

Fisheries in EMS Habitats Regulations Assessment for **Amber** risk categories

Site and gear/features interaction(s) assessed:

European Marine Site:	Berwickshire and North Northumberland Coast SAC
Qualifying feature(s):	Reefs
Generic sub-feature(s):	Subtidal bedrock reef Subtidal boulder & cobble reef Kelp forest communities & subtidal faunal turfs
Gear type(s):	Pots/creels (crustacea/gastropoda)
Gear/feature interaction reference(s):	BNNCSAC-459 BNNCSAC-460 BNNCSAC-461

Revision history

The NIFCA HRA Audit document contains a full timeline of the approach to assess the feature/fishery interaction. Work commenced in March 2013 with the matrix assessment of all feature/fishery interactions to determine no effect, tLSE, evidence gaps requiring a full HRA. This HRA is for a feature/fishery interaction which an evidence gap was identified. The dates below are a summary of the final stages of the process, when evidence was collated and determinations carried out.

Date	Revision	Editor
Pre-March 2013	NE identifies a potting evidence gap in association with NIFCA. Small MPhil initiated, correlating condition monitoring of subtidal rocky reef with fishing effort data in the southern part of the SAC.	CS, MH, JG, Clare Fitzsimmons (NCL Uni)
Sept 2013	Subtidal rocky reef/potting feature fishery interaction identified as an Amber during LSE assessment based on lack of evidence. NE acquired additional funding to continue research in the NIFCA district. Academic research with Newcastle University continues to support this HRA.	CS, MH, JG, Clare Fitzsimmons (NCL Uni) & Fabrice Stephenson (PhD Student)
14/04/2016	Final template created First Draft of Fabrice Stephenson's PhD received.	SM

BNNCSAC-AA 002

		CS, Clare Fitzsimmons (NCL Uni) & Fabrice Stephenson (PhD Student)
16/04/2016	SM started to populate document	SM
18/07/2016	Second Draft of Fabrice Stephenson's PhD received.	CS, Clare Fitzsimmons (NCL Uni) & Fabrice Stephenson (PhD Student)
29/09/2016	NW started writing document	NW
15/11/2016	Fabrice Stephenson's final PhD report received.	CS, Clare Fitzsimmons (NCL Uni) & Fabrice Stephenson (PhD Student)
09/01/2017	Potting AA Draft 1	NW
09/01/2017	NIFCA adopted a monitoring and control plan approach in light of uncertainty and evidence gaps as a pragmatic method to improve data and manage the fishery. This HRA and the potting Monitoring and Control Plan will link with shellfish management plans now and in the future.	CS, NW & JG
28/03/2017	Potting AA Draft 2	NW
05/05/2017	Meeting with Natural England. Read through document and made suggested changes.	CS, NW & JG
05/06/2017	Potting AA Draft 3	NW
20/06/2017	Potting AA Draft 4 and Summary of Impacts Table	NW
11/08/2017	Meeting with Natural England. Read through document and made suggested changes.	CS, VR, NW & JG
08/09/2017	Potting AA Draft 5	NW
02/11/2017	Meeting with Natural England. Read through document and made suggested changes.	CS, VR & NW
03/11/2017	Potting AA Draft 6	NW
11/12/2017	Monitoring and Control Plan approach discussed at Technical and Scientific sub-committee meeting. The approach was broadly agreed and taken to the quarterly meeting as a topic to be discussed.	Technical and Scientific Sub-Committee
22/01/2018	NIFCA Quarterly Meeting Committee ratifies Monitoring and Control Plan approach.	Quarterly meeting committee.
22/02/2018	Meeting with Natural England. Read through document and suggest changes.	CS, NW & JG
13/03/2018	Updated Potting Data to include 2016.	NW
09/04/2018	Document slightly revised and agreed.	NW; CS

Date of document completion/'sign-off':	09/04/2018
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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 an 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/already managed, 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 (**Pots/creels**) have a likely significant effect on the **Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities and subtidal faunal turfs** of the **Berwickshire and North Northumberland Coast SAC**, and on the basis of this assessment whether or not it can be concluded that **Pots/creels** will not have an adverse effect on the integrity of this EMS.

An in-combination assessment will be carried out and will include gears screened out from the phase 2/3 assessment¹ for this site (section 8) and other non-fishery related activities.

¹ 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 species²
- NIFCA monthly shellfish permit returns data provided by shellfish permit holders as a condition of their permit.
- NIFCA patrol sightings, recording GPS location of vessel and potting activity.
- Natural England Fisheries Impact Evidence Database.
- Reference list (Annex 1).
- Site boundary map (Annex 2).
- Map of habitat types within the BNNC SAC (Annex 3).
- NIFCA district Sectors (Annex 4).
- Fabrice Stephenson PhD (2016).

¹See Fisheries in EMS matrix:

http://www.marinemanagement.org.uk/protecting/conservation/documents/ems_fisheries/populated_matrix3.xls

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 645km² of shore and sea (Annex 2). The BNNC SAC contains a complex of marine habitat types and associated communities which 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 species⁵.

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, due to a lack of evidence to assess the feature/fishery interaction it was not possible to determine that there was no likely significant effect) 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**

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, potting 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 \geq 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 μ M 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.

4. Information about fishing activities within the site

In assessing the level of potting within the NIFCA district, two sources of data have been analysed; monthly shellfish permit returns, submitted by NIFCA Shellfish permit holders as a requirement of the permit (low to moderate data confidence) and Officers' patrol sighting data (high data confidence). Permit Returns Data from 2006 to 2010 has been excluded from the analysis as this information was captured by the Marine and Fisheries Agency, MFA (MMO predecessor) for under 10m vessels only. During this period information for over 10m vessels was captured through European log sheets, for which NIFCA do not possess the data. Data collected during this period is less defined spatially and incomplete and therefore does not provide a descriptive representation of our fleet and is excluded. A Natural England Commissioned Report⁶ will also be used to inform this HRA.

4.1 Pots/creels (crustacea/gastropods)

Most fishers in the district use parlour pots of various sizes (single or double 'eyed'), baited with frozen or fresh fish. Pots are typically worked in fleets of 10-40, dependant on the size of the vessel. Pots are attached by ~1m straps to a mainline and spaced ~20-30 metres apart. End weights (e.g. clumps of heavy chain or cast-iron sash weights) are fitted to both ends of the mainline and marker buoys/dahns are attached to each end of the fleet with a rope length usually twice as long as the water depth. The end weights are designed to remain secure on the seabed, however slack in the mainline allows the pots the freedom to move⁶. There is evidence from a study carried out in Northumberland that pot movement does occur due to environmental factors such as waves and tidal currents⁶, however the frequency and extent of movement and associated impacts on the seabed is relatively unknown⁶. In order to protect fishing gear in bad weather fishers tend to move their pots further offshore in winter months and inshore during summer months^{6,11,12}.

