Document Control

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Southern Inshore Fisheries and Conservation Authority (IFCA)

Marine Conservation Zone Fisheries Assessment (Part B)

Marine Conservation Zone: The Needles MCZ

Feature(s): Moderate energy infralittoral rock, High energy infralittoral rock, Moderate energy circalittoral rock, Subtidal chalk

Broad Gear Type: Static – pots/traps

Gear type(s) Assessed: Pots/creels (crustacea/gastropods); Cuttle pots

Technical Summary

As part of the MCZ assessment process for the tranche 2 Needles MCZ, it was identified that potting (specifically crab and lobster, whelk, cuttlefish) and its potential impacts required an in-depth assessment. The level of potting within the site is considered low to moderate, with potting occurring on a regular basis at certain times of the year (during the winter months) by one to two vessels (predominantly for crab and lobster), although with the potential or up to 5 fishing vessels, in areas surrounding moderate energy infralittoral rock and the vicinity of chalk habitats (in the southern end of the site).

The potential pressures likely to be exerted by the activity upon designated features were identified as abrasion and disturbance on the surface of the seabed and the removal of non-target and target species. Scientific literature shows 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.

When considering the low to moderate levels of gear intensity, low number of vessels partaking or with the potential to partake in the fishery and severe lack of scientific evidence to suggest that potting has an adverse effect on reef habitats, it was concluded the activity is unlikely to pose a significant risk to moderate energy infralittoral rock and subtidal chalk features. As such, it is believed the activity will not hinder the achievement of the designated features general management approaches and that it is compatible with the sites conservation objectives. Existing management measures are therefore considered sufficient and to ensure that potting remains consistent with the conservative objectives of the site, fishing effort will continue to be monitored.

1. Introduction

1.1 Need for an MCZ assessment

This assessment has been undertaken by Southern IFCA in order to document and determine whether management measures are required to achieve the conservation objectives of the Needles Marine Conservation Zone (MCZ). Southern IFCA has duties under section 154 (Protection of marine conservation zones) of the Marine and Coastal Access Act 2009 which states;

> *(1)The authority for an IFC district must seek to ensure that the conservation objectives of any MCZ in the district are furthered.*
> *(2)Nothing in section 153(2) is to affect the performance of the duty imposed by this section.*
> *(3)In this section—*
> *(a)"MCZ" means a marine conservation zone designated by an order under section 116;*
> *(b)the reference to the conservation objectives of an MCZ is a reference to the conservation objectives stated for the MCZ under section 117(2)(b).*

Section 125 of the 2009 Act also requires that public bodies (which includes the IFCA) exercise its functions in a manner to best further (or, if not possible, least hinder) the conservation objectives for MCZs.

This MCZ assessment will complement Southern IFCA's assessment of commercial fishing activities in European Marine Sites (EMS) – designated to protect habitats and species in line with the EU Habitats Directive and Birds Directive. To bring fisheries in line with other activities, the Department for Environment, Food and Rural Affairs (DEFRA) announced on the 14th August 2012 a new approach to manage fishing activities within EMSs. This change in approach will promote sustainable fisheries while conserving the marine environment and resources, securing a sustainable future for both.

1.2 Documents reviewed to inform this assessment

- Defra's matrix of fisheries gear types and European Marine Site protected features
- Natural England's Needles MCZ scoping advice (including Overview and designated features (including General Management Approach), Conservation Objectives, Condition assessments, Screening of pressure-feature interactions, Assessment of impacts (including draft Advice on Operations)). See Annex 1.
- Natural England's Supplementary Advice on Conservation Objectives for the Kingmere MCZ (for subtidal chalk), Poole Rocks MCZ (for moderate energy circalittoral rock) and Chesil Beach and Stennis Ledges (for high energy infralittoral rock) and Skerries Bank and Surrounds MCZ (for moderate energy infralittoral rock).

2. Information about the MCZ

2.1 Overview and designated features

The Needles MCZ is an inshore site that covers the stretch of the Solent adjacent to the northwest side of the Isle of Wight to just south of the Needles, and includes a series of sheltered bays. The site covers an area of 11km^2 and was designated in January 2016.

The MCZ protects a number of rare and fragile habitats including chalk on the seabed, shallow (infralittoral) rock and soft sediments which support communities of algae, sponges, sea squirts and delicate anemones. The site protects seagrass beds in both Totland and Colwell Bays.

A summary of the site's designated features is provided in Table 1, together with the recommended General Management Approach (GMA) for each feature. The GMA required for a feature in a MCZ will either be for it to be maintained in favourable condition (if it is currently in this state), or for it to be recovered to favourable condition (if it is currently in a damaged state) and then to be maintained in favourable condition.

Table 1. Designated features and General Management Approaches for each

Designated feature	General Management Approach
Moderate energy infralittoral rock	**Maintain in favourable condition**
High energy infralittoral rock	**Maintain in favourable condition**
Moderate energy circalittoral rock	**Maintain in favourable condition**
Subtidal chalk	**Recover to favourable condition**
Subtidal coarse sediment	Recover to favourable condition
Subtidal mixed sediments	Recover to favourable condition
Subtidal sand	Recover to favourable condition
Subtidal mud	Recover to favourable condition
Sheltered muddy gravels	Recover to favourable condition
Seagrass beds	Recover to favourable condition
Stalked jellyfish (*Lucernariopsis campanulata*)	Recover to favourable condition
Peacock's tail (*Padina pavonica*)	Recover to favourable condition
Native oyster (*Ostrea edulis*)	Recover to favourable condition

Please refer to Annex 2 and 3 for a site feature maps.

2.2 Conservation Objectives

The site’s high-level conservation objectives apply to the Marine Conservation Zone and the individual species and/or habitat for which the site has been designated (the “Designated features” listed below).

The conservation objective of each of the zones is that the protected habitats:

1. are maintained in favourable condition if they are already in favourable condition;
2. be brought into favourable condition if they are not already in favourable condition.

For a protected feature, favourable condition means that, within a zone:

1. its extent is stable or increasing;
2. its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable recovery.

For species of marine fauna, favourable condition means that the population within a zone is supported in number which enable it to thrive, by maintaining:

1. the quality and quantity of the habitat
2. the number, age and sex ratio of its population. Any temporary reduction of numbers of a species is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

3. MCZ Assessment Process

3.1 Overview of the assessment process

The assessment of commercial fishing activities within the Needles MCZ will be undertaken using a staged process, akin to that proposed by the Marine Management Organisation (MMO)[1], for marine license applications. The assessment process comprises of an initial screening stage to establish whether an activity occurs or is anticipated to occur/has the potential to occur within the site. Activities which are not screened out are subject to a simple ‘part A’ assessment, akin to the Test of Likely Significant Effect required by article 6(3) of the Habitats Directive. The aim of this assessment is to identify pressures capable of significantly affecting designated features or their related processes. Fishing activities and their associated pressures which are not screened out in the part A assessment are then subject to a more detailed ‘part B’ assessment, where assessment is undertaken on a gear type basis. A part B assessment is akin to the Appropriate Assessment required by article 6(3) of the Habitats Directive. The aim of this assessment is to determine whether there is a significant risk of the activity hindering the conservation objectives of the MCZ. Within this stage of assessment, ‘hinder’ is defined as any act that could, either alone or in combination:

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1 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/410273/Marine_conservation_zones_and_marine_licensing.pdf

- in the case of a conservation objective of ‘maintain’, increase the likelihood that the current status of a feature would go downwards (e.g. from favourable to degraded) either immediately or in the future (i.e. they would be placed on a downward trend); or

- in the case of a conservation objective of ‘recover’, decrease the likelihood that the current status of a feature could move upwards (e.g. from degraded to favourable) either immediately or in the future (i.e. they would be placed on a flat or downward trend) (MMO, 2013).

If the part B assessment is unable to conclude that there is no significant risk of an activity hindering the conservation objectives of the MCZ, then the activity may be subject to management and consideration will be given to whether or not the public benefit of the activity outweighs the risk of damage to the environment; and if so, whether the activity is able to deliver measures of equivalent environmental benefit to the damage that is likely to occur to the MCZ.

3.2 Screening and Part A Assessment

The aim of the screening stage and part A assessment is to determine whether, under section 125 and 154 of MCAA, fishing activities occurring or those which have the potential to occur within the site are compatible with the conservation objectives of the MCZ.

The screening of commercial fishing activities in the Needles MCZ was undertaken using broad gear type categories. Sightings data collected by the Southern IFCA, together with officers’ knowledge, was used to ascertain whether each activity occurs within the site, or has the potential to occur/is anticipated to occur in the foreseeable future. Engagement with the local fishing industry was also undertaken as part of this process. For these occurring/potentially occurring activities, an assessment of pressures upon MCZ designated features was undertaken using Natural England’s Advice on Operations.

Activities were screened out for further part B assessment if they satisfied one or more of the following criteria:

1. The activity does not occur within the site, does not have the potential to occur and/or is not anticipated to occur in the foreseeable future.

2. The activity does occur but the pressure(s) does not significantly affect/ interact with the designated feature(s).

3. The activity does occur but the designated feature(s) is not sensitive to the pressure(s) exerted by the activity.

3.2.3 Screening of commercial fishing activities based on occurrence

Initial screening was undertaken to identify the commercial fishing activities which currently occur within the site, together with those which have the potential to occur or/and are reasonably foreseen to occur in the future (Annex 4). To maintain consistency with Southern IFCA’s assessment of commercial fishing activities in European Marine Sites, the individual gear types identified in Defra’s matrix were assessed and these were grouped into broad gear types.

3.2.4 Screening of commercial fishing activities based on pressure-feature interaction

Fishing activities which were identified as occurring, have the potential to occur and/or are anticipated to occur in the foreseeable future within the site were screened with respect to the potential pressures which they may be exert upon designated features (Part A assessment). This screening exercise was undertaken using Natural England’s draft Advice on Operations for the

Needles MCZ (Annex 5). This advice provides a broad scale assessment of the sensitivity of designated features to different activity-derived pressures, using nationally available evidence on their resilience (an ability to recover) and resistance (the level of tolerance) to physical, chemical and biological pressures (Natural England, 2016). The assessments of sensitivity to these pressures are measured against a benchmark. It should be noted that these benchmarks are representative of the likely intensity of a pressure caused by typical activities, and do not represent a threshold of an 'acceptable' intensity of a pressure. It is therefore necessary to consider how the level of fishing intensity observed within the Needles MCZ compares with these benchmarks when screening individual activities. Furthermore, Natural England's Advice on Operations does not provide information on the vulnerability of the features (determined by a feature's sensitivity to an activity and its exposure to that activity) because the location and intensity of fishing activities are subject to change

Due to the broad-scale nature of the sensitivity assessments provided in Natural England's Advice on operations, each pressure is assigned a risk profile based upon the likelihood of the pressure occurring and the magnitude of the impact should that pressure occur. These risk profiles have been used, together with site-specific knowledge, to identify those pressures which could significantly affect designated features.

A summary of Natural England's draft Advice on Operations for the Needles MCZ is provided in Annex 5. The resultant activity pressure-feature interactions which have been screened in for potting gear for the part B assessment are summarised in Tables 2 to 5. The activity pressure-feature interactions which were screened out in the Part A Assessment are detailed in a standalone document for Needles MCZ. Where there is insufficient evidence on the sensitivity of a designated feature to fishing-related pressures, and these pressures present a risk to designated features, these pressure-feature interactions have been included for further assessment.

Table 2. Summary of fishing pressure-feature screening for moderate energy infralittoral rock. Please note only pressures screened in for the part B are presented here.

Potential Pressures	Considered in Part B Assessment?	Justification	Relevant Attributes
Abrasion/disturbance of the substrate on the surface of the seabed	Y	The activity is likely to lead to abrasion of the feature during deployment/retrieval and subsequent movement of gear, including the ground rope from currents or storm activity. The activity is considered as low impact and evidence, gathered through potting impact studies, suggests that there is likely to be no or limited impact on the feature. Further investigation into existing literature, severity and magnitude of this pressure, including spatial scale and activity intensity considerations are necessary to confirm this for this site.	Distribution: presence and spatial distribution of infralittoral rock communities; Structure: presence and abundance of typical species; Structure: species composition of component communities
Removal of non-target species	Y	Mechanical impacts of potting may include damage to, and potentially the removal of non-target species through contact with gear including entangling of ropes and surface abrasion. The area directly affected however is likely to be relatively small. Studies on this gear type have reported limited impacts in areas of rocky habitat. There is currently limited	Distribution: presence and spatial distribution of infralittoral rock communities; Structure: presence and abundance of typical species;

		information on the moderate energy infralittoral rock communities which exist at this site as no conservation advice package currently exists. Emergent fauna can be tangled, damaged or removed by setting or hauling pots. Potential bycatch species are generally limited (i.e. wrasse, dogfish) and will often be returned alive. Potting impact studies suggests that there is likely to be no or limited impact on the feature, however further investigation into existing literature, sensitivity of species within the site (from the post-survey site report and using biotopes from nearby MPAs - South Wight Maritime SAC), severity and magnitude of this pressure, including spatial scale and activity intensity considerations is necessary to confirm this activity will not lead to a significant effect on this feature.	Structure: species composition of component communities
Removal of target species	Y	The target species of potting activities include edible crab, European lobster, common whelk and cuttlefish. Video analysis, conducted as part of the post-survey site report, only reported one of the target species (*Cancer pagurus*) as occurring within the site (3% occurrence). Crustaceans and whelks are subject to a minimum landing size, below which individuals cannot be removed from the fishery and if caught in a pot must be returned to the sea. Catches of undersized lobster and crab are also reduced through the use of escape gaps, which is a voluntary measure in the Southern IFCA district. Whelk potting is generally concentrated in areas of subtidal sediments, indicating the species is likely to be limited in areas of rocky reef habitat. The main concern would therefore be the removal of edible crab and European lobster above the minimum landing size. The removal of larger edible crab, in some instances, may have an adverse impact on the ecosystem as large individuals can constitute apex predators and thus belong to a smaller 'functional group' of species. Impacts of European lobster removal is hard to ascertain due to the 'sliding baseline' phenomenon. Further investigation is necessary to ascertain the impacts of the removal of edible crab and European lobster on moderate energy infralittoral rock communities.	Structure: species composition of component communities

Table 3. Summary of fishing pressure-feature screening for high energy infralittoral rock. Please note only pressures screened in for the part B are presented here.

