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:
Stage 1 Assessment

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
v.2

Contents

Version	Date	Author(s)	Reviewer(s)
1	December 2018	Lauren Parkhouse	Elizabeth West
1.1	January 2019		Sarah Clark
2	January 2022	Lauren Parkhouse	

1. Introduction

This assessment has been undertaken by Devon & Severn Inshore Fisheries and Conservation Authority (D&S 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 D&S 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.

Management measures for dredges on circalittoral and infralittoral rock are currently being reviewed by D&S IFCA Officers.

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

An industry survey carried out in 2018 identified two towed demersal gear vessels which stated they worked 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 Figure 3 for activity map). They stated the site was 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, for prolonged periods of time when the vessels are based in Brixham the activity does not occur. It was stated that 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 Figure 2) 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 resulted in D&S IFCA having low confidence in the original habitat map. A further survey has now been undertaken by the Environment Agency and report produced by Cefas. This will be discussed in the Section 8 of this assessment.

Since August 2018, all towed gear vessels greater than 6.99m in length, fishing within the D&S IFCA's District must have iVMS or VMS under a permit condition of the D&S IFCA Mobile Fishing Permit Byelaw. This has allowed for more in-depth analysis of the towed gear fishing which is carried out within the site and the surrounding area.

A DPA request was submitted to the MMO for August onwards in 2018, all of 2019 and 2020 and the first half of 2021 for iVMS and VMS data for all mobile fishing vessels fishing within and adjacent to the D&S IFCA section of the MCZ. The request was for vessels travelling at less than 6 knots. This was then filtered to 2-4knots, as this is the typical speed of towed gear vessels while actively fishing. The data were mapped for each year (Annex 3: Fishing Activity Maps Using VMS and iVMS 2018-2021).

The data for 2018 were limited due to the requirement of iVMS/VMS not being brought in until August for under 12m vessels under the D&S IFCA byelaw, however the results show there were three vessels which fished near the northern part of the MCZ but did not enter the site (Figure 4).

Analysis of the DPA requested data highlighted that in for 2019 and 2020 there were five vessels, and in the first half of 2021 four vessels, operated close to or potentially in the MCZ. The analysis of the 2019 data showed that there was no activity within the MCZ during this year. (Figure 5).

In 2020 (Figure 6) one vessel (Vessel 5) entered the site on a number of occasions in May, June and July. This vessel is known to trawl, pot and net in North Devon. From the IVMS track, it appears that this vessel was potting or netting or passaging rather than trawling (Figure 8), as the tracks do not concur with normal trawling activity. A D&S IFCA Officer contacted the Permit Holder of Vessel 5 to ascertain what fishing activity this vessel was undertaking at the time, The owner of Vessel 5 confirmed that this activity was potting and not trawling.

In 2021 (Figure 12) one vessel entered the site. Vessel 2 is a vessel which only uses otter trawls. This occurred on one occasion on a single day in February and the activity lasted for a total of 3 hour and 40 minutes, including the time outside the MCZ. Due to the pattern of the track, it is difficult to discern normal trawling activity and therefore there may be other reasons for the vessel presence in the site, such as vessel or gear problems or dodging the weather.

From the available IVMS and VMS data from 2018-2021 (Figure 4-Figure 11), it can be concluded that no towed demersal gear activity occurs within the D&S IFCA section of the MCZ. However, towed demersal gear fishing activity may have occurred prior to 2018 and could occur in the future.

See Curtin (2018) for more information regarding other 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 2 displays 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: Pressures Audit Trail.

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 3 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

Habitat Map
In version 1.1 of this assessment D&S IFCA stated that there was low confidence in the feature map for the MCZ, in particular the area in the far northwest of the site. The area, in which fishers had stated they targeted various ray species, had 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 was thought to be fished from the industry questionnaires. The video stills identified the area as high/moderate energy circalittoral rock and the grab as subtidal sand (Green et al, 2016).

A survey was carried out by the Environment Agency in 2018/2019 to gather further evidence. No camera stations were undertaken in the northern part of the site and only four successful grabs were obtained from the area of uncertainty, two grabs contained sand and two slightly gravelly sand. In general, the finer sediments (i.e. sand, muddy sand and (gravelly) muddy sand) appear to be associated with inshore areas of the MCZ and the north of the site around Hartland Point (Close *et al*, 2021).

The surveys confirmed that the site was predominantly comprised of large areas of 'High/medium energy circalittoral rock' amongst 'Subtidal coarse sediment'. The combination of these two broad scale habitats (BSH) can create thin veneers over low-lying rock, resulting in the relatively poor accuracy of any associated BSH map. The mosaic nature of the sediment and rock regions is evident in the distribution of epifaunal communities.

From the accuracy assessment of the 2016 BSH map, using the data collected in 2018 and 2019, the BSH map was found to have an overall accuracy of 56%, with the rock features having an accuracy of 65.5%. It was recommended there be a dedicated survey to collect multibeam echosounder bathymetry and backscatter data for the entire site, enabling a great understanding of the extent of the rock and sediment habitats (Close *et al*, 2021).

The most up to date BSH map available to D&S IFCA which was used for this assessment can be viewed in Figure 2.

Towed (demersal)- Rock features:
There are few studies quantifying the impact of fisheries to hard bottom habitats. Part of the reason for the lack of studies is because the vast majority of trawling occurs in sand habitats (Kasier *et al*., 2002). 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. The study demonstrated that a significant number of boulders were displaced and emergent epifauna were removed. This was for hard-bottoms made up of pebbles, cobbles and boulders at depths of 206m to 274m where natural disturbance would be minimal (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 vicinity of Hartland Point to Tintagel MCZ however, there is currently no evidence of it occurring within the 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 nine 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, 2000). 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. 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.
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.	Removal of non-target species.
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 Table 4.

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.
Informal advice was sought from NE on version 1.1 of this assessment in 2019 and it was agreed that more useful evidence would be obtained from the EA survey results from the 2018/2019 survey.

11. Conclusion

Towed (demersal)- Rock features:

The evidence has indicated that towed (demersal) gear could have an adverse effect on the circalittoral and infralittoral rock features. In version 1.1 of this assessment D&S IFCA stated that there was low confidence in the feature map for the MCZ, in particular the area in the far northwest of the site. 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.”

Due to the lack of confidence in the habitat map for the northern part of the site, D&S IFCA stated that they would monitor the activity in the site using iVMS until there was more certainty in the habitat map.

A survey was carried out by the Environment Agency in 2018/2019. No camera stations were undertaken in the northern part of the sites and only four successful grabs were obtained from the area of uncertainty, two grabs contained sand and two slightly gravelly sand. At the time of writing, the broadscale habitat map has not changed for this area.

The VMS and IMS data obtained for all towed gear vessels in the area from 2018-2021 shows that the section of the MCZ in the D&S IFCA District is not fished as previously suggested by the fishing industry. The areas thought to have been fished were marked on maps by fishers on the quayside without reference to plotters and are not as accurate as IVMS and VMS data. The area that is fished (Annex 3: Fishing Activity Maps Using VMS and iVMS 2018-2021) is just outside the area marked on maps by the industry.

From the evidence, the level of effort for towed demersal trawls within the site on the rock features is currently thought to be none. At current levels of effort, i.e. no activity occurring, it can be concluded that there will be no adverse effects from this gear type of the rock features of the MCZ. However, if the activities were to occur on the features listed in this assessment, the evidence

suggests there could be an adverse effect, and this could hinder the achievement of the conservation objectives of the features.

Due to the conclusion drawn, D&S IFCA, through the Byelaw and Permitting Sub-Committee, will carry out a review of the Mobile Fishing Permit Byelaw conditions to bring in the appropriate management to protect the rock features of the site from demersal trawling to ensure the conservation objectives are furthered.

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).

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 benthic communities that are more resilient to trawl disturbance.

Taking into account the information detailed in this assessment, the current level of activity i.e., no activity occurring, and the moderate to high energy levels and changeable environment in which the activity occurs, D&S IFCA concludes that towed (demersal) gear is not likely to hinder the conservation objectives of the sediment features. D&S IFCA, through its Byelaw and Permitting Sub-committee, will carry out a review of the Mobile Fishing Permit Byelaw conditions to bring in the appropriate management, to protect the rock features but may still allow access in some areas to demersal trawls on the sediment features.