Fleet deployment is initiated by dropping the first buoy-line and end weight into the water, the weight of which pulls the remaining pots overboard one at a time, as the vessel moves along at a speed of ~7 knots heading into the direction of the tide. Pots are then left to soak for typically 1-3 days (weather depending) before being hauled. Pots are lifted by onboard hydraulic pot haulers fitted off the starboard bow or abeam to starboard. Pots are generally lifted in the direction of the tide and so during hauling the vessel is either stationary or moving with the tide. As each pot is hauled it is re-baited and by-catch species such as brittlestars, squat lobsters, sea urchins, hermit crabs, starfish and whelks (depending on the habitat/area) are discarded along with undersized lobsters, crabs and fish. Sized lobsters, crabs and other target species are retained and stored in separate fish boxes on board.

Potting data (no. pots fished, no. of days fished, area fished and total landings) is recorded by fishers on shellfish returns forms, which they are required to submit on a monthly basis to NIFCA. Potting for European lobster (*Homarus gammarus*) and brown crab (*Cancer pagurus*) is the principle fishery within the Northumberland IFCA district, with 97 registered commercial permits in 2016 and approximately ~34,000 pots (maximum reported number of pots for any one month by all permit holders combined) fished within the district in 2016. The estimated annual number of pots hauled within the BNNC SAC between 2003 and 2016 (excluding 2006-10) is shown in figure 2. The peak in number of pots hauled in 2016 is caused by both an increase in number of days the pots were hauled and an increase in the number of pots fishermen were able to haul in one day. This could have been due to better weather conditions facilitating increased potting activity in this year. The total reported annual number of pots in the sea both in the NIFCA district as a whole and within the BNNC SAC has increased between 2003 and 2015, and then remained relatively stable with only a slight decrease in 2016 (Figure 3). Mean no. of pots in the sea is highest during the summer (July, August and September) and vessels fishing from Amble, Seahouses and Scottish pots (Burnmouth and Eyemouth) have the most pots in the sea.

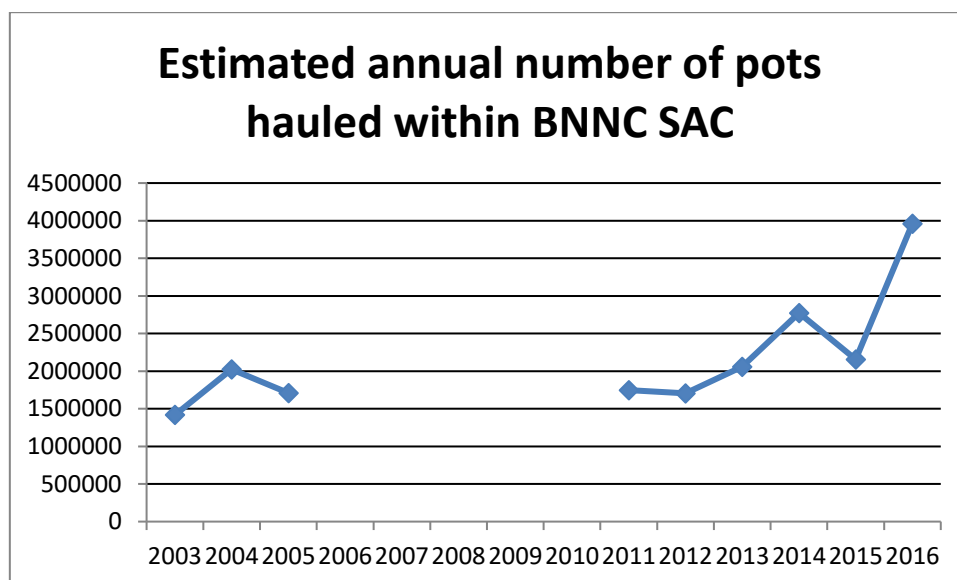


Figure 2 | Estimated annual number of pots hauled within the BNNC SAC per year between 2003 and 2106 (excluding 2006 to 2010, NIFCA permit returns data).

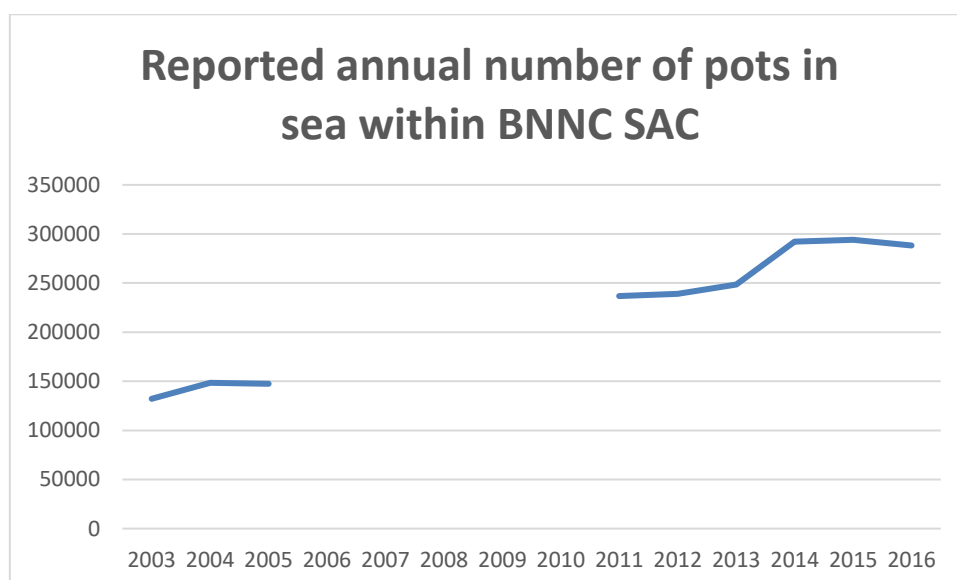


Figure 3 | Reported total number of pots in the sea within the BNNC SAC per year between 2003 and 2016 (excluding 2006 to 2010, NIFCA permit returns data).

