises a person to gather cockles and mussels and carry out all related activities, such as moving them and transporting them;
 - g. "support worker permit" means a permit which authorises a person to carry out activities related to the gathering of cockles and mussels, such as moving them and transporting them to support a person with a full gathering permit but only after the cockles and mussels have been placed in a receptacle, and in the case of cockles after having been passed through a riddle, by person with the full gathering permit;
 - "gathering" includes all activities related to the gathering of cockles and mussels such as moving and transporting them;
 - "Commercial Shellfish Fisheries Area" means an area designated by the NWIFCA pursuant to paragraph 13;
 - "Morecambe Bay Commercial Fisheries Area" means the area enclosed by straight lines joining the following co-ordinates in order:
 - 54° 08.490'N 03° 02.011'W
 54° 07.686'N 02° 53.497'W
 - II. 54° 07.686'N 02° 53.497'W III. 54° 03.204'N 02° 56.331'W
 - IV. 54° 04.062'N 03° 03.776'W
 - V. 54° 08.490'N 03° 02.011'W
 - k. "Ribble Estuary Commercial Fisheries Area" means the area enclosed by straight lines joining the following co-ordinates in order:

I. 53° 43.008'N 03° 05.177'W II. 53° 43.572'N 02° 59.986'W III. 53° 40.902'N 03° 00.341'W IV. 53° 40.860'N 03° 05.122'W V. 53° 43.008'N 03° 05.177'W

NWIFCA

 "Gangmaster Licensing Authority licence" means a licence issued under the Gangmasters Licencing) Act 2004;

"Foreshore Gatherers Safety Training Certificate" means a document issued by a Seafish Industry Group Training Association or a trainer approved by the NWIFCA, certifying that the person named on the certificate has completed a safety training course for intertidal shellfishing.

Permit

- Subject to paragraphs 10, 11, 25 and 26 of this byelaw no person shall gather cockles or mussels within or from a fishery unless he has in his possession a full gathering permit.
- Subject to paragraphs 10, 11, 25 and 26 of this byelaw, no person shall, in the area of the District below mean high water springs, move or transport cockles or mussels within or from a fishery unless he has either a full gathering permit or a support worker permit.
- No person shall have in their possession any article for use in the course of or in connection with gathering cockles or mussels within or from a fishery in breach of this byelaw.
- No person shall have in their possession any cockle or mussel gathered within or from a fishery in breach of this byelaw.

Minimum Sizes

 No person shall gather within or from a fishery any cockle which will pass through a gauge having a square opening of 20mm measured across each side of the square or any mussel less than 45mm in length.

Fishing Methods

- 7. No person shall gather cockles or mussels except:
 - by hand or using hand-held rakes;
 - b) in the case of cockles by using craams, rakes, spades, tamps or jumbos; or
 - by using buckets, sacks, net bags, ton bags and other such containers ordinarily used for the storage of cockles and mussels.
- No person shall place cockles that have just been fished into a container unless they have been passed through a rigid riddle designed to retain cockles which will not pass through a gauge having a square opening of 20mm measured across each side.

Redeposit

9. Any person who removes or possesses shellfish the removal or possession of which is prohibited by or in pursuance of these byelaws or any Act of Parliament shall immediately redeposit the same without injury as nearly as possible in the fishery from which they were taken or under the written authority of the NWIFCA on another suitable fishery and shall spread them thinly and evenly through the fishery.

Written permission

This byelaw shall not apply to any person performing an act which would otherwise constitute an
offence against this byelaw if that act was carried out in accordance with a written permission
issued by the NWIFCA permitting that act for scientific, management, stocking or breeding
purposes.

Exception for Personal Consumption to the Requirement for a permit

11. No person shall require a permit under this byelaw to gather less than a total of 5kg of cockles and 5kg of mussels during a calendar day intended for their own personal consumption within or from a fishery which is neither closed pursuant to paragraph 12 of this byelaw or byelaw 13A of the North Western and North Wales Sea Fisheries Committee (cockles and mussels – management of the fishery) or byelaw 18 of the Cumbria Sea Fisheries Committee (shellfishery – temporary closure) nor designated a Commercial Shellfish Fishery Area pursuant to paragraph 13 of this byelaw nor part of the District managed under the Dee Estuary Cockle Fishery Order (2008).

Fisheries Closure

12. No person shall gather any cockle within or from a fishery on or between the 1st day of May and the 31st day of August in the same year or have in their possession any cockle or mussel from a fishery area that has been closed pursuant to byelaw 13A of the North Western and North Wales Sea Fisheries Committee (cockles and mussels – management of the fishery) or byelaw 18 of the Cumbria Sea Fisheries Committee (shellfishery – temporary closure) or from within that part of the District managed under the Dee Estuary Cockle Fishery Order (2008) without a licence to fish issued within the terms of that Order.

Commercial cockle or mussel fisheries

 The NWIFCA designates the Morecambe Bay Commercial Fisheries Area and the Ribble Estuary Commercial Fisheries Area as Commercial Shellfish Fisheries Areas.

Application for Permits

- 14. The period of validity of permits shall be from 1st September in any given year to 31st of August the following year unless otherwise stated. Permits shall be annually renewable subject to paragraph 15 of this byelaw. A fee of £500 will be charged each year by the NWIFCA for all Byelaw 3 permits.
- 15. Holders of a permit to gather cockles or mussels under this byelaw in any given year shall be entitled to renew the permit for the next year up to one year after the permit term has expired.
- 16. Applications for the renewal of permits pursuant to this byelaw shall be made using the printed forms available from the NWIFCA offices or the NWIFCA website. Renewal forms will be made available 2 calendar months before the date each permit term begins. On renewal, applicants must satisfy the NWIFCA that at some time in the previous 3 years they have derived a substantial part of their income from fishing activities by providing evidence which may include a personal statement detailing fishing activities in the last 3 years and evidence that tax has been paid on fishing income in the last 3 years.
- 17. Applications for new permits pursuant to this byelaw shall be made using the printed forms available from the NWIFCA offices or the NWIFCA website. Applications for new permits to be issued pursuant to paragraphs 22 and 27 of this byelaw shall be made by first registering an interest with the NWIFCA in writing. If the number of applicants registering an interest exceeds the number of available permits a waiting list will be compiled on a 'first come, first served' basis and an applicant will be invited to complete an application for a new permit in the first year a new permit becomes available. Applications shall meet all the requirements of paragraph 22 in the case of full gathering permits and paragraph 27 in the case of support worker permits.
- 18. A permit issued pursuant to this byelaw is not transferable.
- Failure to produce, on the reasonable demand of a properly warranted Officer or a Constable, a valid permit when carrying out any activity for which a permit is required constitutes a breach of this byelaw.

