Document Control

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Southern Inshore Fisheries and Conservation Authority (IFCA)

Marine Conservation Zone Fisheries Assessment (Part B)

Marine Conservation Zone: Poole Rocks

Feature(s): Moderate energy circalittoral rock; Subtidal mixed sediments; Native oyster (*Ostrea edulis*)

Broad Gear Type: Bottom Towed Fishing Gear

Gear type(s) Assessed: Beam trawl (whitefish); Light otter trawl; Oyster dredge

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 Poole Rocks Marine Conservation Zone (MCZ). Southern IFCA has duties under section 154 of the Marine and Coastal Access Act 2009 which states;
154 Protection of marine conservation zones
(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 High Level Conservation Objectives for the Poole Rocks MCZ
- Natural England's Supplementary Advice on Conservation Objectives for the Poole Rocks MCZ
- Natural England's Advice on Operations for Poole Rocks MCZ

2. Information about the MCZ

2.1 Overview and designated features

The Poole Rocks MCZ is located on the central south coast in the English Channel. This inshore site covers an area of 3.73 km^2 and lies to the east of Poole Harbour entrance and approximately 2 km each of Sandbanks beachfront. The site contains rocky outcrops within the sediment-dominated Poole Bay. Depths range between 10.1 to 15 metres above Ordnance Datum. The site was designated in 2013.

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 Approach

Designated feature	General Management Approach
Subtidal mixed sediments	**Maintain in favourable condition**
Moderate energy circalittoral rock	**Maintain in favourable condition**
Couch's goby (*Gobius couchi*)	Recover to favourable condition
Native oyster (*Ostrea edulis*)	**Recover to favourable condition**

A conflict was identified with respect to designated features between the Poole Rocks MCZ designation order and post-survey site report. The designation order states that designated features of the site include moderate energy circralittoral rock, whilst the post-survey site report states that the majority of rock outcrops are shallower than 10 m and are dominated by foliose algae and sparse kelp and are therefore classified as moderate energy infralittoral rock. 'Circalittoral' is defined as the 'region of the seafloor within the sublittoral zone beyond where sunlight reaches the seafloor. This subtidal zone is characterised by animal-dominated communities. The depth at which the circalittoral zone begins is directly dependent on how much light reaches the seabed'[1]. This definition helps to explain why the conflict exists and the reason for this is included within the designated feature description (for circalittoral rock) below[2]:

'Poole Rocks MCZ marks a rocky outcrop within the typically sandy and sediment dominated Poole Bay. Due to high levels of suspended sediment within the water benthic communities are overlaid with a layer of silt. This creates circalittoral conditions at infralittoral depths. Therefore circalittoral rocky communities have been recorded throughout the site on rock at depths commonly associated with infralittoral communities, making this an unusual feature (Davies et al., 2001), (Ware and Kenny, 2011), (Seasearch, 2000), (Defra, 2013), (Dorset Seasearch, 2012).'

Please refer to Annex 1 for a site feature map.

2.2 Conservation Objectives

The site's 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 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] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82738/mcz-annex-i-121213.pdf
[2] https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0014&SiteName=poole%20rocks&countyCode=&responsiblePerson=

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.

3. MCZ Assessment Process

3.1 Overview of the assessment process

The assessment of commercial fishing activities within the Poole Rocks MCZ will be undertaken using a staged process, akin to that proposed by the Marine Management Organisation (MMO)[3], 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 and 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:

- 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 Poole Rocks 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. For these occurring/potentially occurring

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

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 2). 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 Advice on Operations for the Poole Rocks MCZ[4]. 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, 2016a). 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 Poole Rocks MCZ compares with these benchmarks when screening individual activities.

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 Advice on Operations for the Poole Rocks is provided in Annex 4. The resultant activity pressure-feature interactions which have been screened in for bottom towed fishing gear for the part B assessment are summarised in Tables 2 to 4 for sensitive designated features. The activity pressure-feature interactions which were screened out in the Part A

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

Assessment are detailed in a standalone document (‘Screening and Part A Assessment’) for Poole Rocks 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 circalittoral rock. Please note only pressures screened in for the part B are presented here.

Potential Pressures	Demersal Trawl	Dredges	Considered in Part B Assessment ?	Justification	Relevant Attributes
Abrasion/disturbance of the substrate on the surface of the seabed	S	S	Y	This gear type is known to cause abrasion and disturbance to the seabed surface. A part B assessment will be necessary to investigate the magnitude of this pressure including the effect of the gear and spatial scale/intensity of the activity.	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
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	S	S	Y (Oyster dredging only)	Trawling - Due to the nature of the gear and fishing practices (i.e. location), the activity is likely to lead to insignificant penetration/disturbance of the seabed. Abrasion is assessed under 'abrasion/disturbance of the substrate on the surface of the seabed'. Oyster dredging - This gear type Is known to cause abrasion and disturbance to the seabed. A part B assessment will be necessary to investigate the magnitude of the pressure, including effect of the gear and the spatial scale/intensity of the activity	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; Structure: physical structure of rocky substrate; Extent and distribution

Removal of non-target species	S	S	Y	Trawling - Typically, demersal fish species are targeted or form the bycatch of this gear type and their removal is unlikely to have an impact on benthic communities associated with this feature. Physical contact with the seabed surface (and resulting abrasion) may result in the removal of larger epifaunal species, characteristic of littoral rock habitats. A part B assessment will be necessary to investigate t the magnitude of removal and disturbance to associated communities/species. Oyster dredging - Physical contact with the seabed surface (and resulting abrasion) may result in the removal of larger epifaunal species, characteristic of littoral rock habitats. A part B assessment will be necessary to investigate t the magnitude of removal and disturbance to associated communities/species.	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

Table 3. Summary of fishing pressure-feature screening for Subtidal mixed sediments. Please note only pressures screened in for the part B are presented here.

Potential Pressures	Demersal Trawl	Dredges	Considered in Part B Assessment?	Justification	Relevant Attributes
Abrasion/disturbance of the substrate on the surface of the seabed	S	S	Y	This gear type is known to cause abrasion and disturbance to the seabed surface. A part B assessment will be necessary to investigate the	Distribution: presence and spatial distribution of subtidal mixed sediment communities; Structure/function: presence and

				magnitude of this pressure including the effect of the gear and spatial scale/intensity of the activity.	abundance of key structural and influential species; Structure: species composition of component communities
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	S	S	Y	This gear type is known to cause abrasion and disturbance to the seabed and is characteristically deployed in areas of subtidal mixed sediment. A part B assessment will be necessary to investigate the magnitude of this pressure including the effect of the gear and spatial scale/intensity of the activity.	Distribution: presence and spatial distribution of subtidal mixed sediment communities; Structure/function : presence and abundance of key structural and influential species; Structure: species composition of component communities: Structure: sediment composition and distribution
Removal of non-target species	S	S	Y	Trawling: Typically, demersal fish species are targeted or form the bycatch of this gear type and their removal is unlikely to have an impact on benthic communities associated with this feature. Physical contact (and resulting abrasion) and potential penetration of the seabed may result in the removal of larger epifaunal species and/or disturbance of infaunal species. A part B assessment will be necessary to investigate t the magnitude of removal and disturbance to associated communities/species .	Distribution: presence and spatial distribution of subtidal mixed sediment communities; Structure/function : presence and abundance of key strucutural and influential species; Structure: species composition of component communities

				Oyster dredging: Physical contact (and resulting abrasion) and potential penetration of the seabed may result in the removal of larger epifaunal species and/or disturbance of infaunal species. A part B assessment will be necessary to investigate t the magnitude of removal and disturbance to associated communities/species .	

Table 4. Summary of fishing pressure-feature screening for Native oyster (*Ostrea edulis*). Please note only pressures screened in for the part B are presented here.

Potential Pressures	Demersal Trawl	Dredges	Considered in Part B Assessment?	Justification	Relevant Attributes
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	S	S	Y	Trawling: Any contact with the gear is unlikely to lead to damage of native oyster shells. Native oysters are typically harvested using dredges and are therefore robust enough to withstand contact from demersal trawl gear. The only relevant attribute with respect to the Native oysters supporting habitat is extent and distribution. Supporting habitats include subtidal rock and subtidal sediments. It is not believed that demersal trawl gear will lead to any changes in the extent and distribution of subtidal sediments (which can only be comprised of subtidal mixed sediments in	Supporting habitats: extent and distribution (subtidal rock only)

				the site) and subtidal rock through penetration of the substrate below the surface of the seabed due to the nature of the gear and fishing practices (i.e. location). Oyster dredging: Any contact with the gear is unlikely to lead to damage of native oyster shells. Native oysters are typically harvested using dredges and are therefore robust enough to withstand contact from such gear. The only relevant attribute with respect to the Native oysters supporting habitat is extent and distribution. Supporting habitats include subtidal rock and subtidal sediments. It is not believed oyster dredging will lead to any changes in the extent and distribution of subtidal sediments (which can only be comprised of subtidal mixed sediments in the site), but the activity does have the potential to lead to changes in the extent and distribution of subtidal rock, through penetration of the substrate below the surface of the seabed. This is assessed under other designated features (moderate energy circalittoral rock).	
Removal of target species	-	S	Y (Oyster dredging only)	Native oysters form the target species of this gear and as such will be removed by the activity. The	Population: population size; Population: recruitment and reproductive

				removal of native oysters is restricted by the minimum landing size, allowing individuals over 70 mm to be removed. It is important to note however that the native oyster has a general management approach of 'recover'. This is likely to warrant protection of larger individuals which have greater spawning capacity to help achieve favourable condition. This is further supported by the low numbers of recorded native oysters within the site (6 records in the site assessment document - 2011).	capability; Presence and spatial distribution of the 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 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[5]. 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 from Natural England's Supplementary Advice. These are outlined in Tables 2 to 4.

4.1 Assessment of trawling in the Poole Rocks MCZ

4.1.1Summary of the Fishery

Trawling, using a light otter trawl is known to occur within the area of Poole Bay which surrounds the site, whilst beam trawling is known to have fringed the site up until 2013. Trawling can take place all year round within the site but is predominantly focused in the winter month. The activity targets flatfish, skates and rays.

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5 https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0004&SiteName=chesil%20beach&countyCode=&responsiblePerson=

4.1.2 Technical Gear Specifications

There are two types of demersal trawl known to have taken place in the site or takes place in the area surrounding the site. These include beam trawls and light otter trawl.

4.2.1 Beam trawl

A net is held open by a rigid framework to maintain trawl opening, regardless of towing speed, in addition to supporting the net (Seafish, 2015). The framework consists of a heavy tubular steel beam which is supported by steel beam heads at each end. Each beam head has wide shoes at the base which slide over the seabed (Seafish, 2015). A cone shaped net is towed from the framework, with the head rope attached to the beam and foot rope connected to the base of the shoes (Seafish, 2015). The footrope forms a ‘U’ shape curve behind the beam as it is towed over the seabed (Seafish, 2015). The beam is towed using a chain bridle which is attached to both shoes and at the centre of the beam; all coming together to form a single trawl warp which leads to the vessel (Seafish, 2015).

There are two types of beam trawl and these are referred to as ‘open gear’ and ‘chain mat gear’ (Seafish, 2015). Open gear uses a lighter rig, with a number of chains, known as ‘ticklers’, which are towed along the seabed across the mouth of the net (Figure 1) (Seafish, 2015). Tickler chains help to disturb fish from a muddy seabed. Open gear is used on clean and soft ground. Chain mat gear on the other hand is used for towing over harder and stonier seabed and if often used by larger vessels (Seafish, 2015). The chain mat gear uses a lattice work of chains which are towed from the back of the beam and attach to the footrope of the net (Figure 2) (Seafish, 2015). Lighter styles of beam, using fewer tickler chains and without a chain mat, are used to target shrimp (Seafish, 2015).

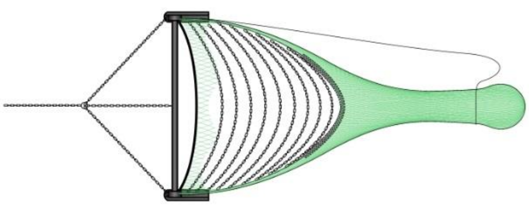

Figure 1. 'Open gear' beam trawl.

