Marine Conservation Zone Assessment

Site name:	Hartland Point to Tintagel MCZ UKMO 20160010
Protected feature(s):	Moderate energy infralittoral rock High energy infralittoral rock Moderate energy circalittoral rock High energy circalittoral rock Subtidal coarse sediment Subtidal sand Fragile sponge & anthozoan communities on subtidal rocky habitats Pink sea-fan (*Eunicella verrucosa*) Honeycomb worm (*Sabellaria alveolata*) reefs

Fishing activities assessed at this site:
<u>Stage 1 Assessment</u>

Towed (demersal): Beam trawl (whitefish); Beam trawl (shrimp); Beam trawl (pulse/wing); Heavy otter trawl; Multi-rig trawls; Light otter trawl; Pair trawl; Anchor seine; Scottish/fly

Devon & Severn IFCA
Inshore Fisheries and Conservation Authority

D&S IFCA Reference
HPT-MCZ-005

Contents

Version	Date	Author(s)	Reviewer(s)
1	December 2018	Lauren Parkhouse	Elizabeth West
1.1	January 2019		Sarah Clark

1. Introduction

This assessment has been undertaken by Devon & Severn Inshore Fisheries and Conservation Authority (IFCA) in order to document and determine whether management measures are required to achieve the conservation objectives of marine conservation zones (MCZs). The IFCA's responsibilities in relation to management of MCZs are laid out in Sections 124 to 126, & 154 to 157 of the Marine and Coastal Access Act 2009.

2. MCZ site name(s), and location

Hartland Point to Tintagel MCZ is an inshore site on the north coast of Devon and Cornwall in the south west of England. The site covers 304 km² and follows the coastline along the mean high-water mark from Tintagel Head to Hartland Point. This assessment only covers the area in Devon and Severn IFCA's District.

Further information regarding the MCZ and its protected feature can be found in the Hartland Point to Tintagel MCZ Draft Conservation Advice (Natural England, 2017).

3. Feature(s) / habitat(s) of conservation importance (FOCI/HOCI) and conservation objectives

Table 1 - Protected features relevant to this assessment

Feature	**General management approach**
Moderate energy infralittoral rock	Maintain in favourable condition
High energy infralittoral rock	Maintain in favourable condition
Moderate energy circalittoral rock	Recover to favourable condition
High energy circalittoral rock	Recover to favourable condition
Subtidal coarse sediment	Recover to favourable condition
Subtidal sand	Recover to favourable condition
Fragile sponge & anthozoan communities on subtidal rocky habitats	Recover to favourable condition
Pink sea-fan (*Eunicella verrucosa*)	Recover to favourable condition
Honeycomb worm (*Sabellaria alveolata*) reefs	Maintain in favourable condition

The conservation objectives for these features are that they are brought to, and remain in, favourable condition.

4. Gear/feature interaction in the MCZ categorised as 'red' risk and overview of management measure

The management measures for towed (demersal) gear on circalittoral and infralittoral rock are under consideration in this assessment.

5. Activities under consideration

- Towed (demersal): Beam trawl (whitefish); Beam trawl (shrimp); Beam trawl (pulse/wing); Heavy otter trawl; Multi-rig trawls; Light otter trawl; Pair trawl; Anchor seine; Scottish/fly

There are two towed demersal gear vessels known to work within the boundaries of the site. The vessels use otter trawls to target various ray species in the north of the site (see Annex 2 for activity map). The site is fished throughout the year however, the main focus of activity is during the winter. The two vessels split their time between the port of Brixham in south Devon and Ilfracombe in north Devon therefore, the activity does not occur for prolonged periods of time when the vessels are based in Brixham. The area is an important fishing ground for the two vessels when they are based in the port of Ilfracombe.

The primary species which are targeted in this area are *Raja brachyura (*blonde ray), *Raja clavata* (thornback ray), and *Raja microocellata* (small-eyed ray). The blonde ray is a bottom dwelling species which prefers sand and muddy areas (Shark trust, 2009), the thornback ray frequents a wide variety of ground from mud, sand, shingle and gravel (Snowden, 2008), and the small-eyed ray is found on sand and rock-sand bottoms (Barnes, 2008).

The habitat map provided (Annex 1) indicates that the area fished is circalittoral rock however, this is not the preferred habitat for ray species, and the fishers have indicated they would not target rock areas for these species. This has resulted in D&S IFCA having low confidence in the current habitat map.

See Curtin (2018) for more information regarding fishing activities occurring in the Hartland Point to Tintagel MCZ.

6. Is there a risk that activities are hindering the conservation objectives of the MCZ?

Yes,
Evidence:
To determine whether each pressure is capable of affecting (other than insignificantly) the site's feature(s), the sensitivity assessments and risk profiling of pressures from the advice on operations section of the Natural England conservation advice package was used (Natural England, 2017). Table 22 displays the fishing activities and pressures included for assessment. The justifications for the pressures chosen for inclusion in this assessment can be seen in **Error! Reference source not found.**

Table 2 - Fishing activities and pressures included in this assessment.