Failure to notify the NWIFCA of any change of name or address during the period of the validity
of a permit constitutes a breach of this byelaw.

Filing returns

21. The holder of a permit to gather cockles or mussels under this byelaw shall be required to file with the NWIFCA, no later than the 5th day of the month following, such information in regard to catches and fishing effort for the previous month, under the terms of such permit, as the NWIFCA may require. Nil returns may be required at the discretion of the NWIFCA. Permit holders not filing returns may have their permits suspended by the NWIFCA until returns have been filed.

New Permits

- 22. New full gathering permits shall be issued each year to a maximum of the first 10 applicants on the waiting list who have not held a permit pursuant to this byelaw in the previous year on production of:
 - evidence of the applicant's identity, containing photograph and signature, such as a valid passport; or a driving licence with photo;
 - evidence of the applicant's address, such as a utility bill issued in the preceding 4 months of application or a current tenancy agreement;
 - 3. evidence of the applicant's National Insurance Number;
 - 2 recent passport style photographs of the applicant signed on the back by the applicant;
 - the applicant's valid Foreshore Gatherers Safety Training certificate or proof of the successful completion of an equivalent safety training course. Equivalence is determined at the discretion of the NWIFCA; and
 - 6. payment of the fee set in paragraph 14.

Transitional Arrangements

- Holders of a permit for 2011/2012 issued under byelaw 5 of the NWIFCA (permit to fish for cockles (*Cerastoderma edule*) and mussels (*Mytilus edulis*)) shall be entitled to renewal of that permit under this byelaw 3 for the year 2012/2013.
- 24. Permits to fish for cockles and mussels for the year 2012/2013 shall be issued to 40 new applicants under the rules set out in Byelaw 5 of the NWIFCA (permit to fish for cockles (Cerastoderma edule) and mussels (Mytilus edulis)). No permits to fish for cockles and mussels shall be issued to new applicants under this byelaw 3 for the year 2012/2013.
- 25. Persons who provide evidence to the satisfaction of the NWIFCA that they have in the past held a permit issued under Cumbria Sea Fisheries Committee byelaw 21 (cockles – permit scheme) or 23 (mussels – permit scheme) and have in the past been engaged in commercial cockle or mussel fishing activities in a specified region or regions within the district formerly administered by the Cumbria Sea Fisheries Committee shall be eligible to apply to the NWIFCA for written authority to continue to fish in any fisheries within that region or regions. The obligations in this byelaw apply to a person fishing under a written authority but no fee is payable for the issue of that authority.
- 26. Persons who provide evidence to the satisfaction of the NWIFCA that they have in the past been engaged in commercial cockle or mussel fishing activities in a specified region or regions within the Dee Estuary shall be eligible to apply to the NWIFCA for written authority to continue to fish in any fisheries within that region or regions. The obligations in this byelaw apply to a person fishing under a written authority but no fee is payable for the issue of that authority.

Support worker permit

27. Commercial organisations trading in cockles and mussels may apply to the NWIFCA for permits for specified members of staff who they wish to perform ancillary trading activities within a cockle or mussel fishery which would constitute taking, removing or transporting cockles or mussels within or from a fishery including driving transport vehicles, transporting shellfish, weighing shellfish. The NWIFCA may issue up to a maximum of 6 support worker permits to each commercial organisation upon receipt of complete applications on production of:

- The names, contact details, national insurance numbers and proof of right to work of the members of staff. Proof of identity of those members of staff containing photograph and signature, such as a valid passport; or a driving licence with photo and proof of address of those members of staff, such as a recent utility bill;
- Proof from the annual account or annual report of the organisation's trade in cockles or mussels;
- Evidence that the organisation holds a Gangmaster Licensing Authority licence for shellfish operations if required;
- Statement of the duties members of staff will perform in the shellfish fishery;
- Two recent passport style photographs of the members of staff signed and dated on the back by the members of staff;
- Valid Foreshore Gatherers Safety Training certificates for each of the members of staff or proof of the successful completion of an equivalent safety training course. Equivalence is decided at the discretion of the NWIFCA; and
- Payment of the fee set in paragraph 14.

Use of boats

- 28. No holder of a permit pursuant to this byelaw shall use a boat to access shellfish beds in order to gather, remove or transport cockles or mussels without having their permit endorsed as a boat user by the NWIFCA. The NWIFCA will endorse permits as boat users on production of evidence that the holder has completed training of an equivalent standard to the courses provided by Seafish in: Sea Survival, First Aid, Fire Fighting and Health and Safety Awareness. Equivalence is decided at the discretion of NWIFCA.
- 29. No person shall be granted an endorsement as a boat user unless they have in their possession a serviceable life jacket and the boat they will use is equipped with a serviceable means of communication such as a VHF radio or mobile telephone, a serviceable means of navigation such as global positioning equipment and serviceable safety provision including marine distress flares and an adequate anchor with a means of effective deployment.

