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Southern Inshore Fisheries and Conservation Authority (IFCA)

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

European Marine Site: South Wight Maritime SAC

Feature: Reefs

Generic Sub-feature(s): Intertidal and subtidal chalk reef; Subtidal bedrock reef (exc. Chalk); Subtidal boulder and cobble reef

Site Specific Sub-Feature(s): Rocky shore communities; Subtidal faunal turf communities

Gear type(s) Assessed: Pots/creels

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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 Reefs of the South Wight Maritime SAC, and on the basis of this assessment whether or not it can be concluded that the '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

- South Wight Maritime Special Area of Conservation (UK0030061)

2.1 Overview and qualifying features

- H1170. **Reefs.**
    - Rocky shore communities
    - Kelp forest communities
    - Subtidal red algae communities
    - Subtidal faunal turf communities
- H1230. Vegetated sea cliffs of the Atlantic and Baltic coasts.
- H8330. Submerged or partially submerged sea caves.
    - Sea cave communities

[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/3194758

Please refer to Annex 2 for a site feature map.

The southern shore of the Isle of Wight, off the coast of southern England, includes a number of subtidal **reefs** that extend into the intertidal zone. This site is selected on account of its variety of reef types and associated communities, including chalk, limestone and sandstone reefs. To the west and south-west some of the most important subtidal British chalk reefs occur, representing over 5% of Europe's coastal chalk exposures, including the extensive tide-swept reef off the Needles and examples at Culver Cliff and Freshwater Bay. These support a diverse range of species in both the subtidal and intertidal. Other reef habitats within the site include areas of large boulders off the coast around Ventnor. There is a large reef of harder limestone off Bembridge and Whitecliff Bay, where the horizontal and vertical faces and crevices provide a range of habitats. The bedrock is extensively bored by bivalves. Their presence, together with the holes they create, give shelter to other species, which adds further to habitat diversity. Intertidal pools support a diverse marine life, including a number of rare or unusual seaweeds, such as the shepherd's purse seaweed *Gracilaria bursa-pastoris*. A number of other species reach their eastern limit of distribution along the English Channel at the Isle of Wight.

2.2 Conservation Objectives

The Conservation Objectives for the South Wight Maritime SAC features:

- H1170. Reefs
- H1230. Vegetated sea cliffs of the Atlantic and Baltic coasts
- H8330. Submerged or partially submerged sea caves

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 objectives for the South Wight Maritime SAC are available online at: http://publications.naturalengland.org.uk/publication/6242150467502080

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 South Wight Maritime SAC there is one large prohibited area which covers 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.

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

4. Information about the fishing activities within the site

4.1 Activities under Consideration/Summary of Fishery

Potting occurs all year round within the South Wight Maritime SAC. Potting targets crustaceans (edible crab and European lobster) and whelks and the pots used differ for each target species. Potting for crab and lobster is the most common activity, followed by whelks.

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 South Wight Maritime SAC. 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

There is limited information on the number of pots worked by each vessel. The number of pots worked by each vessel and the number of pots in a string can largely vary and is often related to vessel size. Smaller vessels, less than 8m in length, are thought to work between 50 and 100 crab and lobster pots. Larger fishing vessels (some of which operate out of Ventnor) may not always fish within the SAC and will deploy gear in surrounding areas, typically further offshore.

Potting for crab and lobster occurs subtidally, typically over harder rocky ground and is widespread throughout the site. Key areas of activity include Bembridge Ledges, where up to 6 vessels can be observed at any one time, and Sandown Bay. In other areas, up to 1 or 2 vessels may be seen at any one time. The activity also occurs on the south west side of the Isle of Wight and although to a lesser extent than the aforementioned areas, the activity is consistent in this area at low to moderate levels.

Southern IFCA sightings data presented in Annex 4 is largely in agreement with information presented above regarding the location of potting for crab and lobster. The greatest number of sightings are present in an area known as Bembridge Ledges, east of Bembridge and to a lesser extent in the northern half of Sandown Bay. The numbers of sightings on the south west side of the Isle of Wight are less than that on the south east side. On the southwest side of the Isle of Wight, sightings are present in the area slightly north of the Needles and to a lesser extent in Compton Bay. There appears to be a distinct lack of sightings to the south of the island, however this may be more a reflection of the lack of patrols in this area. 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.

It is difficult to determine exactly how many vessels pot for crab and lobster within the SAC. Based on knowledge of the area it may be up to 23 boats (details provided in table 1). These vessels operate out of five ports within the Solent and include Bembridge, Ventnor, Yarmouth, Lymington and Langstone Harbour.

Table 1. Details of fishing vessels that are berthed within the Solent and known to pot for crab and lobster.

Area	No. of Vessels	Size
Bembridge	5 to 10	One at 12 metres One at 10 metres Majority <8 metres
Ventnor	Up to 5	All at 10 metres
Yarmouth	3	One >10 metres One <10 metres
Lymington	3 to 4	All at 10 metres
Langstone Harbour	1	Unknown

There is limited information on the potting for whelks within the SAC as there are a limited number of vessels which are involved in the fishery, the numbers of which are uncertain. The extent of the fishery within the site is an extension of that which takes place in the wider Solent and the boundaries of which are unclear. The activity is known to occur over a different substrate to that for crab and lobster potting and is often characterised by coarse sediment. Within the SAC, the activity is largely concentrated on the south east side of the island as this is where more suitable substrate is thought to occur. More specific areas include Sandown Bay and the south side of the Warner Shoal.

Southern IFCA sightings data presented in Annex 4 support the limited information known on the location of whelk potting within the SAC. All sightings data, which is sparse, are concentrated on the south east side of the Isle of Wight, except for one sighting located to the west of the Needles. These sightings generally occur further offshore than potting for crab and lobster.

Landings data provided by the Marine Management Organisation (MMO) show the greatest quantities of edible crab and lobster caught between 2005 and 2014 were largely landed into the Isle of Wight, except during 2009 for lobsters and 2005, 2013 and 2014 for edible crab. No whelks were landed into the Isle of Wight from 2009 onwards. The highest quantities of whelk were landed in 2007 at 832 tonnes and were relatively consistent between 2008 and 2014 fluctuating between 290 and 435 tonnes, with a steady increase from 2011 onwards. The quantities of edible crab and lobster appear to show opposing fluctuating trends. Landings of edible crab dipped in 2009 to 90 tonnes, before peaking in 2012 at 166 tonnes and dipping again in 2014 to their lowest at 45 tonnes. Landings of lobster on the other hand peaked in 2010 at 63 tonnes before showing a downward trend thereafter.

