Marine Conservation Zone Assessment

Site name:	Bideford to Foreland Point MCZ UKMO 20160002
Protected feature(s):	Subtidal coarse sediment Subtidal mixed sediments Subtidal sand

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

Dredges (towed): Scallops; Mussels, Clams, Oysters

Devon & Severn IFCA
Inshore Fisheries and Conservation Authority

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Contents

Version	Date	Author(s)	Comments	Reviewer(s)
1	January 2019	Lauren Parkhouse		
	31/01/2019			Sarah Clark
	June 2019		Minor changes	Lauren Parkhouse
1.1	March 2022	Lauren Parkhouse	Paragraph update in conclusion and new maps to reflect EA survey results.	

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. The text in blue on page 11 is additional information included in this assessment from the review of further survey data.

2. MCZ site name(s), and location

Bideford to Foreland Point MCZ is an inshore site located on the coast of north Devon in the south west of England. The site covers an area of 104 km². This site protects a wide range of habitats, from beaches of intertidal sand, which are exposed to the air at low tide and below water at high tide, to subtidal sediment and rock habitats, which are permanently submerged.

Further information regarding the MCZ and its protected feature can be found in the Bideford to Foreland Point MCZ Factsheet.

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
Subtidal coarse sediment	Maintain in a favourable condition
Subtidal mixed sediment	Maintain in a favourable condition
Subtidal sand	Recover to 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 interaction of demersal fishing gears with circalittoral and infralittoral rock features has been considered under a separate MCZ assessment. Formal advice has been received for Natural England and D&S IFCA will introduce management measures during 2019/2020 to prohibit the activity on the rock features to protect these sensitive features.

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
- Dredges (towed): Scallops; Mussels, Clams, Oysters.

There are seven vessels registered to north Devon ports which have D&S IFCA's Mobile Fishing Permits, and therefore have the potential to fish within the MCZ. Of these seven vessels, three are known to fish with otter trawls within the southern section of the MCZ (see Annex 2: Fishing Activity Map Towed (demersal) Vessels for activity map). One vessel, which is under 8m, fishes the area throughout the year, whereas the other two vessels only fish in this area when the weather isn't suitable for going further out to sea and usually during the winter. These two vessels split their time between a north Devon port and a south Devon port therefore, the activity does not occur for prolonged periods of time. Another vessel is thought to fish close to the MCZ and may occasionally fish within the MCZ, however this has not been confirmed as the vessel is new to the fishery. There is no known dredging within the MCZ.

See Parkhouse (2018) for more information regarding fishing activities occurring in the Bideford to Foreland Point MCZ.

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

Yes,
Evidence:
Table 2 shows the fishing activities and pressures included for assessment. The justifications for the pressures chosen for inclusion in this assessment can be seen in Annex 4: Screening Justification Table.

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

Activity	Pressures
Demersal trawl and dredges	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

Table 3 shows 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. It should be noted that no conservation advice package is currently available (July 2019) for the Bideford to Foreland Point MCZ. Therefore, relevant advice on operations and supplementary advice tables for other sites with similar features were used (Table 4), alongside considering site specific information.

Table 3 - Relevant favourable condition targets for identified pressures.

Feature	Attribute	Target
Subtidal coarse sediment; Subtidal mixed sediment; Subtidal sand	Extent and distribution	Maintain/Recover the total extent and spatial distribution of subtidal mixed sediment.
	Distribution: presence and spatial distribution of biological communities	Maintain/Recover the presence and spatial distribution of subtidal mixed sediment communities.
	Structure: species composition of component communities	Maintain/ Recover the species composition of component communities.
	Structure and function: presence and abundance of key structural and influential species	Maintain/ Recover the abundance of listed species to enable each of them to be a viable component of the habitat.

Table 4 – Conservation advice package used for MCZ features

Feature	Conservation advice package used
Subtidal Coarse Sediment	Hartland Point to Tintagel MCZ
Subtidal Sand	
Subtidal Mixed Sediment	The Manacles MCZ

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 permit conditions, via consultation, if the D&S IFCA deems it to be necessary. This could include limitations or spatial/temporal restrictions. The permitting system allows for adaptive management.

8. Referenced supporting information to inform assessment

There is currently no site-specific evidence for the presence and spatial distribution of the biological communities for the Bideford to Foreland Point MCZ. Therefore, this assessment will draw on more general evidence for potential impacts on the three sediment features; subtidal coarse sediment, subtidal sand, and subtidal mixed sediment. Towed (demersal) fishing predominately occurs on what is thought to be the subtidal sand feature of the site. There is currently only point data available for the features in the west of the site where the activity occurs (Annex 1 Figure 2). A survey is being carried out by the Environment Agency in early 2019, the results will provide a more accurate feature map.