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

The relevant targets for favourable condition were identified within Natural England's conservation advice, supplementary advice tables (Natural England, 2017). Table 33 displays which targets were identified as relevant to the activity assessed. The impacts of pressures on features were assessed against these targets to determine whether the activities causing the pressures are compatible with the site's conservation objectives.

Table 3 - Relevant favourable condition targets for identified pressures.

Feature	Attribute	Target
Moderate energy infralittoral rock; High energy infralittoral rock	Distribution: presence and spatial distribution of communities	Maintain the presence and spatial distribution of communities
	Extent and distribution	Maintain the total extent of feature and spatial distribution
	Structure and 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
	Structure: species composition of component communities	Maintain the species composition of component communities
Moderate energy circalittoral rock; High energy circalittoral rock; Subtidal coarse sediment; Subtidal sand	Distribution: presence and spatial distribution of communities	Recover the presence and spatial distribution of communities
	Extent and distribution	Maintain the total extent of feature and spatial distribution
	Structure and 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
	Structure: species composition of component communities	Recover the species composition of component communities
Pink sea-fan (*Eunicella verrucosa*)	Presence and spatial distribution of the species	Recover the presence and spatial distribution of the species
	Population: population size	Recover the population size within the site.
	Population: recruitment and reproductive capability	Recover the reproductive and recruitment capability of the species.
	Supporting habitats: extent and distribution	Maintain the distribution and abundance of the following supporting habitats: reef
Fragile sponge & anthozoan communities on subtidal rocky habitats	Extent and distribution	Maintain the total extent and spatial distribution of fragile sponge and anthozoan communities on subtidal rocky habitat.
	Distribution: presence and spatial distribution of communities	Recover the presence and spatial distribution of fragile sponge and anthozoan communities.
	Structure and 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
	Structure: physical structure of rocky substrate	Maintain the surface and structural complexity, and the stability of the subtidal rock structure
	Structure: species composition of component communities	Recover the species composition of component communities
Honeycomb worm (*Sabellaria alveolata*)	Extent and distribution	Maintain the total extent and spatial distribution of intertidal *Sabellaria* reef at 0.38 Ha, and spatial distribution.
	Structure and 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

	Structure: population density	Maintain the density of Sabellaria species across the feature.
	Structure: Species composition of the community	Maintain the species composition of the *Sabellaria* reef community.

7. Can D&S IFCA exercise its functions to further the conservation objectives of the site?

Yes,
Evidence: Monitoring and Control Arrangements

- Enforcement of current byelaws.
- Monitoring and review of current byelaws.
- The D&S IFCA Mobile Fishing Permit byelaw can gauge where any future changes or developments may occur.
- Changes can be made to the permit conditions, via consultation, if D&S IFCA deems it to be necessary. This could include spatial/temporal restrictions. The permitting system allows for adaptive management.
- Use of iVMS to monitor activity.

8. Referenced supporting information to inform assessment

Towed (demersal)- Rock features:
Empirical studies quantifying the impact of fisheries to hard bottom habitats are few. However, it is known that towing demersal trawls across rock substrates will cause damage or death to a significant proportion of large, upright attached species such as sponges and corals (Løkkeborg, 2005). In the Gulf of Alaska, 67% of sponges were damaged during a single pass of a trawl (Feese et al, 1999). Other species such as hydroids, anemones, bryozoans, tunicates and echinoderms are vulnerable to mobile fishing gear (McConnaughey et al, 2000; Sewell and Hiscock, 2005). Trawling may also reduce habitat complexity as boulders and cobbles associated with the hard substrate are moved around (Engel and Kvitek, 2008; Fresse et al, 1999).

Towed (demersal)- Sediment features:
There is currently no site-specific evidence on the presence and spatial distribution of the biological communities for the Hartland Point to Tintagel MCZ. Therefore, this assessment will draw on more general evidence for potential impacts on the two sediment features; subtidal coarse sediment and subtidal sand.

The major sources of seabed disturbance in UK waters are near-bed currents, wind-induced waves, aggregate dredging for mineral resources, and bottom trawling/dredging for fish (Foden et al, 2010). Demersal towed gear disturbs the seabed to catch bottom-dwelling fish and benthic invertebrates. This disturbance can modify benthic habitats and lead to mortality of benthic species in the path of the gear (Denderen et al, 2015). The degree of disturbance from fishing is dependent on three main factors: the type of fishing gear deployed, the intensity of the fishing activity and the sensitivity of the habitat. If a pressure occurs too frequently for a habitat to recover, the biomass and productivity of the benthic community declines, and the sustainability may be jeopardised (Foden et al ,2010).

