Fisheries in EMS Habitats Regulations Assessment for Red risk categories

Habitats Regulations Assessment document: BNNCSAC-AA 003

European Marine Site:	**Berwickshire and North Northumberland Coast SAC**
Generic sub-feature(s):	**Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities & sub-tidal faunal turf**
Gear type(s):	**Towed (demersal): light otter trawl**
NIFCA tLSE type:	**Appropriate Assessment**
Gear/feature interaction reference(s):	**BNNCSAC-294 BNNCSAC-295 BNNCSAC-296**

Revision history		
Date	***Revision***	***Editor***
30/11/2018	Document created following comments at a National MPA Working Group meeting (24/10/2018) advising that these feature fishery interactions should be taken to an Appropriate Assessment. Note that as part of the byelaw process an Impact Assessment had been produced.	NW AA CLS
3/12/2018	AA started to populate and write document	AA
4/12/2018	Document reviewed (Natural England)	CLS
4/12/2018	Edits made to document	AA
17/01/2019	Document slightly revised and agreed	NW AA CLS

Has Natural England been formally consulted on this HRA (and do they agree)?	**Yes**

Date of document completion/'sign-off':	**17/01/2019**

1. Introduction

1.1 1.1 Need for an HRA assessment

In 2012, the Department for Environment, Food and Rural Affairs (Defra) announced a revised approach to the management of commercial fisheries in European Marine Sites (EMS). The objective of this revised approach is to ensure that all existing and potential commercial fishing activities are managed in accordance with Article 6 of the Habitats Directive.

This approach is being implemented using an evidence based, risk-prioritised, and phased basis. Risk prioritisation is informed by using a matrix of the generic sensitivity of the sub-features of EMS to a suite of fishing activities as a decision-making tool. These sub-feature-activity combinations have been categorised according to specific definitions, as red, amber, green or blue.

Activity/feature interactions identified within the matrix as red risk have the highest priority for implementation of management measures by the end of 2013 in order to avoid the deterioration of Annex I features in line with obligations under Article 6(2) of the Habitats Directive. Activity/feature interactions identified within the matrix as amber risk require a site-level assessment to determine whether management of an activity is required to conserve site features. Activity/feature interactions identified within the matrix as green also require a site level assessment if there are "in combination effects" with other plans or projects.

Site level assessments are being carried out in a manner that is consistent with the provisions of Article 6(3) of the Habitats Directive. The aim of this assessment is to determine whether management measures are required in order to ensure that fishing activity or activities will have no adverse effect on the integrity of the site. If measures are required, the revised approach requires these to be implemented by 2016.

Northumberland Inshore Fisheries and Conservation Authority (NIFCA) is implementing the site-level assessment process in four phases:

1. simple screening assessment (activity is not occurring), or interaction categorised as blue in the matrix (no interaction with the feature))
2. likely significant effect (LSE) type test (scale or magnitude of effect not likely/likely to be significant)
3. detailed LSE type test
4. appropriate assessment (AA) type test (ascertaining whether the activity will cause an adverse effect on site integrity)

The purpose of this site specific assessment document is to assess whether or not in the view of **Northumberland Inshore Fisheries and Conservation Authority** the fishing activities considered here (**Light otter trawls**) have a likely significant effect on the **Reef features** of the **Berwickshire and North Northumberland Coast SAC**, and on the basis of this assessment whether or not it can be concluded that **Light otter trawls** will not have an adverse effect on the integrity of this EMS. The other features for this site have either been classified as blue in the matrix or have been determined not to have a significant effect at phase 2 or 3 assessments and are therefore not included in this assessment.

Mobile gear activity is heavily restricted within the SAC, with three soft ground areas opening to light otter trawls only. At Phase 3, the assessment concluded no likely significant effect however the gear/feature interaction have been taken to Phase 4 as, due to new legislation, an assessment cannot be screened out due to mitigating factors through the Sweetman ruling[1]. An in-combination assessment will be carried out and will include gears screened out from the phase 2/3 assessment[2] for this site (section 8) and other non-fishery related activities.

[1] Court of Justice of the European Union ("CJEU") *People Over Wind and Sweetman v Coillte Teoranta* (C-323/17)
[2] Note: gears screened out of HRA type assessment in phase 2/3 are documented in site audit spreadsheet and are considered in-combination in section 8.

1.2 Documents reviewed to inform this assessment

- Defra's risk assessment Matrix of fishing activities and European habitat features and protected species[3]
- NIFCA Byelaw 1 Trawling permit numbers
- Natural England Fisheries Impact Evidence Database
- MMO Sea Fisheries Statistics
- Reference list (Annex 1)
- Site boundary map (Annex 2)
- Map of habitats within the BNNC SAC (Annex 3)

2. Information about the BNNC SAC

The Berwickshire and North Northumberland Coast SAC stretches from Alnmouth in Northumberland, along 115km of coastline to Fast Castle Head in Berwickshire and out to almost 4 nautical miles at its widest point, encompassing 645km^2 of shore and sea (Annex 2). The BNNC SAC contains a complex of marine habitat types and associated communities that is unusually diverse for the North Sea. Intertidal mudflats and sand flats, seagrass beds, intertidal reefs and intertidal and submerged sea caves, all contribute to the site's overall habitat diversity and international importance. The BNNC SAC also provides important habitat for the grey seal *Halichoerus grypus,* as well as internationally important populations of overwintering and summer breeding bird species[29].

2.1 Overview and qualifying features

- Annex I Habitat **1170 Reefs:**

Reefs are rocky marine habitats or biological concretions that arise from the seabed. They are predominantly subtidal within the BNNC SAC and extend into the intertidal zone. The types of reef which characterise this feature include vertical rock walls, horizontal ledges, broken rock and boulder fields. Reef habitats, mainly classified as moderately exposed to waves, occur throughout the BNNC SAC where they support a high diversity of communities and species characterised by algae, invertebrates and associated mobile animals such as crustaceans and fish. The diversity and composition of biological communities on the reef are a direct result of variation in this habitat type and are influenced by a number of key environmental factors e.g. coastal geology and hydrodynamic regime. For the reefs feature within this site, the following sub-features are identified in the Regulation 33/35 advice: rocky shore communities (referred to as intertidal rocky reef), kelp forest communities and sublittoral/subtidal faunal turf communities. During the earlier screening process (Phase 3) the assessment concluded no likely significant effect however the gear/feature interaction cannot be screened out at this stage as mitigating factors are in place to limit the impacts of the fishery on the following sub-features:

1. **Subtidal bedrock reef**
2. **Subtidal boulder and cobble reef ('stony reef')**

The subtidal rocky reefs and their rich marine communities are the most diverse examples found on the North Sea coast due to the wide range of physical conditions and diverse substrata ranging from soft limestone to hard volcanic rock. As a consequence, subtidal reefs within the BNNC SAC have a high diversity of communities and species. A large number of the species present are characteristic of cold water such as the anemone *Bolocera tuediae* and the bottle brush hydroid *Thuiaria thuja*, with some others reaching their southern or eastern limit of distribution such as the Devonshire cup coral *Caryophyllia smithii*.

3. **Kelp forest communities**

[3]See Fisheries in EMS matrix: http://www.marinemanagement.org.uk/protecting/conservation/documents/ems_fisheries/populated_matrix3.xls

Kelp forests are highly productive ecosystems, contributing significantly to primary production in coastal waters. Much of the open coast within the BNNC SAC is fringed by dense kelp forest communities. Kelp species such as *Laminaria hyperborea*, which occurs in the sublittoral fringe but is mostly found sub-tidally, supports a rich understorey of red algal turf and short epifaunal turf. Beyond this fringing area, reefs in over 10m depth of water, are characterised by urchin grazed kelp habitats and communities of small crabs, squat lobsters and anemones. The kelp forest communities are therefore considered to be key structural and functional components of the reefs within the BNNC SAC.

4. **Subtidal faunal turf communities**

Where kelp communities and other algae are unable to establish due to a lack of light, faunal turf communities tend to dominate the reefs, forming a species rich and structurally and functionally important component of the reef ecosystem. This living turf comprises diverse assemblages of attached animals growing on subtidal substrata, ranging from encrusting forms such as sea mats and sponges, to tall erect soft corals and sea fans. These communities also include prominent mobile species, echinoderms, molluscs, fish and crustaceans, some of which are commercially important, in particular the European lobster (*Homarus gammarus),* and Brown crab (*Cancer pagarus*), which is targeted by the potting fleet off the Northumberland coast. At the Farne Islands for example, dense beds of deadman's fingers *Alcyonium digitatum*, plumose anemones *Matridium senile*, the hydroid *Tubularia larynx* and a short turf of byozoans and ascidians attach firmly to the rock.

The boundaries of faunal turf communities and kelp forests are often blurred and so for the purpose of this Appropriate Assessment, trawling impacts are considered for the feature 'subtidal reef' habitats (subtidal bedrock reef and subtidal boulder and cobble reef) and communities (Kelp forest and subtidal faunal turf communities) as a whole.

2.2 Conservation Objectives

The Conservation Objectives provided are targeted at the site's supporting habitats for the EC Habitats Directive qualifying features and are set, subject to natural change to 'Maintain' in favourable condition. The Conservation Objectives were assigned a confidence level based on the quality of evidence used to infer condition of the feature. The dated 'Maintain' Conservation Objective assigned to the feature Reefs within the BNNC SAC has been retained and was assigned a 'Medium' confidence level.

The Conservation Objectives for the Berwickshire and North Northumberland Coast SAC feature **1170 Reefs** are 'Subject to natural change, to **maintain*** in favourable condition:

- the total extent and spatial distribution of reef;
- the presence and spatial distribution of reef communities;
- [Restrict OR Reduce] the introduction and spread of non-native species and pathogens, and their impacts;
- the surface and structural complexity, and the stability of the reef structure;
- the abundance of listed typical species, to enable each of them to be a viable component of the habitat;
- the species composition of component communities;
- the natural physical energy resulting from waves, tides and other water flows, so that the exposure [High / Medium / Low] does not cause alteration to the biotopes, and stability, across the habitat;
- the natural physico-chemical properties of the water;
- the natural rate of sediment deposition;

- aqueous contaminants to levels equating to (High / Good) Status (according to Annex VIII and X of the Water Framework Directive), avoiding deterioration from existing levels;

- the dissolved oxygen (DO) concentration [at / to] levels equating to [Good / High] Ecological Status [(specifically ≥ XX mg per litre (at 35 salinity) for 95 % of the year)], avoiding deterioration from existing levels;
- the natural water quality and specifically winter dissolved inorganic nitrogen (DIN) [at / to] a concentration equating to [Good / High / Moderate] Ecological Status [(specifically mean winter DIN is < XX µM for coastal waters)], avoiding deterioration from existing levels;

- natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

3. Interest feature/fisheries interaction of the BNNC SAC categorised as 'Red' risk and overview of management measure(s)

- **H1170 Reefs**

The red risk interaction of mobile fishing gears and reef features was addressed in 2014 with the creation and implementation of NIFCA Byelaw 7: Prohibition of the use of Mobile Fishing Gear within the English section of the Berwickshire and Northumberland Coast SAC. This was operating under the precautionary approach due to a lack of evidence on the extent and distribution of the subtidal rocky reef within the SAC boundary.