Table 2. Landings (in tonnes) from 2005 to 2014 of target species (edible crab, European lobster, whelk) into ports located or close to South Wight Maritime SAC 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	Isle of Wight	82.80	78.94	81.08	73.49	64.21	64.12	94.01	119.37	38.84	9.40
	Lymington and Keyhaven	123.82	77.85	55.94	42.36	26.27	28.99	45.62	47.01	44.51	36.50
	Total	206.62	156.78	137.02	115.85	90.48	93.11	139.63	166.38	83.34	45.89
European lobster	Isle of Wight	13.15	25.01	23.32	15.05	13.55	56.71	25.27	19.13	8.02	3.69
	Lymington and Keyhaven	8.99	14.99	9.72	8.89	44.40	7.06	6.63	5.76	2.88	4.36
	Total	22.13	40.00	33.04	23.94	57.95	63.77	31.90	24.89	10.89	8.05
Whelk	Isle of Wight	4.32	56.04	378.44	35.04	0.26	0.78	1.11	1.28	0.31	0.11
	Lymington and Keyhaven	27.55	130.77	453.64	385.69	290.39	337.16	263.68	336.47	343.90	435.02
	Total	31.87	186.82	832.08	420.73	290.65	337.94	264.79	337.76	344.21	435.13

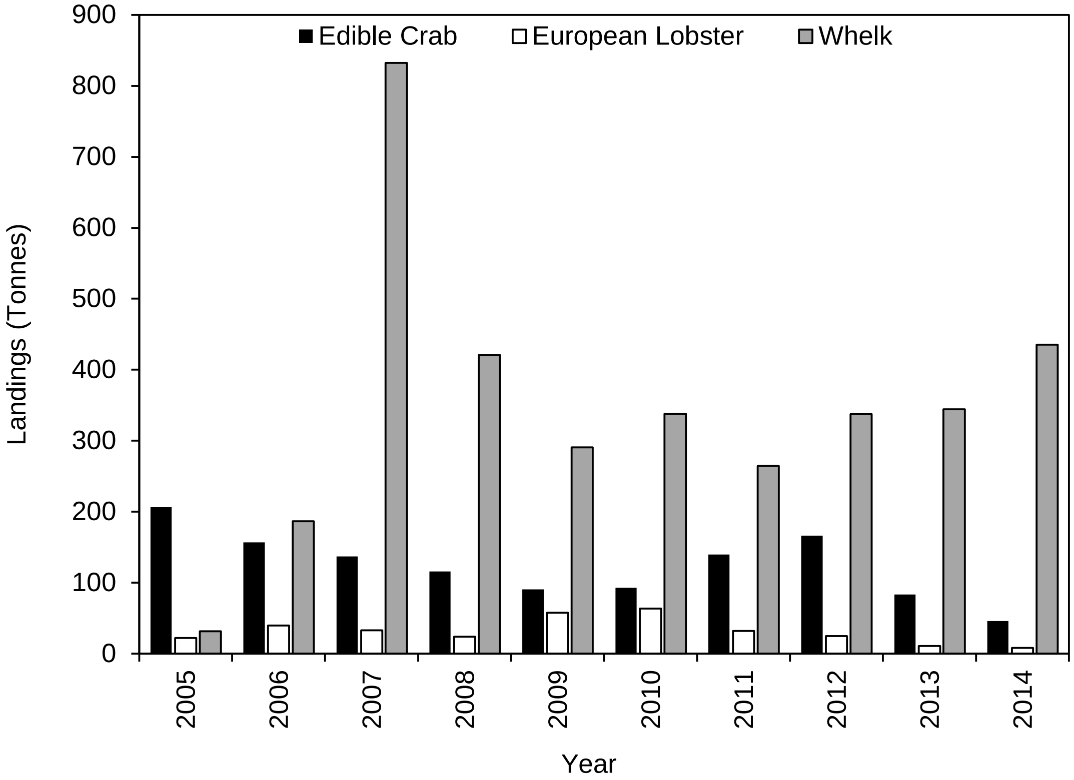


Figure 3. Total landings (in tonnes) from 2005 to 2014 of target species (edible crab, European lobster, whelk) into ports (Isle of Wight, Lymington and Keyhaven) located within or close to South Wight Maritime SAC caught by UK vessels using traps and pots. Data was provided by the Marine Management 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 3 and 4.

5.1 Table 3: Summary of LSE Assessment (Intertidal and subtidal chalk 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>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 33 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. Toxic contamination – introduction of synthetic compounds/ Hydrocarbon & PAH contamination/ Introduction of other substances/ Synthetic compound contamination/ Transition elements & organo-metal contamination
6. Non-toxic contamination – changes in nutrient and organic loading
7. Non-toxic contamination – changes in turbidity
8. Biological disturbance – introduction of non-native species and translocation/ Introduction or spread of non-indigenous species
9. Biological disturbance – selective extraction of species/ Removal of non-target species
10. Interim Conservation Advice only: Litter
11. Interim Conservation Advice only: Penetration and/disturbance of the substrate below the surface of the seabed, including abrasion</td></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 the contact of the gear with feature during deployment/retrieval and any subsequent movement of gear including ground ropes and weights, from currents or storm action. Overall, sensitivity and vulnerability of rocky shore communities to physical abrasion is moderate. Most of the reef sub-features, especially those in more wave exposed areas of the coastlines, have natural adaptations to the high energy physical environment to which they are often subjected and are consequently less sensitive to abrasion than more sheltered areas. If local damage is intensive or persistent this may be detrimental to the favourable condition of the reefs interest feature in relation to its structure and function. The soft nature of the substrate however means the substrate is considered vulnerable to erosion by abrasion. Despite this, generic sensitivity assessments deemed the feature to have low sensitivity to low intensity potting and low sensitivity to physical abrasion for subtidal chalk. Some infauna may be relatively resistant to fishing impacts. For example, sensitivity assessments recognised that species that are able to bore into chalk reefs, such as piddocks, which are recognised as a key biotope within the SAC, are predicted to be relatively unaffected by static fishing gear. Emergent fauna can be tangled, damaged or removed by setting and hauling pots. A recent study assessed the impact of physical disturbance from lobsters pots on chalk reef communities in the Flamborough Head EMS. The study revealed statistically significant differences on community assemblage between a no take zone (NTZ) and fished site, with a higher abundance of benthic taxa inside of the NTZ and higher percentage of bare substrate in the fished site. Species known to occur within this habitat which may be more sensitive, including *Flustra foliacea*, this species is classed as 'moderately fragile' with a 'moderate' recovery potential. Benthic communities may be relatively unaffected by static gear due to the relatively small area of seabed which is directly affected. Further investigation is required to determine the severity and magnitude of this pressure, including spatial scale and activity intensity considerations.

	5.	OUT – Insufficient activity levels to pose risk of large scale pollution event.
	6.	OUT – The activity will not lead to any change sin nutrient or organic loading and therefore there is no direct interaction between the pressure and feature under assessment.
	7.	OUT – The activity is considered unlikely to lead to siltation and therefore will not lead to changes in turbidity.
	8.	OUT – The fleet operates within the local area, so the introduction or translocation of non-indigenous species is considered unlikely.

	9.	OUT – The selective extraction of species refers to the removal of species or community and includes the removal of a specific species, community or key species in the biotope. Reef communities are moderately sensitive and vulnerable to selective extraction which includes the removal of shellfish. The removal of a particular species or predators from a marine food web may not only affect the population but also have indirect effects on associated species and may also disrupt the functioning and stability of reef communities. It is difficult to assess the likely impact of selective extraction. Potting targets the removal of whelks, edible crab and European lobster. The edible crab is not considered a key stone species and its removal would not be considered detrimental to overall ecosystem function, stability and resilience. The European lobster is considered to be moderately-heavily exploited around English coasts, so current ecosystems are functioning under low levels of *H. gammarus* habituation. The 'sliding baseline' phenomenon makes it unfeasible to access the impact of the species removal on ecosystem structure, function and stability. When the species is freed from top-down controls from fishing, the population expands at the expense of other others and therefore lower populations may be beneficial to community biodiversity and maintain ecosystem function and stability. The common whelk, *Buccinum undatum,* belong to a large 'functional' group of species with regards to ecosystem structure and function and so other species could conveniently fill the ecological niche of the species if it were removed. It appears as though the removal of these species is unlikely to disrupt the functioning and stability of chalk reef communities. In addition to this, 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. Based on the lack of evidence to suggest the removal of target species will have a deleterious impact on reef communities, combined with the selectivity of pots and other management measures to safe guard the population of target species, the activity is unlikely to have a significant impact through the selective extraction of species.

