Document Control

Title	**HRA – Studland to Portland SCI – Potting**
SIFCA Reference	HRA/02/001
Author	V Gravestock
Approver	
Owner	V Gravestock
Template Used	HRA Template v1.2

Revision History

Date	Author	Version	Status	Reason	Approver(s)
02/03/2016	V Gravestock	1.0	Draft	Initial Draft	
21/04/2016	V Gravestock	1.1	Draft	QA by SP	
20/06/2016	S Pengelly	1.2	Draft	Response to NE comments	
25/07/2016	S Pengelly	1.3	Final	NE feedback	
28/09/2016	V Gravestock	1.3	FINAL		

This document has been distributed for information and comment to:

Title	Name	Date sent	Comments received
HRA – Studland to Portland SCI – Potting (v1.1)	Natural England	21/04/2016	12/05/2016
HRA – Studland to Portland SCI – Potting (v1.2)	Natural England	20/06/2016	07/05/2016

Southern Inshore Fisheries and Conservation Authority (IFCA)

Fisheries in EMS Habitats Regulations Assessment for amber and green risk categories

European Marine Site: Studland to Portland SCI

Feature: Annex 1 Reefs

Generic Sub-feature(s): Subtidal bedrock reef; Subtidal boulder and cobble reef; Subtidal mussel bed on rock

Site Specific Sub-Feature(s): Bedrock reef; Stony reef;

Gear type(s) Assessed: Pots/creels

Table of Contents

1. Introduction

1.1 Need for an HRA assessment

Southern IFCA has duties under Regulation 9(3) of the Conservation of Habitats and Species Regulations 2010 as a competent authority, with functions relevant to marine conservation to exercise those functions so as to secure compliance with the Habitats Directive. Article 6.2 of the Habitats Directive requires appropriate steps to be taken to avoid, in Natura 2000 sites, the deterioration of natural habitats and habitats of species as well as significant disturbance of the species for which the area has been classified.

Management of European Marine Sites is the responsibility of all competent authorities which have powers or functions which have, or could have, an impact on the marine area within or adjacent to a European Marine Site (EMS). Under section 36 of the Species and Habitats Regulations (2010):

“The relevant authorities, or any of them, may establish for a European marine site a management scheme under which their functions (including any power to make byelaws) are to be exercised so as to secure in relation to that site compliance with the requirements of the Habitats Directive.”

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 in European Marine Sites are managed in accordance with Article 6 of the Habitats Directive. Articles 4.1 and 4.2 of the Birds Directive also require that the Member States ensure the species mentioned in Annex I and regularly occurring migratory bird species are subject to special conservation measures concerning their habitat in order to ensure survival and reproduction in their area of distribution. This affords Special Protection Areas (SPAs) a similar protection regime to that of Special Areas of Conservation (SACs).

This approach is being implemented using an evidence-based, risk-prioritised, and phased approach. Risk prioritisation is informed by using a matrix of the generic sensitivities of the sub-features of the 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[1], amber[2], green[3] or blue[4].

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.

[1] Where it is clear that the conservation objectives for a feature (or sub-feature) will not be achieved because of its sensitivity to a type of fishing – irrespective of feature condition, level of pressure, or background environmental conditions in all EMSs where that feature occurs – suitable management measures will be identified and introduced as a priority to protect those features from that fishing activity or activities.

[2] Where there is doubt as to whether conservation objectives for a feature (or sub-feature) will be achieved because of its sensitivity to a type of fishing, in all EMSs where that feature occurs, the effect of that activity or activities on such features will need to be assessed in detail at a site specific level. Appropriate management action should then be taken based on that assessment.

[3] Where it is clear that the achievement of conservation objectives for a feature is highly unlikely to be affected by a type of fishing activity or activities, in all EMSs where that feature occurs, further action is not likely to be required, unless there is the potential for in combination effects.

[4] For gear types where there can be no feasible interaction between the gear types and habitat features, a fourth categorisation of blue is used, and no management action should be necessary.

Activity/feature interactions identified within the matrix as amber risk require a site-level assessment to determine whether management of an activity is required to conserve site features. Activity/feature interactions identified within the matrix as green also require a site level assessment if there are "in-combination effects" with other plans or projects.

Site level assessments are being carried out in a manner that is consistent with the provisions of Article 6(3) of the Habitats Directive, but are required to meet the 6(2) responsibilities of Southern IFCA as a competent authority. The aim of the assessment will be to consider if the activity could significantly disturb the species or deteriorate natural habitats or the habitats of the protected species and from this, a judgement can be made as to whether or not the conservation measures in place are appropriate to maintain and restore the habitats and species for which the site has been designated to a favourable conservation status (Article 6(2)).If measures are required, the revised approach requires these to be implemented by 2016.

The purpose of this site specific assessment document is to assess whether or not in the view of Southern IFCA the fishing activity 'Pots/creels' has a likely significant effect on the Annex 1 Reefs of the Studland to Portland SCI, 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.

1.2 Documents reviewed to inform this assessment

- Natural England's risk assessment Matrix of fishing activities and European habitat features and protected species[5]
- Reference list[6] (Annex 1)
- Natural England's Regulation 35 Advice/ Natural England's draft conservation advice[7]
- Site map(s) – sub-feature/feature location and extent (Annex 2)
- Fishing activity data (map(s)) (Annex 3)
- Fisheries Impact Evidence Database (FIED)

2. Information about the EMS

- Studland to Portland Site of Community Importance (UK0030382)

2.1 Overview and qualifying features

- H1170. **Reefs.**
    - Bedrock reef communities
    - Stony reef communities

Please refer to Annex 2 for a site feature map.

Studland to Portland SCI lies off the south coast of Dorset and contains numerous areas of reef in many forms, which exhibit a large amount of geological variety and biological diversity. Features of particular interest within the Studland Bay to Ringstead Bay area include a series of limestone ledges (up to 15m across) protruding from shelly gravel at Worbarrow Bay, which support a rich

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

[6] Reference list will include literature cited in the assessment (peer, grey and site specific evidence e.g. research, data on natural disturbance/energy levels etc)

[7] http://publications.naturalengland.org.uk/publication/3282207?cache=1378210457.13

sponge and sea fan community; dense brittlestar beds (*Ophiothrix fragilis*)) on shale reefs extending from Kimmeridge; a unique reef feature, known as St Albans ledge, extending out over 10km offshore and subject to strong tidal action; and an area of large limestone blocks known as the “seabed caves”. The Portland Reefs are characterised by flat bedrock, limestone ledges (Portland stone), large boulders and cobbles. On the western side of Portland Bill, rugged limestone boulders provide deep gullies and overhangs. Mussel beds (*Mytilus edulis*) are found to occur in very high densities on bedrock associated with strong currents to the southeast of Portland Bill.

2.2 Conservation Objectives

The Conservation Objectives for the Studland to Portland SCI features:

- H1170. Reefs

Are to “ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats
- The structure and function (including typical species) of qualifying natural habitats, and
- The supporting processes on which the qualifying natural habitats rely.”

The high level conservation objects for the Studland to Portland SCI are available online at: http://publications.naturalengland.org.uk/publication/6554772136001536

3. Interest feature(s) of the EMS categorised as ‘Red’ risk and overview of management measure(s)

- Reef

A red risk interaction between bottom towed gears and reef features was identified and subsequently addressed through the creation of the ‘Bottom Towed Fishing Gear’ byelaw[8]. The ‘Bottom Towed Fishing Gear’ prohibits the use of any bottom towed fishing gear within sensitive areas (characterised by reef features or eelgrass/seagrass beds) in European Marine Sites throughout the district. The byelaw also states that that if transiting through a prohibited area carrying bottom towed fishing gear, all parts of the gear are inboard and above the sea. Within the Studland to Portland SCI there are two prohibited areas which cover the extent of the reef features within the site. This was based on habitat mapping data provided by Natural England and groundtruthing by Southern IFCA.

4. Information about the fishing activities within the site

4.1 Activities under Consideration/Summary of Fishery

Potting occurs all year round within the Studland to Portland SCI. Potting targets crustaceans (edible crab and European lobster) and whelks. The pots used differ for each target species. Potting for crab and lobster is the most common activity, followed by potting for whelks.

[8] Bottom Towed Fishing Gear Byelaw:
https://secure.toolkitfiles.co.uk/clients/25364/sitedata/files/PDFbyelaw_bottomtowedfishi.pdf

4.2 Technical Gear Specifications

Pots and traps differ in size, shape and construction material depending on the behaviour of the target species and local fishing practices (Seafish, 2015).

Crab/lobster pots and whelk pots are typically baited with some type of fish or shellfish. The choice of bait varies depending on location and target species. The pots are commonly shot in strings, with a number of pots attached to one long rope which is laid on the seabed and marked at one end with a buoy. An anchor may also be attached to one or both ends of the string. Pots will often be soaked for between 24 to 48 hours (Seafish, 2015), however the length of time may be longer in periods of poor weather.

Crab/lobster pots

One of the most common styles of pots used for catching lobster and crab is the ‘D’ creel, also referred to as a parlour pot and is the type of pot used within the Studland to Portland SCI. Parlour pots are typically constructed with a metal frame, commonly plastic coated steel and covered with netting, often black in colour. The size of pots can range between 22 x 16 x 13” to 42 x 22 x 17” and weigh approximately 15 to 20 kg. The stretch mesh size of the netting used typically ranges between 80 and 100 mm and the width of the netting used typically ranges between 3 and 5 mm. Once the netting is fitted, the outside edges are wrapped with rope or strings of rubber to protect the pot from damage through abrasion on the seabed (Seafish, 2015). The position of the entrance can vary; some have a side entry and others have a top entrance (Figure 1). Those with an entrance on top often have a plastic entrance which resembles a plastic bucket without a bottom. The diameter of the entrance typically ranges between 8 and 10 inches. Those with a side entry commonly have tapered netting entrance held open with a plastic ring, and is referred to as a ‘hard eye’. The size of the plastic ring can vary, with those sold ranging between 60 and 150 mm. Some do not have a plastic ring in the entrance and this is referred to as a ‘soft eye’. Typically there will only be one entry point but there may be two. The end of the pot is hinged to allow the removal of catch and bait replacement. The base may be constructed using metal bars, the spacing of which can be used to release crab and lobsters under the minimum landing size (MLS) (Seafish, 2015). Alternatively, the base can be made of plastic. Escape gaps, a rectangular plastic release panel typically fitted to the end of a pot, may also be fitted to the end of each pot. The aim of the escape pot is designed to allow the release of animals below the MLS. In the Devon and Severn IFCA district, the use of escape gaps (84 x 46 mm) is a mandatory requirement. Southern IFCA currently employ a voluntary escape gap scheme using escape gaps measuring 45 x 87 mm in size.

Figure 1. Top entry (left) and side entry parlour pot (right) used to catch crab and lobster. Source: http://www.medleypots.co.uk/products/fully-rigged-pots/

Whelk pots

Whelk pots are typically smaller than those used for used to target crab and lobster and are often made from discarded 25 litre plastic containers, although purpose built ones are available. Pots typically weigh about 12 to 13 kg. One side of the plastic container is removed and replaced by a section of netting with a hole in the centre which acts as an entrance (Figure 2). The entrance often forms the top of the trap. This set up allows whelks to easily enter the pot but prevents escape. The bottom of the pot is weighted using cement to ensure pots land upright when they land on the seabed. There numerous holes inside the pot to allow water to drain from it.

Figure 2. Whelk pot. Source: http://www.seafish.org/geardb/gear/pots-and-traps-whelks/

4.3 Effort, Location and Scale of Fishing Activities

The number of pots worked by each vessel and the number of pots in a string can largely vary and is often related to fishing vessel size, with the maximum number of pots worked per vessel reported to be approximately 900 for crab and lobster and up to 500 for whelks. Smaller vessels, below 8m in length however are thought to work a much lower number of pots; between approximately 20 and 50 pots, averaging 30 pots. For vessels working a large number of pots, whelk pots are made up of approximately 40 pots per string, whilst strings of crab and lobster pots can largely vary, although the information obtained included strings of between 25 and 40 pots. Fishermen do not always fish within the SCI and will deploy gear in surrounding areas.

Potting for crab and lobster occurs subtidally, typically over harder rocky ground and is widespread throughout the site. Key areas of activity include around Portland Bill, Swanage Bay and the coastal fringe running from Ringstead to Worbarrow Bay, approximately one mile offshore. Potting for whelks occurs further offshore in areas of softer and coarser sediment.

Southern IFCA sightings data, illustrated in Annex 4, largely corroborates the information presented above regarding the location of potting for crab and lobster. In the eastern section of the site the vast majority of sightings are made up of potting for crab and lobster. These sightings are concentrated off Peveril Point in southern part of Swanage Bay and up to Durlston Head. Sightings are scattered relatively close inshore from Durlston Head round to Ringstead Ledge, with sightings extending further offshore on Lulworth Banks and St Albans Ledge. In the western section of the site, sightings are concentrated inshore around Portland, particularly on the eastern side of Portland on the Portland Ledge, with a line of sightings extending south from the tip of Portland. A number of sightings are scattered offshore within the western section of the site, in the south east area of this section. Please note that Southern IFCA's sightings data may reflect home ports of patrol vessels, high risk areas and typical patrol routes and therefore are only indicative of fishing activity. Over the ten year period covered by sightings data (2005-2015), it is likely that the geographical extent of the fishery is well reflected however intensity may be skewed by aforementioned factors. Sightings of whelk potting largely occur outside of the SCI, in between the two sections which make up the site. Whelk potting sightings that do occur within SCI are sparse and occur further offshore, including south of Lulworth Banks and in the south east area of the western section of the SCI.

The total number of commercially licensed vessels which undertake potting can be up to 30, with up to 20 working at any one time. Approximately 25 of these vessels are small boats under 10 metres in length. The remainder are over 10 metres. Almost all the vessels involved in potting for crab and lobster, also pot for whelks. Not all vessels fish within the SCI all year round.

Landings data provided by the Marine Management Organisation (MMO) show the greatest quantities of all target species caught between 2005 and 2014 were landed into Weymouth, followed by Portland and Swanage for landings of crab and lobster (Table 1). The quantity of lobster landed into Swanage exceeded that into Portland from 2011 onwards, with relatively similar quantities landed prior to this. The quantity of edible crab landed into Swanage also increased 2011 onwards, largely matching landings into Portland. Very limited quantities of whelks were landed into ports other than Weymouth. Landings into Weymouth have shown a large overall increase between 2005 and 2014, increasing from 195.5 tonnes 839.4, which demonstrates the growth of the fishery of this period. The quantities of edible crab and European lobster landed into all ports between 2005 and 2014 exhibit a relatively similar pattern; peaking around 2007/2008, dipping in 2010 and increasing again in 2014. As both species show a similar pattern, this may be explained by changes in fishing effort over this period or environmental pressures affecting both species. Please note that landings data should be viewed with caution, although reflective of the overall trends of the fishery. Exact figures are not always accurate; however this data represents the best available information to date.