Potential Pressures	Considered in Part B Assessment?	Justification	Relevant Attributes
Abrasion/disturbance of the substrate on the surface of the seabed	Y	The activity is likely to lead to abrasion of the feature during deployment/retrieval and subsequent movement of gear, including the ground rope from currents or storm activity. The activity is considered as low impact and evidence, gathered through potting impact studies, suggests that there is likely to be no or limited impact on the feature. Further investigation into existing literature, severity and magnitude of this pressure, including spatial scale and activity intensity considerations are necessary to confirm this for this site.	Distribution: presence and spatial distribution of biological communities; Structure and function: presence and abundance of key structural and influential species; Structure: species composition of component communities
Removal of non-target species	Y	Mechanical impacts of potting may include damage to, and potentially the removal of non-target species through contact with gear including entangling of ropes and surface abrasion. The area directly affected however is likely to be relatively small. Studies on this gear type have reported limited impacts in areas of rocky habitat. There is currently limited information on the high energy infralittoral rock communities which exist at this site as no conservation advice package currently exists. Emergent fauna can be tangled, damaged or removed by setting or hauling pots. Potential bycatch species are generally limited (i.e. wrasse, dogfish) and will often be returned alive. Potting impact studies suggests that there is likely to be no or limited impact on the feature, however further investigation into existing literature, sensitivity of species within the site (from the post-survey site report and using biotopes from nearby MPAs - South Wight Maritime SAC), severity and magnitude of this pressure, including spatial scale and activity intensity considerations is necessary to confirm this activity will not lead to a significant effect on this feature.	Distribution: presence and spatial distribution of biological communities; Structure and function: presence and abundance of key structural and influential species; Structure: species composition of component communities
Removal of target species	Y	The target species of potting activities include edible crab, European lobster, common whelk and cuttlefish. Video analysis, conducted as part of the post-survey site report, only reported one of the target species (*Cancer pagurus*) as occurring within the site (3% occurrence). Crustaceans and whelks are subject to a	Structure and function: presence and abundance of key structural and influential species

		minimum landing size, below which individuals cannot be removed from the fishery and if caught in a pot must be returned to the sea. Catches of undersized lobster and crab are also reduced through the use of escape gaps, which is a voluntary measure in the Southern IFCA district. Whelk potting is generally concentrated in areas of subtidal sediments, indicating the species is likely to be limited in areas of rocky reef habitat. The main concern would therefore be the removal of edible crab and European lobster above the minimum landing size. The removal of larger edible crab, in some instances, may have an adverse impact on the ecosystem as large individuals can constitute apex predators and thus belong to a smaller 'functional group' of species. Impacts of European lobster removal is hard to ascertain due to the 'sliding baseline' phenomenon. Further investigation is necessary to ascertain the impacts of the removal of edible crab and European lobster on moderate energy infralittoral rock communities.	

Table 4. Summary of fishing pressure-feature screening for moderate energy circalittoral rock. Please note only pressures screened in for the part B are presented here.

Potential Pressures	Considered in Part B Assessment?	Justification	Relevant Attributes
Abrasion/disturbance of the substrate on the surface of the seabed	Y	The activity is likely to lead to abrasion of the feature during deployment/retrieval and subsequent movement of gear, including the ground rope from currents or storm activity. The activity is considered as low impact and evidence, gathered through potting impact studies, suggests that there is likely to be no or limited impact on the feature. Further investigation into existing literature, severity and magnitude of this pressure, including spatial scale and activity intensity considerations are necessary to confirm this for this site.	Distribution: presence and spatial distribution of circalittoral rock communities; Structure/function: presence and abundance of key structural and influential species; Structure: species composition of component communities
Removal of non-target species	Y	Mechanical impacts of potting may include damage to, and potentially the removal of non-target species through contact with gear including entangling of ropes and surface abrasion. The area directly affected however is likely to be relatively small. Studies on this gear type have reported limited impacts in areas of	Distribution: presence and spatial distribution of circalittoral rock communities; Structure/function: presence and abundance of key

		rocky habitat. There is currently limited information on the moderate energy circalittoral rock communities which exist at this site as no conservation advice package currently exists. Emergent fauna can be tangled, damaged or removed by setting or hauling pots. Potential bycatch species are generally limited (i.e. wrasse, dogfish) and will often be returned alive. Potting impact studies suggests that there is likely to be no or limited impact on the feature, however further investigation into existing literature, sensitivity of species within the site (from the post-survey site report and using biotopes from nearby MPAs - South Wight Maritime SAC), severity and magnitude of this pressure, including spatial scale and activity intensity considerations is necessary to confirm this activity will not lead to a significant effect on this feature.	structural and influential species; Structure: species composition of component communities
Removal of target species	Y	The target species of potting activities include edible crab, European lobster, common whelk and cuttlefish. Video analysis, conducted as part of the post-survey site report, only reported one of the target species (*Cancer pagurus*) as occurring within the site (3% occurrence). Crustaceans and whelks are subject to a minimum landing size, below which individuals cannot be removed from the fishery and if caught in a pot must be returned to the sea. Catches of undersized lobster and crab are also reduced through the use of escape gaps, which is a voluntary measure in the Southern IFCA district. Whelk potting is generally concentrated in areas of subtidal sediments, indicating the species is likely to be limited in areas of rocky reef habitat. The main concern would therefore be the removal of edible crab and European lobster above the minimum landing size. The removal of larger edible crab, in some instances, may have an adverse impact on the ecosystem as large individuals can constitute apex predators and thus belong to a smaller 'functional group' of species. Impacts of European lobster removal is hard to ascertain due to the 'sliding baseline' phenomenon. Further investigation is necessary to ascertain the impacts of the removal of edible crab and European lobster on moderate energy infralittoral rock communities.	Structure/function: presence and abundance of key structural and influential species

Table 5. Summary of fishing pressure-feature screening for subtidal chalk. Please note only pressures screened in for the part B are presented here.

Potential Pressures	Considered in Part B Assessment?	Justification	Relevant Attributes
Abrasion/disturbance of the substrate on the surface of the seabed	Y	The activity is likely to lead to abrasion of the feature during deployment/retrieval and subsequent movement of gear, including the ground rope from currents or storm activity. The activity is considered as low impact and evidence, gathered through potting impact studies, suggests that there is likely to be no or limited impact on the feature. The soft nature of the substrate however means the substrate may be considered more vulnerable to erosion by abrasion. Further investigation into existing literature, severity and magnitude of this pressure, including spatial scale and activity intensity considerations are necessary to confirm this for this site.	Distribution: presence and spatial distribution of communities; Structure: presence and abundance of typical species; Structure: species composition of component communities
Removal of non-target species	Y	Mechanical impacts of potting may include damage to, and potentially the removal of non-target species through contact with gear including entangling of ropes and surface abrasion. The area directly affected however is likely to be relatively small. Studies on this gear type have reported limited impacts in areas of rocky habitat. There is currently limited information on the moderate energy circalittoral rock communities which exist at this site as no conservation advice package currently exists. Emergent fauna can be tangled, damaged or removed by setting or hauling pots. Species that are able to bore into chalk reefs, such as piddocks, which occur throughout the neighbouring South Wight Maritime SAC, are however predicted to be relatively unaffected by static fishing gear. Potential bycatch species are generally limited (i.e. wrasse, dogfish) and will often be returned alive. Potting impact studies suggests that there is likely to be no or limited impact on the feature, however further investigation into existing literature, sensitivity of species within the site (from the post-survey site report and using biotopes from nearby MPAs - South Wight Maritime SAC), severity and magnitude of this pressure, including spatial scale and activity intensity considerations is necessary to confirm this activity will not lead to a significant effect on this feature.	Distribution: presence and spatial distribution of communities; Structure: presence and abundance of typical species; Structure: species composition of component communities

Removal of target species	Y	The target species of potting activities include edible crab, European lobster, common whelk and cuttlefish. Video analysis, conducted as part of the post-survey site report, only reported one of the target species (*Cancer pagurus*) as occurring within the site (3% occurrence). Crustaceans and whelks are subject to a minimum landing size, below which individuals cannot be removed from the fishery and if caught in a pot must be returned to the sea. Catches of undersized lobster and crab are also reduced through the use of escape gaps, which is a voluntary measure in the Southern IFCA district. Whelk potting is generally concentrated in areas of subtidal sediments, indicating the species is likely to be limited in areas of rocky reef habitat. The main concern would therefore be the removal of edible crab and European lobster above the minimum landing size. The removal of larger edible crab, in some instances, may have an adverse impact on the ecosystem as large individuals can constitute apex predators and thus belong to a smaller 'functional group' of species. Impacts of European lobster removal is hard to ascertain due to the 'sliding baseline' phenomenon. Further investigation is necessary to ascertain the impacts of the removal of edible crab and European lobster on moderate energy infralittoral rock communities.	Structure: presence and abundance of typical species

4. Part B Assessment

The aim of the part B assessment is for the IFCA to ensure that that there is no significant risk of a fishing activity hindering the conservation objectives of the MCZ; and to confirm that the authority is able to exercise its functions to further the site's conservation objectives.

In order to adequately assess the potential impacts of an activity upon a designated feature, it is necessary to consider the relevant attributes of that feature that may be affected. Attributes are typically provided in Natural England's Supplementary Advice on Conservation Objectives (SACOs) and represent the ecological characteristics or requirements of the designated species and habitats within a site. These attributes are considered to be those which best describe the site's ecological integrity and which if safeguarded will enable achievement of the Conservation Objectives[2]. Each attribute has an associated target which identifies the desired state to be achieved; and is either quantified or qualified depending on the available evidence. After relevant pressures were identified from the pressure-feature interaction screening, suitable attributes were identified. As there is currently no Supplementary Advice available for the Needles MCZ, relevant attributes for each

2 https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0014&SiteName=poole%20rock&countyCode=&responsiblePerson=

feature have been taken from other MCZ Conservation Advice packages with the same features. These are outlined in tables 2 to 5.

4.1 Assessment of potting in the Needles MCZ

4.1.1 Summary of the fishery

Potting can take place all year round and does so on a regular basis (at certain types of year) within the Needles MCZ. Within the MCZ, the main type of potting activity targets European lobster (*Homarus gammarus*) and Edible crab (*Cancer pagurus*), with unknown levels of potting for the common whelk (*Buccinum undatum*) and cuttlefish (*Sepia officinalis*). The pots used for all target species differ, both in construction and size.

4.1.2 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).

In the UK, potting configuration and methods vary between locations including the materials used for pot construction, size and weight of pots, the number of pots per string and distance between pots and size of anchor-weights used (Stephenson *et al*., 2016). Pot set up and deployment however is relatively standardised in the UK (Lovewell *et al*., 1988; Bullimore *et al*., 2001; Coleman *et al*., 2013; Stephenson *et al*., 2016). Ten to thirty baited pots are attached to a 'mainline' using 2 to 3 m of rope at intervals of approximately 10 fathoms (18 metres) (Stephenson *et al*., 2016). This is referred to a 'string' or 'fleet' of pots. Bait used in pots is typically a type of fish or shellfish and the type used varies depending on location and target species. At the end of each string, anchor-weights are attached to prevent movement or dragging during periods of water movement from waves or strong currents (Stephenson *et al*., 2016). Marker buoys are attached to each end of the string and are used to mark the location of gear and facilitate retrieval (Stephenson *et al*., 2016). Pots are deploydc by dropping the first buoy and anchor-weight into the water. The pots and second anchor-weight and buoy are then pulled overboard as the vessel travels over the chosen fishing ground (Stephenson *et al*., 2016). Anchors and buoys are designed to remain static whilst slack in the mainline will allow the pots some freedom of movement (Stephenson *et al*., 2016). Pots will often be soaked for a period of 24 to 48 hours, potentially longer in periods of adverse 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 Needles MCZ. 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, may also be fitted to the end of each pot. The aim of the escape gap is designed to allow the release of animals below the MLS. 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/

Cuttlefish pots

Cuttlefish pots are much larger than those used to target crab/lobster and whelk. The pots are either square or circular in shape. Circular traps typically measure 100 cm in diameter are 50 cm in height whilst square traps approximately 90 cm square and height of 50 cm. Pots typically weight approximately 15 kg and are light in both construction and weight. Pots are constructed from steel bars covered with light weight netting, with a typical stretch mesh size range between 80 to 100 mm (Figure 3). Each pot has two or three plastic entrances with plastic fingers on the inside of the trap to prevent cuttlefish from escaping. The plastic fingers are able to bend freely as a cuttlefish enters. Fishermen bait pots with a plastic disc or live (female if possible) cuttlefish to attract cuttlefish into the pot. This uses their matting instinct to attract others into the trap.

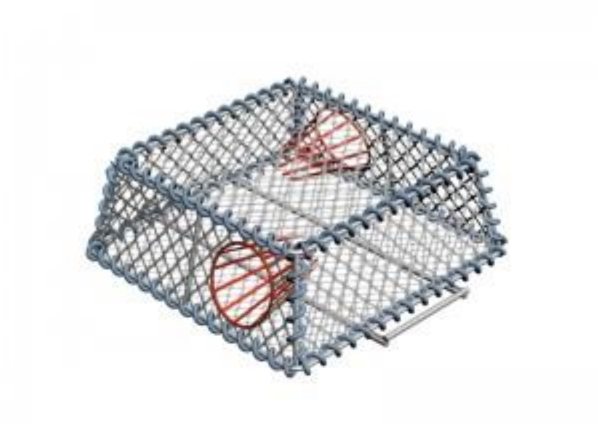

Figure 3. Cuttlefish pot. Source: http://www.seafish.org/geardb/gear/pots-and-traps-cuttlefish/

4.1.3 Location, Effort and Scale of fishing activities

One to two fishing vessels are currently known pot (predominantly for crab and lobster) within the Needles MCZ, with the potential for up to 5 fishing vessels. Both vessels currently known to fish are believed to be operated by regular and full-time fishermen. Vessels currently known to fish or with the potential to fish within the MCZ operate out of either Yarmouth or Lymington.

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. It is typical UK practice to arrange pots in strings of ten to thirty. The number of pots used within the area is unknown, however it is believed to be of light to moderate intensity at a maximum of 500 (all types) at any one time, although definitions of gear intensity largely varies between studies (see Annex 6).

Potting for crab and lobster is generally focused during the winter months over or in areas surrounding harder rocky ground which are located relatively close inshore. Whelk potting typically takes place over subtidal sediments (including subtidal coarse sediment and subtidal mixed sediments) which occur in the mid to outer regions of the site. The level of whelk potting and cuttle potting is currently unknown. The greatest deployment of whelk pots occurs during the winter and spring. Potting for cuttlefish is a seasonal fishery which occurs between April to June, although inactive traps are left over summer to allow cuttlefish eggs to hatch as these are commonly laid on traps. Inactive traps are then removed before the winter months.

Sightings data presented in figure 4 confirm potting for crab and lobster and whelks occurs within the Needles MCZ, with the most prevalent activity being crab and lobster potting as expected. Over the period covered by sightings data (2005-2017) one sighting for cuttle potting was recorded. Crab and lobster potting sightings are located relatively close inshore in Alum Bay, including north of the Needles, Totland Bay and over Warden Bank and Ledge (between Totland and Colwell Bay). Whelk potting sightings are concentrated in the northern half of the site, in the inner, mid and outer regions of the site, although the total number of sightings are relatively low (6 between 2005 to 2017). 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. Unfortunately, the area in which the Needles MCZ occurs has relatively less sea and land patrol coverage as it does not form part of typical patrol routes and as such may not be completely reflective of the true extent of the fishery.

