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):	**Intertidal rock**
Gear type(s):	**Handwork (access from land) (Periwinkle collection in 'High' collection pressure areas only)**
Gear/feature interaction reference(s):	**BNNC SAC – 587** **BNNC SAC – 588**

Revision history		
Date	**Revision**	**Editor**
16/02/2022	Conclusion of Detailed TSLE required an Appropriate Assessment of periwinkle collection in areas identified as subject to high pressure collection. Document created to assess this.	AA
Feb 2024	Updated some information and finished off the AA table.	KO
14/10/2024	Edited and updated with 2024 data, map added.	SR
21/10/2024	Reviewed by AA	AA
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IFCA reference
BNNCSAC- AA 004

1 Introduction

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 Marine Protected Areas (MPAs). 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 (**Handwork (access from land) – Periwinkle collection**) have a likely significant effect on the **Intertidal bedrock reef, and Intertidal boulder and cobble reef** in areas of **high collection pressure** of the **Berwickshire and North Northumberland Coast SAC**, and on the basis of this assessment whether or not it can be concluded that **Handwork (access from land) – Periwinkle collection** will not have an adverse effect on the integrity of this SAC.

An in-combination assessment will be carried out and will include gears screened out from the phase 2/3 assessment[1] 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 species[2]
- NIFCA intertidal sightings data
- Reference list
- Periwinkle code of conduct (Annex 1)
- Site boundary map (Annex 2).
- Map of habitat types within the BNNC SAC (Annex 3).
- Ashleigh Tinlin MacKenzie PhD (2018) (Tinlin MacKenzie, 2018).

[1]See 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 645km^2 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 species[5].

2.1 Overview and qualifying features

2.1.1 Reefs

Along the Berwickshire and North Northumberland Coast, rock platforms extend offshore as a series of reefs and rocky plains. These platforms extend several kilometres out to sea as a series of underwater terraces. Although this part of the coast is exposed to the full fetch of the North Sea from the east and northeast, the wave action is rapidly attenuated on the more extensive wave cut, rocky platforms, which allows a wide range of animal and plant communities to live in close proximity.

Reef habitats along the Berwickshire and North Northumberland Coast support a high diversity of communities and species. A large number of the species present are characteristic of cold water habitats, such as the deeplet sea anemone *Bolocera tuediae* and the bottle brush hydroid *Thuiaria thuja*. Other species reach their southern or eastern limit of distribution within the site, including the Devonshire cup coral *Caryophyllia smithii*.

The substrata of the rocky reefs on the Berwickshire and North Northumberland Coast SAC is extremely diverse and ranges from soft limestone bored by the bivalve *Hiatella arctica*, to hard volcanic rock (for example, whin sill) pitted by erosive forces of the sea. The Farne Islands are of particular importance as they are one of the only rocky islands with extensive reefs in the North Sea. Here the whin sill overlies layers of sandstone and limestone. The limestone is particularly species rich and bored by hydroids and bryozoans. In siltier areas it is colonised by the rare erect bryozoan *Smittina landsborovii*.

Rocky reef communities are characterised by attached algae and invertebrates, usually associated with a range of mobile animals such as crustaceans and fish. The rocky reefs of the Berwickshire and North Northumberland Coast SAC are rich in species with a high diversity of reef communities. This feature consists of the following sub-features:

- Intertidal rock (469 ha)
- Infralittoral rock (6936 ha)
- Circalittoral rock (9470 ha)
- Subtidal stony reef and Intertidal biogenic reef: mussel beds (101 ha).

This Appropriate Assessment focusses in the intertidal rock subfeatures of the Reef qualifying feature.

2.1.2 Intertidal rock

The intertidal rocky reefs of the Berwickshire and North Northumberland Coast SAC support a diverse range of habitats, including extensive rock pool systems and boulder shores. This diversity is due primarily to the different rock types and structures within the site such as whin sill and limestone reefs at Newton Haven. The shores associated with headlands and islands such as those at St Abbs Head and the Farne Islands are mainly steep and subject to strong wave surge conditions. The resultant high splash zone dominated by grey and orange lichens and black tar lichen *Verrucaria maura* in the littoral fringe, form distinctive broad bands under these high energy conditions. The upper and middle areas of these shores are typically covered by barnacles and mussels, or communities of limpets and red algae. The majority of

the rocky shores in the site, are gently sloping bedrock or boulder shores. There is an extensive example of such a bedrock platform at Boulmer Steel, just north of Alnmouth, where the majority of the intertidal zone is dominated by fucoid algae. The large extent of these shores result in reduced mid and upper shore areas, with dissipated wave action allowing the fucoids, typical of more wave sheltered shores, to maintain a firm attachment. Where sediments are adjacent to sheltered or moderately exposed rocky shores, sand deposited on the shore is often bound by the filaments of the red algae *Audouinella* spp. The main rocky shore biotopes provide ideal habitats for brown algae such as *Fucus* spp., red algae such as *Porphyra* spp., pink coralline crusts, coral weed *Corallina officinalis*, the less common china limpet *Patella ulyssiponensis*, kelps *Laminaria* spp. and shanny *Lipophrys pholis*.

The more exposed shores, such as the coastline from Fast Castle Head to Eyemouth, tend to be animal dominated, whilst more sheltered rocky shores tend to be dominated by algae, such as at Newton Haven. Fucoid dominated algal communities such as these provide a significant contribution to the primary production within the reef system. The highly diverse and abundant marine communities found on rocky shores also provide an important source of food for predators such as foraging fish, crustaceans and birds. The extent of this habitat is estimated to be 6936 ha.

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)

3.1 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.

3.2 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

This Appropriate Assessment concerns Hand Gathering with access from land targeting periwinkle (*Littorina littorea*). Other forms of hand gathering take place within the BNNC SAC including collection of mussel, shore crab and cleeking for lobster which have been screened out in previous assessments (BNNC SAC tLSE 022 – Handwork from land).

The level of periwinkle gathering within the BNNC SAC has been assessed using NIFCA shore patrol sightings data (medium-high data confidence). NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (± 2 hours). All intertidal activity is recorded within this time window, officers also record when no activity is seen during a visit. Using this sightings data, periwinkle collection activity has been classified as 'high', 'medium', or 'low.'

Periwinkle collection activity in areas classified as medium or low has been screened out in assessment BNNC SAC tLSE 022. This assessment concluded that hand gathering for periwinkle in areas categorised as Low or Medium activity will likely not have a significant effect on the features of the site or the supporting habitat of the features. This assessment therefore focuses on high collection areas or 'hotspots' which include Berwick, and Seaton Point (Boulmer).

4.1 Periwinkle collection activity

Periwinkles can be harvested from the shore when uncovered by the tide. Harvesters will hand-pick the target species from the shore, collecting them into buckets, this can involve turning rocks, cobbles or boulders. The activity occurs both recreationally and commercially on rocky intertidal areas up and down the Northumberland Coast.

France, the United Kingdom and Ireland are the countries with the most important gastropod fisheries in Europe, accounting for over 90% of catches between 1979–1996 (Leiva & Castilla, 2001). Periwinkles are one of the most harvested species and are mainly exported to Europe, predominantly France and Spain (Cummins et al., 2002). The market value of the periwinkle fishery in England is unknown (Tinlin-Mackenzie, 2018) though was estimated at £5 million in Ireland in 1994 (Pearson, 1994 as cited by Cummins et al., 2002). It is difficult to accurately assess the size of periwinkle fisheries as they are unregulated, under reported, and often black market in nature (Cummins et al., 2002; Crossthwaite et al., 2012). There is a peak in price and demand at Christmas with more intense harvesting, however periwinkles are harvested year round with summer demand from restaurants in France (Crossthwaite et al., 2012).

