Fisheries in EMS Habitats Regulations Assessment for Amber and Green risk categories

European Marine Site: Plymouth Sound & Estuaries

Fishing activities assessed: Static – pots/traps

Gear/feature interactions assessed:

D&S IFCA Interaction ID	Fishing Activity	Sub-feature(s)
HRA_UK0013111_W23	Fishtraps	Intertidal rock
HRA_UK0013111_Z23		Circalittoral rock
HRA_UK0013111_AC23		Infralittoral rock

(V.4 Updated June 2020)

Contents

1. Introduction

1.1 Need for an HRA Assessment

In 2012, the Department for Environment, Food and Rural Affairs (Defra) announced a revised approach to the management of commercial fisheries in European Marine Sites (EMS). The objective of this revised approach is to ensure that all existing and potential commercial fishing activities are managed in accordance with Article 6 of the Habitats Directive.

This approach is being implemented using an evidence based, risk-prioritised, and phased basis. Risk prioritisation is informed by using a matrix of the generic sensitivity of the sub-features of EMS to a suite of fishing activities as a decision making tool. These sub-feature-activity combinations have been categorised according to specific definitions, as red, amber, green or blue.

Activity/feature interactions identified within the matrix as red risk have the highest priority for implementation of management measures by the end of 2013 in order to avoid the deterioration of Annex I features in line with obligations under Article 6(2) of the Habitats Directive.

Activity/feature interactions identified within the matrix as amber risk require a site-level assessment to determine whether management of an activity is required to conserve site features. Activity/feature interactions identified within the matrix as green also require a site level assessment if there are “in combination effects” with other plans or projects.

Site level assessments are being carried out in a manner that is consistent with the provisions of Article 6(3) of the Habitats Directive. The aim of this assessment is to determine whether additional management measures are required in order to ensure that fishing activity or activities will have no adverse effect on the integrity of the site.

The purpose of this site specific assessment document is to assess whether or not in the view of Devon & Severn Inshore Fisheries and Conservation Authority (D&S IFCA) the fishing activities fishtraps have a likely significant effect on the ‘intertidal rock’, ‘circalittoral rock’ and ‘infralittoral rock’ of the Plymouth Sound & Estuaries EMS, and on the basis of this assessment whether or not it can be concluded that the fishtraps will not have an adverse effect on the integrity of this EMS.

This HRA represents a review of one of five HRAs, on the interaction of fish traps on features of the Plymouth Sound and Estuaries SAC, which were completed in January 2018 and sent to NE for their formal advice. As this was over two years ago and a Comprehensive Review of the Live Wrasse Fishery (a key pressure considered within the original HRA) has taken place, with changes in management of the fishery implemented over time, now is an appropriate time for this HRA to be reviewed, and for formal advice to be requested from Natural England.

1.2 Documents Reviewed to Inform this Assessment

- Natural England’s risk assessment Matrix of fishing activities and European habitat features and protected species[1]
- Reference list (Annex 1)
- Natural England’s comments on wrasse potting and fish trap vs rock HRA (Annex 2)
- Site map(s) – sub-feature/feature location and extent (Annex 3)
- Maps of fishing activity and voluntary closed areas (Annex 4)
- Mobile fishing permit byelaw map (Annex 5)

[1] See Fisheries in EMS matrix: http://www.marinemanagement.org.uk/protecting/conservation/documents/ems_fisheries/populated_matrix3.xls

- Pressures Audit Trail (Annex 6)
- Three Year Comprehensive Review of the Live Wrasse Fishery in Devon and Severn IFCA's District (Annex 7)

Paper provided to D&S IFCA's Byelaw and Permitting Sub-Committee, addressing concerns raised in the 2020 consultation on Amendments to the Permit Conditions to Manage the Live Wrasse Pot Fishery (Annex 8).

2. Information about the EMS

The Plymouth Sound & Estuaries EMS is made up of the Plymouth Sound & Estuaries SAC and the Tamar Estuaries Complex SPA (Figure 1, Annex 3). Plymouth Sound and its associated tributaries comprise a complex site of marine inlets. The ria systems entering Plymouth Sound (St John's Lake and parts of the Tavy, Tamar and Lynher), the large bay of the Sound itself, Wembury Bay, and the ria of the River Yealm are of international marine conservation importance because of their wide variety of salinity conditions and sedimentary and reef habitats. The high diversity of habitats and conditions gives rise to communities both representative of ria systems, and some very unusual features, including abundant southern Mediterranean-Atlantic species rarely found in Britain (English Nature, 2000). This site crosses the border between Devon & Severn IFCA and Cornwall IFCA.