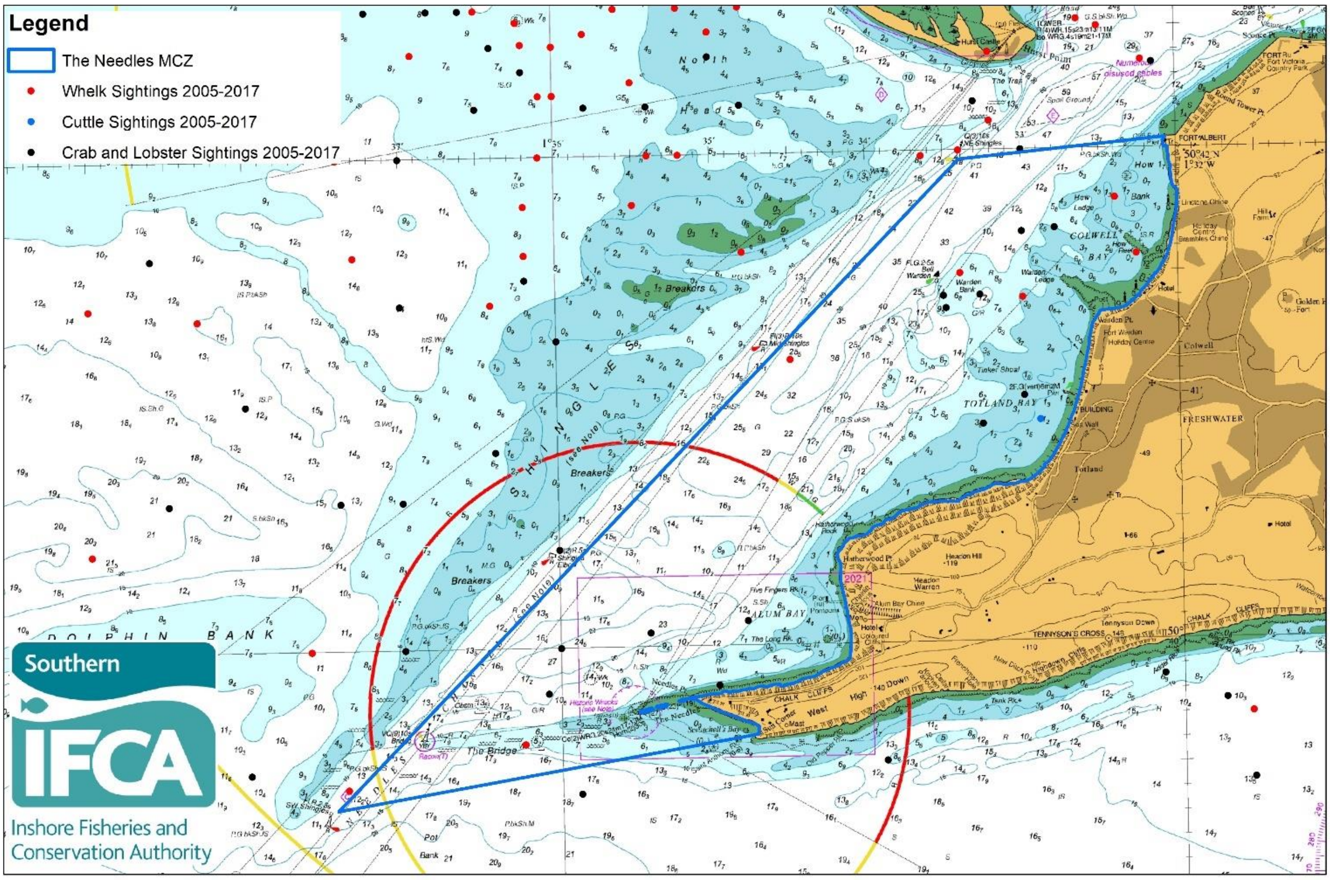

Figure 4. Fishing activity map(s) using potting sightings data from 2005-2017, split by potting method (whelks, crustaceans and cuttlefish) in the Needles MCZ.

4.2 Co-Location of Fishing Activity and Designated Features

A map of potting sightings and designated site features are illustrated in Figure 5 and 6. These maps reveal where fishing activity occurs in relation to relevant designated features of the site.

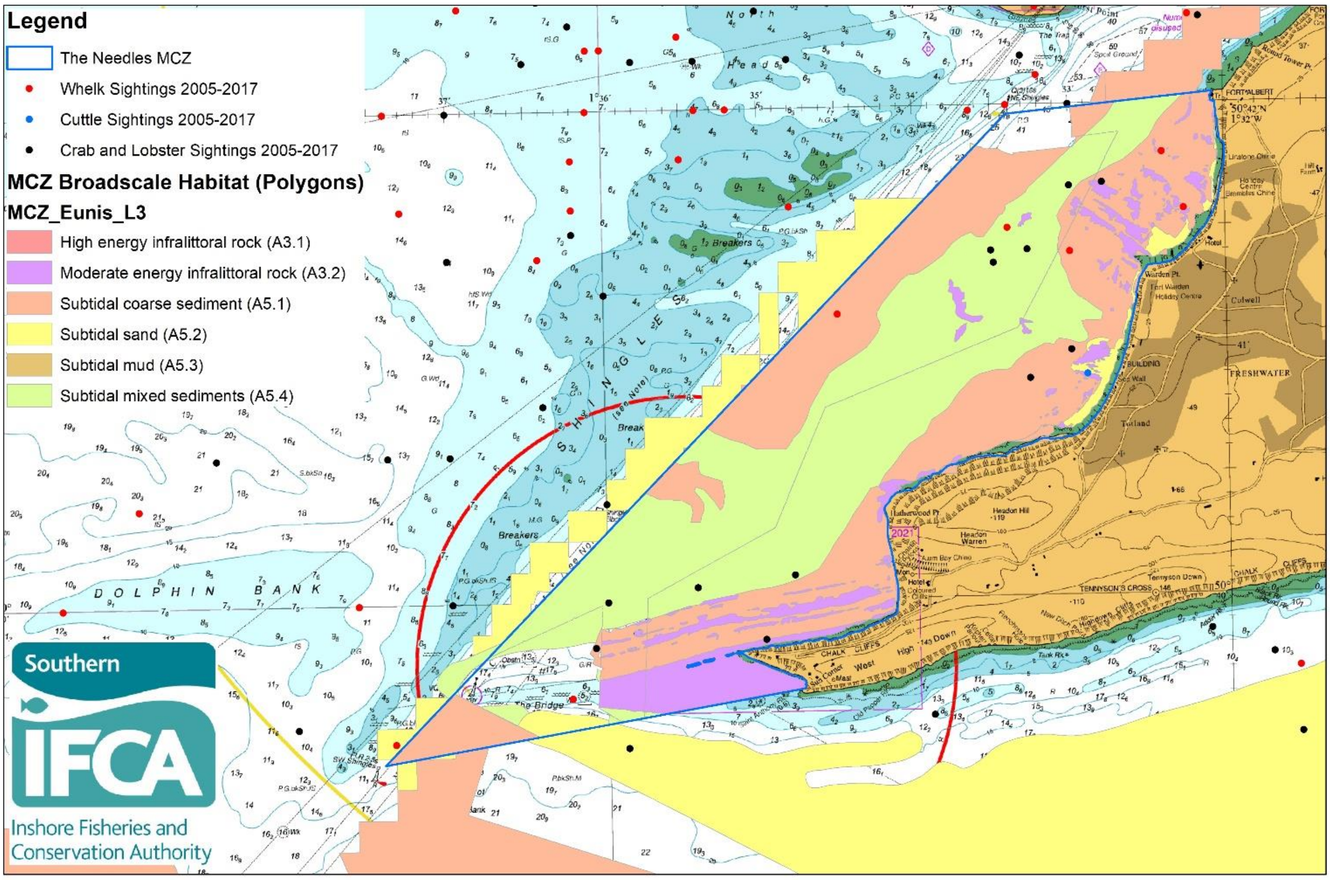

Figure 5. Co-Location of fishing activity using potting (crab and lobster, whelk & cuttlefish) sightings data from 2005-2017 and designated site features (broadscale habitat types) in the Needles MCZ.

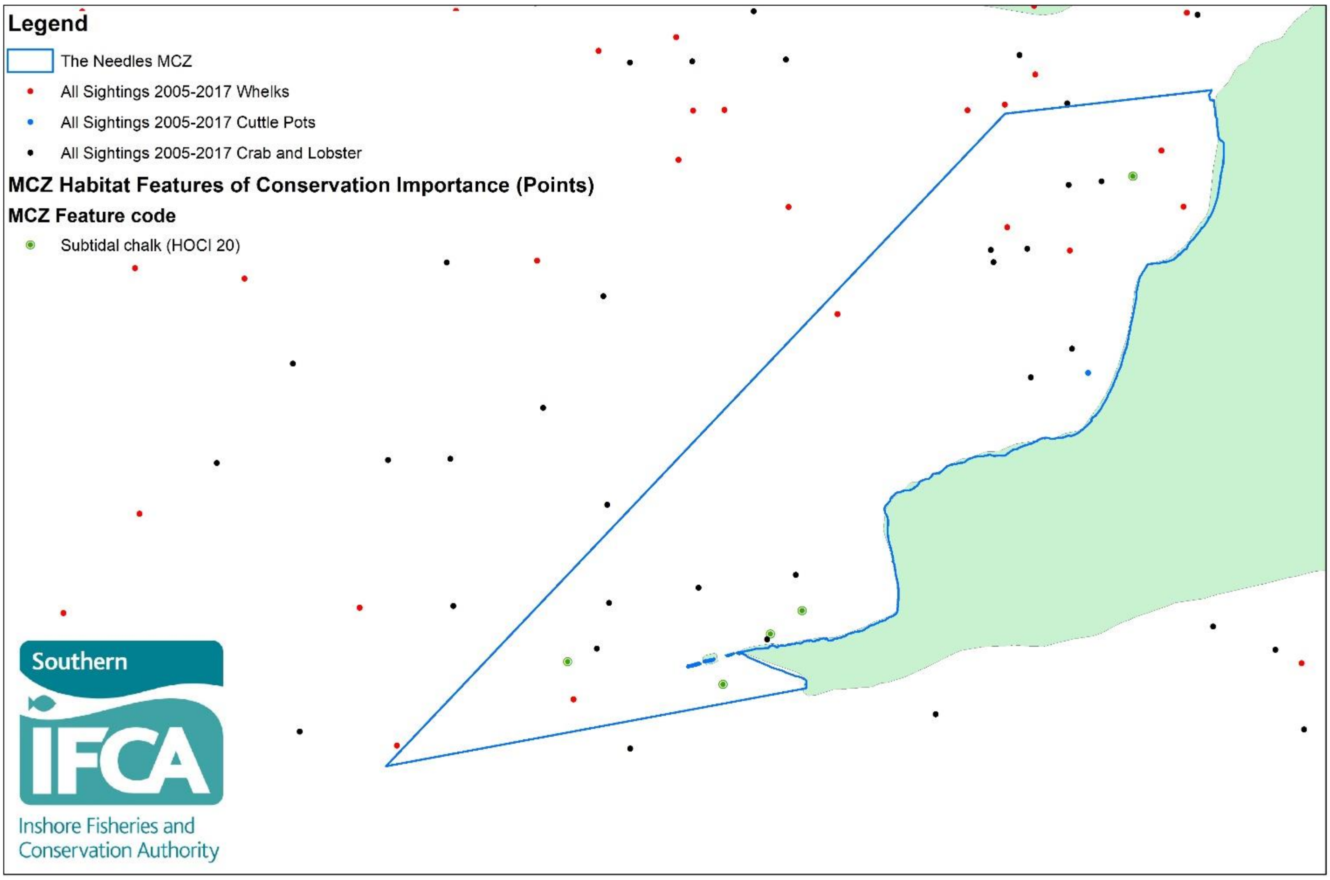

Figure 6. Co-Location of fishing activity using potting (crab and lobster, whelk & cuttlefish) sightings data from 2005-2017 and designated site features (subtidal chalk) in the Needles MCZ.

Crab and lobster potting sightings appear to occur in areas surrounding moderate energy infralittoral rock throughout the site. Crab and lobster sightings also occur in the vicinity of subtidal chalk (indicated by habitats of conservation importance (HOCI) points) in the southern end of the site. Whelk potting sightings are concentrated in the northern half of the site over a mixture of seabed types, including over and in areas surrounding moderate energy infralittoral rock close inshore and subtidal coarse sediment and mixed sediments in mid to outer regions of the site.

4.3 Pressures

4.3.1 *Abrasion/disturbance of the substrate on the surface of the seabed (Physical)*

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 the most along the seabed, 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 storms 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.

Gall (2016) investigated the direct physical and ecological impacts of inkwell and parlour pots on reef features within the Start Point to Plymouth Sound and Eddystone Special Area of Conservation at depths ranging from 20 to 30 metres. Sampling took place between late April and early September in 2014 and 2015. At 27 sites, a string of 4 inkwell pots and 4 parlour pots were deployed 200 m apart and were deployed in a fashion as they would under normal fishing conditions. GoPro cameras were attached to alternate pots at different angles to monitor movement and rope scour associated with the deployment and recovery of pots. Pots were left to soak for 25 minutes. The aim of the study was to quantify the mechanisms of potting interaction with the seabed and the true footprint of a pot. Additional biotic metrics were also used to quantify interactions with different taxa, including five indicator taxa known to be sensitive to fishing impact.

The study reported a haul corridor, the directly impacted area, of 3.22 ± 0.24 m^2 and a rapid haul time of 41 seconds, 20.7 seconds of which were in contact with the seabed. Pots took had an average settlement time of 3.5 seconds and once settled on the seabed, only the rims of the pot come into contact with the seabed, as opposed to the entire base and were reported to be relatively stationary during the soak period. 86% of deployments showed no movement, whilst 8% showed occasional sporadic and small movements and only one pot made significant movements throughout the soak period. Rope movement was observed for 51% of soaks, although this movement was minimal 46% of the time with only slight movements generated by the tide and no scour or species impacts.

4.3.2 *Abrasion/disturbance of the substrate on the surface of the seabed (Biological); Removal of 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 (*Dysidea*, *Hemimycale*, *Phorbas*, *Tethya*, Axinellids) increased significantly in experimental plots after potting, whilst in control plots no significant changes were found, except for an increase in *Dysidea* spp. *Halichondria* spp. abundance decreased significantly in control plots, but showed no significant change in experimental plots. In Lyme Bay, three out of five species (*Phallusta*, *Stelligera/Raspailia*, *Pentapora*) significantly increased in abundance in experimental plots, whilst in control plots no significant changes were found in the same three species, in addition to *Haliclona simlans*. Significant changes in *Haliclona* spp. and *Eucinella* spp. abundance (within experimental plots) could not be determined as a result of statistical limitations. *Pentapora foliacea* colony was found broken after hauling, although the cause of which is unknown and 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 contact 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 prevalent among 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 and compared these 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 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 randomly selected. 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 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. 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 6 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 6. 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 were 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; 2016) investigated 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 into a number of phases.

The first involved frequency analysis of biotopes from previously collected video footage for the purposes of condition monitoring (2002/03 and 2011), provided by Natural England, to examine if any biotope changes had occurred in relation to shellfish potting intensity. Data were extracted from previously collected video monitoring footage, undertaken in three transect corridors throughout the EMS (stratified by depth 0-10m, 10-20m, 20m+), 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. It was hypothesised temporal changes (between 2002/03 and 2011) were related to shellfish potting intensity. 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 and by the low frequency occurrence of rare biotopes. 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. The lack of observed change in biotopes between years meant fishing pressure as a cause of change was not investigated. 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 between years, 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, so species presence/absence was used to describe communities. It was hypothesised that there was a link between biotic changes and potting pressure. This was tested by examining potting pressure effects on changes in benthic community structure of individual biotopes across the EMS between years (2012/03 and 2011). Potting pressure data, was categorised into two levels (low = 0 – 226 and high = 227 – 770 pots / month / km^2). The effect of potting pressure on species presence/absence between years was investigated using a mixed model. Overall, the results indicated no significant changes in species composition of biotopes within the EMS between years. Post-hoc analysis revealed 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 and a significantly differing species composition between years. The author advised caution should be used during interpretation of results and temporal change is likely during this period, with further investigation recommended to determine specific links with pressures.