Table 1. Landings (in tonnes) from 2005 to 2014 of target species (edible crab, European lobster, whelk) into ports located within or close to the Studland to Portland SCI caught by UK vessels using traps and pots. Data was provided by the Marine Management Organisation (MMO). Increases in landings between 2005 and 2006 are likely to reflect the legal requirement since 2005 for all buyers and sellers of first sale fish and shellfish landed into England to be registered with the MMO.

		Landings (Tonnes)									
	Port of Landing	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Edible crab	Kimmeridge	0.48	3.31	5.31	6.62	4.40	4.57	5.25	4.86	1.63	0.90

	Lulworth Cove	2.55	5.70	6.39	4.18	4.30	2.87	5.07	5.26	6.01	4.73
	Portland	20.84	44.00	55.72	44.14	34.76	47.71	45.01	48.28	32.88	33.23
	Swanage	8.54	10.96	14.05	20.89	23.52	9.76	30.16	37.82	32.32	29.36
	Weymouth	454.93	500.55	531.15	567.98	470.06	446.71	534.56	530.45	535.69	767.67
	Total	487.34	564.51	612.62	643.81	537.04	511.62	620.04	626.66	608.53	835.89
European lobster	Kimmeridge	0.48	3.31	5.31	6.62	4.40	4.57	5.25	4.86	1.63	0.90
	Lulworth Cove	1.30	2.34	3.14	1.84	2.04	1.43	2.21	1.99	2.02	2.38
	Portland	1.58	5.11	7.17	4.51	4.47	4.98	5.09	4.88	3.19	5.13
	Swanage	0.82	2.87	5.29	5.16	5.98	2.87	9.74	8.31	7.66	7.91
	Weymouth	22.85	39.43	40.04	35.19	28.95	25.57	38.40	32.27	37.97	50.98
	Total	27.02	53.06	60.96	53.32	45.85	39.42	60.68	52.30	52.48	67.30
Whelk	Kimmeridge			0.00	0.03	0.04	0.01	0.32			
	Lulworth Cove										
	Portland			2.69	1.15	0.33	15.33	20.62	2.46		
	Swanage		20.32	53.03	46.58	1.05	0.27	1.02	0.21	0.25	0.04
	Weymouth	195.51	355.38	310.27	264.00	455.11	619.77	683.52	515.67	722.22	839.30
	Total	195.51	375.70	366.00	311.76	456.53	635.37	705.47	518.34	722.47	839.35

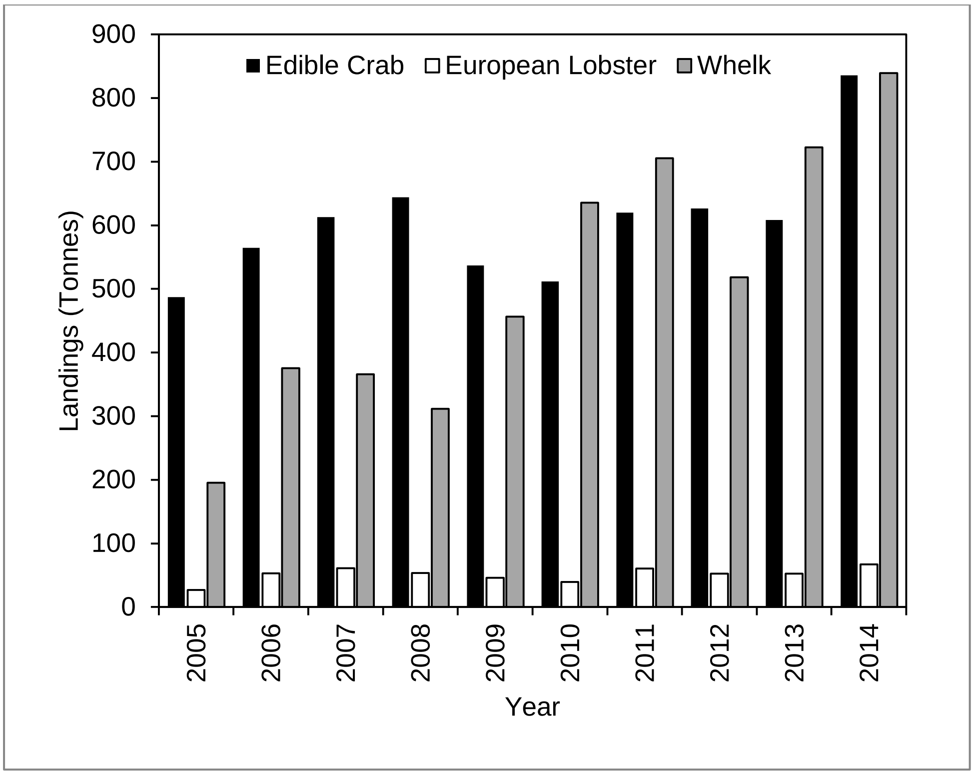


Figure 3. Total landings (in tonnes) from 2005 to 2014 of target species (edible crab, European lobster, whelk) into ports (Kimmeridge, Lulworth Cove, Portland, Swanage and Weymouth) located within or close to the Studland to Portland SCI caught by UK vessels using traps and pots. Data was provided by the Marine Management Organisation (MMO). Increases in landings between 2005 and 2006 are likely to reflect the legal requirement since 2005 for all buyers and sellers of first sale fish and shellfish landed into England to be registered with the MMO.

The number of vessels and the spatial and temporal pattern of the activity. Scale of activity indicated by landings data of species in question. Map in Annex 3.

5. Test of Likely Significant Effect (TLSE)

The Habitats Regulations assessment (HRA) is a step-wise process and is first subject to a coarse test of whether a plan or project will cause a likely significant effect on an EMS[9]. Each feature/sub-feature was subject to a TLSE, the results of which are summarised in tables 2 and 3.

5.1 Table 2: Summary of LSE Assessment (Subtidal bedrock reef; 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

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

<table>
<tr><td rowspan="2">2. What potential pressures, exerted by the gear type(s), are likely to affect the feature(s)/sub-feature(s)?</td><td colspan="2">Regulation 35 Conservation Advice/ Interim Conservation Advice:
1. Physical loss – removal
2. Physical loss – smothering
3. Physical damage – siltation
4. Physical damage – abrasion/ Abrasion/disturbance of the substrate on the surface of the seabed
5. Physical damage – selective extraction
6. Toxic contamination – introduction of synthetic and non-synthetic compounds, introduction of radionuclides/ Hydrocarbon & PAH contamination/ Introduction of other substances/ Synthetic compound contamination/ Transition elements & organo-metal contamination
7. Non-toxic contamination – changes in nutrient and organic loading
8. Non-toxic contamination – changes in turbidity and salinity
9. Biological disturbance – introduction of microbial pathogens
10. Biological disturbance – introduction of non-native species and translocation/ Introduction or spread of non-indigenous species
11. Biological disturbance – selective extraction of species/ Removal of non-target species
12. Interim Conservation Advice only – Litter
13. Interim Conservation Advice only – Penetration and/or disturbance below the surface of the seabed, including abrasion</td></tr>
<tr></tr>
<tr><td rowspan="4">3. Is the feature(s)/sub-features(s) likely to be exposed to the pressure(s) identified?</td><td>Pressure</td><td>Screening - Justification</td></tr>
<tr><td>1.</td><td>OUT – The activity will not lead to the physical removal of the feature and therefore there is no direct interaction between the pressure and feature under assessment.</td></tr>
<tr><td>2.</td><td>OUT – The activity will not lead to physical loss of the feature through smothering and therefore there is no direct interaction between the pressure and feature under assessment.</td></tr>
<tr><td>3.</td><td>OUT – The activity is not likely to lead to siltation and cause subsequent physical damage to the features. Pots are typically deployed in areas of hard ground with limited or no fine sediment.</td></tr>
</table>

	4.	IN - The activity is likely to lead to abrasion of the features through contact of the gear with the feature during deployment/retrieval and any subsequent movement of gear, including ground rope, from currents or storm action. At current levels of activity, exposure of bedrock and stony reefs to physical damage through abrasion is considered to be low. Overall, vulnerability of bedrock to physical damage is considered to be moderate and the vulnerability of stony reef is considered to be low. Further investigation is required to determine the severity and magnitude of this pressure, including spatial scale and activity intensity considerations
	5.	OUT – The activity will not lead to physical damage through selective extraction and therefore there is no direct interaction between the pressure and feature under assessment.
	6.	OUT – Insufficient activity levels to pose risk of large scale pollution event.
	7.	OUT – The activity will not lead to any changes in nutrient or organic loading and therefore there is no direct interaction between the pressure and feature under assessment.
	8.	OUT – The activity is considered unlikely to lead to siltation and therefore will not lead to changes in turbidity. The activity will not lead to changes in salinity.
	9.	OUT – The fleet operates within the local area, so the introduction of new microbial pathogens from outside the local vicinity is considered unlikely.
	10.	OUT – The fleet operates within the local area, so the introduction or translocation of non-indigenous species is considered unlikely.

	11.	IN – Selective extraction refers to the removal of species or community and includes the removal of a specific species, community or key species in a biotope. Removal of larger molluscs or crustaceans can have significant impacts on the structure and functioning of benthic communities. Potting targets the removal of whelks, the edible crab, European lobster and cuttlefish. Sensitivity of reef sub-features to such selective extraction is considered moderate for both bedrock and stony reef. The exposure of reef sub-features to selective extraction is considered as moderate due to a relatively high incidence of static gear fishing using pots. Overall vulnerability is therefore considered to be moderate. Crustaceans and whelks are subject to a minimum landing size, below which individuals cannot be removed from the fishery. The selectivity of pots results in low incidental bycatch and any retained undersized lobsters, crabs or whelks are returned. Catches of undersized lobster and crab are also reduced through the use of escape gaps, the use of which is voluntary in the Southern IFCA district. Further investigation is required to determine the severity and magnitude of this pressure including spatial scale and activity intensity considerations.
	12.	OUT – It is unlikely the level of fishing activity could lead to a level of discarded fishing gear that would be at a level of concern.
	13.	OUT – Instances where subsurface penetration occurs are likely to only include anchoring. Anchoring occurs on an infrequent basis as it does not commonly occurring during fishing. The area of the feature affected by the pressure is likely to be minimal and recovery from any effects would be highly likely due to the infrequent nature of anchoring.

4. What key attributes of the site are likely to be effected by the identified pressure(s)?	**Regulation 35 Conservation Advice:** Bedrock Reef: - Biotope composition of bedrock reefs - Distribution and spatial pattern of bedrock reef biotopes - Extent of representative/notable bedrock reef biotopes - Species composition of representative notable bedrock reef biotopes - Presence and/or abundance of specified bedrock reef species Stony Reef: - Biotope composition of stony reefs - Distribution and spatial pattern of stony reef biotopes - Species composition of representative or notable stony reef biotopes **Interim Conservation Advice (Generic Feature Frameworks Workbook – September 2015):** Circalittoral Rock - Distribution: presence and spatial distribution of circalittoral rock communities - Structure: presence and abundance of typical species - Structure: species composition of component communities Stony Reef: - Distribution: presence and spatial distribution of stony reef communities - Structure: presence and abundance of typical species - Structure: species composition of component communities	
5. Potential scale of pressures and mechanisms of effect/impact (if known)	Refer to full LSE.	
6. Is the potential scale or magnitude of any effect likely to be significant?	**Alone** Yes	**OR In-combination[10]** N/A
7. Have NE been consulted on this LSE test? If yes, what was NE's advice?	Please refer to letters from Natural England dated 12/01/16 & 01/03/16.	

[10] If conclusion of LSE alone an in-combination assessment is not required.

5.2 Table 3: Summary of LSE Assessment (Subtidal mussel bed on rock)

1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?	No	
2. What potential pressures, exerted by the gear type(s), are likely to affect the feature(s)/sub-feature(s)?	Regulation 35 Conservation Advice/ Interim Conservation Advice: 1. Physical loss – removal 2. Physical loss – smothering 3. Physical damage – siltation 4. Physical damage – abrasion/ Abrasion/disturbance of the substrate on the surface of the seabed 5. Physical damage – selective extraction 6. Toxic contamination – introduction of synthetic and non-synthetic compounds, introduction of radionuclides/ Hydrocarbon & PAH contamination/ Introduction of other substances/ Synthetic compound contamination/ Transition elements & organo-metal contamination 7. Non-toxic contamination – changes in nutrient and organic loading 8. Non-toxic contamination – changes in turbidity and salinity 9. Biological disturbance – introduction of microbial pathogens 10. Biological disturbance – introduction of non-native species and translocation/ Introduction or spread of non-indigenous species 11. Biological disturbance – selective extraction of species/ Removal of non-target species 12. Interim Conservation Advice only – Litter 13. Interim Conservation Advice only – Penetration and/or disturbance below the surface of the seabed, including abrasion	
3. Is the feature(s)/sub-features(s) likely to be exposed to the pressure(s) identified?	**Pressure**	**Screening – Justification**
	1.	OUT – The activity will not lead to the physical removal of the feature and therefore there is no direct interaction between the pressure and feature under assessment.
	2.	OUT – The activity will not lead to physical loss of the feature through smothering and therefore there is no direct interaction between the pressure and feature under assessment.
	3.	OUT – The activity is not likely to lead to siltation and cause subsequent physical damage to the features. Pots are typically deployed in areas of hard ground with limited or no fine sediment.

	4.	IN - The activity is likely to lead to abrasion of the feature through contact of the gear with the feature during deployment/retrieval and any subsequent movement of gear, including ground round, from currents or storm action. At current levels of activity, exposure of bedrock reefs to physical damage through abrasion is considered to be low. Overall, vulnerability of bedrock to physical damage is considered to be moderate. Further investigation is required to determine the severity and magnitude of this pressure, including spatial scale and activity intensity considerations
	5.	OUT – The activity will not lead to physical damage through selective extraction and therefore there is no direct interaction between the pressure and feature under assessment.
	6.	OUT – Insufficient activity levels to pose risk of large scale pollution event.
	7.	OUT – The activity will not lead to any changes in nutrient or organic loading and therefore there is no direct interaction between the pressure and feature under assessment.
	8.	OUT – The activity is considered unlikely to lead to siltation and therefore will not lead to changes in turbidity. The activity will not lead to changes in salinity.
	9.	OUT – The fleet operates within the local area, so the introduction of new microbial pathogens from outside the local vicinity is considered unlikely.
	10.	OUT – The fleet operates within the local area, so the introduction or translocation of non-indigenous species is considered unlikely.