2.1 Overview and Qualifying Features

Plymouth Sound and Estuaries qualifies as a SAC for the following Annex I habitats as listed in the EU Habitats Directive (Natural England, 2015a):

- Large shallow inlets and bays, the key sub-features are:
    - Intertidal rock
    - Circalittoral rock
    - Infralittoral rock
    - Subtidal mud
    - Subtidal sand
    - Subtidal seagrass beds
- Estuaries, the key sub-features are:
    - Circalittoral rock
    - Infralittoral rock
    - Intertidal mixed sediment
    - Intertidal mud
    - Intertidal rock
    - Intertidal seagrass beds
    - Lower-mid saltmarsh
    - Mid-upper saltmarsh
    - Pioneer saltmarsh
    - Subtidal mixed sediments
    - Subtidal mud
    - Subtidal sand
    - Subtidal seagrass beds
    - Transition & driftline saltmarsh
    - Upper saltmarsh
- Sandbanks which are slightly covered by seawater all the time, the key sub-features are:
    - Subtidal coarse sediment
    - Subtidal mixed sediment
    - Subtidal mud
    - Subtidal sand
    - Subtidal seagrass beds
- Atlantic salt meadows
- Mudflats & sandflats not covered by seawater at low tide, the key sub-features are:
    - Intertidal coarse sediment
    - Intertidal mixed sediments
    - Intertidal mud
    - Intertidal sand & muddy sand
    - Intertidal seagrass beds

- Reefs
    - Circalittoral rock
    - Infralittoral rock
    - Intertidal rock

Plymouth Sound and Estuaries qualifies as a SAC for the following Annex II species as listed in the EU Habitats Directive (Natural England, 2015a):

- Allis shad (*Alosa alosa*)
- Shore dock (*Rumex rupestris*)

The Tamar Estuaries Complex qualifies as a SPA under the Birds Directive for (Natural England, 2015b):

- Nationally important populations of regularly occurring Annex 1 species, Avocets (*Recurvirostra avosetta*) and Little egrets (*Egretta garzetta*), the key supporting habitats are:
    - Annual vegetation of driftlines
    - Coastal reedbeds
    - Freshwater & coastal grazing marsh
    - Intertidal mixed sediments
    - Intertidal mud
    - Intertidal sand & muddy sand
    - Intertidal seagrass beds
    - Water column
    - Saltmarsh

2.2 Conservation Objectives

The site's conservation objectives which apply to the **Special Area of Conservation** and the natural habitat and/or species for which the site has been designated are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:

- the extent and distribution of qualifying natural habitats and habitats of the qualifying species
- the structure and function (including typical species) of qualifying natural habitats
- the structure and function of the habitats of qualifying species
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- the populations of qualifying species
- the distribution of qualifying species within the site

The site's conservation objectives which apply to the **Special Protection Area** and the individual species and/or assemblage of species for which the site has been classified are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- the extent and distribution of the habitats of the qualifying features
- the structure and function of the habitats of the qualifying features
- the supporting processes on which the habitats of the qualifying features rely
- the populations of the qualifying features
- the distribution of the qualifying features within the site

3. Interest feature(s) of the EMS categorised as 'red' risk and overview of management measure(s) (if applicable)

- Subtidal rock and reef communities were categorised as "red" risk against all demersal towed gear and towed dredges. In January 2014 D&S IFCA introduced the Mobile Fishing Permit Byelaw, which prohibits the use of towed gear within this EMS (Map, Annex 5).
- Seagrass bed communities were categorised as "red" risk against towed demersal gear, dredges, intertidal handwork, crab tiling, and digging with forks. At that time, only subtidal seagrass beds were considered as a sub-feature of the site which would not be exposed to intertidal handwork, crab tiling or digging with forks. In January 2014 D&S IFCA introduced the Mobile Fishing Permit Byelaw, which prohibits the use of towed gear within this EMS (Map Annex 5).