	10.	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.
	11.	OUT –Anchoring occurs on an infrequent basis. The area of the feature affected by the pressure is therefore 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 33 Conservation Advice:** Rocky shore communities: - Range and distribution of characteristic biotopes **Interim Conservation Advice** (Generic Feature Frameworks Workbook – September 2015): Littoral chalk communities: - Distribution: presence and spatial distribution of littoral chalk communities - Structure: presence and abundance of typical species - Structure: species composition of component communities Subtidal chalk: - Distribution: presence and spatial distribution of subtidal chalk 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.	

5.2 Table 4: Summary of LSE Assessment (Subtidal bedrock reef (exc. Chalk) & 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

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

<table>
<tr><td rowspan="4">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 33 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. Toxic contamination – introduction of synthetic compounds/ Hydrocarbon & PAH contamination/ Introduction of other substances/ Synthetic compound contamination/ Transition elements & organo-metal contamination
6. Non-toxic contamination – changes in nutrient and organic loading
7. Non-toxic contamination – changes in turbidity
8. Biological disturbance – introduction of non-native species and translocation/ Introduction or spread of non-indigenous species
9. Biological disturbance – selective extraction of species/ Removal of non-target species
10. Interim Conservation Advice only: Litter
11. Interim Conservation Advice only: Penetration and/disturbance of the substrate below the surface of the seabed, including abrasion</td></tr>
</table>

<table>
<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 the contact of the gear with feature during deployment/retrieval and any subsequent movement of gear including ground ropes and weights, from currents or storm action. Overall, sensitivity and vulnerability of subtidal faunal turf communities to physical abrasion is moderate. Most of the reef sub-features, especially those in more wave exposed areas of the coastlines, have natural adaptations to the high energy physical environment to which they are often subjected and are consequently less sensitive to abrasion than more sheltered areas. If local damage is intensive or persistent this may be detrimental to the favourable condition of the reefs interest feature in relation to its structure and function. Further investigation is required to determine the severity and magnitude of this pressure, including spatial scale and activity intensity considerations.
	5.	OUT – Insufficient activity levels to pose risk of large scale pollution event.
	6.	OUT – The activity will not lead to any change sin nutrient or organic loading and therefore there is no direct interaction between the pressure and feature under assessment.
	7.	OUT – The activity is considered unlikely to lead to siltation and therefore will not lead to changes in turbidity.
	8.	OUT – The fleet operates within the local area, so the introduction or translocation of non-indigenous species is considered unlikely.

	9.	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. Reef communities are moderately sensitive and vulnerable to selective extraction which includes the removal of shellfish. The removal of a particular species or predators from a marine food web may not only affect the population but also have indirect effects on associated species and may also disrupt the functioning an stability of reef communities. It is difficult to assess the likely impact of selective extraction. Potting targets the removal of whelks, edible crab, European lobster and potentially cuttle fish. 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.
	10.	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.
	11.	OUT – Anchoring occurs on an infrequent basis. The area of the feature affected by the pressure is therefore likely to be minimal and recovery from any effects would be highly likely due to the infrequent nature of anchoring.

<table>
<tr><td>4. What key attributes of the site are likely to be effected by the identified pressure(s)?</td><td colspan="2">Regulation 33 Conservation Advice:

Subtidal faunal turf communities:
- Extent and distribution of characteristic biotopes
- Species composition of characteristic biotope

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</td></tr>
<tr><td>5. Potential scale of pressures and mechanisms of effect/impact (if known)</td><td colspan="2">Refer to full LSE</td></tr>
<tr><td>6. Is the potential scale or magnitude of any effect likely to be significant?</td><td>Alone

Yes</td><td>OR In-combination[11]

N/A</td></tr>
<tr><td>7. Have NE been consulted on this LSE test? If yes, what was NE's advice?</td><td colspan="2">Please refer to letters from Natural England dated 12/01/16 & 01/03/16.</td></tr>
</table>

[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 feature data used in Annex 4 uses broad scale habitat types based on interpretation of acoustic datasets with additional groundtruthing. When using the 2013 dataset, certain areas of low confidence were highlighted and habitat types described as 'gravel and mixed sediment' were considered to potentially contain reef features. Based on this, areas mapped as 'gravel and mixed sediment' will be considered to contain reef features. Best available evidence from the Bembridge rMCZ broadscale habitat map will also be used to help determine the habitat type over which the activity occurs. This broadscale habitat map of the Bembridge rMCZ illustrates that Sandown Bay is made up of many different habitat types. The patchwork of each habitat type makes it hard to specify which habitat type whelk potting is likely to occur over. Based on knowledge of the fishery however it is most likely to take place over areas of coarser sediment rather than reef habitat.

The Bembridge rMCZ broadscale habitat map shows that Bembridge Ledges, where the largest proportion of sightings occur, is largely made up of moderate energy circalittoral rock. As stated above, the patchwork of different habitat types in Sandown Bay make it hard to determine which habitat type potting for crab and lobster occur over.

On the south west side of the Isle of Wight, all sightings occur almost exclusively over bedrock and boulders, with those to the north of the Needles occurring on the boundary between bedrock and boulders and gravel and mixed sediments.

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 South Wight Maritime SAC physical abrasion and its subsequent impact on the benthic environment and through the selective extraction of species (for subtidal faunal turf communities only). 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 5 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 5. 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

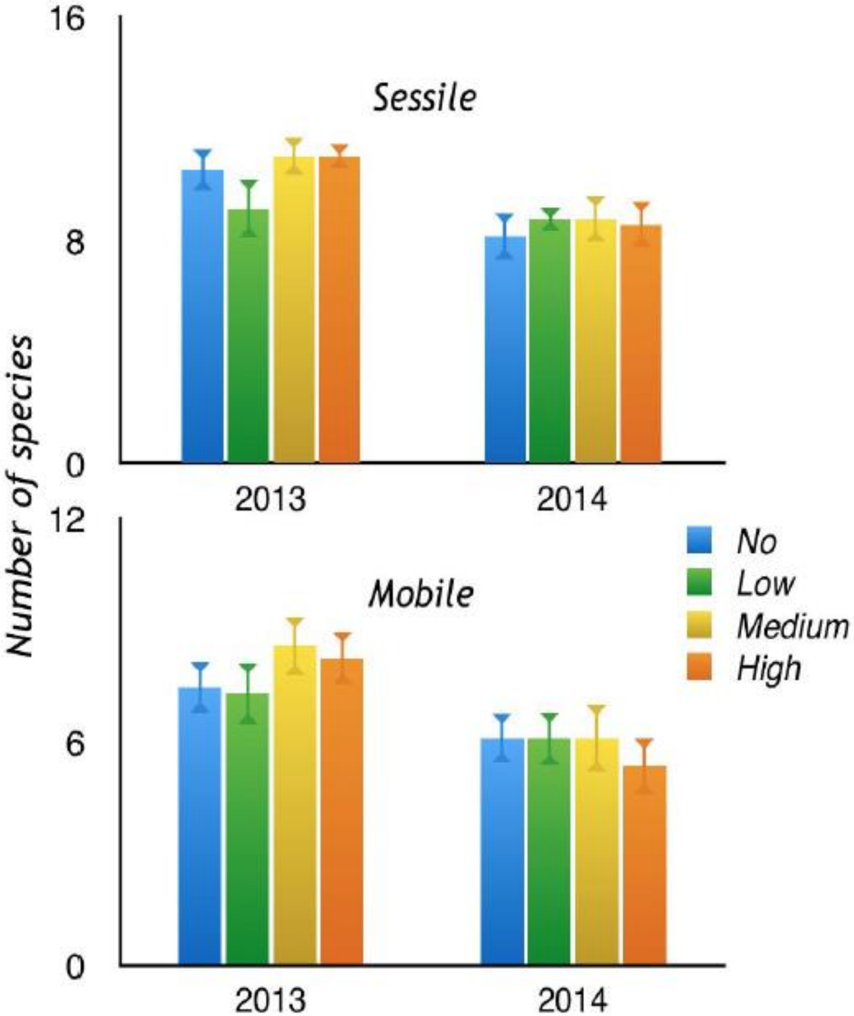
Haynes *et al*. (2014) compared a dataset on the abundance of five sponge species (*Axinella dissimilis*, *Axinella infundibuliformis*, *Haliclona oculata*, *Stelligera stuposa* and *Raspailia ramosa*) from the Skomer Marine Nature Reserve collected during the autumn of 2006, 2008 and 2009, to pot density 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