	11.	IN – Selective extraction refers to the removal of species or community and includes the removal of a specific species, community or key species in a biotope. Removal of larger molluscs or crustaceans can have significant impacts on the structure and functioning of benthic communities. Potting targets the removal of whelks, the edible crab, European lobster and cuttlefish. The removal of sizeable crustaceans and whelks as a result of potting has been assessed for bedrock reef in a separate tLSE. With respect to subtidal mussel bed on rock, the activity will not lead to the removal of mussels. Species associated with the sub-feature include the common starfish and very large whelks. Potting for whelks in this area therefore may have an impact on this sub-feature. Sensitivity of reef sub-features to such selective extraction is considered moderate for bedrock reef. The exposure of reef sub-features to selective extraction is considered as moderate due to a relatively high incidence of static gear fishing using pots. Overall vulnerability is therefore considered to be moderate. Whelks are subject to a minimum landing size, below which individuals cannot be removed from the fishery. The selectivity of pots results in low incidental bycatch. Further investigation is required to determine the severity and magnitude of this pressure including spatial scale and activity intensity considerations.
	12.	OUT – It is unlikely the level of fishing activity could lead to a level of discarded fishing gear that would be at a level of concern.
	13.	OUT – Instances where subsurface penetration occurs are likely to only include anchoring. Anchoring occurs on an infrequent basis as it does not commonly occurring during fishing. The area of the feature affected by the pressure is likely to be minimal and recovery from any effects would be highly likely due to the infrequent nature of anchoring.

4. What key attributes of the site are likely to be effected by the identified pressure(s)?	**Regulation 35 Conservation Advice:** Bedrock Reef: - Biotope composition of bedrock reefs - Distribution and spatial pattern of bedrock reef biotopes - Extent of representative/notable bedrock reef biotopes - Species composition of representative notable bedrock reef biotopes - Presence and/or abundance of specified bedrock reef species - Population structure of *Mytilus edulis* beds **Interim Conservation Advice (Generic Feature Frameworks Workbook – September 2015):** Circalittoral Rock - Distribution: presence and spatial distribution of circalittoral rock communities - Structure: presence and abundance of typical species - Structure: species composition of component communities	
5. Potential scale of pressures and mechanisms of effect/impact (if known)	Refer to full LSE	
6. Is the potential scale or magnitude of any effect likely to be significant?	**Alone** Yes	**OR In-combination**[11] N/A
7. Have NE been consulted on this LSE test? If yes, what was NE's advice?	Please refer to letters from Natural England dated 12/01/16 & 01/03/16.	

[11] If conclusion of LSE alone an in-combination assessment is not required.

6. Appropriate Assessment

6.1 Co-location of Fishing Activity and Site Features/Sub-feature(s)

Maps of potting sightings and site sub-features can be found in Annex 4. These maps reveal where fishing activity occurs in relation to the designated sub-features of the site. The vast majority of sightings for crab and lobster potting occur within areas of infralittoral rock as the majority of sightings are concentrated relatively inshore, although a number extend further offshore and these predominantly occur in areas of circalittoral rock, particularly south and southeast of Peveril Point and in the south east area of the western section of the SCI. The sparse number of whelk sightings that are present within SCI occur over both infralittoral and circalittoral rock.

6.2 Potential Impacts

It has been identified that potting has the potential to cause an adverse impact of the features and sub-features of the Lyme Bay portion of the Studland to Portland SCI through physical abrasion and its subsequent impact on the benthic environment and through the selective extraction of species. There are a number of factors that may influence the effect of potting of benthic habitats, including the spatial and temporal intensity of potting, technical gear type (single buoyed pots or strings of pots), the severity of weather and storm, events and the sensitivity of the effected benthic habitat (Young *et al*., 2013). Depth can also influence the effect of potting, with shallower depths potentially allowing for the greater movement of pots (Lewis *et al*., 2009).

6.2.1 Physical disturbance

Physical abrasion

Mechanical impacts of static gear include weights and anchors hitting the seabed which is likely to occur when the gear is set, hauling the gear over the seabed during retrieval and rubbing or entangling effects of ropes (when pots are fixed in strings) (JNCC & NE, 2011). In addition, the movement of gear may also occur over benthic habitats during rough weather or storm events (Roberts *et al*., 2010). Eno *et al*. (2001) reported that from observations of potting in Lyme Bay on rocky substrate, that when the wind and tidal streams were strong, pots tended to drag along the seabed the largest amount, especially when the wind was blowing across the tide. Anchor-weights on the end of each string of pots are typically used to prevent dragging when fishing in dynamic areas (Coleman *et al*., 2013). When deployed correctly, pots were typically observed to be static, however when there is insufficient line during deployment, it can cause the lead pot to bounce up and down on the seabed during periods of strong tides and large swell (Eno *et al*., 2001).

Lewis *et al*. (2009) investigated the impact of single-buoyed lobster traps after winter storms on coral communities in areas of hard-bottom and reef habitats in the Florida Keys, United States. Impacts were assessed after 26 wind events occurring over three winters. Traps moved when stormed sustained winds higher than 15 knots (27.8 km/h). Storms above this threshold were reported to move buoyed traps a mean distance of 3.63m, 3.21m and 0.73m per trap and affected a mean area of 4.66m^2, 2.88m^2 and 1.06m^2 per trap at depths of 4, 8 and 12 m respectively.

Young *et al*. (2013) assessed the effects of physical disturbance from potting on chalk reef communities in Flamborough Head European Marine Site. The maximum potential footprint of pots within the EMS was calculated using information of fishing effort, intensity and configuration. The maximum potential area within the SAC affected by potting per year was calculated at 2.97km^2 or 4.71% of the site. This was based on the following assumptions, which are derived from discussions with local fishermen and other information sources, include; potting intensity is at its highest in summer and halved in the winter, the number of pots fished in the EMS at any one time during the summer is 3562, each pot has a 1m^2 foot print (high estimate) and no duplicated seabed interaction, average fishing days per days of 150 and two thirds of total pots are hauled per fishing day. Survey work was also undertaken as part of the study in the Flamborough Head no-take zone (NTZ), designated in 2010, and a fished area of similar size, physical and hydrographic properties. Both areas occurred within the Flamborough Head Prohibited Trawl Area. In the fished site, a higher percentage of bare substrate (7.2%) was reported, which may imply physical abrasion from pots could be removing sessile epifauna. Reduced epifauna was however vastly reduced by adverse weather during the study which led to the seafloor being scoured within both the NTZ and fished site.

Stephenson *et al*. (2015) examined the long-term impacts of potting on benthic habitats in the Berwickshire and North Northumberland Coast European Marine Site from 2002 to 2012. The study was split up into a number of sections, one of which explored pot movement over a 23 day period using novel acoustic telemetry methods. The experimental pot configuration was made up of a string of 10 parlour pots, attached to the mainline by 2 m lengths of rope at intervals of 18 m. The end of each string was anchored with a 25 kg weight. The acoustic telemetry array allowed the position of each pot to be recorded every 1 to 5 minutes. Significant pot movements were not reported to occur daily, but were detected on 6 out of 17 sampling occasions; equating to less than half of the sampling days. Significant movements occurred during neap and spring tides and at swell heights of 0-1 m and > 2 m, but not 1-2 m. Four of the six days with significant pot movement occurred during spring tides. Mean and maximum pot movement distances were slightly greater with increasingly extreme conditions, suggesting wave height and tidal height influence pot movement. The area potentially impacted by pot movements ranged between 53 and 115 m^2 per pot, with a mean of 85.8 m^2. There was no difference in the impacted area between neap and spring tides or between swell heights. The authors pointed out two aspects of the data that should be discussed, the first was lack of robustness based on the low number of significant pot movements and the second is the methodology which may under represent pot movement frequency. The conservative approach used to calculate 95% confidence intervals means only large movements will be significant as small non-significant distances are always lower than the mean error. Additionally, the mean error also means the range of possible movement is large and this means in reality the potentially impacted area may be smaller.

There are a number of ongoing pieces of research into the effects of potting, one of which is being conducted by Sarah Gall at the University of Plymouth. This study based in Lyme Bay and is aiming to quantify the direct ecological impacts of potting associated with pot landing, pot movements and associated rope scour and hauling of strings using GoPro digital cameras attached to pots in order to capture video footage. The research is still in progress and results are not yet available, indications are that impacts are not significant, reflecting the fact that the whole base of the pot does not come into contact with the seabed and when hauling, the pots are not in contact with the seabed for long distances. Pots and ropes have also been observed to be fairly stationary during the time they are on the ground.

6.2.2 Biological disturbance

Effects on non-target species

Benthic communities, including non-target epifauna, may be directly impacted by potting gear in a number of ways, including being directly struck by a pot or end-weight during deployment, through the entanglement or removal with moving pots or ropes under the influence of tidal currents or waves and through retrieval of pots which may lead to lateral dragging of the gear as it is being lifted (Coleman *et al*., 2013). The latter method is generally avoided by fishermen and is only likely to occur under the influence of wind, tide or navigational hazard which prevents vertical lift (Coleman *et al*., 2013). Up until recently there has been a paucity of scientific evidence on the impacts of static gear on benthic habitats (Walmsley *et al*., 2015). Although there is still considerably scientific literature less when compared to mobile fishing, there has been a recent rise in the number of studies investigating the impacts of potting in order to address this evidence gap. A number of the studies are still ongoing and where preliminary findings have been indicated, they have been reported here. This section will be discussed study by study.

Eno *et al*. (2001) investigated the effects of fishing with crustacean traps on benthic species in Great Britain were examined. In Scottish sea lochs, the effects of *Nephrops* creels on different sea pens was studied. In southern England (Lyme Bay) and west Wales (Greenala Point), the effects of crab and lobster pots on rocky substrates and associated communities was studied. Three species of sea pen (*Pennatula phosphorea*, *Virgularia mirabilis* and *Funiculina quadrangularis*) were all observed to bend as a result of the pressure wave generated by the sinking creel, protecting the tip of the sea pen from damage. *P. phosphorea* and *V. mirabilis* were thought to be more tolerant to disturbance than *F. quadrangularis*, although *F. quadrangularis* was found to be able to reinsert themselves after being uprooted. No lasting effects on the muddy substrate were found, although no other species were studied. In Lyme Bay and west Wales, rocky substrate habitats and associated communities appeared to be unaffected (no significant differences in abundance of species) before and after four weeks of relatively intense fishing activity (equivalent to around 1,000,000 pot hauls per km^2 per year). In west Wales, the abundance of five sponge species increased significantly in experimental plots after potting, whilst in control pots no significant changes were found, except for an increase in *Dysidea* spp and decrease in *Halichondria* spp. One ross coral *Pentapora fascialis* colony was found broken after hauling, although the cause of which is unknown. In Lyme Bay, the pink sea fan *Eunicella verrucosa* was observed to bend under the action of pots, but returned to an upright position once the pots had passed. The pink sea fan is slow growing and long lived and therefore considered as relatively susceptible to damage.

Sheridan *et al*. (2005) assessed the effects lobster and fish traps on coral reef ecosystems in the US Virgin Islands, Puerto Rico and Florida Keys. One part of the study was to quantify damage to corals and other structure providing organisms. Overall, a relatively small proportion (<20%) of traps set in shallow water (<30m) made contract with hard corals, gorgonians or sponges. Damage mainly occurred to hard corals and this was patch, at a scale less than the total trap footprint. In Florida Keys, habitat damage was only occasionally observed under or near traps and such limited observations did not allow for quantification of trap impacts. Habitat distribution maps revealed that only 10% are deployed over coral or sponge/gorgonian habitats, with relatively few traps found on coral habitats. In the US Virgin Islands, a significant proportion (54%) of trap locations were located within coral habitats. Unsurprisingly, diver surveys found that traps were estimated to cause damage at about 50% of traps visited, instances of damage were most relevant amount gorgonians and sponges, followed by corals.

Adey *et al*. (2007) examined the effects of fishing with *Nephrops norvegicus* creels on benthic species, in areas of soft mud, on the west coast of Scotland were examined and compared to areas of trawling and no fishing. Sampling was undertaken using towed video cameras and recordings from 2000, 2002 and 2003 were analysed. Animals were identified to the lowest possible taxonomic level and the number of species at each sampling site was recorded. A total of 142 stations were analysed and 29 species or taxonomic groups were identified. Species composition significantly differed among areas, but these differences were largely caused by variation in environmental conditions. Sea pens were used as an indicator of physical disturbance of the seabed and sea pen species *Virgularia mirabilis*, *Pennatula phosphorea* and *Funiculina quadrangularis* (and associated brittle star *Asteronyx loveni*) were all found in lower densities in the trawled areas when compared to areas fished solely by *Nephrops* creels. Despite being caught in moderate quantities by the creel fishery, high densities of *V. mirabilis* and *P. phosphorea* were observed in creel-fished areas where bycatch was greatest. High densities of *F. quadrangularis* were also observed, thus suggesting no adverse impact on these three species. Abundances of *A. loveni* in creel-fished areas were also not significantly different from no-fished zones. The portion of damaged or dead colonies of sea pen species was significantly higher in the creel-fished areas than in the trawled areas for both *F. quadrangularis* and *V. mirabilis* (10.7% and 18.6% in creel-fished areas and 5.5% and 5.4% in trawled areas, respectively). The authors however concluded this finding was contradictory and requires further investigation.

Lewis *et al*. (2009), the details of which are also discussed in section 6.2.1, reported injuries of scraping, fragmenting and dislodging sessile fauna as a result of trap movement. This resulted in significant damage to stony corals, octocorals and sponges. In areas of trap movement, sessile faunal cover reduced from 45% to 31%, 51% to 41% and 41% to 35% at depths of 4m, 8m and 12m, respectively.