4. Information about the fishing activities within the site

Fish traps are occurring in Plymouth Sound SAC. A pot fishery for wild wrasse has developed in the Plymouth Sound, the wrasse being trapped for use as cleaner fish in salmon aquaculture in Scotland. The species targeted are four out of the five that are common in the south west: Ballan (*Labrus bergylta*), Goldsinny (*Ctenolabrus rupestris*), Corkwing (*Symphodus melops*) and Rock Cook (*Centrolabrus exoletus*). The fishery is thought to have begun in Plymouth around March 2015 and Devon and Severn IFCA were informed of the fishery by Cornwall IFCA in September 2016. There are four known vessels which currently fish for wrasse in D&S IFCA's District. Whilst the fishery for wrasse could potentially take place all year fishers tend not to fish for wrasse in January and February each year, and the period May–mid-July is currently closed for fishing under D&S IFCA's Potting Permit Byelaw Conditions, amended in 2018(see Section 4.2). Therefore the fishery typically operates between March–May and mid-July–December; this allows good time for a review of data and evidence collected on the wrasse fishery, with a window for adapting management via a review of Potting Permit Byelaw Conditions if required (as detailed in Section 4.1 – Section 4.3, below). The parlour pots used are specifically designed to catch wrasse (Figure 1). They are lightweight (3.7kg) and fitted with wrasse escape gaps. They measure 72Lx40Wx28H.

Figure 1 – Wrasse pot used by fisherman ©D.Cresswell

In 2016 and the beginning of 2017 the four vessels had 120-200 pots each. The vessels' sizes ranged from 5m to up to 8m and work to depths of 12m maximum. They mostly worked within Plymouth Sound, south of the breakwater and along the shore from Mount Batten Breakwater down to the Mew Stone. Three of these vessels also fished within Cornwall IFCA's District from Fort

Picklecombe to Rame Head. Detailed information on the wrasse fishery can be seen in the PDFs attached at the end of Section 4 (Page 9).

Devon & Severn IFCA undertook a survey within the SAC in May 2016 (prior to the wrasse fishery becoming known to the Authority) to determine the level of potting activity occurring (Annex 4, Figure 1). A total of 24 buoys/bottles were unmarked and of this, seven located near Batten Bay were thought to be no longer active as were covered with seaweed and five were located outside the SAC. Commercial vessel three was seen potting within the SAC using similar unmarked bottles to those found in the area. However, the vessels fishing for wrasse did not have potting permits at the time and therefore the unmarked buoys may have belonged to them.

A literature review and desk top research of wrasse and live wrasse fisheries was undertaken in late 2016/early 2017 (see embedded document) and the findings were reported to the D&S IFCA's Byelaw and Permitting Sub-committee. Management of the Live Wrasse Fishery then proceeded as detailed in Section 4.1 – Section 4.3.

A review of wrasse ecology and fisheries

4.1 Management of the Live Wrasse Pot Fishery

Five initial management measures were established in July 2017, following a period of public consultation and consideration by D&S IFCA's Byelaw and Permitting Sub-Committee (B&PSC) and the Full Authority. These management measures:

1. **To establish a Fully Documented Fishery**
   Under Paragraph 17 of the Potting Permit Byelaw, those permit holders who wish to engage in the Live Wrasse Pot Fishery are required to provide relevant fishery information to the Authority. The following information is required:
   1. The name and contact details of the Salmon Farm company, agent or associated company who the fishermen are supplying live wrasse to.
   2. Name and contact details of transport company.
   3. Transport documents for all those consignments sent to the Salmon Farm company.
   4. Number of pots actively being used in the Live Wrasse Fishery.
   5. Completion of weekly returns including information on the dates and times of hauling, location of strings, number of strings hauled, number of pots hauled, and the number of wrasse retained on board per day.

   Fishermen will also be required to allow D&S IFCA officers on board their vessels to collect catch data for the fishery.

2. **Pot Limitations**
   The maximum number of pots per permit holder shall not exceed 120.

3. **Marking of Gear**
   a. Every pot used for the capture of live wrasse must be marked with a tag that is issued by D&S IFCA, to allow for identification of the wrasse pots and aid compliance of the effort restrictions.
   b. All strings of wrasse pots to be used to capture live wrasse must be marked with a buoy or dahn, and each buoy or dahn must be marked with "WRA" together with the vessel's PLN. This is for identification purposes to differentiate wrasse pots from other potting gear used for the capture of Crustacea and Molluscs.
   c. Strings of pots used for the capture of live wrasse must be used solely for that purpose.

4. **Closed Season**
   The period between 1st April and 30th June was closed to the Live Wrasse Pot Fishery.