There are currently no regulations in place to control the quantities of periwinkles harvested. There are no requirements to be a 'picker' or harvester and as such it is an unregulated fishery. There is a difficulty in gathering information regarding the periwinkle fishery on the Northumberland Coast due to its 'black market' nature. Harvester and wholesalers are reluctant to provide information for fear of economic or regulatory consequences.

Data on periwinkle collection from NIFCA Officer patrols, collected when a visit coincides with low water (± 2 hours) has been used to create a map showing collection hotspots in the District (Figure 1). The high collection areas or 'hotspots' for the whole district include Berwick, and Boulmer (Seaton Point) Periwinkle collection is recorded on 36% of patrols throughout the whole district, in areas of high collection pressure this percentage increases. This is particularly noticeable at Berwick where it is recorded on 65% of patrols, significantly more than at other hotspots.

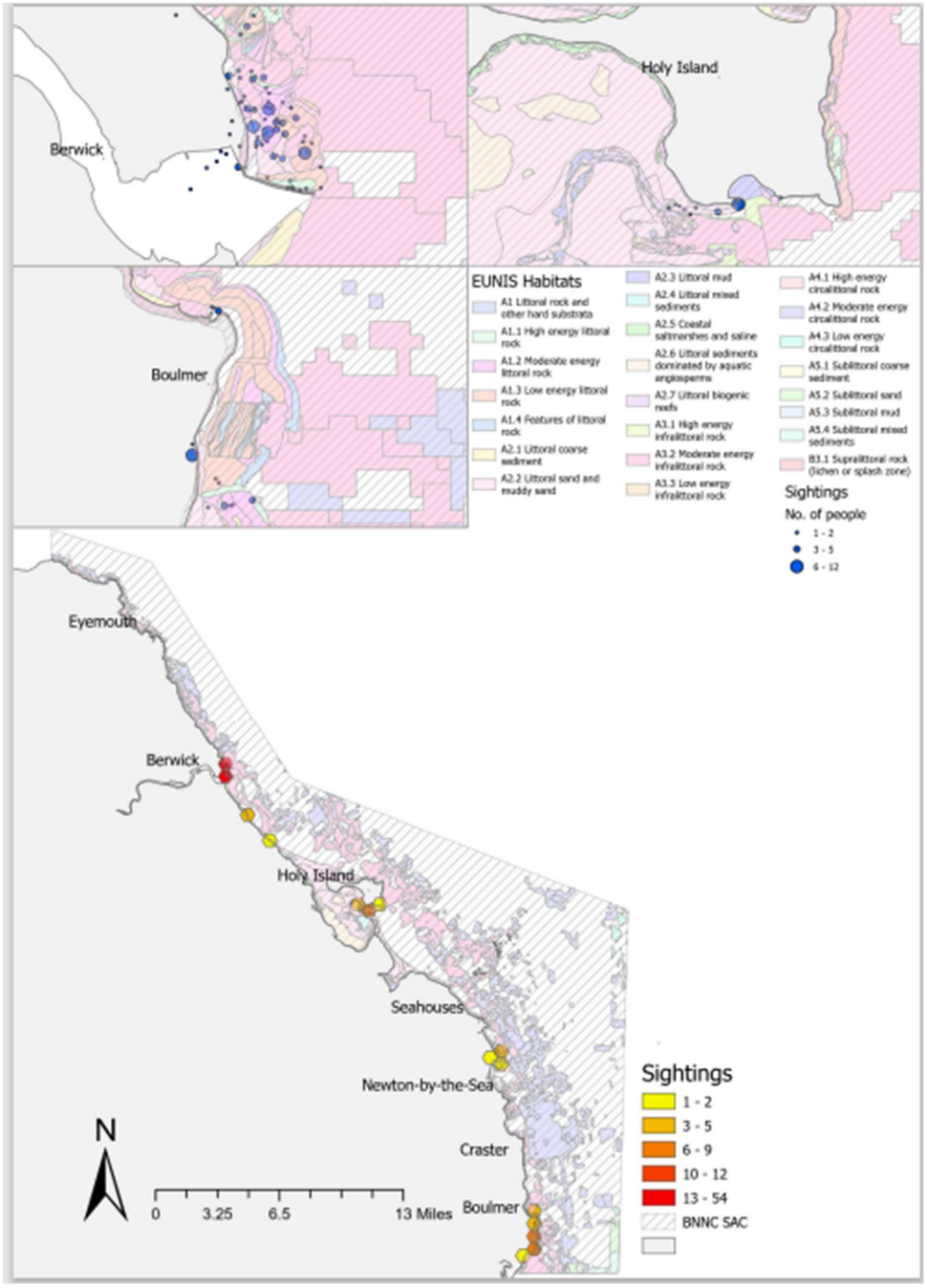

Figure 1 - Number of periwinkle collection sightings within the BNNC SAC from NIFCA patrols from 2016-2024 showing sightings at Berwick, Boulmer (Seaton Point) and Holy Island on rocky intertidal habitats.

For sites within the BNNC SAC, hotspot areas have been identified as Berwick, and Boulmer (Seaton Point) and these areas will be the focus of this assessment (Table 1). LNNR / Holy Island has been classified as Medium, this classification has been updated since the completion of the detailed assessment for hand gathering (access from land) where LNNR/ Holy Island was classified as High. Therefore this area will not be assessed here as it has effectively been screened out in previous assessments. However, effort will be monitored throughout the NIFCA district and changes in effort in high, medium and low areas will be recorded in the Hand Gathering monitoring and control plan, with management put in place, if appropriate. A summary of the NIFCA periwinkle surveys carried out at Berwick, Boulmer, Cresswell, Holy Island and St Marys island between June 2020 – June 2022 can be found in Table E

There are other sites within the BNNC SAC including Craster, Newton, Seahouses, and Scremerston where periwinkle collection activity has been anecdotally reported to NIFCA but there are no sightings recorded (Table 1). These areas will continue to be monitored and will be included in intertidal patrols.

Table 1 Periwinkle gathering activity classifications for all sites within the BNNC SAC from NIFCA intertidal patrols between 2016 and September 2024. Showing total number of patrols, the proportion of patrols periwinkle collection was sighted on, the average number of individuals per sighting, the average number of individuals per patrol (proportion of patrols x average number per sighting) and the maximum number of collectors sighted at one time. Periwinkle activity rankings (Low – High) were based on average number of collectors per patrol to the area from NIFCA patrols, in addition to officer knowledge.

Site	Number of patrols	Proportion of patrols activity sighted	Average no. of collectors per sighting	Average no. of collectors per patrol	Max. no of collectors	Periwinkle collection activity
Beadnell	25	0.20	1.60	0.32	2	Low
Berwick	60	0.78	2.51	1.97	8	High
Boulmer N	73	0.14	2.40	0.33	6	Low
Foxton - Seaton Point	9	0.11	2.00	0.22	2	Low
LNNR / Holy Island	19	0.47	2.00	0.95	7	Medium
Boulmer S /Seaton Point	13	0.62	2.63	1.62	4	High

A PhD study was conducted by Tinlin-Mackenzie (2018) on intertidal collection within the BNNC SAC which covers a significant proportion of the NIFCA district from Alnmouth to north of the Scottish border. The study found periwinkle harvesting occurs throughout Northumberland, with Seahouses and Berwick popular collection sites, probably due to the proximity of wholesalers there. In general, there was a southerly skew to collection activities, due to the higher population density in the south of the district. Summer was the peak periwinkle collection season and spring tides were favoured. The average mass taken by each collector was 12.14kg, with collectors often filling several large sacks. 45% of collectors were commercial and harvest more intensively, for longer durations and at greater frequencies than recreational gatherers. Overall, Tinlin-Mackenzie estimated that over 3 million periwinkles are removed from the BNNC SAC every year and the estimated economic value of the fishery is £133,982.