Shester and Micheli (2011) quantified and compared the ecosystem impacts (discards and benthic habitat impacts) of four gear types (including lobster traps) employed in small-scale fisheries in Baja California in Mexico in areas of temperate to sub-tropical kelp forests and rocky reef. Observations were made of traps being deployed from a boat at the surface were made and to simulate the worse-case scenario of crushing of gorgonian corals, a diver lifted and forcefully dropped traps on top of gorgonian corals. Observations were also made of fishermen occasionally dragging traps and divers tried to replicate the same action that has been observed from a boat. Further simulations were achieved by divers by pulling a trap by the line over corals. After each treatment, gorgonian corals were examined for signs of skeletal damage or tissue loss. Lobster traps that were dropped onto gorgonians had minimal impact, with only one in 37 trials resulting in damage of less than 1% of the colony in the yellow gorgonian coral Eugorgia ampla. Lobster traps that were dragged caused damage to corals significantly more frequently than crushing, although damage was never over 5% of the skeleton. No corals were detached from the seafloor.

Coleman *et al*. (2013) studied the effects of potting on benthic assemblages, specifically sessile epifauna, in circalittoral reef habitats over a four year period following the designation of a no-take zone (NTZ) at Lundy Island in 2003. Control locations were positioned on the west coast of Lundy and on the east coast of Lundy, the latter occurring within the NTZ and for each sampling year six different sites within each location was random selectively. Differences in wave exposure, depth and substrate were present between control and NTZ locations. Control locations outside the NTZ were subject to normal levels of commercial fishing effort and those inside the NTZ were subject experimental potting of approximately 2000 pots per km^2 per year. Multivariate analyses revealed no difference in how assemblages changed over the four year period between areas subject to potting and those not fished. The study concluded no detectable effects of potting for lobster and crabs on the benthic assemblage over the time scale of the experiment. It is important to note that physical differences in NTZ and control locations are likely to complicate the detection of any changes in assemblage.

A study by Young *et al*. (2013), the details of which are also discussed in 6.2.1, consisted of a vulnerability analysis and survey work. The vulnerability analysis involved sensitivity mapping of different biotopes combined with mapping of fishing effort. A sensitivity score of 0 to 3 was assigned (0=none, 1=low, 2=moderate, 3 = high) and the following effort intensity thresholds were defined; very high (250+ pots per km^2/12 strings per km^2), high (175-250 pots per km^2/9-11 strings per km^2), moderate (100-175 pots per km^2/6-8 strings per km^2), low (50-100 pots per km^2/3-5 strings per km^2), very low (0-50 pots per km^2/0-2 strings per km^2) and none (0 pots per km^2/0 strings per km^2). Vulnerability to abrasion from potting was then defined as a function of sensitivity and exposure to fishing. Mapping revealed areas of moderate to high fishing intensity coincided with habitats of moderate sensitivity, resulting in approximately 3 km^2 considered to have high vulnerability to potting and 1 km^2 to have very high vulnerability. This analysis only applies during summer months when potting intensity it at its highest. The survey work, undertaken in in the Flamborough Head no-take zone (NTZ), designated in 2010, and a fished area, revealed a statistically significant difference in community assemblage between the NTZ and fished site was identified. A higher abundance of benthic taxa, namely Mollusca, Hydrozoa and Rhodophyta, were reported within the NTZ, the three of which accounted for 68% of the dissimilarity between the NTZ and fished site. Table 4 provides details of the differences in mean presence of different taxonomic groups. In the fished site, there was a higher percentage of bare substrate (7.2%), which may imply physical abrasion from pots could be removing sessile benthic epifauna. Contrary to expectation, the abundance of kelp species, *Sacharinna latissima*, was found to be higher in the fished site than the NTZ. The abundance of Bryozoans between sites was also found to be similar, suggesting potting pressure is unlikely to be impacting upon their abundance. The authors stated a degree of uncertainty must be associated with the survey due to unusually adverse weather conditions which occurred from January to March 2013. This led to the seafloor being scoured within both sites and subsequent reductions in epibiota across both sites. Prior to the spell of adverse weather, video footage gathered by divers' shows very high benthic cover of fauna and flora, which highlights the severity of damage. The extent of which the adverse weather influenced the outcome of the study is unknown.

Table 4. Summary of mean presence (% cover) of taxonomic groups in a no-take zone and fished area in Flamborough Head European Marine Site. Source: Young *et al*. (2013).

Site	**Bryozoa**	**Hydrozoa**	**Decapoda**	**Mollusca**	**Ochrophyta**	**Rhodophyta**
No-take zone	10.11	55.05	11.45	39.10	6.58	45.94
Fished area	13.92	36.79	8.50	29.36	20.37	31.60

Haynes *et al*. (2014) compared a dataset on the abundance of five sponge species (*Axinella dissimilis*, *Axinella infundibuliformis*, *Haliclona oculata*, *Stelligera stuposa* and *Raspailia ramosa*) from the Skomer Marine Nature Reserve collected during the autumn of 2006, 2008 and 2009, to pot density within a 50 m radius to assess the impacts of abrasion from potting. These species were identified as being susceptible to abrasion. Total species abundance and potting density (a proxy for abrasion) were tested and regression analysis revealed no significant relationship between sponge abundance and potting density. Regression analyses was also performed to examine potting density against sponge life strategy and morphotype diversity, as well as *Eucinella verrucosa* abundance (a potential indicator species for abrasion). The results reveal no significant relationship between any of these variables. Analysis of the data for testing and validation however proved inconclusive due to limited availability of suitable environmental and pressure data. The surveys were not designed to test to changes driven by a wide range of anthropogenic pressures and power to detect such changes was not a consideration of the original sampling design, meaning that existing datasets were not well suited for validation.

Stephenson *et al*. (2015) investigated the long-term impacts of potting on benthic habitats in the Berwickshire and North Northumberland Coast European Marine Site were investigated from 2002 to 2012. The study was split into a number of phases. The first involved frequency analysis of biotopes from previously collected video monitoring footage from past condition monitoring (2002/03 and 2011) provided by Natural England. Data were extracted from previously collected video monitoring footage, undertaken in three transect corridors throughout the EMS, and grouped into biotopes. These biotopes were analysed including the change in number, composition and range, to give an indication of the ecological health of the EMS. Species were recorded to the lowest taxonomic level and biotope classifications were assigned. Biotope richness varied slightly between years and transects, however non-significant differences were a result of rare biotopes. Biotope composition was similar between years and transects. Non-significant fluctuations in biotopes between years were attributed to natural variability. Overall, the number and range of biotopes was maintained between the two sampling periods (2002/03 and 2011), with the persistence of a few dominating biotopes; infralittoral kelp and circalittoral faunal and algal crust biotopes. Conclusions drawn from this analysis are limited due to the broad nature of biotope analysis and low number of sampling years. The methodology used did not allow for changes in abundance, species diversity or species composition of each biotope to be taken into account. The second phase of the study involved an in depth analysis of video monitoring footage collected in 2002/03 and 2011, including changes in benthic community parameters in relation to potting intensity. Video monitoring footage, used in biotope frequency analysis (first phase of the study), was used to investigate changes in benthic community structure within specific biotopes, including taxonomic composition, species diversity and ecologically important species. Data was pooled and change across the whole EMS was explored to examine the effects of potting pressure. A lack of scale on the camera system used prevented collection of abundance data from the footage collected and species presence/absence was used to describe communities. Potting pressure data, derived from another study, was categorised into two levels (low = 0 – 226 and high = 227 – 770 pots / month / km^2). Overall, the results indicate no changes in species composition of biotopes within the EMS. The only biotope to exhibit change in species composition between years and across all transects was ‘faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock (CR.MCR.EcCR.FaAlCr)’, thus indicating little change overall between 2002 and 2011. When incorporating ‘fishing pressure’ into the analysis, the same biotope exhibited an altered species assemblage between years, suggesting this significant change in species composition between years may be driven by fishing pressure. There was little evidence to suggest that species richness within biotopes differed between years, with differences only detected in ‘*Laminaria hyperborea* on tide-swept infralittoral mixed substrata’ (IR.MIR.KR.LhypT.Pk). In three out of ten biotopes, species richness differed between different levels of fishing pressure. Despite nine out of ten biotopes having greater species richness at low fishing pressures when compared with higher fishing pressures, differences were not significant. The exception to this was the ‘Brittlestars on faunal and algal encrusted exposed to moderately wave-exposed circalittoral rock’ (CR.MCR.EcCR.FaAlCr.Bri) biotope where species richness suggests in areas of high fishing pressure that the assemblage structure may be affected. Further information however is required and conclusions were deemed as speculative. The results suggest that biotopes most likely to be impacted by fishing pressure are deeper, faunal and algal crusts as opposed to the shallower *Laminaria* biotopes. It does however remain uncertain as to whether fishing pressure is linked to species diversity as no clear pattern in species richness between years at different fishing pressure was observed. The low number of biotopes affected and the limited temporal data do not confirm whether fishing pressure impacts the environment or not. Analysis involving the reduced list of species, chosen in relation to those which can indicate biotope sensitivity to anthropogenic impacts, revealed no changes between years. From this data, it was concluded no deterioration in ‘biotope health’ from 2002 – 2011 occurred; the state of health of biotopes however could not be concluded. Overall it was concluded that, despite changes in species richness and composition of the biotope FaAlCr between years, there was little evidence of change in species composition or species richness of biotopes between years and it was not fully possible to investigate the role of fishing pressure in relation to community change. Results from this research suggest that on the scale of the EMS, impacts of small scale potting on epibenthic assemblages cannot be detected against the background of natural variability. The third explored pot movement over a 23 day period using novel acoustic telemetry methods (as discussed in section 6.2.1).

Walmsley *et al*. (2015) analysed existing literature and ongoing studies on the impacts of potting on different habitats and features as part of a project funded by the Department for Environment Food and Rural Affairs in order to provide conclusions from evidence on whether potting may compromise the achievement of conservation objectives within European Marine Sites. The review of evidence found limited sources of primary evidence specifically addressing the physical impact of potting. Studies reported no or limited significant impacts from potting on subtidal bedrock reef and subtidal boulder and cobble reef, on brittlestar beds and subtidal mud. Particular evidence gaps were identified include those which relate to certain habitats (specifically maerl, seagrass, mussel beds, subtidal mixed sediments) and pot types (i.e. whelk pots and cuttle traps). Overall, the review of evidence found that most sub-features are unlikely to be of significant concern, particularly at existing potting intensity levels and limited impacts are likely to be undetectable against natural variability and disturbance.

There are a number of ongoing pieces of research into the effects of potting on benthic habitats, including Sarah Gall at the University of Plymouth, Adam Rees who is also at the University of Plymouth, Clare Fitzsimmons at the University of Newcastle-upon-Tyne and the Agri-Food and Biosciences Institute (AFBI). The details of the study being completed by Sarah Gall is given in section 6.2.1.

The study being completed Adam Rees is investigating the impacts of different potting intensities in Lyme Bay by manipulating potting intensity across a set of experimental areas. The aim of the project is to determine if the impact of potting and at what level commercial potting activity becomes environmental unsustainable. Test areas are 500 x 500 m and located on a mixed ground or rocky reef to allow for comparison. The four potting intensities used include no potting, low density (5 to 10 pots), medium density (15 to 25 pots) and high density (30+ pots). Intensity calculations are based on the highest density of pots, which equates to approximately 30 pots per 0.25 km^2 (120 pots per 1 km^2). Based on the assumption pots are hauled three times a week (on average), the highest density of pots equates to 19,000 pot hauls per km^2 per year. The number of times pots are hauled each week will vary depending on the season, with pots more likely to be hauled every day during the summer. In winter however pots may not be hauled for 3 months depending on the weather. Each site (16 overall) is monitored using underwater video sampling techniques to collect data on mobile species, sessile fauna and any impacts on the benthic habitat. Data on commercially important species (crab and lobster) is also collected. Data collection began in 2013, however results from the study have been limited so (with respect to potting impacts) far because of adverse weather conditions experienced during December 2013 to March 2014. Results from video analysis conducted in summer 2014 reveals much of the key sessile reef features and associated mobile species have been significantly reduced as a result of increase wave action from the storm events seen during the period of adverse weather (Figure 4). Most reef areas are of a similar condition and represent a severely naturally disturbed state, which may be likened to towed gear impacts, and is much more severe that any impacts which may occur as a result of the potting density study. Impacts from the period of adverse weather have removed any evidence of impact that the different levels of potting intensity may have started to show. As a result the study has been extended and will run until 2016. The results so far however do demonstrate that the impacts of extreme weather events are likely to far exceed those which occur from potting.

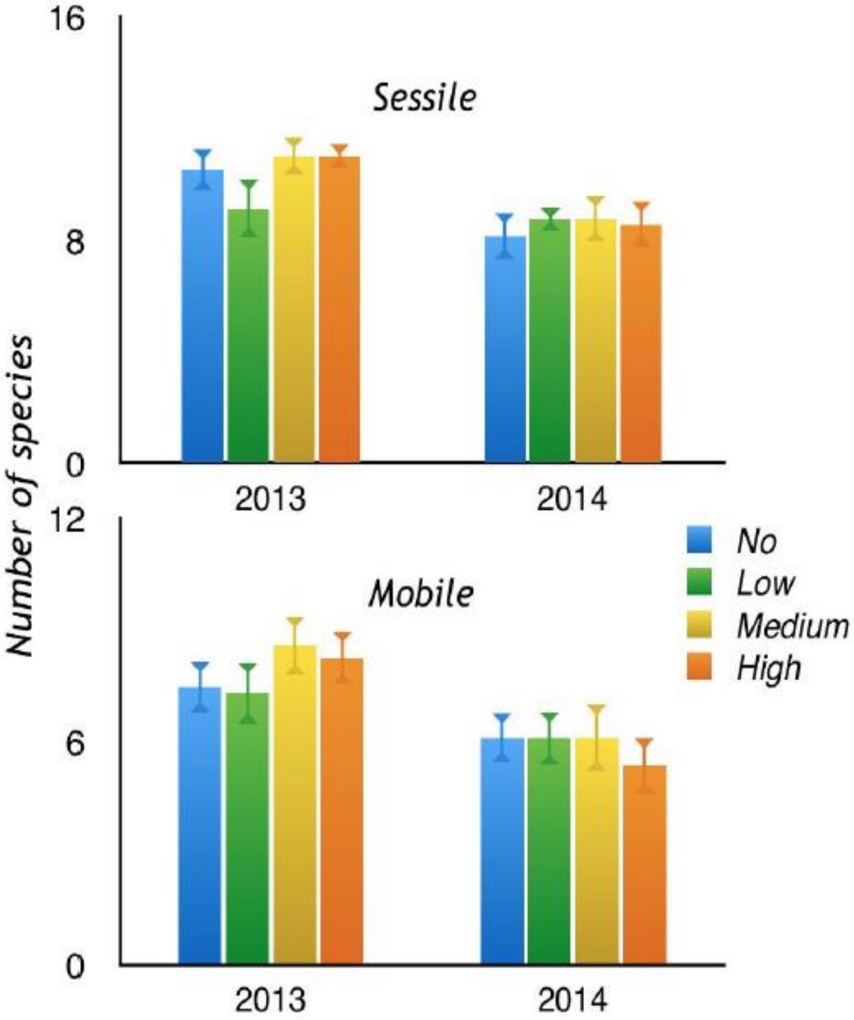


Figure 4. Changes in the number of sessile and mobile species between 2013-14 in Lyme Bay, prior to and after a period of extreme weather (December 2013 to March 2014). Source: Rees, No Date.