5. **Minimum and maximum conservation reference sizes**
   To introduce Minimum and Maximum Conservation Reference Sizes for five species of wrasse:
   a. Ballan and cuckoo wrasse less than 150mm or greater than 230mm
   b. Corkwing, rock cook and goldsinny wrasse less than 120mm or greater than 230mm

4.2 Initial Management Review Process (2017-2018)

- The Authority decided that if there is an increase in the number of vessels entering the Live Wrasse Fishery this will trigger a review of the permit conditions for the Live Wrasse Fishery, and may lead to further changes to the permit conditions, which may include a reduction in the number of pots per vessel.
- The Authority decided that a review of the management of the Live Wrasse Fishery was to be undertaken in November 2017. Data collected from fishermen and on-board surveys informed the review of the permit conditions for the Live Wrasse Fishery, In November 2017 a report on the analysis of the wrasse fishery data collected from on-board surveys and returns data from the fishermen (see link to PDF below) was presented to the D&S IFCA's B&PSC The B&PSC recommended proposed changes to management measures for the Live Wrasse Fishery, which were implemented in August 2018 following a period of public consultation and consideration by the Byelaw and Permitting Sub-Committee and the Full Authority. The implemented changes were:
  - **to amend the slot size for corkwing to 140mm to 180mm**
  - **to change the closed season to May 1st to 15th July.**

Guidance for the live wrasse fishery:
Further to the regulatory conditions, D&S IFCA has developed additional guidance to support these measures and the fishery. This guidance is in the form of voluntary measures to be adopted by those fishermen participating in the Live Wrasse Fishery.

1. A series of small closed zones to the Live Wrasse Pot Fishery or 'No Wrasse Pot Zones' have been identified through discussions with the fishermen. These areas lie within the fishery area in the Plymouth Sound and associated area and include reef habitat known to be favoured by the wrasse species fished. Figures 2 and 3 (Annex 4) show the areas closed to the Live Wrasse Fishery, which were updated in 2018, in consultation with the fishers. There is also an eastern limit to the fishery to prevent its spread along the coast from Plymouth Sound, containing the effort and allowing for robust repeat monitoring.
2. Mount Batten Breakwater is known to be a popular angling mark and in order to remove any conflict with anglers in this area, fishermen are requested to keep their pots 30m from the pier.

Failure to meet all conditions set out in this policy statement may also trigger a review of the permit conditions. In addition to formal management under the Potting Permit conditions, the Authority may introduce further voluntary measures to support the management of the Live Wrasse Fishery. Failure to adhere to these voluntary measures may lead to a review of the permit conditions.

4.3 Further Live Wrasse Pot Fishery Management Review Processes (2018 – 2020)

In November 2018, the D&S IFCA B&PSC was presented with the Live Wrasse Data Analysis Nov 2018 report (embedded below), a report on the Formal Review of the Live Wrasse Pot Fishery (embedded below). Members recommended that (subject to the findings of further evidence presented by D&S IFCA Officers) there should be no changes to the current management of the Live Wrasse Pot Fishery. Management includes both the Potting Permit Conditions and separate Policy & Guidance. Subsequently, in February 2019, the B&PSC was presented with an

addendum to the Live Wrasse Data Analysis (Nov 18) report. Members endorsed the findings of this report and recommended that existing management measures for the Live Wrasse Pot Fishery be maintained, and that a Comprehensive Review of the Live Wrasse Pot Fishery be undertaken at the end of 2019, reflecting the three years of data collected by that point.

Data collection for the Live Wrasse Pot Fishery in 2019 ended in December 2019, allowing for production of the Three Year Comprehensive Review of the Live Wrasse Fishery in D&S IFCA's District (embedded below), which was presented to the B& in February 2020.

Data analyses, carried out as part of the Three Year Comprehensive Review of the Live Wrasse Fishery, have shown that landings per unit effort and catch per unit effort have remained stable over the fishery as a whole, and for most wrasse species, for the 2017–2019 period (Figures 2 and 4 in Annex 7). This indicates that the fishery as a whole, and most wrasse species, are not overexploited and that the current management measures are an effective way to manage the fishery. However the data analysis has highlighted concerns regarding rock cook wrasse. While Landings Per Unit Effort (LPUE) and Catch Per Unit Effort (CPUE) appear to be stable or increasing for most species (Figures 5-6, 8-9 and 14-15 in Annex 7), these measures have declined have both declined for rock cook over the 2017–2019 period (see Figures 11 and 12 in Annex 7). It is on this basis that the D&S IFCA B&PSC recommended the prohibition of removal of rock cook from a fishery by all Potting Permit holders, including those prosecuting the Live Wrasse fishery. This change to the Potting Permit Byelaw Conditions has completed its period of public consultation and was confirmed at the Byelaw and Permitting Sub-Committee meeting on 18th June 2020. Overall, analyses presented in the Three Year Comprehensive Review of the Live Wrasse Fishery do not provide evidence to suggest that the fishery is unsustainable for the other species; conversely, corkwing wrasse CPUE appears to have increased over the 2017–2019 period.