Revocation of Legacy Byelaws

- Byelaw 5 (permit to fish for cockles (Cerastoderma edule) and mussels (Mytilus edulis)) made by the NWIFCA is revoked.
- 31. The following byelaws made by the North Western and North Wales Sea Fisheries Committee are revoked in so far as they apply within the District:
 - byelaw 5 (permit to fish for cockles (Cerastoderma edule) and mussels (Mytilus edulis));
 - (b) byelaw 13 (cockles minimum size);
 - (c) byelaw 14 (cockle fishery seasonal closure);
 - (d) byelaw 15 (mussels minimum size);
 - (e) byelaw 17 (redeposit of shellfish);
- 32. The following byelaws made by the Cumbria Sea Fisheries Committee are revoked in so far as they apply within the District:
 - (a) byelaw 5 (minimum removal size for mussels);
 - (b) byelaw 6 (minimum removal size for cockles);
 - (c) byelaw 12 (re-depositing of shellfish);
 - (d) byelaw 16 (cockles seasonal closure).
 - (e) byelaw 21 (cockles permit scheme)
 - (f) byelaw 22 (cockles catch restrictions)
 - (g) byelaw 23 (mussels permit scheme)
 - (h) byelaw 24 (mussels catch restrictions)

Explanatory Note: (This note does not form part of the byelaw)

- 1. The purpose of this byelaw is to control the exploitation of shellfish fisheries of cockles and mussels to ensure catches remain at a sustainable level and are obtained by sustainable fishing methods. As cockle and mussel fishing can be highly lucrative depending on price variations the NWIFCA has concluded a permit scheme is necessary to limit the number of fishermen and consequently the number of cockles gathered, along with the methods they use.
- 2. The byelaw prohibits the gathering of cockles or mussels for sale without a full gathering permit and prohibits the moving and transporting of cockles or mussels for sale below mean high water springs without a support worker permit (paragraphs 2 and 3). The full gathering permit also permits the holder to move and transport cockles or mussels below mean high water springs (definition of 'full gathering permit' in paragraph 1).
- The byelaw prohibits the possession of articles to gather cockles or mussels in breach of the byelaw and specifies the fishing methods that may be used (paragraphs 4, 7 and 8).
- The byelaw prohibits the possession of cockles or mussels gathered in breach of the byelaw (paragraph 5) and provides for their redeposit (paragraph 9).
- 5. The byelaw sets minimum sizes for cockles and mussels (paragraph 6).
- The byelaw provides an exemption for a person who carries out an act which would otherwise constitute an
 offence if it is in accordance with a written permission issued by the NIFCA permitting that act for scientific,
 stocking or breeding purposes (paragraph 10).
- The byelaw provides that a person does not need a permit to gather less than 5kg of cockles or mussels for personal consumption from areas that are not closed or in Commercial Shellfish Fisheries Areas (paragraph 11).
- The byelaw provides for the annual closure of cockle fisheries throughout the District for a specified period (paragraph 12).
- The byelaw provides for the designation of certain cockle beds as Commercial Shellfish Fisheries Areas as shown in the indicative maps (paragraph 13).



Fig 1. Ribble Commercial Fisheries Area with known historical cockle beds



Fig 2. Morecambe Bay Commercial Fisheries Area with known historical cockle beds

- 10. The byelaw provides an application procedure for permits (paragraphs 14 to 20).
- 11. The byelaw provides for permit holders to file returns (paragraph 21).
- The byelaw provides for the renewal of permits and the issue of new permits (paragraph 22).
- The byelaw provides transitional arrangements for those with a right to gather shellfish under existing byelaws (paragraphs 23 to 26).
- 14. The byelaw provides for the issue of support worker permits (paragraph 27).
- The byelaw provides that a full gathering permit must be endorsed if the holder uses a boat to access shellfish beds (paragraphs 28 and 29).
- The byelaw provides for the revocation of specified byelaws that previously applied in the District (paragraphs 30, 31, and 32).

b) NWSFC BYELAW 12 - RESTRICTIONS ON FISHING FOR BIVALVE MOLLUSCAN SHELLFISH

This byelaw applies to that part of the District within a line drawn on the seaward side of the baselines 6 nautical miles from the baselines from which the breadth of the territorial sea adjacent to the United Kingdom is measured. For the purposes of this paragraph "the baselines" means the baselines as they existed at 25th January 1983 in accordance with the Territorial Waters Order in Council 1964 (1965 III p.6452A) as amended by the Territorial Waters (Amendment) Order in Council 1979 (1979 II p.2866).

- 1. No person shall fish for bivalve molluscan shellfish, except
 - a) by hand; or
 - b) in the case of cockles with a craam, rake, spade or jumbo; or
 - c) in the case of mussels with a rake or in that part of the District which is inshore of a line drawn North true from Penmaen-Bach Point (Latitude 53[°] 17.3' North, Longitude 03[°] 52.8' West) to the high water mark at Gt. Ormes Head with a rake, provided that the rake is no more than 1 metre in width and that it is only used from a boat when the mussel bed has at least 1 metre of water over it; or (*applies only to Wales*)
 - d) when using a dredge or other appliance where:
 - such dredge or appliance is of a pattern approved in writing by the Committee, the Committee having been advised by scientists who in the opinion of the Committee appear to be suitably qualified to comment on the conservation and environmental implications;
 - (ii) such use is in accordance with a written authorisation issued by the Committee and with any conditions subject to which that authorisation was issued, including prohibitions on use at particular times, or in particular areas and definitions of the fishing instrument. The Committee may also require as a condition that returns be made on the species and quantities of bivalve molluscan shellfish taken.
- 2. no person shall take or use on any mussel bed, any sledge or other contrivance which in the opinion of the Committee is likely to crush or loosen the mussels or loosen the foundations of the bed, without a written authorisation issued by the Committee.
- 3. no person shall dig in any mussel bed for any purpose without a written authorisation issued by the Committee.

Byelaw confirmed 21.01.98
c) NWSFC Byelaw 13a – Cockles and Mussels Management of the Fishery and NWSFC Byelaw 16 = Shell Fishery – Temporary Closure

BYELAW 13A - COCKLES AND MUSSELS - MANAGEMENT OF THE FISHERY. Byelaw confirmed 29.03.96

- The Committee, may close any cockle (Cerastoderma edule) or mussel (Mytilis edulis) bed or part of a bed for the purposes of fishery management or for controlling the rate of exploitation with regard to cockles and mussels.
- Such closure shall be for a specified period and be undertaken only after the Joint Committee has consulted such persons or bodies appearing to them to represent local cockle or mussel fishermen, and provided the Committee has been advised by fishery scientists who appear to them to be suitably qualified, as to the need for such action.
- No person shall, without the consent of the Committee, under the written authority in that behalf signed by the Clerk, remove, take or disturb any cockle or mussel from a bed or part of a bed of cockles or mussels which has been closed pursuant to this byelaw.