The number of commercial shellfish permits registered within the district has declined from 155 in 2001 to 97 in 2016. However, in 2001 just 70% of these permits were 'active' and in fact potting effort has increased over this time period; the median number of pots fished per month per vessel has increased from 250 to 460 and subsequently the maximum number of pots worked per month has increased from 32,624 in 2001 to ~45,000 in 2016⁶, NIFCA data. This rise in effort may be attributed to a shift away from whitefish and *Nephrops* fisheries off the Northumberland coast due to tightening regulations and quota restrictions, resulting in a change from a seasonal, mixed fishery to year round potting for shellfish, which is deemed to provide a more consistent income (Al Browne, NIFCA, 2016, pers. comm.). Over the same time period, fishers have invested in modern, more powerful and efficient fishing vessels with improved fishing technology (including GPS, sonar and hydraulic trap haulers enabling them to maximise landings) (Al Browne, NIFCA, 2016, pers. comm.).

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 (*Gadus morhua*) and Atlantic wolf fish (*Anarhichas lupus*). Potting on subtidal soft sediments targeting edible crab and prawns (*Nephrops norvegicus*) also occurs within the site but is largely focused on areas further offshore during the winter months. A recent study analysing the relationship between NIFCA potting sightings and substrate type within nearby Coquet to St Mary's MCZ, indicated that potting vessels show a significant preference towards rocky habitats⁶. This preference for rocky habitat can be seen in Figure 3, however it is important to note that both vessel sightings data and habitat data are biased towards to southern end of the map due to both the NIFCA's patrol vessel being based in the south of the district, and that high confidence Cefas data is only available for the southern part of the site. Sightings data is low in 2015 as NIFCA did not have a patrol vessel for approximately 3 months.

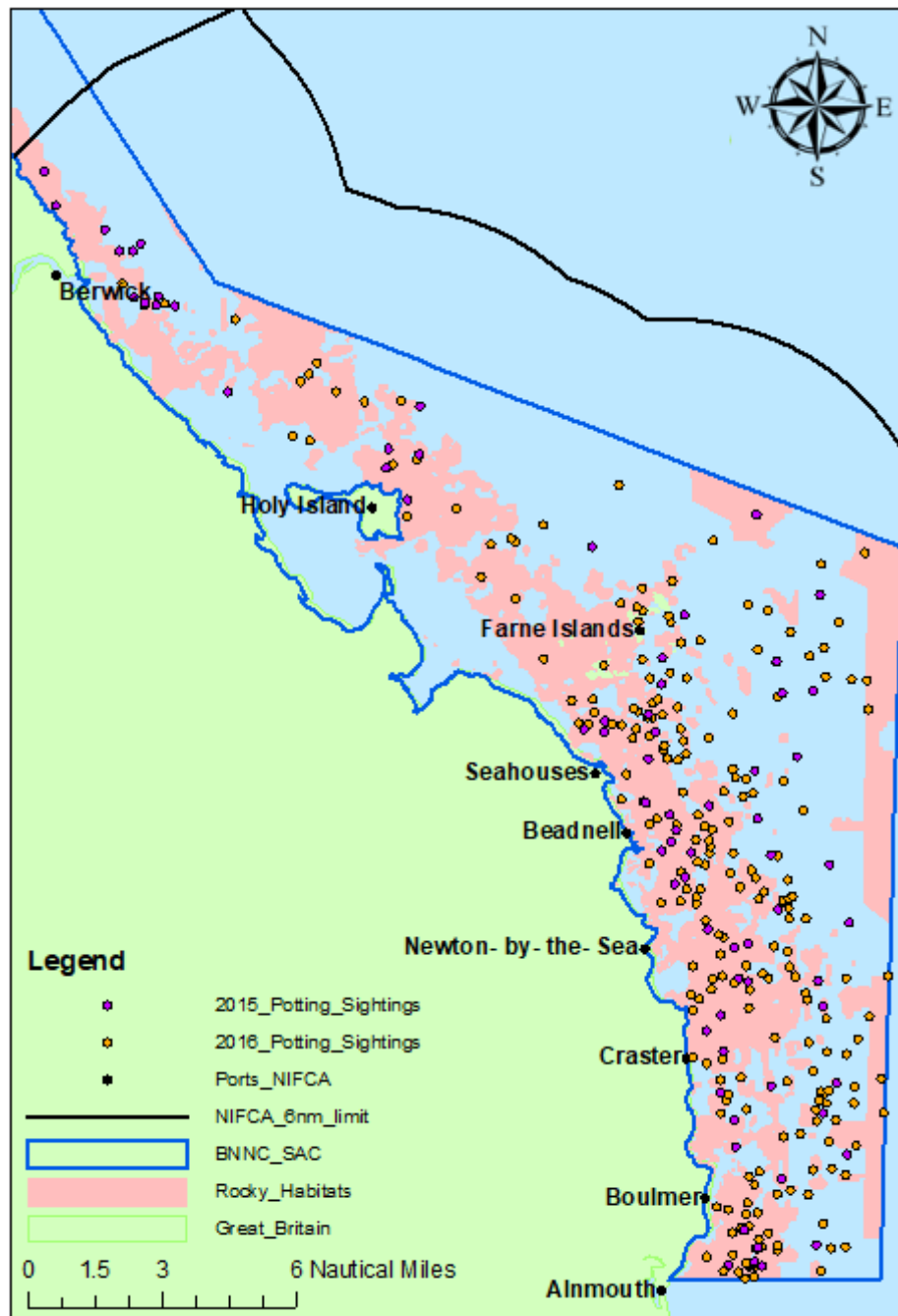


Figure 3 | Distribution of Potting Activity within the BNNC SAC in relation to rocky reef for 2015-16 Sightings (NIFCA sightings data, ArcGIS Habitat files provided by Natural England).

NIFCA Sector	No. of vessels actively potting (2015)	No. of vessels actively potting (2016)
Sector 1	18	14
Sector 2	12	9
Sector 3	15	13
Sector 4	29	26
Sector 5	24	21
Sector 6	20	14
Sector 7	32	25

Table 1. Number of vessels actively potting for shellfish within each sector of the NIFCA district in 2015 and 2016. In 2015 59 vessels recorded fishing within the SAC. In 2016 47 vessels recorded fishing within the SAC. Note that some vessels will be fishing in more than 1 sector.

NIFCA sightings data (figure 3) suggests that potting activity is relatively low in the northern part of the district (including the BNNC SAC). However, NIFCA permit returns data highlights that the highest potting effort occurs in sector 7 (Sector map in Annex 4, Table 1) with sectors 5, 6 and 7 (significantly made up of the BNNC SAC) having relatively high effort when compared to sectors 1, 2 and 3 in the south of the district. 59 of the 92 active permit holders in 2015 recorded fishing within the BNNC SAC. The discrepancies between sightings data and permit returns data is one of the factors which justifies the creation of a Monitoring and Control Plan for Potting.