- **A2.61 Intertidal seagrass beds**

Further measures were also brought in to address the red risk interaction of fishing activity on/amongst seagrass beds (particularly at Lindisfarne where extensive seagrass beds are found): NIFCA Byelaw 8: Seagrass Protection Byelaw within the English section of the Berwickshire and North Northumberland Coast SAC.

Figure 1 Map produced by the Environment Agency seagrass survey

4. Information about fishing activities within the site

In assessing the level of trawling within the NIFCA district, three sources of data have been analysed; the number of permit holders detailing the number of local trawling vessels operating within 3 nautical miles (high data confidence), Officers' patrol sighting data (high data confidence) and MMO Sea Fisheries Statistics (medium data confidence).

4.1 Light otter trawls

A bottom trawl is constructed like a cone-shaped net that is towed (by one or two boats) on the bottom. It consists of a body ending in a codend, which retains the catch. Normally the net has two lateral wings extending forward from the opening. The mouth of the trawl is framed by headline and ground rope. They are designed to catch species above the sea bed but do however have components which remain in contact with the sea bed during the fishing activity[28]. Parts of the gear such as ropes, chains, sole plates and teeth come into contact with the sea floor to keep the trawl mouth open but may not remain in continuous contact. Other components such as the trawl doors must penetrate the sediment for the duration of the fishing activity and could impact the sea bed[28].

Three categories of bottom trawls can be distinguished based on how their horizontal opening is maintained: demersal otter trawls, demersal pair trawls and beam trawls. This assessment concerns the first of the three: **demersal light otter trawls**, pair trawls and beam trawls do not operate within the NIFCA district (NIFCA Byelaw 1).

The local fishery takes place between 3-25 miles offshore with best catches being seen during the autumn and winter months. When the fishery is at its height it also attracts a large number of visiting trawlers from Scotland, Northern Ireland and other English ports. The majority of the visiting trawlers are larger and more powerful than the local boats, and this enables them to work further offshore in most weather conditions. In the summer months a number of smaller under 10 metre boats from North Shields, Blyth and Amble move up to the Firth of Forth to target the summer prawns, normally working daylight and darkness throughout the week and coming home at weekends. The remaining under 10 metre boats and the larger local trawlers tend to work further offshore (beyond 6 nm) in the summer when the weather is usually finer, targeting both white fish and prawns (A. Browne, NIFCA, November 2018, pers. comms.).

In the last 5 years the trawl fleet has become ever more reliant on the local prawn (*Nephrops norvegicus*) fishery, which is now the fleet's principal fishery. Anecdotal evidence indicates that the decline in the use of demersal light otter trawls within the NIFCA district is due to various factors, but predominantly the introduction of Total Allowable Catches and quotas in 1983, which drove many towards potting for shellfish. Locally, the cessation of dumping sewage sludge at sea around 15 years ago, particularly off the River Tyne and Blyth, is indirectly attributed to a decline in local cod (*Gadhus* morhua) stocks, which used the dumping grounds for feeding. In 2016, NIFCA began permitting trawling activity within 3nm. There were 34 vessels with permits, this decreased to 25 in 2018. The number of local vessels has decreased since 2010 (Table 1). Landings of *Nephrops* into ports in the NIFCA district have fluctuated since 2013 (940 tonnes) with a with a significant decrease in 2015 (550 tonnes), this increased in 2016 but decreased again in 2017 (740 tonnes) (Fig. 2) (MMO Sea Fisheries Statistics, 2017).

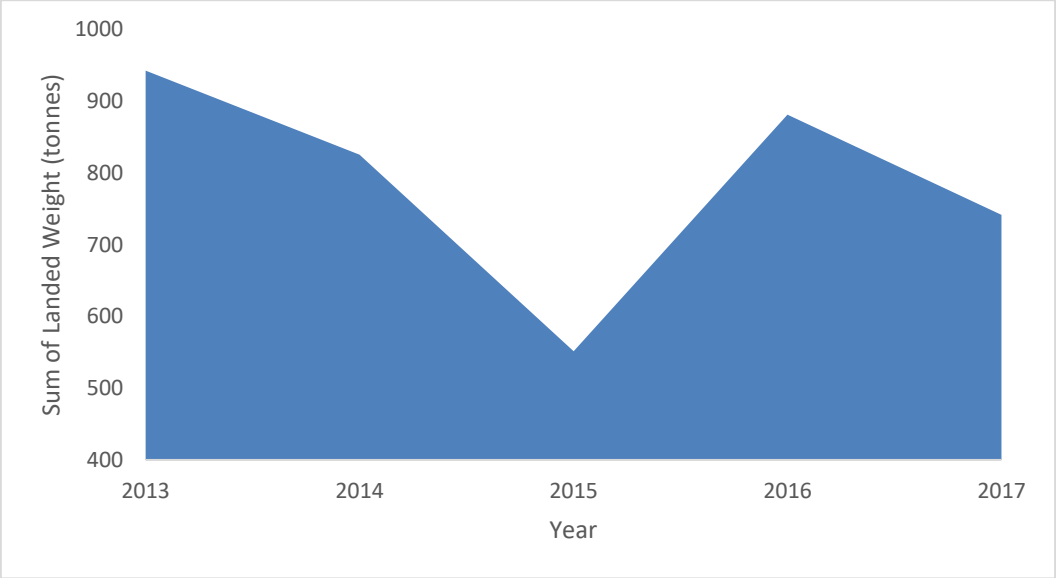

Figure 2 Landings by weight of *Nephrops* landed into ports in the Northumberland IFCA district by demersal trawls 2013-2016.

Landings of cod from demersal trawls into NIFCA district ports have also fluctuated but with an overall decline from 2013 to 2016. Landings peaked in 2015 (177 tonnes) and decreased to 2017 (25 tonnes) (MMO Sea Fisheries Statistics, 2017).

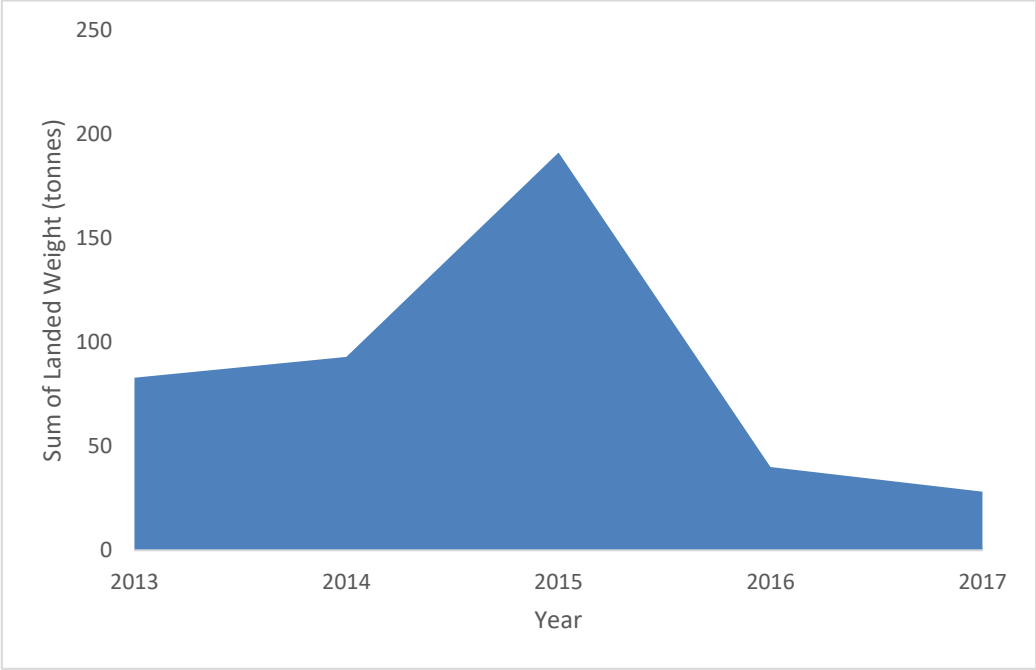

Figure 3 Landings by weight of cod landed into ports in the Northumberland IFCA district by demersal trawls 2013-2016.

Table 1 Number of active trawling vessels with home ports in the NIFCA district.

	2010	2012	2018
Under 10 m	32	22	25
Over 10 m	19	13	8
Total	**51**	**35**	**33**

Much of the NIFCA district is designated as the Farne Deeps ground. This is defined as ICES rectangles 38E8, 38E9, 39E9, 40E8 and 40E9. Here, there are different regulations on mesh sizes and a quota. Mesh sizes of the trawls are dependent on their target species, for the UK sizes are specified under Council Regulation (EC) No 850/98 of 30 March 1998 for the conservation of fishery resources through technical measures for the **protection of juveniles of marine organism**s. Annex 1 states the minimum mesh sizes for towed gears, applicable to our district, with 80 mm used for *Nephrops*. Within the Farne Deeps the mesh size has been increased to 90 mm. *Nephrops* are a quota

species, for 2018, the quota for the under 10 fleet was capped at 20 tonne per quarter and for the over 10 fleet at 20 tonne per quarter within the Farne Deeps, limiting fishing activity when this quota is reached.

Within the BNNC SAC, Byelaw 7 prohibits the use of mobile gear. This was implemented under the precautionary approach as the presence and extent of the protected reef features was unknown. This management was put in place under the proviso that the extent of the reef feature would be determined with the potential to reopen historic grounds where no reef features are present. This evidence gathering process is set out in detail in the tSLE below. Of the three areas, one is an area of muddy sand targeted by light otter trawls for *Nephrops*, the other two are sandy areas historically trawled for whitefish. The primary target species here was cod, with some whiting and flatfish caught as well. Since there has been a decline in the trawl fishery throughout the district due, in part, to the decrease in whitefish activity within the BNNC SAC is predicted to be minimal.

It is important to note that the open areas of the BNNC SAC are within 3nm, therefore only <12m vessels are permitted to trawl within them.

4.2 Management (Trawling

Commercial trawling within the NIFCA district is regulated by the following byelaws which are summarised:

NIFCA byelaw 1 Trawling

Prohibitions a person must not fish for sea fish using a trawl or other net towed by a vessel within the NIFCA district other than (a) the vessel is less than 12 metres in overall length; and the use is in accordance with a permit and any conditions attached to that permit. Or (b) if the vessel is between 12 metres overall length and 18.3 metres in overall length, the vessel can only fish between 3 nautical miles and 6 nautical miles. All persons trawling within the NIFCA district must use a single trawl fitted with a single cod-end and one pair of otter boards.