BYELAW 16 – SHELL FISHERY -TEMPORARY CLOSURE. Byelaw confirmed 14.09.73

Where, in the opinion of the Committee, in any fishery, any bed or part of a bed of shellfish is so severely depleted as to require temporary closure in order to ensure recovery, or any bed or part of a bed contains mainly immature shellfish which in the interests of the protection and development of the fishery ought not to be disturbed for the time being, or any bed of transplanted shellfish ought not to be fished until it has become established, and where the bed, or part thereof, has been clearly defined in notices displayed in the vicinity prohibiting the removal or disturbance of the shellfish, no person shall, while the bed or part thereof is so defined, take away or otherwise disturb any shellfish therein.

Provided that no bed or part of a bed may remain closed under this byelaw at any one time for a longer period than one year, without review by the Committee.

Protection of Sabellaria alveolata reef from Annex A2: **Bottom Towed Gear**

NWIFCA Byelaw 6 – sections relevant to Heysham Flat:

BYELAW 6: PROTECTION FOR EUROPEAN MARINE SITE FEATURES. Byelaw confirmed 15.05.14

Interpretation

- 1. In this byelaw:
 - 'the Authority' means the North Western Inshore Fisheries and Conservation Authority as a) defined in articles 2 and 4 of the North Western Inshore Fisheries and Conservation Order 2010 (SI 2010 No. 2200);
 - 'the District' means the North Western Inshore Fisheries and Conservation District as b) defined in articles 2 and 3 of the North Western Inshore Fisheries and Conservation Order 2010 (SI 2010 No. 2200);
 - C) 'specified areas' means the following areas as defined in the Schedule to this byelaw;
 - i. The Solway Firth EMS Sabellaria alveolata reef closed area;
 - ii. The Morecambe Bay EMS Seagrass beds closed areas;
 - The Morecambe Bay EMS Walney Channel boulder and cobble reef closed area;
 The Morecambe Bay EMS Heysham Flat Sabellaria alveolata reef closed area;

 - v. The Dee Estuary EMS Hilbre Island Sabellaria alveolata reef closed area; and
 - vi. The Shell Flat & Lune Deep SAC reef closed area;
 - "bottom towed fishing gear" means any fishing gear which is capable of being towed, d) dragged or moved along the seabed including any fishing dredge, beam trawl or otter trawl; and

- e) "to work fisheries by hand" means to gather sea fisheries resources by hand or using a hand operated implement.
- Co-ordinates used in this byelaw are measured from WGS 84 datum. The WGS 84 means the World Geodetic System revised in 1984 and 2004.

Prohibitions

- No person shall use any bottom towed fishing gear in the specified areas except with the written authorisation of and using gear approved by the Authority in accordance with paragraph 5.
- No person shall collect bait or work fisheries by hand in the Morecambe Bay EMS seagrass beds closed areas except with the written authorisation of and using methods approved by the Authority in accordance with paragraph 5.

Exemptions

- This byelaw shall not apply to any person performing an act which would otherwise constitute an
 offence against this byelaw if that act was carried out in accordance with a written authorisation
 issued by the NWIFCA permitting that act for scientific, management stocking or breeding
 purposes.
- An authorisation to use bottom towed gear in the Shell Flat and Lune Deep SAC reef closed area will be issued to an applicant by the Authority provided that:
 - an application for an authorisation is received by the Authority within 6 months of this byelaw coming into effect;
 - b) evidence, as agreed by the Authority to be sufficient, is provided that the applicant fished within the closed area for at least 5 days within the last 36 months immediately prior to the byelaw being made;
 - c) the same vessel, gear type and size is used by the applicant to fish in the closed area as were used in fishing the closed area prior to the making of this byelaw; and
 - the applicant's fishing vessel remains in the same legal and beneficial ownership as on the date of this byelaw being made.
- 7. An authorisation issued under paragraph 6 will remain valid until such a time as it is revoked by the Authority or any of the conditions set out in paragraph 6 cease to be true at which time the authorisation will cease to have effect and cannot be used to fish in the Shell Flat and Lune Deep SAC reef closed area. The Authority may revoke an authorisation at any time after it has been issued for any reason it considers necessary in accordance with its statutory fisheries management duties.

SCHEDULE

'The Morecambe Bay EMS Heysham Flat Sabellaria alveolata reef closed area' means the area enclosed by a line connecting the following points A, B, C, D, E in order and returning to Point A, as shown, for illustrative purposes only, in Figure 3:

> Point A 54° 03'.43 N 2° 55'.23 W Point B 54° 03'.70 N 2° 54'.56 W Point C 54° 03'.70 N 2° 54'.30 W Point D 54° 03'.19 N 2° 54'.30 W Point E 54° 03.19' N 2° 55'.16 W

Explanatory Note This note does not form part of the Byelaw)

This byelaw prohibits the use without written permission from the NWIFCA of all bottom towed fishing gear in parts of European Marine Sites (EMS) in the NWIFCA District which contain features of conservation importance which could be damaged by such gear. This byelaw further prohibits bait digging and other hand gathering activities in parts of Morecambe Bay SAC containing seagrass beds.

The specified areas affected by this byelaw are defined in the Schedule to this byelaw and identified, for illustrative purposes only, on the maps in Figures 1-5.

Paragraphs 6 and 7 allow the Authority to grant authorisation to enter the Shell Flat and Lune Deep SAC reef closed area while using towed gear, to fishers who can show with evidence that they fished this area with their current vessel prior to the byelaw being made.