4.2 Management (Pots/creels)

Commercial potting for shellfish within the NIFCA district is regulated by the following byelaws, which are summarised:

NIFCA Byelaw 3 Crustacea Conservation

Prohibits landing of v-notched, mutilated, soft-shelled or detached part of lobsters. As well as soft shelled, berried or detached parts of edible crab and detached parts of velvet crab. It is also prohibited to use edible crab as bait in pots. All prohibited shellfish must be re-deposited immediately to the sea, as near as possible to the place from which it was taken.

NIFCA Byelaw 4 Crustacea and Molluscs permitting and pot limitation

Persons wishing to fish for shellfish using pots within the district must apply for either a recreational or commercial shellfish permit from the authority. There is a £10 annual charge for recreational permits and the permit holder is limited to a maximum of 5 tagged pots and a maximum of 1 lobster, 5 edible crabs or velvet crabs, 20 whelks or 5 prawns in any one day. The annual fee for commercial permits is £180. Commercial permit holders are limited to a maximum of 800 tagged pots. No limit on number of permits/vessels fishing in the district.

NIFCA Byelaw 5 Marking of Fishing Gear and Keep Boxes

All gear must be marked by a buoy or dahn with the fishing vessel/owner's details and clearly visible on the surface of the water. Where there are more than 5 pots in a fleet, a marker bouy/dahn must be fitted to both ends.

Emergency Byelaw Prohibition of Landing Berried Hens

No person can retain, store, carry, transport, land or offer for sale berried (egg-bearing) lobsters. This includes both recreational and commercial fishers. This emergency byelaw was brought in following the implementation of a national statutory instrument and will be transposed into NIFCA byelaws.

4.3 Other fishing activity 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.

Currently (in 2017) mobile fishing gear is prohibited within the English section of the BNNC SAC (Byelaw 7 Prohibition of the use of Mobile gear within the English section of the Berwickshire and North Northumberland Coast Special Area of Conservation).

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 EMS³.

Table 2: Assessment of LSE

BNNCSAC-459: Subtidal bedrock reef BNNCSAC-460: Subtidal boulder and cobble reef

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)? <i>*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).</i>	Abrasion/disturbance of the substrate on the surface of the seabed (Sensitive) ¹ Introduction or spread of non-indigenous species (Sensitive) ² Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion (Sensitive) ³ Removal of non-target species (Sensitive) ⁴ Removal of target species
3. Is the feature potentially exposed to the pressure(s)⁴?	Yes

³ Managing Natura 2000 sites: http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm

<p>4. What are the conservation objectives for the feature?</p> <p><i>*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), current knowledge of the status, and the pressures affecting designated features (see sections 4 &5).</i></p> <p><i>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'.</i></p>	<p>Conservation objective(s) for Subtidal rocky reef: Maintain*:</p> <ul style="list-style-type: none"> - The total extent and spatial distribution of subtidal reef - <u>The presence and spatial distribution of subtidal reef communities</u> - <u>The surface and structural complexity of the reef</u> - <u>The abundance of listed typical species</u> - <u>The species composition of component communities</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 - Natural levels of turbidity - Restrict or Reduce: <u>The introduction and spread of non-native species and pathogens</u> <p><i>*Those conservation objectives that might be affected by potting activity are underlined.</i></p> <p><i>*Confidence level for interim, inferred Conservation Objective: MEDIUM (see section 6 for detail).</i></p>
<p>5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?</p>	<p>Potting for European lobster <i>Homarus gammarus</i> and brown crab <i>Cancer pagurus</i> is the principle fishery within the Northumberland IFCA district, with 91 registered commercial permits in 2016 and approximately ~45,000 pots (maximum reported number of pots for any one month by each permit holder) fished within the district in 2015. Potting occurs predominantly in and around subtidal stony reef habitats where the greatest impacts are likely to result from 'Abrasion/disturbance of the substrate on the surface of the seabed (Sensitive)¹, but at current exposure levels (high) there may also be significant impacts from 'Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion' (Sensitive)³ and 'Removal of non-target species' (Sensitive)⁴ and target species.</p> <p>Potting impact studies indicate no significant adverse impact of potting on subtidal bedrock and boulder/cobble reef⁸, however consideration for site-specific environmental and topographical conditions, species assemblages and fishing intensity is required via a full appropriate assessment.</p>

6. Condition and Conservation Objective Inferences	<p>Commissioned report to Natural England⁹ 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. Subsequently, this data has been used in a study looking at changes between 2002-2010 biotopes correlating with fishing intensity data (NIFCA sightings data), which indicates that further research was needed to ascertain if fishing affected biotopes¹⁰. 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.</p>	
7. Is the potential scale or magnitude of any effect likely to be significant?	Alone: Yes BNNCSAC- AA 002	OR In-combination No

BNNCSAC-461: Kelp forest communities & Sub-tidal faunal turfs

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).	<p>Abrasion/disturbance of the substrate on the surface of the seabed (Sensitive)¹</p> <p>Introduction or spread of non-indigenous species (Sensitive)²</p> <p>Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion (Sensitive)³</p> <p>Removal of non-target species (Sensitive)⁴</p> <p>Removal of target species</p>
3. Is the feature potentially exposed to the pressure(s)⁵?	Yes

<p>4. What are the conservation objectives for the feature?</p> <p><i>*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), current knowledge of the status, and the pressures affecting designated features (see sections 4 &5).</i></p> <p><i>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'.</i></p>	<p>Conservation objective(s) for Subtidal rocky reef: Maintain*:</p> <ul style="list-style-type: none"> - The total extent and spatial distribution of subtidal reef - <u>The presence and spatial distribution of subtidal reef communities</u> - <u>The surface and structural complexity of the reef</u> - <u>The abundance of listed typical species</u> - <u>The species composition of component communities</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 - Natural levels of turbidity - Restrict or Reduce: <u>The introduction and spread of non-native species and pathogens</u> <p>Those conservation objectives that might be affected by potting activity are underlined.</p> <p><i>*Confidence level for interim, inferred Conservation Objective: MEDIUM (see section 6 for detail).</i></p>
<p>5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?</p>	<p>Potting for European lobster <i>Homarus gammarus</i> and brown crab <i>Cancer pagurus</i> is the principle fishery within the Northumberland IFCA district, with 97 registered commercial permits in 2016 and approximately ~45,000 pots (maximum reported number of pots for any one month by each permit holder) fished within the district in 2015. Potting occurs predominantly in and around subtidal stony reef habitats, of which Kelp forest communities and subtidal faunal turfs are an attribute. The greatest impacts of potting on these communities are likely to occur as a result of 'Abrasion/disturbance of the substrate on the surface of the seabed (Sensitive)ⁱ, but at current exposure levels (high) there may also be significant impacts from 'Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion' (Sensitive)³ and 'Removal of non-target species (Sensitive)⁴ and target species'.</p> <p>Potting impact studies indicate no significant adverse impact of potting on kelp forest communities and sub-tidal faunal turf^{8,12}. However, consideration for site-specific environmental and topographical conditions, species assemblages and fishing intensity is required via a full appropriate assessment.</p>