Periwinkles harvested on the Northumberland Coast go through wholesalers at Berwick-upon-Tweed and on to France. The price offered per kilo depends on both size of periwinkle and present market demand. Prices offered to gatherers varies but is usually around £1/kg for small, £2/kg for medium and £3/kg for large, this can increase to £5/kg for large size classes around Christmas. Commercial collectors will collect periwinkle by hand, as described above, into ‘onion’ sacks which hold around 25kg of periwinkle. Wholesalers report that they return the discards to a suitable area of rocky shore through trusted collectors and fishers. Periwinkles are also sold privately through internet sales on sites such as Facebook. This makes monitoring the fishery extremely difficult.

Anecdotal evidence from officers talking to collectors out on the coast suggests that gatherers do not target the same shore every time they gather. Rather, they ‘cycle’ through shore. One gatherer said he starts in Berwick and goes down the coast as far as Boulmer, so there are often 3-4 weeks in between targeting the same shore.

Table 2 Locations where patrols have recorded no activity between 2016-2024 but NIFCA have received anecdotal reports. *Locations where Tinlin MacKenzie (2018) recorded periwinkle collection. Due to Tinlin MacKenzie evidence these sites have been assigned a 'Medium' collection pressure and will be prioritised for intertidal patrols in the future.

Location	Number of patrols	Number of sightings

Craster	3	0
Newton*	10	0
Scremerston	2	0
Seahouses*	7	0
Bamburgh	2	0

4.2 Management

4.2.1 National

There is national and European legislation outlining practice for the collection and sale of shellfish for human consumption. Shellfish is categorised as, 'Live Bivalve Molluscs' (LBMs) (for example cockles and mussels) and 'Live Shellfish' (periwinkle are in this category). The following applies to all Live Shellfish (and therefore periwinkles):

- Food Safety Act 1990
- Food Safety & Hygiene (England) Regulations 2013
- Food Law Code of Practice (England)
- Food Law Practice Guidance (England) - It is the statutory obligation to treat food intended for human consumption in a controlled and managed way. The key requirements of the Act are that food must comply with food safety requirements, must be "of the nature, substance and quality demanded", and must be correctly described (labelled).
- Regulation (EC) No 178/2002 - laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety.
- Regulation (EC) No 854/2004, Article 6, Annex II (as amended) - laying down specific hygiene rules for food of animal origin.

To enact the legislation in place, Northumberland County Council have a registration system which requires wholesalers or collectors to document information about the catch including the location harvested from, amount collected, and date collected. This information is for the identification of each batch of live shellfish during transport from the production area to a despatch centre, purification centre, relaying area or processing plant.

Under Regulation 853/2004, each batch of LBMs / LS that are to be placed on the market (i.e. commercial volumes in excess of 5kgs) must be accompanied by a registration document (unless issued with a permanent transport authorisation) to identify each batch harvested and transported. The registration document must be completed upon landing and accompany the batch from the classified harvesting area, and between establishments, up to and including the arrival of the batch at a relay area, dispatch centre or processing establishment.

4.2.2 Regional

Periwinkles are classified as 'seafish' and there is therefore a public right to collect both personally and commercially (Cummins et al., 2002). As a 'seafish', commercial collection of *L. littorea* is controlled under fisheries legislation; however, there are currently no regulations in place to control the quantities of periwinkles harvested. Byelaws can regulate the public right to fish, and some other IFCAs have periwinkle harvesting regulations in place (Table 3).

In 2020 NIFCA published a voluntary Periwinkle Gathering Code of Conduct (Annex 1) which is posted at intertidal sites within the district, with guidelines for minimising disturbance to intertidal rocky shores and a recommendation to only collect periwinkles over the minimum market size of 12mm shell length. This has the possible advantages of securing local support and is flexible to changing conditions, however, may have limited success as not everyone may be aware (Tinlin-Mackenzie, 2018).

Table 3 Periwinkle collection regulations in the UK

Region/Area	Management	Regulation
Northumberland IFCA	Voluntary Code of Conduct	Guidelines to minimise disturbance, minimum harvesting size of 12mm, returning undersize individuals to area of collection.
Cornwall IFCA	Voluntary Code of Conduct	Winkle Fishing Code of Practice specifies a gatherer should use a riddle with bars spaced at least 16cm, return undersize individuals to the area they were caught, seek landowner's permission, and have regard for other legislation i.e. SSSI consents.
Devon and Severn IFCA	Byelaw	Minimum harvesting size of 16mm using a gauge with a square opening
North Western IFCA	Byelaw (Legacy – old Cumbria SFC area only)	Only hand gathering allowed, minimum harvesting size of 16mm using a gauge with a square opening
Southern IFCA	Byelaw	Only hand gathering allowed, and closed season from 15th May to 15th September
	Byelaw	Poole Harbour Shellfish Hand Gathering byelaw specifies that within defined areas from 1st November-31st March no shellfish of any kind may be removed by any means.
Kent and Essex IFCA	Byelaw	Specifies winkles can only be removed by hand.
Sussex IFCA	Voluntary Code of Conduct	Generic for all hand gathering/bait collection activity – nothing specific to periwinkles
Jersey	Byelaw	Recreational bag limits – 200 periwinkle per day

4.3 Other fishing activity within the BNNC SAC

Potting for European lobster *Homarus gammarus* and brown crab *Cancer pagurus* is the principle fishery within the Northumberland IFCA district, with 86 commercial shellfish permit holders in 2024. This fishery is a permit fishery, one of the conditions attached to a permit is to provide monthly activity returns forms including information on weight of catch and effort (number of pots in the sea, number of days fished, and average number of pots hauled per day). This enables NIFCA to monitor fishing activity within the site. Commercial shellfish permit holders are limited to 800 pots and permitted vessels must not exceed 12 metres in length (NIFCA Byelaw: Crustacea and Molluscs permitting and Pot Limitation). There is also a recreational potting fishery in Northumberland. This recreational fishery is also permitted. Recreational shellfish permit holders are limited to five pots and must not take more than two lobster, five edible or velvet crabs, 20 whelks or five prawns in any one day. Permit holders are requested to record and submit catch information on a voluntary basis. Recreational potting predominantly takes place within the infralittoral or intertidal areas where pots can be accessed from the shore.

Trawling for *Nephrops* occurs within the NIFCA district, there were approximately 38 local trawlers with 23 active vessels working from 4 ports in the NIFCA district. The local fishery takes place between 3-25 miles offshore with best catches being seen during the autumn and winter months. Fishers target *Nephrops* on areas of subtidal mud using otter trawl gear. An otter trawl is constructed like a cone-shaped net that is towed on the bottom. Trawling is a permit fishery but until 2021, NIFCA only required trawlers to have a permit to fish in the 0-3 nautical mile area of the District. In 2021, NIFCA updated the byelaw to include the full district and limit trawl gear type in Coquet to St Mary's MCZ. Trawling is also limited in the BNNC SAC, it is prohibited in the majority of the site with three small areas open to light otter trawl gear only (NIFCA Byelaw: Prohibition of the use of Mobile Fishing Gear within the English section of the Berwickshire and North Northumberland Coast Special Area of Conservation (SAC)). No trawling activity has been recorded in the site since the mobile gear prohibition in 2014. Scallop dredging is prohibited throughout the whole NIFCA District by byelaw 2 Dredging (NIFCA, 2022).

Other intertidal fishing activities occur in the BNNC SAC. Angling is a popular sport from both the shore and at sea, with anglers seen on the coast year-round targeting cod and flatfish in the winter and mackerel and other finfish such as pollock in the summer. Bait collection also occurs along the coast, with digging for bait

worms on intertidal soft sediments, collection of mussel from beds within estuaries, and collection of 'peeler' crab from tyres placed on mud within estuaries.