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A	54° 03.43' N	2° 55.23' W
В	54° 03.70' N	2° 54.56' W
Ċ	54° 03.70' N	2° 54.30' W
D	54° 03.19' N	2° 54.30' W
Е	54° 03.19' N	2° 55.16' W



Annex B: Site Maps





National Nature Reserves and SSSI sites within Morecambe Bay and bordering on the proposed Fishery Order area.



Other Marine Protected Areas adjoining the Morecambe Bay and Duddon Estuary ES.

Annex C: Habitat Maps

Broad Scale Map



Historic Mapping of Heysham Flat Sabellaria alveolata reef



Annex D: Fishing activity maps



The distribution of cockle and mussel beds (orange and blue respectively) within Morecambe Bay and the Duddon Estuary in 2007.



Aerial view of Heysham Flat skears from west looking landward 25th May 2017

Annex E: Fishing activity methods





Hand-gathering seed mussel at Heysham Flat

Mussels:

i. Fleetwood (5 scars) – Rossall, Neckings, Kings Scar, Perch Scar, Black Scar

Inspection 26-06-17 0.6m tide.

Patches of live *Sabellaria alveolata* on Rossall and Neckings scar. Patchy old barnacled mussel present on all scars but at low densities. Kings Scar contains a consistent patch of mussel three hectares in size which consists of mussel approximately 20mm in length. Perch Scar is bare except for old barnacled mussel scattered around channel edge ~ 20% cover just on this patch. Scoured mussel mud remains from previous years. Black Scar has had a spat settlement (50% coverage) of small spat (less than 5mm).





Heysham Flat Dutch Wand Survey Area

TUL

Dutch Wand Survey 28-06-17 – 1.0m tide

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Line transects were completed and using a Dutch Wand the number of hits and misses of live mussel were recorded to give percentage cover. The transects start and finish at the edge of the mussel bed. A mussel sample was taken every 40 hits using a 10cm diameter corer. Twenty-two transects were completed and twenty-eight samples collected.

The total weight of live mussel and the size frequency of each sample were recorded. The samples were subsampled with 50 individuals from each sample measured and recorded. From the transect and sample data, it is estimated that within the bed area highlighted on the map (34.8 ha) there are 3212 tonnes of mussel. The value for tonnage of size mussel within this total has been extrapolated from only four individual size mussels found in the samples and must be viewed with caution. It proves an estimate of 37 tonnes. These four size mussels where collected from the edge of Dallam Dyke within the remaining area of *Sabellaria alveolata* reef, which is the area of the proposed exclusion zone.

The bed area surveyed here (34.8 ha) is smaller than surveyed in previous years (62.6 ha). In 2015 a Dutch Wand survey was carried out covering a larger area of the main skear (Knott End skear was not included), starting where the mussel began in 2015. This area was not surveyed this time as much of it is cobble/boulder and dead shell. The north east of this area has also been covered in gut weed with little mussel underneath, and so was not included in this survey.

Condition information (percentage of mussel meat) of the 4 size mussel was collected. The mussels ranged from 45mm to 49mm in length, and the condition varied between 36.5% and 44.1% with a mean of 40.5%.

The total length frequency of mussels for the bed area is provided below with the highest frequency of mussel in the 15 to 25mm size ranges – ie. seed mussel.



The weight of each sample has been standardised for the weight of mussel (kg per m²) and has been mapped below. The biomass of mussel varies across the bed, increasing towards Dallam Dyke, and on to Knott End skear where the mussel coverage of mussel is highest and covers most of the ground. The highest densities, and the size mussel, are found along Dallam Dyke within the area of remaining *Sabellaria alveolata* reef. Across the rest of the bed there is a dense settlement of seed mussel, within the 15-25 mm range. This continues up to the area around Big Stone, after which the mussel becomes less dense. The majority here are still within the 15-20 mm size range.



Heysham Flat Bottom skears

From the heliflight carried out on 23rd June and tracking round the bottom skears the following map was produced.

Heysham Flat Seed Mussel Areas June 2017 - combined mapping from heliflight 23rd June and Dutch Wand foot survey 28th June



The estimated area of the bottom skears may be an over-estimate as tracking from the helicopter is not exact – however it provides an indication of the extent of the seed mussel, which was very dense, uniform and level, on these skears, giving a combined total of 7.57 ha. As these beds are not accessible on foot the tonnage per hectare from the main Heysham Flat/ Knott End skear has been used as a proxy to estimate biomass – giving 92.3 tonnes per ha, and a total of 699 tonnes on these three bottom skear.

Overall tonnage for all Heysham skears combined is therefore estimated at the end of June 2017 as 3911 tonnes.



Dutch Wand Mussel Survey 22-06-2017 – 1.3m tide

Line transects were completed and using a Dutch Wand the number of hits and misses of live mussel were recorded to give percentage cover. The transects start and finish at the edge of the mussel bed on the west of the bed and at the oyster frames on the east of the bed. A mussel sample was taken every 50 hits using a 10cm diameter corer. Seven transects were completed and 22 samples collected.

For analysis the bed was split into two areas: Foulney Ditch and Low Bottom. Foulney Ditch has a resource of larger mussel that would be under-represented if combined with the whole bed. This area is demarcated by the grey line in the map below (percentage and weight frequency).

The total weight of live mussel and size frequency of each sample was recorded. Where the number of individuals in a sample totalled >100, a sub sample of 100 were measured. Condition (percentage of mussel meat) of all mussel greater then 45mm was collected. From the transect and sample data, it is estimated that on the Foulney Ditch bed area (35.8 ha) there is 3888 tonnes of mussel of which 1075 tonnes was size mussel. On the Low Bottom bed area (62.2 ha) there is 2935 tonnes of mussel of which 404 tonnes was size mussel.

The total length frequency for the bed area is provided below, at Foulney Ditch the highest frequency of mussel is in the 15 - 25 mm range. At Low Bottom the highest frequency is in the 10-15 mm range.

A large swathe of the bed is now covered with gutweed.







The condition (meat content) of 11 mussels over 45 mm at Foulney Ditch, ranging from 45mm to 57mm in length was recorded, and varied between 10.77% and 30.85% with a mean of 20.88%. At Low Bottom the condition of 8 mussels over 45 mm were recorded, ranging from 45 mm to 50 mm. This varied between 17.86% and 30.08% with a mean of 24.27%.