6. Condition and Conservation Objective Inferences	<p>A commissioned report to Natural England⁹ 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. Subsequently, this data has been used in a study looking at changes between 2002-2010 biotopes correlating with fishing intensity data (NIFCA sightings data), which indicates that further research was needed to ascertain if fishing affected biotopes¹⁰. Provisionally, condition is thought to be unchanged, and in combination of the Conservation Objective of 'Maintain' based on Regulation 33 advice (June 2000) a 'Medium' confidence level is inferred.</p>	
7. Is the potential scale or magnitude of any effect likely to be significant?	Alone: Yes BNNCSAC- AA 002	OR In-combination 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, 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 pots and creels/ 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 (pots and creels) 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 potting 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 \geq 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 μ M 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 result from contact between gear and seabed; magnitude of pressure will depend on spatial scale/intensity of activity and extent to which gear moves around”. ¹	<p>Epibenthic species may be dislodged by abrasion/disturbance caused by gear landing on the seabed, movement of gear on the seabed and recovery of gear^{7,19}.</p> <p>Top level study looked at approximately 20 biotopes, out of these habitats 2 required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two</p>	<p>None required.</p> <p>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 Potting, which outlines the parameters to be assessed for the fishery and the conservation status of sites’ features.</p>

* 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).

			habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC. This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>) did not decline with physical abrasion from potting ⁶ .	
	Removal of non-target species	“Pressure may be exerted by, for example, by-catch associated with fish traps. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis”. ⁴	Since August 2016 NIFCA have been conducting potting surveys (NIFCA escape gap survey) on hard ground types. The level of by-catch has been very low (consisting of mainly cod, hermit crabs and urchins).	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.

		Removal of target species	“Species can be directly removed as a result of a targeted fishery”. ^{1,8,9,10}	In 2016, 296 tonnes of lobster and 997 tonnes of brown crab were landed by fishers using pots and traps to ports within the NIFCA district ^(MMO Landings Data) . NIFCA Data collected between 2014-2016 shows that over 75% of lobsters caught are below MLS. NIFCA is working on stock assessments for lobster working with Cefas and Newcastle Uni and plans to do more work on brown crab. This evidence could not be obtained within the timeframe of the HRA therefore NIFCA are undertaking stock assessment work (e.g. Lobster Management Plan and future crab FMP).	None required. However, having a better understanding of the stock is required hence NIFCA have created a lobster Fisheries Management Plan which is linked to the 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 across the NIFCA district.
		Litter (i.e. ghost fishing)	“Activity may result in litter but unlikely to be at level that would cause concern”.	Loss of pots will add to abrasion. The lost pot move, with currents in one spot for extended duration of time (unlike actively fished pots which will be regularly hauled and re-shot in a slightly different location). Top level study looked at approximately 20 biotopes, out of these habitats 2	None required.

				<p>required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC. This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>) did not decline with physical abrasion from potting⁶.</p> <p>Lost pots could also have an impact on species such as fish and crustacea. Several studies suggest that lost pots continue to fish until the pot deteriorates or is washed ashore^{13,14,15,16,17,18,}.</p> <p>Within the NIFCA district in 2016, 1385 pots representing 0.34% of pots (total no. of pots = 407153) were reported as lost. Whereas, Breen (1989)</p>	<p>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 Potting, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features in the NIFCA district.</p>
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				<p>looks at the proportion of pots lost in several coastal fisheries and indicates that the proportion of pots lost annually is typically around 10-20%. The low proportion of lost gear within the NIFCA district suggests that ghost fishing will not be a significant problem in the area.</p> <p>The current level of potting activity within the district is insufficient to cause a significant physical impact⁶ or a significant amount of ghost fishing, therefore it can be inferred that the low number of lost pots will not have a significant effect on the presence and spatial distribution of reef communities.</p>	
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<p>Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities and Subtidal faunal turfs</p>	<p>Maintain the surface and structural complexity, and the stability of the reef structure</p>	<p>Abrasion/disturbance of the substrate on the surface of the seabed</p>	<p>“Pressure would result from contact between gear and seabed; magnitude of pressure will depend on spatial scale/intensity of activity and extent to which gear moves around”.¹</p>	<p>Disturbance and abrasion could occur from gear landing on the seabed, movement of the gear from tides, currents and storms and during recovery of gear^{7,19}.</p> <p>The total number of pots fished within the NIFCA district has increased between 2001 and 2014⁶, with NIFCA permit returns showing a and increase in 2015 and a slight decrease in number of pots in 2016.</p> <p>Top level study looked at approximately 20 biotopes, out of these habitats 2 required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC.</p>	<p>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.</p>
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				<p>This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>) did not decline with physical abrasion from potting⁶.</p> <p>The physical footprint of a lobster pot is relatively small, and it is considered unlikely that a pot will land in the same location on successive trips⁷.</p>	
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	“Pressure would be caused by anchors; magnitude of pressure will depend on spatial scale/intensity of activity”. ³	<p>Disturbance and abrasion could occur from gear landing on the seabed, movement of the gear from tides, currents and storms and during recovery of gear^{7,19}.</p> <p>Potting effort and total number of pots fished within the NIFCA district has increased between 2001 and 2014⁶, with NIFCA permit returns showing a and increase in 2015 and a slight decrease in number of pots in 2016.</p> <p>Top level study looked at approximately 20 biotopes, out of these habitats 2</p>	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.