4.4 Test for Likely Significant Effect (LSE)

BNNC SAC – 587 Intertidal rock

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)? Pressures listed are all those for which the feature is deemed to be sensitive. Pressures in bold are Medium-High Risk. The sensitivities listed are based on the current Conservation Advice available on Natural England's Designated Site System.	**Abrasion/disturbance of the substrate on the surface of the seabed** **Habitat structure changes - removal of substratum (extraction)** **Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion** **Removal of non-target species** **Removal of target species** Deoxygenation Introduction of light Introduction or spread of invasive non-native species (INNS)
3. Is the feature potentially exposed to the pressure(s)?	Yes
4. What are the conservation objectives for the feature? *A list of key structural and influential species is at this time not available from Natural England. Species which are a viable component of the habitat are likely to include those which are hand gathered such as lobster, shore crab, periwinkle, flora (*Fucus* spp., *Osmundia* spp. etc.).	The conservation objectives for Intertidal rock are to **Maintain:** - <u>The presence and spatial distribution of intertidal rock communities</u> The total extent of intertidal rock at 6936 ha - <u>The abundance of listed typical species*</u> - The surface and structural complexity, and the stability of the reef structure. - <u>The species composition of component communities</u> - The natural physical energy resulting from waves, tides and other water flows, so that the exposure 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 - The dissolved oxygen (DO) concentration at levels equating to High Ecological Status - Water quality at mean winter dissolved inorganic nitrogen level - Natural levels of turbidity **Restrict**: - The introduction and spread of non-native species and pathogens **Reduce:** - Reduce aqueous contaminants to levels equating to High Status Those conservation objectives that might be affected by handwork activity are underlined.

5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?	The BNNC SAC boundary from North of the Northumberland IFCA district boundary at Fast Castle Head to just north of Alnmouth (Annex 1). Intertidal hand gathering within the BNNC SAC includes: hand gathering for periwinkle (*Littorina littorea*) and for shore/peeler crab (*Carcinus maenus*), and cleeking for European lobster (*Homarus gammarus*) for example. NIFCA have also received requests to carry out collection of seaweed and are aware of a commercial operator planning to carry out collection of seaweed species on a commercial basis (more information is needed on the area and scale of this activity before assessments can be carried out). As this is a new activity it requires an assessment to be carried out, this falls outside of the original Article 6 assessment process. A separate assessment will be conducted when information on this activity is provided by the applicant. They have been told of the legal requirements and necessity of needing appropriate permissions. Due to the differences in the way each activity is carried out they will be considered separately throughout the document. There is no national description of what is commercial and what is recreational levels of collection, therefore activity has been assessed regardless of the end point of the catch, since it is the activity linked to effort that impacts rather than whether it is commercial or recreational in nature. Hand gathering involves the collection of periwinkles or shore crab by hand from the intertidal rocky areas, which can involve turning rocks, cobbles or boulders. Cleeking is a traditional method of catching lobster involving using a long pole with a hook to tease lobsters from under rocks or in crevices. Lobster will use their claws to clamp onto the hook and are removed from the sea. The activity is highly seasonal and concentrated during the summer months. Both activities occur on rocky intertidal areas, the habitat of the target species. These activities occur along the rocky intertidal/infralittoral habitats on the North East coast within other MPAs including the Northumbria Coast SPA and Coquet to St Mary's MCZ, hand gathering activities in these sites will be assessed in other HRA and MCZ assessments carried out by NIFCA. **Hand gathering targeting shore crabs** NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (± 2 hours). Between January 2016 and October 2021, 110 visits to handwork locations within the BNNC SAC were made by officers. 123 individuals were observed hand gathering for periwinkles or shore crab. Collection of crab comprises a small proportion of hand gathering activity with less than 10% of NIFCA sightings attributed to this activity. NIFCA have received reports that shore crab are difficult to find on the rocky intertidal, with the best places being around staithes or under shelter on muddy intertidal habitats. In fact, many shore crab collectors will travel to the North West coast as collection is more efficient due to higher abundance of shore crabs found in intertidal areas there (Les Weller, pers. comms. 2020). On the North East coast, hand gathering for shore crab is typically seasonal with crab targeted when soft shelled just after moulting, which takes place in late Spring and Summer. Therefore, collection occurs in a 3-4 month period from late May to August. There have been reports that some collectors will target shore crab year-round and will keep them until they moult and can be used effective bait. However, anecdotal evidence suggests this practice needs a sophisticated set up and is not common in the North East. The collection of shore crabs from rocky intertidal areas will have similar impacts to hand gathering for periwinkles. Shore crab shelter under rocks or in crevices and so collectors will search these cryptic habitats turning rocks as they search.

A proportion of the collection of shore crab is carried out in estuaries using artificial shelters. It has been reported that 90% of the shore crab collected within the NIFCA district is collected using artificial shelters. This is thought to be a more efficient method of collection as the target species congregates within the shelter facilitating easier collection than searching and turning rocks on intertidal rocky shores. Artificial shelters, termed fisheries aggregation devices, are placed in areas of intertidal estuarine mud and are found both within Marine Protected Areas and outside of them in the Northumberland IFCA district. No fisheries aggregations devices are placed within the BNNC SAC intertidal rocky reef habitat. This activity therefore falls outside of the remit of this assessment, however assessments for this activity in the Aln Estuary MCZ (Aln MCZ – SRA 016) and Northumberland Marine SPA (NCSPA – tLSE 038) will be carried out.

Due to the scale of the activity, it is unlikely that the collection of shore crabs from intertidal rocky reef will adversely impact the conservation objectives of these features (moderate confidence).

Hand gathering targeting periwinkle

Hand gathering for periwinkle is carried out both commercially and recreationally within the BNNC SAC. Commercial collectors sell periwinkle through two wholesalers in Berwick where they are exported to Europe, mainly to France where there is a large market. Wholesalers only take periwinkle above the minimum market size of 12 mm. At the wholesalers, periwinkle are put through a riddle which grades them by size into small, medium and large categories (small = 12-14mm, medium = 14-17mm, large = 17+mm). Wholesalers report that they return the discards to a suitable area of rocky shore through trusted collectors and fishers. Prices offered to gatherers varies but is usually around £1/kg for small, £2/kg for medium and £3/kg for large, this can increase to £5/kg for large size classes around Christmas. Commercial collectors will collect periwinkle by hand, as described above, into 'onion' sacks which hold around 25kg of periwinkle. Catch data is held by wholesalers, NIFCA plan to work with wholesalers who will share this information. This can be used in the Hand Gathering Monitoring and Control Plan to understand effort and the impact of the activity.

The activity has been reported to be higher in summer, with the most activity recorded in August (Tinlin McKenzie, 2018). Collection is higher over spring tides. On average, collectors carry out 5 trips per month, spending 3 hours collecting per trip. They collect, on average, 13.9 kg per trip (Tinlin McKenzie, 2018). The average periwinkle biomass removed from BNNC SAC per year is estimated to be 13,398.2 kg (Tinlin McKenzie, 2018).

NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (± 2 hours). Between January 2016 and October 2021, 110 visits to handwork locations within BNNC SAC were made by officers with hand gathering recorded on 40 of those patrols. 123 individuals were observed hand gathering for winkles or shore crab. Given the lack of collection of shore crab as outlined above, for the purpose of this assessment these sightings have been classed as periwinkle collection sightings.

Areas where activity is known to occur in the NIFCA district has been classified as High, Medium and Low based on comparing collection pressure from the sightings data, which has been corroborated using the findings of Tinlin-McKenzie (2018) and from reports to NIFCA on activity (Annex 2). Classifications were split equally but checked to see if more natural breaks were more suitable, and against officers' knowledge. Within BNNC SAC, Berwick, Holy Island, and Seaton Point (south of Boulmer) have been categorised as high pressure. With the addition of information from Tinlin

MacKenzie (2018), Seahouses and Newton have been classified as medium pressure although there are no sightings of collection at either area. This may be due to low patrol effort in these areas. Information from IFCOs suggest that these areas are not heavily collected sites, however NIFCA will target more patrols at these sites to confirm collection intensity. This will be monitored through the NIFCA Hand Gathering Monitoring and Control Plan.