species between 2013-14 in Lyme Bay, prior to and after a period of extreme weather (December 2013 to March 2014).

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.

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:

<u>Edible/Brown crab – *Cancer pagurus*</u>
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.

<u>European lobster – *Homarus gammarus*</u>
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.

<u>Velvet swimming crab – *Necora puber*</u>
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.

<u>Cuttlefish – *Sepia officinalis*</u>
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 South Wight Maritime SAC are detailed in Table 6. 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. Please 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 grounds and which also occur within the South Wight Maritime SAC.

Table 6. Likely sensitivity of some species (which occur within the South Wight Maritime SAC) 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**
Alcyonium digitatum	Dead man's fingers	1	2	5	Intermediate	High	Low
Cliona celata	A boring sponge	2	2	11	-	-	-
Flustra foliacea	Hornwrack	2	2	11	Intermediate	High	Low

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 and high for fragile sponge and anthozoan communities on subtidal rocky habitats (Table 7). 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 8). Underboulder communities on lower shore and subtidal boulders and cobbles was the least sensitive with low sensitivity to heavy, moderate and light gear intensities.

Table 7. 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)
Subtidal chalk	Low (Low)	Pressure screened out for this sub-feature.

Table 8. 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
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.

The most recent condition monitoring of the South Wight Maritime SAC was undertaken in 2003 and 2004 to look at the extent and diversity of selected biotopes of subtidal reefs (Bunker *et al*., 2005). The study was designed to enable the condition of kelp forest communities, subtidal red algae and subtidal faunal turf communities to be assessed in line with targets for each sub-feature. Comparisons were made with data collected from other surveys since 1997. The study concluded that the species composition faunal turf communities did not significantly deviate from the baseline. Species rich faunal communities were found on bedrock reefs and in areas with large boulders. The majority of biotopes recorded in 1994 were present in 2004. The species noted that faunal species composition of the recorded faunal turf communities will change markedly from year to year and this should be considered with respect to monitoring targets.

6.4 Existing Management Measures

- **Bottom Towed Fishing Gear Byelaw** – prohibits bottom towed fishing gear over sensitive reef features within the South Wight Maritime SAC.
- **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.
- **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.
- **Voluntary Escape Gap 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.

- **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 9: Summary of Impacts

The potential pressures, associated impacts, level of exposure and mitigation measures are summarised in table 9. 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]
Reefs	Rocky shore communities (site-specific); Intertidal and subtidal chalk reef (generic)	Range and distribution of characteristic biotopes	Range and distribution of characteristic biotopes should not deviate significantly from an established baseline, subject to natural	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	Up to 23 vessels commercially licensed fishing vessels may pot for crab and lobster within the site, with the majority of these all 10 metres or less in length. This number has remained relatively constant over the past five years. The number of vessels potting for whelks is unknown as the activity is not regular and there are a limited number involved. The number of crab and lobster pots worked by each vessel largely varies and often relates to vessel size. Smaller vessels work a lower	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.

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

			change.	species which often have slow growth and are vulnerable to physical disturbance. Some infauna may be relatively resistant to fishing impacts as species that are able to bore into chalk reefs, such as piddocks, are predicted to be relatively unaffected by static fishing gear. 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; 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). Only one of these studies was based on chalk reef	number of pots (50 to 100). Landings of target species show a fluctuating trend for both edible crab and European lobster. European lobster landings have declined since 2011 whilst landings of edible crab peaked in 2012, followed by sharp decline in following years. Colocation of sightings data and feature mapping reveal that the vast majority of sightings for crab and lobster potting largely take place over reef features (as would be expected by the nature of the target species). In certain areas it is difficult to determine which habitat type the activity occurs over due to the patchwork of different habitat types. The level of whelk potting sightings within the SAC is however very low and the patchwork each habitat type make it hard to specify which habitat the activity occurs over. Sensitivity analyses of species which occur within the SAC do not highlight any species as being particularly sensitivity to low intensity gears and physical disturbance and abrasion. Existing scientific literature and ongoing studies suggest the impact	

				communities in Flamborough Head EMS (Young *et al*., 2013). Results of this study reported a higher abundance of benthic taxa in non-fished sites when compared to fished sites and a slightly higher percentage of bare substrate (7.2%) in 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. A period of extreme weather during a study based in Lyme Bay also compounded results; with damage to benthic habitats to be far in excess that of the impacts of potting (report by Adam Rees).	of potting on benthic communities is negligible or limited in extent. The results of the only study to investigate the impact of potting on chalk communities should be interpreted with caution as a result of adverse weather during the study period which led to a degree of uncertainty. 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	Subtidal faunal turf communities (site-specific); Subtidal bedrock reef (exc. Chalk) (generic); Subtidal	Extent and distribution of characteristic biotopes	Extent and distribution of characteristic biotopes should not deviate significantl	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,	Up to 23 vessels commercially licensed fishing vessels may pot for crab and lobster within the site, with the majority of these all 10 metres or less in length. This number has remained relatively constant over the past five years. The number of vessels potting for whelks is unknown as the activity is	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.

	boulder and cobble reef (generic)		y from an established baseline, subject to natural change.	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; 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).	not regular and there are a limited number involved. The number of crab and lobster pots worked by each vessel largely varies and often relates to vessel size. Smaller vessels work a lower number of pots (50 to 100). Landings of target species show a fluctuating trend for both edible crab and European lobster. European lobster landings have declined since 2011 whilst landings of edible crab peaked in 2012, followed by sharp decline in following years. Colocation of sightings data and feature mapping reveal that the vast majority of sightings for crab and lobster potting largely take place over reef features (as would be expected by the nature of the target species). In certain areas it is difficult to determine which habitat type the activity occurs over due to the patchwork of different habitat types. The level of whelk potting sightings within the SAC is however very low and the patchwork of each habitat type make it hard to specify which habitat the activity occurs over. Sensitivity analyses of species which occur within the SAC do not	

					highlight any species as being particularly sensitivity to low intensity gears and physical disturbance and abrasion. 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	Subtidal faunal turf communities (site-specific); Subtidal bedrock reef (exc. Chalk) (generic); Subtidal boulder and cobble reef (generic)	Species composition of characteristic biotope.	Presence and abundance of composite species should not deviate significantly from an established baseline, subject to 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	Up to 23 vessels commercially licensed fishing vessels may pot for crab and lobster within the site, with the majority of these all 10 metres or less in length. This number has remained relatively constant over the past five years. The number of vessels potting for whelks is unknown as the activity is not regular and there are a limited number involved. The number of crab and lobster pots worked by each vessel largely varies and often relates to vessel size. Smaller vessels work a lower number of pots (50 to 100). Landings of target species show a fluctuating trend for both edible crab and European lobster. European lobster landings have	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