Towed (demersal)

The major sources of seabed disturbance in UK waters are; near-bed currents, wind-induced waves, aggregate dredging for mineral resources, and bottom trawling for fish (Foden et al, 2010). Demersal towed gear disturbs the seabed by dragging the fishing gear over 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. They demonstrated that smaller body-sized fauna were 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 where towed gear fishing occurred. 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. The IFCA are aware of both trawling and scallop dredging taking place in the IPA. The impact of scallop dredging is known to be higher than the impact of otter trawling, with the latter being the method used in the Bideford to Foreland Point 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 (approx. 30m), 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 different fishing impact manipulations. They found no detectable initial impact from otter trawling on communities in sand habitats, whether examined by total number of species or 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 analysis loses 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 BFP 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 area of the MCZ where fishing occurs is of less than 10m chart datum and the site is characterised by moderate to high energy/exposure levels https://www.emodnet-seabedhabitats.eu/access-data/launch-map-viewer/ and see chart in Appendix 4. The fished area is very similar to the Hartland Point to Tintagel MCZ, in that it is west facing, exposed to the prevailing wind and wave direction, including storm waves generated in the Atlantic (Natural England, 2017). Appendix 4 also includes the 2017 Annual Wave Report for Bideford Bay produced by the Channel Coastal Observatory the Bideford Bay 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 or subtidal mixed sediment. Additionally, much of the literature has focussed on scallop dredging and beam trawling rather than otter trawling, with the latter being the gear type used in the site. The best available evidence has been used to draw conclusions in this assessment.

Dredges

Dredging for scallops can have a number of impacts on benthic systems, including a reduced seabed habitat complexity and heterogeneity, shifts in community structure and trophic interactions, alterations to the physical structure of the sea floor, and an impact on by-catch species (Sciberras et al, 2013). Scallops dredges can cause homogenization of sediments and the seabed topography by penetrating, mixing and flattening the sediment. This mixing reduces spatial heterogeneity in benthic communities, altering the density of mega fauna and therefore affecting recruitment in a population (Collie et al, 2000; Craven et al, 2012; Kaiser et al, 2002; Beukers-Stewart, 2009). Scallop dredges have teeth on them which are designed to dig into the sediment, and therefore have been considered to be potentially among the most damaging (Veale et al, 2000).

Gravel, mixed sand and mud habitats tend to support diverse benthic communities of high biomass and are the main focus of the scallop fisheries in the UK. These habitats are known to be relatively sensitive to disturbance by scallop fisheries. The degree of disturbance is dictated by; the fishing gear used, the intensity of fishing effort, the type of species present, the natural stability and energy levels of the seabed (Beukers-Stewart, 2009). Benthic communities in gravel and mixed sand substrates will recover if closed to fishing, with recovery times varying. Summer closed seasons can allow certain hydroid species to start to re-establish and provide an important settlement habitat for invertebrate species (Beukers-Stewart, 2009).

Bradshaw et al (2001) studied the effect of scallop dredging on benthos off the coast of the Isle of Man. The seabed in the study area comprises a mixture of mud and sand with a variable amount of dead shell and stone. Twice yearly grab samples were taken from experimentally dredged plots inside and outside the closed area to compare benthic infauna and epifauna. The results showed evidence that scallop dredging alters benthic communities and can lead to reduced habitat complexity. They found that the closure of areas to commercial dredging allows the development of heterogeneous communities and habitat complexity. They did however hypothesis that although upright sessile species are more prone to be directly damaged; sponges and encrusting bryozoan on stones can recolonise if turned over. The response to dredging depends on variables related to species, local hydrography, intensity, frequency and time of year of the dredging.

The benthic communities most resilient to scallop fisheries are those in shallow sand areas which are subjected to high levels of natural disturbance. Although benthic species do suffer negative effects from fishing disturbance, the relative impact tends to be lower and recovery quicker than in other habitats (Beukers-Stewart, 2009). Løkkeborg (2005) found that impacts of bottom trawling are less pronounced on mobile sediments due to the high levels of natural disturbance which makes them better adapted to general disturbance.

Sciberras et al (2013) undertook underwater camera surveys and Hamon grab samples in an area closed to scallop dredging, and a seasonally fished area in Cardigan Bay to investigate any differences in scallop abundance and epibenthic community structure between the two management areas. They did not detect differences in the abundance of scallops and the epibenthic community composition between the permanently closed area and the seasonally fished area. They discuss there could be several reasons for the lack of fishing effect. Firstly, the natural seasonal fluctuations in species abundance. Another possible explanation that they give is due to the relatively high level of natural disturbance at the study area, which may obscure the effect of fishing on the benthic community.

Scallop dredging can have negative impacts on target and non-target species, including post-fishing mortality of species which come into contact with the gear, especially the teeth of the dredge. These can cause damage to the scallop shells along with non-target species (Bradshaw, 2001; Beukers-Stewart, 2009). Fatal damage can vary from 2% to more than 20%, depending on the fishing grounds, for captured and non-captured undersized scallops (Beukers-Stewart, 2009). Along with fatal damage to discarded scallops, there is evidence of a reduced predator escape response in discarded juvenile scallops, this is coupled with an influx of predators and scavengers taking advantage of the damage caused (Craven et al, 2012, Shephard et al, 2008; Bradshaw, 2001).