The weight of each size class has been standardised to the weight of each size class per metre squared. This has been mapped below. The size of the pie chart represents the weight of each sample.

iv. Foulney

Dutch Wand Survey 25-05-17 0.8m tide





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Line transects were completed and using a Dutch Wand the number of hits and misses of live mussel were recorded to give percentage cover. The transects start and finish at the edge of the mussel bed. A mussel sample was taken every 25 hits using a 10cm diameter corer. Eleven transects were completed and 57 samples collected.

The total weight of live mussel and size frequency of each sample was recorded. Condition (percentage of mussel meat) of all mussel greater then 45mm was collected. From the transect and sample data, it is estimated that in the bed area highlighted in the map (59.12ha) there is <u>4611 tonnes</u> of mussel with <u>322 tonnes</u> of size mussel. The total length frequency for the bed area is provided below with the highest frequency of mussel in the 15 to 25mm size ranges. The percentage of each size frequency which has been standardised for the number of mussel per m² for each sample and has been mapped below. It can be seen there is a mix of sizes classes across the bed and within each sample, with the most abundant size class being 11-25mm which is present in all but one sample. The condition of 31 mussels over 45mm, ranging from 45mm to 65mm in length was recorded, and varied between 12.77% and 29.57% with a mean of 21.28%.





Foulney - Inspection 13-06-17 - 1.8m tide

A return inspection was carried out to look for an area of size / larger mussel which had be seen on previous inspections but had not been captured in the Dutch Wand survey transects on the 25th May 2017. The area of size / larger mussel was located and six samples were collected for size class analysis. The position and percentage of each size class has been mapped below. Due to the samples containing a greater percentage of larger mussels than that recorded during the Dutch Wand survey it is likely that the estimated figure for bed biomass is lower than what is actually present. In addition the size frequency for the larger size class intervals will be under-represented. Due to the Dutch Wand methodology the two sets of data cannot be combined, nor the estimated biomass adjusted to incorporate the larger mussel.



From the heliflight on 23rd June – the bottom end of Foulney and Foulney island is now covered with gutweed. This may serve to protect the mussel as in some years, or it may smother it as in others.

v. South America

Heliflight 23rd June. 1.1m tide. Sanded over. No mussel.

vi. Falklands

Photographs received from industry (Tim Manning) in June and provided in a separate pdf show that on the ground there is a substantial seed mussel settlement, but that there is a lack of mussel mud to date. As has been seen from the air on previous heliflights there are many gulls feeding on the bed. Mr Manning's tracking was provided, and it shows an area of estimated at 15.6ha.



Heliflight 23rd June. 1.1m tide.

This area did not uncover totally. Some mussel and rocks were visible. It also looks green so it is possible it has a gutweed covering. The scheduled RIB inspection due on 27th June was aborted due to winds and weather. An attempt will be made to re-schedule this inspection. Further heliflights have been booked by industry for July and August.

d) Duddon Estuary - Hardacre

An inspection was carried out on 27th June following a report from a fisherman he had seen 'black' under the water in the channel. There is no mussel present, and only scarce patches of cobble in the channel. The rest is sanded over.

Cockles

Maps

Maps were created showing the overall survey area, density of undersize cockle and the frequency of size classes (pie charts show the frequency of different size classes, the size of the pie chart indicates the total density of cockles present).

i. Pilling

Survey scheduled for August. Possible low-level fishery in September.

ii. Middleton Sands - Inspection with industry on 01-06-2017. 2.0m tide

Method: Jumbo and 0.5m² quadrat randomly across the bed

An inspection was carried out north and south of Middleton car park. To the north there were small patches of cockle up to 150 per m² but overall the stock is low.

To the south there is a small patch of high density cockle indicated in the maps below. The cockle is one year class and ranges between 20mm and 30mm in size. The densest patch covers <u>3.2ha</u> with estimated mean <u>700 per m²</u>. Surrounding that is a less dense area covering <u>7.7ha</u> with estimated mean density of <u>200 per m²</u>.

It is proposed to leave this bed unfished as an undisturbed area for bird feeding should other fisheries in the Bay go ahead.

Biomass – crude estimate

Note of caution - This is a crude estimate of biomass in the dense area to the south from the data collected from the inspection, and is not supported by full survey data.

Total Area of Dense Patch to the south = 10.9ha

A crude estimate of biomass has been calculated by assigning an average weight of 7g per cockle (based on a cockle with a shell length of 26mm), with a mean density of 700 per m² for the densest area (3.2ha) and 200 per m² for the remaining area (7.7ha).

Dense Area 157 tonnes Other Area 108 tonnes

Total 265 tonnes



iii. Flookburgh - Survey 29-3-17(West) 26-04-17 (East)

Flookburgh survey grid was split into two (West and East), each area was surveyed on different days. Survey method: Jumbo and 0.5m² quadrat

Survey 1 (West) - 0.7 m tide.

60 survey stations were sampled from a grid with stations 500m apart.

Survey 2 (East) - 0.6 m tide.

57 survey stations were sampled from a grid with stations 500 m apart.

Means

Means were calculated from all survey stations from both surveys with the defined bed area (zero counts on the edge of the bed have been removed).

Mean number of size cockle = 12 per m^2 (min. 0, max 138)

Mean number of undersize cockle = 22 per m^2 (min. 0, max 260)

Maps

Bed Area

Total Bed Area = 2608ha

Return surveys are scheduled for July with potential for a commercial fishery in September.









v. Leven Sands survey 28-04-17. 0.5m tide.

Survey method: Jumbo with 0.5m² quadrat

The survey was carried out two days before the fishery closed. Thirty-three survey stations were sampled from a grid 500m apart. Thirteen of the stations were randomly added around the grid (mainly to the southeast).

Means

Means were calculated from all survey stations with the defined bed area (zero counts on the edge of the bed have been removed).