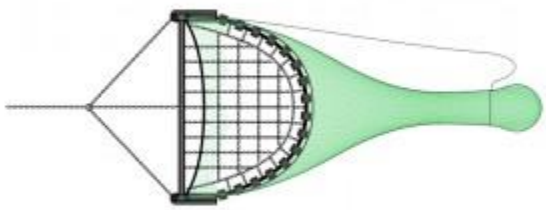

Figure 2. 'Chain mat gear' beam trawl.

Generally vessels below 12 metres, like those used in the Southern IFCA district, tow one trawl from the stern of the vessel (Seafish, 2015). The size of the beam towed, and the horsepower of many vessels, can be restricted by the local fishery regulations (Seafish, 2015).

4.2.2 Light otter trawl

An otter trawl comprises of following design (see Figure 3). Two shaped panels of netting are laced together at each side to form an elongated funnel shaped bag (Seafish, 2015). The funnel tapers down to a cod-end where fish are collected (Seafish, 2015). The remaining cut edges of the net and net mouth are strengthened by lacing them to ropes to form ‘wings’ that are used to drive fish into the net (Seafish, 2015). The upper edge of the rope is referred to as the head line, the lower edge is referred to as the foot rope of fishing line and side ropes are known as wing lines (Seafish, 2015). Floats are attached to the headline to hold the net open and the foot rope is weighted to maintain contact with the seabed and prevent damage to the net (Seafish, 2015). The wings of the net are held open by a pair of trawl doors, also known as otter boards, and are attached to the wings by wires, ropes or chains known as bridles and sweeps (Seafish, 2015). The sweep connects the trawl door to top and bottom bridles which are attached to the headline and footrope of the net, respectively (Seafish, 2015). The choice of material used for the sweeps and bridles depends on the size of gear and nature of the seabed, with smaller inshore boats using thin wire and combination rope (Seafish, 2015). The trawl doors, which are made of wood or steel are towed through the water at an angle which causes them to spread apart and open the net in a horizontal direction (Seafish, 2015). The trawl doors are attached to the fishing vessel using wires referred to as trawl warps (Seafish, 2015). The trawl doors must be heavy enough to keep the net on the seabed as it is towed

(Seafish, 2015). As the trawl doors are towed along the seabed they generate a sediment cloud which helps to herd fish towards the mouth of the trawl (Seafish, 2015). The bridles and sweeps continue the herding action of the trawl doors as the trail on the seabed and disturb the sediment, creating a sediment cloud (Seafish, 2015). The length of the sweeps and bridles and distance between the two trawl doors is tuned to the target species (Seafish, 2015). Species such as lemon sole and plaice can be herded into the trawl over long distances and so the length of the sweeps is longer (Seafish, 2015).

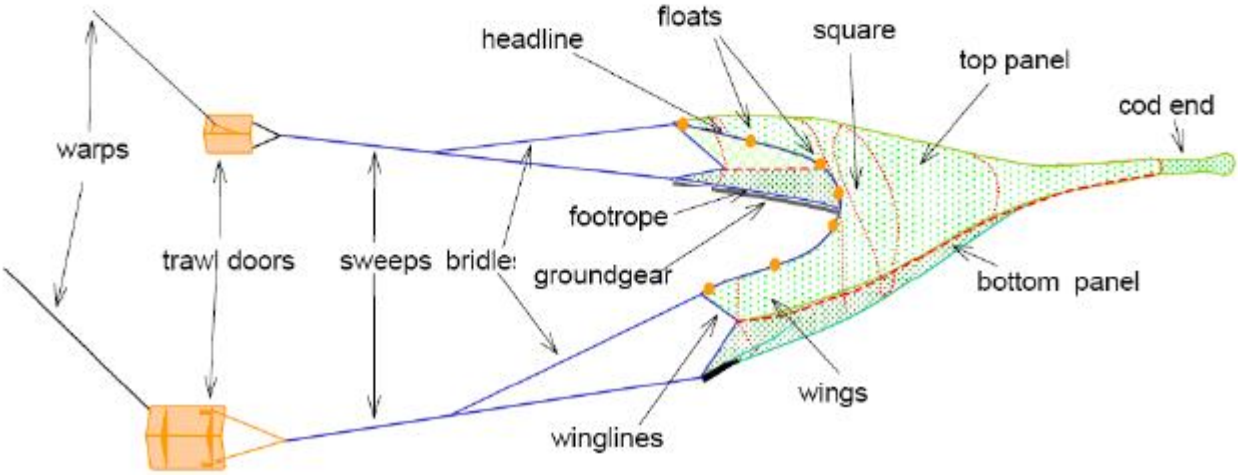

Figure 3. Key components of an otter trawl.
Source: www.seafish.org/upload/b2b/file/r_d/BOTTOM%20TRAWL_5a.pdf

The mesh size of the net used varies depending on the type of trawl (Seafish, 2015). In the UK, there has been a move towards an increase in mesh size, particularly in the top panel and wings, in order to improve gear selectivity (Seafish, 2015).

The ground rope will have some form of ground gear attached to protect the netting from damage on the seabed (Seafish, 2015). The ground gear can largely vary. The most basic is where bare fishing line and the netting is laced directly to the rope of combination rope (Seafish, 2015). Chains may also be used and the style of attachment can vary (Seafish, 2015). Ground gear may also include bobbins and rock hoppers which commonly use small and large rubber discs (up to 600 mm) (Seafish, 2015).

The drag of the gear, combined with the floats on the headline, mean the weight of the trawl on the seabed is in the region of 10 to 20% of what it would be in air (Seafish, 2015).

A light otter trawl is one that uses anything less than the definition given for a heavy otter trawl, which include any of the following (MMO, 2014):

- Sheet netting of greater than 4 mm twine thickness
- Rockhoppers or discs of 200 mm or above in diameter
- A chain for the foot/ground line (instead of wire)

Generally, vessels will shoot and haul their gear over the stern of the boat (Seafish, 2015). Restrictions on vessels over 12 metres in length in the Southern IFCA district limits the size of gear that can be used within the district.

4.1.3 Location, Effort and Scale of Fishing Activities

Up until 2013, one vessel was known to beam trawl on the fringes of the site (to the south east) over areas of subtidal mixed sediment. Up to five vessels are known to light otter trawl within the surrounding area of Poole Bay over subtidal coarse or mixed sediments. The occurrence of light otter trawling within the surrounding area and recent beam trawling on the fringes of the site indicates that areas of the site are suitable trawl grounds.

Unfortunately no sightings data are available for bottom towed fishing gear activity within Poole Rocks MCZ. Figure 4 shows trawl sightings in the area surrounding Poole Rocks MCZ.

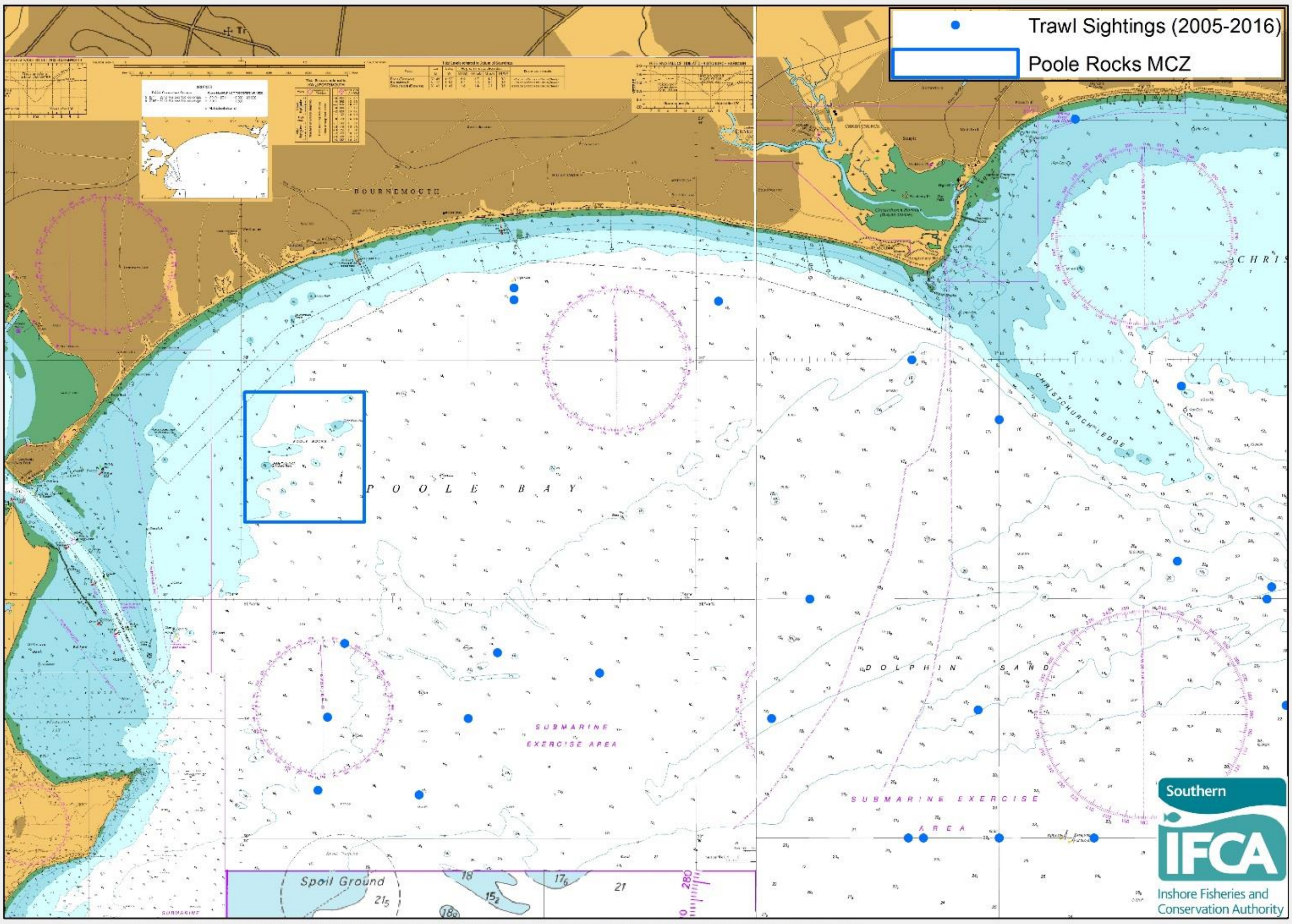

Figure 4. Fishing activity map using trawl sightings data from 2005-2016 in the area surrounding Poole Rocks MCZ.

4.2 Assessment of oyster dredging in the Poole Rocks MCZ

4.2.1Summary of the fishery

Native oysters were historically fished within the surrounding area of Poole Bay, approximately 10 years ago. More recently, a number of vessels have been known to prospect in the area to investigate the viability of the Native oyster population within Poole Bay and collect oysters for relaying into Poole Harbour lease beds. This indicates the area surrounding the site is able to support viable populations of the Native oyster and therefore could be subject to future oyster dredging is the Native oyster becomes prevalent in this area.

4.2.2 Technical gear specifications

A type of mechanical dredge, known as a ladder dredge is used to fish for oysters in the Southern IFCA district. A ladder dredge consists of a metal frame with parallel bars at the base of the dredge mouth which form a 'ladder', a set of skis at both ends of the dredge base and a posterior mesh chain-link bag used to collect oysters, which sit on the surface of the seabed (Figure 5). The skis allow the dredge to sit on the seabed whilst being towed. Unwanted debris and sediment passes through the mesh chain-link bag. A diving plate is fitted to the top of the dredge and helps to stabilise the dredge during deployment. The ladder, which reduces penetration into the sediment when compared with toothed dredges such those used for clam dredging in the Solent, can be up to 8.5 cm long, with parallel bars spaced approximately 4.5 cm apart. As stipulated by the 'Oyster Dredges' byelaw (see section 4.5), the width of a dredge cannot exceed 1.5 m in width.