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), Species richness did not differ in response to fishing pressure however for this biotope (IR.MIR.KR.LhypT.Pk). In three out of ten biotopes, species richness differed between levels of fishing pressure (CR.MCR.EcCr.FaAlCr, CR.MCR.EcCR.FaAlCr.Bri and CR.MCR.EcCR.FaAlCr.Flu (*Flustra foliacea* on slightly scoured silty circalittoral rock)). Greater species richness was reported at low fishing pressures in nine out of ten biotopes when compared higher fishing pressures, although not all differences were 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 low 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 phase of the study aimed to quantify small scale potting impacts on two subtidal habitat types; 'Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock' (abbreviated as FaAlCr) and Laminaria hyperborea park with foliose red seaweeds on moderately exposed lower infralittoral rock (abbreviated as Lhyp.Pk) through in-situ experimental fishing using a BACI design (Stephenson *et al*., 2016). Historic intensively (187-265 pots month^{-1} km^{-2}) and lightly (0-139 pots month^{-1} km^{-2}) fished areas were chosen and subject to the same level of experimental potting (equivalent to 10,000 pots month^{-1} km^{-2}). Three sites were selected for each fishing pressure and habitat type. Due to a lack of suitable sites Lhyp.Pk habitat was only sampled for intensively fished areas. Each site consisted of two impact areas (25 x 10 m) and one control area (5 x 10 m). Baseline data was collected by divers using photoquadrats for impact and control sites. Following this, experimental fishing began in impact sites using a single parlour pot attached to a mainline rope, anchored by two weights. Parlour pots were soaked for a minimum of 24 hours and then hauled following local commercial methods. The impact and control areas were then resampled using the same method as the baseline data. Pots were left to soak, hauled and then sampled three times in each site. Benthos from the images collected were identified and recorded and percentage cover analysis was completed. Overall changes in percentage benthos cover were the same between treatments (control and experimental fishing) in both habitats and fishing pressures. Assemblages did not differ between baseline and control treatments for all sites, habitats and fishing pressures, allowing any changes found between baseline and impact treatments and not reflected in controls to be potentially explained by experimental fishing. Whilst significant interactions between baseline and impact treatments were reported, assemblages between control baseline and control impact treatments also differed and no differences were observed between impact and control impact treatments, indicating temporal change in community composition cannot be attributed to potting impacts. Only small differences were reported in overall abundance of different species between treatments in both habitat types. Percentage cover of species did not greatly differ between pre- and post-experimental fishing in impact or control areas, with no pattern in the benthos between treatments consistent with patterns predicted to occur from potting. FaAlCr habitats subject to intensive fishing activity exhibited a greater overall diversity and abundance of large erect species than areas of low fishing intensity showing that there is no evidence community composition differences between areas of different fishing intensity is caused by potting. The lack of short-term direct impacts shown by this study infer long-term direct impacts are unlikely in the habitats examined. The four phase explored pot movement over a 23 day period using novel acoustic telemetry methods (Stephenson *et al*., 2015) (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.

Gall (2016) investigated the direct physical and ecological impacts of inkwell and parlour pots on reef features within the Start Point to Plymouth Sound and Eddystone Special Area of Conservation. The methodology used and physical impacts observed are reported in section 6.2.1. During periods of rope movement (in 51% of soaks), minimal damage to taxa was observed and limited to abrasion of *A. digitatum* and *E. verrucosa*. Five instances were reported during which damage from rope contact was evident. On four occasions (3.7% of hauls), rope caught on A. digitatum; leading to abrasion and removal of 2 individuals. Direct impacts from pots were observed for 14 out of 22 identified taxa, including all five indicator species (*Alcyonium digitatum*, *Cliona celata*, *Eunicella verrucosa*, *Pentapora foliacea* and branching sponges) and individuals from six taxa were removed. Removed taxa included *Alcyonidium diaphanum, A. digitatum*, *C. celata, P. foliacea* and *D. grossularia*. Significantly more species were not damaged than damaged or removed however and in the few instances where a pot landed directly on top of an individual, *E. verrucosa* was observed to ‘bounce back’ once the pot had passed; supporting observations made by Eno *et al*. (2001). Although there was some level of damage and removal caused by potting impacts, the study suggested that the reef in Start Point to Plymouth Sound and Eddystone SCI is currently being maintained in a favourable condition, thus achieving the sites conservation objectives, despite the presence of potting activity.

There are a number of ongoing pieces of research into the effects of potting on benthic habitats, including Adam Rees at the University of Plymouth, and the Agri-Food and Biosciences Institute (AFBI).

The objectives of the study being conducted by Adam Rees include assessing the level of static gear likely to have a significant impact on benthic communities and mobile organisms associated with reef habitats, assessing how different gear intensities impact populations of target species (brown crab and European lobster) (see section 4.4.3) and to assess whether areas of no fishing can lead to spillover effects into surrounding areas. All of which are based in the Lyme Bay section of the Lyme Bay and Torbay SCI (Rees *et al*., 2016). This will be achieved by manipulating potting intensity across a set number of experimental areas (16 in total). Test areas measure 500 by 500 m and are located on mixed ground or rocky reef to allow for comparison. The four potting intensities being 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. Impacts on the benthic communities and mobile species are monitored using underwater video sampling, including baited underwater video for mobile species. Data collection began in the summer of 2013 and the latest results contain information collected during summer 2013 to 2015. Adverse weather experienced during December 2013 to March 2014 interrupted the project with many of the key sessile reef features and associated mobile species being significantly reduced as a result of increased wave action from storm events (Figure 7). Most reef areas were of a similar condition and represented a severely naturally disturbed state, likened to towed gear impacts and much more severe that any impacts which may occur as a result of the potting density study. Impacts from the period of adverse weather have removed any evidence of impact that the different levels of potting intensity may have started to show. As such project milestones were pushed back and an extra year was added to the project. Whilst this period of adverse weather served to interrupt the project it provides a unique opportunity to look at recovery under different fishing intensity scenarios.

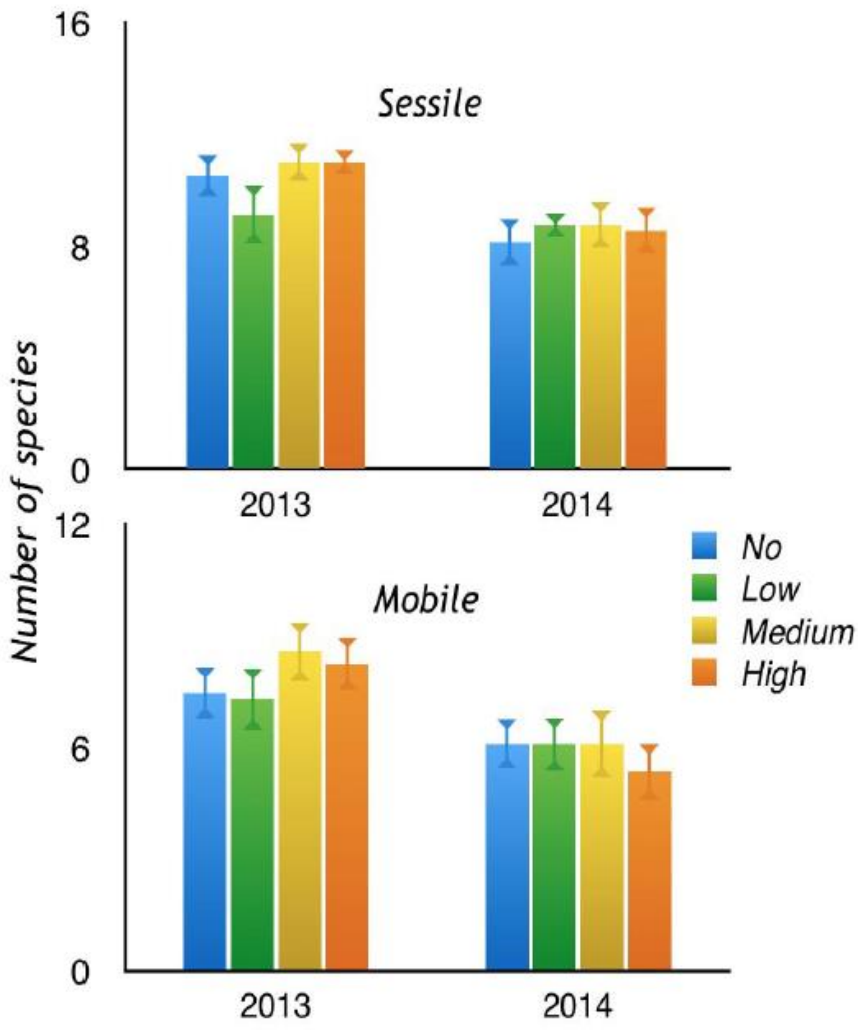

Figure 7. Changes in the number of sessile and mobile species between 2013 and 2014 in Lyme Bay, prior to and after a period of extreme weather (December 2013 to March 2014). Source: Rees, No Date.

Between 2013 and 2014, the overall abundance and species richness of sessile fauna was significant reduced across all potting intensities and in 2015 remained at a consistent level showing no treatment effects. In areas of medium and high potting intensities abundance and species richness were less than 2013 levels. It is important to note that in 2013, prior to the period of adverse weather, both mean abundance and species richness were higher in areas of medium and high gear intensities than no potting and low gear intensities. Decreases in abundance between 2013 and 2014 were mirrored in the following key indicator species and species group; dead man's finger (*Alcyonium digitatum*), Ross coral (*Pentapora fascialis*); the white sea squirt (*Phallusia mammillata*), encrusting species and large bodied erect species. Other species (Pink sea fans (*Eunicella verrucosa)* and the king scallop (*Pecten maximus*) did not exhibit a significant decline. This indicates the Pink sea fan have a tough exoskeleton and as such are more resilient to physical damage. In 2015, *P. mammillata*, a relatively fast growing species, had recovered significantly across all treatments exhibiting no treatment effect, whilst the slower growing *P. fascialis* only increased significantly in areas of no potting (similar to 2013 levels) when compared to other potting intensities. It is important to note however in areas of other potting intensity, some level of recovery was also observed. This indicates *P. fascialis* benefitted from a period of no potting, particularly in relation to its recovery. This is to be confirmed by 2016 results. Statistically, other species did not exhibit any signs of recovery but remained at a consistent level across all potting intensities.

Mobile fauna abundance and species richness declined across all treatments between 2013 and 2014 and between 2014 and 2015 increased in all treatments. Such declines may be associated with the removal of sessile reef species. Significant treatment effects were reported in areas of no potting and medium intensity potting, with higher abundances reported in both. Grouped large fish declined in all treatments (except no potting) between 2013 and 2014, remaining at similar levels in 2015 with no sign of recovery; perhaps caused by removal of key reef species which are still recovering.

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.

4.3.3 *Removal of target species*

Fishing leads to the removal of certain species from an ecosystem. More specifically, potting principally targets edible crab, European lobster, and whelk, 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. Removing top predators, such as lobsters or large edible crabs, may lead to indirect destabilizing effects on the ecosystem as a result of alterations to food web interactions (Eno *et al*., 2001; Stephenson *et al*., 2016). There is a strong interaction between crustacean target species and other non-target species, thus any removal is likely to impact on the structure of benthic communities (Stephenson *et al*., 2016). Literature on the ecological effects of selective extraction of target species is relatively limited and little studied as a result of the long timescales needed for such studies (Stephenson *et al*., 2016). The following studies however may give some insight 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.

A study by Rees *et al*. (2016) is currently assessing how different gear intensities impact populations of target species (brown crab and European lobster) and has also begun to assess whether areas of no fishing can lead to spillover effects into surrounding areas. A quantitative experimental potting survey is being used to sample and collect data on target species populations from each experimental area on a quarterly basis and potential spillover effects are being assessed using no potting control areas inside treatment areas. Spillover effects will be quantified by using pots deployed within a 10 metre zone surrounding each experimental area. Data collection for spillover effects only began in summer 2016 and as such no analysis has yet been completed. Abundance, carapace width and total wet weight were used as response variables for target species. Data collected in the summer months of 2013 to 2015 was used to assess how different gear intensities may impact target species populations. Brown crab showed a relative reduction in abundance between 2013 and 2014 although abundance and appeared to be variable between year and treatment. This was mirrored in mean carapace width and mean weight, with both reducing significantly across all treatments between 2013 and 2014 but increasing (although not significantly) in 2015. European lobster exhibited a contrasting trend to brown crab, with mean abundance increasing significantly between 2013 and 2014 in all treatments except for high potting intensities (which was significant higher than other treatments in 2013). Between 2014 and 2015, mean abundance significantly increased in areas of no potting, becoming significantly higher than abundances in areas of high potting intensity. Mean abundance remained constant between 2013 and 2015 in high intensity areas. A lack of increase between years, as seen in other treatments, may suggest a negative impact of high intensity areas. Mean weight and carapace length significantly decreased across all treatments and between 2013 and 2014 and did not increase in 2015. These patterns in mean carapace length and weight are largely driven by changes in 'undersized' lobsters (i.e. those below the minimum landing size of 87 mm carapace length), who's abundance was significantly higher between 2013 and 2014 in low potting intensity areas and significantly greater than in other treatments. Mean abundances of under sized lobster were significantly greater in no potting and low intensity areas in 2015 when compared to medium and high intensity areas.

A study by Babcock *et al*. (1999) based in New Zealand investigated whether changes in protected predators, in 'no take' marine reserves, resulted in indirect changes to grazers and subsequently algal abundances. Abundances of spiny lobster (*Jasus edwardsii*) were approximately 1.6 to 3.7 times greater inside reserves than outside reserves. The mean carapace length of spiny lobsters was also greater inside reserves, with a mean carapace length of 109.9 mm compared with 93.5 m outside the reserves. Similar trends were displayed by the demersal predatory fish *Pagrus auratus*. Densities of the sea urchin, *Evechinus chloroticus* however declined from 4.9 to 1.4 m^{-2} and as a result kelp forests become more extensive inside of the reserves (due to a lack of grazing action). This led to a lack of dominance of urchin-dominated barrens, occupying only 14% of available reef substratum inside of reserves, as opposed to 40% outside of reserves. Authors speculated higher predation upon sea urchins inside reserves by enhanced populations of lobsters and predatory fish, led to observed changes in community structure i.e. significantly lower proportional cover of urchin-grazed rock flat habitats and increases in macroalgal cover.