Mean number of size cockle = 20 per m^2 (min. 0, max 74)

Mean number of undersize cockle = 15 per m^2 (min. 0, max 66)

Biomass

Total Bed Area = 974 ha.

Biomass was calculated based on an average of 20 size cockles per m², with an average cockle weight of 7g and a bed area of 9.74 km².

Crude biomass = 1364 tonnes.

A return surveys will be scheduled with potential for a commercial fishery in September.









vi. Aldingham

No reports of significant stock at present. Not scheduled in for survey at present.

vii. Newbiggin

No reports of significant stock at present. Not scheduled in for survey at present.
Annex G Natural England Advice 2016 and 2017

Date: 18 July 2016 Our ref: 189656 Your ref: Seed Mussel Fishery Heysham Flat, Morecambe Bay

North Western Inshore Fisheries and Conservation Authority (NWIFCA) Preston Street Carnforth Lancashire LA5 9BY

BY EMAIL ONLY



Hombeam House Crewe Business Park Electra Way Crewe Cheshire CW1 6GJ

T 0300 060 3900

Dear Mandy

Seed Mussel Fishery Heysham Flat, Morecambe Bay

Thank you for your consultation on the above which was received by Natural England on 28 June 2016.

THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2010 (AS AMENDED)

The application site is within a European designated site (also commonly referred to as Natura 2000 sites), and therefore has the potential to affect its interest features. European sites are afforded protection under the Conservation of Habitats and Species Regulations 2010, as amended (the 'Habitats Regulations'). The application site is within the Morecambe Bay Special Protection Area (SPA), Morecambe Bay and Duddon Estuary potential SPA (pSPA) and the Morecambe Bay Special Area of Conservation (SAC) which are European sites. The site is also listed as Morecambe Bay Ramsar site' and also notified at a national level as Morecambe Bay Site of Special Scientific Interest (SSSI). Please see the subsequent sections of this letter for our advice relating to SSSI features.

In considering the European site interest, Natural England advises that you, as a competent authority under the provisions of the Habitats Regulations, should have regard for any potential impacts that a plan or project may have⁴. The <u>Conservation objectives</u> for each European site explain how the site should be restored and/or maintained and may be helpful in assessing what, if any, potential impacts a plan or project may have. No objection

Natural England notes that your authority, as competent authority under the provisions of the

p://www.defra.gov.uk/habitats-review/implementation/process-guidance/guidance/sites/



Page 1 of 3

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¹ Listed or proposed Wetlands of International Importance under the Ramsar Convention (Ramsar) sites are protected as a matter of Government policy. Paragraph 118 of the National Planning Policy Framework applies the same protection measures as those in place for European sites.

² Requirements are set out within Regulations 61 and 62 of the Habitats Regulations, where a series of steps and tests are followed for plans or projects that could potentially affect a European site. The steps and tests set out within Regulations 61 and 62 are commonly referred to as the "Habitats Regulations Assessment" process. The Government has produced core guidance for competent authorities and developers to assist with the Habitats Regulations Assessment process. This can be found on the Defra website.

Habitats Regulations, has undertaken an Appropriate Assessment of the proposal, in accordance with Regulation 61 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 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.

WILDLIFE AND COUNTRYSIDE ACT 1981 (AS AMENDED)

No objection – no conditions requested

This application is in close proximity to Morecambe Bay Site of Special Scientific Interest (SSSI). Natural England is satisfied that the proposed development being carried out in strict accordance with the details of the application, as submitted, will not damage or destroy the interest features for which the site has been notified. We therefore advise your authority that this SSSI does not represent a constraint in determining this application. Should the details of this application change, Natural England draws your attention to Section 28(I) of the Wildlife and Countryside Act 1981 (as amended), requiring your authority to re-consult Natural England.

DETAILED COMMENTS

The Habitats Regulations Assessment (HRA) does not make use of or mention of the bird food requirement model provided by NE to NWIFCA on 13th May. Although it is accepted that the mussel resource on the Heysham Flat bed is likely to change, the assessment should ensure that there is sufficient mussel stock available in the Morecambe/Heysham area of the Bay to meet the predicted needs of oystercatcher and knot (2743 tonnes in total). This is based on 3 Heysham WeBS sectors (Heysham, Morecambe Stone Jetty and Morecambe Prom)

- Mean of the peaks over 5-year period 2009/2010 2013/2014 for oystercatcher 8,107 birds which have an ecological requirement of 2,396 tonnes based on model
- Mean 5 year peak is 2009/2010 2013/2014 for knot -13,803 birds which have an ecological requirement of 347 tonnes based on model.
- Herring gull are also known to utilise mussel beds as they are omnivorous and gulls that remain over winter will also make use of these beds.

Due to the nature of the Sabellaria (Honeycomb worm) reef and the potential for resettlement on old, 3D reef structures we would advise that a survey of the site should be conducted prior to the start of the opening of the fishery. Should substantial areas of live worm reef structures or of exposed old worm reef be identified, both of which could facilitate development of more extensive Sabellaria reef structures, these should be demarcated and access to them restricted. We advise that the site is monitored as the fishery progresses to review the effectiveness of these demarcated areas in protecting the Sabellaria and identify whether any changes in management measures, including changes in demarcated areas, are needed.

No total allowable catch (TAC) has been proposed however the proposed authorisation states: "the fishery may be closed with immediate effect by the NWIFCA if in the opinion of NWIFCA Officers or Scientists, there is a failure to comply with these conditions or there is ge to the beds through over-fishing". In the absence of a TAC it is suggested that if



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catch returns exceed that of the 2015 fishery (700 tonnes) then the HRA and fishery should be reviewed to identify whether additional management action needs to be taken in order to prevent damage through over-fishing.

In other HRAs (eg North Morecambe Bay Dredge Fishery, July 2016) North Western IFCA has stated that it would be able to close the fisheries should fisheries or natural mortality result in mussel stocks declining to levels at which the ability of SPA bird species to meet their feeding requirements could be compromised. We advise that a similar mitigation measure should be included in any authorisation for the proposed fishery with appropriate monitoring put in place that would trigger implementation of this measure.