The study being completed by Clare Fitzsimmons at the University of Newcastle-upon-Tyne is examining the impacts of potting at different intensity levels in a series of 10 x 10 m impact areas and a 10 x 10 m control area (subject to normal levels of fishing). A large number of pots were deployed within a small area (equivalent to 80,000 per km²), which is orders of magnitude greater than current levels of fishing effort. No significant impacts on faunal-algal crust habitat were detected. This work is being extended to other rocky reef habitats (kelp and chalk reefs).

The study being completed by Agri-Food and Biosciences Institute is assessing the impacts of potting on different SAC features in Northern Ireland. These include rocky reefs with sponges, *Modiolus* beds, maerl and sandbanks. The project is combining ecological data with other data sources such as fishing pressure, allowing experimental work to be extrapolated to what is occurring at a fishery scale. The project has also focused on the experimental deployment of pots with cameras and accelerometers with associated faunal analysis. Although the research is still in progress, preliminary results indicate a lack of effect on the habitats mentioned above.

Selective extraction of species

The selective extraction of species refers to the removal of a species or community and includes the removal of a specific species/ community/ keystone species in a biotope. Fishing leads to the removal of certain species from an ecosystem. More specifically, potting principally targets edible crab, European lobster, whelk and cuttlefish, alongside other species which may be favourably retained including the velvet swimming crab. Edible crab, European lobster, whelks and velvet swimming crab are subject to minimum landing sizes and so are only removed above a certain size. Literature on the ecological effects of selective extraction of target species is limited, however the following studies may give some indication as to the ecological impacts of removing target species through potting.

A study by Hoskin *et al*. (2011) explored ecological effects of removing the top down pressure of potting on target species (edible crab, European lobster, velvet swimming crab), by examining changes in their populations under different fishing scenarios. These included a no-take zone (NTZ) in an area adjacent to Lundy Island which were compared with areas (proximal and distant locations) subject to an experimental potting program (using 240 pots in total) over a four year period (2004-2007). Rapid and large increases in the abundance and size of legal-sized lobsters (*Homarus gammarus*) occurred within the NTZ and there was evidence of spillover of sublegal lobsters into adjacent areas. Legal-sized lobsters were observed to exhibit an effect of the NTZ within 18 months of its designation. Between 2004 and 2007, mean abundance within the NTZ increased by 127%, four years after being designated as a NTZ, whilst abundances in the proximal and distinct location did not change significantly. This equated to legal-sized lobsters being 5 times more abundant in the NTZ than other locations. Sublegal lobsters increased by 97% within the NTZ and by 140% in proximal locations. Over the four year period, the mean size of legal-sized lobsters in the NTZ increased by 5.2%, whilst mean sizes in the proximal and distant locations declined by 2.8% and 2.1% respectively. Small but significant increases of 25% were observed in the size of brown crab (*Cancer pagurus*), but no apparent effects were seen in abundance. Declines of 65% in the abundance of velvet swimming crab (*Necora puber*) were also observed within the NTZ, potentially owing to predation and/or predation from lobsters.

Wootton *et al*. (2015) investigated the potential ecological effects of removing certain target species through potting and trapping around the British coast. The results of this analysis are summarised below for each species:

Edible/Brown crab – *Cancer pagurus*

In the UK there are a large number of brachyuran crab species (50-60), including *C. pagurus*. These species are thought to have very similar diets and behaviour and because of this are likely to belong to a large functional group of species. As a consequence, the removal or large reduction in abundance of *C. pagurus* is unlikely to significantly modify any existing top-down control exerted by the species and negatively impact on ecosystem function and stability. Additionally, *C. pagurus* is not considered a keystone species and this means the probability of detrimental trophic cascades and phase shifts is low if the species were removal. The only concern is the removal of large *C. pagurus*, as they constitute apex predators in some ecosystems, particularly subtidally. Larger individuals belong to a smaller 'functional group' together with the European lobster. The potential for ecological perturbations may occur if the European lobster, which belongs to the same small 'functional group' is unable to fill the vacant apex predator niche and functional role.

European lobster – *Homarus gammarus*

It is unfeasible to determine the impact of *H. gammarus* removal on ecosystem structure, function and stability as a result of the 'sliding baseline' phenomenon. It is known however that when *H. gammarus* is freed from commercial exploitation the population is able to rapidly expand at the expense of other species (*C. pagurus* and *Necora puber*), whose populations' contract. Lower *H. gammarus* populations may therefore increase biodiversity, maintain ecosystem function ad stability and minimise the risk of deleterious trophic cascades.

Velvet swimming crab – *Necora puber*

N. puber fulfils functional roles similar to that of other decapod crustaceans with respect to ecosystem structure, function and stability. There is no documented evidence of *N. puber* fulfilling a unique role in ecosystem function and stability and it is likely that another decapod crustacean such as *Carcinus maenas* would be able to fill the ecological niche of the species if it were removed or reduced in abundance. This means that any adverse effects on top-down and bottom-up regulation, community structuring, ecosystem connectivity and energy flow within ecosystem are likely to be nullified.

Cuttlefish – *Sepia officinalis*

The short-lived nature of *S. officinalis* means that it is susceptible to large interannual fluctuations in abundance, the knock on effects of which on ecosystem function and stability have not been documented. It is likely the species belongs to large functional group of organisms and thus if the species diminished the potential for any detrimental effects to ecological system function and structure are likely to be offset. A limiting factor in determining this species role however is the lack of research into its general biology and ecology.

Whelk – *Buccinum undatum*

B. undatum belongs to a large functional group of species with regards to ecosystem function and structure, with numerous crustaceans, echinoderms and fish species fulfilling a similar scavenging and predatory role. Such species could easily fill the ecological niche of *B. undatum* if the species was removed within an ecosystem. A limiting factor in determining this species role however is the lack of research into its general biology and ecology.

6.2.3 Sensitivity

Sensitive species

A number of studies used indicator species, perceived to be sensitive to potting, to detect change as a result of potting impacts, whilst others use community assemblage (Young *et al*., 2013). Such species are often sessile and are diverse and abundant in rocky reef habitats, where crab and lobster potting commonly takes place. Epifauna on subtidal rock include erect and branching species which can be characterised by slow growth and as such are vulnerable to physical disturbance (Roberts *et al*., 2010). There is a risk that static gear could cause cumulative damage to such species, with some being more resilient to the effects of fishing than others, and the recovery of more vulnerable species from such impacts likely to be slow (Roberts *et al*., 2010; JNCC & NE, 2011). The ability of fauna to resist impacts of static gear will depend on the species and degree of impact will depend on intensity and duration (Roberts *et al*., 2010). Recovery of species will depend on the life-history characteristic of species affected, including the ability to repair or regenerate damaged parts and the ability of larvae to recolonise the habitat (Roberts *et al*., 2010). Typical species include axinellid sponges, pink sea fan (*Eunicella verrucosa*) and Ross coral (*Pentapora foliacea*) (Roberts *et al*., 2010). Other potential vulnerable species in the North East Atlantic include dead men's fingers (*Alcyonium digitatum*) and various erect branching sponges (e.g. *Axinella* spp., *Raspalia* spp.) (Coleman *et al*., 2013). MacDonald *et al*. (1996) assessed the fragility and recovery potential of different benthic species to determine their sensitivity to fishing disturbance. Recovery represents the time taken for a species to recover in a disturbed area and fragility represents the inability of an individual or colony of the species to withstand physical impacts from fishing gear. Recovery was scored on a scale of 1 to 4 (1 – short, 2 – moderate, 3 – long and 4 – very long) and fragility was scored on a scale of 1 to 3 (1 – not very fragile, 2 – moderately fragile and 3 – very fragile). The scores assigned to potentially vulnerable species in the Studland to Portland SCI are detailed in Table 5. The table also includes sensitivity information assigned by MarLIN in relation to physical disturbance and abrasion. Please note that the sensitivity ratings assigned by MarLIN are based on a single dredging event, the force of which is likely to be greater in magnitude than the impacts caused by potting. Also note this is not an exhaustive list of potentially vulnerable species, these were selected based on those listed by MacDonald *et al*. (1996) on rocky ground and which also occur within the Studland to Portland SCI.

Table 5. Likely sensitivity of some species (which occur within the Studland to Portland SCI) to disturbance caused by an encounter with fishing gear on rocky ground scored by MacDonald *et al*. (1996) and MarLIN (in relation to physical disturbance and abrasion). Low intensity gears include pots, gill nets and longlines. Fragility is derived from personal knowledge of species structure and recovery values were derived from a review of literature on life-histories of the species. Source: MacDonald *et al*. (1996) and www.marlin.ac.uk/).

		MacDonald *et al*. (1996)			**MarLIN**		
Species	**Common name**	**Fragility**	**Recovery**	**Sensitivity (for low intensity gear)**	**Intolerance**	**Recoverability**	**Sensitivity**
Eucinella verrucoa	Pink sea fan	3	3	24	Intermediate	Moderate	Moderate
Pentapora foliacea	Ross coral	3	2	16	High	Moderate	Moderate
Alcyonium digitatum	Dead man's fingers	1	2	5	Intermediate	High	Low
Halichondria panicea[1]	Breadcrumb sponge	1	1	3	Intermediate	High	Low
Laminaria hyperborea	Tangle or cuvie (brown algae / seaweed)	2	2	11	Intermediate	Moderate	Moderate
Flustra foliacea	Hornwrack	2	2	11	Intermediate	High	Low
Nemertesia antennina	Sea beard (a hydroid)	2[a]	1	5	Intermediate[2]	High	Low
Pomatoceros sp.[3]	A tubeworm	1	1	3	-	-	-

[1]*Halichondria* sp. is listed in Regulation 35 Conservation Advice but only sensitivity scores for this species is available; [2]Sensitivity scores for *Nemertesia ramosa*; [3]Sensitivity scores for *Pomatoceros triqueter*

Sensitivity analyses

A number of recent studies have endeavoured to map the sensitivity of habitats to different pressures (Tillin *et al*., 2010) and fishing activities (Hall *et al*., 2008).

Tillin *et al*. (2010) developed a pressure-feature sensitivity matrix, which in effect is a risk assessment of the compatibility of specific pressure levels and different features of marine protected areas. The approach used considered the resistance (tolerance) and resilience (recovery) of a feature in order to assess its sensitivity to relevant pressures (Tillin *et al*., 2010). Where features have been identified as moderately or highly sensitive to benchmark pressure levels, management measures may be needed to support achievement of conservation objectives in situations where activities are likely to exert comparable levels of pressure (Tillin *et al*., 2010). In the context of this assessment, the relevant pressures likely to be exerted are surface abrasion and removal of non-target species. All features have medium to high sensitivity to the removal of non-target species, whilst the sensitivity to surface abrasion ranged between low too high for moderate energy circalittoral rock, high for fragile sponge and anthozoan communities on subtidal rocky habitats and medium for blue mussel beds and moderate energy infralittoral rock (Table 6). The hard outer shell of mussels buys some protection against physical impacts although their shells can be broken by direct pressure (Roberts *et al*., 2010). The denser aggregations of *Mytilus edulis* mean the species is likely to be less sensitive to abrasion than mussel species including *Modiolus modiolus* (Walmsley *et al*., 2015). It is important to note that generally there is low confidence in these assessments.

Hall *et al*. 2008 aimed to assess the sensitivity of benthic habitats to fishing activities. A matrix approach was used, composed of fishing activities and marine habitat types and for each fishing activity sensitivity was scored for four levels of activity (Hall *et al*., 2008). The matrix was completed using a mixture of scientific literature and expert judgement (Hall *et al*., 2008). The type of fishing activity chosen was 'static gear (fishing activities which anchor to the seabed)' as this best encompassed the fishing activity under consideration. Rock with erect and branching species appears to be the most sensitive to higher gear intensities compared with rock with low-lying and fast growing faunal turf which was considered to have a sensitivity level of no higher than medium (Table 7). Underboulder communities on lower shore and subtidal boulders and cobbles and biogenic reef on sediment and mixed substrate were the least sensitive with low sensitivity to heavy, moderate and light gear intensities.

Table 6. Sensitivity of SAC features to pressures identified by Tillin *et al*. (2010). Confidence of sensitivity assessment is included in brackets.

	Pressure	
Feature	Surface abrasion: damage to seabed surface features	Removal of non-target species
Fragile sponge and anthozoan communities on subtidal rocky habitats	High (Low to High)	High (Low)
Moderate energy infralittoral rock	Medium (Low)	Medium (Low)
Moderate energy circalittoral rock	Low to High (Low)	Medium to High (Medium)

Blue Mussel beds (including intertidal beds on mixed and sandy sediments)	Medium (Low)	Medium (High)

Table 7. Sensitivity of SAC features to different intensities (high, medium, low, single pass) of static gear (fishing activities which anchor to the seabed) as identified by Hall *et al*. (2008).

Habitat Type	**Gear Intensity***			
	Heavy	Moderate	Light	Single pass
Rock with low-lying and fast growing faunal turf	Medium	Medium	Low	None
Rock with erect and branching species	High	High	Medium	None
Biogenic reef on sediment and mixed substrate (includes *Mytilus*)	Low	Low	Low	None
Underboulder communities on lower shore and shallow subtidal boulders and cobbles	Low	Low	Low	None

*Heavy - >9 pairs of anchors/area 2.5nm by 2.5nm fished daily, Moderate- 3- 8 pairs of anchors/area 2.5nm by 2.5nm fished daily, Light - 2 pairs of anchors/area 2.5nm by 2.5nm fished daily, Single - Single pass of fishing activity in a year overall

6.3 Site Condition

Natural England provides information on the condition of designated sites and describes the status of interest features. This is derived from the application of 'Common Standards Monitoring Guidance' which is applied to a subset of 'attributes' of site features as set out in the sites' Regulation 33/35 Conservation Advice document. Feature condition influences the Conservation Objectives in that it is used to determine whether a 'maintain' or 'recover' objective is needed to achieve the target level for each attribute. Natural England's current process for conducting condition assessments for marine features was developed due to requirements to report on condition of Annex 1 features at the national level in 2012/13 under Article 17 of the Habitats Directive. Since then, the methods have been reviewed and Natural England are actively working to revise this process further so that it better fulfils obligations to inform management actions within MPAs and allows them to report on condition. In light of this revision to the assessment methods, the condition assessments for the features of European Marine Sites have not been made available in the timeframe required under the revised approach.