				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). 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	declined since 2011 whilst landings of edible crab peaked in 2012, followed by sharp decline in following years. 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 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 largely take place over reef features (as would be expected by the nature of the target species). In certain areas it is difficult to determine which habitat type the activity occurs over due to the patchwork of different habitat types. The level of whelk potting sightings within the SAC is however very low and the patchwork each habitat type makes it hard to specify which habitat the activity occurs over. Studies looking into the likely impacts of the selective extraction of the target species conclude limited potential for adverse ecological effects.	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 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).

				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.		

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). Young *et al*. (2013) is currently the only study known that is on chalk reef communities (based in Flamborough Head EMS). The results of this study reported adverse effects on this reef type, with a higher abundance of benthic taxa in non-fished sites when compared to fished sites and a slightly higher percentage of bare substrate (7.2%) in fished sites. 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, revealed that potting for crab and lobster is largely concentrated relatively close inshore over areas of characterised by reef features. The patchwork of different habitat types in certain areas and low confidence in the feature data for certain habitat types make it harder to determine which habitat type potting for crab and lobster occurs over. This is also true for the very low number of whelk sightings within the SAC.

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 South Wight Maritime SAC. Potting can occur all year round but is likely to be higher during the summer months and is undertaken by up to approximately 23 vessels, the majority of which are under 10 metres in length. 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, the majority of higher are smaller vessels (<10m), it is deemed that potting for crab, lobster, and whelks within the South Wight Maritime SAC 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 IFCAs 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 from IFCOs. The need for assessments will be reviewed should new evidence relevant to this gear/feature interaction become available.

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

8. In-combination assessment

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

Commercial plans and projects that occur within or may affect the South Wight Maritime SAC are considered in section 8.1. The impacts of these plans or projects require a Habitat Regulations Assessment in their own right, accounting for any in-combination effects, alongside existing fisheries activities.

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 8.2. Any fishing activities that were screened out as part of the revised approach assessment process will not be considered (see South Wight Maritime SAC screening summary for details of these activities). In the South Wight Maritime SAC, 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 plans and project

Project details	Status	Potential for in-combination effect
Queen Elizabeth aircraft carrier capital dredge	Consented and underway	Relevant impact pathways identified in relation to this project includes increase in suspended sediment concentrations and increase in sedimentation rates. Approximately 3.2 million cubic metres of capital dredge material will be disposed of at the Nab Tower which is located approximately 5 to 6 km outside the south east boundary of the South Wight Maritime SAC. This will lead to an increase level in suspended sediment and associated siltation of fine sediment on sensitive habitats which will result in local smothering. A likely significant effect on the South Wight Maritime SAC reef features was concluded. Modelling of dredged material revealed concentrations of suspended sediment decaying to 1000 mg/l 25 minutes after disposal and returning to background levels within an hour and a half. The modelling predicts that fourteen days after disposal accumulations would not exceed 4mm at any time beyond approximately 15 kilometres inshore of the disposal site; the accumulation of sediment would not exceed 4mm at any time beyond approximately 15 kilometres inshore of the disposal site. There is no evidence to indicate that reef communities have been adversely affected by previous disposal activities at the Nab Tower site. The appropriate assessment concluded that the approach channel dredge will not have an adverse effect on the integrity of the site.

		Monitoring will be undertaken, including the establishment of baseline conditions prior to any disposals and specification for modelling forms part of the marine licence. Physical loss/damage as a result of smothering and siltation was screened out at a tLSE level as the activity was not considered to cause such impacts. The project and the activity considered do therefore not share common impact pathways and no adverse effect on site integrity was concluded will not lead to in-combination effects from an increase in suspended sediment concentrations and subsequent smothering effects.
Perpetuus tidal energy centre	In planning	Relevant impact pathways identified in relation to this project includes damage to intertidal and subtidal habitats. Construction activities may include the removal of rock by trenching or directional drilling for installation of onshore cables which may lead to a number of impacts including habitat loss and disturbance of the seabed and seashore ecology and loss of structure of geology. The length of the subsea export cable across the seabed is 23 km with a footprint of 5,980m^2. Between landfall and 1 km from shore, the cable will be buried, most likely using ROV jetting and from 1 to 4 km from shore, burial may be possible in areas of gravelly sands. Trenching for cables will be up to 1.5m deep and not extend into bedrock geology. In areas of rock, cables will be surface laid and may be protected in the form of split pipe sleeves, rock bags or concrete mattresses. A combined footprint of rock bags or mattresses is estimated to have a footprint of 1500m^2.Material that is excavated will be reinstated following cable installation. Worst case scenario of disturbance to intertidal and near shore subtidal habitat, gives a footprint of 5000m^2. Disturbance will be temporary during installation and the trench will be backfilled using original materials. The area of disturbance within the SAC is calculated to be 0.32km^2 or 0.16% of the site. Embedded mitigation measures for the installation of onshore cables during construction include routing to avoid key reef features, other areas where rapid variations in bathymetry could represent reef feature, cable protection to prevent the cable from moving and surface laying where possible to reduce the need for drilling, blasting or jetting a cable trench. Due to the small scale of onshore works and

		following best practice measures, impacts associated with the project are not expected to be significant. It was concluded that impacts on the SAC were at worse of negligible significance[14]. Where the cable intersects the SAC mitigation measures apply. Based on the assessment that damage to intertidal and subtidal habitats within the SAC (as a result of the project) are likely to be a negligible significance, and the lack of evidence to suggest potting has an adverse effect on reef features, it is unlikely that two will result in any significant in-combination effects.

8.2 Other fishing activities

Fishing activity	Potential for in-combination effect
Demersal netting and longlining	Annex 5 shows that netting and longlining overlaps 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 lower when compared with potting. The number of commercially licensed vessels engaged is netting and longlining is unknown, however a number of the vessels are known to also engage in other fishing activities including potting. This means that fishing effort of a number of 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, due to the low impact of the gear, relatively low fishing effort and separate target species.

[14] No discernible change in receptor condition.

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 South Wight Maritime SAC; 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 SAC. The current mitigation measures, detailed in table 9, are therefore considered sufficient.

Annex 1: Reference list

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.

Bunker, F., Mercer, T. & Christine, H. 2005. Isle of Wight European Marine Site Sublittoral Monitoring 2003-2004. English Nature Contract No. FST20-46-16. 127 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.

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.