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, D&S IFCA will review permit condition of the Mobile Fishing Permit Byelaw to bring in the appropriate management to ensure the conservation objectives are met.	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, D&S IFCA conclude that towed (demersal) gear is not likely to hinder the achievement of the conservation objectives.	Yes, Management measures could include: 1. Monitor activity levels 2. Enforcement of byelaws 3. Monitoring and review of current byelaws

13. References

Attrill MJ, Austen MC, Bayley DTI, Carr HL, Downey K, Fowell SC, Gall SC, Hattam C, Holland L, Jackson EL, Langmead O, Mangi S, Marshall C, Munro C, Rees S, Rodwell L, Sheehan EV, Stevens, J. Stevens, TF. Strong S. 2011. Lyme Bay – a case-study: measuring recovery of benthic species; assessing potential "spillover" effects and socio-economic changes, 2 years after the closure. Response of the benthos to the zoned exclusion of bottom towed fishing gear and the associated socio-economic effects in Lyme Bay. Final Report 1. 2011. Report to the Department of Environment, Food and Rural Affairs from the University of Plymouth-led consortium. Plymouth: University of Plymouth Enterprise Ltd. 108 pages.

Barnes, M.K.S. 2008. Raja microocellata Small-eyed ray. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 11-12-2017]. Available from: http://www.marlin.ac.uk/species/detail/74

Beukers-Stewart B., Beukers-Stewart J. (2009). Principles for the Management of Inshore Scallop Fisheries around the United Kingdom. Environment Department, University of York.

Blyth, R.E., Kaiser, M.J., Edwards-Jones, G. and Hart, P.J.B. 2004. Implications of a zoned fishery management system for marine benthic communities. Journal of Applied Ecology. Vol. 41, 951-961.

Boulcott, P., and T.R.W. Howell 2011. The impact of scallop dredging on rocky-reef substrata. Fisheries Research, Vol 110, Issue 3. 415-420.

Bradshaw, C, Veale, L.O., Hill, A.S. & Brand, A.R. 2001. The effect of scallop dredging on Irish Sea benthos: experiments using a closed area. Hydrobiologia. Vol. 465, 129-138

Close, H., Mitchell, P. and Bullimore, R. (2021). Hartland Point to Tintagel Marine Conservation Zone (MCZ) Characterisation Report 2018-19. MPA Monitoring Programme- DRAFT.

Collie, J.S., Hall, S.J., Kaiser, M.J. And Poiner, I.R. 2000 A quantitative analysis of fishing impacts on shelf-sea benthos. Journal of animal ecology. Vol. 69, 785-798

Craven, H.R., Brand, A.R., Stewart, B.D. 2012. Patterns and impacts of fish bycatch in a scallop dredge fishery. Aquatic Conservation: Marine and Freshwater Ecosystems.

Davies, S., Parkhouse, L. (2017) Hartland Point to Tintagel MCZ Fishing Activity Report. Devon and Severn IFCA Report.

Denderen, P., Bolam, S., Hiddink, J., Jennings, S., Kenny, A., Rijnsdorp, A., Kooten, T. 2015. Similar effects of bottom trawling and natural disturbance on composition and function of benthic communities across habitats. Marine Ecology Progress Series. Vol. 541: 31-43.

D&S IFCA (2018) Fisheries in MCZ Monitoring and Control Plan – Marine Conservation Zone: Hartland Point to Tintagel. Iteration 1: December 2018

Engel, J. and Kvitek, R. 1998. Effects of otter trawling on a benthic community in Monterey Bay National Marine Sanctuary. Conservation Biology, 12: 1204–1214

Freese, L., Auster, P.J., Heifetz, J. and Wing, B.L. 1999. Effects of trawling on seafloor habitat and associated invertebrate taxa in the Gulf of Alaska. Marine Ecology Progress Series, 182: 119–126

Foden, J., Rogers, S.I., Jones, A.P. 2010. Recovery of UK seabed habitats from benthic fishing and aggregate extraction- towards a cumulative impact assessment. Marine Ecology Progress Series. Vol. 411, 259-270

Gilkinson, K., Paulin, M., Hurley, S., Schwinghamer, P. 1998. Impacts of trawl door scouring on infaunal bivalves: results of a physical trawl door model/dense sand interaction. Journal of Experimental Marine Biology and Ecology, 224, 291-312.

Green, S., Cooper, R. and Dove, D. 2016. Hartland Point to Tintagel rMCZ Post-Survey Site Report: Defra.

Hall, K., Paramor, O.A.L., Robinson, L.A., Winrow-Giffin, A., Frid, C.L.J., Eno, N.C., Dernie, K.M., Sharp, R.A.M., Wyn, G.C. & Ramsay, K. 2008. Mapping the sensitivity of benthic habitats to fishing in Welsh Waters: development of a protocol. CCW (Policy Research) Report No: 8/12. 85pp

Hall-Spencer, J., Allain, V. and Fossa, J.H. 2002. Trawling damage to Northeast Atlantic ancient coral reefs. Proceedings of the Royal Society, London B, 269: 507–511.

Hinz H, Tarrant D, Ridgeway A, Kaiser MJ, Hiddink JG (2011) Effects of scallop dredging on temperate reef fauna. Mar Ecol Prog Ser 432:91-102

Kaiser, M.J., Clarke, K.R., Hinz, H., Austen, M.C.V., Somerfield, P.J., Karakassis, I. 2006 Global analysis of response and recovery of benthic biota to fishing. Marine Ecology Progress Series. Vol. 311:1-14

Kaiser, M.J., Collie, J.S.,Hall, S.J., Jennings, S. And Roiner. 2002 Modification of marine habitats by trawling activities: prognosis and solutions. Fish and fisheries. Vol. 3, 114-136

Kaiser, M. J., Edwards, D. B., Armstrong, P. J., Radford, K., Lough, N. E. L., Flatt, R. P. and Jones, H. D. 1998. Changes in megafaunal benthic communities in different habitats after trawling disturbance. ICES Journal of Marine Science: Journal du Conseil. Vol. 55 (3), 353-361. (1.16/jmsc.1997.322)

Lambert I. Glawys, Simon Jennings, Michel J. Kaiser, Thomas W. Davies and Jan G. Hiddink Journal of Applied Ecology 2014 doi: 10.1111/1365-2664.12277 “Quantifying recovery rates and resilience of seabed habitats impacted by bottom fishing”

Løkkeborg, S. 2005 Impact of trawling and scallop dredging on benthic habitats and communities, 58 p. FAO Fisheries Technical Paper 472.

McConnaughey,A., K. L. Mier, and C. B. Dew McConnaughey, R. A., Mier, K. L., and Dew, C. B. 2000. An examination of chronic trawling effects on soft-bottom benthos of the eastern Bering Sea. – ICES Journal of Marine Science, 57: 1377–1388

Natural England (2017) Draft Conservation Advice for Hartland Point to Tintagel Marine Conservation Zone (MCZ)

Rayment, W.J. 2001. Venerid bivalves in circalittoral coarse sand or gravel. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. Available from: http://www.marlin.ac.uk/habitat/detail/63

Sciberras M, Hinz H, Bennell JD, Jenkins SR, Hawkins SJ, Kaiser MJ. (2013). Benthic community response to a scallop dredging closure within a dynamic seabed habitat. Marine Ecology Progress Series. Vol. 480, 83-98.

Sewell, J. & Hiscock, K., 2005. Effects of fishing within UK European Marine Sites: guidance for nature conservation agencies. *Report to the Countryside Council for Wales, English Nature and Scottish Natural Heritage from the Marine Biological Association.* Plymouth: Marine Biological Association. CCW Contract FC 73-03-214A. 195 pp

Shark Trust; 2009. An Illustrated Compendium of Sharks, Skates, Rays and Chimaera. Chapter 1: The British Isles. Part 1: Skates and Rays.

Shephard, S., Goudey, C.A. & Kaiser, M.J. (2008) Hydrodredge: reducing the negative impacts of scallop dredging. Fisheries & Conservation report No. 2, Bangor University. Pp. 16.