Figure 5. Ladder style oyster dredge similar to those used within the Solent oyster fishery.

One or two dredges can be deployed side by side, depending on the size of the boat, from the stern. The dredge is typically deployed using a mechanized winch to lower the gear to the sea bed and lift it back onto the vessel. The dredge is attached to the vessel using a metal wire and is towed along the seabed in straight lines in the direction of the boat. Once back on deck, the dredge is emptied onto sorting table where the catch is sorted and sized.

4.2.3 Location, Effort and Scale of fishing activities

Approximately ten years ago, native oysters were fished in the surrounding area of Poole Bay. This involved 2 to 3 vessel from Portsmouth within the oyster season. Within the last ten years, up to three vessels have been known to fish outside of the oyster season (see existing management measures) for purpose of restocking in Poole Harbour lease beds. The level of activity is dependent on the viability of the population and will not last for long periods of time as boats are only allowed to harvest enough oysters for relaying purposes. The activity occurs relatively close inshore between Bournemouth and Boscombe Pier

The presence of Native oysters within the surrounding area of Poole Bay indicates the area surrounding the site is able to support viable populations of the Native oyster and therefore could be subject to future oyster dredging is the Native oyster becomes prevalent in this area.

Unfortunately no sightings data are available for bottom towed fishing gear activity within Poole Rocks MCZ.

4.3 Pressures

4.3.1 *Abrasion/disturbance of the substrate on the surface of the seabed/ Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion*

Physical disturbance of the seabed is generally related to the direct effects of bottom towed fishing gear and include the scraping and ploughing of the substrate, creation of depressions and trenches, scouring and flattening of the seabed, sediment resuspension and changes in the vertical redistribution of sediment layers (Roberts *et al*. 2010). The depth and width of a trench is largely determined by the mode of fishing, gear type and target species (Wheeler *et al*., 2014). Mobile gear in general can penetrate from 5 to 30 cm into the substrate under usual fishing conditions (Johnson, 2002).

4.3.1.1 Trawling

Otter trawl fishing gear has contact with the seabed through the ground rope, chains and bobbins, sweeps, doors and any chaffing mats or parts of the net bag (Jones, 1992). Otter boards, or doors, leave distinct tracks on the seafloor ploughing distinct groove or furrows, which can be 0.2-2 metres wide and up to 30 centimetres deep (Jones, 1992; Thrush & Dayton, 2002). Trawling in mixed sediment habitats can create tracks of 1-8 cm deep in less compact substrate (Freese *et al*., 1999; Roberts *et al*., 2010). The depth of furrows depends on the weight of the board, the angle of attack, towing speed, and the nature of the substrate, being greatest in soft mud (Jones, 1992; Løkkeborg, 2005). The passage of the doors also creates sediment mounds known as berms (Gilkinson *et al*. 1998; Johnson *et al*. 2002). Marks on the seabed caused by other parts of the gear are faint when compared with those caused by trawl doors (Løkkeborg *et al*. 2005). Ground ropes and weights can scour and flatten the seabed, skimming the surface sediment between the grooves left by the trawl doors (Jones, 1992; Roberts *et al*. 2010; Grieve *et al*., 2014). Spherical footrope bobbins can cause compressed tracks on surficial sediments (Brylinsky *et al*. 1994). In areas of surface roughness i.e. sand waves and ripples, features can be flattened and the habitat smoothed (Kaiser & Spencer, 1996; Tuck *et al*., 1998; Schwinghamer *et al*., 1996; 1998). In areas of rocky reefs, demersal trawls can lead to reductions in habitat complexity and subsequent habitat homogenisation, particularly through the removal of biogenic structures (Sewell and Hiscock, 2005). Bridles or sweeps, the cables that connect the trawl doors to the trawl net, can snag on boulders or other obstructions over rough ground (Grieve *et al*., 2014).

The passage of an otter trawl however has been found to cause fairly minor physical and visual impact on the seabed in comparison to beam trawling (Lindeboom and De Groot, 1998; Grieve *et al*., 2014). The trawl heads, also known as beam trawl shoes, provide the vertical openings of the net, are in contact with the seafloor and of all gear parts have the deepest sediment penetration (in areas of softer substrate) and pressure on the seabed (Grieve *et al*., 2014). The tickler chains or chain matrix also have bottom contact and the chain matrix is used to fish in rougher grounds (i.e. in an area of stones and boulders) and are likely to be equipped with bobbins (Grieve *et al*., 2014). Studies have revealed that the penetration depth of tickler chains on a beam trawl range from a few centimetres to at least 8 cm in softer substrates (Løkkeborg, 2005). Using a light beam trawl, of 700 kg with 15 tickler chains, disturbance was revealed to be restricted to the upper 1 cm in sandy sediments and 3 cm in muddy silt (Bridger, 1972). An average penetration depth of 40 to 70 mm was reported by de Groot *et al*. 1995.

The following studies look more specifically at the types of physical disturbance within substrate types similar to those designated within the Poole Rocks MCZ. A wide range of sediment types can be described as ‘subtidal mixed sediment’ including muddy, gravely sands to mosaic of cobbles and pebbles in or on a sand, gravel or mud seabed (JNCC and Natural England, 2011). Gravel habitats often describe those in which gravel forms a major component and normally these types of habitats are actually mixed sediments with gravel, shell debris, coarse sand and silt (Collie *et al*., 2000). The studies relevant to subtidal mixed sediment can therefore largely vary with respect to sediment composition and a wide range of studies have therefore been considered.

Johnson *et al*. (2002) found a number of studies on the effects of otter trawling in gravel and variable habitats and these revealed trawling physically removed fine sediments and biogenic structures, moved or overturned stones and boulders, smoothed the seafloor and exposed sediment/shell fragments (Bridger, 1972; Auster *et al*., 1996; Engel & Kvitek, 1998; Freese *et al*., 1999; Johnson *et al*., 2002; Sewell and Hiscock, 2005). Experimental trawling, using a 3.5 tonne 4 m beam trawl with chain matrix, led to the flattening of sand ripples, suspension of fine materials and a reduction in the consolidation of sediments in areas of stable coarse sand and gravel and mobile sand in the eastern Irish sea (Kaiser & Spencer 1996, Kaiser *et al*. 1996, 1998, 1999).

There appear to be a lack of fishing impact studies in relation to trawling over rocky habitat. This is likely to be related to the inability of certain fishing gear to be used in particular habitats or lack of appropriate target species (Kaiser *et al*., 2006). As such, towed gear is not generally considered a major threat to rocky habitat types due to the unsuitability of the habitat (Roberts *et al*., 2010). This is concurrent with habitat types known to be fished using trawl gear, with trawling predominantly focused over areas of subtidal coarse and mixed sediment, although potentially fringing areas of rocky habitat, particularly in the Poole Rocks MCZ where subtidal mixed sediment is interspersed with rock (see Annex 1). If trawling were to fringe on areas of circalittoral rock, physical damage to softer rocks may occur, as well as the removal of biogenic structures (Sewell & Hiscock, 2005; Roberts *et al*., 2010). Auster *et al*. (1996) investigated the impacts of otter trawling in previously inaccessible rocky, boulder habitat in the Gulf of Maine, between 1987 and 1993 (Johnson *et al*., 2002). Prior to fishing, this habitat was characterised a thin veneer of mud covered gravel and boulders (>2 m diameter) (Johnson *et al*., 2002). Once modifications to fishing gear allowed the habitat to be fished, the thin veneer was mud disappeared, boulders had moved and the abundance of erect epifauna was reduced (Johnson *et al*., 2002). Freese *et al*. (1999) also documented that boulders were moved and overturned after a single passage of an otter trawl over cobble-boulder habitat in the eastern Gulf of Alaska.

4.3.1.2 Oyster dredging

Shellfish dredges are fitted with teeth or ladders (in the case of the oyster dredge) and can disturb the top 2 to 6 cm (Thrush & Dayton, 2002). The more benign traditional, lightweight oyster dredges towed at slow speeds, usually in estuaries, however have a relatively low impact (Sewell & Hiscock, 2005). Intertidal shellfish dredging can result in furrows up to tens of centimetres deep (Kaiser *et al*., 2006). There appears to be a lack of fishing impact studies in relation to oyster dredging in general. An investigation into the effects of clam dredging in Langstone Harbour, where a modified oyster dredge was used, reported a clear disturbance of sediment (muddy gravel) down to a depth of 15 to 20 cm (EMU, 1992). The same study reported the removal of the coarse fraction of the sediment and larger sand and fine sediment fraction, with minor differences in the silt component (EMU, 1992). The sediment type for this area was muddy gravel (EMU, 1992).

Natural England commissioned a study into the impacts of oyster dredging on subtidal coarse mixed sediment in Chichester Harbour in 2015 over a 5 week period which encompassed the oyster dredging season. The interim findings of the investigation were split into three channels (Bosham, Emsworth and Thorney) due to differences in sediment type and fishing intensity (Natural England, 2016b). Emsworth and Thorney channels was subject to fishing during the oyster season, whilst Bosham Channel acted as a control and was also subject to experimental fishing. No statistical differences between pre oyster season (i.e. prior to oyster dredging) and post oyster season (i.e. after oyster dredging) were detected for the particle size analysis.

There appear to be a lack of fishing impact studies in relation to oyster dredging over rocky habitat. This is likely to be related to the inability of the fishing gear to be used over particular habitats, or lack of target species (Kaiser *et al*., 2006). *Ostrea edulis* is found on firm bottoms of mud, rocks, muddy sand and muddy gravel with shells and hard silt (Jackson *et al*., 2007). Like trawling, oyster dredging is likely to focused on areas of subtidal coarse sediment and mixed sediment, however may fringe on areas of circalittoral rock. If this were to take place, physical damage to softer rocks may occur, as well as the removal of biogenic structures (Sewell & Hiscock, 2005; Roberts *et al*., 2010). It is likely any impacts on rocky habitats will be incremental, like those reported for scallop dredging over rocky reef habitats (Boulcott and Howell, 2011).

4.3.2 *Removal of non-target species*

Bottom towed fishing gear have been proven to have detrimental impacts on benthic communities (Thrush and Dayton, 2002; Kaiser *et al*., 2006). Such impacts include the removal or mortality of non-target species, reduction in the structural complexity of the seabed and changes in the diversity and composition of benthic assemblages (Boulcott *et al*., 2014). The level of impact depends on substrate type, gear type and sensitivity of the benthic community (Boulcott *et al*., 2014). Bottom towed fishing gear has been shown to reduce biomass, production and species richness and diversity (Veale *et al*., 2000; Hiddink *et al*., 2003). When dredges and trawls are towed along the seafloor, surface dwelling organisms can be removed; crushed, buried or exposed and sessile organisms will be removed from the substrate surface (Roberts *et al*., 2010; Mercaldo-Allen & Goldberg, 2011). In a meta-analysis of 39 studies investigating the effects of bottom towed gear, there was an overall reduction of 46% in the abundance of individuals within disturbed (fished) plots (Collie *et al*., 2000).

4.3.2.1 Trawling

Trawling within gravel habitats can lead to the loss of biogenic structure through the removal of structure-forming epifauna (Collie *et al*., 1997; Auster *et al*,, 1996). In a meta-analysis of experimental fishing impact studies, conducted by Kaiser *et al*. (2006), otter trawling was found to have one the least negative impacts, compared to other gear and substrata combinations. The initial impact on benthic communities from otter trawl disturbance on mud was estimated to be -29%, -15% on sand and +3% on gravel (Kaiser *et al*., 2006; Hinz *et al*., 2009). Bolam *et al*. (2014) investigated the relative sensitivity of benthic macrofauna to trawling, both short- and long-term and used this information to describe the spatial variation in sensitivity of secondary production. In general, it was found that the more sensitive and productive regions (northern North Sea and western English Channel) are associated with poorly-sorted, gravelly or muddy sediments, whilst less sensitive and less productive regions (southern North Sea) are associated with well-sorted sandy sediments (Bolam *et al*., 2014).