Gilkinson et al (1998) simulated the physical interaction of otter trawl doors on sand with infaunal bivalves present, in a laboratory test tank. The findings showed that smaller body-sized fauna are less susceptible to physical damage, as they are pushed aside with fluidized sediments generated by the pressure wave which occurs in front of the moving trawl. However, all bivalves were seen to be displaced with many ending up in the berm created by the trawl, this could leave them susceptible to predation.

Rayment (2001) undertook a sensitivity study of Venerid bivalves in circalittoral coarse sand and gravel and found the biotope has an intermediate intolerance to abrasion, physical disturbance and displacement, with a high recoverability rate. It was found that there would be no change to species richness due to abrasion and physical disturbance; and a minor decline due to displacement of tube worms.

Blyth et al. (2004) investigated the large-scale chronic impacts of towed fishing gear using the Inshore Potting Agreement (IPA) in South Devon as a case study area. They used scallop dredges to sample benthic communities that were subjected to different fishing regimes within and adjacent to the IPA. The areas sampled ranged from very coarse sand to very fine sand. The benthic communities in areas that had only been open to static gear in the year preceding sampling were richer and of greater biomass than those in areas that were impacted by towed fishing gear. They suggested that regular trawling disturbance will result in a community dominated by a small number of rapidly colonizing and maturing species. Occasional trawling disturbance may enhance species richness because of opportunities for slower developing species to become established in addition to the fastest colonizers. The results from the study showed that the benthic communities found at the seasonal sites were nearly the same as found at the trawled sites, only the biomass of the attached community was greater at the seasonal site. This indicates that the 6-month cessation of towed-gear in this location is insufficient for the benthic communities to recover. There were limitations in the study, the dredges used would have been unlikely to sample small species consistently. The particle size across the study sites also varied greatly which could have had an impact on the species present. The trawled area was characterised by very coarse sand whereas the other survey points consisted of fine to very fine sand. Finally, the paper does not state which towed gear methods are used in the site. D&S IFCA is aware of both trawling and scallop dredging taking place in this site. The impact of scallop dredging is known to be higher than the impact of otter trawling, the latter method is used in the Hartland Point to Tintagel MCZ.

A review of experimental studies of the impact of towed fishing gears on benthic communities found that furrows and berms created by the trawl doors are the most conspicuous physical impact caused by otter trawls on soft sediments, creating an irregular bottom topography (Løkkeborg 2005). The area disturbed by the trawl doors comprises only a small proportion of the total area swept by the trawl. Because no or only faint marks are created by the other parts of an otter trawl, the physical impacts on the sea bed are likely to be marginal in most otter trawl fisheries. The consequences of physical disturbance of the sea bed topography for benthic community structure are poorly understood and have not been investigated greatly. Løkkeborg (2005) noted that, with the available evidence, when considering the biological impacts of otter trawls, it is difficult to attribute changes in the benthic community to fishing effort at a spatial scale that is representative of commercial fishing activities. Only subtle effects from otter trawls were demonstrated on soft bottom habitats without tall sessile invertebrates, and impacts were less pronounced on mobile sediments due to the high levels of natural disturbance which makes them better adapted to general disturbance Løkkeborg (2005).

Using a commercial whitefish beam trawl Kaiser et al. (1998), undertook a study to examine the immediate effect of beam trawling on stable sediments with rich fauna, and mobile sediments with fewer fauna. The study aimed to fish each of six way-lines 10 or 20 times however, due to weather conditions this was only possible for three of the way lines. Therefore, the analysis only considered the main trawling effect, and not the effect of fishing intensity. With regards to the infauna it was found that in a shallow water area (about 30m depth) with high energy sand there was no detectable effect on benthic infauna 24 hours after fishing. This was attributed to the associated fauna being adapted to frequent natural disturbances Kaiser et al. (1998).There were however, immediate effects on infauna in the more stable sediments with 9 out of the top 20 most common taxa showing a statistically significant decrease. Although the study was investigating the effect of beam trawling, it can still be useful in this assessment as otter trawls are seen as having a lower impact than beam trawls (Hall et al, 2008).

Collie et al (2000) carried out a meta-analysis of 39 fishing impact studies. The study found that otter trawling had the least impact on species richness when compared to beam trawling, scallop dredging and inter-tidal dredging. In general, the recovery time was rarely less than 100 days if damage occurred, with sand habitats recovering most rapidly (Collie et al, 200). It was however clear that intensively fished areas are likely to be maintained in a permanently altered state, inhabited by fauna adapted to frequent physical disturbance (Collie et al, 2000).

Kaiser et al (2006), carried out a meta-analysis of 101 experimental fishing impact studies. They found no detectable initial impact from otter trawling on communities in sand habitats, in terms of species richness or total number of individuals. Examining deposit feeders and suspension feeders separately similarly showed no detectable impact. Meta-analysis can suffer from a degree of publication bias and should be interpreted with care. What such analyses lose in specificity and consistency of experimental format, they gain in the generality of findings and scale of observations that can be assembled. The habitats are generalised and do not offer a more localised study of habitats.