NIFCA byelaw 7 Prohibition on the use of mobile fishing gear within the English section of the BNNC SAC

No person shall fish using mobile gear of any description (trawls, dredges etc.) in any part of the English section of the BNNC SAC.

4.3 Other fishing activity within the BNNC SAC

Potting for crustacea is the most commercially important fishery on the Northumberland Coast. Pots are typically worked in fleets of 10-40, pots are deployed and left to soak typically for 1-3 days before being hauled, the contents emptied and reset. Potting occurs predominantly on subtidal hard substrates targeting European lobster, edible crab and velvet crab (*Necora puber*) as well as some fish species such as Atlantic cod and Atlantic wolf fish (*Anarhichas lupus*). Potting on subtidal soft sediments targeting edible crab and *Nephrops* also occurs within the site but is largely focused on areas further offshore during the winter months. The number of commercial shellfish permits registered within the district has declined from 155 in 2001 to 97 in 2016, however the number of pots worked per month has increased by over 20%. Potting activity within the NIFCA district **at current** levels**, alone** is **NOT having an** adverse effect on designated reefs within the BNNC SAC.

Some bottom-set static netting activity, targeting whitefish e.g. cod, saithe, plaice still occurs within the BNNC SAC, however levels of gill/entangling netting activity have dropped considerably in recent years as a result of quota restrictions and increasing interactions with grey seals, which predate on fish in the nets. Just one vessel reported static netting activity within the BNNC SAC in 2015 (see various static netting HRAs for full details).

There are nine licenses within the BNNC SAC for fixed 'T-nets' and 2 drift nets targeting anadromous species (salmon and sea trout). The assessment of T, J and drift nets for the migratory salmonid fishery is regulated by the Environment Agency and who are required to carry out Appropriate Assessments where required. This activity is however considered in Section 8 of this document within the in-combination assessments.

5. Test for Likely Significant Effect (tLSE)

The Habitats Regulations assessment (HRA) is a step-wise process and is first subject to a coarse test of whether a plan or project will cause a likely significant effect on an EMS[4].

Test for Likely Significant Effect (LSE)

BNNCSAC-294 Subtidal bedrock reef
BNNCSAC-295 Subtidal boulder and cobble reef
BNNCSAC-296 Kelp forest communities & sub-tidal faunal turf

1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?	No
2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)? *Sensitivities as listed are based on DRAFT Interim conservation advice. Reference to Regulation 33 advice for the BNNC SAC and best judgement has been used to determine which of these pressures are truly exerted by the gear type(s).	**Abrasion/disturbance of the substrate on the surface of the seabed[1]** **Introduction or spread of non-indigenous species[2]** **Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion[3]** **Removal of non-target species** [4] Changes in suspended solids (water clarity)[5] Organic enrichment[6] Physical change (to another seabed type)[7] Siltation rate changes (High), including smothering (depth of vertical sediment overburden)[8] Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)[8]
3. Is the feature potentially exposed to the pressure(s)?	No

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

4. What are the conservation objectives for the feature? *DRAFT interim conservation advice does not give definitive conservation objectives. However, completing an HRA without COs is difficult. The CO as listed in this document is based on Regulation 33 advice (June 2000), interim Regulation 35 advice, current knowledge of the status, and the pressures affecting designated features (see sections 4 &5). Expert judgement has been used to determine which features may be exposed to the pressure(s) resulting in inferred COs. These COs are assigned a degree of uncertainty i.e. a subjective confidence level based on evidence 'High', 'Medium,' 'Low', and 'Unknown'.	Conservation objective for subtidal rocky reef features: **Maintain*:** - The total extent of circalittoral reef - <u>The presence and spatial distribution of subtidal bedrock and subtidal stony reef communities</u> - <u>The surface and structural complexity, and the stability of the reef structure</u> - <u>The abundance of listed typical species, to enable each of them to be a viable component of the habitat</u> - The natural physical energy resulting from waves, tides and other water flows - The natural physico-chemical properties of the water - The natural rate of sediment deposition - <u>**Restrict or Reduce:** the introduction and spread of non-native species and pathogens.</u> - **Restrict or Reduce:** aqueous contaminants to levels Those conservation objectives that might be affected by light otter trawling are underlined. *Confidence level for interim, inferred Conservation Objective: **MEDIUM** (see section 6 for detail).

5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?	If the light otter trawl gear came into contact with the feature pressure would be exerted by movement of gear components over, and penetration into, seabed. The magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions[2]. Direct impacts of this include: - Resuspended sediments which may trigger productivity pulses over rocky reef[8] - Re-mobilisation of buried organic and inorganic matter[9] - Increased chance of the introduction of micropathogens[10] and invasive non-native species[11] - Bycatch causing changes to community structure[12] - Loss of reef associated communities[13] Generally, light otter trawling is unlikely to occur of rocky reef as there is a risk of gear getting snagged and damaged. Therefore, the impact of the gear on rocky reef and kelp forest communities and subtidal faunal turfs are unlikely to occur. Within the NIFCA district, light otter trawling can only be carried out with a permit (NIFCA Byelaw 1: Trawling). In 2016, 34 permits were issued, which decreased to 25 in 2018. The byelaw also places restrictions on vessels: they must not exceed 12 m in length in the area between 0 and 3 nautical miles (nm); and 18.3 m between 3 and 6 nm. It also places restrictions on gear: only a single trawl fitted with a single cod end and one pair of otter boars is permitted. NIFCA officers record sightings of fishing activity on routine patrols throughout the district (Appendix 1). Prior to the closure of the site to mobile gear, the level of trawling activity in the site was very low, with one sighting recorded between 2010 and 2013. After the closure of the site to mobile gear, zero sightings have been recorded. No activity has been recorded in the site since 2012. There is a byelaw in place (NIFCA Byelaw 7: Prohibition of the use of Mobile Fishing Gear within the English section of the Berwickshire and North Northumberland Coast Special Area of Conservation) to prohibit the use of mobile gear, including light otter trawls, within the BNNC SAC. This byelaw is in the process of being updated, evidence has been supplied to DEFRA to revise the byelaw to allow light otter trawls within specified areas of the site where protected reef features are not present. In 2013, the BNNC SAC was closed to mobile gear since the gear/feature interaction was classified as red risk. This decision was taken on the proviso that the regulation would be reviewed after the location and extent of the protected reef features had been identified and mapped, with the potential to

	reopen areas of soft ground, where no protected features are present, to light otter trawls. Extensive work has been carried out to identify the location and extent of Annex 1 reef features and associated biotopes within sections of the English section of the BNNC SAC using acoustic data and targeted video ground-truthing data. NIFCA collected acoustic data using single beam sonar equipment. This was complimented by a CEFAS, in partnership with Natural England, commissioned study which used multibeam sonar to categorise hard and soft ground (Appendix 2)[14]. At stakeholder events held in 2015, fishers supplied information on soft ground habitat within the site. This, combined with the acoustic data (NIFCA and CEFAS), was the focus of ground truthing effort in surveys carried out in 2015. A series of drop-down video camera surveys were carried out by CEFAS (2002, 2003, 2011, 2012) and NIFCA (2015). Protected areas of reef and areas of soft sediment were confirmed (Appendix 3). This was compared with grab sample data gathered by the Environment Agency in similar areas (EA data supplied to NIFCA). Their findings corroborate NIFCA data. A 100m buffer was applied around identified areas of hard ground following advice from Natural England and JNCC[15] to further protect features from any gear deployed within the site (Appendix 4). Areas of soft sediment are proposed to be opened to light otter trawls with an amendment made to NIFCA byelaw 7. Activity is only permitted in certain areas of identified soft sediment with no activity over protected reef features. There is a fourth area of soft sediment, which will not be opened to light otter trawling, and may be kept as a reference area for future monitoring. With all the evidence complied, any light otter trawling activity that occurs within the three open areas of the BNNC SAC will not impact the features of this site. Light otter trawls continue to be prohibited in the remainder of the site.

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<table>
<tr><td>6. Condition and Conservation Objective Inferences</td><td colspan="2">The interim conservation objective for reef features within this site is set to Maintain in favourable, in particular: the extent, distribution, diversity and species richness of reef communities.

Work towards determining the extent of the reef feature has been conducted by CEFAS[14] and by NIFCA. Sub-tidal reef features within the English section of the site have been calculated at 25.35% of the area. Less than 4% of the undesignated soft ground within the BNNC SAC (for which detailed habitat data is available) and less than 1% of the total area of the SAC (for which detailed habitat data is available) will be opened to light otter trawling.

A condition monitoring report commissioned by Natural England[16] on subtidal rocky reef looking at a small proportion of the site indicated that biotopes between 2002-2010 were consistent, pointing towards the indication that condition had not changed. Current ongoing monitoring work includes a project led by Newcastle University (with NIFCA, North Eastern IFCA and Natural England partners) to identify regional indicators for rocky habitat health. Survey methods including drop down video camera are employed in three historic research areas or “corridors” within the BNNC SAC. Biotopes will be classified with indicators of health compared to other areas and adopted, if suitable.

Provisionally, condition is thought to be unchanged and in combination with Conservation Objective of ‘Maintain’ based on Regulation 33 advice (June 2000) a ‘Medium’ confidence level has been assigned.</td></tr>
<tr><td>7. Is the potential scale or magnitude of any effect likely to be significant?</td><td>Alone:

Yes</td><td>OR In-combination

No</td></tr>
<tr><td>8. Have NE been consulted on this LSE test? If yes, what was NE’s advice?</td><td colspan="2">Yes
For the purposes of this LSE there is a condition that only light otter trawls with no rock hopping gear will be used within the defined mobile zone areas. Due to recent legislation[5] this assessment cannot be conclusive as a condition is applied to ensure that there is no likely significant effect. Therefore, an Appropriate Assessment is required.</td></tr>
</table>

[5] Court of Justice of the European Union (“CJEU”) *People Over Wind and Sweetman v Coillte Teoranta* (C-323/17)

BNNCSAC-tLSE 030

Conclusion

Is the proposal likely to have a significant effect 'alone or in combination' on the Berwickshire and North Northumberland Coast SAC?

No

6. Appropriate Assessment

If a 'Test of Likely Significant Effect (Section 5) identified the potential for a significant effect on the SAC feature/sub-feature as a result of the gear-type under consideration, or if there is a lack of information regarding the impact of the gear type on the feature, or mitigation is in place to limit the impact of the gear on a feature it has been carried forward for a full Appropriate Assessment to assess whether or not the potential LSE is likely to have an adverse effect on the conservation objectives given for the designated features of the site in question. The full appropriate assessment for the gear/feature interaction of light otter trawls/reefs within the BNNC SAC is given below.

6.1 Potential risks to features

The potential pressures, ecological impacts, levels of exposure and mitigation measures for the fishing activity (trawling) in regards to the subtidal bedrock reef, subtidal boulder and cobble reef, kelp forest communities and subtidal faunal turfs within the BNNC SAC are summarised in Table 3.