Collie *et al*. (1997) investigated the effects of multiple methods of bottom towing fishing gear (otter trawl and scallop dredging) on benthic megafaunal communities in gravel habitat on Georges Bank at depths between 47 to 90 metres. Numerical abundance of organisms, biomass and species diversity were all significantly greater at undisturbed sites, whilst evenness was greater at disturbed sites (Collie *et al*., 1997). Disturbed sites are likely to have greater evenness because disturbance of towed gear prevents one species becoming numerically dominant (Collie *et al*., 1997). Small fragile polychaetes, shrimps and brittle stars were absent or less common at disturbed sites. At undisturbed sites epifauna such as tube-dwelling polychaetes, bushy bryozoans and hydroids provide a complex habitat.

Engel and Kvitek (1998) documented differences between lightly (average of 220 trawl hours per year) and heavily (average of 816 trawl hours per year) otter trawled areas with similar bottom types (gravel, coarse sand, medium-fine sand and silt-clay) off central California. The densities and abundance of all invertebrate epifaunal species were higher in the lightly fished area when compared to the heavily fished area, including significant differences in species of sea pens, sea stars, sea anemones and sea slugs. Opportunistic species including oligochaetes, nematodes, ophiuroids were found in greater densities in the heavily fished area in each year of the study (1994-1996), whilst significantly more polychaete species were reported in lightly fished areas and no significant difference in the number of crustaceans between the two areas. The study concluded that high levels of trawling can lead to a decrease in habitat complexity and biodiversity and lead to subsequent increases in opportunistic species.

Valentine and Lough (1991) investigated the impact of scallop dredging and trawling on sand and gravel habitats using side scan sonar and a submersible on eastern Georges Bank. The study documented the most obvious signs of disturbance on gravel pavement habitats. Unfished gravel areas (as a result of the presence of large boulders) had more biologically diverse communities with an abundance of epifaunal organisms. In fished areas, the attached epifaunal community was limited.

Thrush *et al*. (1998) assessed the importance of fishing pressure (by collecting samples along a fishing pressure gradient) in accounting for variation in community composition in an area characterised by varied sediment characteristics (from 1 to 48% mud) in Hauraki Gulf in New Zealand at depths between 17 to 35 metres. In this area, a major fin fishery for snapper (*Chrysophrys auratus*) exists. The typical trawl gear used consists of 480 kg doors, ground rope of 140-150 mm diameter rubber bobbins, steel balls, with a total ground rope mass of 240 kg (not including sweeps and bridles). After accounting for differences in environmental conditions, the study reported 15-20% of the variability in the macrofauna community composition was attributed to fishing. Observations following reduction in fishing pressures included increases in the density of echinoderms, long-lived surface dwelling organisms, total number of species, individuals and species diversity. Decreased fishing pressure led to significant increases large epifaunal densities.

As mentioned previously there is a severe lack of fishing impact studies in relation to trawling over rocky habitat. The most applicable studies, which occur over cobble and boulder habitats, are given here. One study, conducted by Auster *et al*. (1996) investigated the impacts of otter trawling (dimensions unknown) previously inaccessible rocky, boulder habitat in the Gulf of Maine, between 1987 and 1993 (Johnson *et al*., 2002). Prior to fishing (1987), rock surfaces supported an abundance of erect sponges, sea spiders, bryozoans, hydroids, anemones, crinoid sea stars and ascidians. The area was resurveyed in 1993, after the habitat was subject to otter trawling due to modification to fishing gear, and this revealed a greatly reduced abundance of erect sponges and associated epifaunal species. Percentage cover of sponges was calculated from non-overlapping video frames. In 1987, 15 out of 100 frames had at least 10% cover, whilst a few made more than 25%. In 1993, no video frames had more than 7% cover. The study revealed a reduction in structural complexity as a result of direct removal of biogenic structures. Another study, conducted by Freese *et al*. (1999) in the eastern Gulf of Alaska, documented the impacts of a single passage of an otter trawl (0.6 m tire gear on the footrope, 0.45 m rockhopper discs, steel bobbins on the wings) over a cobble boulder habitat (comprised of 93% pebble) at a water depth of 206 to 274 metres. The trawl led to significant decreases in emergent epifauna, including anemones, sea whips and sponges. Sixty-seven percentage of vase sponges were damaged, 14% of finger sponges were knocked over and 55% of sea whips were broken or removed from the substrate.

4.3.2.2 Oyster dredging

The impacts of oyster dredging on benthic communities are likely to be similar to those caused by trawling and other forms of bottom towed fishing gear. Shellfish dredging however is likely to have a more negative impact than trawling, as the nature of the gear tends to penetrate deeper into the sediment than trawls (Collie *et al*., 2000). Having said this, traditional oyster dredges have relatively low impact due to their light weight nature and lack of teeth (Sewell & Hiscock, 2005). Oyster dredges have a ‘ladder’ instead of teeth. As stated previously, there appears to be a lack of fishing impact studies in relation to oyster dredging generally.

An investigation into the effects of experimental clam dredging (2 passes of a dredge on different bearings) in Langstone Harbour, where a modified oyster dredge was used in areas of muddy gravel, reported a complete removal or considerable reduction in fauna (EMU, 1992). Species richness was also found to decrease with a mean number of 6.5 species in the control site compared with 4.4 in the dredge site (EMU, 1992). Annelids (except *Tubificoides benedeni*) were badly affected and the abundance of bivalve species was also greatly reduced.

Natural England commissioned a study into the impacts of oyster dredging on subtidal coarse mixed sediment in Chichester Harbour in 2015 over a 5 week period which encompassed the oyster dredging season. The interim findings of the investigation were split into three channels (Bosham, Emsworth and Thorney) due to differences in sediment type and fishing intensity (Natural England, 2016b). Emsworth and Thorney channels was subject to fishing during the oyster season, whilst Bosham Channel acted as a control and was also subject to experimental fishing. No statistical differences between pre oyster season (i.e. prior to oyster dredging) and post oyster season (i.e. after oyster dredging) were detected macrofaunal community analysis (using the Infaunal Quality Index) for all channels and treatments. Studies into other fishing gear types have shown infaunal communities in soft sediments are less impacted than epifaunal communities. As such a subset of epifaunal species was analysed separately for each channel. Investigation into the presence/absence of epifaunal species found a statistical difference between pre and post oyster season samples in Thorney Channel only. This result may indicate that oyster dredging may have a significant impact on the benthic epifaunal communities in Thorney Channel which prior to the season have been unfished for three years.

As stated previously, there appears to be a lack of fishing impact studies in relation to oyster dredging over rocky habitat. Like trawling, oyster dredging is likely to be focused on areas of subtidal coarse sediment and mixed sediment and is not considered a major threat to faunal turf biotopes (Roberts *et al*., 2010), however the activity may fringe on areas of circalittoral rock. If this were to take place, there may be reductions in structural complexity, reduction in biodiversity and removal of erect epifaunal species and large sessile species. Epifaunal taxa that may be subject to damage includes algae, sponges, corals, colonial tube worms, hydroids and bryozoans, all of which provide a three dimensional habitat for other species (Jennings and Kaiser, 1998; Hall, 1999; Roberts *et al*., 2010). It is likely any impacts on rocky habitats will be incremental, like those reported for scallop dredging over rocky reef habitats (Boulcott and Howell, 2011). In Poole Rocks MCZ, the majority of rock outcrops are dominated by foliose algae and sparse kelp (post-survey site report). Kelp and other macroalgae are known to contribute to the structural complexity of this habitat type and therefore their removal will reduce habitat complexity (Roberts *et al*., 2010).

4.3.3 *Removal of target species*

4.3.3.1 Native oyster (Ostrea edulis)

The occurrence of Native oyster within Poole Rocks MCZ is low, with 6 records in the 2011 selection assessment document. The removal of Native oysters above the minimum size of 70 mm will occur as a result of oyster dredging. The activity would further reduce the occurrence of Native oyster, impacting on the availability of large and more fecund oysters that are necessary to rebuild the population. The Native oyster has a general management approach of ‘recover’ and this warrants the protection of larger individuals who have greater spawning capacity to help achieve favourable condition.

Historical declines in the UK native oyster populations, which have been observed since the late 1800s, highlight the potential impacts of fishing (Clarke, 2001; Laing *et al*., 2006; Lallias *et al*., 2010; MEP, 2014). In the mid nineteenth century, industrialisation of the fishing industry and introduction of oyster dredging, led to the over exploitation of the native oyster throughout Europe (Edwards, 1997; Laing *et al*., 2005; Smith *et al*, 2006; Shelmerdine and Leslie, 2009; MEP, 2014). Having sporadic reproduction and being relatively long lived makes the native oyster particularly vulnerable to overfishing (Orton, 1927; Spärck, 1951; Laing *et al*., 2005; MEP, 2014). Populations of native oysters are now restricted to small and localised groups and production remains low (Lallias *et al*., 2008; MEP, 2014). Fishing is therefore considered to have been significant in the decline of oyster beds in England (JNCC & Natural England, 2011).

4.3.4 Sensitivity

4.3.4.1 Sensitive species

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 the species known to occur within the Poole Rocks MCZ (as reported from the video samples in post-survey site report) are provided in table 5. The table also includes sensitivity information assigned by MarLIN in relation to physical disturbance and abrasion. Please note that the sensitivity ratings assigned by MarLIN are based on a single dredging event.

Table 5. Likely sensitivity of species found in Poole Rocks MCZ to disturbance caused by an encounter with fishing gear scored by MacDonald *et al*. (1996) and MarLIN (in relation to physical disturbance and abrasion). Medium intensity gears include otter trawls and high intensity gears include dredges, rockhoppers and beam trawls. 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 medium intensity gears)**	**Sensitivity (for high intensity gears)**	**Intolerance**	**Recoverability**	**Sensitivity**
Alcyonium digitatum[1]	Deadman’s fingers	1	2	15	40	Intermediate	High	Low
Flustra foliacea[2]	Hornwrack	2	2	30	80	Intermediate	High	Low
Laminaria hyperborea[3]	Tangle or cuvie	2	2	30	80	Intermediate	Moderate	Moderate
Asterias rubens[4]	Common starfish	2	2	30	80	Intermediate	High	Low

[1]*Alcyonium digitatum* had 22% occurrence in the video samples taken. [2]*Flustra foliacea* had 29% occurrence in the video samples taken. [3] *Laminaria* had 2% occurrence in the video samples taken. [4]*Asterias rubens* had 1% occurrence in video samples taken.

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, shallow abrasion/penetration, penetration and/or disturbance of the substrate below the surface of the seabed, removal of target and non-target species. Sensitivity to all pressures is variable for pressure-feature combinations associated with moderate energy circalittoral rock. Subtidal mixed sediments appears to have high sensitivity to both shallow abrasion and penetration. The Native oyster has high sensitivity to the removal of target species. Confidence of sensitivity assessments varies but is generally low for abrasion and penetration (Table 6).

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 ‘beam trawls and scallop dredges’, ‘light demersal trawls and seines' and /oyster/mussel dredging and prospecting’ as they best encompassed the fishing activities under consideration. The habitat types were chosen to best reflect the designated features under consideration. Some towed bottom gears where considered unlikely to be deployed in a number of habitat types and as such were not assessed for heavy to light gear intensities.

Oyster beds were sensitive to all gear types regardless of intensity. Stable species rich mixed sediment was also sensitive to the gear types considered whilst unstable coarse sediments with robust fauna showed relatively low sensitivity, except for heavier gear types and at heavy gear intensities (except for light demersal trawls and seines) (Table 7).