To date, fishers have complied well with the voluntary closed areas, with three seemingly unintentional infringements in 2019 by a fisher who was new to the fishery. However, the fisher was informed of their non-compliance and strings were then moved accordingly. Given the general compliance of the voluntary closed areas it would undermine the fishers to make the closed areas mandatory. Having voluntary closed areas allows D&S IFCA to involve the stakeholders resulting in a valued co-management approach that is thought to improve compliance over entirely top-down imposition of management measures.

Overall, most fishers have generally complied with the Potting Permit Byelaw conditions, including requirements under Paragraph 17 for the fishers to submit relevant fisheries information as required by D&S IFCA. However, concerns have been raised regarding prior repeated non-compliance by a single fisher/vessel ('Vessel 3'). D&S IFCA Officers held a meeting with all fishers and the salmon supply agent in March 2020 to reiterate the importance of submitting landings forms and allowing observers on board, in addition to providing sales notes that detail the numbers of wrasse sold on by the fishers. At this meeting, and in a follow-up letter dated 7th April 2020, D&S IFCA advised that if fishers do not provide this documentation they will be in breach of Paragraph 17 of the Potting Permit Byelaw, and made all fishers aware of their obligations to provide relevant data as requested and the implications of non-compliance with all Byelaw Conditions, which would be investigated and could result in prosecution. The owner of vessel 3 was prosecuted on three breaches of Live Wrasse permit conditions in 2019. These offences, which included not marking his fishing gear correctly and two instances of not having tags on his pots were heard in the Magistrates' court in August and September 2019 and fines of £2,532 were issued. Vessel 3 has not previously received observer surveys due to the small size of the vessel. In 2019 D&S IFCA developed a method of observing this vessel and its catch using D&S IFCA's enforcement vessel. This will continue to allow observer surveys to be carried on this vessel in 2020, provided that sea state is reasonable. In addition,

fishers have agreed to complete a sub-sample of the first 20 pots hauled on one day per week of fishing in order to complement the observer surveys and fishers' landings forms. These different data collection methods should increase the evidence provision of the IFCA and lead to greater compliance.

Other fishing activities within the Plymouth Sound and Estuaries EMS are described in the Fishing Activity Report (Gray, 2015).


November 2017 Live Wrasse Fishery Data A


November 2018 Live Wrasse Fishery Data A


Addendum to 2018 Wrasse Report FINAL.


Wrasse formal review supplement Oct 2018.


Curtin, Henly and Stewart (2020). Three

5. Test for Likely Significant Effect (LSE)

5.1 Table 1: Assessment of LSE

1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?	**No**	
2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)	• Abrasion/disturbance of the substrate on the surface of the seabed • Removal of target species • Removal of non-target species **See Annex 6 for pressures audit trail**	
3. Is the feature potentially exposed to the pressure(s)?	**Yes,** D&S IFCA has a potting permit byelaw and through this can gauge where any future changes or developments in this activity occur within Plymouth Sound and Estuaries EMS. D&S IFCA has brought in management measures for the wrasse fishery (see section 4). The Dockyard Port of Plymouth Order 1999 prohibits fishing in some areas of the SAC.	
4. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?	Four commercial vessels are known to pot for wrasse within the SAC. Potting for wrasse generally occurs on rocky reef and seaweed covered areas. Disturbance and abrasion of the substrate could occur from landing of deployed pots on the seabed and movement/recovery of the pots (Coleman et al. 2013). Fish traps are not believed to be set on intertidal rock due to the level of access by boat. Effects of wrasse removal on the rock features with which they are associated is unclear as their ecological importance has not been quantified. D&S IFCA is liaising with a PhD student at the University of Exeter whose research seeks to fill some key knowledge gaps. Given these knowledge gaps, D&S IFCA is taking a precautionary approach to managing the wrasse fishery, by acknowledging that maintaining wrasse stocks within the SAC could be important to the ecological function of the rocky reef ecosystem, despite the current lack of an evidence base to confirm that this is the case.	
5. Is the potential scale or magnitude of any effect likely to be significant?	**Alone**	**Uncertain,** an interaction is present between fishtraps and the reef feature/sub-features of Plymouth Sound SAC. Fishtraps have the potential to impact infralittoral and circalittoral rock. It is unknown what impact the removal of wrasse will have on the reef habitat.
	In-combination	**See section 8 for more information**
6. Have NE been consulted on this LSE test? If yes, what was NE's advice?	The first TLSE and HRA were completed in 2016, and D&S IFCA received formal advice from NE, which supported the outcome of those assessments. NE's comments on the first HRA are available in Annex 2. This iteration has not yet been consulted on.	