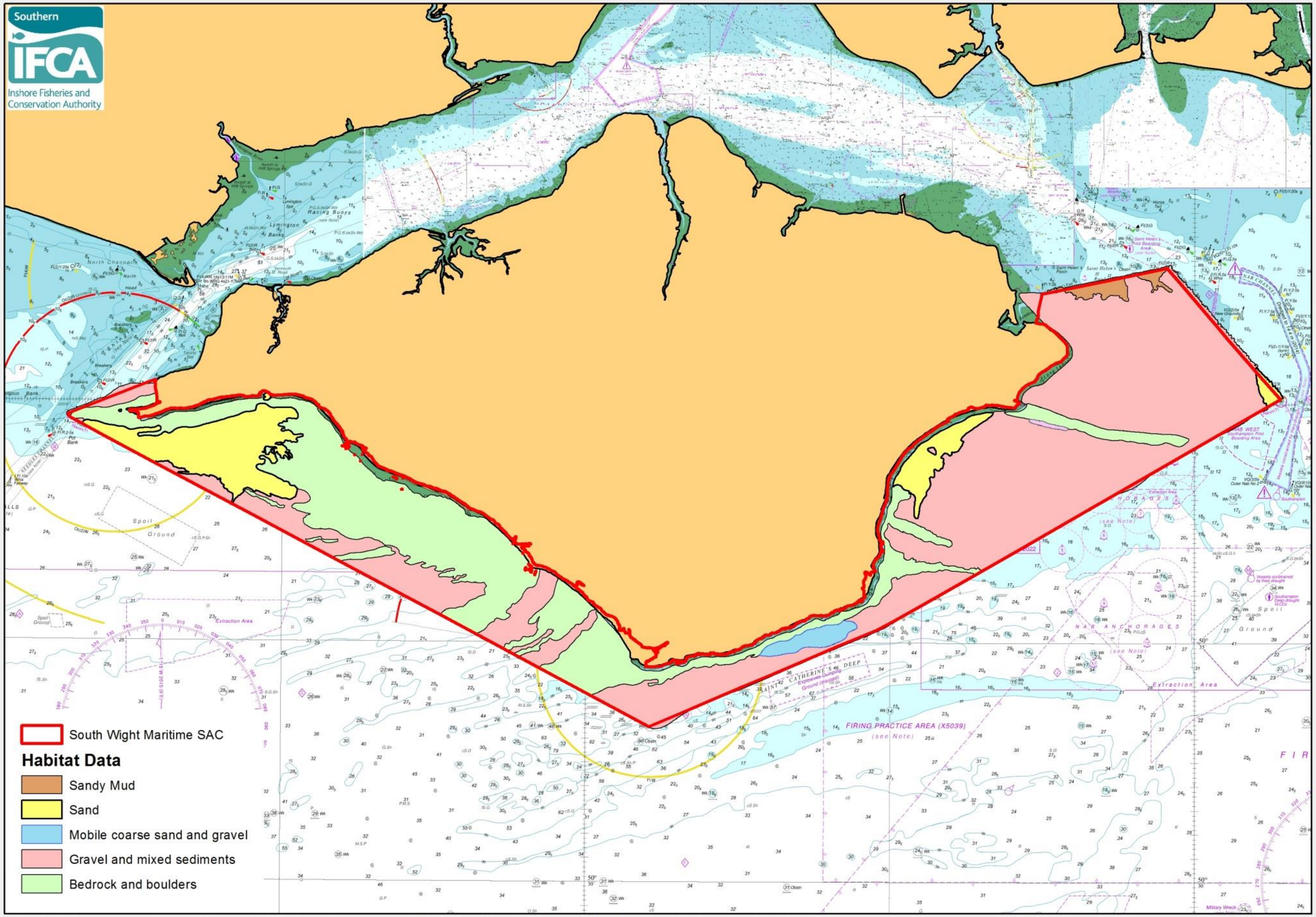
Tillin, H.M., Hull, S.C. & Tyler-Walters, H. 2010. Development of a Sensitivity Matrix (pressures-MCZ/MPA features). Report to the Department of Environment, Food and Rural Affairs (DEFRA) from ABPMer, Southampton and the Marine Life Information Network (MarLIN) Plymouth: Marine Biological Association 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.

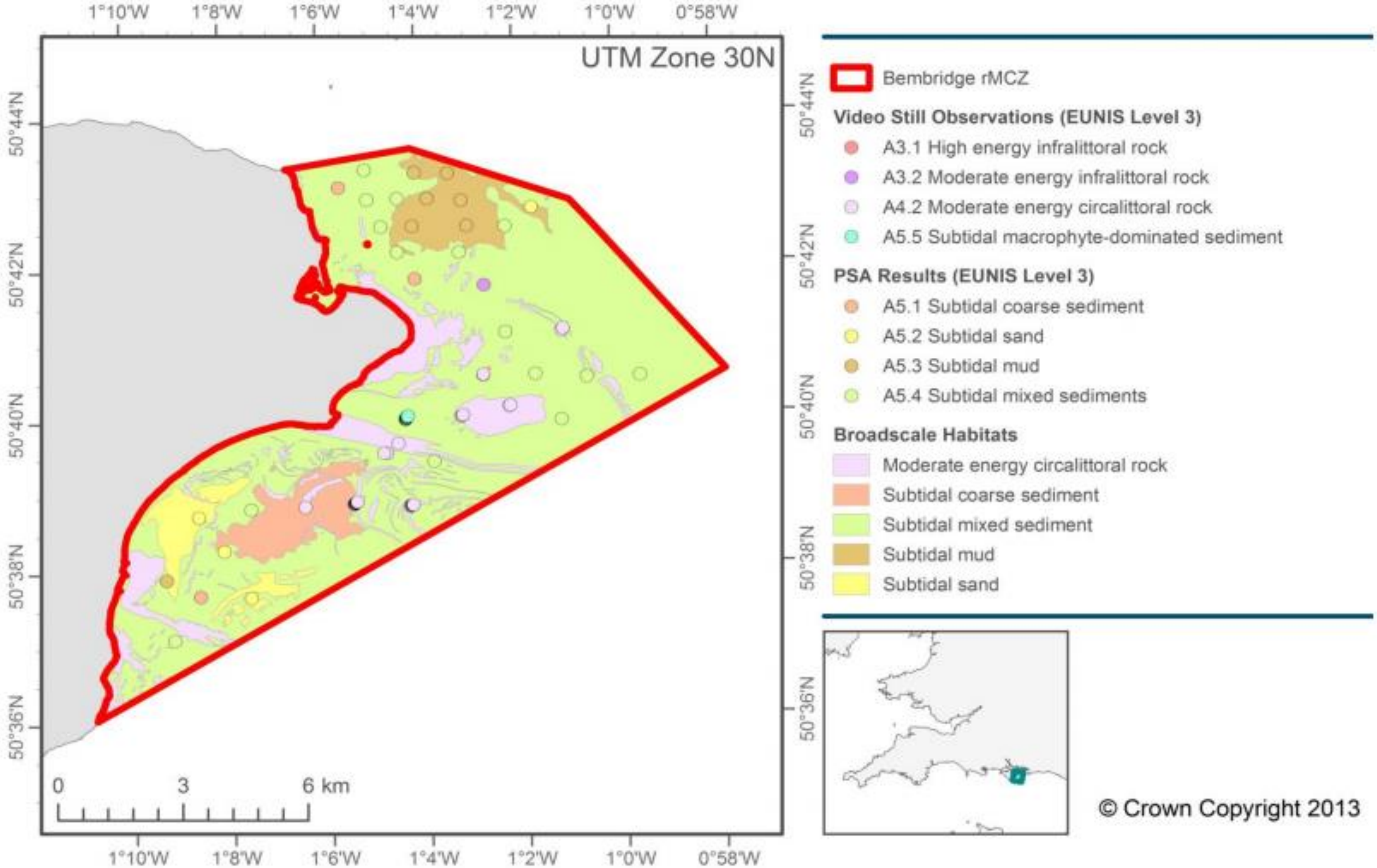
Wootton, E., Clegg, T., Woo, J. & Woolmer, A. 2015. Ecosystem niche review for species caught by commercial potting. 2015. Salacia-Marine Marine Ecological Consultancy. 119 pp.