Siddon and Witman (2004) examined the indirect effects of changes in predator behaviour (prey switching) in a shallow subtidal food web off the Isles of Shoals, Maine in the USA. Crab (*Cancer borealis*) predation on sea urchins (*Strongylocentrous droebachiensis*) was investigated in three habitats (*Codium* fragile algal beds, barrens, and mussel beds); representing different combinations of food and shelter. The lobster (*Homarus americanus*) was also added to the experiment to investigate multiple predator effects. In areas lacking alternate prey species, urchin mortality rates were high, whereas in mussel beds (which represent an alternate food source) crab predation on sea urchins was functionally eliminated. In areas of high urchin mortality, crabs had a positive indirect effect the introduced ascidian *Diplosoma* sp. The foraging effectiveness of crabs was dampened by the introduction of lobsters, leading to a predation risk reduction for urchins. This reduction is attributed to the modification of crab behaviour by lobsters as no direct trophic linkage exists between the two species. The presence of mussels reduced the interaction strength between crab and lobsters on urchins. The authors concluded that crab and lobster are strong interactors and the inclusion of a secondary predator species help to dampen or stabilize community structure. In the Maine fishery, American lobster comprises the majority of commercial landings, follows by sea urchins and crab, which comprises a minor fishery. This is likely to lead to increases in widespread crab predation of sea urchins and indirect increases in *Diplosoma*.

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>Whelk – *Buccinum undatum*</u>

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.

<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.

4.3.4 Sensitivity

4.3.4.1 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 the 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 Needles MCZ are provided in table 7. The table also includes sensitivity information assigned by MarLIN in relation to physical disturbance and abrasion. Please note that the sensitivity ratings assigned by MarLIN are based on a single dredging event, the force of which is likely to be greater in magnitude than the impacts caused by potting. Also note this is not an exhaustive list of potentially vulnerable species, these were selected based on those which occur in MacDonald *et al*. (1996), The Needles post-survey site report and South Wight Maritime SAC Conservation Advice packages (as an indicator from a nearby MPA with similar designated habitat types).

Table 7. Likely sensitivity of species (representative of sensitive designated features: moderate energy circalittoral rock) 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 gears)**	**Intolerance**	**Recoverability**	**Sensitivity**
Flustra foliacea	Hornwrack	2	2	11	Intermediate	High	Low
Cliona celata (massive)	A boring sponge	2	2	11	-	-	-
Alcyonium digitatum	Dead man's fingers	1	2	5	Intermediate	High	Low
Tubularia indivisa	Oaten pipes hydroid	3	1	8	-	-	-
*Nemertesia antennina**	Sea beard	2	1	5	-	-	-
Halichondria panacea	Breadcrumb sponge	1	1	3	-	-	-
Pomatoceros triqueter	Keelworm	1	1	3	-	-	-
-	Encrusting/ Coralline algae	1	1	3	-	-	-

**Nemertesia* spp. is recorded within The Needles MCZ and nearby South Wight Maritime SAC, not specifically *Nemertesia antennina*.

4.3.4.2 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, removal of non-target species and removal of target species. The sensitivity of moderate energy circalittoral rock to relevant pressures appears to range. The feature is least sensitive to removal of target species and most sensitive to removal of non-target species, whilst experiencing low to high sensitivity to surface abrasion (Table 8).

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 – pots’ as this best encompassed the fishing activities under consideration. Both habitat types had low sensitivity to a single pass of the activity. As expected, rock with erect and branching species exhibited the greatest sensitivity, whilst rock with low-lying fast growing faunal turf exhibited low sensitivity to all gear intensities except for heavy gear intensity (Table 9).

Table 8. Sensitivity of relevant 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	Removal of target species
Moderate energy infralittoral rock	Medium (Low)	Medium (Low)	Medium (Medium)
High energy infralittoral rock	Medium (Low)	Medium (Low)	Medium (Medium)
Moderate energy circalittoral rock	Low to High (Low)	Medium to High (Medium)	Not Sensitive to Medium (High)
Subtidal chalk	Low (Low)	Low (Medium)	Not sensitive (Medium)

Table 9. Sensitivity of relevant 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).

Gear Type	**Habitat Type**	**Gear Intensity***			
		Heavy	Moderate	Light	Single pass
Static gear - pots	**Rock with erect and branching species**	High	Medium	Medium	Low
	Rock with low-lying fast growing faunal turf	Medium	Low	Low	Low

* **Heavy** – Lifted daily, more than 5 pots per hectare (i.e. 100m by 100m), **Moderate** – Lifted daily, 2-4 pots per hectare, **Light** – Lifted daily, less than 2 pots per hectare, **Single** – Single accidental fishing event of a string

4.4 Existing Management Measures

- **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, with vessels often using lighter towed gear and restricted to carry less static gear.

- **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.

- **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.

- **The 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.

- **The Lobsters and Crawfish (Prohibition of Fishing and Landings) (Amendment) (England) Order 2017 No. 899** – national legislation which prohibits UK registered vessels from fishing for egg bearing (berried) lobsters in English waters and the landing of berried lobsters in England, regardless of where it may have been caught.

- 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).

4.5 Site Condition

Natural England provides information on the condition of designated sites and describes the status of interest features.

Under the Habitats Directive, relevant for Special Areas of Conservation (SACs) and Sites of Community Importance (SCIs), the United Kingdom is obliged to report on the Favourable Conservation Status of Annex I and Annex II features every 6 years. There are similar reporting requirements under the Birds Directive, relevant for Special Protection Areas (SPAs). Under the Marine and Coastal Access Act there is also a need to assess the achievement of conservation objectives for MCZs. Alongside national reporting requirements, the ability to provide a current view of feature condition within protected sites is crucial to underpin advice on site management and casework.

During 2015-16 Natural England has reviewed, refined and tested the condition assessment methodology to provide more robust results. Natural England will employ this methodology to start a rolling programme of marine feature condition assessments in 2017-18, which will be conducted by their Area Teams. Condition assessments for the designated features of the Needles MCZ have not yet been undertaken. In the absence of this information, a vulnerability assessment was undertaken as a proxy for condition.

4.6 Table 10. Assessment of potting pressures upon relevant features in the Needles MCZ

Feature	Attribute	Target	Potential pressure(s) and Associated Impacts	Likelihood of Impacts Occurring/Level of Exposure to Pressure	Mitigation measures
Moderate energy infralittoral rock	Distribution: presence and spatial distribution of infralittoral rock communities	Target information not available.	Abrasion/disturbance of the substrate on the surface of the seabed and removal of non-target species were identified as potential pressures. Benthic communities can be directly impacted by potting through crushing, entanglement or removal when gear is being deployed, hauled or current the influence of currents or waves which can involve lateral damage. Erect and branching species, are often characterised by slow growth and therefore considered particularly vulnerable to physical damage. There is a relatively paucity of scientific evidence on the impacts of potting on	There is the potential for up to five vessels to pot (using all three potting methods) within the Needles MCZ, with one to two vessels currently known to fish within the site. The number of pots within the area is unknown, however it is believed to be of light to moderate intensity (although definitions of fishing effort largely vary between studies – see Annex 6). The level of fishing effort is however not consistent throughout the year, with crab and lobster potting (the main type of potting within the site) generally focused during the winter months when conditions limit access to other areas (i.e. South Wight). Whelk pots are predominantly deployed throughout the winter and spring and potting for	Vessels Used in Fishing byelaw prohibits commercial fishing vessels over 12 metres from fishing within the Southern IFCA district. The reduction in vessel size also restricts the level of pots that can be worked.

			benthic communities in comparison with mobile gear. Existing literature, the majority of which has been recently published, infers that potting impacts on temperate rocky habitats are negligible or limited in extent (Eno *et al*., 2001; Shester & Micheli, 2011; Coleman *et al*., 2013; Young *et al*., 2013; Haynes *et al*., 2014; Stephenson *et al*., 2015; 2016; Gall, 2016), especially when compared to impacts caused by periods of adverse weather conditions (Young *et al*., 2013; Rees, no date).	cuttlefish concentrated from April to June. Colocation of sightings data and feature mapping reveal crab and lobster potting occurs relatively close inshore in areas surrounding or adjacent to moderate energy infralittoral rock. Whelk potting also occurs close in shore in areas surrounding moderate energy infralittoral rock, but also extends to the mid- and outer reaches of the site. Sensitivity analyses of species likely to occur or which occur within the MCZ (see section 4.4.4.1) do not highlight any species as being particularly sensitivity to low intensity gears and physical disturbance and abrasion. Existing scientific literature suggests 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 expected to be caused by potting impacts (Rees, no date).	
	Structure: presence and abundance of typical species	Target information not available.	Abrasion/disturbance of the substrate of the surface of the seabed and removal of non-target species are addressed above. The removal of target species was identified as a potential pressure (and is not addressed above). European lobster, edible crab, common whelk and common cuttlefish are all targeted by potting which lead to the removal of individuals above a minimum landing size (except cuttlefish which are taken at any size). Such removal may lead to ecological effects on the structure and functioning of benthic communities. Such effects have been the subject of a number of studies. Hoskin *et al*. (2011) reported an expansion of	There is the potential for up to five vessels to pot (using all three potting methods) within the Needles MCZ, with one to two vessels currently known to fish within the site. The number of pots within the area is unknown, however it is believed to be of light to moderate intensity (although definitions of fishing effort largely vary between studies – see Annex 6). The level of fishing effort is however not consistent throughout the year, with crab and lobster potting (the main type of potting within the site) generally focused during the winter months when conditions limit access to other areas (i.e. South Wight). Whelk pots are predominantly deployed throughout the winter and spring and potting for	Vessels Used in Fishing byelaw prohibits commercial fishing vessels over 12 metres from fishing within 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 promotes 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,

			European lobster populations at the expense of other crustacean species (edible crab and velvet swimming crab). Rees *et al*. (2016) studied the effects of different gear intensities on target species populations. The study was interrupted by a period of adverse weather. Edible crab showed variable abundances between years and gear intensities, with reduction observed during the period of adverse weather. European lobster abundance increased in areas of no potting, low and medium gear intensities and remained constant in high gear intensity areas, potentially suggesting a negative impact of high intensity areas on lobster abundances. Potential ecological effects of removing target species were investigated by Wootton *et al*. (2015). Based on information	cuttlefish concentrated from April to June. The relatively high selectivity of pots results in low incidental bycatch of undersized lobsters, crab and whelks, which are subsequently returned to the sea alive. The selectivity of pots is improved through the use of escape gaps, the use of which has been encouraged through a voluntary scheme run in the Southern IFCA district. Colocation of sightings data and feature mapping reveal crab and lobster potting occurs relatively close inshore in areas surrounding or adjacent to moderate energy infralittoral rock. Whelk potting also occurs close in shore in areas surrounding moderate energy infralittoral rock, but also extends to the mid- and outer reaches of the site. Studies on the likely impacts of the selective extraction of the target species conclude	thus reducing mortality and chance of appendage loss. Protection of Berried (Egg Bearing) Lobsters byelaw and very recent amendments to the Lobsters and Crawfish (Prohibition of Fishing and Landing Order), 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. Together, these pieces of legislation help to protect 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

			known on the expansion of European lobster populations (Hoskin *et al.*, 2011), controlled populations (i.e. through some level of commercial exploitation) may reduce the chance of adverse ecological effects. Edible crab, velvet swimming crab, whelk and cuttlefish are reported to belong to large functional groups. Therefore if one of these species diminishes potential negative adverse effects on ecosystem function and structure are likely to be negated as another species could easily fill the ecological niche left. One potential concern raised was the removal of large edible crabs as they constitute apex predators, alongside European lobster. The potential for ecological perturbations therefore may occur if the European lobster was unable to fill the niche left by the removal of large edible crabs.	limited potential for significant adverse ecological effects.	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).

	Structure: species composition of component communities	Target information not available.	Addressed above.	Addressed above.	Addressed above.
High energy infralittoral rock	Distribution: presence and spatial distribution of biological communities	Target information not available.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock. Broadscale habitat map for the Needles MCZ does not show any areas of high energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.
	Structure and function: presence and abundance of key structural and influential species	Target information not available.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock. Broadscale habitat map for the Needles MCZ does not show any areas of high energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.
	Structure: species composition of component communities	Target information not available.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.

				Broadscale habitat map for the Needles MCZ does not show any areas of high energy infralittoral rock.	
Moderate energy circalittoral rock	Distribution: presence and spatial distribution of biological communities	Target information not available.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.
	Structure and function: presence and abundance of key structural and influential species	Target information not available.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.
	Structure: species composition of component communities	Target information not available.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.
Subtidal chalk	Distribution: presence and spatial distribution of communities	Target information not available.	Abrasion/disturbance of the substrate on the surface of the seabed and removal of non-target species were identified as potential pressures. Benthic communities can be directly impacted by	There is the potential for up to five vessels to pot (using all three potting methods) within the Needles MCZ, with one to two vessels currently known to fish within the site. The number of pots within the area is unknown, however it	Vessels Used in Fishing byelaw prohibits commercial fishing vessels over 12 metres from fishing within the Southern IFCA district. The reduction in vessel

			potting through crushing, entanglement or removal when gear is being deployed, hauled or current the influence of currents or waves which can involve lateral damage. Erect and branching species, are often characterised by slow growth and therefore considered particularly vulnerable to physical damage. Species that are able to bore into chalk reefs, such as piddocks, which occur throughout the neighbouring South Wight Maritime SAC, are however predicted to be relatively unaffected by static fishing gear. There is a relatively paucity of scientific evidence on the impacts of potting on benthic communities in comparison with mobile gear. Existing literature, the majority of which has been recently published, infers that potting impacts on temperate rocky habitats are negligible or limited in extent (Eno *et al*.,	is believed to be of light to moderate intensity (although definitions of fishing effort largely vary between studies – see Annex 6). The level of fishing effort is however not consistent throughout the year, with crab and lobster potting (the main type of potting within the site) generally focused during the winter months when conditions limit access to other areas (i.e. South Wight). Whelk pots are predominantly deployed throughout the winter and spring and potting for cuttlefish concentrated from April to June. Colocation of sightings data and feature mapping reveal crab and lobster potting occurs relatively close inshore in the vicinity of subtidal chalk (using HOCI points) areas. Whelk potting also occurs close inshore in relative close proximity to areas of subtidal chalk (although to a lesser extent to crab and lobster potting), but also but also extends to the	size also restricts the level of pots that can be worked.

			2001; Shester & Micheli, 2011; Coleman *et al*., 2013; Young *et al*., 2013; Haynes *et al*., 2014; Stephenson *et al*., 2015; 2016; Gall, 2016), especially when compared to impacts caused by periods of adverse weather conditions (Young *et al*., 2013; Rees, no date). Only one of the above-mentioned studies was based on chalk reef communities located in Flamborough Head EMS (Young *et al*., 2013). Results of the study reported a higher abundance of benthic taxa in non-fished sites (in comparison to fished sites) and a slightly higher percentage of bare substrate (7.2%) in fished areas. The authors stated that 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 epifauna	mid- and outer reaches of the site. Sensitivity analyses of species likely to occur or which occur within the MCZ (see section 4.4.4.1) do not highlight any species as being particularly sensitivity to low intensity gears and physical disturbance and abrasion. Existing scientific literature suggests the impact of potting on benthic communities is negligible or limited in extent over areas of bedrock. The limited research conducted on chalk reefs makes it difficult to assess the true extent of any potential pressures which may result from potting activity. To date, the only study conducted on chalk reefs advises interpreting the results with caution due to the degree of uncertainty that was introduced as a result of adverse weather conditions. Damage to benthic habitats caused by adverse weather conditions in Lyme Bay have been reported to be far in	

			across both fished and non-fished sites.	excess of that caused by the impacts of potting (Rees, No date).	
	Structure and function: presence and abundance of key structural and influential species	Target information not available.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.
	Structure: species composition of component communities	Target information not available.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.	Addressed above under Moderate energy infralittoral rock.