In comparison, periwinkle harvest levels described in Ireland and Scotland are estimated to be 4000 tonnes per year (McKay et al, 1997; Cummins et al., 2002). The exploitation rates in Ireland and Scotland are approximately double the exploitation rates in the BNNC SAC (25 tonnes and 13.4 tonnes respectively) when equated by coastline length (Tinlin McKenzie, 2018). This represents a smaller level of collection on the Northumberland Coast compared to elsewhere in the UK, although this doesn't necessarily mean a smaller impact. NIFCA currently does not have any stock assessment information to fully understand the impacts of collection at any level on the population.

Periwinkle size was compared by Tinlin-McKenzie (2018) to previous studies (Morell 1976; Quigley, 1999). On the most heavily collected shore studied (Boulmer) the largest shell height had not decreased suggesting harvesting periwinkles had not led to a reduction in maximum shell height over the last 50 years. In other areas of the UK, periwinkle size and density was found not to correlate to harvesting pressures at current exploitation levels (Tilin et al., 2010). Natural variation in density between shores is likely to have a greater impact than that of harvesting. With factors such as habitat selection likely to have a greater impact (Gendron, 1977). However, Quigley (1999) revealed differences in the size distributions and mean size of periwinkle between "collected" and "uncollected" populations within the BNNC SAC, and that the maximum size attained by *Littorina* on "collected" shores was smaller than that from "uncollected" suggesting that high levels of collection could have an impact on periwinkle size.

Densities on shores within the BNNC SAC have been found to vary based on collection pressure but with different directions of difference. Quigley (1999) found densities of periwinkle to be higher on two out three shores with 'high' collection rates when compared to adjacent shores with 'low' collection rates. Relatively high densities may have been sustained due to dispersive larval recruitment from other shores (Jackson, 2008) or refuge areas.

Crossthwaite (2012) found that long-term exploitation did significantly affect population abundance and age structure. However, exploitation levels are higher in these study areas, which are located in Northern Ireland. Local findings suggest that periwinkle populations are maintained at harvestable levels at highly collected shores and communities likely vary from natural variation, rather than harvesting effects (Tinlin-McKenzie, 2018).

Direct impacts of periwinkle collection to associated flora and fauna are due to:

- Physical damage to flora and fauna from disturbance (Berthelon et al., 2004) from boulder turning and trampling which can cause a reduction in habitat stability and reduced biodiversity (Davenport and Davenport, 2006). This can damage under-boulder communities which require stable boulder habitats. It can also adversely impact organisms that depend on upper rock surfaces, such as seaweeds (Liddard et al., 2011). Reduction in habitat stability from boulder turning can be lethal to fauna, algae, and under-boulder communities through crushing, smothering and desiccation (Berthelon et al., 2004).
- Reduction in species composition through trampling can reduce biodiversity, abundance, and biomass (JNCC and NE, 2011). It can lead to a higher percentage of bare rock with a decrease in algal cover (Tyler-Walters, 2008; Liddard et al., 2011). These effects can be seen at low trampling with long term impacts (Povey and Keough, 1991). These impacts are variable, dependent upon intensity, duration, and frequency of the trampling (JNCC and NE, 2011).

- These disturbances can negatively alter community structure, they vary spatially and temporally (Berthelon et al., 2004) and most severely impact long lived sedentary species that are slow to reproduce (Berthelon et al., 2004).

Although previous studies show direct impacts of rocky shore disturbance, the impacts can be difficult to predict locally. The local evidence available (Tinlin-McKenzie, 2018; Quigley, 1999) suggests that periwinkle collection, at current levels, does not appear to be negatively impacting rocky shore floral and faunal communities in the ways described above. Natural England commissioned a study investigating the scale, locale, and ecological impacts of harvesting intertidal species including periwinkles (Tinlin-McKenzie, 2018). Three shores were observed representing 'not collected', 'low collection' and 'high collection'. Results found that periwinkle collection does not appear to be negatively impacting rocky shore floral and faunal communities at current intensity levels. Quigley (1999) reported that between shores in Northumberland with different collection pressures ('collected' and 'uncollected') two out of three sites showed no significant difference in non-target animal mean abundance.

Overall, periwinkle stocks appear to be relatively resilient to harvesting. As the local evidence available from peer reviewed research (Tinlin-McKenzie, 2018; Quigley, 1999) suggests the harvesting at current levels does not impact floral and faunal communities. However, literature from other areas of the UK suggest the most significant potential impacts appear to be on non-target rocky shore dwelling plants and animals which experience physical disturbance from human activities (Berthelon *et al.*, 2004; Crossthwaite, 2012). The hydrodynamics along the coastline of the BNNC SAC are variable, in more exposed areas wave and wind naturally turns some small boulders/cobbles. Thus, intertidal and infralittoral communities subject to this natural disturbance will be more resistant to disturbance pressures than communities in sheltered areas. Overall, the intertidal rocky reef feature is subject to naturally high levels of physical disturbance and recovery of rocky reef communities is predicted to be medium (Mieszkowska and Sugden, 2014). However, the impacts of boulder turning are more severe when boulders are left upturned (Davenport and Davenport, 2006; AFBI, 2009).

NIFCA can say with moderate confidence that on area of bedrock reef where activity is medium or low this activity will not have an adverse impact on features of the site if boulders are returned to their original position. However, NIFCA have received multiple reports that activity has increased in certain areas since 2018. Further, evidence in the literature from other areas in the UK (Northern Ireland) (Crossthwaite et al., 2012) suggest that the impact of removal of periwinkle at higher intensity levels of collection could have long term impacts to community composition and structure. Therefore, at areas of high collection, NIFCA are unsure whether this activity will significantly impact the conservation objectives of this feature, especially as there is no stock assessment information. Management could aim to ensure that collectors return all boulders to their original positions after use, or minimise boulder turning all together. This could be done using education, and codes of conduct (Boye *et al.*, 2006). Trampling may be too difficult to manage due to the free access of rocky shores to the public undertaking recreational activities.

NIFCA conclude, with moderate confidence, that this activity will not adversely impact the conservation objectives of the site, through the pressures listed above, at areas of low and medium collection. Areas classified as high collection will be taken to Appropriate Assessment.

All hand gathering will continue to be monitored through routine and target patrols throughout the district. NIFCA has implemented a Code of Conduct (Annex 3) for hand gathering for periwinkles in the district that aims to stop any adverse impacts from the activity including avoiding the collection of small (below minimum market size – 12 mm), reducing disturbance to floral and faunal communities and to birds. NIFCA will monitor adherence to this code of

	conduct, and if found it is not being adhered to, plan to develop management measures. **Cleeking** Cleeking is a low impact activity, those engaged in the activity walk over intertidal areas to reach the sea at low tide. The activity is highly seasonal, concentrated in summer months on big spring tides. The main damage to the marine environment will result from individuals crossing the foreshore, however given the limited and declining levels of activity this is unlikely to cause any adverse impacts. Impacts could also occur when rocks are turned over and not replaced. The hydrodynamics along the coastline of the BNNC SAC are variable, in more exposed areas wave and wind naturally turns some small boulders/cobbles. Thus, intertidal and infralittoral communities subject to this natural disturbance will be more resistant to disturbance pressures than communities in sheltered areas. Overall, the intertidal rocky reef feature is subject to naturally high levels of physical disturbance and recovery of rocky reef communities is predicted to be medium (Mieszkowska and Sugden, 2014). Plus, given the limited and declining levels of activity this is unlikely to cause any adverse impacts. Activity is relatively low in areas of the BNNC SAC. There were 110 patrols to potential cleeking locations within BNNC SAC between January 2016 and October 2021 with cleeking seen on 11 of those patrols. 19 individuals were recorded cleeking. From these activity levels, effort is inferred to be low. The activity is labour intensive and anecdotally it is in decline as younger generations are not partaking in this traditional activity. Further NIFCA byelaws limit the activity: NIFCA Byelaw 4 Crustacea Conservation limits the number of lobster that can be taken using this method to one per person per day. At current declining levels, cleeking in the intertidal zone is unlikely to cause significant adverse impacts to the conservation objectives of this site through the pressures listed above. **NIFCA conclude, with moderate confidence, that this activity will not adversely impact the conservation objectives of the site through the pressures listed above.**
6. Condition and Conservation Objective Inferences	Conservation advice for BNNC SAC give a conservation objective of Maintain for ‘Intertidal rock’. This sub-feature of ‘intertidal rock should be maintained at 6,936 ha. The Conservation Advice package suggests that there is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities. The hand gathering activity detailed above is unlikely to impact the extent of intertidal rock.