Table 6. Sensitivity of designated 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	Shallow abrasion/penetration: damage to seabed surface and penetration	Penetration and/or disturbance of the substrate below the surface of the seabed	Removal of non-target species	Removal of target species
Ostrea edulis	-	-	-	-	High (High)
Moderate energy circalittoral rock	Low to High (Low)	Medium to High (Low)	Medium to High (Low)	Medium (Medium)	-
Subtidal mixed sediment	Medium (Low)	High (Low)	High (Low)	Medium (Medium)	-
- These pressures were screened out at the part A assessment					

Table 7. Sensitivity of designated 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
Beam trawls and scallop dredges	**Rock with low-lying and fast growing faunal turf**				Low

	Shallow subtidal rock with kelp				Medium
	Oyster beds	High	High	High	High
	Stable spp. rich mixed sediment	High	High	Medium	Low
	Unstable coarse sediments – robust fauna	Medium	Medium	Low	Low
Oyster/ Mussel dredging and Prospecting	**Rock with low-lying and fast growing faunal turf**	High	Medium	Low	Low
	Shallow subtidal rock with kelp				Medium
	Oyster beds	High	High	High	High
	Stable spp. rich mixed sediment	High	Medium	Medium	Low
	Unstable coarse sediments – robust fauna	Medium	Low	Low	Low
Light demersal trawls and seines	**Rock with low-lying and fast growing faunal turf**				Medium
	Shallow subtidal rock with kelp				Medium
	Oyster beds	High	High	High	High
	Stable spp. rich mixed sediment	High	Medium	Low	Low
	Unstable coarse sediments – robust fauna	Low	Low	Low	Low

Blank boxes mean there is no information on sensitivity for heavy, moderate or light gear intensity as the gear types are considered unlikely to occur in these habitat types.
* **Heavy** – Daily in 2.5nm x 2.5 nm, **Moderate** – 1-2 times a week in 2.5 nm x 2.5 nm, **Light** – 1-2 times a month during a season in 2.5 nm x 2.5 nm, **Single** – Single pass of fishing activity in a year overall

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.

- **Oyster Dredge** byelaw – in dredging or fishing for oysters is any fishery no dredge shall be used which has a front edge or blade exceeding 1.5 metres in length and if two or more dredges are in dredging or fishing for oysters used at the same time or in from the same boat or vessel the total length of the front edges or blades of such dredges when added together shall not exceed 3.0 metres.

- **Fishing for Oysters, Mussels and Clam** byelaw states that when fishing for these species only the following methods are used; a) hand picking and b) dredging using a dredge with a rigid framed south so designed to take shellfish only when towed along the sea bed.

- **Oysters** byelaw – no person shall remove from a public or regulated fishery any oyster (other than Portuguese or Pacific oysters) which will pass through a circular ring of 70 mm in internal diameter.

- **Oyster Close Season** prohibits any person from dredging or fishing for in or taking any fishery oysters during the period from the 1st day of March to the 31st of October in any year. This byelaw does not apply to an area in the District which is within 10 miles of South Haven Point at the entrance to Poole Harbour, where the oysters are intended for the purpose of oyster cultivation (without delay and without prior sale) on several/lease beds near or within Poole Harbour (as described by the Poole Fishery Order).

- **Minimum Fish Sizes** byelaw - states that no person shall take from the fishery any fish of the following species (black seabream, brill, dab, conger eel, flounder, lemon sole, red mullet, shad, turbot, witch flounder) that measures less than the size listed when measured from the tip of the snout to the end of the tail. The minimum size for flounder is 27 cm. The minimum sizes contained within this byelaw differ from that in EU legislation.

- A separate **Minimum Size** Southern IFCA byelaw exists for Skates and Rays and this states that no person shall take any ray that measures less than 40 cm between the extreme tips of the wings or any wing which measures less than 20 cm in its maximum dimension and which is detached from the body of a skate or ray.

- Other regulations include minimum sizes, mesh sizes and catch composition as dictated by European legislation. European minimum sizes, listed under Council Regulation (EEC) 850/98 specify the minimum size for plaice is 27 cm and for scallops is 10 cm in ICES region VII e and 11 cm in ICES region VII d.

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 SACs and SCIs, the UK is obliged to report on the Favourable Condition Status of Annex I and Annex II features every 6 years. Similar reporting requirements under the Birds Directive are required for SPAs. Under the Marine and Coastal Access Act there is a need to assess the achievement of conservation objectives for MCZs. Alongside these national reporting requirements is the need 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 reviewed, refined and tested the condition assessment methodology. This methodology will be used to start a rolling programme of marine feature condition assessments in 2016/17. As such, the feature condition of moderate energy circalittoral rock, subtidal mixed sediments and the Native oyster are currently not assessed[6].

Where there is no evidence to determine a marine feature's condition, a vulnerability assessment, which includes sensitivity and exposure information for features and activities in a site, has been used as a proxy for condition[7].

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

7 https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0004&SiteName=chesil%20beach&countyCode=&responsiblePerson=

4.6 Table 8. Assessment of trawling and oyster dredging pressures upon Moderate energy circalittoral rock, Subtidal mixed sediments and Native oysters (*Ostrea edulis*)

Feature	Attribute	Target	Potential pressure(s) and Associated Impacts	Likelihood of Impacts Occurring/Level of Exposure to Pressure	Mitigation measures
Moderate energy circalittoral rock	Distribution: presence and spatial distribution of circalittoral rock communities	Maintain the presence and distribution of circalittoral rock communities	Abrasion/disturbance of the substrate on the surface of the seabed and penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion and removal of non-target species were identified as potential pressures. Bottom towed gear can lead to the removal, damage or mortality of non-target species particularly erect epifauna and large sessile organisms, reduction in	One vessel was known to beam trawl on the fringes of the site up until 2013 (when the vessel sank). Up to five vessels light otter trawl within the surrounding area of Poole Bay. Native oysters have been historically fished within the surrounding area of Poole Bay (up to 10 years ago). This indicates the area could support a commercially viable population and therefore may be subject to oyster dredging in the future. Bottom towed fishing gear is not considered a major threat to rocky reef habitats due to the ability of fishing gear to be used over this substrate and/or lack of	Vessels Used in Fishing byelaw prohibits commercial fishing vessels over 12 metres from the Southern IFCA district. The reduction in vessel size also limits the size of fishing gear (i.e. size of trawl) that can be deployed. Oyster Dredge byelaw specifies the size of the dredge and total size of combined dredges that can be used. Oyster Close Season prohibits any person from dredging or fishing for oysters

			structural complexity and reduction in biodiversity. There are a lack of impact studies in relation to trawling and particularly oyster dredging over rocky habitat and this is likely to be related to the inability of fishing gear to be used over particular habitats and/or lack of target species. The most applicable studies occur over boulder and cobble habitats (Auster *et al*. 1996; Freese *et al*. 1999). Both describe a reduction in emergent epifaunal species including sponges and seawhips after trawling disturbance.	target species. Both gear types are focused over areas of subtidal coarse sediment and mixed sediment, however may fringe on area of circalittoral rock. Such interactions with circalittoral rock are likely to occur due to the nature of the site (circalittoral rock interspersed within an area of subtidal mixed sediment). Scientific literature highlights that emergent epifaunal species are reduced in cobble and boulder habitats as a result of trawling activity. The species known to occur within Poole Rocks MCZ have been shown to have limited sensitivity and high recoverability to fishing disturbance and potential pressures (MacDonald *et al*. 1996; MarLIN). *Laminaria* has moderate recoverability, however is recorded to have a low occurrence within the site (2%).	from 1st March until 31st October, except within 10 miles of the Poole Harbour entrance for purposes of oyster cultivation within Poole Harbour. Proposed bottom towed fishing gear closures are outlined in section 5.

				Based on the knowledge of the damaging impacts bottom towed fishing gear is likely to have on rocky reef communities, the potential for trawling and/or oyster dredging to occur would be likely to pose a significant risk to the feature in future. In order to achieve the 'maintain' general management approach for the feature, as well as the individual 'maintain' target for presence and distribution of circalittoral rock communities, it is important to protect this habitat at current levels of fishing (i.e. in the absence of fishing).	
	Extent and distribution	Maintain the total extent and spatial distribution of circalittoral rock subject to natural variation in sediment veneer	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion were identified as potential pressures of oyster dredging.	Native oysters have been historically fished within the surrounding area of Poole Bay (up to 10 years ago). This indicates the area could support a commercially viable population and therefore may be subject to oyster dredging in the future.	Addressed above.

			The ladder of an oyster dredge can disturb the top 2 to 6 cm of softer substrata (Thrush and Dayton, 2002). In areas of harder substrata, physical damage to softer rocks may occur, as well as the removal of biogenic structures. There are a lack of impact studies in relation to oyster dredging over rocky habitat and this is likely to be related to the inability of fishing gear to be used over particular habitats and/or lack of target species.	Bottom towed fishing gear is not considered a major threat to rocky reef habitats due to the ability of fishing gear to be used over this substrate and/or lack of target species. Both gear types are focused over areas of subtidal coarse sediment and mixed sediment, however may fringe on area of circalittoral rock. Such interactions with circalittoral rock are likely to occur due to the nature of the site (circalittoral rock interspersed within an area of subtidal mixed sediment). Oyster dredges are relatively light weight and have therefore have lower impact in areas of softer substrata. Based on the nature of the gear and its ability to inflict damage, it is unlikely if the activity were to occur in the future it would pose a significant risk to the extent and spatial distribution of circalittoral rock.	

	Structure/function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat	Addressed above.	Addressed above. Based on the knowledge of the damaging impacts bottom towed fishing gear is likely to have on rocky reef communities, the potential for trawling and/or oyster dredging to occur would be likely to pose a significant risk to the feature in future. In order to achieve the 'maintain' general management approach for the feature, it is important to protect this habitat at current levels of fishing (i.e. in the absence of fishing).	Addressed above.
	Structure: physical structure of rocky substrate	Maintain the surface and structural complexity, and the stability of the reef structure	Addressed above.	Addressed above. Oyster dredges are relatively light weight and have therefore have lower impact in areas of softer substrata. Based on the nature of the gear and its ability to inflict damage, it is unlikely if the activity were to occur in the future it would pose a significant risk to the	Addressed above.

				physical structure of rocky substrate.	
	Structure: species composition of component communities	Maintain the species composition of component communities	Addressed above.	Addressed above. Based on the knowledge of the damaging impacts bottom towed fishing gear is likely to have on rocky reef communities, the potential for trawling and/or oyster dredging to occur would be likely to pose a significant risk to the feature in future. In order to achieve the 'maintain' general management approach for the feature, as well as the individual 'maintain' target for species composition of component communities, it is important to protect this habitat at current levels of fishing (i.e. in the absence of fishing).	Addressed above.
Subtidal mixed sediment	Distribution: presence and spatial distribution of subtidal mixed	Maintain the presence and spatial distribution of subtidal mixed	Abrasion/disturbance of the substrate on the surface of the seabed and penetration and/or	One vessel was known to beam trawl on the fringes of the site up until 2013 (when the vessel sank). Up to five vessels light otter trawl	Addressed above.

	sediment communities	sediment communities	disturbance of the substrate below the surface of the seabed, including abrasion were identified as potential pressures. Bottom towed gear can lead to the removal, damage or mortality of non-target species particularly epifaunal species, reduction in structural complexity and reduction in biodiversity and composition of benthic assemblages. Studies on the impacts of trawling in mixed sediment or gravel habitats, reported a reduction in abundance, biomass and species diversity, with undisturbed or lightly fished sites showing	within the surrounding area of Poole Bay. Native oysters have been historically fished within the surrounding area of Poole Bay (up to 10 years ago). This indicates the area could support a commercially viable population and therefore may be subject to oyster dredging in the future. Both gear types are focused over areas of subtidal coarse sediment and mixed sediment. Scientific literature highlights that epifaunal communities are particularly vulnerable to methods of bottom towed fishing gear and negative changes can be observed across multiple community measures (abundance, biodiversity etc) in areas of mixed sediment. Based on the knowledge of the damaging impacts bottom towed fishing gear is	

			a greater abundance of epifauna. One study reported a considerable removal in fauna and reduction in species richness after oyster dredging on mixed sediments. Another study reported a statistical difference in the epifaunal species after oyster dredging, in an area which had been unfished for three years prior.	likely to have epifaunal communities associated with subtidal mixed sediments, the potential for trawling and/or oyster dredging to occur would be likely to pose a significant risk to the feature in future. In order to achieve the 'maintain' general management approach for the feature, as well as the individual 'maintain' target for presence and spatial distribution of subtidal mixed sediment communities, it is important to protect this habitat at current levels of fishing (i.e. in the absence of fishing). It is important to note that subtidal mixed sediments covers a broad range of habitats and the studies given in this assessment may largely differ from the sediment types found in Poole Rocks MCZ and so their applicability may be limited.	