5. Conclusion

Research into the impacts 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; 2016; Gall, 2016) and preliminary results from ongoing studies (Adam Rees, 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; Rees, no date). Periods of extreme weather over the course of a number of studies have compounded results and introduced a degree of uncertainty (Young *et al*., 2013; Rees, no date). A study by Young *et al*. (2013), based on chalk reefs in Flamborough Head EMS, reported a higher abundance of benthic taxa in non-fished sites when compared to fished sites, however the authors stated a degree of uncertainty must be associated with the survey results due to unusually adverse weather which scoured both sites and led to reductions in epibiota across both sites.

Potting in the Needles MCZ can take place all year round and does so on a regular basis at certain times of year (predominantly winter months). Combined sightings data and feature mapping data (provided by Natural England) show that potting for crab and lobster and whelks occurs in areas surrounding moderate energy infralittoral rock and in the vicinity of subtidal chalk habitats (in the southern end of the site).

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, whelks and cuttlefish, is unlikely to have a significant impact on moderate energy infralittoral rock, high energy circalittoral rock, moderate energy circalittoral rock and subtidal chalk features within the Needles MCZ. This is based on the level of gear intensity (considered to be light to moderate), very low numbers of vessels currently partaking in the fishery and the low number of vessels with the potential to partake in the fishery, in combination with the lack of scientific evidence which suggests potting is unlikely to have a significant adverse impact on temperate rocky habitats.

It is Southern IFCA’s duty as the competent and relevant authority to manage damaging activities that may impact the achievement of a designated features general management approach, lead to deterioration of the site or hinder the conservation objectives of the site. The light to moderate levels of gear intensity, low number of vessels partaking or with the potential to partake in the fishery 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 hinder the achievement of the general management approaches of relevant features 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 the 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.

6. In-combination assessment

Southern IFCA is not aware of any developments within- or in the vicinity of the Needles MCZ which would lead to in-combination effects.

It has been concluded that, alone, potting within the Needles MCZ will not lead to the deterioration of the site or hinder the conservation objectives of the site. There may be potential for potting to pose a significant risk in-combination with other fishing activities that occur within the site. These are outlined section 6.1. Only fishing activities that were screened in for a part A assessment are considered here. Within the Needles MCZ, and wider Solent, commercially licensed fishing vessels are known to utilise a number of different gear types and can be engaged within multiple fishing activities. Whilst this divides effort between gear types (typically static gear), multiple fishing activities may lead to cumulative impacts which differ to those of a single fishing activity.

6.1 Other fishing activities

Fishing activity	Potential for in-combination effect
Static – pots/traps (Pots/creels – crustacean/gastropod & cuttle pots)	Trawling takes place on the fringes of the site using light otter trawls. The level of activity is however very low with one to two vessels. There is potential for the activity to overlap with whelk potting which may take place on the outer reaches over subtidal sediments, which are not the subject of this assessment. Static gear types, such as potting, and mobile gear types, such as trawling, are however not compatible and so often occur in different areas, thus largely eliminating any spatial overlap between the two activities. In addition, potting alone is considered to be low impact and as such unlikely to lead to any in-combination effects over areas of subtidal sediment.
Static – fixed nets (Gill nets, trammels, entangling)	It is anticipated that static fixed nets are used within the site in areas of shallow water and will therefore have potential to overlap with potting activity (especially crab and lobster) which occurs close inshore. It is anticipated that the level of fishing activity is however very low, with the area worked by 1 to 2 vessels. Netting has the potential to lead to physical abrasion with the seabed however the area of seabed affected is small. Both netting and potting are considered low impact activities, with the latter being shown to have by a number of scientific studies to have negligible or no impact on reef features. In addition, the activities target different species. Based on this, the two activities are not likely to lead to any in-combination effects.
Lines (Longlines – demersal)	It is anticipated that demersal longlines are used within the site. The area where the activity may take place however is unknown and may potentially overlap with potting. It is anticipated that the level of fishing activity is however very low, with the area worked by 1 to 2 vessels. Demersal longlining has the potential to lead to physical abrasion (through contact with weights and potentially lead line) however the area of seabed affected is limited. Both demersal longlining and potting are considered low impact activities, with the latter being shown to have by a number of scientific studies to have negligible or no impact on reef features. In addition, the activities target different species. Based on this, the two activities are not likely to lead to any in-combination effects.

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Annex 1. Natural England’s scoping advice for the Needles MCZ

Date: 27 January 2017
Our ref: 204559
Your ref: Needles MCZ scoping advice

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BY EMAIL ONLY

Dear Vicki

Natural England's advice on the potential impacts of commercial fishing within the Needles Marine Conservation Zone (MCZ)

Thank you for your request for the above which was received on 14 December 2016. The following constitutes Natural England's formal response.

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 (EMSs). The objective of the revised approach is to ensure that all existing and potential commercial fishing activities in EMSs are managed in accordance with Article 6 of the Habitats Directive. In addition to this requirement, Inshore Fisheries and Conservation Authorities (IFCAs) are responsible for assessing the impacts of commercial fishing within Marine Conservation Zones (MCZs) designated under the Marine and Coastal Access Act 2009.

Southern IFCA (SIFCA) has requested scoping advice from Natural England as the Conservation Advice package for the Needles MCZ has not yet been published. This advice will inform SIFCA's assessment of commercial fishing impacts within the site, thereby fulfilling their duties under the Marine and Coastal Access Act 2009.

1. Legal Requirements

SIFCA has duties concerning the protection of Marine Conservation Zones under section 154 of the Marine and Coastal Access Act 2009 which states that:

(1) The authority for an IFC district must seek to ensure that the conservation objectives of any MCZ in the district are furthered.

(2) Nothing in section 153(2) is to affect the performance of the duty imposed by this section.

(3) In this section—

(a) "MCZ" means a marine conservation zone designated by an order under section 116;

(b) the reference to the conservation objectives of an MCZ is a reference to the conservation objectives stated for the MCZ under section 117(2)(b).

Section 125 of the Marine and Coastal Access Act 2009 also requires public authorities (including IFCAs) to exercise their functions in a manner to best further (or, if not possible, least hinder) the conservation objectives of MCZs.

2. The Needles MCZ

2.1 Overview and designated features

The Needles MCZ was designated in January 2016 and covers the stretch of Solent adjacent to the northwest side of the Isle of Wight to just south of the Needles, including a series of sheltered bays. The site covers an area of approximately 11 km² and protects a number of rare and fragile habitats including chalk on the seabed, shallow water (infralittoral) rock and soft sediments which support communities of algae, sponges, sea squirts and delicate anemones. The site also protects seagrass beds in both Totland and Colwell Bays, together with rare and threatened species such as the Stalked jellyfish (*Lucernariopsis campanulata*) and Peacock's tail (*Padina pavonica*).

A summary of the site's designated features is provided in Table 1. For each designated feature, a General Management Approach (GMA) has been identified in order to achieve the conservation objective for that feature. The GMA required for a feature will either be for it to be maintained in favourable condition (if it is currently in this state), or for it to be recovered to favourable condition (if it is currently in a damaged state) and then to be maintained in favourable condition. Generally for a habitat, favourable condition is defined as:

1. its extent is stable or increasing; and
2. its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.[1]

Table 1: Designated features and General Management Approach

Designated feature	General Management Approach
Moderate energy infralittoral rock	Maintain in favourable condition
High energy infralittoral rock	Maintain in favourable condition
Moderate energy circalittoral rock	Maintain in favourable condition
Subtidal chalk	Recover to favourable condition
Subtidal coarse sediment	Recover to favourable condition
Subtidal mixed sediments	Recover to favourable condition
Subtidal sand	Recover to favourable condition
Subtidal mud	Recover to favourable condition
Sheltered muddy gravels	Recover to favourable condition
Seagrass Beds	Recover to favourable condition
Stalked jellyfish (*Lucernariopsis campanulata*)	Maintain in favourable condition
Peacock's tail (*Padina pavonica*)	Recover to favourable condition
Native oyster (*Ostrea edulis*)	Recover to favourable condition

Data on the presence and extent these features has been provided to SIFCA through Natural England's Evidence Mapping Project. Alternatively, this data is available to view online using Defra's Magic Map application: http://magic.defra.gov.uk/MagicMap.aspx.

2.2 Conservation Objectives

The site's high level conservation objectives apply to the Marine Conservation Zone and the individual species and/or habitat for which the site has been designated (the "Designated features" listed below).

The conservation objective of each of the zones is that the protected habitats:

1. are maintained in favourable condition if they are already in favourable condition;

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/259972/pb14078-mcz-explanatory-note.pdf

2. be brought into favourable condition if they are not already in favourable condition.

For each protected feature, favourable condition means that, within a zone:

1. its extent is stable or increasing;
2. its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming part or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

For each species of marine fauna, favourable condition means that the population within a zone is supported in numbers which enable it to thrive, by maintaining:

1. the quality and quantity of its habitat;
2. the number, age and sex ratio of its population. Any temporary reduction of numbers of a species is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

2.3 Condition assessments

Under the Habitats Directive, relevant for Special Areas of Conservation (SACs) and Sites of Community Importance (SCIs), the United Kingdom is obliged to report on the Favourable Conservation Status of Annex I and Annex II features every 6 years. There are similar reporting requirements under the Birds Directive, relevant for Special Protection Areas (SPAs). Under the Marine and Coastal Access Act there is also a need to assess the achievement of conservation objectives for MCZs. Alongside national reporting requirements, the ability to provide a current view of feature condition within protected sites is crucial to underpin advice on site management and casework.

During 2015-16 Natural England has reviewed, refined and tested the condition assessment methodology to provide more robust results. We will employ this methodology to start a rolling programme of marine feature condition assessments in 2017-18, which will be conducted by our Area Teams. At the time of writing, condition assessments for the designated features of the Needles MCZ have not yet been undertaken. In the absence of this information, a vulnerability assessment was undertaken as a proxy for condition. The vulnerability assessment for specific fishing activities is discussed further in section 3.1.

3. Potential impacts that could prevent the achievement of conservation objectives

3.1 Screening of pressure-feature interactions

Consistent with SIFCA's previous assessments of fishing in MCZs, Natural England recommends that an initial screening exercise is undertaken to identify fishing activities which have been identified as occurring, have the potential to occur and/or are anticipated to occur in the foreseeable future within the site. Activities which are not screened out at this stage should proceed to Part A assessment, in order to identify any pressures capable of significantly affecting designated features or their related processes.

Prior to the designation of the Needles MCZ in January 2016, Natural England conducted a vulnerability assessment to consider the exposure and sensitivity of each feature to a comprehensive range of pressures arising from human activities. Natural England liaised with SIFCA during this process in order to identify the type, location and intensity of commercial fishing

activities occurring within the site. The vulnerability assessment conducted by Natural England identified a number of features as being vulnerable (i.e. exposed and sensitive to pressures) to anchored nets/lines, demersal trawling, dredging and shore-based based activities (Table 2). We would therefore expect these feature-activity interactions to be included within a more-detailed Part B assessment. However, we recommend that SIFCA review the type, location and intensity of all fishing activities in the site to ensure that no significant changes have occurred since the vulnerability assessment was conducted.

Table 2: Summary of feature-fishing activity vulnerability assessment for Needles MCZ

Designated feature	Vulnerability to fishing activity type/s
Subtidal chalk	Demersal trawling; Dredging
Subtidal coarse sediment	Demersal trawling; Dredging
Subtidal mixed sediments	Demersal trawling; Dredging
Subtidal sand	Demersal trawling; Dredging
Subtidal mud	Demersal trawling; Dredging
Sheltered muddy gravels	Demersal trawling; Dredging
Seagrass beds	Anchored nets/lines; Shore-based activities
Peacock's tail (*Padina pavonica*)	Demersal trawling
Native oyster (*Ostrea edulis*)	Demersal trawling; Dredging

3.2 Assessment of impacts

For the purposes of both the Part A and Part B assessment, we recommend that the analysis of fishing-related pressures is informed by Natural England's Advice on Operations. This advice is designed to provide an initial assessment of whether an activity may have an impact on a designated feature, using information on its resilience (an ability to recover) and resistance (the level of tolerance) to physical, chemical and biological pressures[2].

In the absence of published Advice on Operations for the Needles MCZ, we have provided generic draft advice on fishing activity-pressure interactions for each designated feature where available. This advice is provided in Annex 1 but can also be made available electronically if required. However, please note that this advice does not constitute Natural England's statutory advice and may therefore be subject to change. Natural England will provide SIFCA with a copy of the finalised Advice on Operations for this site upon completion.

Additionally, because the draft advice provided in Annex 1 is based upon published Regulation 35 Conservation Packages for designated (Tranche 1) MCZs, there are a number of features where Advice on Operations has not yet been produced by Natural England. This applies to the following features of the Needles MCZ:

- Sheltered muddy gravels
- Stalked jellyfish (*Lucernariopsis campanulata*)
- Peacock's tail (*Padina pavonica*)

In the absence of Advice on Operations for these three features, we recommend that SIFCA consider the following key pressures when undertaking their assessment:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Introduction or spread of non-indigenous species
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
- Physical change (to another seabed type)

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/520313/advice-on-operations-guidance.pdf

- Removal of non-target species
- Siltation rate changes (Low), including smothering

It should also be noted that the assessments of sensitivity to fishing-related pressures are measured against a benchmark. These benchmarks are representative of the likely intensity of a pressure caused by typical activities, and do not represent a threshold of an 'acceptable' intensity of a pressure. It is therefore necessary to consider how the level of fishing intensity observed within the Needles MCZ compares with these benchmarks when screening individual activities. Furthermore, Natural England's Advice on Operations does not provide information on the vulnerability of the features (determined by a feature's sensitivity to an activity and its exposure to that activity) because the location and intensity of fishing activities are subject to change.

4. Summary

Natural England welcomes the opportunity to work collaboratively with SIFCA in assessing the impacts of commercial fishing within MCZs. We trust that this scoping advice will assist with the fisheries assessment for the Needles MCZ, but would like to reiterate that in the absence of a published Conservation Advice package this advice may be subject to change. As a final note, we would also be happy to work with SIFCA in the development of any management measures that may result from this assessment.

For any queries relating to the content of this letter, please do not hesitate to contact myself or my colleague Andrzej Narozanski (0208 225 6978; andrzej.narozanski@naturalengland.org.uk).

Yours sincerely

R.D. Morgan.