Yours sincerely

Helen Ake Lead Adviser – Cumbria Area Team

Date: 21 June 2017 Our ref: Your ref:

North Western Inshore Fisheries and Conservation Authority (NWIFCA) Preston Street Carnforth Lancashire LA5 9BY

BY EMAIL ONLY

Dear Mandy

Heysham Flat skear seed mussel fishery 2017

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

Heysham Flat skear is within a European designated site (also commonly referred to as Natura 2000 sites), and therefore has the potential to affect its interest features. European sites are afforded protection under the Conservation of Habitats and Species Regulations 2010, as amended (the 'Habitats Regulations'). The site is within the Morecambe Bay Special Protection Area (SPA), Morecambe Bay and Duddon Estuary potential SPA (pSPA) and the Morecambe Bay Special Area of Conservation (SAC) which are European sites. The site is also listed as Morecambe Bay Ramsar site¹ and also notified at a national level as Morecambe Bay Site of Special Scientific Interest (SSSI).

Natural England has previously provided advice to the North Western Inshore Fisheries & Conservation Authority (NWIFCA) on Appropriate Assessments for seed mussel removal from Heysham Flat skear during July 2016 and for size mussel removal during December 2016. In both cases, we supported the conclusion that the fisheries would not have an adverse effect on the above designated sites with the implementation of an exclusion zone covering the main historical Sabellaria alveolata reef area (Annex A in the relevant Appropriate Assessments).

Having accompanied the NWIFCA on an inspection of Heysham Flat skear on 12 June 2017, Natural England is content that this year there is no live *S. alveolata* within the previously agreed exclusion zone and no remaining underlying reef structure. Natural England therefore supports the proposal by the NWIFCA that the exclusion zone is not necessary for management of the seed mussel fishery this year. All access should however be prohibited on the outer fringes of the skear through zoning to protect what *S. alveolata* does remain.

Natural England advises that providing this mitigation measure is in place then the seed mussel fishery will not result in adverse effects on the integrity of any of the sites in question.

¹ Listed or proposed Wetlands of International Importance under the Ramsar Convention (Ramsar) sites are protected as a matter of Government policy. Paragraph 118 of the National Planning Policy Framework a protection measures as those in place for European sites. Page 1 of 2





Hombeam House Crewe Business Park Electra Way Crewe Cheshire CW1 6GJ

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It should be noted that this advice is only applicable to the seed mussel fishery during 2017. If the fishery is to open in subsequent years then further inspections of Heysham Flat skear will be required prior to opening in order to ascertain the distribution and abundance of any *S. alveolata*.

Yours sincerely

EUM

Emily Hardman Cheshire, Greater Manchester, Merseyside and Lancashire Area Team Email: <u>Emily.Hardman@naturalengland.org.uk</u> Tel: 0208 0268 356



AUTHORISATION TO FISH UNDERSIZED MUSSELS FROM

HEYSHAM FLAT SKEAR 2017

All Current NWIFCA Byelaw 3 Permit Holders

With effect from ??/07/17

Issue Date: <u>??/07/1</u>7 Expiry Date: 22/12/2017

All current Byelaw 3 permit holders are hereby authorised, under Byelaw 3, paragraph 6 (Minimum Sizes) to fish undersized mussels from Heysham Flat, *excluding the area as defined in paragraph 2*, and are responsible for complying with the conditions given below at paragraph 1.

1. Conditions of Authorisation

This authorisation is issued subject to the following conditions.

- (a) It is only valid for the period from the issue date to the expiry date as stated above, *excluding Bank Holiday Monday 28th August 2016*.
- (b) That the mussels shall only be gathered by hand or with a rake.
- (c) That fishing shall take place only from Monday to Friday inclusive, during daylight hours, defined as one hour before sunrise and one hour after sunset.
- (d) The NWIFCA will close the fishery during periods of prolonged cold weather.
- (e) The authorisation is only valid for current Byelaw 3 permit holders. It does not allow any other person to take or remove undersized mussels.
- (f) This authorisation does not exonerate the holder from other sea fisheries legislation, nor does it prejudice any other consents the holder may need to obtain nor does it override or provide permission to go over private land.
- (g) Any fishing taking place under this authorisation shall be carried out in accordance with the Authority's Code of Conduct for Intertidal Shellfisheries.
- (h) Fishing and transit by ATVs (quad bikes) or tractors in the excluded area as defined in paragraph 2 is prohibited.

2. Definition of Excluded Area

Part of that area within Morecambe Bay known as Heysham Flat Skear as illustrated on the map attached at Annex A, west of lines A-B-C-D, and south of lines D-E-F, defined by the following co-ordinates:

Name	Latitude	Longitude
А	N 54 03.648	W 2 54.676
В	N 54 03.432	W 2 54.872
С	N 54 03.384	W 2 55.027
D	N 54 03.312	W 2 55.010
E	N 54 03.379	W 2 54.803
F	N 54 03.452	W 2 53.965

3. Advisory Notes

- (a) When fishing, or when operating vehicles in the vicinity of Heysham Flat Skear, take care to avoid live colonies of the Honeycomb Worm. These are a protected species, and damaging them could lead to a fine of up to £20,000, revoking of authorisations and **closure of the fishery**.
- (b) NWIFCA officers have the power to withdraw authorisations at any point should the need arise, and will consult with Natural England throughout the duration of the fishery. Should there be concerns that losses of mussel around Morecambe Bay is occurring which will impact on the available bird feeding resource, the NWIFCA will withdraw authorisations and close the fishery.
- (c) Avoid driving vehicles over the seed mussels as far as possible. Using a single access route will avoid unnecessary damage to the mussel stock.

This authorisation may be revoked by the NWIFCA at any time and any breach of the terms or conditions of this authorisation shall make it null and void.

By Order of the Authority

STEPHEN ATKINS Chief Executive

Annex A

Heysham Flat Seed Mussel Exclusion Area 2017

In order to protect *Sabellaria alveolata* on the fringes of the skear, all fishing activity including access is prohibited west of lines A-B-C-D, and south of lines D-E-F.



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