The response of a benthic community to trawling will depend on the pre-fished composition of the community. This composition is largely affected by the degree of natural disturbance, due to the currents, waves or storms. Natural disturbance may erode seabed sediment, cause re-suspension of organic matter and may affect settlement of new recruits. Such effects promote species that are adapted to natural disturbance (Denderen et al, 2015). Denderen et al (2015) used a biological trait approach to assess the effects of trawling and natural disturbance on benthic community composition and function. The results confirm their hypothesis that bottom trawling and natural disturbance have comparable effects on benthic communities and that trawl disturbance has a limited additional effect on the benthic ecosystem in areas exposed to high shear stress compared to areas exposed to low shear stress. The HPT MCZ has medium to high energy levels at the seabed.

Wave-induced mortality is known to impact community structure to a water depth of approximately 50m (Sciberras et al, 2013). The features of the HPT MCZ are at depths of less than 25m (chart datum), and the site is characterised by moderate to high energy/exposure. The majority of the coast is west facing, exposed to the prevailing wind and wave direction, including storm waves generated in the Atlantic (Natural England, 2017). The tidal range in this location is very high with tides of over 8m on springs. This wave and tidal scour may lead to natural morality of some species (Sciberras et al, 2013). Lambert et al (2014) observed when assessing the recovery of fished areas around the Isle of Man, using seabed energy as a determinant, that areas of higher seabed energy showed notably shorter recovery times.

The current available evidence for impacts of trawling on subtidal sediment focuses on subtidal sand, with very few studies considering the effect on subtidal coarse sediments. Additionally, much of the literature has focussed on scallop dredging and beam trawling rather than otter trawling. The dominant sediment feature at the site is subtidal coarse sediment, which makes up 42% of the mapped habitats, with only 7% being made up of subtidal sand, located in the north-western corner of the site, and in localised inshore areas (Green et al, 2016). Therefore, the conclusions have been drawn using the best available evidence.

9. In-combination assessment

Table 4 - Relevant activities occurring in or close to the site

Plans and Projects		
Activity	**Description**	**Potential Pressure(s)**
No other plans or projects known to be occurring within Hartland Point to Tintagel MCZ	The impact of future plans or projects will require assessment in their own right, including accounting for any in-combination effects, alongside existing activities.	N/A
Other activities being considered		
Activity	**Description**	**Potential Pressure(s)**
Dredges	There is no known dredging occurring at the site. Therefore, no in-combination effect thought to be possible.	Abrasion/disturbance of the substrate on the surface of the seabed. Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion. Removal of target species. Removal of non-target species.
Commercial diving; Beach seine/ ringnets; Longlines; Fyke & stakenets;	Due to the low level of activities, no in-combination effect thought to be possible.	
Static nets - fixed; Drift nets demersal	At the current level of fishing activity, it is thought that no in-combination effects will lead to the conservation objectives not being met for the features assessed.	
Static pots & traps	At the current level of fishing activity, it is thought that no in-combination effects will lead to the conservation objectives not being met for the features assessed.	
Handworking; Crab tiling; Bait digging; Shrimp push net	Activities occur on the intertidal, no in-combination effect thought to be possible.	

D&S IFCA concludes there is no likelihood of significant adverse effect on the interest features from in-combination effects addressed within **Error! Reference source not found.**.

10. NE consultation response

Natural England was contacted in January 2017 to determine when Tranche 2 MCZ draft conservation advice packages would be available. A draft conservation advice package was available in September 2017 and this assessment has been completed using that package.

11. Conclusion

Towed (demersal)- Rock features:

The evidence has indicated that towed (demersal) gear could have a significant impact on the circalittoral and infralittoral rock features. However, D&S IFCA has low confidence in the feature map for the MCZ, in particular the area in the far north west of the site. The area, in which various ray species are commercially targeted, has been mapped as a mix of coarse sediment and circalittoral rock however, the fishers would not target circalittoral rock when fishing for ray species. The supplementary advice provided by Natural England (2017) states: “The majority of the site is dominated by a mosaic of circalittoral rock and subtidal coarse sediment (Green et al., 2016). It is difficult to delineate boundaries between rock and sediment habitats due to the character of the seabed. Therefore, larger more generalised areas have been mapped and classified according to the dominant habitat (Green et al., 2016). Habitat boundaries in the subtidal part of the site should be regarded as indicative not definitive."

Surveys were carried out by Cefas and the Environment Agency in 2013. However, only three video stills and one grab sample were undertaken in the area that is fished. The video stills identified the area as high/moderate energy circalittoral rock and the grab as subtidal sand (Green et al, 2016).

Other than within the area shown in Annex 2, there is no other known towed (demersal) fishing being undertaken in the D&S IFCA section of the MCZ. The area outside that identified in Annex 2 isn't targeted by the fishery, D&S IFCA has more confidence in the habitat map in this section: If the area was good fishing grounds, i.e. sediment, it would be highly likely it would have been fished due to the close proximately to the area currently targeted for ray.