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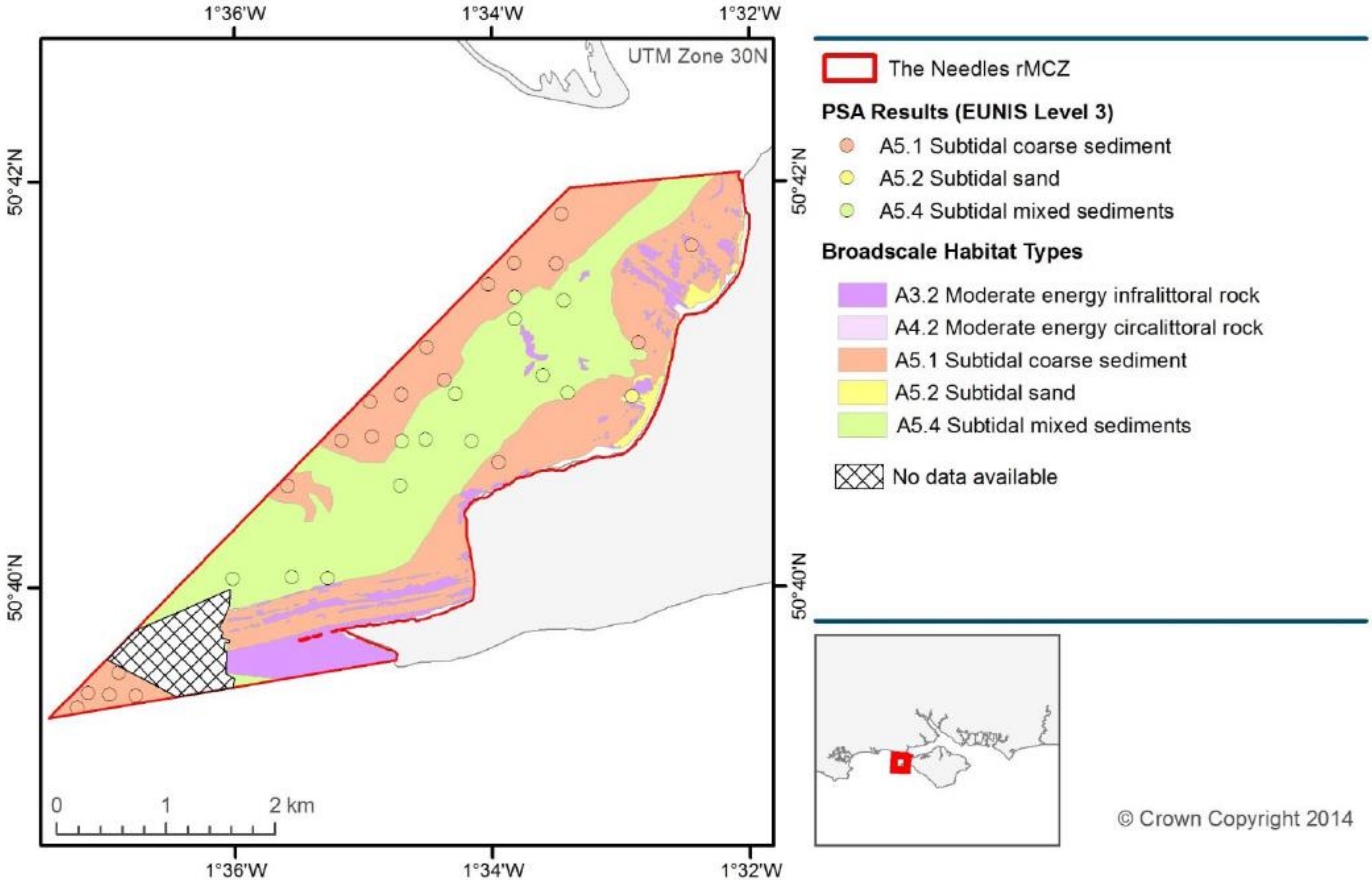
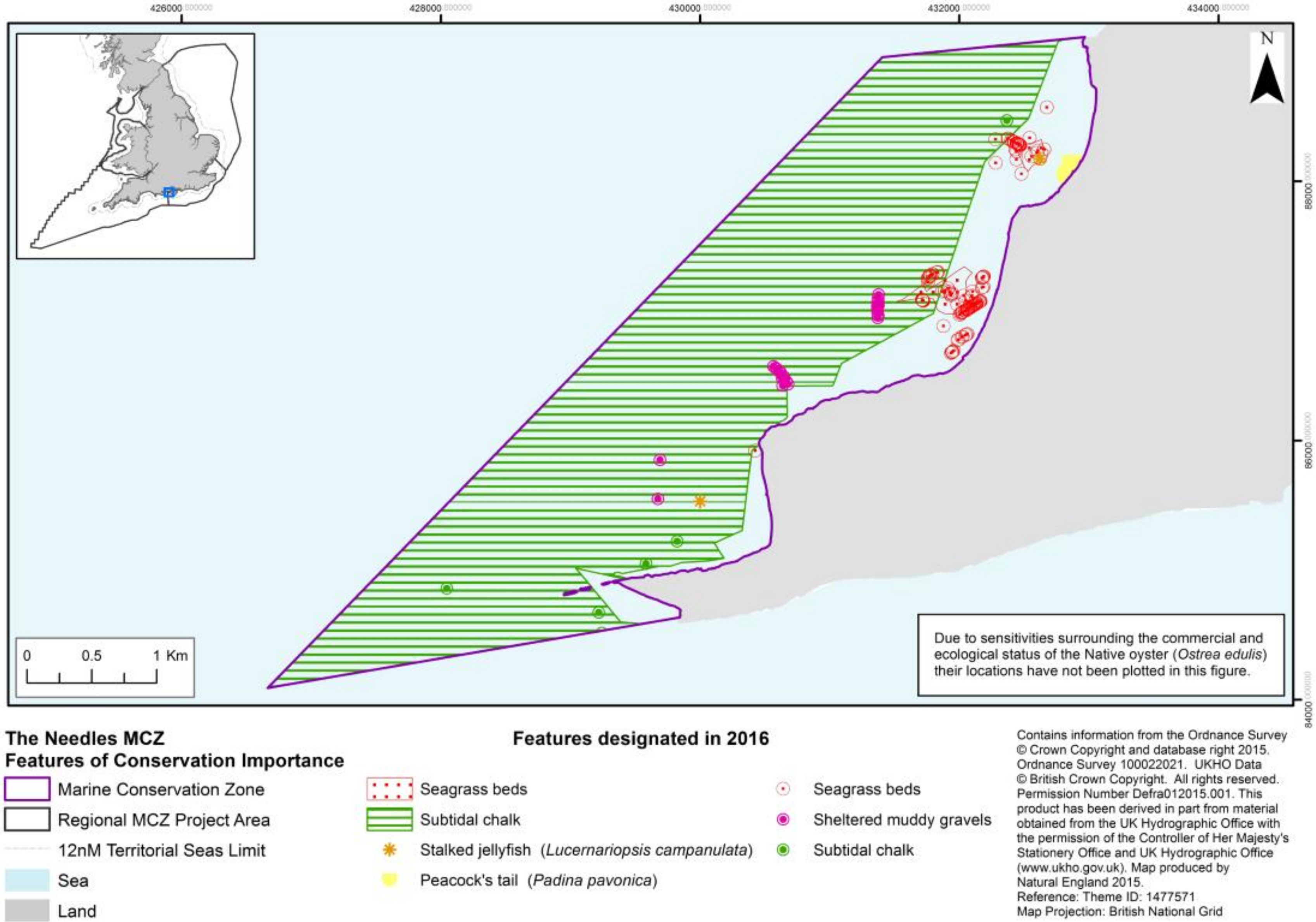
Hampshire Coast & Isle of Wight Team
E-mail: richard.morgan@naturalengland.org.uk
Telephone: 0300 060 0240

Annex 2. Broad-scale habitat map for the Needles MCZ. Source: The Needles MCZ post-survey site Report 2015.


1°36'W
1°34'W
1°32'W
UTM Zone 30N
50°42'N
50°40'N
0
1
2 km
The Needles rMCZ
PSA Results (EUNIS Level 3)
A5.1 Subtidal coarse sediment
A5.2 Subtidal sand
A5.4 Subtidal mixed sediments
Broadscale Habitat Types
A3.2 Moderate energy infralittoral rock
A4.2 Moderate energy circalittoral rock
A5.1 Subtidal coarse sediment
A5.2 Subtidal sand
A5.4 Subtidal mixed sediments
No data available
© Crown Copyright 2014

Annex 3. Features of Conservation Importance (FOCI) map. Source: The Needles MCZ feature maps 17th February 2016 (www.gov.uk)


426000
428000
430000
432000
434000
88000
86000
84000
N
0 0.5 1 Km
Due to sensitivities surrounding the commercial and ecological status of the Native oyster (*Ostrea edulis*) their locations have not been plotted in this figure.
The Needles MCZ
Features of Conservation Importance
Marine Conservation Zone
Regional MCZ Project Area
12nM Territorial Seas Limit
Sea
Land
Features designated in 2016
Seagrass beds
Subtidal chalk
Stalked jellyfish (*Lucernariopsis campanulata*)
Peacock's tail (*Padina pavonica*)
Seagrass beds
Sheltered muddy gravels
Subtidal chalk
Contains information from the Ordnance Survey © Crown Copyright and database right 2015. Ordnance Survey 100022021. UKHO Data © British Crown Copyright. All rights reserved. Permission Number Defra012015.001. This product has been derived in part from material obtained from the UK Hydrographic Office with the permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). Map produced by Natural England 2015.
Reference: Theme ID: 1477571
Map Projection: British National Grid

Annex 4. Initial screening of commercial fishing activities - The Needles MCZ.

Broad Gear Type (for assessment)	Aggregated Gear Type (EMS Matrix)	Fishing gear type	Does it Occur?	Details	Sources of Information	Potential For Activity Occur/ Is the activity anticipated to occur?	Justification	Suitable for Part A Assessment?	Priority
Bottom towed fishing gear	**Towed (demersal)**	Beam trawl (whitefish)	N	Currently not known to occur.	Local IFCO	**Y**	**Has historically occurred and so has the potential to occur (i.e. suitable trawl ground due to coarse substrate). If the activity were to occur, it would most likely be on an irregular basis on the fringes of the site. The likelihood of the activity occurring is therefore considered to be low.**	**Yes**	Medium to High
		Beam trawl (shrimp)	N		Local IFCO	**N**	**Target species does not occur.**	**No**	
		Beam trawl (pulse/wing)	N		Local IFCO	**N**	**Prohibited via Electric fishing byelaw.**	**No**	
		Heavy otter trawl	N		Local IFCO	**N**	**The activity has the potential to occur but is not**	**No**	

							anticipated to occur. The boats which operate within the district (and the Solent) are small in nature (restricted to 12 m or less in length) and so are restricted in the size of gear used. This means light otter trawls are used instead of heavy otter trawls.		
		Multi-rig trawls	N	Currently not known to occur, however one vessel operating within the area uses a multi-rig trawl and has historically fished on the edges of the site with a light otter trawl.	Local IFCO	**Y**	**Has not historically occurred and is not currently known to occur, however one vessel operating within the surrounding area has recently started operating a multi-rig (triple) trawl and this vessel has historically fished on the edges of the site with a light otter trawl. If the activity**	**Yes**	Medium to High

							were to occur, it would most likely be on an irregular basis on the fringes of the site. The likelihood of the activity occurring is therefore considered to be low.		
		Light otter trawl	Y	Currently takes place at a low level, about 1 to 2 times a year by 1 or 2 vessels. The activity takes place on the fringes of the site over areas of subtidal coarse or mixed sediments. Target species will vary depending on location, vessel size and time of year but may include flatfish, skates and rays.	Local IFCO	**N/A**	**Activity is known to occur.**	**Yes**	High

		Pair trawl	N		Local IFCO	**N**	**It is not anticipated to occur as it has not historically occurred. Furthermore there is limited potential due to the space required to accommodate two vessels and the size/power of vessels needed.**	**No**	
		Anchor seine	N		Local IFCO	**N**	**Gear type has not been historically used within the area and is not anticipated to occur. Activity needs a large area and in the site considered would be limited. In addition, large vessels are also required for this gear type and vessels over 12 m in length are prohibited from fishing within the Southern IFCA district.**	**No**	

		Scottish/fly seine	N		Local IFCO	**N**	**Gear type has not been historically used within the area and is not anticipated to occur. Activity needs a large area and in the site considered would be limited. In addition, large vessels are also required for this gear type and vessels over 12 m in length are prohibited from fishing within the Southern IFCA district.**	**No**	
Pelagic towed fishing gear	**Towed (pelagic)**	Mid-water trawl (single)	N		Local IFCO	**N**	**Gear type has not been historically used within the area. Activity has the potential to occur however this gear type does not come into contact with the seabed and therefore there is no chance for interaction with**	**No**	

							designated features.		
		Mid-water trawl (pair)	N		Local IFCO	**N**	**Gear type has not been historically used within the area. Activity has the potential to occur however this gear type does not come into contact with the seabed and therefore there is no chance for interaction with designated features. Also limited potential due to the restricted area of the site to accommodate for two vessels.**	**No**	

		Industrial trawls	N		Local IFCO	**N**	**Activity is not able to occur due to the size of vessel required. Vessels over 12 m are prohibited from fishing within the Southern IFCA district.**	**No**	
Bottom towed fishing gear	**Dredges (towed)**	Scallops	N		Local IFCO	**N**	**Gear type has not historically occurred within the site. Whilst the activity does have the potential to occur, the post-survey site report does not report the occurrence of the King scallop (Pecten maximum), the main target species, which is targeted on the eastern side of the Isle of Wight. The report does mention the occurrence, allbeit at very low levels (4-7% occurrence) of the Queen scallop**	**No**	

							(Aequipecten opercularis) which is also targeted commercially in other parts of the UK. Based on the very low levels of potential target species and lack of historical activity, the activity is not anticipated to occur within the site.		
		Mussels, clams, oysters	N		Local IFCO	**Y**	**Clam target species are not known to occur within the site. The post-survey site report reports a 68% occurrence of the blue mussel (Mytilus edulis) and 7% of the horse mussel (Modiolus) from grab samples and 4% occurrence of the blue mussel from video samples. Unfortunately no information**	**No**	

							is provided on density, size of individuals or the substrate type where each sample was taken. The relatively high occurrence of blue mussels found in grab samples may suggest a potential for mussel dredging to occur. The lack of historical activity within the area and lack of information known about size (mussels can only be harvested over 50 mm unless consent is granted for relaying in a private fishery) and densities, mean it is not anticipated to occur. Oyster dredging has historically taken place within Alum Bay which		

							occurs within the site. The Solent oyster population has since been in decline and there are currently no indications of recovery, however restoration efforts commenced in 2015 and continue to do so. Based on the current status of the Solent oyster population and the direction of decline (from west to east) in the Solent, the activity is not anticipated to occur within the site within the foreseeable future.		
		Pump scoop (cockles, clams)	N		Local IFCO	**N**	**This activity takes place in relatively shallow waters. The substrate type found at these depths (i.e. bedrock and coarse**	**No**	

							sediments) is largely unsuitable for this method of fishing. In addition, target species (clam and cockle) are not known to occur within the site.		
Suction	**Dredges (other)**	Suction (cockles...)	N	Not allowed in the district.	Local IFCO	**N**	**Suction dredging for cockles, clams, mussels and oysters is prohibited (by default) in the Southern IFCA district (by Southern IFCA byelaws).**	**No**	
Tractor		Tractor	N		Local IFCO	**N**	**The activity has not historically occurred within the site. The potential for activity to occur is limited due to limited access and substrate suitability.**	**No**	
Intertidal work	**Intertidal handwork**	Hand working (access from vessel)	N		Local IFCO	**N**	**Handworking with access from a vessel infers a muddy habitat where there difficulty**	**No**	

							accessing areas. At this site, the dominance of coarse and bedrock substrate means there is limited need for a vessel as the substrate means the area is accessible on foot.		
		Hand work (access from land)	N		Local IFCO	**N**	**The activity has not historically taken place within the site and is not anticipated to occur. There is limited potential for the activity to take place due to a dominance of unsuitable substrate for hand gathering activities. Designated features, which would be suitable for hand gathering (i.e. mud, seagrass) are not intertidal and therefore whilst there is**	**No**	

							limited potential for the activity to occur it is not likely take place over designated features.		
Static - pots/traps	**Static - pots/traps**	Pots/creels (crustacea/gastropods)	Y	Potting for crab and lobster takes place closer inshore due to the rocky substrate type. It is currently potted by 1 to 2 vessels, but could be potted by up to 5. The number of pots within the area is unknown. In the outer area of the site, where subtidal sediments exist, there is potential for whelk potting, The level at which it occurs is however unknown. The area is likely	Local IFCO	**N/A**	**Activity is known to occur.**	**Yes**	Medium

				to be less favourable due to the rushing tide which affects the outer area of the site.					
		Cuttle pots	Unknown	Unknown	Local IFCO	**Y**	**It is not currently known if potting for cuttlefish takes place within the site. There is however potential for the activity to take place and it is anticipated the activity may occur or is already occurring.**	**Yes**	Low to Medium