			<p>required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC. This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>) did not decline with physical abrasion from potting⁶. Therefore, it seems unlikely that abrasion from potting on the rock structure will occur.</p> <p>The physical footprint of a lobster pot is relatively small, and it is unlikely that a pot will land in the same location on successive trips⁷.</p>	
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		<p>Litter (i.e. ghost fishing)</p>	<p>“Activity may result in litter but unlikely to be at level that would cause concern”.</p>	<p>Loss of pots will add to abrasion. The lost pot moves with currents in one spot for extended duration of time (unlike actively fished pots which will be regularly hauled and re-shot in a slightly different location).</p> <p>Top level study looked at approximately 20 biotopes, out of these habitats 2 required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC. This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>) did not decline with physical abrasion from potting⁶. Therefore, it seems unlikely</p>	<p>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.</p>
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			<p>that abrasion from potting on the rock structure will occur.</p> <p>Lost pots could also have an impact on species such as fish and crustacean. Several studies suggest that lost pots continue to fish until the pot deteriorates or is washed ashore^{13,14,15,16,17,18}.</p> <p>Within the NIFCA district in 2016, 1385 pots representing 0.34% of pots (total no. of pots = 407153) were reported as lost. Whereas, Breen (1989) looks at the proportion of pots lost in several coastal fisheries and indicates that the proportion of pots lost annually is typically around 10-20%. The low proportion of lost gear within the NIFCA district suggests that ghost fishing will not be a significant problem in the area.</p> <p>The current level of potting activity within the district is insufficient to cause a significant physical impact⁶ or a significant amount of ghost fishing, therefore it can be inferred that the low number of lost pots will not have a</p>	
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				significant effect on the structural complexity and stability of the reef.	
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<p>Subtidal bedrock reef, Subtidal boulder and cobble reef, Kelp forest communities and Subtidal faunal turfs</p>	<p>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)</p>	<p>Abrasion/disturbance of the substrate on the surface of the seabed</p>	<p>“Pressure would result from contact between gear and seabed; magnitude of pressure will depend on spatial scale/intensity of activity and extent to which gear moves around”.¹</p>	<p>Epibenthic species may be dislodged by abrasion/disturbance caused by gear landing on the seabed, movement of gear on the seabed and recovery of gear^{7,19}.</p> <p>Top level study looked at approximately 20 biotopes, out of these habitats 2 required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC. This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>) did not decline with physical abrasion from potting⁶.</p>	<p>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.</p>
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Removal of non-target species	“Pressure may be exerted by, for example, by-catch associated with fish traps. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis”. ⁴	Since August 2016 NIFCA have been conducting potting surveys (NIFCA escape gap survey) on hard ground types. The level of by-catch has been very low (consisting of mainly cod, hermit crabs and urchins).	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.
Removal of target species	“Species can be directly removed as a result of a targeted fishery”. ^{1,8,9,10}	<p>In 2016, 296 tonnes of lobster and 997 tonnes of brown crab were landed by fishers using pots and traps to ports within the NIFCA district (MMO Landings Data). NIFCA Data collected between 2014-2016 shows that over 75% of lobsters caught are below MLS.</p> <p>NIFCA is working on stock assessments for lobster working with Cefas and Newcastle Uni and plans to do more work on brown crab. This evidence could not be obtained within the timeframe of the HRA therefore NIFCA are undertaking stock assessment work (e.g. Lobster</p>	The evidence and data gaps highlighted mean that shellfish management plans linked to a Monitoring and Control Plan for potting (which outlines the parameters to be assessed for the fishery and the conservation status of sites’ features within the NIFCA district will be used.

			Management Plan and future crab FMP).	
	Litter (i.e. ghost fishing)	“Activity may result in litter but unlikely to be at level that would cause concern”.	<p>Loss of pots will add to abrasion. The lost pots move with currents in one spot for extended duration of time (unlike actively fished pots which will be regularly hauled and re-shot in a slightly different location).</p> <p>Top level study looked at approximately 20 biotopes, out of these habitats 2 required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC. This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>)</p>	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.

				<p>did not decline with physical abrasion from potting ⁶.</p> <p>Lost pots could also have an impact on species such as fish and crustacean. Several studies suggest that lost pots continue to fish until the pot deteriorates or is washed ashore ^{13,14,15,16,17,18}.</p> <p>Within the NIFCA district in 2016, 1385 pots representing 0.34% of pots (total no. of pots = 407153) were reported as lost. Breen (1989) looks at the proportion of pots lost in several coastal fisheries and indicates that the proportion of pots lost annually is typically around 10-20%. The low proportion of lost gear within the NIFCA district suggests that ghost fishing will not be a significant problem in the area.</p> <p>The current level of potting activity within the district is insufficient to cause a significant physical impact⁶ or a significant amount of ghost fishing, therefore it can be inferred that the low number of lost pots will not have a</p>	
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				significant effect on the abundance of listed typical species.	
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 result from contact between gear and seabed; magnitude of pressure will depend on spatial scale/intensity of activity and extent to which gear moves around”. ¹	<p>Epibenthic species may be dislodged by abrasion/disturbance caused by gear landing on the seabed, movement of gear on the seabed and recovery of gear^{7,19}.</p> <p>Top level study looked at approximately 20 biotopes, out of these habitats 2 required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC. This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>)</p>	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.

				did not decline with physical abrasion from potting ⁶ .	
		Removal of non-target species	“Pressure may be exerted by, for example, by-catch associated with fish traps. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis”. ⁴	Since August 2016 NIFCA have been conducting potting surveys (NIFCA escape gap survey) on hard ground types. The level of by-catch has been very low (consisting of mainly cod, hermit crabs and urchins).	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.