6. Appropriate Assessment

6.1 Potential risks to features

The potential pressures, impacts and exposure by gear type(s) for each feature/sub-feature are summarised in Table 2.

Table 2: Summary of Impacts

Feature/Sub feature(s)	**Target Attributes/ Conservation Objectives** (Natural England, 2015a)	**Potential pressure (such as abrasion, disturbance) exerted by gear type(s)**	**Potential ecological impacts of pressure exerted by the activity/activities on the feature** *(reference to conservation objectives)*	**Level of exposure of feature to pressure**	**Mitigation measures**
Reefs; Large shallow inlets and bays • Circalittoral rock • Infralittoral rock	**Target Attribute:** Maintain the total extent, spatial distribution and types of reef (and each of its sub-features) subject to natural variation in sediment veneer. **Conservation Objective:** Maintain or restore the extent and distribution of qualifying natural habitats and habitats of the	Abrasion/ disturbance of the substrate on the surface of the seabed.	The distribution of reef feature can be seen in Annex 3 (Figure 2). The use of fish traps would not have an effect on the extent or distribution of the circalittoral and infralittoral rock.	No exposure	No mitigation necessary

	qualifying species.				
Reefs; Large shallow inlets and bays • Circalittoral rock • Infralittoral rock	**Target Attribute:** Maintain the presence and spatial distribution of reef (infralittoral & circalittoral rock) communities **Conservation Objective:** Maintain or restore the extent and distribution of qualifying natural habitats and habitats of the qualifying species. **Target Attribute:** Maintain the species composition of component communities. **Conservation Objective:** Maintain or Restore the structure and	Abrasion/ disturbance of the substrate on the surface of the seabed.	Disturbance and abrasion of the substrate could occur from gear landing on the seabed, the movement of the gear from tide, current and storm activity and the subsequent recovery of gear from the pots dragging along the sea floor when unable to lift vertically (Eno *et al.* 2001, Coleman *et al.* 2013). Long-lived, sessile fauna are the non-target organisms considered to be at most risk from potting. Vulnerable species include the pink sea fan (*Eunicella verrucosa*, dead man's fingers (*Alcyonium digitatum*) ross coral, (*Pentapora fascialis*) and various erect branching sponges (*e.g. Axinella* spp., *Raspalia* spp.) (Coleman *et al.* 2013). The component communities of Plymouth Sound SAC are red algae communities for infralittoral rock, dominated by A3.214 *'Laminaria hyperborea* and foliose red seaweeds on moderately exposed infralittoral rock' (Natural England, 2015a). Faunal communities for circalittoral rock include; on the open coast a range of circalittoral biotopes within A4.13 'Mixed faunal turf communities' occur, often dominated by bryozoans, anemones or sponges. Typical communities characterising circalittoral rock within Plymouth Sound include the biotope A4.2511 'Cushion sponges, hydroids and ascidians on turbid tideswept sheltered circa-littoral rock', which is found at Firestone Bay and Devil's Point from 10m to below 20m below chart datum. The diversity of geology at outer sound sites is key to rich assemblages that can be characterised by dead man's fingers *Alcyonium digitatum* (Natural England, 2015a). Eno *et al.* (2001) studied the effects of lobster and crab pots in Lyme Bay and west Wales. The rocky habitats and communities appeared to have little or no immediate effect by the fishing activity (equivalent to around 1,000,000 pot hauls per km² per year). Immediate effects of hauling pots showed evidence of *E. verrucosa* bending under the weights of pots as and returned upright once passed, although some detachment of ascidians and sponges were noted and individual *P. fascialis* colonies were damaged (Eno *et al.* 2001). However, long term damage	Four commercial vessels are known to pot for wrasse within the SAC in D&S IFCA District. Wrasse are generally targeted on the infralittoral rock sub-feature. The fishery usually operates between March and November (except in bad weather and during the closed season May 1st – July 15th inclusive, implemented to protect spawning individuals). A fully documented fishery will allow the IFCA to understand the level of effort and exact location of where the potting for wrasse occurs throughout the year. Weekly returns are received from the fishermen and transport documents from each landing. Together, the data from log books and on board surveys include catch composition by species,	Activity levels need to be monitored and alongside patrols, the Potting Permit Byelaw can gauge where any future changes or developments may occur. Changes can be made to the permit conditions, via consultation, if the D&S IFCA deems it to be necessary. The permitting system allows for adaptive management. D&S IFCA has introduced permit conditions under the Potting Permit Byelaw for the management of the Live Wrasse Fishery (see section 4). This approach allows for flexible and relatively rapid review of the