9. In-combination assessment

Table 5 - Relevant activities occurring in or close to the site

<table>
<tr><td colspan="3">Plans and Projects</td></tr>
<tr><td>Activity</td><td>Description</td><td>Potential Pressure(s)</td></tr>
<tr><td>No other plans or projects known to be occurring within Bideford to Foreland Point MCZ</td><td>The impact of future plans or projects will require assessment in their own right, including accounting for any in-combination effects, alongside existing activities.</td><td>N/A</td></tr>
<tr><td colspan="3">Other activities being considered</td></tr>
<tr><td>Activity</td><td>Description</td><td>Potential Pressure(s)</td></tr>
<tr><td>Commercial diving; Beach seine/ringnets; Longlines; Fyke & stakenets.</td><td>Due to the low to no level of activities, no in-combinations effect is thought to be possible.</td><td rowspan="4">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.</td></tr>
<tr><td>Static nets- fixed; Drift nets- demersal</td><td>At the current level of fishing activity, it is not thought there would be an in-combination effect which would lead to the conservation objectives not being met for the features assessed.</td></tr>
<tr><td>Static pots & traps</td><td>At the current level of fishing activity, it is not thought there would be an in-combination effect which would lead to the conservation objectives not being net for the features assessed.</td></tr>
<tr><td>Handworking; crab tiling; bait digging; shrimp push nets</td><td>Activities occur on the intertidal, no in-combination effect thought to be possible.</td></tr>
</table>

D&S IFCA concludes there is no likelihood of significant adverse effect on the interest features from in-combination effects addressed within Table 5.

10. NE consultation response

N/A Natural England has not been consulted at this stage.

11. Conclusion

Towed (demersal):

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 are three vessels which are known to fish with otter trawls within the southern section of the MCZ and one that fishes in close proximity, potentially fishing within the MCZ. One of the known vessels, which is under 8m, fishes the area throughout the year, whereas the other two vessels only fish in this area when the weather is too bad to go further out to sea, usually in the winter. The activity predominately occurs on what is thought to be the subtidal sand feature of the site (Annex 2). The fourth vessel is new to the fishery and fishing patterns are yet to be established.

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 fished area is very similar to the Hartland Point to Tintagel MCZ, in that it 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 10m chart datum. These environmental factors can lead to the benthic communities that are more resilient to trawl disturbance.

There is some uncertainty surrounding the current feature map as there is currently only point data available for the features in the west of the site where the activity occurs. A survey is being carried out by the Environment Agency in 2019, the results of which will provide a more accurate feature map.

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 impact on the sediment features of the site and therefore will not hinder the achievement of the conservation objectives. D&S IFCA will consider management measures to limit the activity to certain areas of the site.

Dredges:

The level of effort within the BFP MCZ is currently none, there has been no known historic dredging within the MCZ. However, this does not rule out the activity taking place in the future. No scallop dredging can occur from 1st July until 1st of October due to a district wide temporal closure.

The evidence demonstrates that dredging for scallops can have a negative impact on benthic features including a reduced seabed habitat complexity and heterogeneity, shifts in community structure and trophic interactions, alterations to the physical structure of the sea floor, and an impact on by-catch species. However, the severity and recovery time from these impacts depend on a number of factors including; intensity of activity, and environmental influences. The evidence suggests that less stable, mobile sediments in shallow waters are more resilient to the effects of dredging than stable sediments.

At the current level of effort (i.e. no activity), D&S IFCA concludes that there is no significant risk of the activity hindering the achievement of the conservation objectives. The IFCA is able to monitor the activity via the vessel monitoring systems. If scalloping dredging activity commences the MCZ assessment will be reviewed and, if appropriate, D&S IFCA may introduced management measures for this activity via the Mobile Fishing Permit conditions.

2022 Update

The formal advice from NE on version 1 of this assessment agreed with the conclusions of the assessment. It was advised that once the results from the 2019 Environment Agency survey were available, any additional habitat information should be reviewed to establish if the conclusions are still correct. An updated Broad Scale Habitat (BSH) map for sediment features can be seen in Annex 1 (Figure 3). There has been no change to the BSH where the fishery takes place.

More in-depth habitat information was gathered in the 2019 grab survey in the area that is fished. The main habitat type identified in this area is A5.233 *Nephtys cirrose* and *Bathyporeia* spp. in infralittoral sand (Close, 2019). This biotope occurs in sediments subject to physical disturbance as a result of wave action and strong tidal streams. The species inhabiting this biotope are characteristic of mobile sediments and areas adapted to the high levels of disturbance. When considering the pressures of abrasion/disturbance of the surface of the substratum or seabed the sensitivity is low. The sensitivity is also low when considering penetration or disturbance of the substratum subsurface (Tillin, H and Garrard, S. 2019).

D&S IFCA has reviewed the latest data and the conclusions of this assessment have not changed. The area south of Baggy Point (Down End) where fishing occurs will remain open to towed demersal trawls (Green area in Figure 6). As per the recommendations of the MCZ assessment considering the interaction between towed (demersal) trawls and dredges with rock features, management measures were proposed to protect the rock features (Figure 4) which in turn will protect the sediment features in this portion of the site. In 2019 the D&S IFCA's Byelaw and permitting Subcommittee voted to bring in management to prohibit the use of towed demersal trawls and dredges in the area highlighted in red in Figure 6 which runs east from south of Baggy Point (Down End). Management measures will be consulted on during the review of the Mobile Fishing Permit Byelaw.

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
Subtidal coarse sediment; Subtidal sand; Subtidal mixed sediment	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 do 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
Subtidal coarse sediment; Subtidal sand; Subtidal mixed sediment	See above	Commercial fishing; Dredges (towed)	• 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	Yes, dredge (towed) fisheries can take place within the MCZ. However, this has not occurred historically and is unlikely to occur	No, the activity has not occurred historically and is unlikely to occur in the future.	See above

			See Annex 2 for pressures audit trail	in the future.		