Snowden, E. 2008. Raja clavata Thornback ray. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 11-12-2017]. Available from: http://www.marlin.ac.uk/species/detail/2187

Veale, L. O., Hill, A. S., Hawkins, S. J., & Brand, A. R. (2000). Effects of long-term physical disturbance by commercial scallop fishing on subtidal epifaunal assemblages and habitats. Marine Biology, 137(2), 325-337.

Annex 1: Site Map(s)

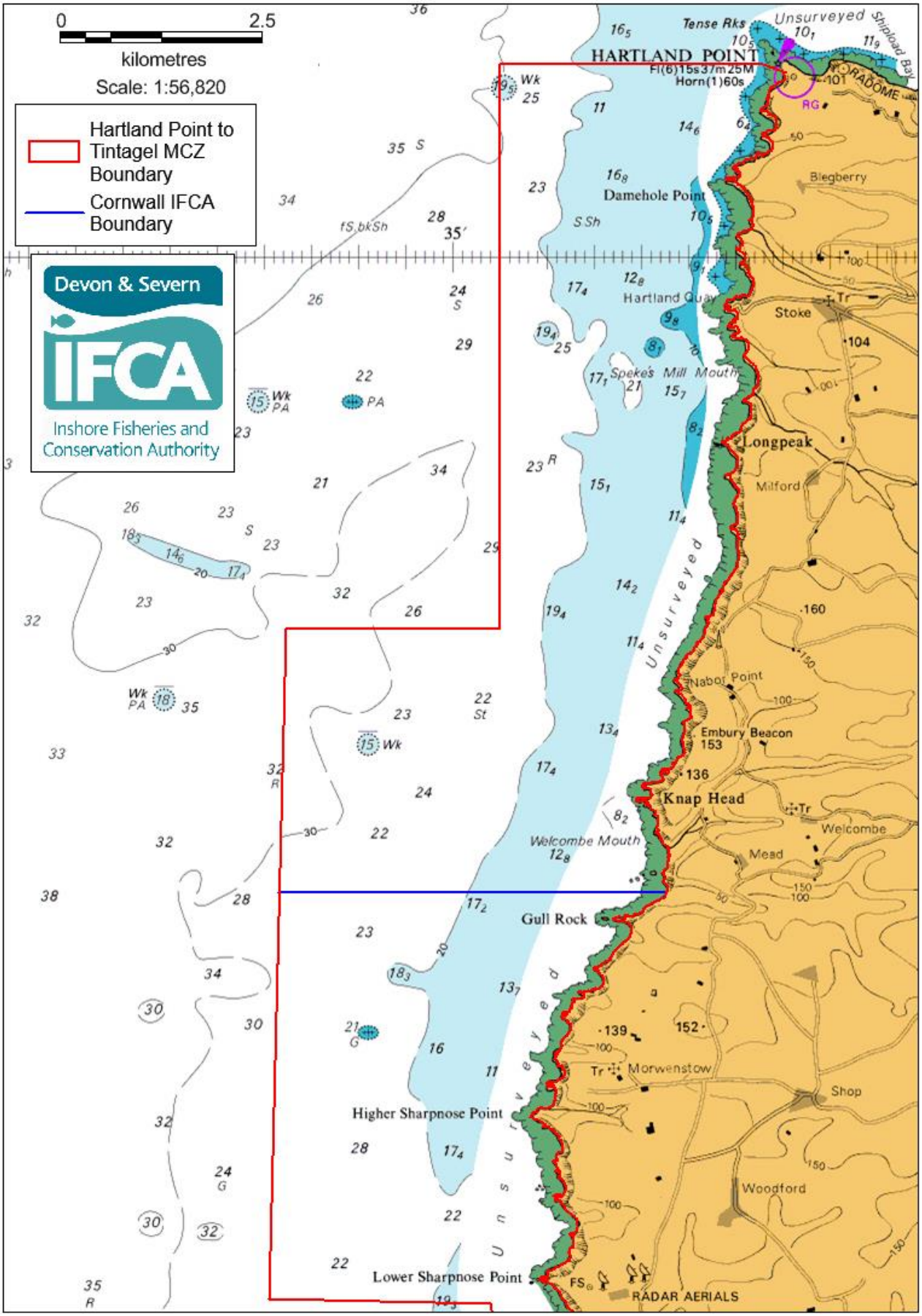

Figure 1 – Hartland Point to Tintagel MCZ