	function (including typical species) of qualifying natural habitats.		from on-going activities was not accounted for in this study, in which potting occurred over one month. Other than the damage caused to individual ross corals this study concluded that short-term impacts of potting were insignificant and that habitats and their communities appear unaffected by potting, however it could not be determined as to how repeated "hits" would affect more resilient species and communities as a whole in the long term. Other limitations of the study include no control sites that had not previously been subject to fishing activities. A four year study by Coleman *et al.* (2013) in Lundy Island No Take Zone (NTZ) compared benthic assemblages inside the NTZ with areas nearby still subject to potting (equivalent to approximately 2,000 pots per km² per year) by scuba divers. Potting had no detectable effect on reef epifauna over the timescale of the experiment and can be considered to have limited impact (Coleman *et al.* 2013). Limitations of this study include the experimental pots were set for five days in June and July every year for four years, which is not a good representation of fishermen's effort intensity. There were natural environmental differences between the control (west of Lundy) and NTZ sites (east of Lundy) of depth, wave exposure and rock type. Additionally, the results were based on the hypothesis of detectable effect after four years and recovery could take a lot longer. D&S IFCA commissioned a PhD project, part of which looked at the impact of inkwells and parlour pots on reef features within the Start Point to Plymouth Sound and Eddystone SAC. The effects of pots landing, movement, rope scour and hauling were monitored using video cameras. Only the rims of the pot come into contact with the seabed (not the whole base) and took on average 3.5 seconds to settle (Gall, 2016). The study found that the pots are fairly stationary during the time they are on the seabed (for 25 minutes), with 86% of soaks showing no movement and 8% of soaks with some occasional movement which were very sporadic and small. Only one pot made large movements throughout the soak. When hauling, the pots do not drag for long distances on the seabed. Pots took 41 seconds to	size distribution and allow for catch per unit effort (CPUE) to be determined on a species-by-species and whole fishery basis. This together with landings per unit effort (LPUE) will help inform assessment of stock abundance and highlight changes over time. Wrasse are also assessed for spawning status to monitor the effectiveness of the closed season. The Minimum and Maximum Conservation Reference Sizes introduced for all five species allow for a degree of protection of both young and mature, reproducing individuals, thereby affording protection to the breeding stock. The closed season, timed to account for wrasse spawning seasons, will allow some spawning to occur before harvesting, and allow nests to be protected. Triggers that would initiate a review of management include:	Potting Permit Conditions.

			haul and the total time that the pots came into contact with the seabed was approximately half the time (20.7 seconds). Rope movement was minimal, only moving slightly by the tide and no scour or species impacts were observed for 46% of the time. In instances where movement and impact occurred abrasion was found on *A. digitatum* and *E. verrucosa*, although no individuals were removed. However, during hauling, five instances occurred where damage caused abrasion and removal of two *A. digitatum*. The assumed haul corridor (area that could be impacted during hauling) was 6.7m² and the length of the realised haul corridor (area actually impacted) was 3.2m² (Gall, 2016). Of the 22 taxa identified, 14 suffered damaged from pot impacts, including all five indicator taxa, and individuals of six were removed from the reef, including one indicator taxa. Pots for wrasse have to have limited/ to no movement on the seabed otherwise wrasse will not enter the pot (Cornwall IFCA 2016, pers. comms.). Walmsley *et al.* (2015) reviewed literature and the evidence indicated no significant impacts from potting have been found on benthic species and communities of reefs, although there are site-specific considerations. Wrasse are found among rocky and seaweed covered areas inshore and in seagrass beds, and therefore these are the habitats the fishermen target for wrasse. Algal communities associated with infralittoral rock should be less sensitive to disturbance from potting because of their annual life-cycles and relatively fast growth rates (Coleman *et al.* 2013) when compared to circalittoral rock which can have more slow growing and fragile species. Walmsley *et al.* (2015) reviewed literature of potting impacts and found no primary literature on the impacts on potting on kelp communities. An unpublished master's thesis assessed the impact of potting on chalk reef communities in Flamborough Head EMS (Young, 2013: reviewed by Walmsley *et al.* 2015). A statistically significant difference in community assemblage was	1) Any increase in effort (number of boats). 2) Failure to meet all permit conditions. 3) Failure to adhere to voluntary closed areas. 4) On board surveys identify over half the proportion of the spawning season not protected. 5) A consistent decrease in CPUE or LPUE . 6) A shift in size distribution. Data collected from fishermen, on-board surveys and fishermen's conduct will inform the review of the permit conditions. Detailed information on the wrasse fishery can be seen in the PDFs attached at the end of Section 4 (Page 11). There is no literature on the impact of wrasse pots or fish traps on infralittoral or circalittoral rock. The traps used to catch wrasse are lightweight (3.7kg), specially-designed parlour pots (Figure 1).	