<table>
<tr>
<td>7. Is the potential scale or magnitude of any effect likely to be significant?</td>
<td>Alone:
<table>
<tr><td></td><td>Intertidal rock</td></tr>
<tr><td>Periwinkle collection</td><td>No (Low/medium collection areas)
Yes (high collection areas)</td></tr>
<tr><td>Shore crab collection</td><td>No</td></tr>
<tr><td>Cleeking</td><td>No</td></tr>
</table>
</td>
<td>OR In-combination

No in low/medium collection areas.

Uncertain in high collection area. An in-combination assessment will be carried out as part of an Appropriate Assessment.</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, NE have been consulted extensively throughout the process.</td>
</tr>
</table>

Conclusion

Is the proposal likely to have a significant effect 'alone or in combination' on the Northumberland Coast SPA?

Uncertain. Alone and in combination with other plans/projects in low and medium pressure collection areas NIFCA have concluded the hand gathering will not have any effect likely to be significant on the above features. For the areas of high collection pressure NIFCA will conduct an Appropriate Assessment. Effort will be monitored throughout the NIFCA district and changes in effort in high, medium and low areas will be recorded in the Hand Gathering monitoring and control plan with management put in place if appropriate.

5 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 periwinkle collection on intertidal rock is given below.

5.1 Potential risks to features

The potential pressures, ecological impacts, levels of exposure and mitigation measures for the fishing activity (Handwork (Access from land) – Periwinkle collection) in regards to intertidal rock within the BNNC SAC are summarised in Table E.

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 intertidal rock;
- Restrict 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 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 E: Summary of Impacts

This table assesses the potential pressures of Hand gathering (Access from land) – Periwinkle collection in areas assigned as High collection pressure areas on the conservation objectives of Intertidal bedrock reef and intertidal boulder and cobble reef. The following conservation objectives are assessed here:

- the presence and spatial distribution of intertidal rock communities:
- the abundance of listed typical species, to enable each of them to be a viable component of the habitat; (Very difficult to assess, Natural England have not defined lists of 'typical species' yet.
- the species composition of component communities;

Against the following pressures

- Abrasion/disturbance of the substrate on the surface of the seabed
- Removal of non-target species
- Removal of target species

Other pressures have been screened out at previous stages of the assessment process.

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
Intertidal rock	**Maintain the presence and spatial distribution of reef communities.** **Maintain the abundance of listed typical species, to enable each of them to be a viable**	Abrasion/disturbance of the substrate on the surface of the seabed Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion Removal of non-target species	Physical disturbance or abrasion at the surface of the substratum in sedimentary or rocky habitats. The effects are relevant to epiflora and epifauna living on the surface of the substratum. In intertidal habitats, surface abrasion is likely to result from access and trampling, and	The level of exposure of the features considered here to the pressure varies. NIFCA have categorised the rocky intertidal areas of BNNC SAC as High, Medium and Low collection pressure areas, and only high collection pressure area are being assessed here. Periwinkle collection could cause abrasion/disturbance	No further measures required, except implementation of a Monitoring and Control Plan. 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 hand gathering, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features.

* 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).

	component of the habitat. **The species composition of component communities.**		harvesting of seaweeds (e.g. kelps) or other intertidal species Activities associated with surface abrasion can cover relatively large spatial areas e.g. bottom trawls or bio-prospecting or be relatively localized activities e.g. seaweed harvesting, recreation, potting, and aquaculture.	through trampling to access to target species, or through the turning of boulders when collectors are looking for periwinkle. The activity could remove non-target species through trampling to access target species, or through exposure dues to leaving boulders upturned when looking for periwinkles. Accidental removal of non-target species misidentified as periwinkle is rare and so not likely to be a significant risk.	The hydrodynamics along the Northumberland Coast are variable, in more exposed areas waves and wind naturally turns some small boulders/cobbles. Thus, intertidal and infralittoral communities subject to this natural disturbance will be more resistant to disturbance pressures than communities in sheltered areas. Overall, the intertidal rocky reef feature is subject to naturally high levels of physical disturbance and recovery of rocky reef communities is predicted to be medium (Mieszkowska and Sugden, 2014). The impacts of boulder turning are more severe when boulders are left upturned (Davenport and Davenport, 2006; AFBI, 2009). NIFCA do have a periwinkle collection Code of Conduct in place, with measures to reduce impacts of activity to intertidal rocky reef communities. This includes replacing any boulders turned (Annex 1). Compliance levels with the code of conduct are not known.

					The local evidence available (Tinlin-McKenzie, 2018; Quigley, 1999) suggests that periwinkle collection, at current levels, does not appear to be negatively impacting rocky shore floral and faunal communities. Natural England commissioned a study investigating the scale, locale, and ecological impacts of harvesting intertidal species including periwinkles (Tinlin-McKenzie, 2018). Three shores were observed representing 'not collected', 'low collection' and 'high collection'. Results found that periwinkle collection does not appear to be negatively impacting rocky shore floral and faunal communities at current intensity levels. NIFCA conduct monitoring surveys in areas of high periwinkle collection activity. Surveys aim to monitor impacts on intertidal rocky reef communities (and periwinkle density and length). Results from the 2022 surveys suggest that periwinkle abundance, species richness or diversity is not related to periwinkle collection intensity. There was little change in rocky shore communities at most sites from 2020-22, with faunal and algal abundance, species richness and diversity remaining similar for most metrics.

					Neither faunal nor algal abundance/percentage cover, species richness or diversity were correlated with collection pressure. However, Berwick, which had the highest levels of collection, had the lowest periwinkle densities in addition to the highest macroalgal abundance and diversity which could be due to lower grazing pressure from periwinkles compared to other sites (Harvey, 2022). Berwick falls outside of the NCSPA boundary and so will be considered in the assessment for the Berwickshire and North Northumberland Coast SAC. The highest collection remained at Berwick, in addition to the lowest periwinkle densities. There was no overall correlation between periwinkle density and collection pressure between sites however, similar to the results in 2020. Evidence on the impacts of periwinkle collection is relatively limited. NIFCA have therefore adopted the approach of continuing further periwinkle surveys and implementing a Monitoring and Control Plan for periwinkle collection, which outlines the parameters to be assessed for the fishery and includes trigger levels for a reassessment of the activity in the SAC.