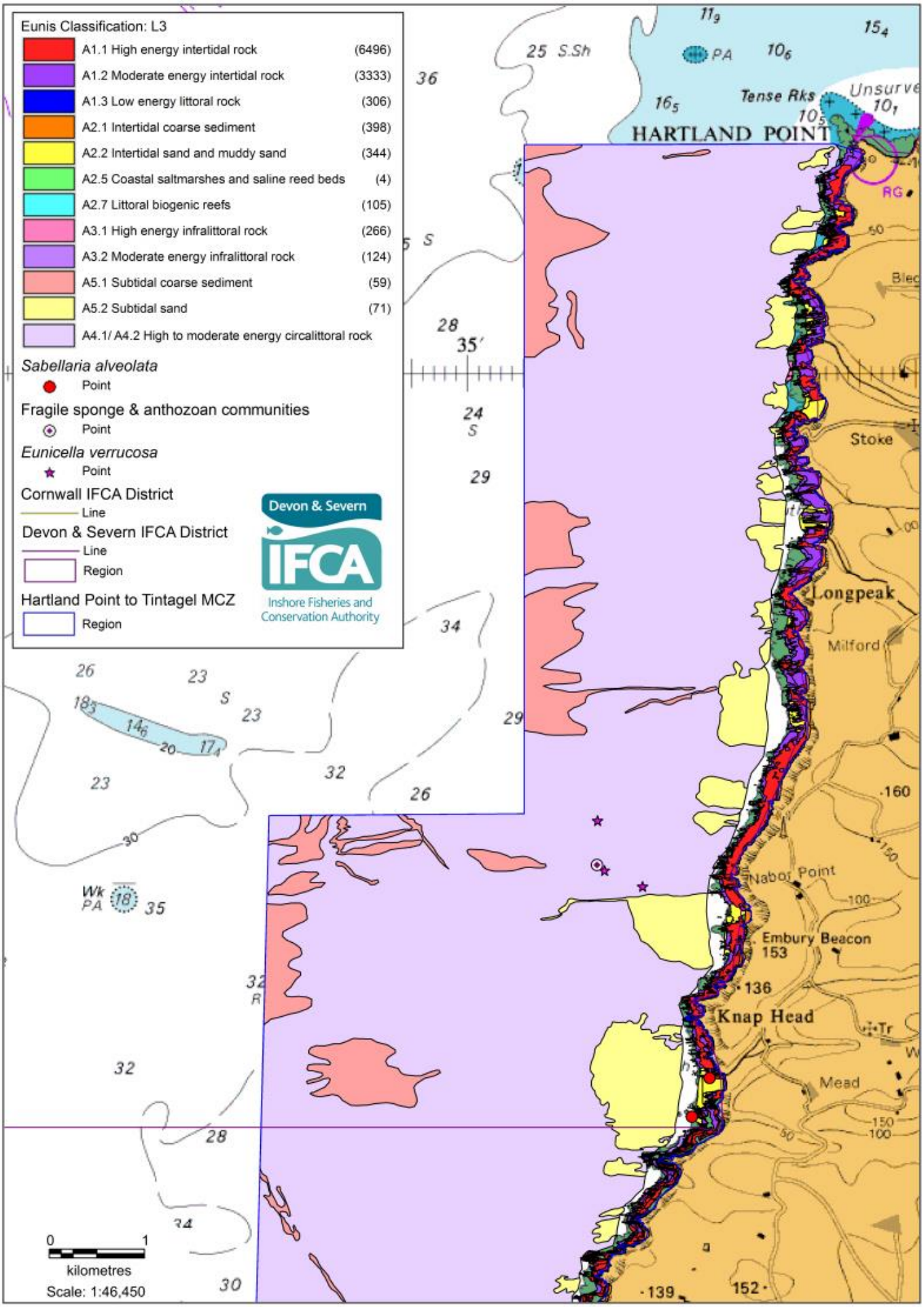

Figure 2 - Hartland Point to Tintagel MCZ Features

Annex 2: Fishing Activity Map from Fishers 2018

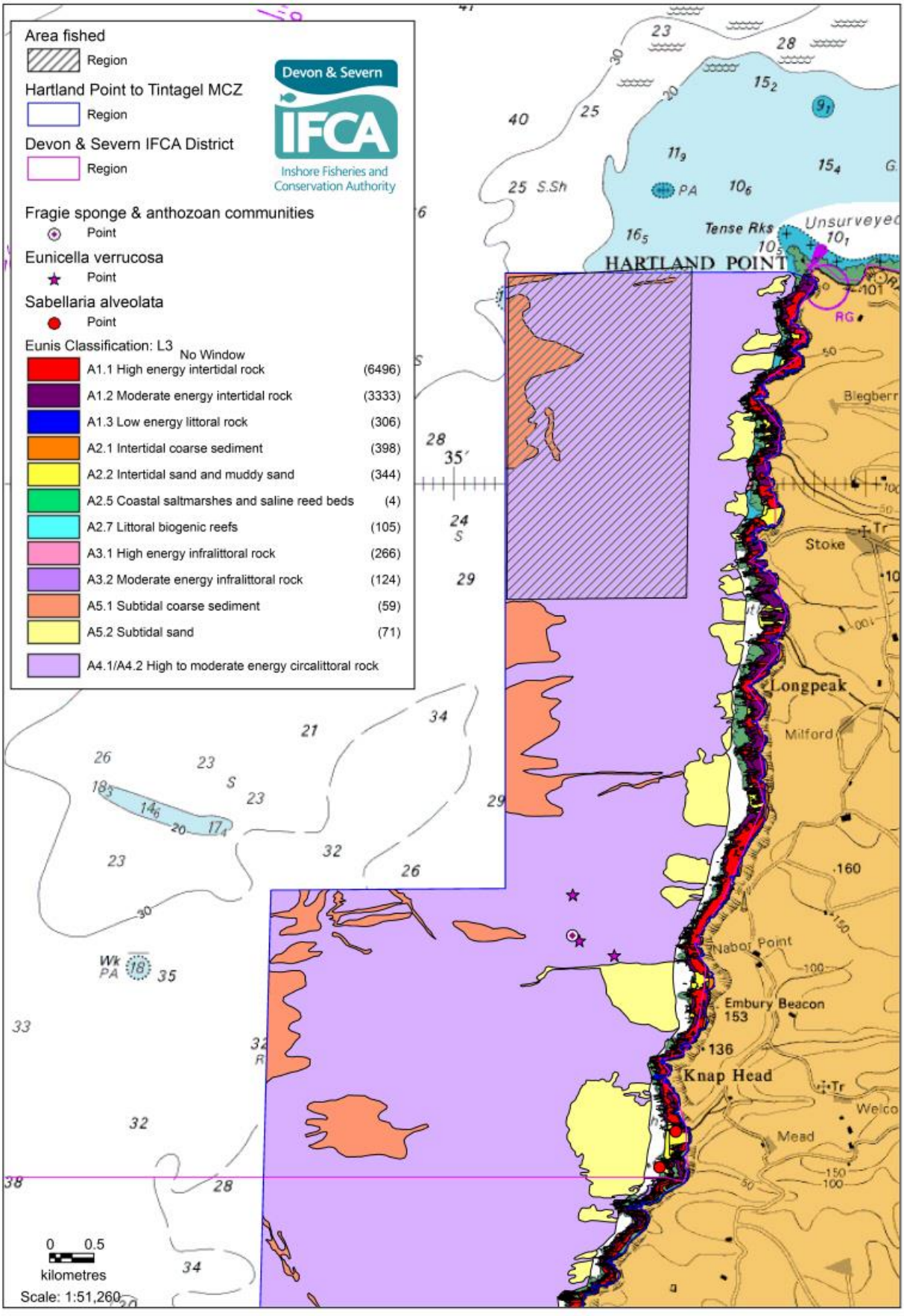

Figure 3 Area assumed to fished using otter trawls by two vessels, as marked out by fishers on paper maps in 2018.

Annex 3: Fishing Activity Maps Using VMS and iVMS 2018-2021

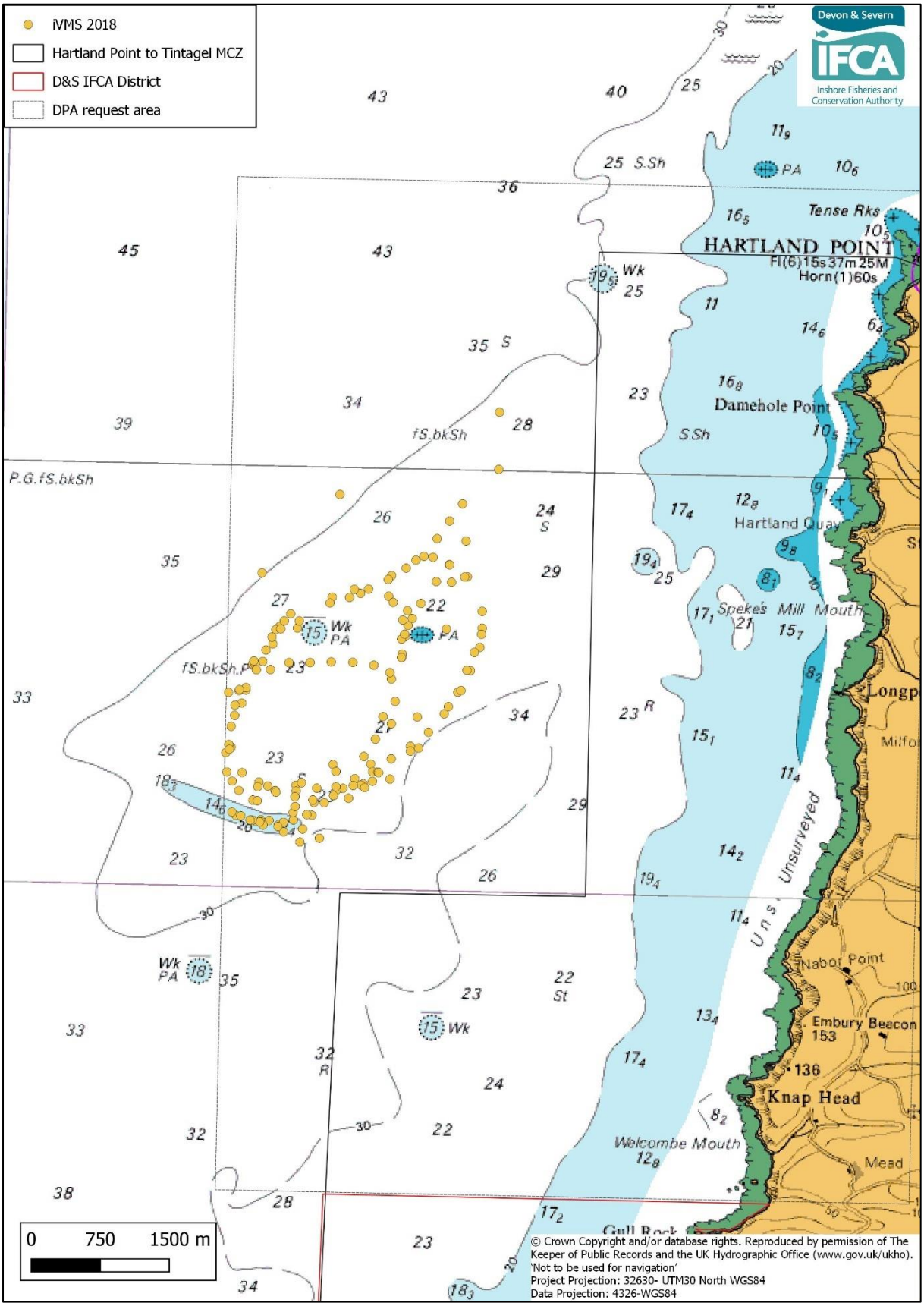

Figure 4 VMS and iVMS for three vessels during 2018. Travelling speed of vessel 2-4 knots.