		Removal of target species	<p>“Species can be directly removed as a result of a targeted fishery”.^{1,8,9,10}</p>	<p>In 2016, 296 tonnes of lobster and 997 tonnes of brown crab were landed by fishers using pots and traps to ports within the NIFCA district (MMO Landings Data). NIFCA Data collected between 2014-2016 shows that over 75% of lobsters caught are below MLS.</p> <p>NIFCA is working on stock assessments for lobster working with Cefas and Newcastle Uni and plans to do more work on brown crab. This evidence could not be obtained within the timeframe of the HRA therefore NIFCA are undertaking stock assessment work (e.g. Lobster Management Plan and future crab FMP).</p>	<p>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.</p>
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		Litter (i.e. ghost fishing)	<p>“Activity may result in litter but unlikely to be at level that would cause concern”.</p>	<p>Loss of pots will add to abrasion. The lost pot move, with currents in one spot for extended duration of time (unlike actively fished pots which will be regularly hauled and re-shot in a slightly different location).</p> <p>Top level study looked at approximately 20 biotopes, out of these habitats 2 required further study (FaAlCr and LhypPk)^{6(chapter 5)}.</p> <p>Stephenson (2016) found little evidence of change in community composition in experimental monitoring, extrapolating that current levels of potting activity are unlikely to have a direct physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and <i>Laminaria</i> spp. dominated (Lhyp.Pk) in the BNNC SAC. This study also found that the abundance of locally occurring, branching species (such as <i>Alcyonium digitatum</i>) did not decline with physical abrasion from potting⁶.</p>	<p>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.</p>
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				<p>Lost pots could also have an impact on species such as fish and crustacean. Several studies suggest that lost pots continue to fish until the pot deteriorates or is washed ashore^{13,14,15,16,17,18,}.</p> <p>Within the NIFCA district in 2016, 1385 pots representing 0.34% of pots (total no. of pots = 407153) within the NIFCA district were reported as lost. Breen (1989) looks at the proportion of pots lost in several coastal fisheries and indicates that the proportion of pots lost annually is typically around 10-20%. The low proportion of lost gear within the NIFCA district suggests that ghost fishing will not be a significant problem in the area.</p> <p>The current level of potting activity within the district is insufficient to cause a significant physical impact⁶ or a significant amount of ghost fishing, therefore it can be inferred that the low number of lost pots will not have a significant effect on the</p>	
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				species composition of component communities.	
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". ²	Pots fished locally within the district and vicinity (and up to 36nm offshore) (Michael Docherty, NIFCA, October 2016, pers. comm.) and fishers tend to make/buy pots from new therefore it is unlikely that potting will introduce non-indigenous species.	None required, except implementation of Shellfish Management Plans and a 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.

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 potting would have a likely significant effect on the following sub features: subtidal bedrock reef, Subtidal boulder and cobble reef, kelp forest communities and Subtidal faunal turf communities, hence evidence gathering and HRAs being carried out.

Potting is the main fishery within the NIFCA district, with effort increasing within the district between 2001 and 2016. Anecdotal evidence indicates that the increase in potting activity is attributable to fishers switching to potting from other fisheries (e.g. trawling and static netting) and the purchasing of larger modern boats enabling fishers to fish more pots. A Lobster Fisheries Management Plan is in development to support the sustainable exploitation of the stocks on the ground.

The greatest impacts of potting 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)ⁱ, but at current exposure levels (high) there may also be significant impacts from 'Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion' (Sensitive)³, 'Removal of non-target species (Sensitive)⁴ and target species'.

A top level study looked at approximately 20 biotopes, out of these habitats 2 required further study (FaAlCr and LhypPk)^{6(chapter 5)}. These experimental studies conducted by Stephenson (2016) concluded that the current level of potting activity within the district is insufficient to cause a significant physical impact on two habitats: epibenthos in faunal and algal crust (FaAlCr) and *Laminaria* spp. dominated (Lhyp.Pk) in the BNNC SAC. It was not possible to assess all possible sensitive features due to financial and time constraints therefore, it was inferred from the features assessed that potting at current levels is insufficient to cause a significant physical impact to the feature of reefs.

The conclusion of this appropriate assessment is that potting activity within the NIFCA district **at current⁶, alone is NOT having an** adverse effect on designated reefs within the BNNC SAC. However, NIFCA will continue to monitor levels of potting activity within the district 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 potting outlines the methodology and parameters NIFCA will use to collect data for the continual monitoring of netting activity and its interaction with this feature. All data (except NE site condition monitoring) will be collated and analysed on an annual basis to assess 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. The Monitoring and Control Plan for potting can be found on NIFCA's website (www.nifca.gov.uk).

8. In-combination assessment

Although Potting 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.

⁶ Potential activities will be monitored within the relevant NIFCA potting monitoring and control plan. Link/ref to be included

Table 3 indicates that potting within the BNNC is not deemed to have a likely significant effect on reefs alone OR in combination with other plans/projects.

Table 3. 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	Trawling Dredging Static netting	<p>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.</p> <p>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.</p> <p>NIFCA Byelaw 7 prohibits trawling and dredging on reefs 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.</p>
Fishing x Fishing	T & J and Drift Nets	<p>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.</p> <p>Fishing effort will be continually monitored and assessed with the implementation of Monitoring and Control Plans for Static Netting and Potting.</p> <p>Low risk to pressure at current levels.</p>

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	NIFCA consider recreational angling to be a relatively small-scale activity, with only 148 sightings of recreational angling vessels in 2016

	to the MMO MCSS MPA activity monitoring trial (begin 09/16).	<p>compared to 680 sightings of commercial potting vessels.</p> <p>Low risk of significant increase in vessel activity (anchoring).</p>
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.	<p>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 limited overlap with commercial fishing gear. Recreational potting is often seasonal and carried out infrequently.</p> <p>Fishing effort will be continually monitored and assessed with the implementation of the Potting Monitoring and Control Plan and Shellfish Fisheries Management Plans.</p>
Yachting, sailing, motor cruises	Currently activity levels unknown. NIFCA participating in MMO MCSS MPA activity monitoring trial begin 09/16.	<p>Increase of vessel activity and disturbance levels within BNNC SAC.</p> <p>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.</p>
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	<p>Platform build/infrastructure,</p> <p>Cables laying /infrastructure</p> <p>Cable repair</p>	<p>Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts.</p> <p>Low risk of physical loss, damage or biological disturbance.</p>

		There are currently no windfarms within the BNNC SAC.
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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 9th April 2018.

10. Integrity test

NIFCA conclude that potting 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 through this process would be subject to public consultation.