	Structure/function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat	Addressed above.	Addressed above. Based on the knowledge of the damaging impacts bottom towed fishing gear is likely to have epifaunal communities associated with subtidal mixed sediments, the potential for trawling and/or oyster dredging to occur would be likely to pose a significant risk to the feature in future. In order to achieve the 'maintain' general management approach for the feature, it is important to protect this habitat at current levels of fishing (i.e. in the absence of fishing).	Addressed above.
	Structure: sediment composition and distribution	Maintain the distribution of sediment composition types across the feature.	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion were identified as potential pressures of oyster dredging.	One vessel was known to beam trawl on the fringes of the site up until 2013 (when the vessel sank). Up to five vessels light otter trawl within the surrounding area of Poole Bay. Native oysters have been historically fished within the	Addressed above.

			Physical impacts on the seabed from bottom towed fishing gear include scraping and ploughing, creation of depressions, trenches, scouring and flattening of the seabed, sediment resuspension and changes in the vertical distribution of sediment layers. Bottom towed fishing gear can penetrate from 5 to 30 cm into the substrate. Trawling has been shown to create tracks 1 to 8 cm deep and oyster dredges have been known to disturb the top 2 to 6 cm. Studies on trawling have been shown to remove fine sediments and biogenic structures and move or overturn	surrounding area of Poole Bay (up to 10 years ago). This indicates the area could support a commercially viable population and therefore may be subject to oyster dredging in the future. Both gear types are focused over areas of subtidal coarse sediment and mixed sediment. Scientific literature shows there is the potential for changes to sediment composition. In relation to trawling this occurs through the removal of fine sediment and overturning of boulders. Oyster dredging has been shown too led to the removal of different sediment fractions, including coarse, large sand and fine sediment, however another study found no statistical differences were found after size particle analysis after oyster dredging took place. Removal of fine sediment is likely to be limited due to the relatively low percentage of	

			stones and boulders and expose shell fragments. Studies on oyster dredging reveal different impacts. One study reported the removal of coarse sediment, larger sand fractions and fine sediment, as well as minor differences in silt component (EMU, 1992). Another study however reported no significant difference in particle size analysis before and after oyster dredging (Natural England, 2016b).	silt/clay (15.7% on average in the post-survey site report). Based on the knowledge of potential changes that may occur to sediment composition as a result of bottom towed fishing gear, the potential for trawling and/or oyster dredging to occur may pose a significant risk to the feature in the future. It is however important to acknowledge the lack of conclusive results for oyster dredging. In order to achieve the 'maintain' general management approach for the feature, as well as the individual 'maintain' target for the distribution of sediment composition types across subtidal mixed sediments, it is important to protect this habitat at current levels of fishing (i.e. in the absence of fishing). It is important to note that subtidal mixed sediments	

				covers a broad range of habitats and the studies given in this assessment may largely differ from the sediment types found in Poole Rocks MCZ and so their applicability may be limited.	
	Structure: species composition of component communities	Maintain the species composition of component communities	Addressed above.	Addressed above. Based on the knowledge of the damaging impacts bottom towed fishing gear is likely to have epifaunal communities associated with subtidal mixed sediments, the potential for trawling and/or oyster dredging to occur would be likely to pose a significant risk to the feature in future. In order to achieve the ‘maintain’ general management approach for the feature, as well as the individual ‘maintain’ target for the species composition of component communities, it is important to protect this habitat at current levels of	Addressed above.

				fishing (i.e. in the absence of fishing).	
Native oyster (*Ostrea edulis*)	Population: population size	Maintain the population size within the site	The removal of target species was identified as a potential pressure of oyster dredging. Oyster dredging leads to the removal of Native oyster above the minimum size of 70 mm. The removal of these larger oysters will reduce the population size and number of more fecund individuals, thus decreasing the reproductive capability of the population. Fishing is thought to have played a significant role in the historical declines of Native oyster	Native oysters have been historically fished within the surrounding area of Poole Bay (up to 10 years ago). This indicates the area could support a commercially viable population and therefore may be subject to oyster dredging in the future. Historically, fishing is thought to have played a role in the reduction of Native oyster populations within England. Native oyster have a 'recover' general management approach for Native oysters and based on this, the population should be protected from any potential removal in the future to firstly 'maintain' the population size target and prevent the removal of larger more fecund oysters	Addressed above. Oysters byelaw protects the removal of any oyster below 70 mm in diameter.

			populations in England.	necessary to achieve favourable condition.	
Native oyster (*Ostrea edulis*)	Population: recruitment and reproductive capability	Maintain the reproductive and recruitment capability of the species.	Addressed above.	Addressed above. Native oyster have a 'recover' general management approach for Native oysters and based on this, the population should be protected from any potential removal in the future to 'maintain' the reproductive and recruitment capability as removal of larger more fecund oysters will prevent this target being achieved.	Addressed above.
Native oyster (*Ostrea edulis*)	Presence and spatial distribution of the species	Maintain the presence and spatial distribution of the species.	Addressed above.	Addressed above. Native oyster have a 'recover' general management approach for Native oysters and based on this, the population should be protected from any potential removal in the future in order to 'maintain' the presence and spatial	Addressed above.

				distribution of the species as reproduction may be inhibited if individual oysters are located to far apart from one another.	
Native oyster (*Ostrea edulis*)	Supporting habitats: extent and distribution	Maintain the extent and spatial distribution of the following supporting habitats: subtidal rock.	Addressed above under moderate energy circalittoral rock. Potential pressures are considered to be the same for moderate energy infralittoral rock. Extent and distribution was not considered as a relevant attribute for subtidal mixed sediments.	Addressed above under moderate energy circalittoral rock for subtidal rock. Likelihood of Impacts Occurring/Level of Exposure to Pressure are considered to be the same for moderate energy infralittoral rock. Extent and distribution was not considered as a relevant attribute for subtidal mixed sediments.	Addressed above.

5. Management Options

In recognition of the potential pressures of bottom towed fishing gear upon designated features and their supporting habitats, Southern IFCA is in the process of introducing a permanent bottom towed fishing gear closure within Poole Rocks MCZ in order to protect sensitive designated features.

The bottom towed fishing gear closures are designed to protect moderate circalittoral rock, subtidal mixed sediments and the Native oyster against bottom towed fishing gear which is likely to pose a significant risk to the achievement of the general management approaches of the sensitive designed features and conservation objectives of the site. In order to 'maintain' moderate energy circalittoral rock and subtidal mixed sediment habitats fishing activity should also maintained at current levels (i.e. in the absence of fishing). Similarly, to allow for the 'recovery' of Native oysters, the population within the site should be protected from any removal and thus maintain the current absence of fishing activity. This approach is in line with Southern IFCA's duties under sections 125 and 154 of the Marine and Coastal Access Act 2009 to further the conservation objectives of MCZs.

The designated features that require protection cover the entirety of the site of the 3.73km^2 site (94% subtidal mixed sediments and 6% moderate energy infralittoral rock – post-survey site report). As discussed earlier a conflict exists between the Poole Rocks MCZ designation order and post-survey site report with respect to the designation of circalittoral and infralittoral rock. High levels of suspended sediment in the site lead to benthic communities being overlaid with a layer of silt. This creates circalittoral conditions at infralittoral depths. The feature is therefore covered under the designation order. As such, the permanent bottom towed fishing gear closure within Poole Rocks MCZ is proposed to cover the entire site (Figure 6).

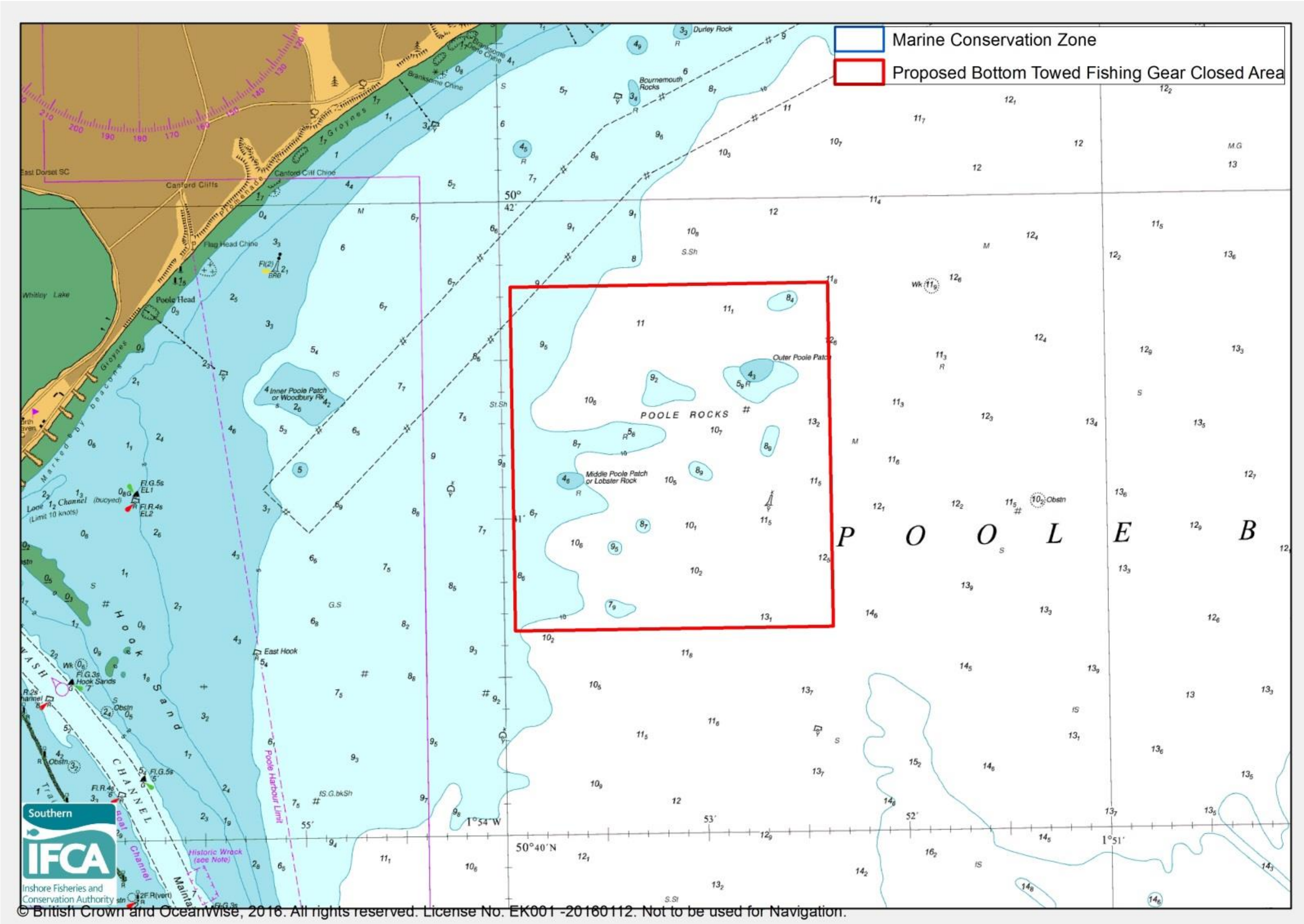

Figure 6. A map showing the proposed bottom towed fishing gear closure area within Poole Rocks MCZ.

6. Conclusion

In order to conclude whether types of bottom towed fishing gear (light otter trawl, beam trawl, oyster dredge) pose a significant risk, it is necessary to assess whether the impacts of the activities considered will hinder the achievement of the general management approaches of the sensitive designated features (moderate energy circalittoral rock, subtidal mixed sediment and Native oyster) (as outlined in Table 1) and the sites conservation objectives, namely:

“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 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

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."