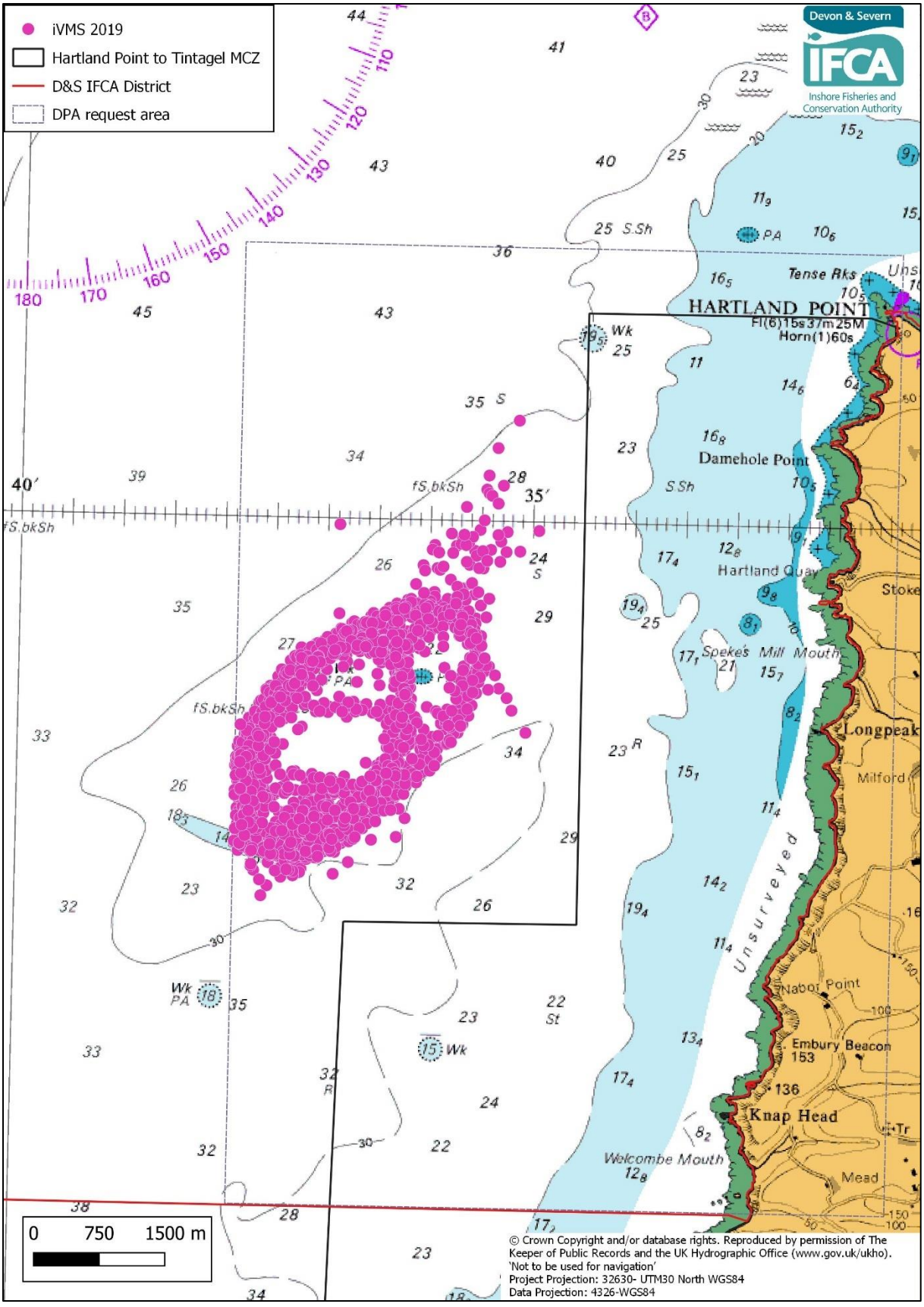

Figure 5 VMS and iVMS for five vessels during 2019. Travelling speeds of vessels 2-4 knots.

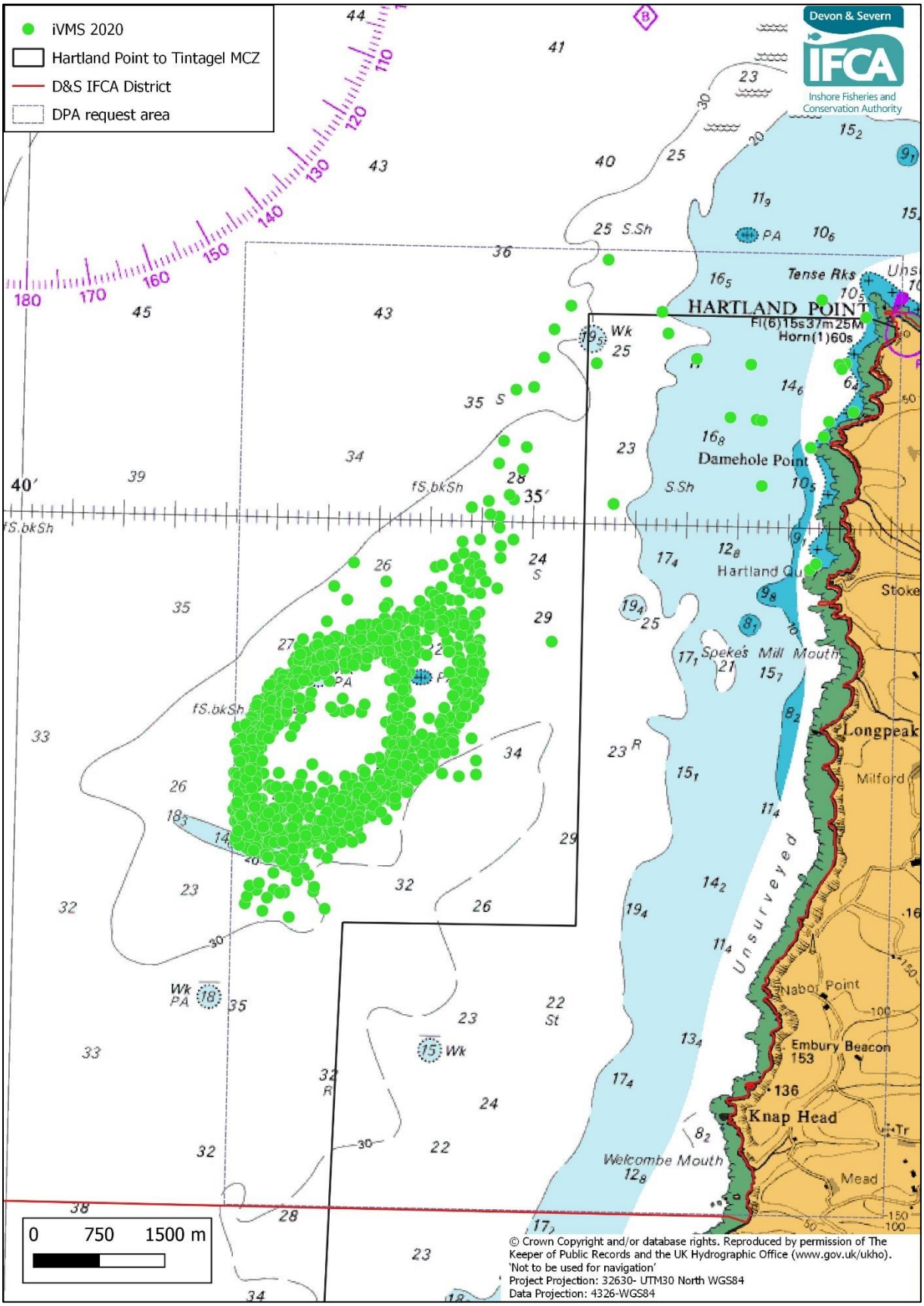

Figure 6 VMS and iVMS for five vessels during 2020. Travelling speeds of vessel 2-4 knots.