An indication as to the condition of the site is available from the Regulation 35 Conservation Advice which states that 'video and photographic analysis (Axelsson *et al*., 2011) combined with extensive diver survey data indicate that the majority of the reef habitat within the site is of excellent quality and structure'.

6.4 Existing Management Measures

- **Bottom Towed Fishing Gear Byelaw** – prohibits bottom towed fishing gear over sensitive reef features within the Lyme Bay portion of the Studland to Portland SCI.
- **Vessel Used in Fishing Byelaw** – prohibits commercial fishing vessels over 12 metres from the Southern IFCA district. The reduction in vessel size also restricts the type of gear that can be used and the level of static gear that can be worked.
- **Voluntary Escape Gap Trial Scheme** – Southern IFCA commenced the voluntary scheme in July 2014 through the purchase of 500 escape gaps (87 x 45 mm) which were subsequently distributed to fishermen throughout the district. A further 500 escape gaps were purchased and are still in the process of being distributed. The aim of the trial scheme was to promote the use of escape gaps in crab and lobster pots and encourage their use on a voluntary basis.
- **Protection of Berried (Egg Bearing) Lobsters Byelaw** – prohibits the removal of any berried lobster of the species *Homarus gammarus* with any berried lobsters caught to be returned immediately to the sea as near as possible from where it was taken.
- **Lobsters and Crawfish (Prohibition of Fishing and Landing) Order 2000 No. 874** – national legislation which prohibits the landings of any mutilated lobster or crawfish or any lobster or crawfish bearing a V notch.
- Other regulations include minimum sizes as dictated by European legislation. European minimum sizes, listed under Council Regulation (EEC) 850/98 specify the minimum size for European lobster is 87 mm (carapace length), 140 mm for edible crab (carapace width) and 45 mm for whelks (shell length).

6.5 Table 8: Summary of Impacts

The potential pressures, associated impacts, level of exposure and mitigation measures are summarised in table 8. Only relevant attributes identified through the TLSE process have been considered here.

Feature	**Sub feature(s)/ Supporting habitat(s)**	**Attribute**	**Target**	**Potential Pressure(s) and Associated Impacts**	Nature and Likelihood of Impacts	Mitigation measures[12]

[12] Detail how this reduces/removes the potential pressure/impact(s) on the feature e.g. spatial/temporal/effort restrictions that would be introduced.

Reefs	Bedrock reef	Biotope composition of bedrock reefs	Maintain the full variety of bedrock reef biotopes identified for the site to an established baseline, subject to natural change.	Abrasion and disturbance to the surface of the seabed was identified as a potential pressure. Benthic communities can be directly impacted by potting gear through crushing, entanglement or removal, when gear is being deployed, hauled or under the influence of currents or waves which can involve lateral dragging. Epifauna on subtidal rocky habitats include erect and branching species which often have slow growth and are vulnerable to physical disturbance. There is a relative paucity of scientific evidence on the impacts of potting on benthic communities when compared when mobile gear. Existing literature however infers that impacts of potting on temperate rocky habitats are negligible or limited in extent, especially when compared to impacts resulting from periods of adverse weather conditions (i.e. Eno *et al*., 2001; Shester & Micheli, 2011; Coleman *et al*., 2013;	Approximately 30 commercially licensed fishing vessels use both types of potting gear within the site, with approximately 20 of these smaller vessels under 10 metres in length. This number has remained relatively constant over the past five years. The number of pots worked by each vessel largely varies and often relates to vessel size. Smaller vessels work a much lower number of pots (20 to 50). Landings of target species include similar fluctuations in those for edible crab and lobster from 2005 to 2014. Quantities of edible crab and lobster peaked in 2007/2008, dipped in 2010 and increased again in 2014. Landings of whelks show a large overall increase between 2005 and 2014. Colocation of sightings data and feature mapping reveal that the vast majority of sightings for crab and lobster potting take place over reef features (as would be expected by the nature of the target species). The level of whelk potting sightings within the SCI is however very low, although sightings which do occur within the site do so occur reef features.	Vessel Used in Fishing byelaw prohibits commercial fishing vessels over 12 metres from the Southern IFCA district. The reduction in vessel size also restricts the level of pots that can be worked.

				Young *et al*., 2013; Haynes *et al*., 2014; Stephenson *et al*., 2015). Preliminary results from ongoing studies are also in agreement (Sarah Gall, Adam Rees, Claire Fitzsimmons, AFBI).	Regulation 35 Conservation Advice (released in March 2013) states 'Static gear fishing (potting and netting) is known to occur within the site, particularly around the Isle of Portland and in the Ringstead to Studland area, as well as anchoring of both commercial and recreational vessels. At current levels of activity, the exposure of Studland to Portland bedrock and stony reefs to physical damage through siltation and abrasion is considered to be low'. Existing scientific literature and ongoing studies suggest the impact of potting on benthic communities is negligible or limited in extent. Damage to benthic habitats caused by adverse weather conditions in Lyme Bay have been reported to be far in excess of that caused by the impacts of potting (report by Adam Rees).	
Reefs	Bedrock reef	Distribution and spatial pattern of bedrock reef biotopes	Maintain the distributio n and spatial pattern of bedrock reef biotopes identified for the site, to an	Addressed above.	Addressed above.	Addressed above.

			established baseline, allowing for natural change.			
Reef	Bedrock reef	Extent of representative / notable bedrock reef biotopes	No change in the extent of the Mytilus edulis biotopes, from an established baseline, allowing for natural change.	In addition to information provided above, the preliminary findings of an ongoing study by AFBI into the impacts of potting on *Modiolus* beds, suggest a lack of effect.	In addition to information provided above, the preliminary findings of an ongoing study by AFBI into the impacts of potting on *Modiolus* beds, suggest a lack of effect.	In addition to measures stated above, the Southern IFCA conduct an annual survey to monitor the presence of mussel spat within designated fished areas. The survey is used to inform an appropriate assessment which is required for potential impacts of the proposed mussel seed fishery to be assessed in view of the integrity and conservation objectives of the site. The survey involves the collection of underwater camera footage which is analysed for mussel density, presence of megafauna, presence/absence of mussel spat and mussel average length, as well as mapping extent of mussel beds in the area. The most recent survey highlighted a lack of mussel presence as a result of recent storm activity and highlighted the ephemeral nature of mussel beds.
Reef	Bedrock reef	Population structure of *Mytilus edulis* beds	Maintain age/size class structure	In addition to information provided above, the preliminary findings of an ongoing study by AFBI into	In addition to information provided above, the preliminary findings of an ongoing study by AFBI into the impacts of potting on *Modiolus*	In addition to measures stated above, the Southern IFCA conduct an annual survey to monitor the presence of

			of individual species to an established baseline, allowing for natural change.	the impacts of potting on *Modiolus* beds, suggest a lack of effect.	beds, suggest a lack of effect.	mussel spat within designated fished areas. The survey is used to inform an appropriate assessment which is required for potential impacts of the proposed mussel seed fishery to be assessed in view of the integrity and conservation objectives of the site. The survey involves the collection of underwater camera footage which is analysed for mussel density, presence of megafauna, presence/absence of mussel spat and mussel average length, as well as mapping extent of mussel beds in the area. The most recent survey highlighted a lack of mussel presence as a result of recent storm activity and highlighted the ephemeral nature of mussel beds.
Reef	Bedrock reef	Species composition of representative or notable bedrock reef biotopes	No decline in bedrock reef biotope quality due to changes in species composition or loss of notable species, from an establishe	Addressed above.	Addressed above.	Addressed above.

			d baseline, allowing for natural change.			
Reef	Bedrock reef	Presence and/or abundance of specified bedrock reef species.	Maintain presence and/or abundance of species from an established baseline, allowing for natural change.	Abrasion and disturbance to the surface of the seabed is addressed above. The selective extraction of species was identified as a potential pressure. Species are targeted (edible crab, European lobster, whelk) or preferentially retained (velvet swimming crab) through potting which will lead to the removal of individuals above the minimum landing size. Such removal may lead to ecological effects on the structure and functioning of benthic communities. The ecological effects of removing fishing pressure were studied in the Lundy Island (Hoskin *et al*., 2011). Populations of European lobster expanded at the expense of other crustacean species (edible crab and velvet swimming crab).	Approximately 30 commercially licensed fishing vessels use both types of potting gear within the site, with approximately 20 of these smaller vessels under 10 metres in length. This number has remained relatively constant over the past five years. The number of pots worked by each vessel largely varies and often relates to vessel size. Smaller vessels work a much lower number of pots (20 to 50). Landings of target species include similar fluctuations in those for edible crab and lobster from 2005 to 2014. Quantities of edible crab and lobster peaked in 2007/2008, dipped in 2010 and increased again in 2014. Landings of whelks show a large overall increase between 2005 and 2014. The relatively high selectivity of pots results in low incidental bycatch and retained undersized lobsters, crabs or whelks are returned to the sea. The selectivity of pots is improved through the use of escape gaps, which are	Vessel Used in Fishing byelaw prohibits commercial fishing vessels over 12 metres from the Southern IFCA district. The reduction in vessel size also restricts the level of pots that can be worked. Voluntary Escape Gap Scheme run by Southern IFCA aims to promote the use of escape gaps (87 x 45 mm) and encourage their use on a voluntary basis. Escape gaps used in crab and lobster pots and are designed to release undersized individuals (those below the minimum landing size) from pots at the seabed, thus reducing mortality and chance of appendage loss. In the Devon and Severn IFCA district, the use of escape gaps (84 x 46 mm) is mandatory and forms a condition of the potting permit. Protection of Berried (Egg Bearing) Lobsters byelaw, prohibits the removal of any berried lobster (regardless of size) and requires they are

				Potential ecological effects of removing target species were investigated by Wootton *et al*. (2015). Based on information known on the expansion of European lobster populations (as described above), controlled populations (i.e. through commercial exploitation) may reduce the chance of adverse ecological effects. The edible crab, velvet swimming crab and whelk were all reported to belong to large functional groups and therefore if the species diminishes any potential negative adverse effects on ecosystem function and structure are likely to be negated as another species could easily fill the ecological niche left. The other concern which potential arose was the removal of large edible crabs as they constitute apex predators, alongside the European lobster. The potential for ecological perturbations may occur if the European lobster was unable to fill the niche left by the removal of large edible crabs.	voluntary in the Southern IFCA district. Colocation of sightings data and feature mapping reveal that the vast majority of sightings for crab and lobster potting take place over reef features (as would be expected by the nature of the target species). The level of whelk potting sightings within the SCI is however very low, although sightings which do occur within the site do so occur reef features. This limits the removal of whelks from areas of reef habitat. Regulation 35 Conservation Advice (released in March 2013) states 'Static gear fishing (potting and netting) is known to occur within the site, particularly around the Isle of Portland and in the Ringstead to Studland area, as well as anchoring of both commercial and recreational vessels. At current levels of activity, the exposure of Studland to Portland bedrock and stony reefs to physical damage through siltation and abrasion is considered to be low'. Studies looking into the likely impacts of the selective extraction of the target species conclude limited potential for adverse ecological effects.	returned immediately to the sea as near as possible from where they were taken. This byelaw helps to safeguard future European lobster populations, especially through the protection of larger berried females (above the minimum landing size) who are more fecund. Minimum sizes are dictated by European legislation and specify the minimum size for European lobster is 87 mm (carapace length), 65 mm for velvet swimming crab (carapace width), 140 mm for edible crab (carapace width) and 45 mm for whelks (shell length).

Reef	Stony reef	Biotope composition of stony reefs.	Maintain the full variety of biotopes identified for the site to an established baseline, subject to natural change.	Addressed above under bedrock reef.	Addressed above under bedrock reef.	Addressed above under bedrock reef.
Reef	Stony reef	Distribution and spatial pattern of stony reef biotopes	Maintain the distribution and spatial pattern of stony reef biotopes identified for the site, to an established baseline, allowing for natural change.	Addressed above under bedrock reef.	Addressed above under bedrock reef.	Addressed above under bedrock reef.
Reef	Stony reef	Species composition of representative or notable stony reef	No decline in stony reef biotope quality due to change in	Addressed above under bedrock reef.	Addressed above under bedrock reef.	Addressed above under bedrock reef.

		biotopes.	species composition or loss of notable species, from an established baseline, allowing for natural change.			

7. Conclusion[13]

Research into the impact of potting on benthic habitats has shown there is a relative paucity of scientific evidence when compared with the impacts of mobile gear. The number of studies completed in recent years on the impacts of potting in rocky habitats has however increased and additional studies are ongoing in order to address this evidence gap. Existing literature (i.e. Eno *et al*., 2001; Shester & Micheli, 2011; Coleman *et al*., 2013; Young *et al*., 2013; Haynes *et al*., 2014; Stephenson *et al*., 2015) and preliminary results from ongoing studies (Sarah Gall, Adam Rees, Claire Fitzsimmons, AFBI) infer the impacts of potting on temperate rocky habitats are negligible or limited in extent, especially when compared to impacts resulting from periods of adverse weather (Young *et al*., 2013; Report by Adam Rees). Periods of extreme weather over the course of a study have compounded results and introduced a degree of uncertainty (Young *et al*., 2013; Report by Adam Rees). A study by Young *et al*. (2013), based in Flamborough Head EMS, reported a higher abundance of benthic taxa in non-fished sites when compared to fished sites, however the authors stated a degree of uncertainty must be associated with the survey results due to unusually adverse weather which scoured both sites and led to reductions in epibiota across both sites.

Combining sightings data and feature mapping data (provided by Natural England), revealed that potting for crab and lobster is concentrated relatively close inshore over areas of predominantly infralittoral, with fewer sightings shown to occur offshore over areas of circalittoral rock. Potting for whelks largely occurs outside out the SCI, although those which were present within the site occurred over both infralittoral and circalittoral rock.