		Removal of target species	This pressure considers the commercial exploitation of fish & shellfish stocks, including smaller scale harvesting, angling and scientific sampling. The physical effects of fishing gear on sea bed communities are addressed by the "abrasion" pressures above. This pressure addresses the direct removal / harvesting of biota. Ecological consequences include the sustainability of stocks, impacting energy flows through food webs and the size and age composition within fish stocks.	The removal of periwinkles from BNNC SAC could impact the presence and spatial distribution of the community, as well as the structure of the periwinkle community.	No further measures required, except implementation of a Monitoring and Control Plan. 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 hand gathering, which outlines the parameters to be assessed for the fishery and the conservation status of sites' features. Local evidence suggests that periwinkle density and size are not impacted by collection (Quigley, 1999; Tinlin-McKenzie, 2018). See detailed TLSE for further details. From June 2020 until June 2022 NIFCA surveyed five known collection sites (Berwick-Upon-Tweed, Boulmer Haven, Cresswell, Holy Island and St Mary's Island), ranking them in terms of collection intensity from NIFCA patrol sightings of intertidal activity. Surveys were carried out every three months where possible, measuring periwinkle densities and sizes in addition to faunal and algal assemblages and substrate cover (Harvey, 2022).

				There was no correlation between collection intensity and periwinkle densities or sizes at different locations. Periwinkle size was instead negatively related to density, probably due to competition for available food causing lower growth rates where high densities of periwinkles occur. The highest densities of periwinkle were found on boulder- and cobble-covered areas of shore which has been found in previous studies. Overall, environmental variables such as substrate type and other factors not measured in this study such as organic content and elevation are likely to cause the observed differences in periwinkle densities (Harvey, 2022). However, Berwick, which had the highest levels of collection, had the lowest periwinkle densities in addition to the highest macroalgal abundance and diversity which could be due to lower grazing pressure from periwinkles compared to other sites (Harvey, 2022). Periwinkle density overall was negatively related to abundance of algae and slightly positively related to cover of gravel substrate. The highest densities of periwinkle were found on boulder- and cobble-

				covered areas of shore which has been found in previous studies. Overall, environmental variables such as substrate type and other factors not measured in this study such as organic content and elevation are likely to cause the observed differences in periwinkle densities (Harvey, 2022). When comparing individual sites over time (between 2020-2022) the were no significant changes in periwinkle density except at St Mary's where periwinkle density increased slightly. Periwinkles are generally resilient to localised impacts due to their ability to recolonise from larvae which disperse widely in the sea, therefore harvested populations could be maintained from uncollected populations elsewhere. Rocky shore communities remained consistent over the year, though periwinkle densities were higher in summer surveys which should be considered in future survey work. Overall periwinkle size remained similar at most sites, with slight declines in the average sizes at St Mary's, Holy Island and Boulmer S from 2020. Overall, there was little change in collection pressure, periwinkle density and sizes, and rocky

				shore communities from surveys in June 2020 and 2022. Periwinkle gathering and populations will continue to be monitored by NIFCA, particularly at Berwick, to ensure sustainable levels of collection and populations are maintained in the future (Harvey, 2022).

7. Conclusion

Reef habitats occur throughout the Berwickshire and North Northumberland Coast SAC. Regulation 33/55 conservation advice for the feature **1170 Reefs** is to maintain the intertidal rock in favourable condition (subject to environmental change). During the earlier screening process, it was unknown if periwinkle collection would have a significant effect on the intertidal rock feature, hence evidence gathering and HRAs being carried out.

This assessment considered whether periwinkle collection, in areas of high activity, would have a likely significant effect on the intertidal rock through:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion.
- Removal of non-target species
- Removal of target species

The local evidence available through peer-reviewed research (Tinlin-McKenzie, 2018; Quigley, 1999) and NIFCA surveys 2020-2023 suggests that periwinkle collection, at current levels, does not appear to be negatively impacting rocky shore floral and faunal communities. It is noted that low patrol effort affects the confidence level of this assessment and NIFCA will work with Natural England staff to gather further evidence on this activity.

NIFCA conclude with **moderate** confidence in the appropriate assessment, that periwinkle collection activity within the BNNC SAC **at current levels alone,** is **NOT having an** adverse effect on designated reefs. However, NIFCA will continue to monitor levels of periwinkle collection activity within the district and will re-address this activity / feature interaction should changes to designated features/sub-features be detected.

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

8. In-combination assessment

Although periwinkle collection is deemed to have no likely significant effect on intertidal 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 3 indicates that periwinkle 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	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 2 lobster (5 brown or velvet crabs, 20 whelks or 5 prawns) per day. In 2023 there were 272 recreational permit holders	At sea, fishing activities will not overlap with shore-based periwinkle collection. Additionally, these fishing activities are not targeting periwinkles, but seafish or crustaceans. Therefore, NIFCA conclude with high confidence that trawling, netting and potting will not have an in-combination effect with the shore-based collection of periwinkles.
Coastal Infrastructure	Outflow pipes Maintenance	Small scale Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts.
Harbour dredging [vicinity of SAC]	Harbour dredging	Small scale harbour dredging occurs; however this will not spatially overlap with any intertidal collecting on rock. 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 148 sightings of recreational angling vessels in 2016 compared to 680 sightings of commercial potting vessels. Recreational angling is targeting seafish and not gastropods such as periwinkles. There will also be no spatial overlap with intertidal collection. NIFCA therefore conclude that there will not be an in-combination effect with periwinkle collection.
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 2023 there were 272 recreational permit holders.	Small scale in comparison to commercial potting activity. In 2023, NIFCA had 272 registered recreational potting permit holders, as each permit holder is only allowed a maximum of 5 pots this results in a total of 1,360 pots. A significant proportion of recreational pots are fished within the intertidal zone from the shore. Whilst there may some spatial overlap between recreational potting and periwinkle collection these activities are targeting different species. NIFCA does not therefore consider that there will be an in-combination effect of these activities.
Bait digging	Digging for worms (lugworms and ragworms) occurs on intertidal sediment shores in the SAC.	Bait digging occurs on intertidal sediment shores, whereas periwinkle collection occurs on intertidal

	These worms are collected for angling bait, by both recreational and commercial collectors.	rocky shores. These activities are also targeting different species, therefore NIFCA concludes with high confidence that there will not be an in-combination effect.

9. Summary of consultation with Natural England

Regular meetings have been held with Natural England 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 16/07/2025.

10. Integrity test

NIFCA conclude, with **medium** confidence that handwork (access from land) activities specifically periwinkle collection in areas of high collection intensity, either alone or in-combination do not adversely affect the intertidal rocky reef or intertidal boulder and cobble subfeatures of 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 periwinkle collection activity within the NIFCA district. This document describes 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.

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Annex 1: Periwinkle code of conduct

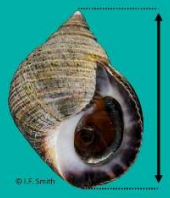
Northumberland IFCA Periwinkle Gathering Code of Conduct

PURPOSE

Collecting periwinkles in large numbers has the potential to damage seaweed and animals found on the rocky shore. Bird life can also be harmed by taking their food resources and causing disturbance.

To reduce these impacts **the guidelines listed below should be followed** by any person removing periwinkles. These guidelines apply to the coastline from the River Tyne to the Scottish border.

GUIDELINES



1. Do not create unnecessary disturbance:
   - rocks that are moved to search for or collect periwinkles should be replaced,
   - Care should be taken not to damage or displace any living organism.
   - Avoid bird disturbance in important feeding and resting areas.
2. Only collect periwinkles above 12 mm (minimum size taken by local wholesalers) to avoid taking juvenile periwinkles.
3. Sort out and return small periwinkles (under 12mm) as close as possible to area of collection. Northumberland IFCA recommends using a sieve or riddle constructed of rigid mesh or bars spaced at least 12 mm apart to separate out smaller winkles.
4. Periwinkles should be measured across the height of the shell from tip to tip (see diagram).
5. Only collect edible periwinkles and no other similar looking species (see guide below).

EDIBLE PERIWINKLE GUIDE

Periwinkles are usually black/ dark grey-brown in colour with a white interior around the mouth

They are usually around 2-3 cm high

They have a smooth or slightly ribbed shell which extends to a pointed tip.

Northumberland IFCA will monitor the collection of periwinkles to check whether the points listed above are followed. If they are not, this may result in the application of statutory measures.