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 Maps for South Wight Maritime SAC (Map A and B). Map A was produced using best available evidence provided to Southern IFCA in 2013. The broad scale habitat types are based on interpretation of acoustic datasets with additional ground truthing. When using the 2013 dataset, certain areas of low confidence were highlighted and habitat types described as 'gravel and mixed sediment' were considered to potentially contain reef features. Map B is a broadscale habitat map of the Bembridge rMCZ (proposed as part of the second tranche of MCZs but later lost) using dedicated survey data from 2012. Source of Map B: file:///C:/Users/Vicki.Gravestock/Downloads/12822_BembridgerMCZSiteSummaryReportv5.pdf


Southern
IFCA
Inshore Fisheries and Conservation Authority
South Wight Maritime SAC
Habitat Data
Sandy Mud
Sand
Mobile coarse sand and gravel
Gravel and mixed sediments
Bedrock and boulders

A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1°10'W
1°8'W
1°6'W
1°4'W
1°2'W
1°0'W
0°58'W
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50°42'N
50°40'N
50°38'N
50°36'N
0
3
6 km
Bembridge rMCZ
Video Still Observations (EUNIS Level 3)
A3.1 High energy infralittoral rock
A3.2 Moderate energy infralittoral rock
A4.2 Moderate energy circalittoral rock
A5.5 Subtidal macrophyte-dominated sediment
PSA Results (EUNIS Level 3)
A5.1 Subtidal coarse sediment
A5.2 Subtidal sand
A5.3 Subtidal mud
A5.4 Subtidal mixed sediments
Broadscale Habitats
Moderate energy circalittoral rock
Subtidal coarse sediment
Subtidal mixed sediment
Subtidal mud
Subtidal sand
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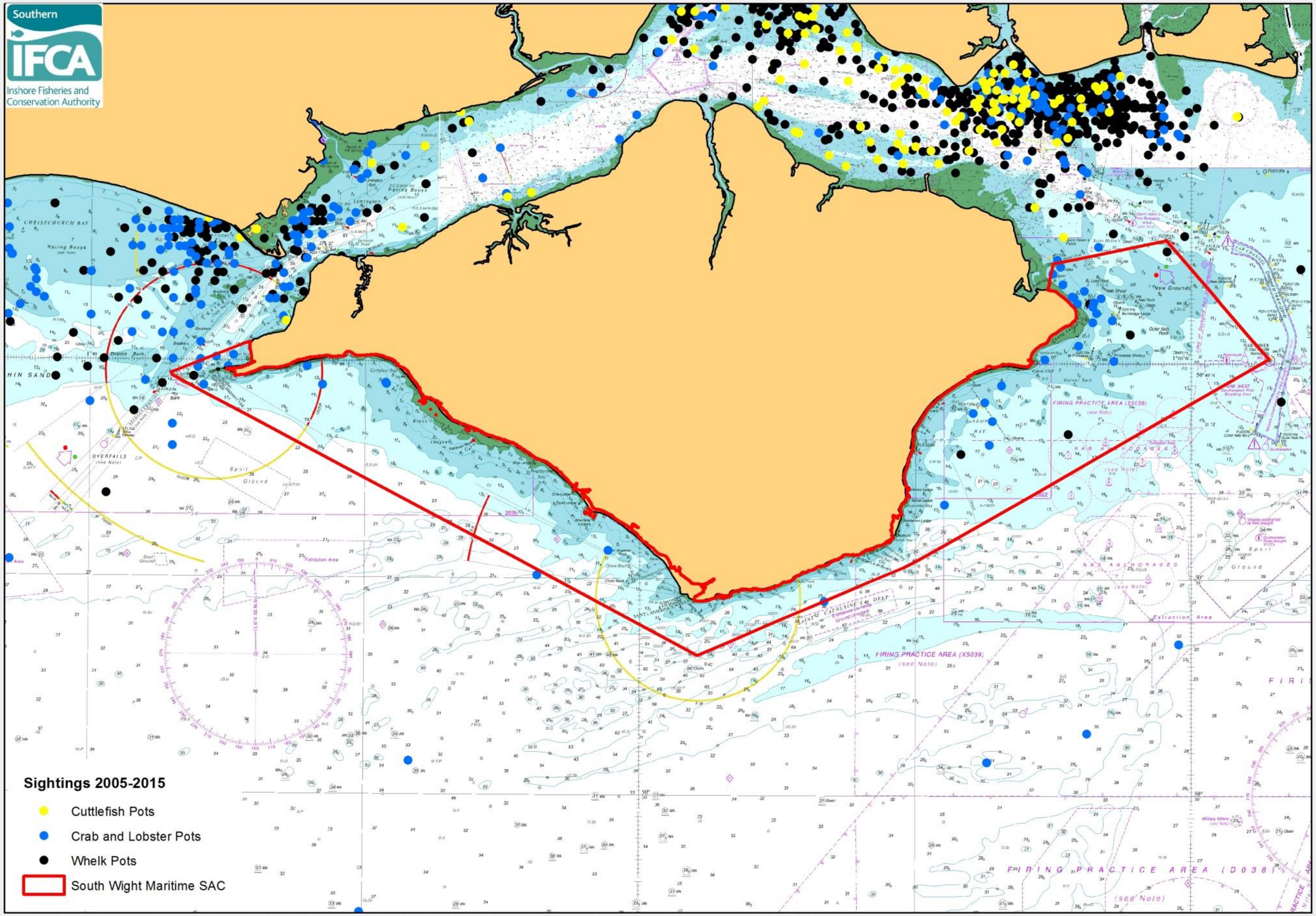
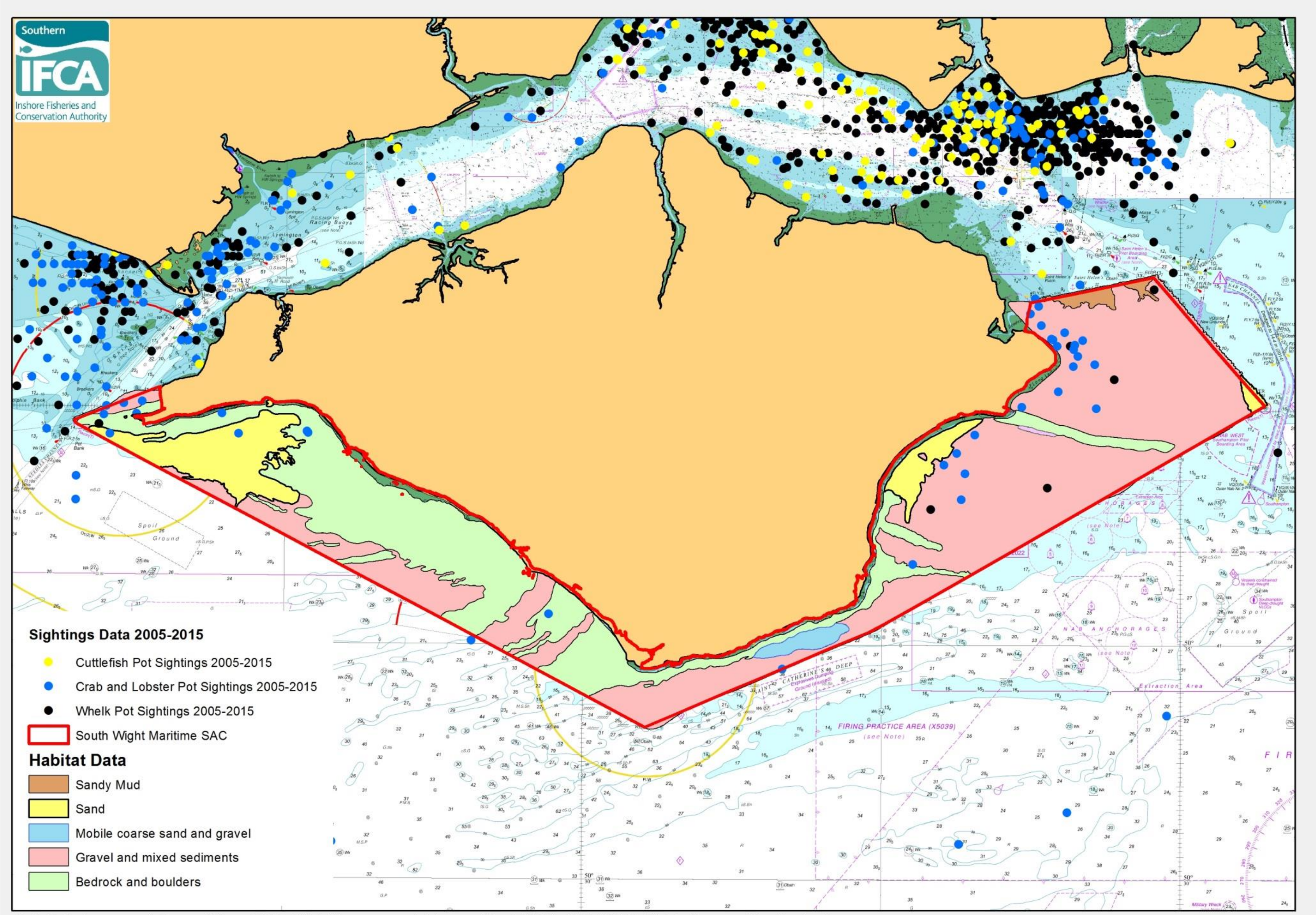
B