The following conservation objectives for **reefs** are not deemed to be at risk from pressures associated with trawling activity within the BNNC SAC (or they are outside the remit of NIFCA):

- the total extent and spatial distribution of reef;
- the natural physical energy resulting from waves, tides and other water flows, so that the exposure [High / Medium / Low] does not cause alteration to the biotopes, and stability, across the habitat;
- the natural physico-chemical properties of the water;
- the natural rate of sediment deposition;
- aqueous contaminants to levels equating to (High / Good) Status (according to Annex VIII and X of the Water Framework Directive), avoiding deterioration from existing levels;
- the dissolved oxygen (DO) concentration [at / to] levels equating to [Good / High] Ecological Status [(specifically ≥ XX mg per litre (at 35 salinity) for 95 % of the year)], avoiding deterioration from existing levels;
- the natural water quality and specifically winter dissolved inorganic nitrogen (DIN) [at / to] a concentration equating to [Good / High / Moderate] Ecological Status [(specifically mean winter DIN is < XX µM for coastal waters)], avoiding deterioration from existing levels;
- natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

Table 3: Summary of Impacts

Feature/Sub feature(s)	Conservation Objective*	Potential pressure** (such as abrasion, disturbance) exerted by gear type(s)	Potential ecological impacts of pressure exerted by the activity/activities on the feature**	Level of exposure of feature to pressure	Mitigation measures
Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities and Subtidal faunal turfs	**Maintain the presence and spatial distribution of reef communities.**	Abrasion/disturbance of the substrate on the surface of the seabed	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions[1].	Epibenthic species may be dislodged by abrasion/disturbance caused by gear in contact with the seabed, movement of gear on the seabed and recovery of gear[26,27]. The protected feature, and the subject of this HRA: subtidal reefs should not be exposed to the pressure as fishers should not be in the vicinity of subtidal rock features. They will be operating on mobile sediments within defined zones in which a buffer zone is also included. The total number of vessels with a permit to trawl within 3 nm of the shore (and therefore within the open area of the BNNC SAC) is 25 under 12m vessels permitted to use a single trawl only (2018). Expert local knowledge says that only 19 vessels are rigged for trawling and could actively fish within the district (with the total actually fishing estimated to be fewer). Vessels apply for a permit to ensure they have a 'track record' should there be any future management further limiting the fishery (A.	Byelaw 7 limits fishing activity to three areas which have been identified to have no reef features present, through extensive research detailed in the above tLSE. A buffer has been added around identified rocky reef features to decrease the likelihood of light otter trawls accidentally interacting with the subtidal reef feature, and sediment resuspension/distribution on reef biotopes.

* Based on conservation objectives provided in Natural England draft interim Regulation 35 Conservation Advice (received July 2015). This conservation advice however does not provide definitive objectives (i.e. Maintain/Recover/Restore), which makes completing an HRA difficult. The CO as listed in this document is based on Regulation 33 advice (June 2000), current knowledge of the status, and the pressures affecting designated features.

** Based on 'Advice on Operations' provided in Natural England draft interim Regulation 33 Conservation Advice (received July 2015).

				Browne NIFCA, October 2018, pers. comm.). Fishers should not be in the vicinity of subtidal rock features. Decline in the Northumberland white fish fishery means the main target species for the demersal trawl fishery is *Nephrops*. Two of the open areas are historical white fish trawl grounds, the other area is historical *Nephrops* trawl ground. The decline in the white fish fishery means any fishing activity in the historical white fish grounds will be low.	Cognizant of the extant research into a limited number of habitats studied throughout the SAC, NIFCA have adopted the approach of implementing a Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features. Starting in 2019, NIFCA is implementing a permit returns scheme for all trawling activity permitted in the district. This will increase knowledge on the scale and intensity of activity, catch and bycatch levels.

		Changes in suspended solids (water clarity)	Bottom towed gear may have direct impacts on seabed and produce significant amounts of re-suspension which may trigger off considerable productivity pulses due to the rate of dissolved and particulate nutrient releases from seabed disturbance[3].	Given the hydrodynamics of the area there is high levels of natural redistribution of sediment in the SAC (Mercer et al., 2003; Stephenson, 2016) Gear not deemed to produce resuspension to significant levels due to the type of gear (light otter trawls) on sandy mobile sediment will not penetrate the seabed as severely as other bottom towed gear. Further, fishing intensity is minimal thus the sediment disturbance from the few vessels operating is unlikely to contribute significantly over and above natural processes.	None required, except implementation of Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features.
		Siltation rate changes, including smothering (depth of vertical sediment overburden)	May result from sediment mobilisation in wake behind gear components. The extent of the changes would depend on intensity/scale, substratum type (particle size) and hydrographic conditions[6].	Given the hydrodynamics of the area there is high levels of natural redistribution of sediment in the SAC (Mercer et al., 2003; Stephenson, 2016) Gear not deemed to produce resuspension to significant levels due to the type of gear (light otter trawls) on sandy mobile sediment will not penetrate the seabed as severely as other bottom towed gear. Further, fishing intensity is minimal thus the sediment disturbance from the few vessels operating is unlikely to contribute significantly over and above natural processes.	None required, except implementation of Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features.

		Removal of non-target species	Pressure may be exerted by by-catch associated with fishing activities. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis[4].	Two of the open areas are historical white fish trawl grounds, the other area is historical *Nephrops* trawl ground. The main target species of the demersal light otter trawl fishery is *Nephrops*. In this fishery, fishers are highly selective about the areas fished. *Nephrops* are generally found in soft sediment mud or muddy sand (A. Browne, NIFCA, October 2018, pers. comm.). Historically in the BNNC SAC, whitefish have been targeted by demersal light otter trawls on sandy sediments (the new proposed areas). Fishing will not take place over rocky ground where there is risk of damage to light otter trawl gear.	Byelaw 7 limits fishing activity to three areas which have been identified to have no reef features present, through extensive research detailed in the above tLSE. A buffer has been added around identified rocky reef features to decrease the likelihood of light otter trawls accidentally interacting with the subtidal reef feature, and sediment resuspension/distribution on reef biotopes.

					Cognizant of the extant research into a limited number of habitats studied throughout the SAC, NIFCA have adopted the approach of implementing a Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features. Starting in 2019, NIFCA is implementing a permit returns scheme for all trawling activity permitted in the district. This will increase knowledge on the scale and intensity of activity, catch and bycatch levels.

Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities and Subtidal faunal turfs	**Maintain the surface and structural complexity, and the stability of the reef structure**	Abrasion/disturbance of the substrate on the surface of the seabed	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions[1].	Disturbance and abrasion could occur from gear coming into contact with the seabed. Fishers will not be targeting the subtidal rocky reef, they will be operating on mobile sediments within defined zones in which a buffer zone is also included.The protected feature, and the subject of this HRA: subtidal reefs should not be exposed to the pressure as fishers should not be in the vicinity of subtidal rock features. They will be operating on mobile sediments within defined zones in which a buffer zone is also included. The total number of vessels with a permit to trawl within 3 nm of the shore (and therefore within the open area of the BNNC SAC) is 25 under 12m vessels permitted to use a single trawl only (2018). Expert local knowledge says that only 19 vessels are rigged for trawling and could actively fish within the district (with the total actually fishing estimated to be fewer). Vessels apply for a permit to ensure they have a 'track record' should there be any future management further limiting the fishery (A. Browne NIFCA, October 2018, pers. comm.). Fishers should not be in the vicinity of subtidal rock features. Gear not deemed to produce resuspension to significant levels due to both type of gear (light otter trawls) on sandy sediment will not penetrate the seabed as severely as other bottom towed gear, and fishing intensity. Minimal activity will take place in the site.	Byelaw 7 limits fishing activity to three areas which have been identified to have no reef features present, through extensive research detailed in the above tLSE. A buffer has been added around identified rocky reef features to decrease the likelihood of light otter trawls accidentally interacting with the subtidal reef feature, and sediment resuspension/distribution on reef biotopes.

				Decline in the Northumberland white fish fishery means the main target species for the demersal trawl fishery is *Nephrops*. Two of the open areas are historical white fish trawl grounds, the other area is historical *Nephrops* trawl ground. The decline in the white fish fishery means any fishing activity in the historical white fish grounds will be low.	Cognizant of the extant research into a limited number of habitats studied throughout the SAC, NIFCA have adopted the approach of implementing a Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features. Starting in 2019, NIFCA is implementing a permit returns scheme for all trawling activity permitted in the district. This will increase knowledge on the scale and intensity of activity, catch and bycatch levels.

		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions[4].	Disturbance and abrasion could occur from gear coming into contact with the seabed. The total number of vessels with a permit to trawl within 3 nm of the shore (and therefore within the open area of the BNNC SAC) is 25 under 12m vessels permitted to use a single trawl only (2018). Expert local knowledge says that only 19 vessels are rigged for trawling and could actively fish within the district (with the total actually fishing estimated to be fewer). Vessels apply for a permit to ensure they have a 'track record' should there be any future management further limiting the fishery (A. Browne NIFCA, October 2018, pers. comm.). Fishers should not be in the vicinity of subtidal rock features. Gear not deemed to produce resuspension to significant levels due to both type of gear (light otter trawls) on sandy sediment will not penetrate the seabed as severely as other bottom towed gear, and fishing intensity. Minimal activity will take place in the site. Decline in the Northumberland white fish fishery means the main target species for the demersal trawl fishery is *Nephrops*. Two of the open areas are historical white fish trawl grounds, the other area is historical *Nephrops* trawl ground. The decline in the white fish fishery means any fishing activity in the historical white fish grounds will be low.	None required, except implementation of Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features.