For more information please visit: www.nifca.gov.uk

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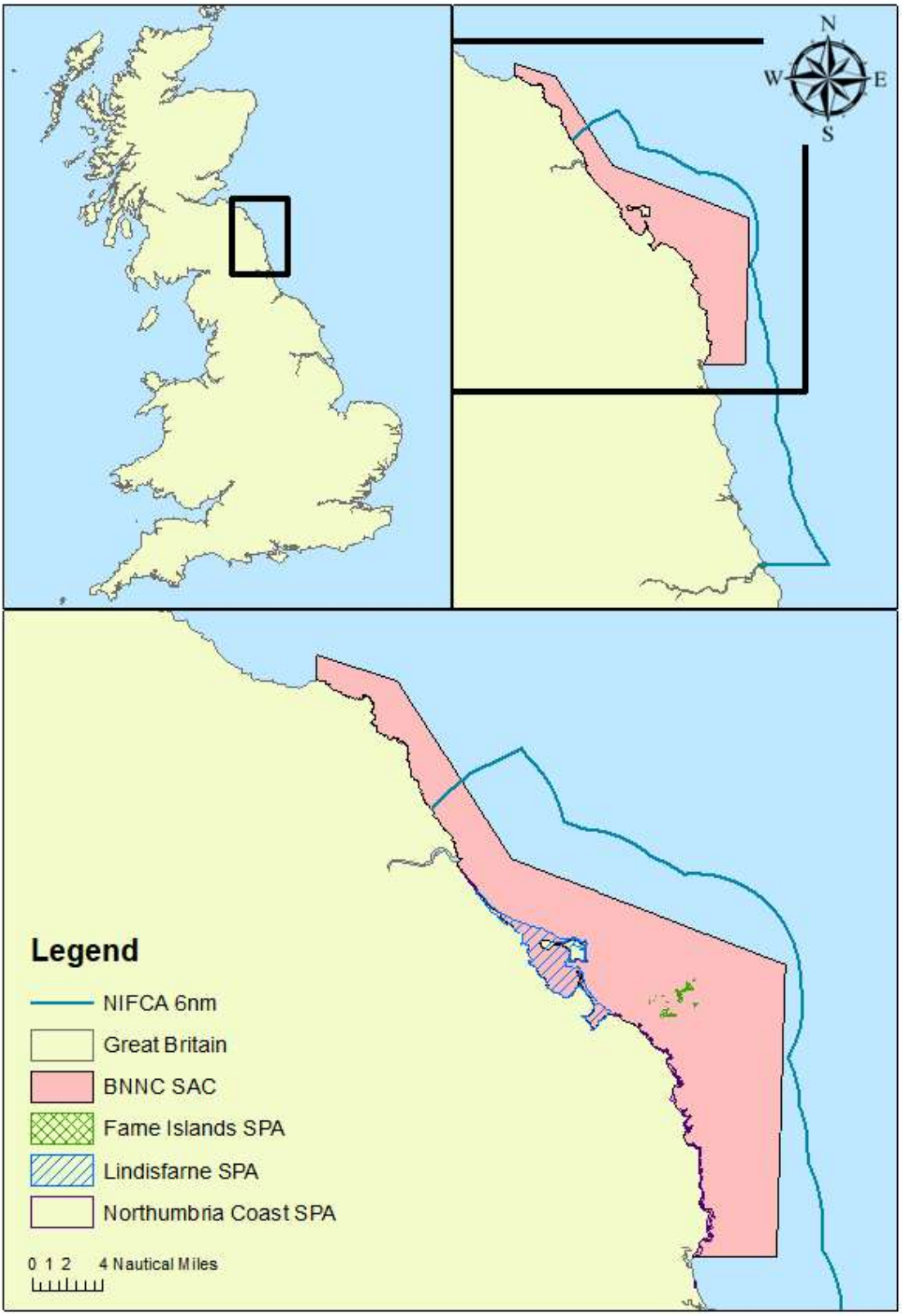
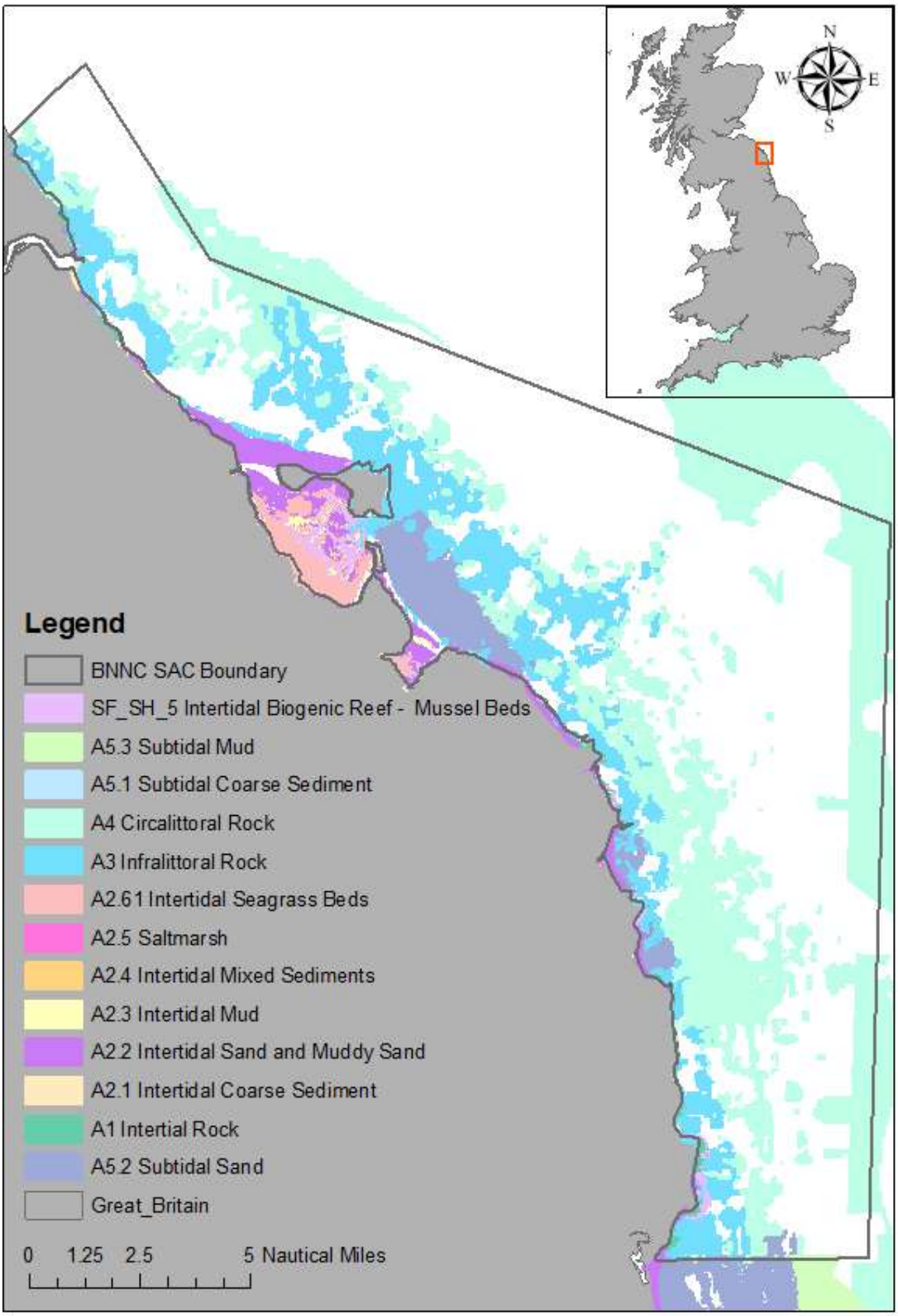
Annex 2: Site Map



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



Annex 4: NIFCA District's Sectors