The review of the research into the impacts on bottom towed fishing gear over reef habitat and subtidal mixed sediment identified the activity has the capability to cause both physical and biological disturbance. Physical disturbance can occur through the creation of depression and trenches, changes in sediment composition, suspension of fine materials, removal of biogenic structures and overturning or moving of boulders and stones. Biological disturbance can occur through the removal, damage or mortality of non-target species, particularly epifaunal species. It is therefore recognised that the activities have the potential to pose a significant risk upon the following attributes of sensitive designated features:

- Moderate energy circalittoral rock: 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, structure: physical structure of rocky substrate, extent and distribution.
- Subtidal mixed sediments: distribution: presence and spatial distribution of subtidal mixed sediment, structure/function: presence and abundance of key structural and influential species, structure: species composition of component communities, structure: sediment composition and distribution.
- Native oyster: population: population size, population recruitment and reproductive capability, presence and spatial distribution of the species, supporting habitats: extent and distribution (subtidal rock only)

The likelihood and magnitude of impacts associated with bottom towed fishing gear upon these attributes will be determined by the following variable:

I. Number of vessels participating
II. Location of bottom towed fishing gear activity
III. Timing and duration of bottom towed fishing gear activity
IV. Sensitivity of designated features (and their supporting habitats) to the impacts of bottom towed fishing gear
V. Ability of designated features (and their supporting habitats) to recover from the impacts of bottom towed fishing gear

Additionally, the location, timing, duration and intensity of bottom towed fishing gear within the site will be influenced by existing management measures (section 4.5) and/or those being developed to mitigate against the significant risk posed by the activities (section 5).

Having reviewed a wide range of evidence, including scientific knowledge, IFCO knowledge and habitat feature mapping, it has been concluded that bottom towed fishing gear is likely to pose a significant risk to moderate energy circalittoral rock, subtidal mixed sediments and the Native oyster (and their supporting habitats) within the Poole Harbour MCZ. The rationale for this conclusion is summarised below:

- IFCO knowledge indicates that whilst no bottom towed fishing gear activity currently occurs within the site, there is the potential for trawling (both beam trawl and light otter trawl) and oyster dredging to occur within the site. This is indicated by historic and current levels of fishing activity within the surrounding area of Poole Bay and the occurrence of beam trawling on the fringes of the site up until 2013.
- Subtidal mixed sediments are most threatening by the types of bottom towed fishing gear considered due to the substrates suitability for trawling and oyster dredging. Areas of rock habitat are interspersed throughout subtidal mixed sediments within the site and therefore are at risk from fishing activity which may fringe this type of habitat.
- Subtidal mixed sediments is a broadscale habitat type and a review of scientific over variable substrate types consistently reported reductions of epifaunal following trawling disturbance. The same was reported for cobble and boulder habitat, which represented the most applicable habitat as there was a severe lack of fishing impact studies in relation to trawling over rocky habitat. Similarly, there was a severe lack of fishing impact studies in relation to oyster dredging over rocky habitat. The limited number of studies on oyster dredging in subtidal mixed sediments reported mixed results.
- The sensitivity of the designated features to pressures associated with bottom towed fishing gear is medium to high (Table 6).
- Fishing has been implicated in the historical decline of oyster beds in England. The occurrence of Native oysters within the Poole Rocks MCZ is very low (6 records in the 2011 selection assessment document). The activity would further reduce the occurrence of Native oyster (above the minimum size of 70 mmm), impacting on the availability and spatial distribution of large and more fecund oysters that are necessary to rebuild the population. The Native oyster has a general management approach of 'recover' and this warrants the protection of larger individuals who have greater spawning capacity to help achieve favourable condition.
- In order to 'maintain' moderate energy circalittoral rock and subtidal mixed sediment habitats and 'recover' the Native oyster to favourable condition, as well as furthering the conservation objectives of the site (as stated in section 125 and 154), Southern IFCA believe the current levels of fishing activity within the site (i.e. absence of fishing) should be maintained. This can be achieved through a permanent closure to bottom towed fishing gear over the entire site.
- It should be acknowledged that a conflict between the Poole Rocks MCZ designation order and post-survey site report exists in relation to the designation of moderate energy circalittoral and infralittoral rock. High levels of suspended sediment within the site lead to benthic communities being overlaid with a layer of silt. This creates circalittoral conditions at infralittoral depths. The feature is therefore covered under the designation order.

In summary, it has been concluded that bottom towed fishing gear will not pose a significant risk to the achievement of sites conservation objectives to 'maintain' moderate energy circalittoral rock and subtidal mixed sediments and 'recover' the Native oyster to favourable condition with the introduction of proposed bottom towed fishing gear management measures. Southern IFCA must seek to ensure that the conservation objectives of any MCZ in the district are furthered.

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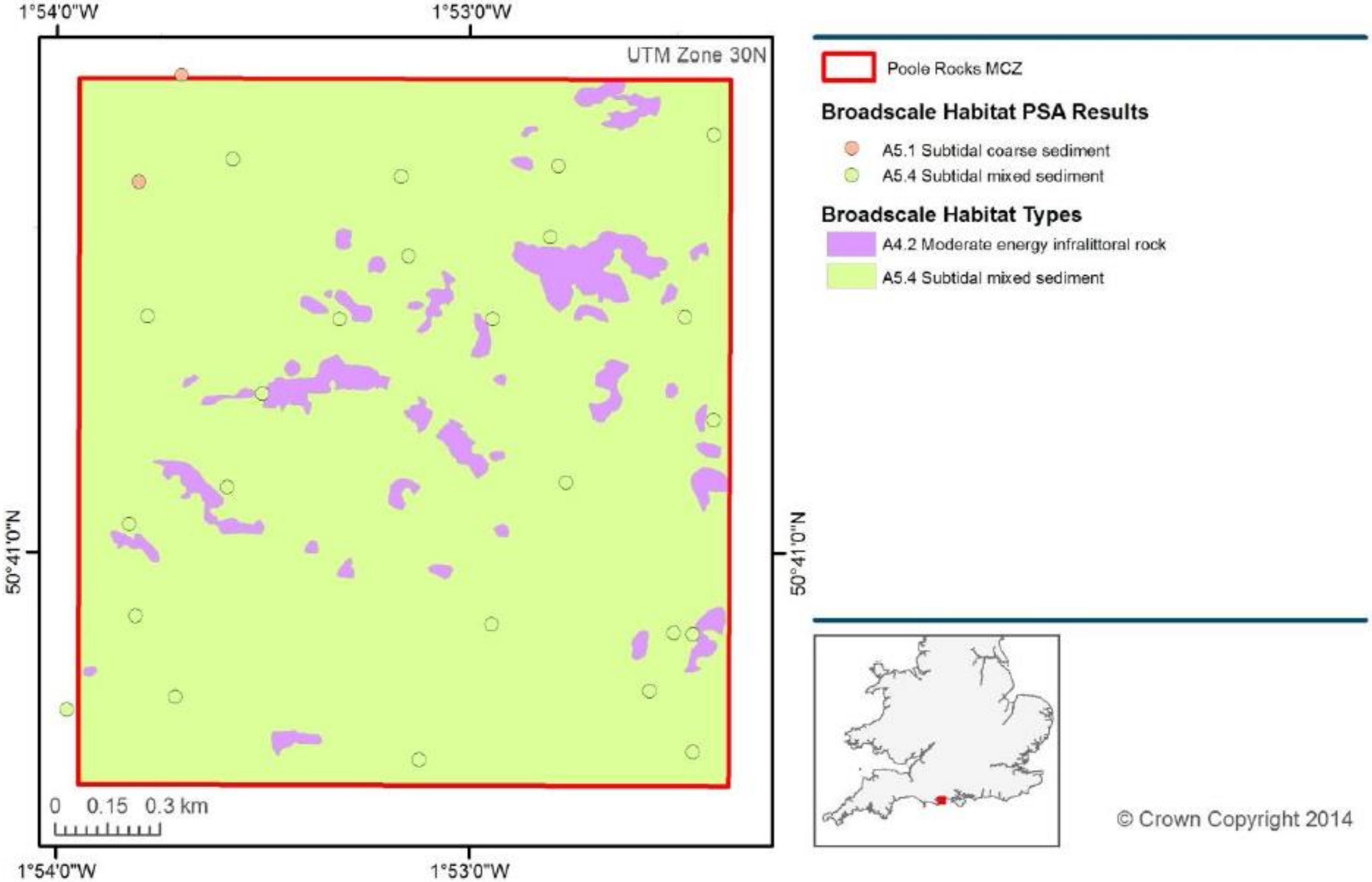
Annex 1. Broadscale Habitat Map for Poole Rocks MCZ. Source: Poole Rocks MCZ Post-survey Site Report 2015.



 SIFCA Reference: SIFCA/MCZ/

Annex 2. Initial screening of commercial fishing activities which take place in the Poole Rocks 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		Local IFCO	**Y**	**One vessel known to previously (up until 2013) fish on the fringes of site. This indicates the fringes of the site may be suitable for trawling.**	Y	High
		Beam trawl (shrimp)	N		Local IFCO	**N**	**Target species does not occur within the site.**	N	
		Beam trawl (pulse/wing)	N		Local IFCO	**N**	**This activity is prohibited by 'Electric Current' byelaw.**	N	
		Heavy otter trawl	N		Local IFCO	**N**	**There is a limited potential for the activity to occur as vessels are restricted in length to 12 m or less (as per the Southern IFCA byelaw) and therefore have limited capacity to deploy a heavy otter trawl. In addition, the activity does not take place within the site or surrounding area of Poole Bay and has not historically done so. It is therefore not anticipated**	N	

							to take place in the future.		
		Multi-rig trawls	N		Local IFCO	**N**	**There is limited potential for the activity to occur as vessels are restricted in length to 12 m or less (as per the Southern IFCA byelaw) and are therefore limited by size and probably power necessary for a multi-rig set up. In addition, the activity does not take place within the site or surrounding area of Poole Bay and has not historically done so. It is therefore not anticipated to take place in the future.**	N	
		Light otter trawl	N		Local IFCO	**Y**	**Up to five vessels operate within the surrounding area of Poole Bay. It is therefore likely that there may be suitable trawl grounds within areas of the site.**	Y	High
		Pair trawl	N		Local IFCO	**N**	**The activity is not anticipated to occur within the site or within the surrounding area of Poole Bay as the activity has not taken place within the district for the past 30 years.**	N	

		Anchor seine	N		Local IFCO	**N**	**Gear type has not been historically used within the area and is not anticipated to occur. Large vessels are also required for this type of gear type and vessels over 12 m in length are prohibited from fishing within the Southern IFCA district (as per the Southern IFCA byelaw).**	N	
		Scottish/fly seine	N		Local IFCO	**N**	**Gear type has not been historically used within the area and is not anticipated to occur. Large vessels are also required for this type of gear type and vessels over 12 m in length are prohibited from fishing within the Southern IFCA district (as per the Southern IFCA byelaw).**	N	
Pelagic towed fishing gear	**Towed (pelagic)**	Mid-water trawl (single)	N		Local IFCO	**N**	**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.**	N	
		Mid-water trawl (pair)	N		Local IFCO	**N**	**Activity has the potential to occur however this gear type does not come into contact with the seabed and therefore there is no**	N	

							chance for interaction with designated features.		
		Industrial trawls	N		Local IFCO	**N**	**Activity is not able to occur due to the size of vessels required. Vessels over 12 m are prohibited from fishing within the Southern IFCA district (as per the Southern IFCA byelaw).**	N	
Bottom towed fishing gear	**Dredges (towed)**	Scallops	N		Local IFCO	**N**	**The target species of the activity does not occur in commercially viable population size within the site. The activity is therefore not anticipated to occur.**	N	
		Mussels, clams, oysters	N		Local IFCO	**Y**	**Native oysters were historically fished for within Poole Bay approximately ten years ago. This indicates the area surrounding the site is able to support viable populations of the Native oyster and therefore could be subject to future oyster dredging. Dredging for mussels and clams in Poole Bay has not historically occurred. Mussels and clams do either not occur within the site or do not occur in commercially viable populations. It is therefore anticipated**	Y	High

							that dredging for mussels and clams will not take place in the future.		
		Pump scoop (cockles, clams)	N		Local IFCO	**N**	**Activity is not able to occur due to the nature of the site which is too deep, in addition to the incompatible nature of the substrate (circalittoral rock; subtidal mixed sediment) with the gear type considered. It is therefore anticipated that pump scoop dredging will not take place in the future.**	N	
Suction	**Dredges (other)**	Suction (cockles...)	N		Local IFCO	**N**	**Suction dredging for cockles, clams, mussels and oysters is prohibited (by default) in the Southern IFCA district (by Southern IFCA byelaws).**	N	
Tractor		Tractor	N		Local IFCO	**N**	**The activity is unable to take place as site is subtidal in nature.**	N	
Intertidal work	**Intertidal handwork**	Hand working (access from vessel)	N		Local IFCO	**N**	**The activity is unable to take place as site is subtidal in nature.**	N	
		Hand work (access from land)	N		Local IFCO	**N**	**The activity is unable to take place as site is subtidal in nature.**	N	
Static - pots/traps	**Static - pots/traps**	Pots/creels (crustacea/gastropods)	Y	No more than ten vessels. Exact number of vessels is unknown. Light to moderate activity.	Local IFCO	**N/A**		Y	Medium