		Siltation rate changes, including smothering (depth of vertical sediment overburden)	May result from sediment mobilisation in wake behind gear components. The extent of the changes would depend on intensity/scale, substratum type (particle size) and hydrographic conditions[6].	Given the hydrodynamics of the area there is high levels of natural redistribution of sediment in the SAC (Mercer et al., 2003; Stephenson, 2016) Gear not deemed to produce resuspension to significant levels due to the type of gear (light otter trawls) on sandy mobile sediment will not penetrate the seabed as severely as other bottom towed gear. Further, fishing intensity is minimal thus the sediment disturbance from the few vessels operating is unlikely to contribute significantly over and above natural processes.	None required, except implementation of Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features.
		Physical change (to another seabed type)	Whilst activity could result in loss of certain habitats e.g. seagrass, change unlikely to be permanent if activity were to cease[7].	Physical change could occur from gear coming into contact with the seabed. The total number of vessels with a permit to trawl within 3 nm of the shore (and therefore within the open area of the BNNC SAC) is 25 under 12m vessels permitted to use a single trawl only (2018). Expert local knowledge says that only 19 vessels are rigged for trawling and could actively fish within the district (with the total actually fishing estimated to be fewer). Vessels apply for a permit to ensure they have a 'track record' should there be any future management further limiting the fishery (A. Browne NIFCA, October 2018, pers. comm.). Fishers should not be in the vicinity of subtidal rock features. Gear not deemed to produce physical change to significant levels due to both type of gear (light otter trawls) on sandy sediment will not penetrate the seabed as severely as other	None required, except implementation of Monitoring and Control Plan for Potting, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features in the NIFCA district.

				bottom towed gear, and fishing intensity. Minimal activity will take place in the site.	
Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities and Subtidal faunal turfs	**Maintain the abundance of listed typical species, to enable each of them to be a viable component of the habitat. (NIFCA consider targeted species such as lobster and crab to be typical species)**	Abrasion/disturbance of the substrate on the surface of the seabed	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions[1].	Epibenthic species may be dislodged by abrasion/disturbance caused by gear in contact with the seabed, movement of gear on the seabed and recovery of gear[26,27]. The protected feature, and the subject of this HRA: subtidal reefs should not be exposed to the pressure as fishers should not be in the vicinity of subtidal rock features. They will be operating on mobile sediments within defined zones in which a buffer zone is also included. The total number of vessels with a permit to trawl within 3 nm of the shore (and therefore within the open area of the BNNC SAC) is 25 under 12m vessels permitted to use a single trawl only (2018). Expert local knowledge says that only 19 vessels are rigged for trawling and could actively fish within the district (with the total actually fishing estimated to be fewer). Vessels apply for a permit to ensure they have a 'track record' should there be any future management further limiting the fishery (A. Browne NIFCA, October 2018, pers. comm.). Fishers should not be in the vicinity of subtidal rock features. Decline in the Northumberland white fish fishery means the main target species for the demersal trawl fishery is *Nephrops*. Two of the open areas are historical white fish trawl grounds, the other area is historical *Nephrops* trawl ground. The decline in the white fish	Byelaw 7 limits fishing activity to three areas which have been identified to have no reef features present, through extensive research detailed in the above tLSE. A buffer has been added around identified rocky reef features to decrease the likelihood of light otter trawls accidentally interacting with the subtidal reef feature, and sediment resuspension/distribution on reef biotopes.

				fishery means any fishing activity in the historical white fish grounds will be low.	Cognizant of the extant research into a limited number of habitats studied throughout the SAC, NIFCA have adopted the approach of implementing a Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features. Starting in 2019, NIFCA is implementing a permit returns scheme for all trawling activity permitted in the district. This will increase knowledge on the scale and intensity of activity, catch and bycatch levels.

		Removal of non-target species	Pressure may be exerted by by-catch associated with fishing activities. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis[4].	Two of the open areas are historical white fish trawl grounds, the other area is historical *Nephrops* trawl ground. The main target species of the demersal light otter trawl fishery is *Nephrops*. In this fishery, fishers are highly selective about the areas fished. *Nephrops* are generally found in soft sediment mud or muddy sand (A. Browne, NIFCA, October 2018, pers. comm.). Historically in the BNNC SAC, whitefish have been targeted by demersal light otter trawls on sandy sediments (the new proposed areas). Fishing will not take place over rocky ground where there is risk of damage to gear coupled with a lack of catch.	Byelaw 7 limits fishing activity to three areas which have been identified to have no reef features present, through extensive research detailed in the above tLSE. A buffer has been added around identified rocky reef features to decrease the likelihood of light otter trawls accidentally interacting with the subtidal reef feature, and sediment resuspension/distribution on reef biotopes.

					Cognizant of the extant research into a limited number of habitats studied throughout the SAC, NIFCA have adopted the approach of implementing a Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features. Starting in 2019, NIFCA is implementing a permit returns scheme for all trawling activity permitted in the district. This will increase knowledge on the scale and intensity of activity, catch and bycatch levels.

Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities and Subtidal faunal turfs	**Maintain the species composition of component communities.**	Abrasion/disturbance of the substrate on the surface of the seabed	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions[1].	Epibenthic species may be dislodged by abrasion/disturbance caused by gear in contact with the seabed, movement of gear on the seabed and recovery of gear[26,27]. The protected feature, and the subject of this HRA: subtidal reefs should not be exposed to the pressure as fishers should not be in the vicinity of subtidal rock features. They will be operating on mobile sediments within defined zones in which a buffer zone is also included. The total number of vessels with a permit to trawl within 3 nm of the shore (and therefore within the open area of the BNNC SAC) is 25 under 12m vessels permitted to use a single trawl only (2018). Expert local knowledge says that only 19 vessels are rigged for trawling and could actively fish within the district (with the total actually fishing estimated to be fewer). Vessels apply for a permit to ensure they have a 'track record' should there be any future management further limiting the fishery (A. Browne NIFCA, October 2018, pers. comm.). Fishers should not be in the vicinity of subtidal rock features. Decline in the Northumberland white fish fishery means the main target species for the demersal trawl fishery is *Nephrops*. Two of the open areas are historical white fish trawl grounds, the other area is historical *Nephrops* trawl ground. The decline in the white fish fishery means any fishing activity in the historical white fish grounds will be low.	Byelaw 7 limits fishing activity to three areas which have been identified to have no reef features present, through extensive research detailed in the above tLSE. A buffer has been added around identified rocky reef features to decrease the likelihood of light otter trawls accidentally interacting with the subtidal reef feature, and sediment resuspension/distribution on reef biotopes.

					Cognizant of the extant research into a limited number of habitats studied throughout the SAC, NIFCA have adopted the approach of implementing a Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features. Starting in 2019, NIFCA is implementing a permit returns scheme for all trawling activity permitted in the district. This will increase knowledge on the scale and intensity of activity, catch and bycatch levels.

		Removal of non-target species	Pressure may be exerted by by-catch associated with fishing activities. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis[4].	Two of the open areas are historical white fish trawl grounds, the other area is historical *Nephrops* trawl ground. The main target species of the demersal light otter trawl fishery is *Nephrops*. In this fishery, fishers are highly selective about the areas fished. *Nephrops* are generally found in soft sediment mud or muddy sand (A. Browne, NIFCA, October 2018, pers. comm.). Historically in the BNNC SAC, whitefish have been targeted by demersal light otter trawls on sandy sediments (the new proposed areas). Fishing will not take place over rocky ground where there is risk of damage to gear coupled with a lack of catch.	Byelaw 7 limits fishing activity to three areas which have been identified to have no reef features present, through extensive research detailed in the above tLSE. A buffer has been added around identified rocky reef features to decrease the likelihood of light otter trawls accidentally interacting with the subtidal reef feature, and sediment resuspension/distribution on reef biotopes.

					Cognizant of the extant research into a limited number of habitats studied throughout the SAC, NIFCA have adopted the approach of implementing a Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features. Starting in 2019, NIFCA is implementing a permit returns scheme for all trawling activity permitted in the district. This will increase knowledge on the scale and intensity of activity, catch and bycatch levels.

Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities and Subtidal faunal turfs	**[Restrict or Reduce] the introduction and spread of non-native species and pathogens, and their impacts.**	Introduction or spread of non-indigenous species	The introduction and movement of invasive non-indigenous species may occur as a result of vessel movements, hull fouling and fishing activities[12].	The local under 12m trawling vessels fish within the district and vicinity (and up to xxnm offshore) (M. Southerton, NIFCA, October 2018, pers. comm.). Net are often cleaned and defouled regularly to ensure they fish effectively therefore it is unlikely that light otter trawling will introduce non-indigenous species.	None required, except implementation of Monitoring and Control Plan for Trawling, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features.

7. Conclusion

Reef habitats occur throughout the Berwickshire and North Northumberland Coast SAC. Regulation 33/55 conservation advice and interim draft conservation advice for the feature **1170 Reefs** are to maintain in favourable condition (subject to change). During the earlier screening process, it was unknown if light otter trawling if carried out in zones adjacent the protected features (sub features: subtidal bedrock reef, Subtidal boulder and cobble reef, kelp forest communities and Subtidal faunal turf communities) would have a significant impact. Hence, evidence gathering and HRAs have been carried out.

In the last 5 years, the trawl fleet has become ever more reliant on the local prawn (*Nephrops*) fishery, which is now the fleet's principal fishery. There has been a decline in the number of local vessels actively engaged in the fishery since 2010, and a decrease in landings of *Nephrops* and whitefish to ports in the NIFCA district since 2013. An increase in potting activity suggests fishers have switched to potting from other fisheries including trawling and netting.

The greatest impacts of trawling on SAC subtidal rocky reef communities are likely to occur as a result of 'Abrasion/disturbance of the substrate on the surface of the seabed (Sensitive)[1], and 'Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion' (Sensitive)[3], 'Removal of non-target species (Sensitive)[4] but at current exposure levels (low to non-existent) there is no interaction. Extensive work has been carried out to identify the location and extent of Annex 1 reef features and associated biotopes within sections of the English section of the BNNC SAC using acoustic data and targeted video ground-truthing data. NIFCA collected acoustic data using single beam sonar equipment. This was complimented by a CEFAS, in partnership with Natural England, commissioned study which used multibeam sonar to categorise hard and soft ground (Appendix 2)[14]. At stakeholder events held in 2015, fishers supplied information on soft ground habitat within the site. This, combined with the acoustic data (NIFCA and CEFAS), was the focus of ground truthing effort in surveys carried out in 2015. A series of drop-down video camera surveys were carried out by Natural England and CEFAS (2002, 2003, 2011, 2012) and NIFCA (2015). Protected areas of reef and corresponding areas of soft sediment were confirmed (Appendix 3). This was compared with grab sample data gathered by the Environment Agency in similar areas (EA data supplied to NIFCA). Their findings corroborate NIFCA data. A 100m buffer was applied around identified areas of hard ground following advice from Natural England and JNCC[15] to further protect designated features from any gear deployed within the site (Appendix 4). Subsequently, three areas of soft sediment (not designated in the BNNC SAC) are proposed to be opened to light otter trawls with an amendment made to NIFCA byelaw 7. There is a fourth area of soft sediment, which will not be opened to light otter trawling, and may be kept as a reference area for future monitoring. Activity is only permitted in the three specific areas of identified soft sediment with **no activity over protected reef features**.

Light otter trawling is unlikely to occur over rocky reef as there is a risk of gear getting snagged and damaged incurring cost to the fishers. Therefore, the interaction of the gear on rocky reef, kelp forest communities and subtidal faunal turfs are unlikely to occur. On consideration of all the evidence complied, any light otter trawling activity that occurs within the three open areas of the BNNC SAC **will not impact the features of this site**. Notably, light otter trawls continue to be prohibited in the remainder of the site.

The conclusion of this appropriate assessment is that trawling activity within the NIFCA district **at current levels[6], alone** is **NOT having an** adverse effect on designated reefs within the BNNC SAC. However, NIFCA will continue to monitor levels of trawling activity within the district as part of developing Monitoring & Control plans and will re-address this gear/feature interaction should effort levels increase or changes to designated features/sub-features be detected.