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Annex 1: Site Map(s)

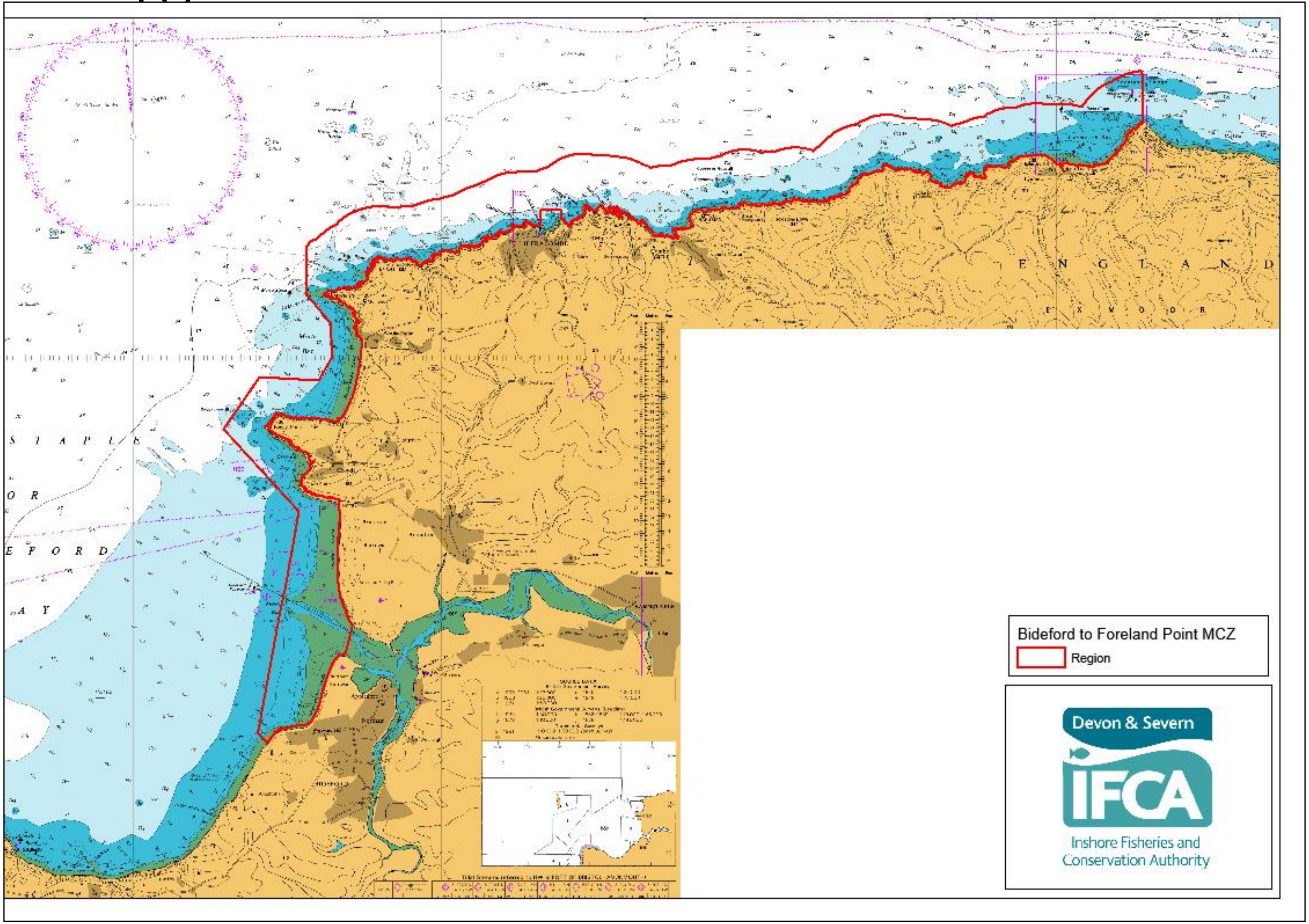

Figure 1 - Bideford to Foreland Point MCZ

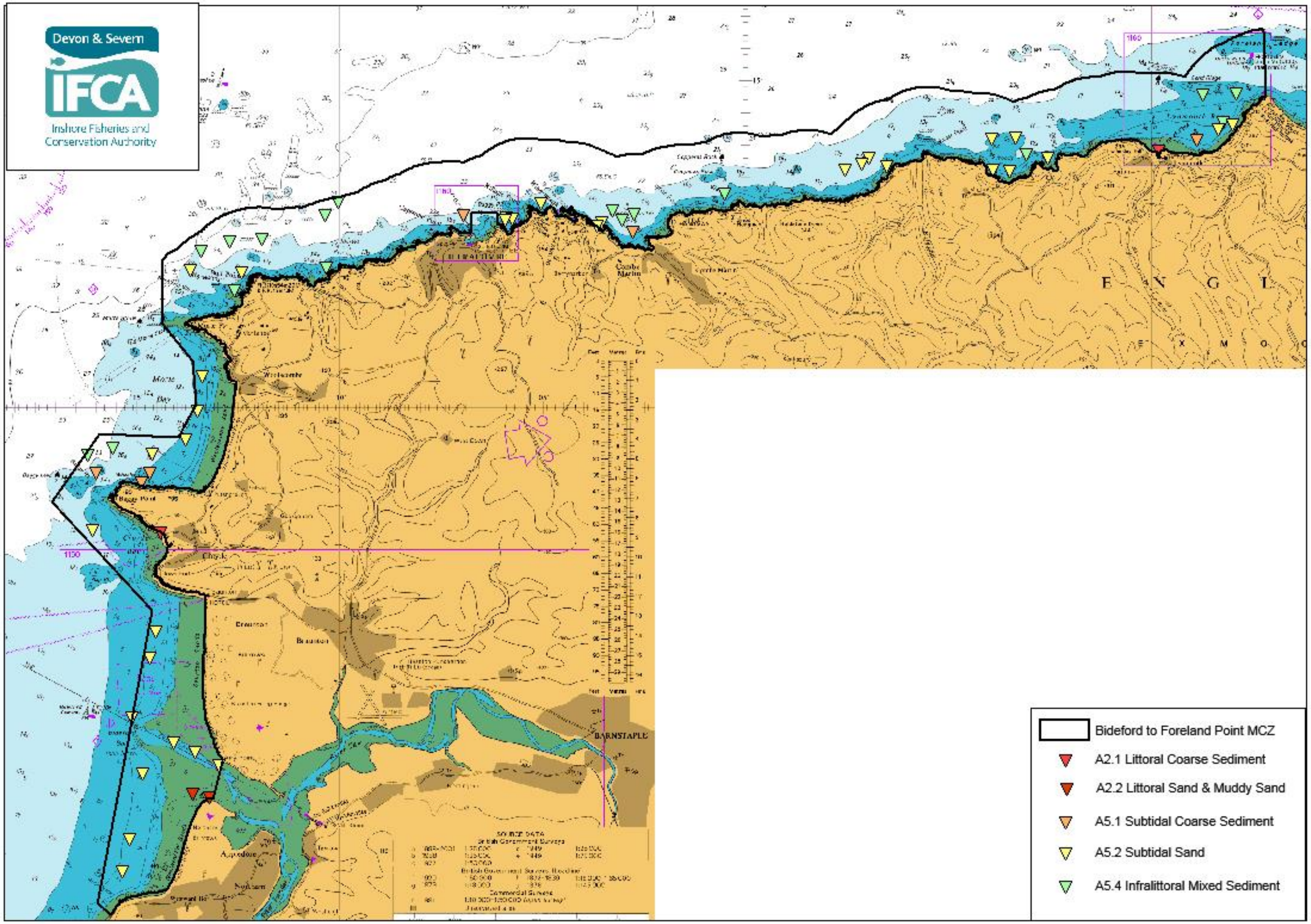

Figure 2 Bideford to Foreland Point MCZ Sediment Feature Point Data 2018

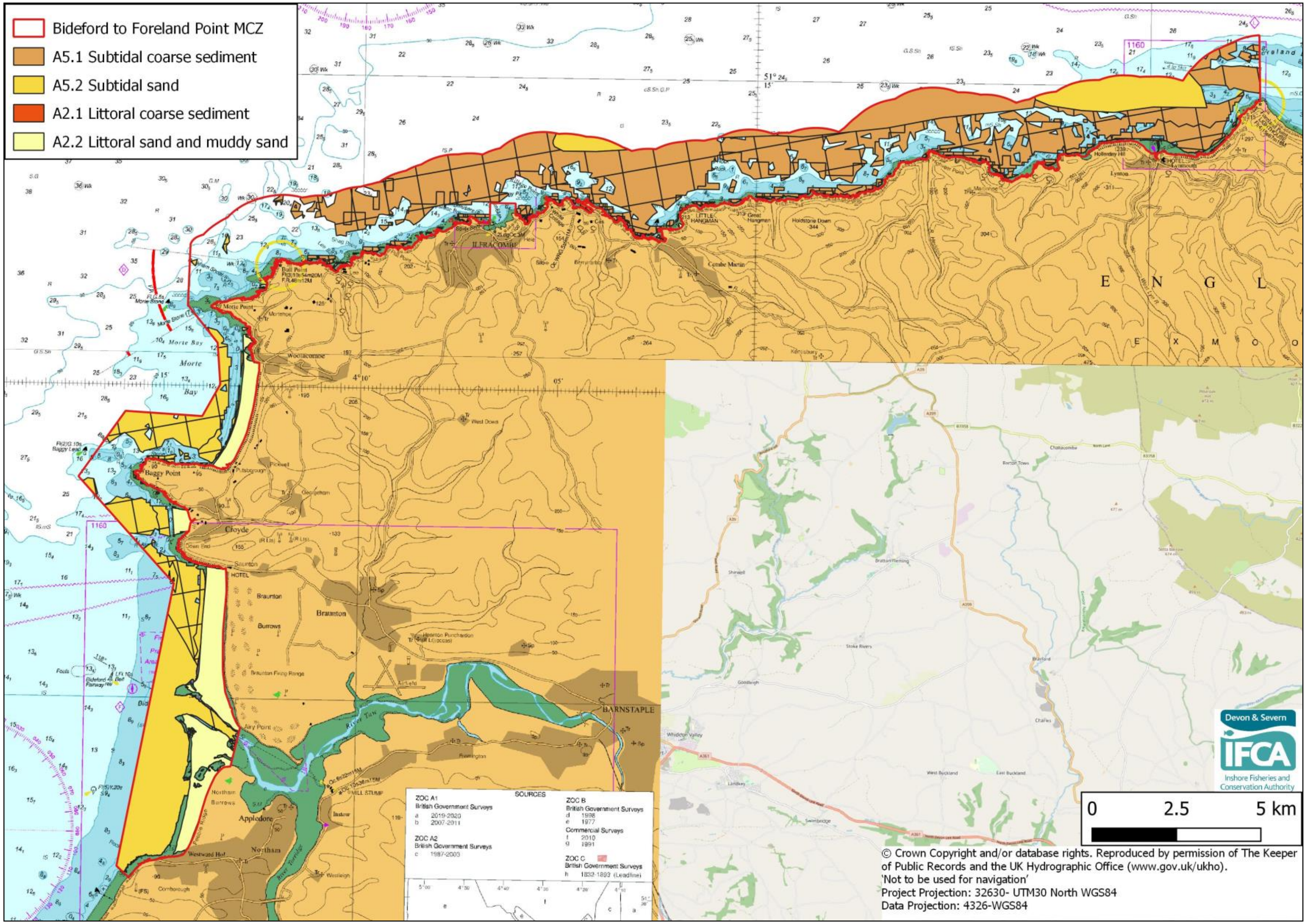

Figure 3 Broad Scale Habitat map for sediment features from 2020 data

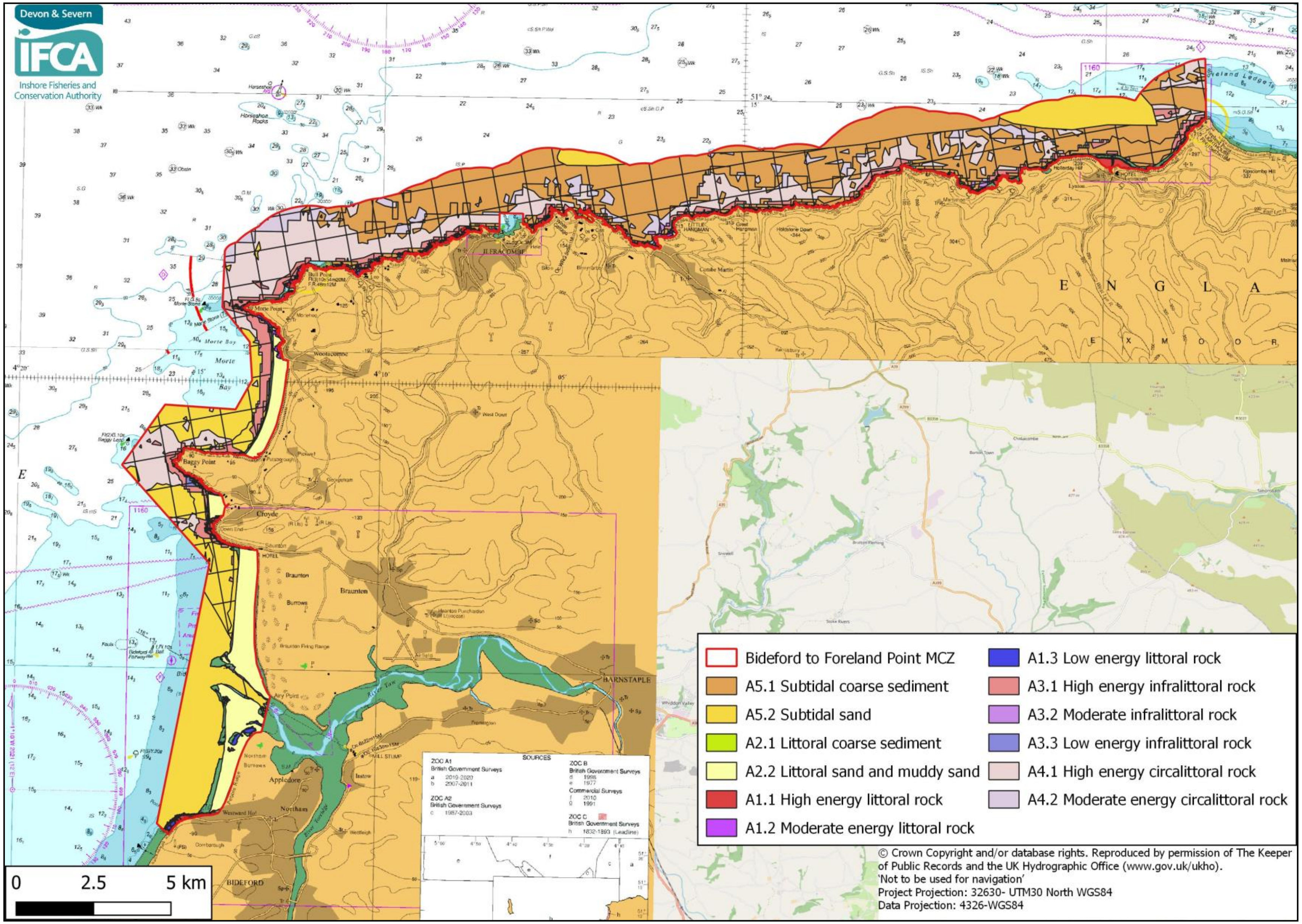

Figure 4 Broad Scale Habitat map for all features from 2020 data

Annex 2: Fishing Activity Map Towed (demersal) Vessels

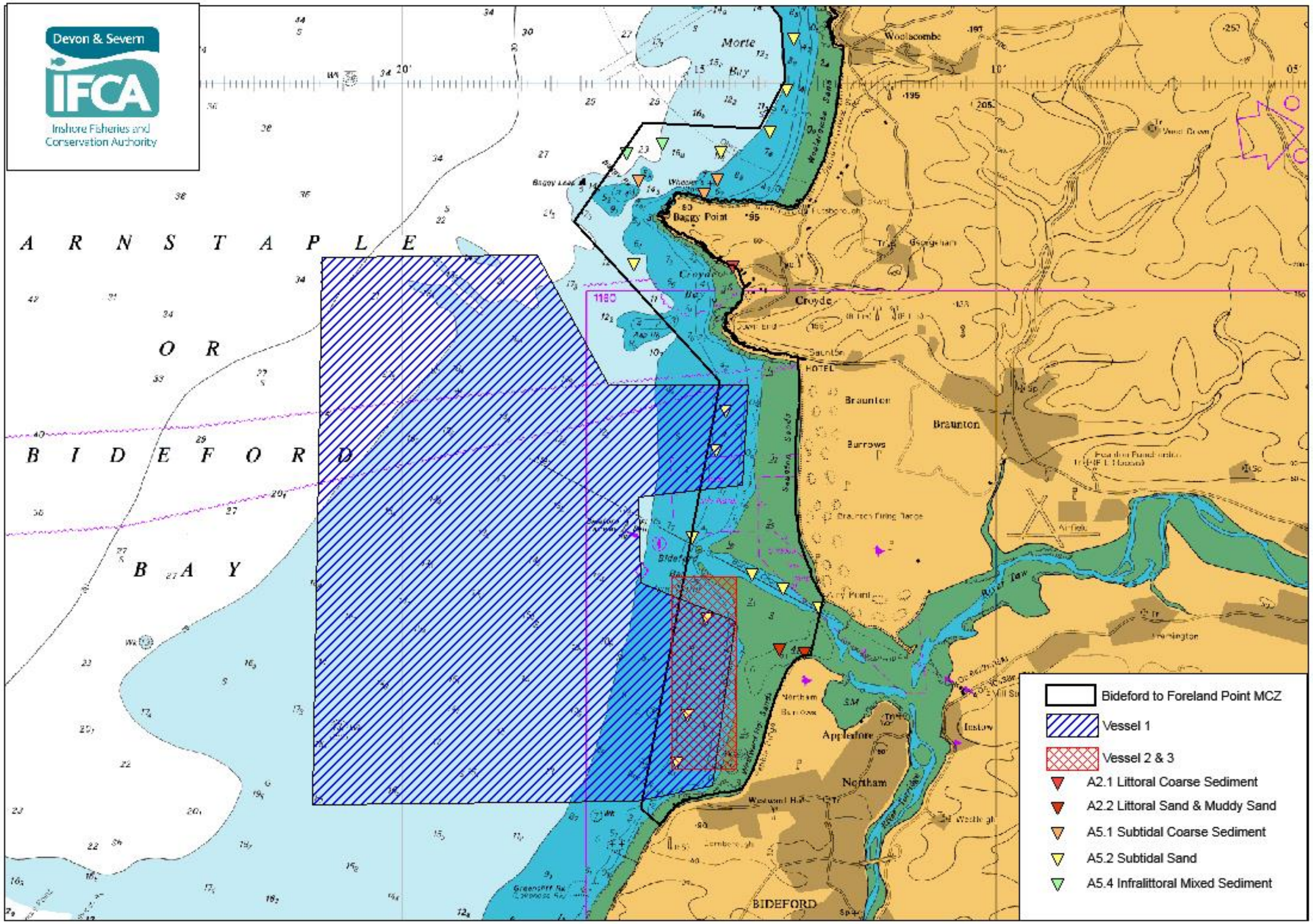

Figure 5 Towed (demersal) Gear Activity Map 2017

Annex 3: Management Proposal

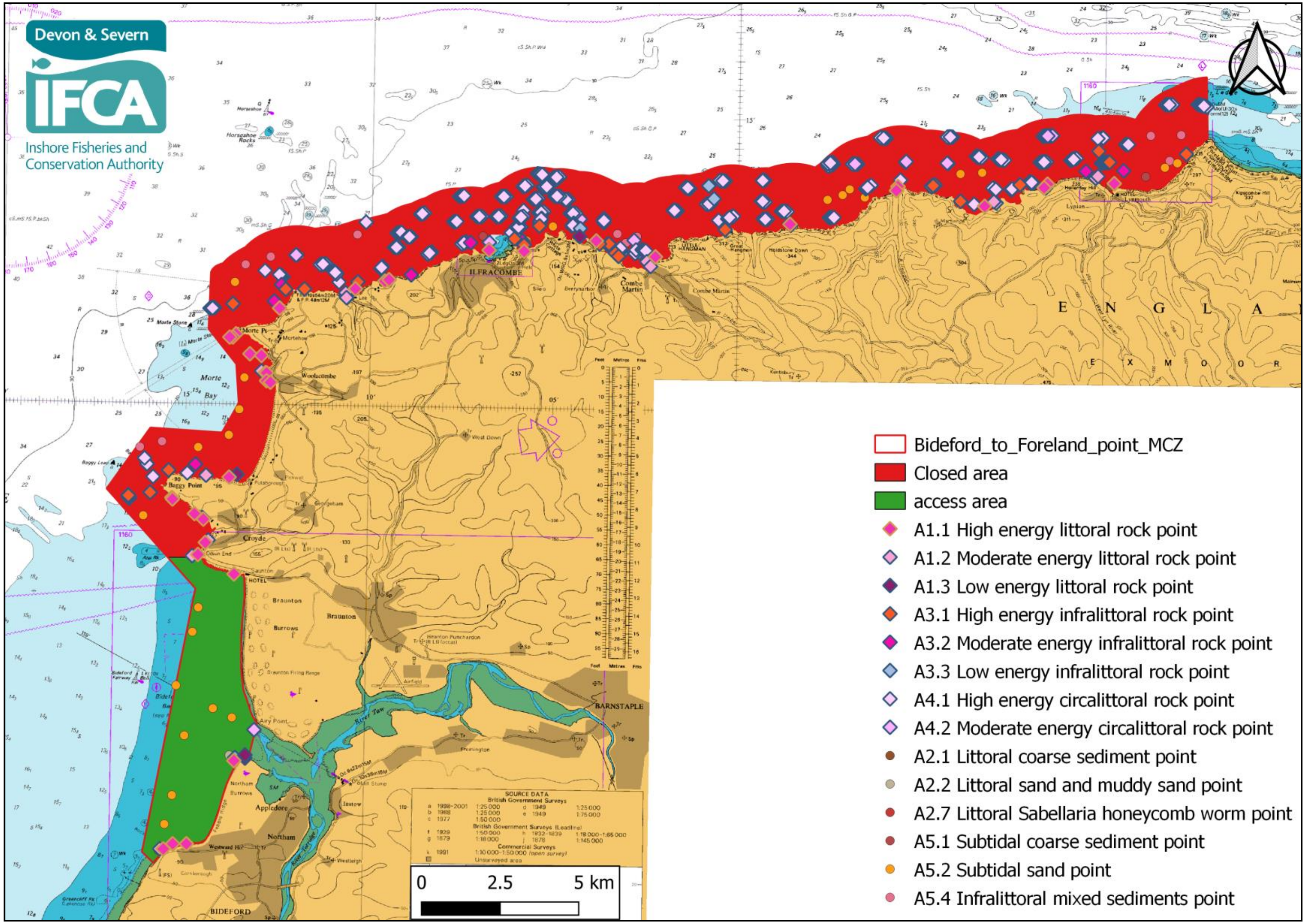

Figure 6 Management proposal put to the D&SIFCA's Byelaw and Permitting Subcommittee in 2019. Red indicates area to be closed to towed demersal gear (trawls and dredges) and green to remain open to towed demersal gear