		Cuttle pots	N	It is not known if the activity occurs within the site.	Local IFCO	**Y**	**Vessels deploy cuttle fish pots within the surrounding area of Poole Bay. It is therefore possible that the activity occurs within the site. The site is relatively far from the shore however which may make it less suitable for the activity.**	Y	Medium
		Fish traps	N		Local IFCO	**N**	**Activity has not historically occurred within the site and is not anticipated to occur. No known target species occur within the site. It is therefore anticipated that the activity will not occur in the future.**	N	
Demersal nets/lines	**Static - fixed nets**	Gill nets	Y	Activity is known to occur but at unknown levels and location.	Local IFCO	**N/A**		Y	Medium
		Trammels	Y	See above.	Local IFCO	**N/A**		Y	Medium
		Entangling	Y	See above.	Local IFCO	**N/A**		Y	Medium
Pelagic nets/lines	**Passive - nets**	Drift nets (pelagic)	N	It is not known if the activity occurs within the site.	Local IFCO	**Y**	**The activity is known to occur within the surrounding area of Poole Bay and therefore it is possible that it could occur within the site. There is very limited, if no, interaction with the designated features of the sites as the activity is pelagic.**	N	

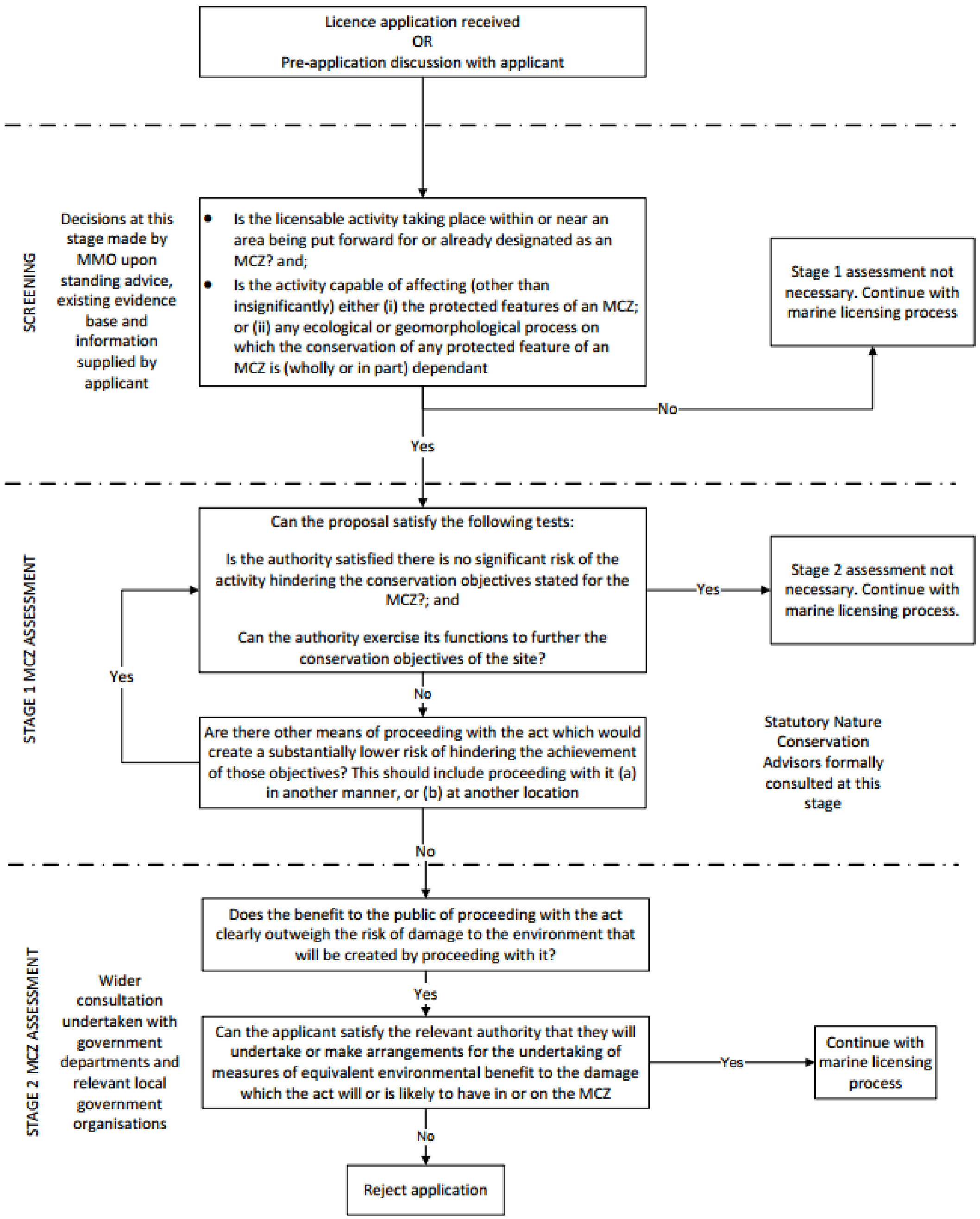
Demersal nets/lines		Drift nets (demersal)	N		Local IFCO	**N**	**The activity is not known to occur within the site or surrounding area of Poole Bay. Based on the nature of areas of the seabed within the site (circalittoral rock) it is unlikely that gear type would be compatible due to snagging. It is therefore anticipated there is limited potential for the activity to occur and is not anticipated to occur in the future.**	N	
	Lines	Longlines (demersal)	N		Local IFCO	**Y**	**The activity is not known to occur within the site or the surrounding area of Poole Bay. The activity does however have the potential to occur.**	Y	Low
Pelagic nets/lines		Longlines (pelagic)	N		Local IFCO	**Y**	**The activity is not known to occur within the site or the surrounding area of Poole Bay. The activity does however have the potential to occur.**	Y	Low
		Handlines (rod/gurdy etc)	Y	Large numbers of recreational anglers - up to 10/15 at any one time. Activity occurs throughout the site. Activity occurs all year round.	Local IFCO	**Y**	**The activity is known to occur within the site however this gear type is only likely to come into contact with the Couch's goby and not likely to interact with other designated features of the site.**	Y	Low

		Jigging/trolling	Y	See above.	Local IFCO	**Y**	**The activity is known to occur within the site however this gear type is only likely to come into contact with the Couch's goby and not likely to interact with other designated features of the site.**	Y	Low
Purse seine	**Seine nets and other**	Purse seine	N		Local IFCO	**N**	**The activity has not historically occurred within the site or surrounding area of Poole Bay. Although the activity has the potential to occur, it is not anticipated to occur in the future due to the lack of historical activity.**	N	
Demersal nets/lines		Beach seines/ring nets	N		Local IFCO	**N**	**The activity is unable to take place as site is subtidal in nature.**	N	
Miscellanous		Shrimp push-nets	N		Local IFCO	**N**	**The activity is unable to take place as site is subtidal in nature.**	N	
EA Only		Fyke and stakenets	EA Only	EA Only	**EA Only**	**EA Only**	**EA Only**	EA Only	EA Only
Miscellaneous	**Miscellaneous**	Commercial diving	N		Local IFCO	**N**	**The activity has not historically occurred within the site. The main target species of commercial diving (king scallop) is also absent from the site (post-survey site report). It is therefore anticipated there is limited potential**	N	

							for the activity to occur and is not anticipated to occur in the future.		
Bottom towed fishing gear		Bait dragging	N		Local IFCO	**N**	**The activity is unable to take place in the site as the substrate present is not suitable for the activity, and as such, the target species are also not present. In addition, the activity has not historically occurred within the site. It is therefore anticipated there is no potential for the activity to occur and is not anticipated to occur in the future.**	N	
Miscellaneous		Crab tiling	N		Local IFCO		**The activity is unable to take place as site is subtidal in nature.**	N	
Intertidal work	**Bait collection**	Digging wth forks	N		Local IFCO		**The activity is unable to take place as site is subtidal in nature.**	N	

Annex 3. Summary of MMO assessment process for MCZs

N.B. This process will be integrated into the marine licensing process



Annex 4. Summary of Natural England's Advice on Operations for commercial fishing activities in Poole Rocks MCZ

		Habitats		Species		
Activity	**Pressure**	**Moderate energy circalittoral rock**	**Subtidal mixed sediment**	**Couch's goby (*Gobius couchi*)**	**Native oyster (*Ostrea edulis*)**	**Risk profile**
Demersal trawl	Above water noise					Low
Demersal trawl	Abrasion/disturbance of the substrate on the surface of the seabed	S	S		S	Medium-high
Demersal trawl	Changes in suspended solids (water clarity)	S	S		NS	Medium-high
Demersal trawl	Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)					Low
Demersal trawl	Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)					Low

Demersal trawl	Deoxygenation	NS	NS	S	NS	Low
Demersal trawl	Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS	IE	NS	Low
Demersal trawl	Introduction of light					Low
Demersal trawl	Introduction or spread of non-indigenous species	S	S	IE	S	Low
Demersal trawl	Litter	IE	IE	IE	IE	Low
Demersal trawl	Nutrient enrichment	NS	NS		NS	Low
Demersal trawl	Organic enrichment	S	IE		NS	Low
Demersal trawl	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	S	S		S	Medium-high
Demersal trawl	Physical change (to another seabed type)	S	S		S	Low
Demersal trawl	Removal of non-target species	S	S		S	Medium-high
Demersal trawl	Removal of target species					Medium-high

Demersal trawl	Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	S	S	S	S	Medium-high
Demersal trawl	Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS	IE	NS	Low
Demersal trawl	Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS	IE	NS	Low
Demersal trawl	Underwater noise changes			S		Low
Demersal trawl	Visual disturbance					Low
Dredges	Above water noise					Low
Dredges	Abrasion/disturbance of the substrate on the surface of the seabed	S	S		S	Medium-high
Dredges	Changes in suspended solids (water clarity)	S	S		NS	Medium-high
Dredges	Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)					Low
Dredges	Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)					Low
Dredges	Deoxygenation	NS	NS		NS	Low

Dredges	Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS		NS	Low
Dredges	Introduction of light					Low
Dredges	Introduction of microbial pathogens	S	S		S	Low
Dredges	Introduction or spread of non-indigenous species	S	S		S	Low
Dredges	Litter	IE	IE		IE	Low
Dredges	Nutrient enrichment	NS	NS		NS	Low
Dredges	Organic enrichment	S	IE		NS	Low
Dredges	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	S	S		S	Medium-high
Dredges	Physical change (to another seabed type)	S	S		S	Low
Dredges	Removal of non-target species	S	S		S	Medium-high
Dredges	Removal of target species	NA	NA		S	Medium-high

Dredges	Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	S	S		S	Medium-high
Dredges	Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS		NS	Low
Dredges	Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	NS	NS		NS	Low
Dredges	Underwater noise changes					Low
Dredges	Visual disturbance					Medium-high

Legend:

S	Sensitive
NS	Not sensitive at this benchmark
IE	Insufficient evidence to assess
NA	Not applicable
	Not relevant