Due to the lack of confidence in the habitat map for the northern part of the site, D&S IFCA will monitor the activity in the site using iVMS until there is more certainty in the habitat map. A separate Monitoring and Control Plan (M&CP) (D&S IFCA 2018) has been developed which outlines the monitoring that will take place and should be read in conjunction with this assessment.

A survey is being carried out by the Environment Agency in early 2019, including a baseline grab survey of the northern part of the site where there is uncertainty. The results from this survey, and the continued monitoring of the activity will be used to determine the appropriate management to ensure the conversation objectives are met.

Towed (demersal)- Sediment features:

Demersal towed gear physically disturbs the seabed by dragging the fishing gear over the seabed to catch bottom-dwelling fish and benthic invertebrates. The level of disturbance differs from gear type, to sediment type, intensity and natural processes (Denderen et al, 2015).

There is an active fishery in the northern section of the HPT MCZ, with two vessels targeting various ray species with otter trawls. The main activity is during the winter months however, only when the vessels are based in the port of Ilfracombe. The two vessels which work this area are often based in the port of Brixham on the south coast of Devon.

The available evidence demonstrates that demersal trawling can have a negative impact on benthic features; however, the severity and recovery time from these impacts depend on a number of factors including; gear type, intensity of activity, and the environmental influences. The evidence suggests that less stable, mobile sediments in shallow waters are more resilient to the effects of trawling than stable sediments. The MCZ is west facing, exposed to the prevailing wind and wave direction, including storm waves generated in the Atlantic (Natural England, 2017) with a large tidal range, and has depths of less than 25m. These environmental factors can lead to the benthic communities that are more resilient to trawl disturbance.

Taking into account the information detailed in this assessment, the current level of activity, and the moderate to high energy levels and changeable environment in which the activity occurs, Devon and Severn IFCA concludes that towed (demersal) gear is unlikely to have a significant effect on the sediment features of the site.

However, D&S IFCA will monitor the activity closely, see separate M&CP for detail, and if the activity changes to a level which may have an impact on the site integrity, or if new evidence comes to light, the IFCA will bring in mitigation measures to ensure the conservation objectives are met.

12. Summary table

Feature or habitat of Conservation interest	Conservation objectives/ Target Attributes (Natural England, 2015)	Activity	Potential pressures from activity and sensitivity of habitats to pressures. (Natural England, 2015)	Potential exposure to pressures and mechanism of impact significance	Is there a risk that the activity could hinder the achievement of conservation objectives of the site?	Can D&S IFCA exercise its functions to further the conservation objectives of the site? If Yes, list management options
Moderate energy infralittoral rock; High energy infralittoral rock; Moderate energy circalittoral rock; High energy circalittoral rock	Extent and distribution Presence and spatial distribution of communities Presence and abundance of key structural and influential species Species composition of component communities	Commercial fishing; Towed (demersal)	•Abrasion/disturbance of the substrate on the surface of the seabed •Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion •Removal of target species •Removal of non-target species See Annex 2 for pressures audit trail	Yes, towed (demersal) fisheries can currently take place within the MCZ.	Yes, however due to the lack of confidence in the habitat map, it is unclear where this risk is posed. D&S IFCA will monitor the activity closely in the interim before a more detailed habitat map becomes available. Once the new evidence is available, appropriate management will be brought into place.	Yes, Management measures could include: 1. Monitor activity levels 2. Enforcement of byelaws 3. Monitoring and review of current byelaws
Fragile sponge & anthozoan communities on subtidal rocky habitats; Honeycomb worm (*Sabellaria alveolata*) reefs; Pink sea-fan (*Eunicella verrucosa*)	Presence & spatial distribution of the species/ communities Population size or density Recruitment & reproductive capability	Commercial fishing; Towed (demersal)	• Abrasion/disturbance of the substrate on the surface of the seabed •Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion •Removal of target species •Removal of non-target species See Annex 2 for pressures audit trail	See above	See above	See above

	Extent & distribution Species composition of the community Presence & abundance of key structural and influential species					
Subtidal coarse sediment; Subtidal sand	Extent and distribution Presence and spatial distribution of communities Presence and abundance of key structural and influential species Species composition of component communities	Commercial fishing; Towed (demersal)	• Abrasion/disturbance of the substrate on the surface of the seabed • Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion • Removal of target species • Removal of non-target species See Annex 2 for pressures audit trail	Yes, towed (demersal) fisheries can currently take place within the MCZ.	No, taking into account the information detailed in this assessment, the current level of activity, and the moderate to high energy levels and changeable environment in which the activity occurs, Devon and Severn IFCA concludes that towed (demersal) gear is unlikely to have a significant effect on the sediment features of the site.	Yes, Management measures could include: 1. Monitor activity levels 2. Enforcement of byelaws 3. Monitoring and review of current byelaws