The Monitoring and Control Plan for trawling outlines the methodology and parameters NIFCA will use to collect data for the continual monitoring of trawling activity and its interaction with this feature. All data (except NE site

[6] Potential activities will be monitored within the relevant NIFCA trawling monitoring and control plan.

condition monitoring) will be collated and analysed on an annual basis to access if further management is required, unless a trigger is initiated to prompt an automatic assessment. This will ensure any risks to the site features will be addressed and management measures will remain appropriate and adaptive. This will be in association with the NIFCA Fisheries Management Plan work.

8. In-combination assessment

Although trawling is deemed to have no likely significant effect on reefs within the BNNC SAC, potential risks of in-combination effects have been considered in Table 3 for current and possible plans and projects and other activities within the vicinity of the site.

Table 4 indicates that trawling within the BNNC is not deemed to have a likely significant effect on reefs alone OR in-combination with other plans/projects.

Table 4. In-combination assessments of Potting with other plans and projects within and around the BNNC SAC.

Plans and Projects		
Activity	**Description**	**Potential Pressure**
Fishing x Fishing	Potting Dredging Static netting	No adverse effect at current levels, but potential for increase vessel activity and disturbance levels within the BNNC SAC. Fishing effort will be continually monitored and assessed with the implementation of Monitoring and Control Plans for Static Netting and Potting. Fisheries permitted by NIFCA. Potting is the main fishery throughout the district with 115 commercial permit holders 2015, of which 26 reported operating within the BNNC SAC. All vessels known to use static nets are shellfish permit holders and are therefore part of the same potting fleet. NIFCA Byelaw 7 dredging within the BNNC SAC and only 1 vessel recorded fishing static nets in the BNNC SAC for a period of 11 days in 2015. Therefore, the impact on the pressure is low risk at current levels.
Fishing x Fishing	T & J and Drift Nets	This fishery operates from March through to the end of August and targets migratory species, primarily salmon. All fishermen must gain a license to fish from the Environment Agency, who are responsible for regulating this fishery. Currently there are 21 T and J nets licensees (2 combined) and 8 drift net licensees across our district and the

		EA are in the process of rolling out a phasing out scheme. Fishing effort will be continually monitored and assessed with the implementation of Monitoring and Control Plans for Static Netting and Potting. Low risk to pressure at current levels.
Coastal Infrastructure	Outflow pipes Maintenance	Small scale Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts.
Anchorage and Mooring	Anchorage and Mooring	Several moorings and anchorage sites occur within the BNNC SAC and in the surrounding waters (Amble, Alnmouth, Boulmer Haven, Newton Haven, Inner Farne, Holy Island, Beadnell, North Sunderland and Berwick). Most of these sites are historical anchorages/moorings and are not or infrequently used at present. The main authorised industrial anchorage sites occur south of the BNNC SAC and are managed by the Port of Blyth and the Port of Tyne. Fishers do not generally anchor, and anchorages are typically on sediment not on reefs. Low risk to pressure at current levels.
Harbour dredging [vicinity of SAC]	Harbour dredging	Small scale harbour dredging occurs; however, no potting occurs within harbours. Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts of harbour dredging.
Coastal management scheme	Flood and erosion risk management	Northumberland and North Tyneside Shoreline Management Plan 2 (05/2009) covers the coastline from the Scottish border to the River Tyne. As stated in Section (2) of the document projects and plans within

		the SMP are subjected to its own Appropriate Assessment for proposed work, which assesses any impacts to the BNNC SAC.
Other activities being considered (which are not plans or projects by definition)		
Activity	**Description**	**Potential Pressure**
Recreational Angling from Vessels	NIFCA record sightings of angling vessels observed during patrols since 2001. This data was provided to the MMO MCSS MPA activity monitoring trial (begin 09/16).	NIFCA consider recreational angling to be a relatively small-scale activity, with only 149 sightings of recreational angling vessels in 2017. Low risk of significant increase in vessel activity (anchoring).
Recreational Potting	In 2016 NIFCA introduced a recreational potting permit which will enable NIFCA to monitor levels of recreational potting within the district. Each permit holders is permitted to fish up to 5 pots within the NIFCA district and can only take 1 lobster (5 brown or velvet crabs, 20 whelks or 5 prawns) per day. In 2016 there were 168 recreational permit holders.	Small scale in comparison to commercial potting activity. In 2016, NIFCA had 176 registered recreational potting permit holders, as each permit holder is only allowed a maximum of 5 pots this results in a total of 880 pots. A significant proportion of recreational pots are fished within the intertidal zone from the shore therefore there is no overlap with commercial trawling. Recreational potting is often seasonal and carried out infrequently. Fishing effort will be continually monitored and assessed with the implementation of the Potting Monitoring and Control Plan and Shellfish Fisheries Management Plans.
Yachting, sailing, motor cruises	Currently activity levels unknown. NIFCA participating in MMO MCSS MPA activity monitoring trial begin 09/16.	Increase of vessel activity and disturbance levels within BNNC SAC. There is potential for a disturbance effect on classified birds and designated seals when wildlife watching boats and visitors around the Farne Islands, particularly during summer months. However, boats operating out of the port of Seahouses adhere to the 'Northumberland Wildlife Watching Boating Code of Conduct', designed to minimise disturbance to the colonies on the Farne Islands. The National Trust manages the site.
Other activities with potential to occur but don't occur [list cannot be exhaustive/obvious suspects]		

Aggregate Dredging	Aggregates dredge	No dredging in vicinity
Windfarm	Platform build/infrastructure, Cables laying /infrastructure Cable repair	Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts. Low risk of physical loss, damage or biological disturbance. There are currently no windfarms within the BNNC SAC.

9. Summary of consultation with Natural England

Monthly meetings have been held with Natural England's Lead Advisor for the Northumberland East region from the outset of this process. The creation of this document was supported by ongoing consultation with Natural England and they agree with the conclusions of this assessment. Formal advice was received on _____.

10. Integrity test

NIFCA conclude that trawling activities, either alone or in combination, within the Berwickshire and North Northumberland Coast SAC do not adversely affect the designated reefs within the site.

11. Adaptive risk management

Assessments will be periodically reviewed should activity levels change above existing levels or if new evidence relating to this gear/feature interaction emerges. To monitor activity levels and gear /feature interactions a Monitoring and Control Plan document has been produced for potting activity within the NIFCA district. These documents describe the parameters which are to be monitored and the mechanisms in which the data is to be collected. Clear triggers/ thresholds are defined within section 3 of the document, which if reached will initiate action to either mitigate or modify the trigger. Section 4 outlines all possible management tools, which are to be assessed on their ecological and socio-economic outcomes for both the fishery and the feature. These options will be subject to scrutiny through NIFCA's byelaw working group and committee. Any management options decided though this process would be subject to public consultation.

Annex 1 References

1. Linnane et al., 2000; Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Wildfowl and Wetlands Trust (WWT) Consulting, 2012. “Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions.” 556 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations.)**
2. ICES (International Council for Exploration of the Sea), 2009. “The introduction and movement of invasive non-indigenous species may occur as a result of vessel movements, hull fouling and fishing activities”. 619 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
3. Gubbay and Knapman, 1999; Linnane et al., 2000; Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012. “Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions”. 554 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
4. Gubbay and Knapman, 1999; Kaiser et al., 2001; Sewell et al., 2007; Sewell and Hiscock, 2005. “Pressure may be exerted by by-catch associated with fishing activities. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis”. 542 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
5. (Gilman et al., 2012; Kaiser et al., 2001; Polet and Depestele, 2010. Fishing gears may disturb sediment and remobilise buried organic and inorganic matter. In fisheries where discards are spatially concentrated, and especially in areas of low current flow, discards may cause localized hypoxia or anoxia of the seabed. **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
6. Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Wildfowl and Wetlands Trust (WWT) Consulting, 2012. May result from sediment mobilisation in wake behind gear components. The extent of the changes would depend on intensity/scale, substratum type (particle size) and hydrographic conditions. **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
7. Kaiser et al., 2001; Roberts et al., 2010. Whilst activity could result in loss of certain habitats e.g. seagrass, change unlikely to be permanent if activity were to cease. **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
8. Gubbay and Knapman, 1999; Kaiser et al., 2001; Linnane et al., 2000; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005. Bottom towed gear may have direct impacts on seabed and produce significant amounts of re-suspension which may trigger off considerable productivity pulses due to the rate of dissolved and particulate nutrient releases from seabed disturbance. **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
9. Gubbay and Knapman, 1999; Kaiser et al., 2001; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005. “Bottom towed gear may have direct impacts on seabed and produce significant amounts of re-suspension which may trigger off considerable productivity pulses due to the rate of dissolved and particulate nutrient releases from seabed disturbance”. 132 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
10. Kaiser et al., 2001; Polet and Depestele, 2010. “As fishing gears disturb soft sediment they produce sediment plumes and re-mobilize previously buried organic and inorganic matter”. 48 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
11. Saccà, 2015. “This interaction can occur where gear used in one area is used in a second area leading to the introduction of micropathogens”. 776 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
12. ICES (International Council for Exploration of the Sea), 2009. “The introduction and movement of invasive non-indigenous species may occur as a result of vessel movements, hull fouling and fishing activities”. 619 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
13. Hooper and Austen, 2013. “As structures are installed there could be an increased risk of this occurring”. 54 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
14. Kaiser et al., 2001; Roberts et al., 2010. “Whilst activity could result in loss of certain habitats e.g. seagrass, change unlikely to be permanent if activity were to cease”. 705 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**