Annex 4: Screening Justification Table

Fishing Activity Pressures: Demersal trawls	**Subtidal coarse sediment**	**Subtidal sand**	**Subtidal mixed sediment**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Changes in suspended solids (water clarity)	NS	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	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Smothering and siltation rate changes (Light)	NS	NS	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				OUT – Not applicable
Deoxygenation	S	S	S	OUT - Insufficient activity levels to pose risk at level of concern
Hydrocarbon & PAH contamination	NS	NS	NS	OUT - Insufficient activity levels to pose risk of large scale pollution event
Introduction of light	IE	S	IE	OUT – Not applicable
Introduction or spread of invasive non-indigenous species (INIS)	IE	IE	S	OUT – Activity operates in local area only so risk considered extremely low
Litter	NA	NA	NA	OUT - Insufficient activity levels to pose risk at level of concern
Nutrient enrichment	NS	NS	NS	OUT - Insufficient activity levels to pose risk of large scale pollution event
Organic enrichment	NS	S	S	OUT - Insufficient activity levels to pose risk of large scale pollution event
Physical change (to				OUT - Insufficient activity levels to pose risk at level

another seabed type)				of concern
Physical change (to another sediment type)	S	S	S	OUT - Insufficient activity levels to pose risk at level of concern
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	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	OUT - Insufficient activity levels to pose risk of large scale pollution event
Underwater noise changes		NS	NS	OUT – Not applicable
Visual disturbance		NS	NS	OUT – Not applicable