Annex 1: Reference list

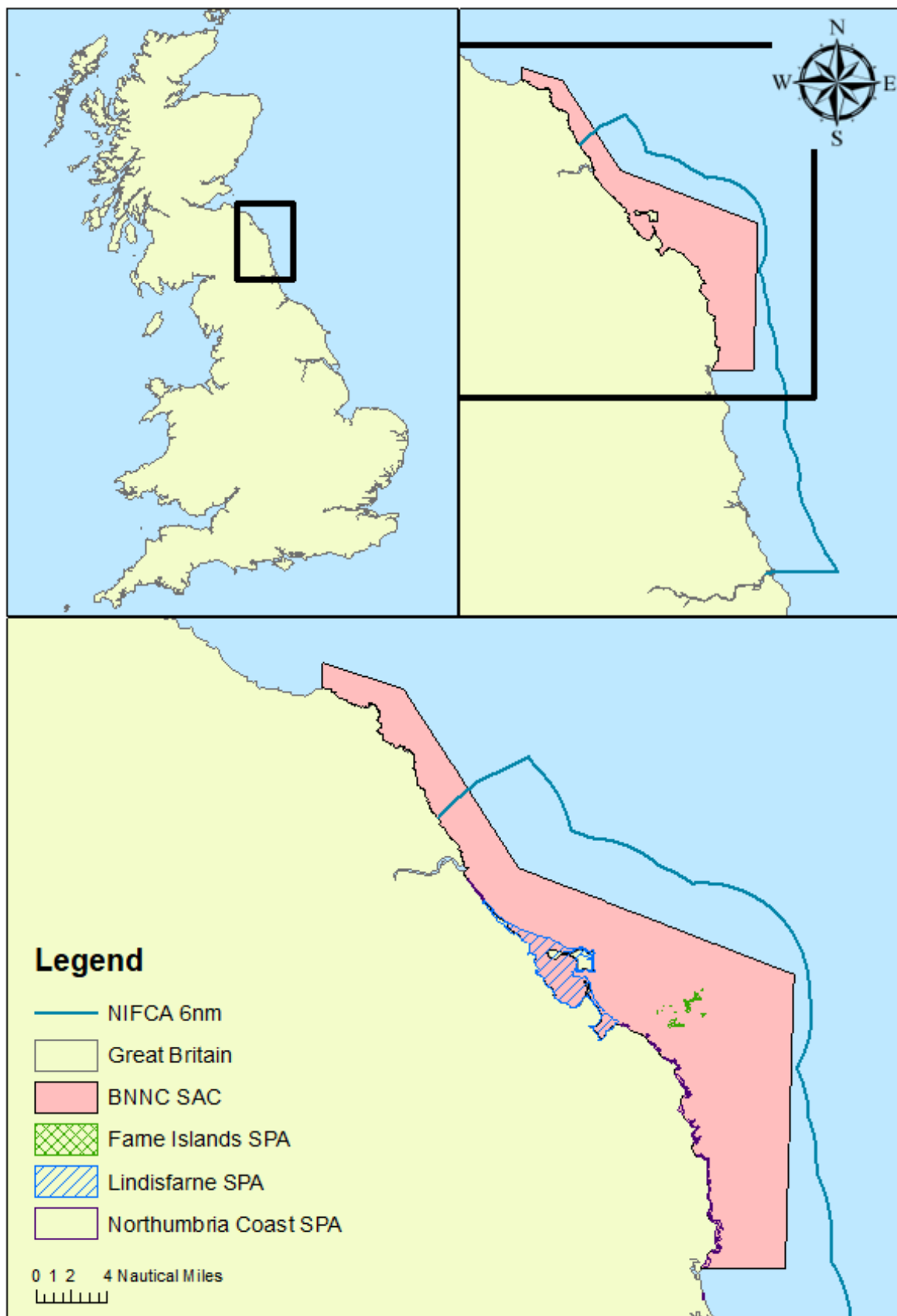
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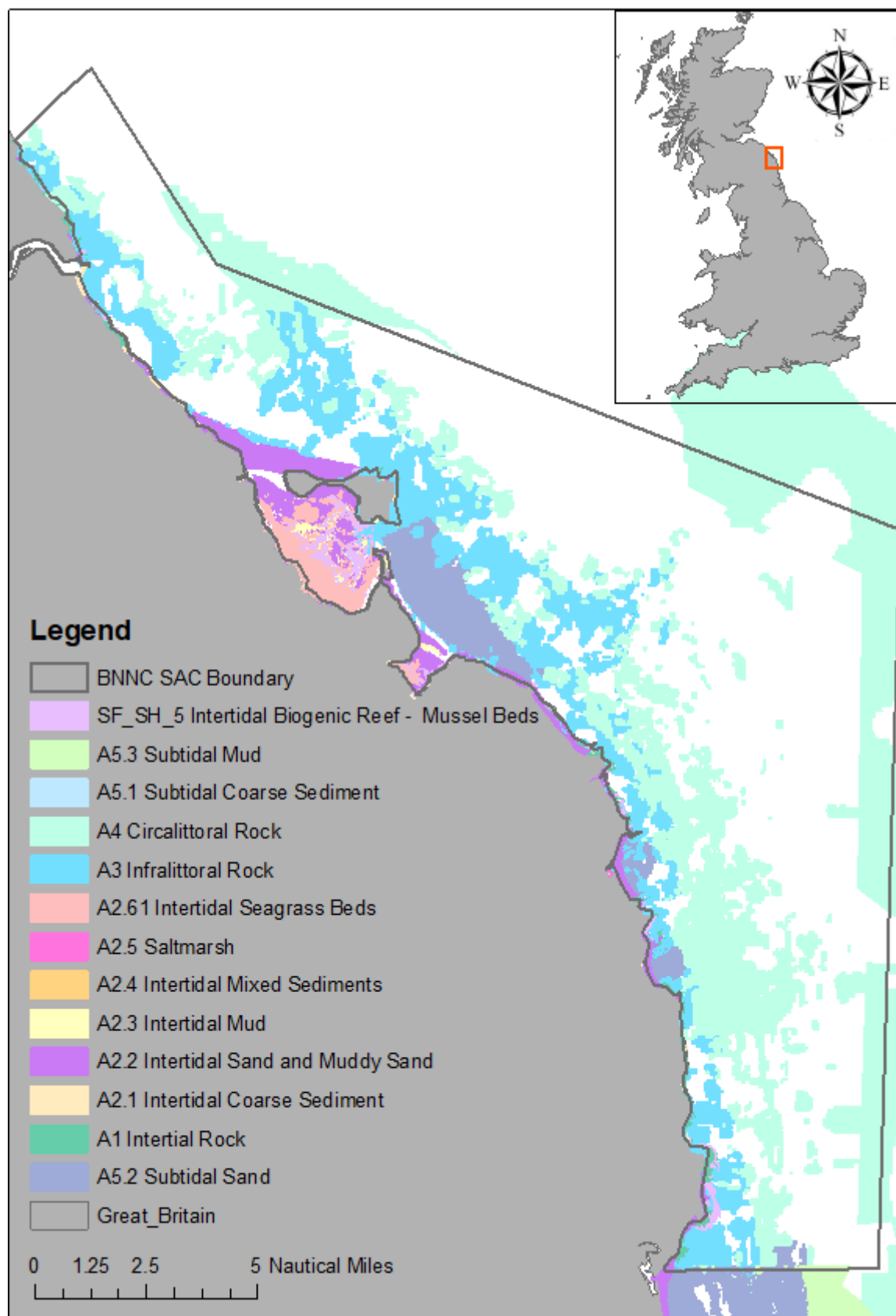
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Annex 2: Site Map



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



Annex 4: NIFCA District's Sectors