15. Callaway, A. (2013) Mapping the Berwickshire and North Northumberland Coast European Marine Site (BNNC EMS): Sea bed characterisation utilising available data. Cefas Report (C6065).
16. Natural England and JNCC (2010). Marine Conservation Zone Project Ecological Network Guidance. Available at: http://jncc.defra.gov.uk/pdf/100705_ENG_v10.pdf. Accessed on: 23rd August 2018.
17. Mercer, T. (2012) 'Berwickshire and North Northumberland Coast cSAC Sublittoral monitoring 2012', Report to Natural England, Newcastle.
18. Stillman et al., 2007; Wildfowl and Wetlands Trust (WWT) Consulting, 2012. “Whilst activity would cause pressure, impact considered better captured by 'visual disturbance'.” 708 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
19. Davenport and Davenport, 2006. “Collision can occur as a result of this activity in instances where a vessel in used.” 150 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
20. Bowmer and Kershaw, 2010; Lozano and Mouat, 2009. “Activity may result in litter including the loss of fishing gear but unlikely to be at level that would cause concern.” 19 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
21. Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009. “Pressure (e.g. increase in noise above ambient level) would be exerted via vessel movement, gear deployment/towing/hauling and the use of fish finding sonars.” 536 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
22. Stillman et al., 2007; Wildfowl and Wetlands Trust (WWT) Consulting, 2012.” May result from the presence/movement of the vessel and potentially also the presence/movement of the gear. Magnitude of pressure would depend on nature and scale/intensity of activity.” 362 **(UK0017072_Berwickshire_and_North_Northumberland_Coast_SAC_Advice_on_Operations).**
23. Thompson, D., Russel D.J. and Morris, C. (2017) Berwickshire and North Northumberland Coast Special Area of Conservation: grey seal population status. Sea Mammal Research Unit Report to Natural England.
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25. Blakely, L. and Tooth. E. (2015) Grey Seals on the Farne Islands in 2015. National Trust Report.
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27. Coleman, R. A., Hoskin, M. G., Von Carlshausen, E., & Davis, C. M. (2013). Using a no-take zone to assess the impacts of fishing: Sessile epifauna appear insensitive to environmental disturbances from commercial potting. *Journal of experimental marine biology and ecology*, *440*, 100-107.
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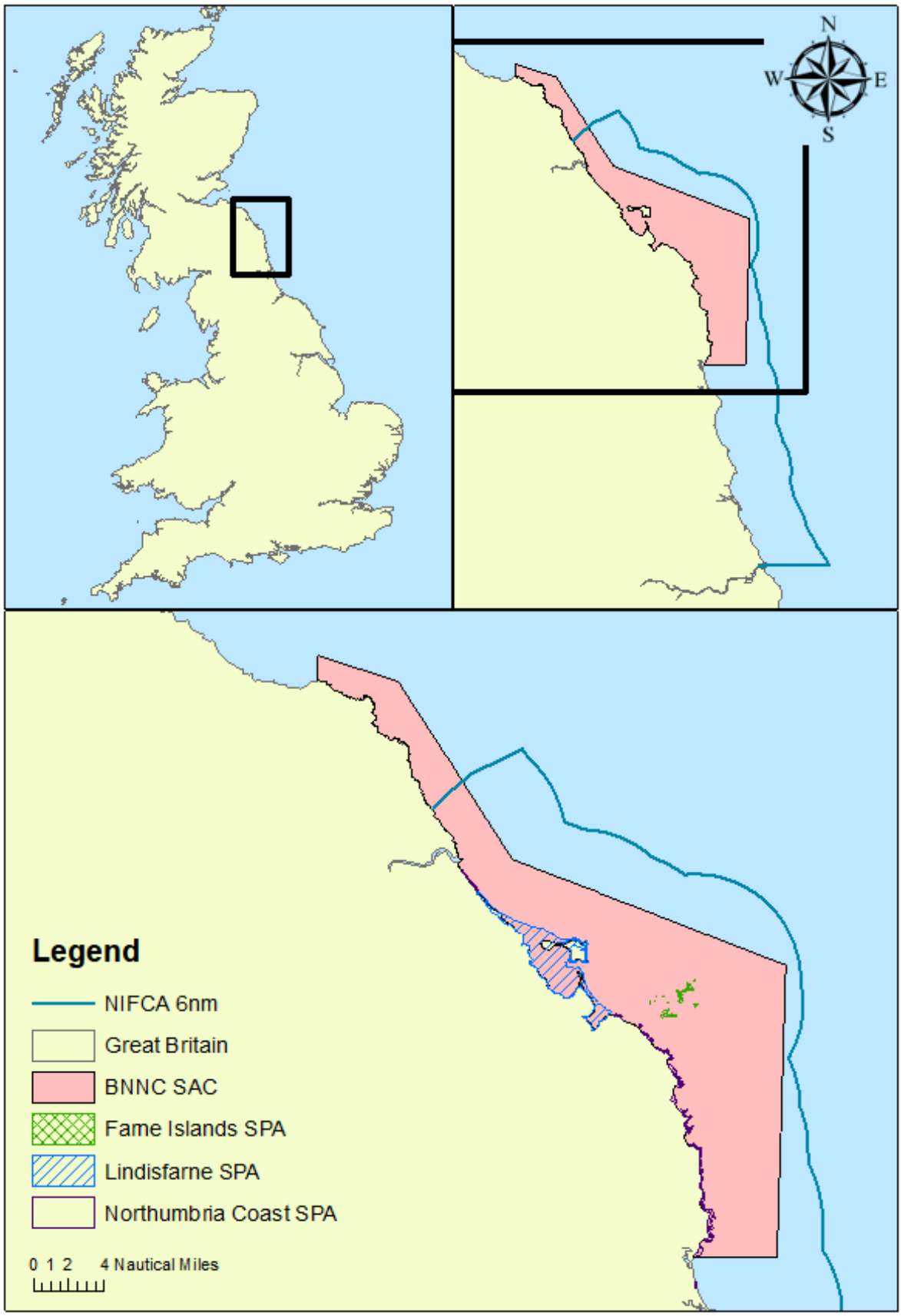
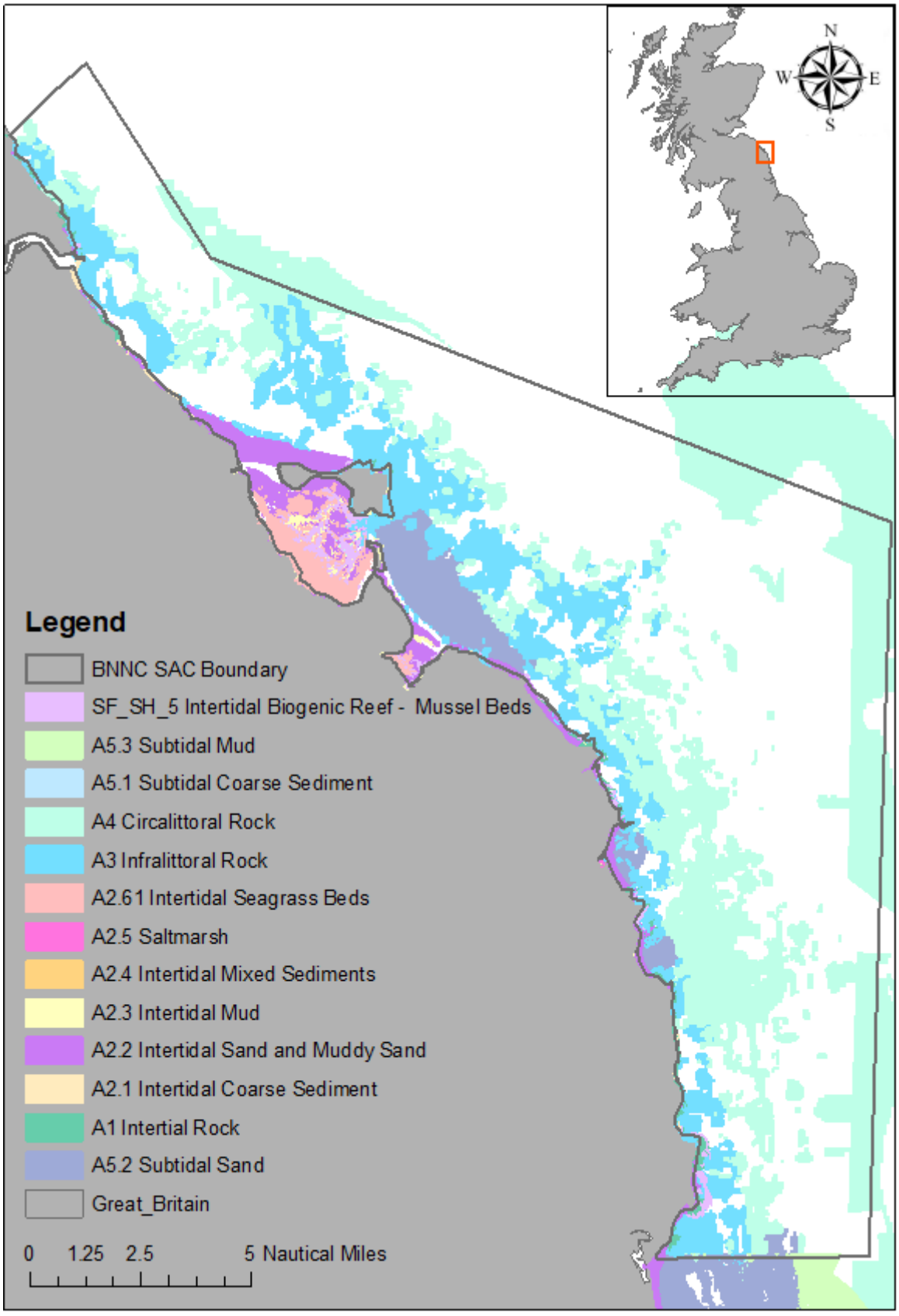
29. English Nature & Scottish Natural Heritage, 2000. Berwickshire and North Northumberland Coast European Marine Site: English Nature’s and Scottish Natural Heritage’s advice given in compliance with Regulation 33(2) and in support of the implementation of The Conservation (Natural Habitats &c.) Regulations 1994.