Fishing Activity Pressures: Dredges	**Subtidal coarse sediment**	**Subtidal sand**	**Subtidal mixed sediment**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Changes in suspended solids (water clarity)	NS	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	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of target species		NA	NA	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Smothering and siltation rate changes	NS	NS	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of

(Light)				pressure
Visual disturbance		NS	NS	OUT – Not applicable
Collision BELOW water with static or moving objects not naturally found in the marine environment				OUT – Not applicable
Deoxygenation	S	S	S	OUT - Insufficient activity levels to pose risk of large scale pollution event
Hydrocarbon & PAH contamination	NS	NS	NS	OUT - Insufficient activity levels to pose risk of large scale pollution event
Introduction of light	IE	S	IE	OUT – Not applicable
Introduction of microbial pathogens	IE	IE	S	OUT - Insufficient activity levels to pose risk at level of concern
Introduction or spread of invasive non-indigenous species (INIS)	IE	IE	S	OUT - Insufficient activity levels to pose risk at level of concern
Litter	NA	NA	NA	OUT - Insufficient activity levels to pose risk at level of concern
Nutrient enrichment	NS	NS	NS	OUT - Insufficient activity levels to pose risk of large scale pollution event
Organic enrichment	NS	S	S	OUT - Insufficient activity levels to pose risk of large scale pollution event
Physical change (to another seabed type)				OUT - Insufficient activity levels to pose risk at level of concern
Physical change (to another sediment type)	S	S	S	OUT - Insufficient activity levels to pose risk at level of concern
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	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	OUT - Insufficient activity levels to pose risk of large scale pollution event
Underwater noise changes		NS	NS	OUT – Not applicable