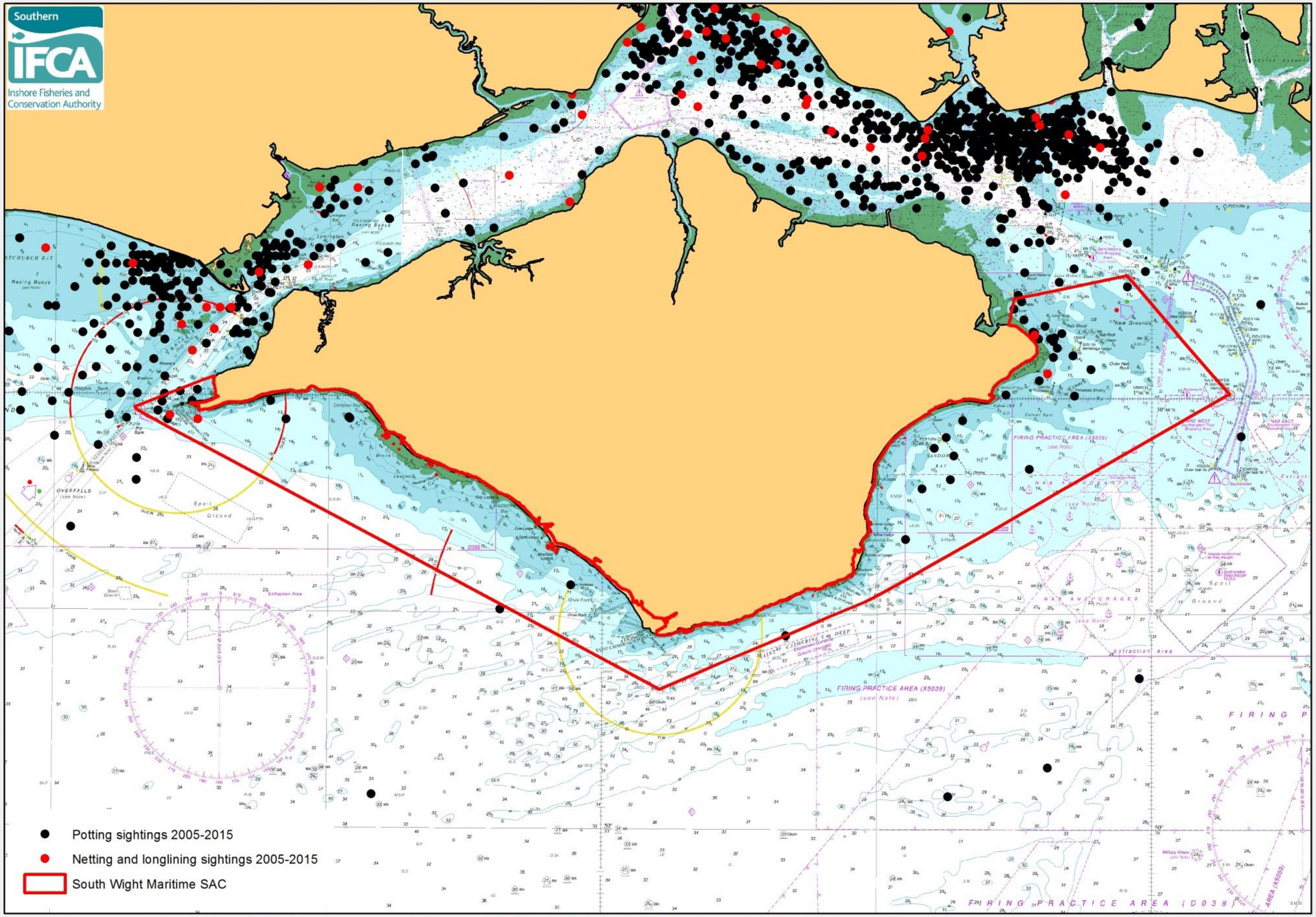
Annex 3: Fishing Activity Map using Potting (Crab/lobster, Whelk, Cuttlefish) Sightings Data from 2005-2015 in the South Wight Maritime SAC.


Southern
IFCA
Inshore Fisheries and Conservation Authority
Sightings 2005-2015
Cuttlefish Pots
Crab and Lobster Pots
Whelk Pots
South Wight Maritime SAC

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 South Wight Maritime SAC


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
South Wight Maritime SAC
Habitat Data
Sandy Mud
Sand
Mobile coarse sand and gravel
Gravel and mixed sediments
Bedrock and boulders
FIRING PRACTICE AREA (X5039)
NAB ANCHORAGES
Spoil Ground
Extraction Area

Annex 5: Co-Location of Potting (Crab/lobster, Whelk, Cuttlefish) and Netting/Longlining Sightings Data from 2005-2015 in the South Wight Maritime SAC.


Southern
IFCA
Inshore Fisheries and Conservation Authority
Potting sightings 2005-2015
Netting and longlining sightings 2005-2015
South Wight Maritime SAC