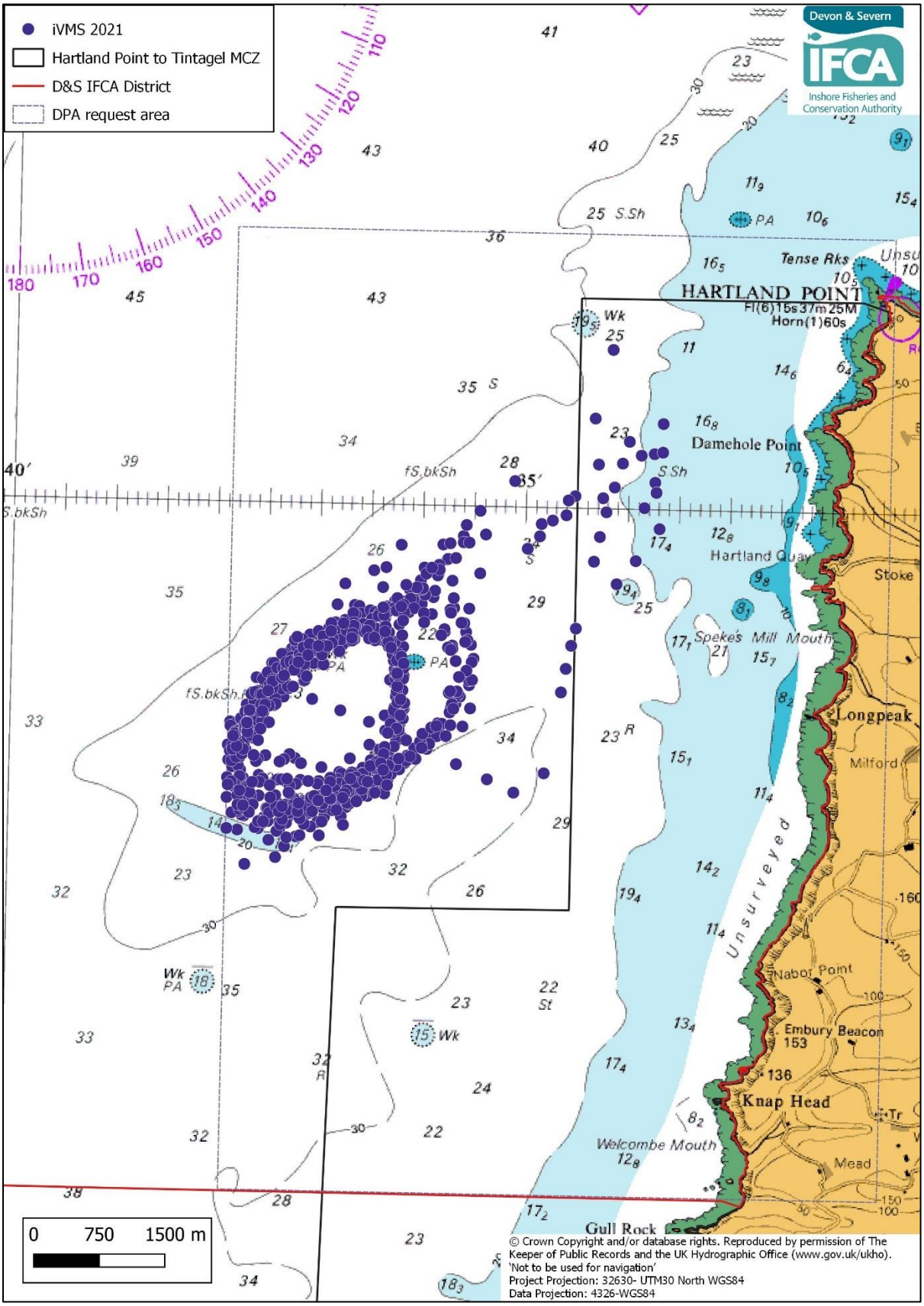

Figure 7 VMS and iVMS for four vessels in the first half of 2021. Travelling speeds of vessel 2-4 knots.

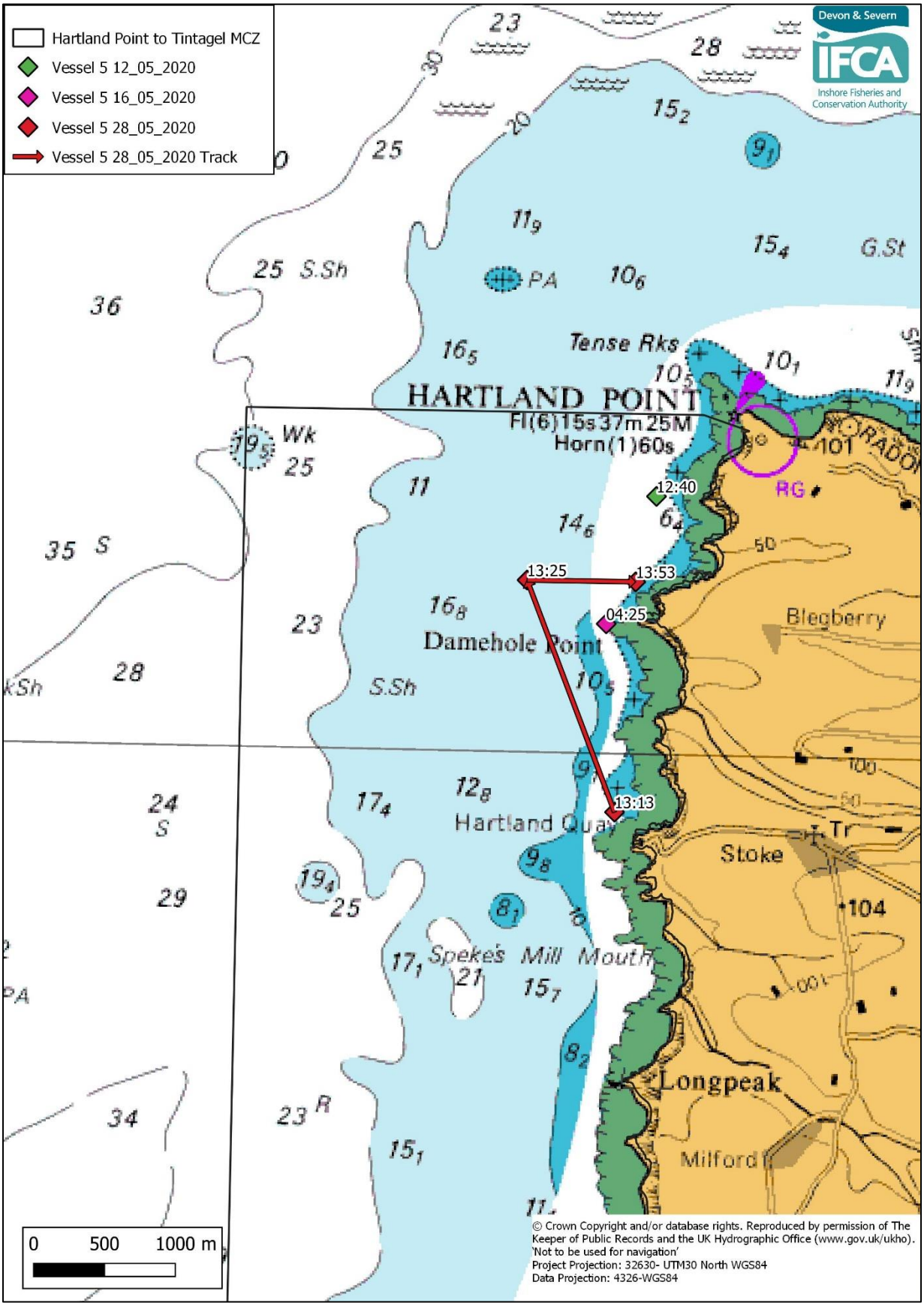

Figure 8 iVMS tracks of Vessel 5 travelling at speeds of 2-4 knots in May 2020. Entry to the site occurred on three occasions. Vessel 5 also pots and nets and carries out angling. Due to the pattern of the tracks and the closeness to the shore, it is unlikely this activity was towed gear activity.