		Fish traps	N		Local IFCO	**N**	**Activity has not historically occurred within the site and is not anticipated to occur.**	**No**	
Demersal nets/lines	**Static - fixed nets**	Gill nets	Unknown	Unknown	Local IFCO	**Y**	**It is anticipated that static fixed nets are used within the site in areas of shallow water, although effort is likely to be low with the area worked by 1 to 2 vessels. The activity is unlikely in deeper water due to the rushing tide in the outer reaches of the site.**	**Yes**	Low to Medium
		Trammels	Unknown	See 'gill nets'	Local IFCO	**Y**	**See 'gill nets'**	**Yes**	Low to Medium
		Entangling	Unknown	See 'gill nets'	Local IFCO	**Y**	**See 'gill nets'**	**Yes**	Low to Medium
Pelagic nets/lines	**Passive - nets**	Drift nets (pelagic)	N		Local IFCO	**N**	**Activity is not anticipated to occur and potential for the activity is limited by the rushing tide that effects the site,**	**No**	

							particularly the outer areas.		
Demersal nets/lines		Drift nets (demersal)	N		Local IFCO	**N**	**Activity is not anticipated to occur and potential for the activity is limited by the rushing tide that effects the site, particularly the outer areas.**	**No**	
	Lines	Longlines (demersal)	Unknown	Unknown	Local IFCO	**Y**	**It is anticipated that demersal longlines are used within the site, although effort is likely to be low with the area worked by 1 to 2 vessels.**	**Yes**	Low to Medium
Pelagic nets/lines		Longlines (pelagic)	N		Local IFCO	**N**	**The activity has not historically occurred within the site and is not anticipated to occur.**	**No**	

		Handlines (rod/gurdy etc)	Y	This activity is conducted by commercial, recreational and charter vessels, as well as from the shore. The activity takes place within the Needle Channel on the fringes of the site. Three to four commercial vessels conduct the activity. The activity is also unlikely to be the main activity of commercial vessels due to operating multiple gear types. The activity is only undertaken during the summer months on a spring tide, up to four to five days at a time. Target species of the activity is	Local IFCO, Deeming, A.	**Y**	**The activity is known to occur however this gear type does not come into contact with the seabed and therefore there is no chance for interaction with designated features. Shore-based angling is limited and due to the nature of the shoreline is highly unlikely to interact with any of the designated features (which are predominantly subtidal).**	**No**	

				predominantly bass. From the shore, angling is relatively limited due to the nature of the shoreline. Limited shore-based angling takes place in east half of Alum Bay, west half of Totland Bay and far eastern port of Colwell Bay (close to Fort Albert).					
		Jigging/trolling	Y	See 'handlines (rod/gurdy etc)'	Local IFCO	**Y**	**See 'handlines (rod/gurdy etc)'**	**No**	
Purse seine	**Seine nets and other**	Purse seine	N		Local IFCO	**N**	**Activity has not historically occurred within the site and is not anticipated to occur.**	**No**	
Demersal nets/lines		Beach seines/ring nets	N		Local IFCO	**N**	**Activity has not historically occurred within the site and is not anticipated to occur.**	**No**	

Miscellanous		Shrimp push-nets	Unknown	Unknown	Local IFCO	**N**	**The occurrence of the activity is unknown. It is not anticipated to occur as it is not thought to have occurred historically within the site. The activity has the potential to occur but is unlikely to because of a lack of areas with suitable substrate to support the target species. In addition, activity is conducted intertidally and designated features are not intertidal and therefore whilst there is limited potential for the activity to occur it will not take place over designated features.**	**No**	
EA Only		Fyke and stakenets			**EA Only**	**EA Only**	**EA Only**	**EA Only**	

Miscellanous	**Miscellaneous**	Commercial diving	N	Not known to occur.		**Y**	**Activity has not historically occurred but has the potential to occur over circalittoral rock habitats for king scallops (*Pecten maximus*) (although they have not been recorded in the site in the post-survey site report) and queen scallops (Aequipecten opercularis) (which are recorded in the post-survey site report albeit it low occurrences - 4-7%). Based on the low occurrence of target species and lack of historical activity, the activity is not anticipated to occur.**	**No**	

Bottom towed fishing gear		Bait dragging	N			**N**	**Activity has not historically occurred within the site and is not anticipated to occur. The majority substrate present is not suitable for the activity to take place. As such, the target species are also not present.**	**No**	
Miscellanous		Crab tiling	N			**N**	**Activity has not historically occurred within the site or Southern IFCA district and therefore is not anticipated to occur.**	**No**	
Intertidal work	**Bait collection**	Digging with forks	N			**N**	**Activity has not historically occurred within the site and is not anticipated to occur. The majority substrate present is not suitable for the activity to take place. As such, the target species are**	**No**	

							also not present. In addition, activity is conducted intertidally and designated features (which may be suitable for digging with forks i.e. mud, seagrass) are not intertidal and therefore whilst there is limited potential for the activity to occur it will not take place over designated features.		

Annex 5. Natural England's DRAFT Advice on Operations for commercial fishing activities in The Needles MCZ (Traps only)

	Habitats										Species		
Pressure	**Moderate energy infralittoral rock**	**High energy infralittoral rock**	**Moderate energy circalittoral rock**	**Subtidal chalk**	**Subtidal coarse sediment**	**Subtidal mixed sediments**	**Subtidal sand**	**Subtidal mud**	**Sheltered muddy gravels**	**Seagrass beds**	**Stalked jellyfish (*Lucernariopsis campanulata*)**	**Peacock's tail (*Padina pavonica*)**	**Native oyster (*Ostrea edulis*)**
Above water noise									*		*	*	
Abrasion/disturbance of the substrate on the surface of the seabed	S	S	S	S	S	S	S	S	*		*	*	S
Barrier to species movement									*		*	*	

Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)									*		*	*	
Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)									*		*	*	
Deoxygenation	NS	IE	NS	NS	NS	NS	NS	NS	*		*	*	NS
Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS	NS	NS	NS	NS	NS	IE	*	S	*	*	NS
Introduction of light									*		*	*	
Introduction or spread of non-indigenous species	S	S	S	S	IE	S	S	S	*		*	*	S
Litter	IE	IE	IE	IE	IE	IE	IE	IE	*	NS	*	*	IE
Organic enrichment	S	S	S	S	S	IE	S	S	*	S	*	*	NS
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	S	S	S	S	S	S	S	S	*	NS	*	*	S
Removal of non-target species	S	S	S	S	S	S	S	S	*		*	*	S
Removal of target species	NA	NA	NA	NA	NA	NA	NA	NA	*	S	*	*	
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS	NS	NS	NS	NS	NS	IE	*	IE	*	*	NS
Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS	NS	NS	NS	NS	NS	IE	*	S	*	*	NS
Underwater noise changes									*	S	*	*	

Visual disturbance									*	S	*	*	

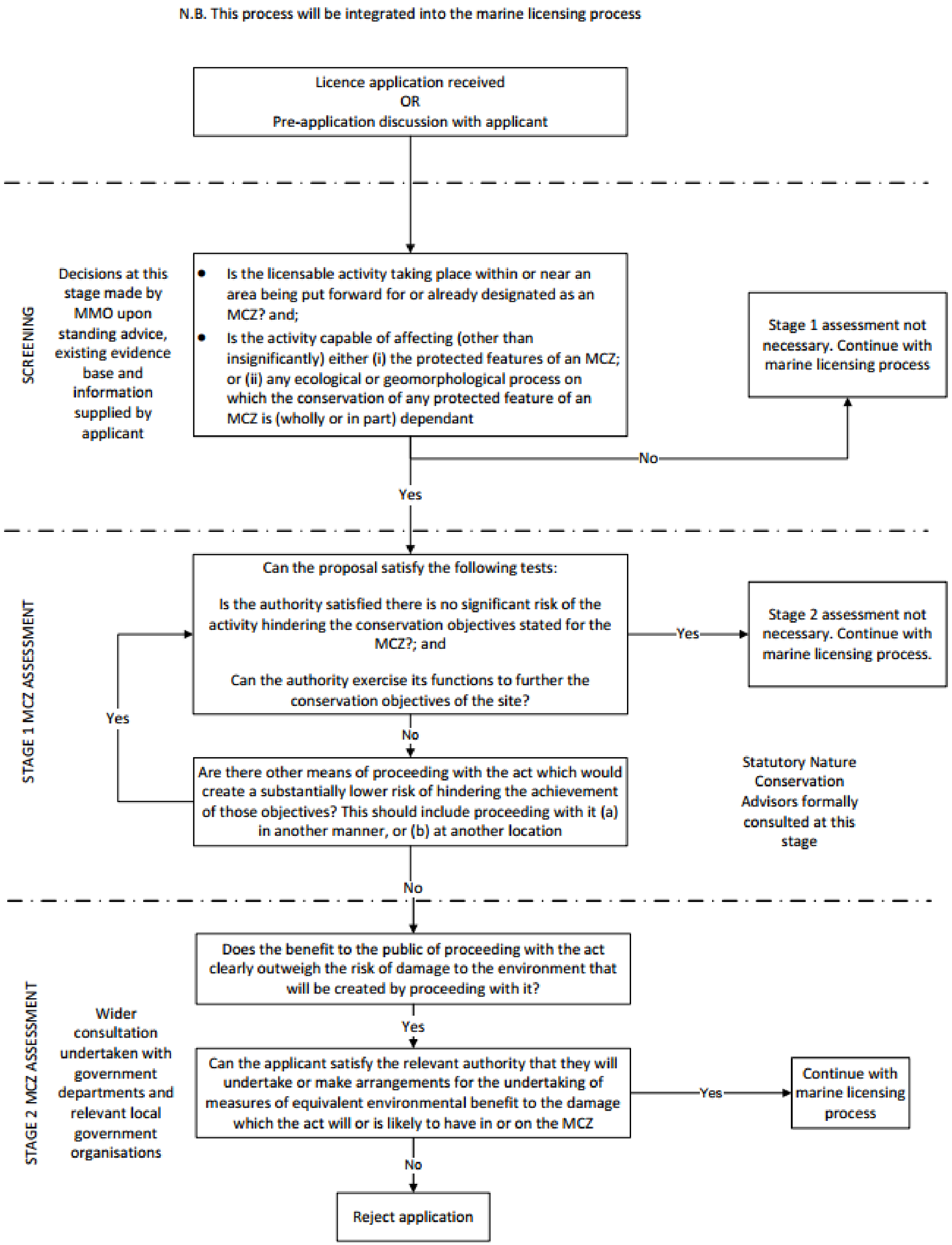
Legend:

S	Sensitive
NS	Not sensitive at this benchmark
IE	Insufficient evidence to assess
NA	Not applicable
	Not relevant
*	Sensitivity for this feature has not yet been assessed by Natural England. In this instance, Southern IFCA have used similar habitat or species, combined with best judgement and Natural England's Scoping Advice, to determine the potential sensitivity to each pressure.

Annex 6. Gear intensity thresholds defined by different studies.

Study	Gear Intensity Thresholds
Eno *et al*., 2013	Heavy — Lifted daily, more than five pots per hectare (i.e. 100m by 100m) (equivalent to over 182,500 pot hauls per km^2 per year) Moderate — Lifted daily, two to four pots per hectare (equivalent to 73,000– 182,500 pot hauls per km^2 per year) Light — Lifted daily, less than two pots per hectare (equivalent to less than 73,000 pot hauls per km^2 per year) Single — Single accidental fishing event of a string
Young *et al*., 2013	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 None - 0 pots per km^2/0 strings per km^2
Stephenson *et al*., 2016	Low – 0 – 139 pots $month^{-1}$ km^{-2} (equivalent to 4170 pot hauls $month^{-1}$ km^{-2}, assuming 30 hauls per month) Medium – 140 – 187 pots $month^{-1}$ km^{-2} High – 188 – 265 pots $month^{-1}$ km^{-2} (equivalent to 7950 pot hauls $month^{-1}$ km^{-2}, assuming 30 hauls per month)
Rees *et al*., 2016	Low – 5 – 10 pots 0.25 km^{-2} (equivalent to 20-40 pots per km^{-2}) Medium – 15 – 25 pots 0.25 km^{-2} (equivalent to 60-100 pots per km^{-2}) High – 30+ pots 0.25 km^{-2} (equivalent to 120 pots per km^{-2})

Annex 7. Summary of MMO assessment process for MCZs


N.B. This process will be integrated into the marine licensing process
Licence application received OR Pre-application discussion with applicant
SCREENING
Decisions at this stage made by MMO upon standing advice, existing evidence base and information supplied by applicant
• Is the licensable activity taking place within or near an area being put forward for or already designated as an MCZ? and;
• Is the activity capable of affecting (other than insignificantly) either (i) the protected features of an MCZ; or (ii) any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or in part) dependant
No
Stage 1 assessment not necessary. Continue with marine licensing process
Yes
STAGE 1 MCZ ASSESSMENT
Can the proposal satisfy the following tests:
Is the authority satisfied there is no significant risk of the activity hindering the conservation objectives stated for the MCZ?; and
Can the authority exercise its functions to further the conservation objectives of the site?
Yes
Stage 2 assessment not necessary. Continue with marine licensing process.
No
Yes
Are there other means of proceeding with the act which would create a substantially lower risk of hindering the achievement of those objectives? This should include proceeding with it (a) in another manner, or (b) at another location
Statutory Nature Conservation Advisors formally consulted at this stage
No
STAGE 2 MCZ ASSESSMENT
Wider consultation undertaken with government departments and relevant local government organisations
Does the benefit to the public of proceeding with the act clearly outweigh the risk of damage to the environment that will be created by proceeding with it?
Yes
Can the applicant satisfy the relevant authority that they will undertake or make arrangements for the undertaking of measures of equivalent environmental benefit to the damage which the act will or is likely to have in or on the MCZ
Yes
Continue with marine licensing process
No
Reject application