Having reviewed a wide range of evidence, including scientific literature, sightings data and feature mapping, it has been concluded that potting for crab and lobster and whelks, is unlikely to have a significant adverse effect on the reef interest feature in the Studland to Portland SCI. Potting can occur all year round but is likely to be higher during the summer months and is undertaken by up to approximately 30 vessels, of which 25 are under 10 metres in length. Annual monitoring of mussel beds within the site shows how ephemeral in nature the mussel beds in this area can be and how periods of adverse weather can lead to their lack of presence. Most importantly, there is a severe lack of scientific evidence to suggest that potting has an adverse effect on reef habitats, with the impacts being negligible or of limited extent.

Based on the moderate level of fishing intensity, with a high number smaller vessels partaking in the fishery, it is deemed that potting for crab, lobster, and whelks within the Studland to Portland SCI is unlikely to have an adverse effect on the features considered and will not hinder the site from achieving its conservation objectives. This is further supported by the lack of scientific evidence to suggest potting is likely to have an adverse effect on reef features. It is Southern IFCA's duty as the competent and relevant authority to manage damaging activities that may affect site integrity and lead to deterioration of the site. The moderate levels of fishing activity, limited area for interaction (of static fishing gear) with reef features and severe lack of scientific evidence to suggest that potting has an adverse effect on reef habitats is such that it is not believed to lead to the deterioration of the site and that it is compatible with the sites conservation objectives.

A change in the status of the fishery is unforeseen, however it is recognised that the status of a fishery may change (i.e. gear enhancements, increase in fishing effort). Southern IFCA will continue to monitor fishing effort through sightings data and any information on gear enhancement

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

from IFCOs. The need for assessments will be reviewed should new evidence relevant to this gear/feature interaction become available.

8. In-combination assessment

No adverse effect on the reef feature/sub-features of Studland to Portland SCI was concluded for the effect of potting (crab and lobster & whelks) activity alone within the SCI. Potting activities currently occur in the Studland to Portland SCI alongside other fishing activities and commercials plans and projects and therefore require an in-combination assessment.

No commercial plans and projects were found to occur within or potentially affect the Studland to Portland SCI. Potential projects were considered and screened out[14].

There is the potential for potting activity to have a likely significant effect when considered in-combination with other fishing activities that occur within the site. These are outlined in section 8.1. Any fishing activities that were screened out as part of the revised approach assessment process will not be considered (see Studland to Portland SCI screening summary for details of these activities). In the Studland to Portland SCI, commercially licensed fishing vessels are known to utilise a number of different gear types and are engaged in multiple fishing activities (i.e. potting, netting and longlining) and this, whilst dividing effort between gear types, may lead to cumulative impacts different to those of a single fishing activity.

8.1 Other fishing activities

Fishing activity	Potential for in-combination effect
Demersal netting/ longlining	Annex 5 shows that netting and longlining largely occurs inshore outside of the SCI boundary. It also illustrates that netting and longlining are likely to overlap spatially with potting activity and this is likely to occur over reef features or on the boundary of reef features (see Annex 2). Netting and longlining has potential to lead to physical abrasion with the seabed however the area affected is small. Unlike potting, which has evidence to support the activity has a negligible or no impact on reef features, there is a severe lack of evidence to suggest netting or longlining has any impact. Based on this, the activities combined are unlikely to lead to a significant effect. The activities target different species and therefore there are no in-combination effects with respect to the selective extraction of species. In addition, Annex 5 shows the level of fishing effort associated with netting is low when compared with potting. Up to 20 vessels undertake netting within the Studland to Portland SCI, with the majority of vessels also engaged in potting. This means that fishing effort of many vessels is split between gear types throughout the year and would not necessarily increase proportionally when both gear types are combined as it may be the same vessels pursuing different fisheries at different times of the year. In conclusion, there are unlikely to be any in-combination effects with demersal netting and longlining, due to the low impact of the gear, relatively low fishing effort and separate target species.
Pelagic longlining	Longlining only occurs on the fringes of the site and therefore potential for spatial overlap is limited.

[14] Please refer to the 'Dorset MPAs In-Combination Assessment – Other Plans & Projects' document.

	Pelagic longlining has very limited potential for contact with the seabed and therefore the likelihood of physical abrasion is negligible. The very low potential for physical abrasion with respect to pelagic longlining and the lack of evidence to suggest negative impacts potting, mean the two activities in-combination are likely to lead to a likely a significant effect. The two activities target different species and therefore there are no in-combination effects with respect to the selective extraction of species. In addition, the level of fishing effort associated with pelagic longlining is very low, with up to five vessels operating within Studland to Portland SCI. In conclusion, there are unlikely to be any in-combination effects with commercial diving, due to the very low impact of pelagic longlining, low fishing effort and separate target species.
Commercial diving	Commercial diving may overlap spatially with potting activity over reef features. Commercial diving however is a very low impact activity and has very limited potential for physical abrasion, with the area affected likely to be negligible. The very low potential for physical abrasion with respect to commercial diving and the lack of evidence to suggest negative impacts of potting, mean the two activities in-combination are likely to lead to a likely significant effect. The two activities target different species and therefore there are no in-combination effects with respect to the selective extraction of species. In addition, the level of fishing effort associated with commercial diving is very low, with only five vessels operating within Studland to Portland SCI. In conclusion, there are unlikely to be any in-combination effects with commercial diving, due to the very low impact of commercial diving, low fishing effort and separate target species.

9. Summary of consultation with Natural England

Consultation	Date submitted	Response from NE	Date received
First draft (v1.1)	21/04/2016	Recommended amendments	12/05/2016
Revised draft in response to NE recommendations (v1.2)	20/06/2016	Accepted amendments	07/05/2016

10. Integrity test

It can be concluded that the activities in this habitat regulations assessment (pots/creels), alone or in-combination, do not adversely affect the integrity of the Studland to Portland SCI; and that future activity, if it remains similar to current levels, will not foreseeably have an adverse effect on the reef features/ sub-features of the SCI. The current mitigation measures, detailed in table 8, are therefore considered sufficient.

Annex 1: Reference list

Axelsson, M., Dewey, S., and Plastow, L., 2011. Dorset Integrated Seabed Survey: Drop-down camera (ground-truthing) survey report. J/09/180. Seastar Survey Ltd., Southampton.

Adey, J.M. 2007. Aspects of the sustainability of creel fishing for Norway lobster, *Nephrops norvegicus* (L.), on the west coast of Scotland. PhD thesis, University of Glasgow. 488 pp.

Coleman, R.A., Hoskin, M.G., von Carlshausen, E. & Davis, C.M. 2013. Using a no-take zone to assess the impacts of fishing: Sessile epifauna appear insensitive to environmental disturbances from commercial potting. *Journal of Experimental Marine Biology and Ecology*, **440**, 100–107.

Eno, N.C., MacDonald, D.S., Kinnear, J.A.M., Amos, S.C., Chapman, C.J., Clark, R.A., Bunker, F.St.P.D & Munro, C. 2001. Effects of crustacean traps on benthic fauna. *ICES Journal of Marine Science*, **58**, 11-203.

Hall, K., Paramor, O.A.L., Robinson, L.A., Winrow-Giffin, A., Frid, C.L.J., Eno, N.C., Dernie, K.M., Sharp, R.A.M., Wyn, G.C. & Ramsay, K. 2008. Mapping the sensitivity of benthic habitats to fishing in Welsh Waters: development of a protocol. CCW (Policy Research) Report No: 8/12. 85 pp.

Haynes, T., Bell, J., Saunders, G., Irving, R., Williams, J. & Bell. G. 2014. Marine Strategy Framework Directive Shallow Sublittoral Rock Indicators for Fragile Sponge and Anthozoan Assemblages Part 1: Developing Proposals for Potential Indicators. JNCC Report No. 524, Nature Bureau and Environment Systems Ltd. for JNCC, JNCC Peterborough.

Hoskin, M.G., Coleman, R.A., von Carlshausen, E. & Davis, C.M. 2011. Variable population responses by large decapod crustaceans to the establishment of a temperate marine no-take zone. *Canadian Journal of Fisheries and Aquatic Sciences*, **68**, 185-200.

JNCC & Natural England. 2011. Advice from the Joint Nature Conservation Committee and Natural England with regards to fisheries impacts on Marine Conservation Zone habitat features. 113 pp.

Lewis, C.F., Slade, S.L., Maxwell, K.E. & Matthews, T.R. 2009. Lobster trap impact on coral reefs: effects of wind-driven trap movement. *New Zealand Journal of Marine and Freshwater Research*, **43**, 1, 271–282.

MacDonald, D.S., Little, M., Eno, N.C. & Hiscock, K. 1996. Disturbance of benthic species by fishing activities: a sensitivity index. *Aquatic Conservation: Marine and Freshwater Ecosystems*, **6**, 257-268.

Natural England. 2013. Studland to Portland candidate Special Area of Conservation Formal Advice Under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010 (as amended). Version 6.5. 42 pp.

Rees, A. No Date. *The Lyme Bay Experimental Potting Project – How does commercial potting activity impact underwater reef habitats? MB5024: The Lyme Bay Experimental Potting Project*. [Online]. Available at: http://www.lymebayreserve.co.uk/download-centre/files/12693_MB52042PageSummary.pdf [Accessed 2016, 30th March]

Roberts, C., Smith, C., Tillin, H. Tyler-Walters, H. 2010. Review of existing approaches to evaluate marine habitat vulnerability to commercial fishing activities. Report: SC080016/R3.Environment Agency, Bristol. 150 pp.

Seafish. 2015. Basic fishing methods. A comprehensive guide to commercial fishing methods. August 2015. 104 pp.

Sheridan, P., Hill., R., Matthews, G., Appeldoorn, R., Kojis, B. & Matthews, T. 2005. Does Trap Fishing Impact Coral Reef Ecosystems? An Update. 56th Gulf and Caribbean Fisheries Institute, 511-519.

Shester, G.G. & Micheli, F. 2011. Conservation challenges for small-scale fisheries: Bycatch and habitats impacts of trap and gillnets. *Biological Conservation*, **144**, 1673-1681.

Stephenson, F., Fitzsimmons, C., Polunin, N.V.C., Mill, A.C. & Scott, C.L. 2015. Assessing Long-Term Benthic Impacts of Potting in Northumberland. Report to Natural England. 198 pp.

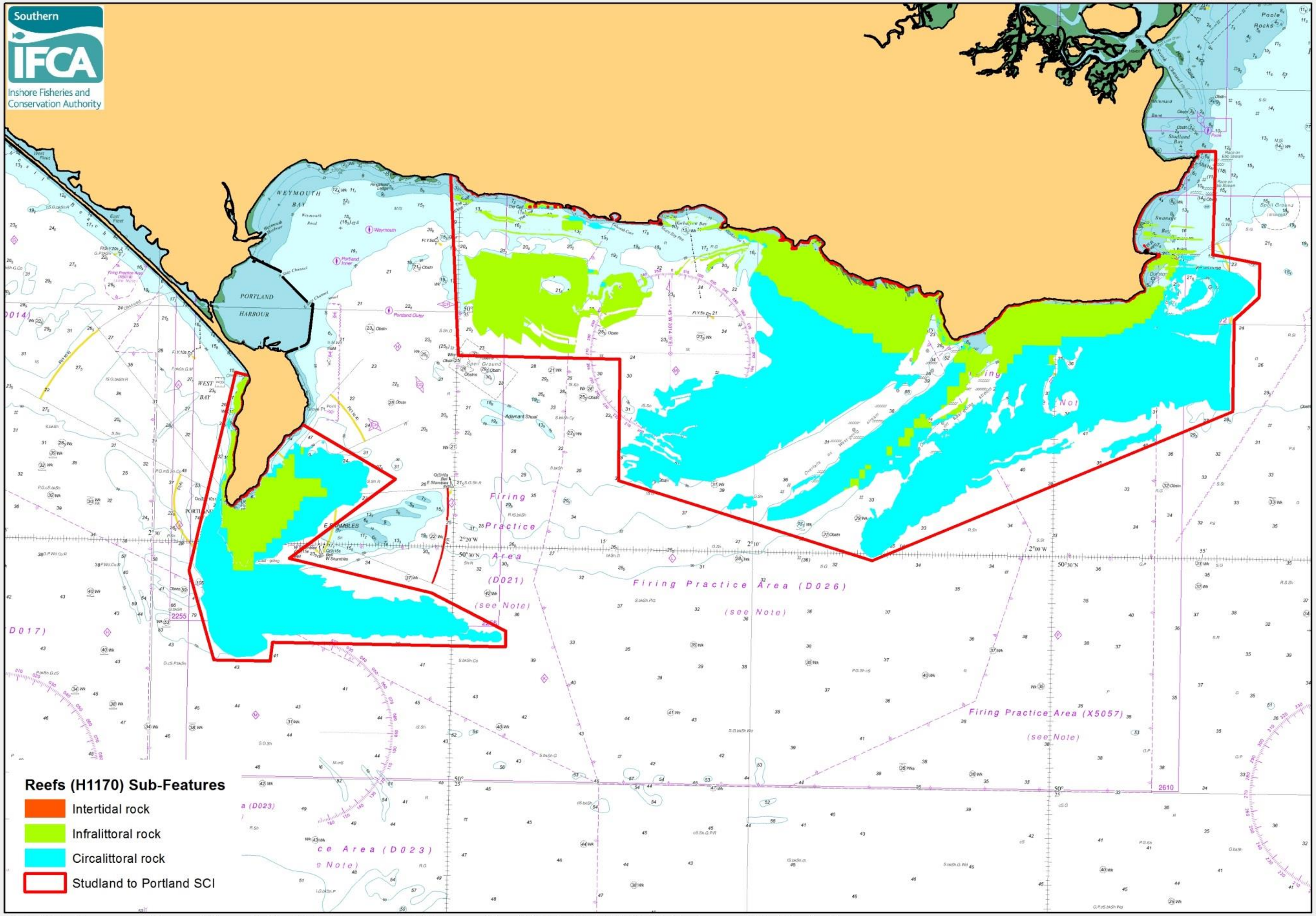
Tillin, H.M., Hull, S.C. & Tyler-Walters, H. 2010. Development of a Sensitivity Matrix (pressures-MCZ/MPA features). Report to the Department of Environment, Food and Rural Affairs (DEFRA) from ABPMer, Southampton and the Marine Life Information Network (MarLIN) Plymouth: Marine Biological Association of the UK. Defra Contract No. MB0102 Task 3A, Report No. 22. 947 pp.

Walmsley, S.F., Bowles, S.F., Eno , N.C. & West, N. 2015. Evidence for Management of Potting Impacts on Designated Features. Report prepared by: ABP Marine Environmental Research Ltd, Eno Consulting and Centre for Environment, Fisheries and Aquaculture Science. Funded by Department for Environment Food and Rural Affairs (Defra). 116 p.