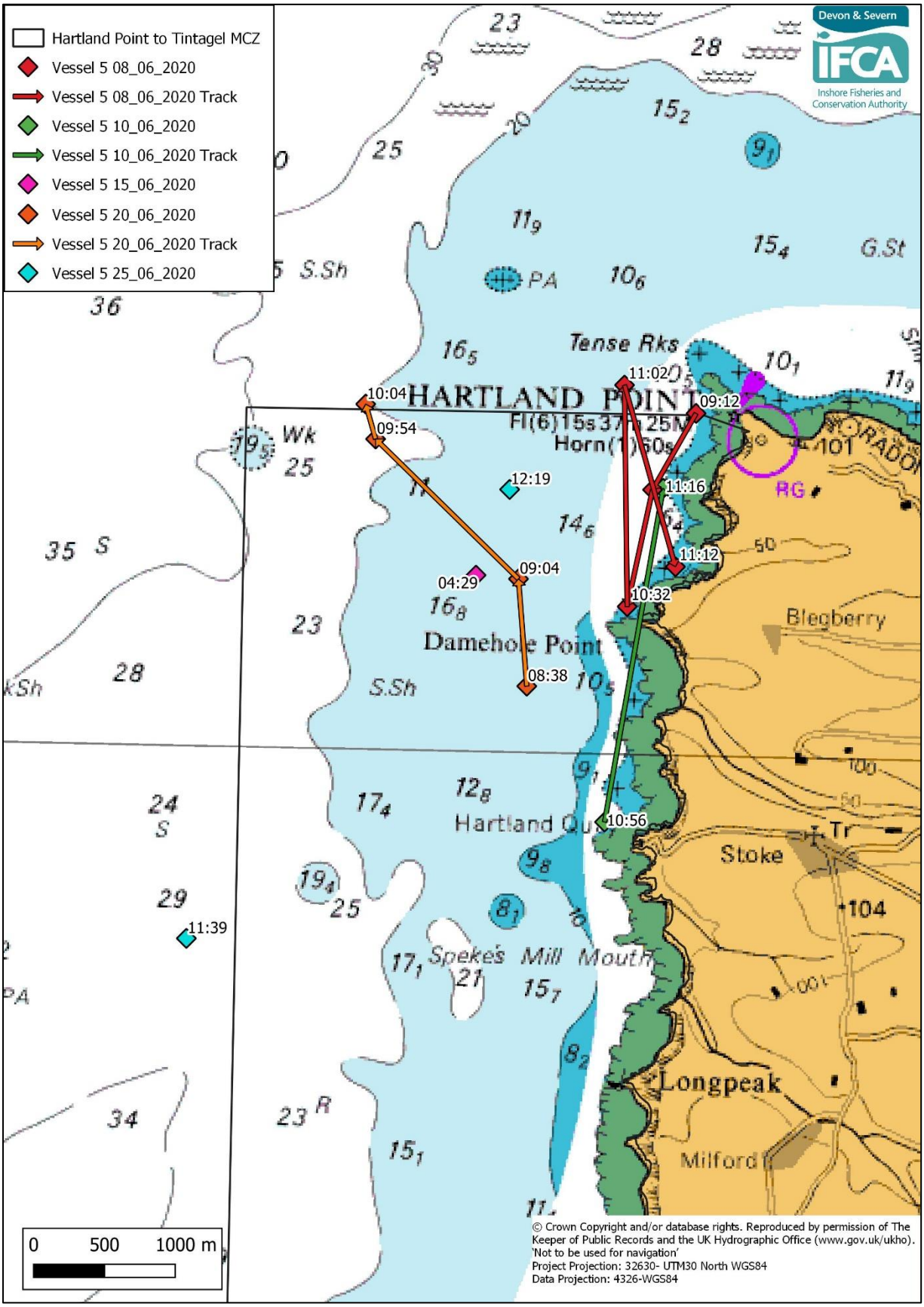

Figure 9 iVMS tracks of Vessel 5 travelling at speeds of 2-4 knots in June 2020. Entry to the site occurred on five occasions. Vessel 5 also pots and nets and carries out angling. Due to the pattern of the tracks and the closeness to the shore, it is unlikely this activity was towed gear activity.

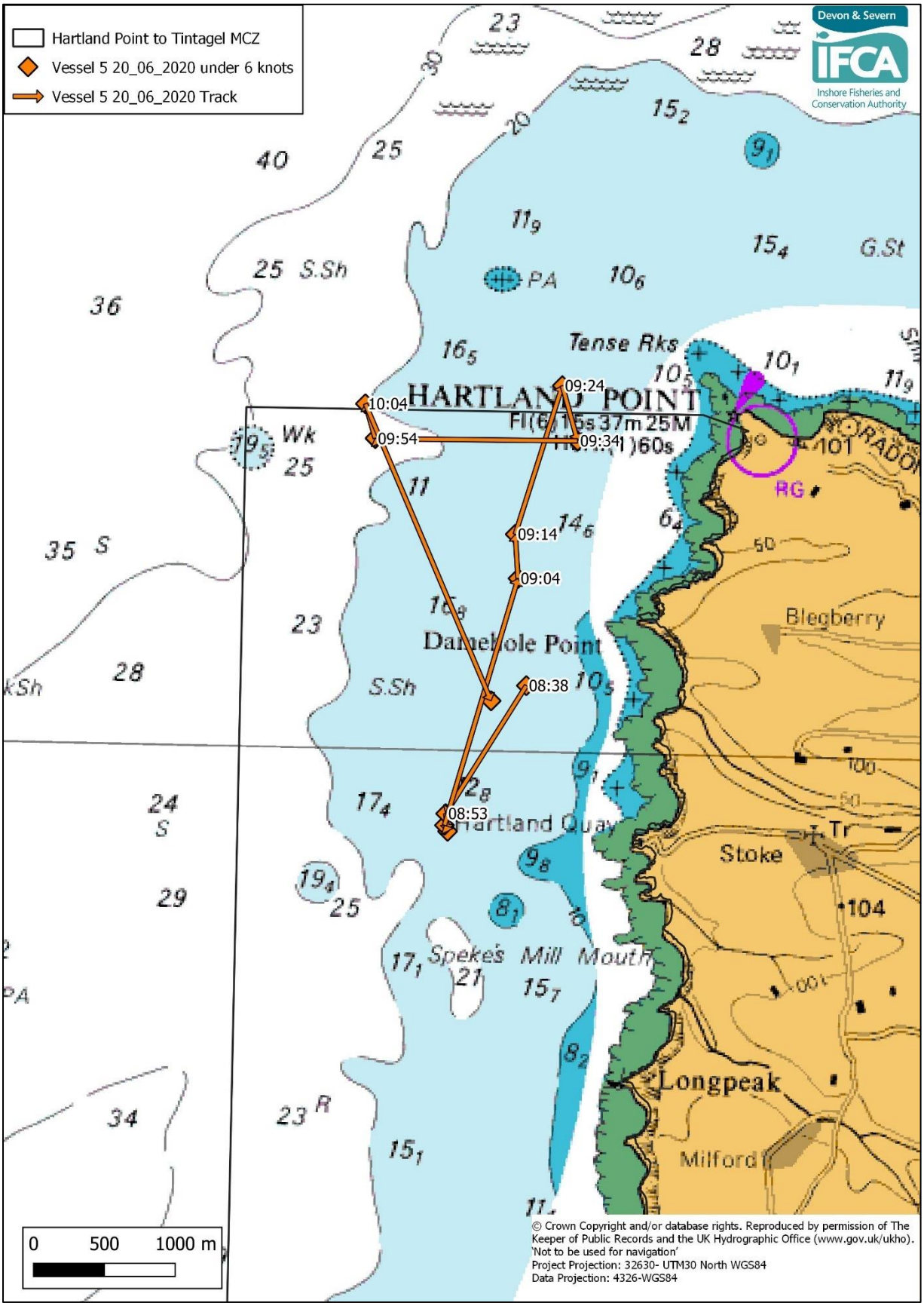

Figure 10 Vessel 5 track from 20/06/2020 for speeds of less than 6 knots. Points within the MCZ which were not included in Figure 9 are at speeds of 0-0.41 knots or greater than 5.4 knots.