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Annex 1: Site Map(s)

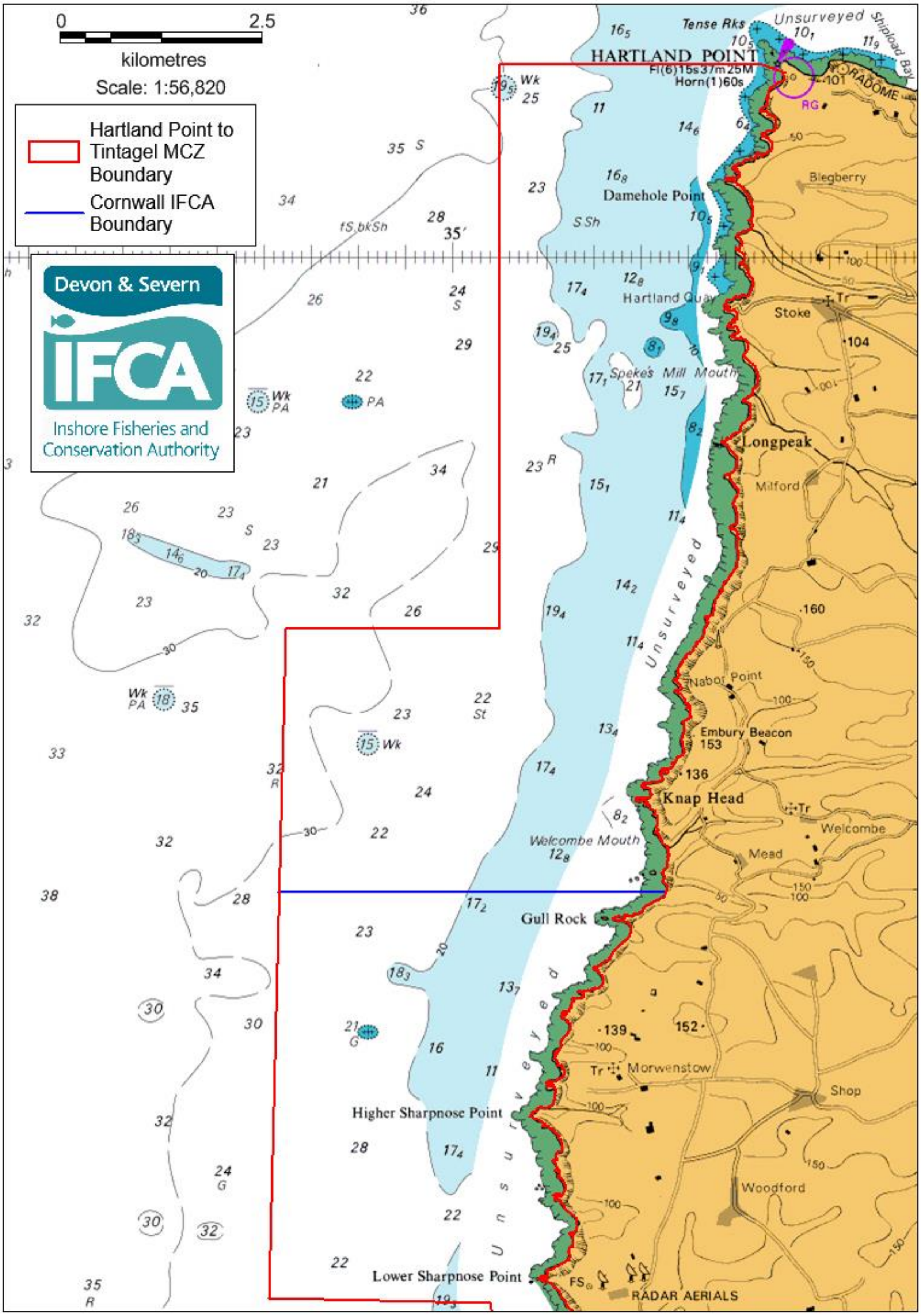

Figure 1 – Hartland Point to Tintagel MCZ

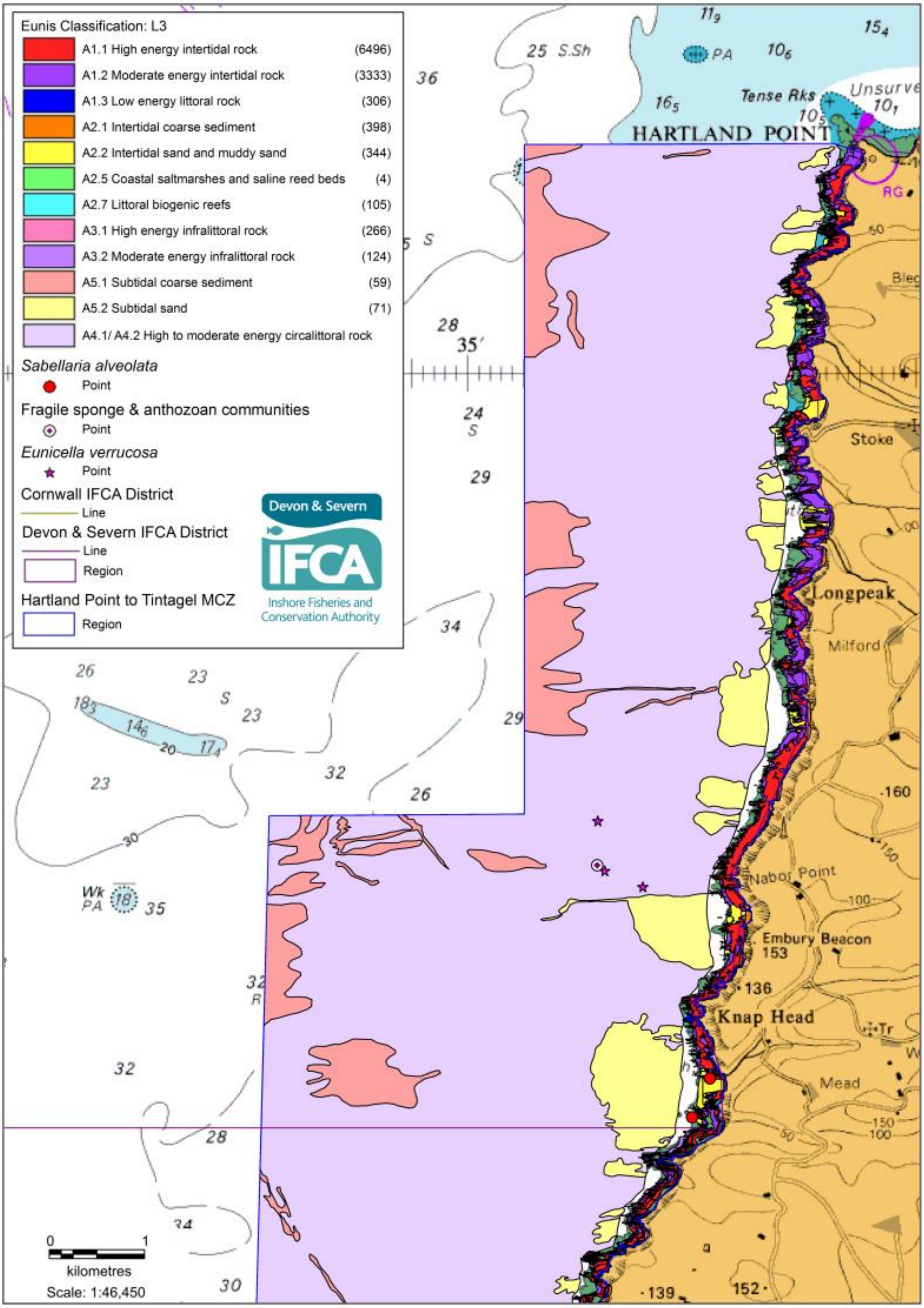

Figure 2 - Hartland Point to Tintagel MCZ Features

Annex 2: Fishing Activity Map

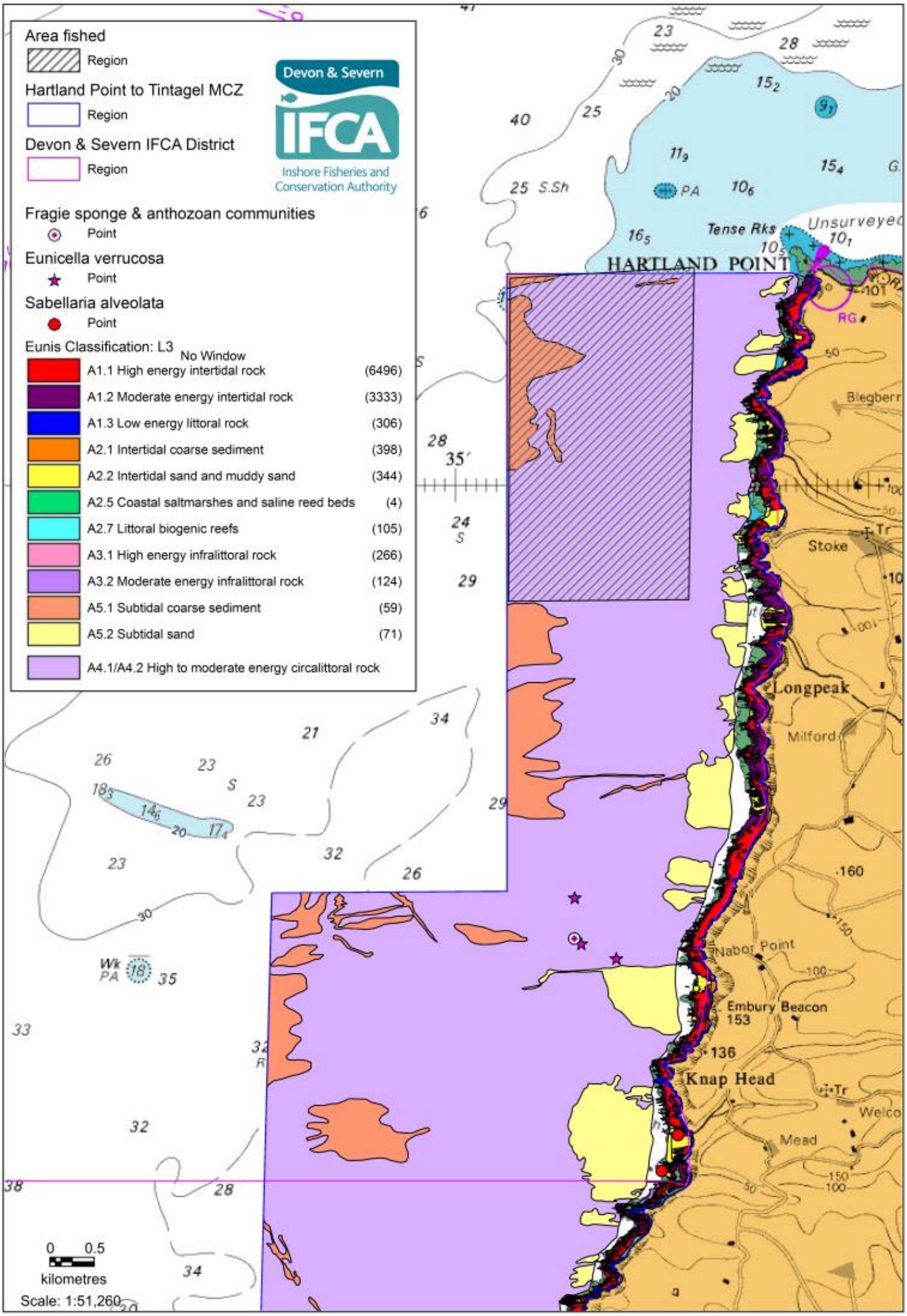

Figure 3 Area fished using otter trawls by two vessels

Annex 3: Pressures Audit Trail

Fishing Activity Pressures: Demersal trawls	**High energy intertidal rock**	**Low energy intertidal rock**	**Moderate energy intertidal rock**	**Honeycomb worm reefs**	**Intertidal coarse sediment**	**Intertidal sand and muddy sand**	**High energy infralittoral rock**	**Moderate energy infralittoral rock**	**Subtidal coarse sediment**	**Subtidal sand**	**Fragile sponge and anthozoan communities on subtidal rocky habitats**	**High energy circalittoral rock**	**Moderate energy circalittoral rock**	**Pink sea-fan**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed		S	S	S	NS	S	S	S	S	S	S	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Changes in suspended solids (water clarity)		S	S	S	NS	S	S	S	NS	S	S	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion		S	S	S	NS	S		S	S	S		S	S	S	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species		S	S	S		S	S	S	S	S	S	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Smothering and siltation rate changes (Light)		S	S	NS	NS	S	NS	S	NS	NS	NS	NS	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Collision BELOW water with static or moving objects not naturally found in the marine environment														NS	OUT – Not applicable

Deoxygenation		S	S	S	NS	S	IE	S	S	S	S	S	S	NS	OUT - Insufficient activity levels to pose risk at level of concern
Hydrocarbon & PAH contamination		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	OUT - Insufficient activity levels to pose risk of large scale pollution event
Introduction of light		S	S	IE		S	S	S	IE	S	NS	NS	IE	NA	OUT – Not applicable
Introduction or spread of invasive non-indigenous species (INIS)		S	S	S		S	S	S	IE	IE	S	S	S	S	OUT – Activity operates in local area only so risk considered extremely low
Litter		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	OUT - Insufficient activity levels to pose risk at level of concern
Nutrient enrichment		IE	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	OUT - Insufficient activity levels to pose risk of large scale pollution event
Organic enrichment		S	S	NS	NS	NS	S	S	NS	S	NS	S	S	NS	OUT - Insufficient activity levels to pose risk of large scale pollution event
Physical change (to another seabed type)		S	S	S			S	S			S	S	S	S	OUT - Insufficient activity levels to pose risk at level of concern
Physical change (to another sediment type)					S	S			S	S				S	OUT - Insufficient activity levels to pose risk at level of concern
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	OUT - Insufficient activity levels to pose risk of large scale pollution event
Transition elements & organo-metal (e.g. TBT) contamination		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	OUT - Insufficient activity levels to pose risk of large scale pollution event
Underwater noise changes		IE								NS	NS	NS		NS	OUT – Not applicable
Visual disturbance						NS				NS			NS	NA	OUT – Not applicable