Annex 2: Site Map

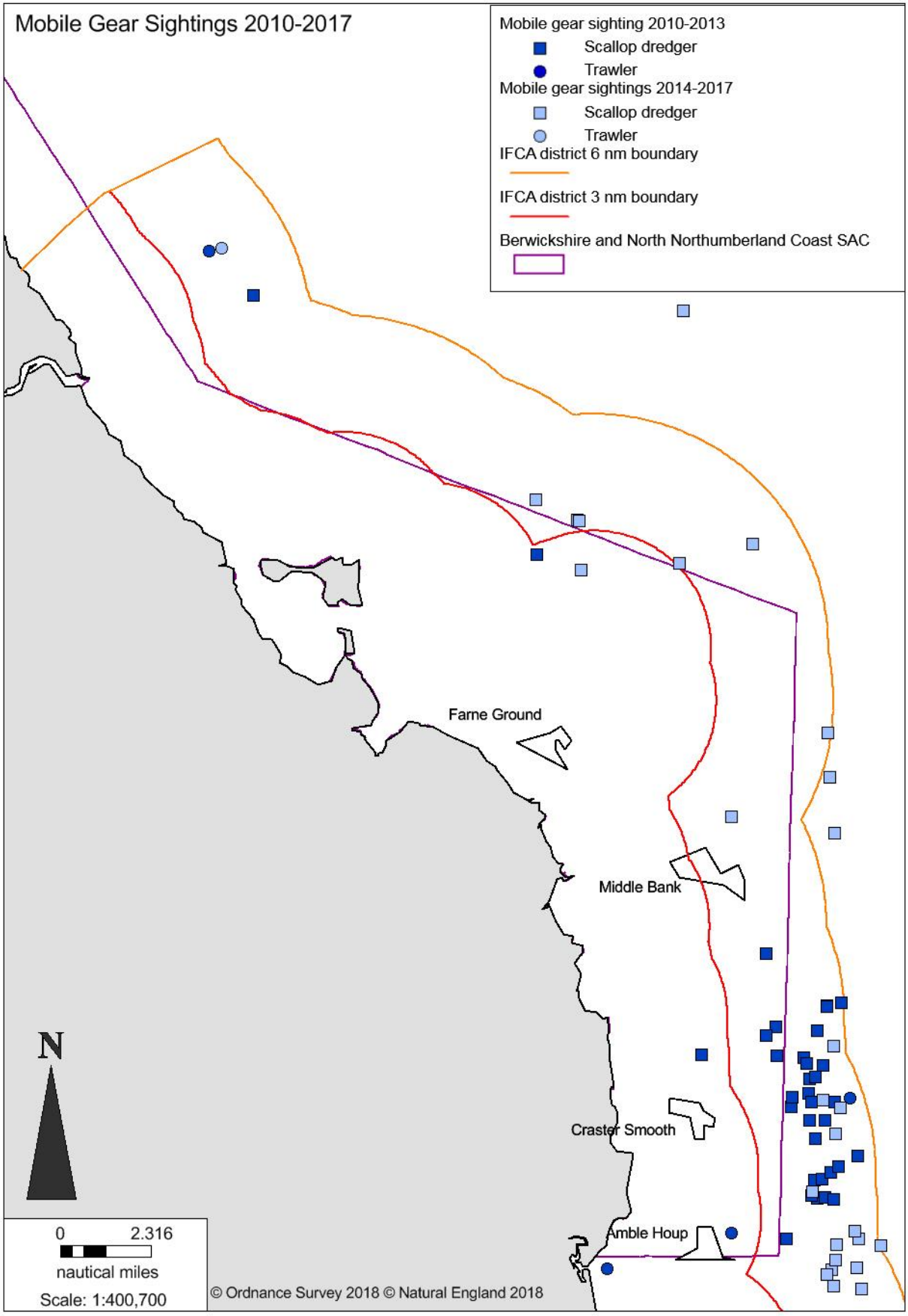


Annex 3: Eunis Habitat within the BNNC SAC. ArcGIS data files provided by Natural England.



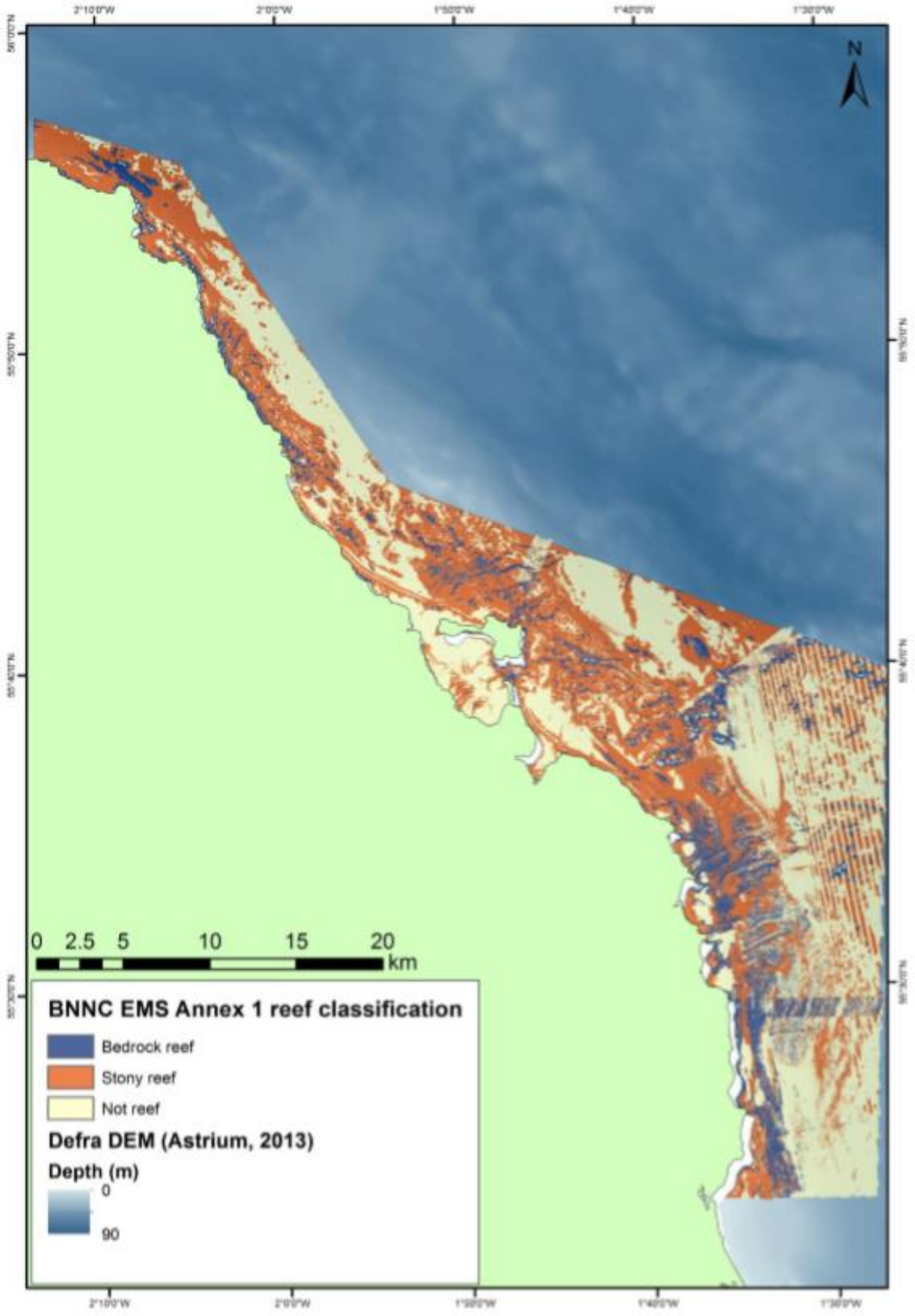
Appendix 1

Mobile gear sightings from NIFCA patrol vessel St Aidan on routine patrols 2010-2017



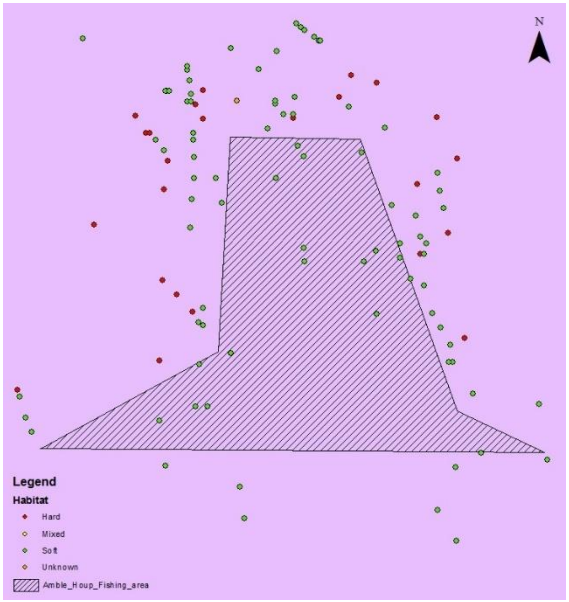
Appendix 2

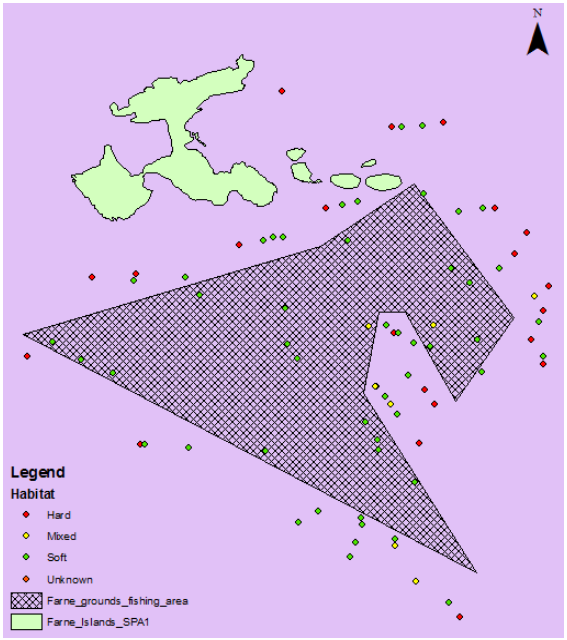
CEFAS Annex 1 reef classification of the BNNC SAC (not reef refers to no data)

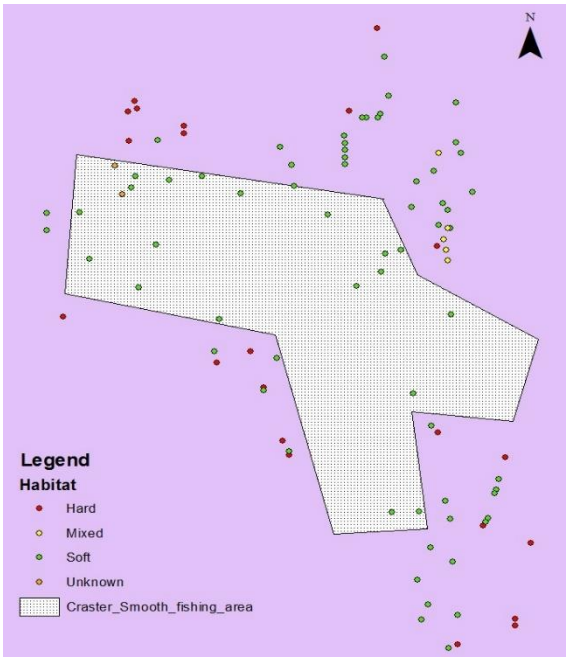


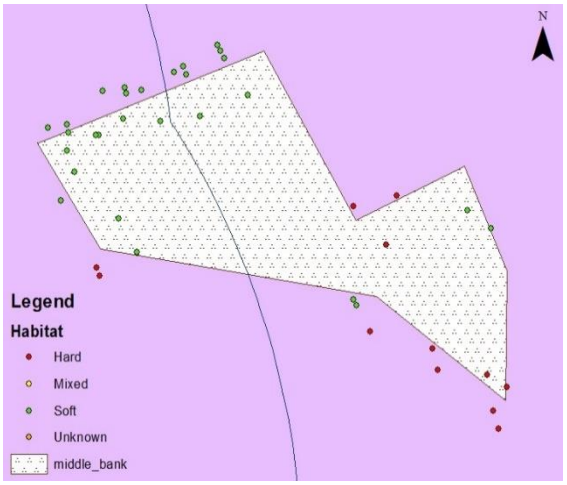
Appendix 3

Results of drop-down camera surveys determining hard, soft and mixed ground carried out by NIFCA in 2015. The images in Appendix 3 show the distribution of habitats. Middle Bank was not selected as an area to open to light otter trawls.









Appendix 4

Reef features of the BNNC SAC with a 100m buffer applied (pink), with the 3 proposed open areas (yellow, pink, green) and the other area considered (red) which will remain closed.