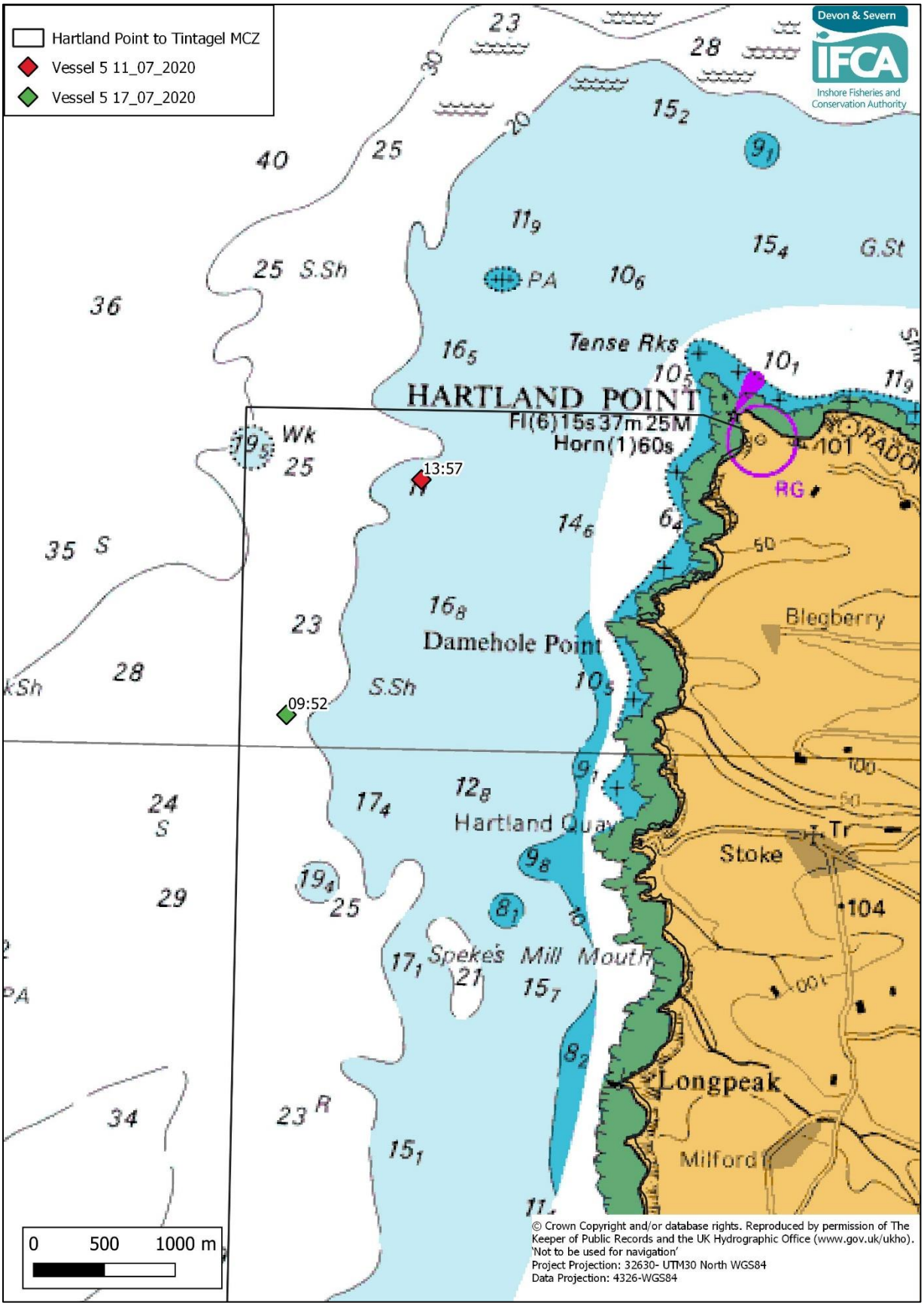

Figure 11 iVMS tracks of Vessel 5 travelling at speeds of 2-4 knots in July 2020. Entry to the site occurred on two occasions. Vessel 5 also pots and nets and carries out angling. Due to there being just one entry point of the two dates, it is unlikely this activity was towed gear activity.

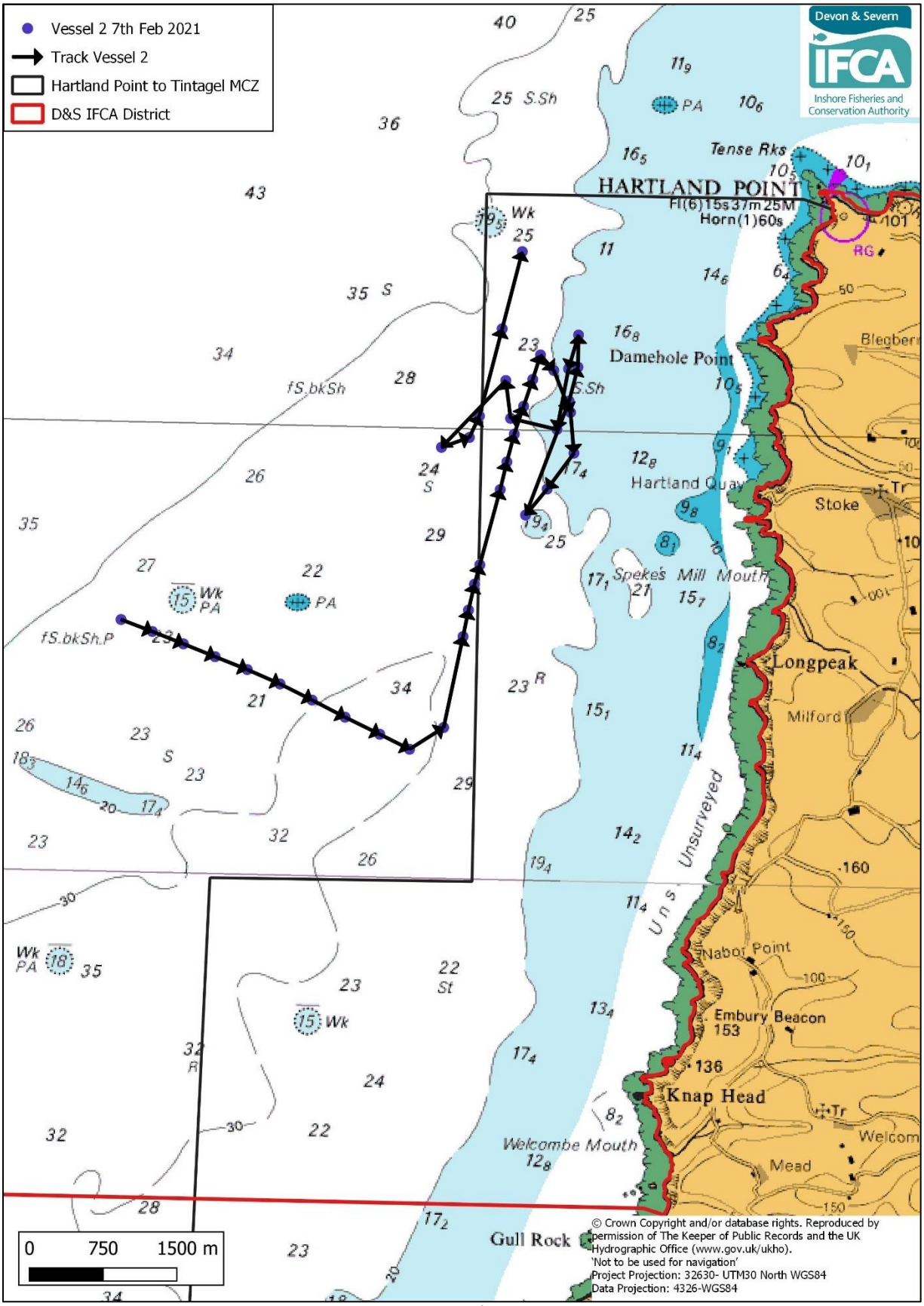

Figure 12 Vessel 2 iVMS track entering the MCZ on 7th February 2021.

Annex 4: 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