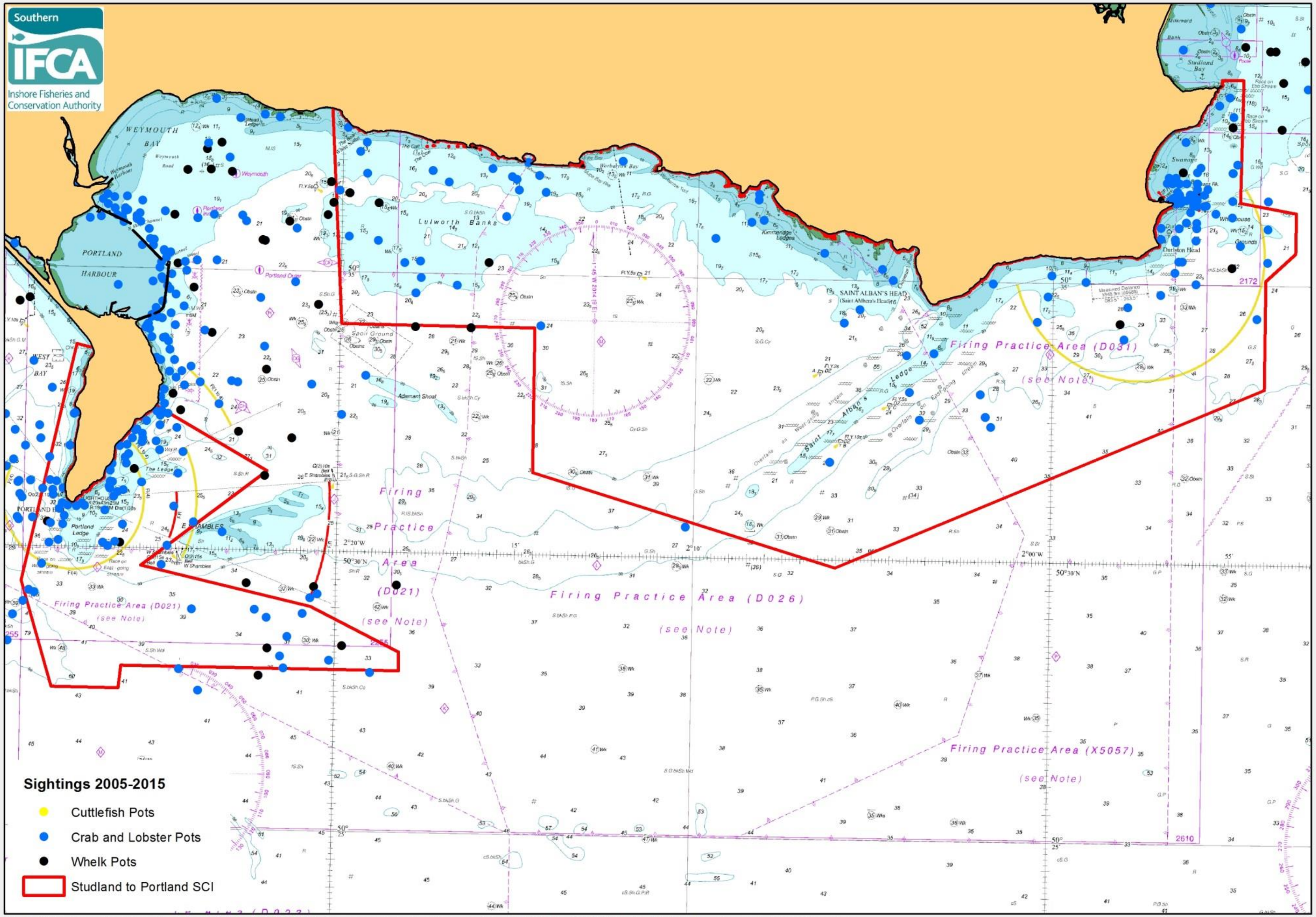
Wootton, E., Clegg, T., Woo, J. & Woolmer, A. 2015. Ecosystem niche review for species caught by commercial potting. 2015. Salacia-Marine Marine Ecological Consultancy. 119 pp.

Young, T. E. 2013. Assessing the impact of potting on chalk reef communities in the Flamborough Head European Marine Site. Report to the North Eastern Inshore Fisheries and Conservation Authority. MSc Thesis. Newcastle University. 74 pp.

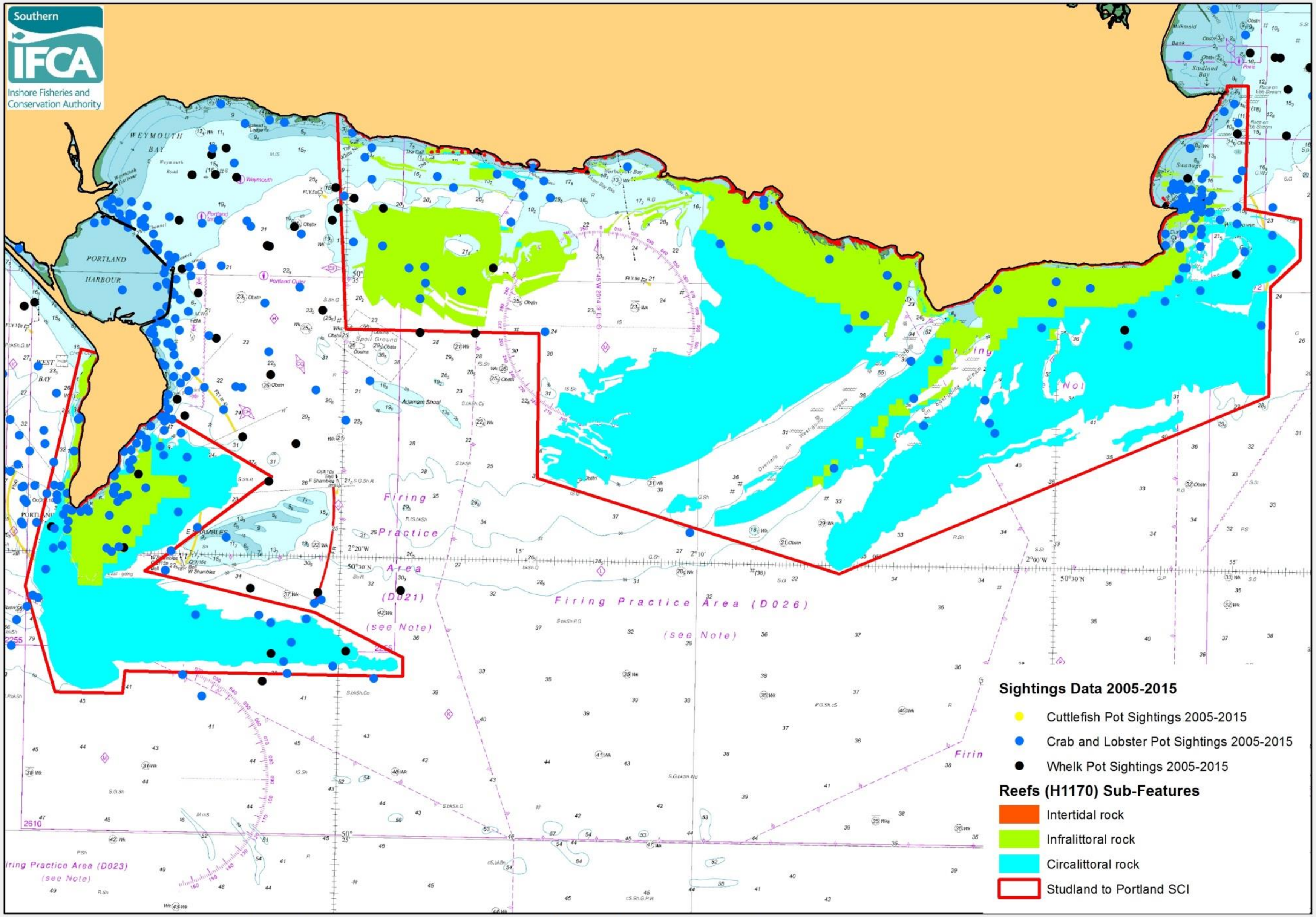
Annex 2: Site Feature/Sub-feature Map for Studland to Portland SCI.


Southern
IFCA
Inshore Fisheries and Conservation Authority
Reefs (H1170) Sub-Features
Intertidal rock
Infralittoral rock
Circalittoral rock
Studland to Portland SCI
PORTLAND HARBOUR
WEYMOUTH BAY
Firing Practice Area (D026)
Firing Practice Area (X5057)
Firing Practice Area (D021)

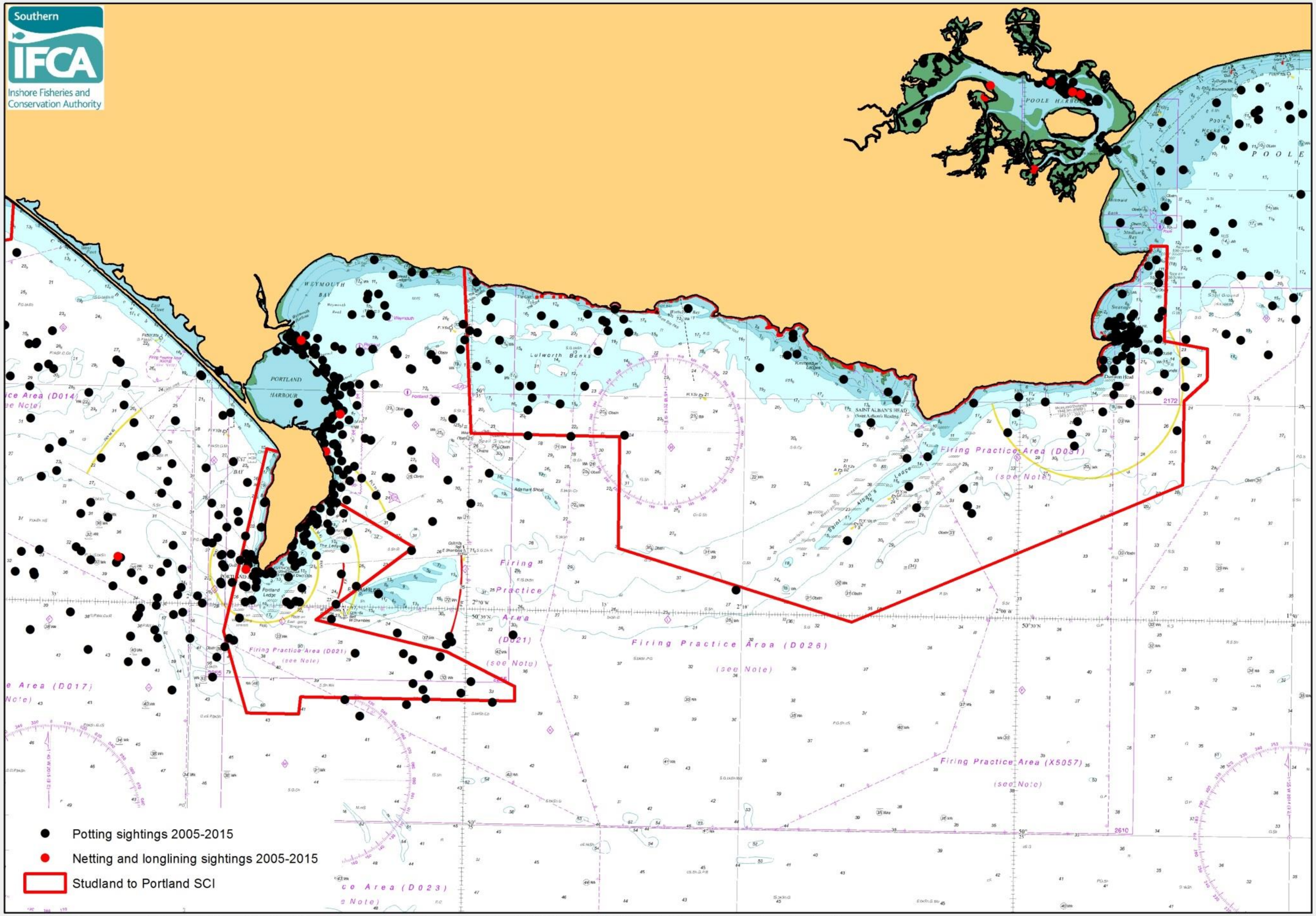
Annex 3: Fishing Activity Map using Potting (Crab/lobster, Whelk, Cuttlefish) Sightings Data from 2005-2015 in the Studland to Portland SCI.


Southern
IFCA
Inshore Fisheries and Conservation Authority
WEYMOUTH BAY
PORTLAND HARBOUR
Lulworth Banks
SAINT ALBAN'S HEAD
Swanage
Studland Bay
Durlston Head
Firing Practice Area (D021)
Firing Practice Area (D026)
Firing Practice Area (D031)
Firing Practice Area (X5057)
(see Note)
Sightings 2005-2015
Cuttlefish Pots
Crab and Lobster Pots
Whelk Pots
Studland to Portland SCI

Annex 4: Co-Location of Fishing Activity using Potting (Crab/lobster, Whelk, Cuttlefish) Sightings Data from 2005-2015 and Site Feature(s)/Sub-feature(s) in the Studland to Portland SCI.


Southern IFCA
Inshore Fisheries and Conservation Authority
Sightings Data 2005-2015
Cuttlefish Pot Sightings 2005-2015
Crab and Lobster Pot Sightings 2005-2015
Whelk Pot Sightings 2005-2015
Reefs (H1170) Sub-Features
Intertidal rock
Infralittoral rock
Circalittoral rock
Studland to Portland SCI
WEYMOUTH BAY
PORTLAND HARBOUR
Firing Practice Area (D026)
Firing Practice Area (D021)
(see Note)

Annex 5: Co-Location of Potting (Crab/lobster, Whelk, Cuttlefish) and Netting/Longlining Sightings Data from 2005-2015 in the Studland to Portland SCI.


Southern IFCA Inshore Fisheries and Conservation Authority
Potting sightings 2005-2015
Netting and longlining sightings 2005-2015
Studland to Portland SCI
POOLE HARBOUR
WEYMOUTH BAY
PORTLAND HARBOUR
Lulworth Banks
SAINT ALBAN'S HEAD
Firing Practice Area (D031)
Firing Practice Area (D026)
Firing Practice Area (D021)
Firing Practice Area (X5057)