			identified between NTZ and fished sites. A higher abundance of benthic taxa, namely Mollusca, Hydrozoa and Rhodophyta was identified inside the NTZ. A higher abundance of kelp *Sacharinna latissimi* was observed in the fished site compared to the NTZ. This was inconsistent with other taxonomic groups observed. However, there are limitations of the results due to adverse weather which scoured the seafloor in both sites and surveys were conducted at different states of tide which affected visibility in the fished site.	Benthic communities are thought to be relatively unaffected by static gear due to the footprint of the gear and the small area of the seabed in direct contact (Eno *et al.* 2001).	
Reefs; Large shallow inlets and bays • Circalittoral rock • Infralittoral rock	**Target Attribute:** Maintain the presence and spatial distribution of reef (infralittoral & circalittoral rock) communities **Conservation Objective:** Maintain or restore the extent and distribution of qualifying natural habitats and habitats of the qualifying species. **Target Attribute:** Maintain the species composition of	Removal of target species Removal of non-target species	**<u>Target species:</u>** A direct effect of wrasse potting includes the removal of the target species: ballan (*Labrus bergylta*), goldsinny (*Ctenolabrus rupestris*) and corkwing (*Symphodus melops*). Rock cook (*Centrolabrus exoletus*) have previously been targeted in the D&S IFCA's District. However, in response to data gathering and reporting by D&S IFCA Officers, and following a period of public consultation, the B&PSC confirmed a change to the Potting Permit Conditions (on 18th June 2020), which now prohibit the removal of rock cook from the fishery. Cuckoo wrasse (*Labrus mixtus*) are not targeted in the District and are returned to the sea alive if caught. The five species of wrasse generally live among rocky and seaweed covered areas inshore and seagrass beds. Their diet mainly consists of molluscs, crustaceans and barnacles. The five species of wrasse have relatively different life history strategies. The two larger species, ballan and cuckoo are protogynous hermaphrodites, which means they are born females and some change their sex to male later in life. Sexual inversion depends on the proportion of the sexes in local populations and most populations tend to have more females than males (Naylor, 2005). In ballan wrasse, a male guards a harem of females (Darwall *et al.* 1992). Apart from goldsinny which have planktonic eggs, wrasse have sticky benthic eggs deposited in nests guarded by the males (Darwall *et al.* 1992). In goldsinny and corkwing wrasse, non-territorial, but mature 'sneaker' males which mimic the female phenotype steal fertilisation of eggs in territorial male's nests (Darwall *et al*. 1992).	See row above for more information.	See row above.

	component communities. **Conservation Objective:** Maintain or Restore the structure and function (including typical species) of qualifying natural habitats.		Wrasse stocks and their biology in the UK are poorly understood and whilst there has been some limited research in the past, currently no stock assessment exists. **Biology:** ***Population structure:*** The minimum size for use in salmon cages is 12cm so the removal of larger (>12cm) fish can alter population structures (Darwall *et al.* 1992). For goldsinny and corkwing, the population may be ensured due to enabling some spawning before removal as <12cm fish are returned, and size at maturity is ~10cm. However, due to the mature species being targeted the average size and age at first maturity would be expected to decrease over time (Darwall *et al.* 1992). For larger species, such as the ballan and cuckoo wrasse, their size at sexual maturity is higher than 12cm (ballan: females 16-18cm, males 28cm; cuckoo: females 16cm and males 24cm) so individuals are removed before having a chance to spawn. The industry requires certain sizes of the different species related to their efficiency in cleaning. In the beginning of the fishery, there were industry led voluntary size limits such as >22cm as larger species tend to become too aggressive in cages (Cornwall IFCA 2016, pers. comms.). In ballan wrasse, two distinct colour patterns (morphotypes) have been reported: spotted and plain. They coexist in sympatry and are not related to sexual dimorphism. These two types have different life history strategies, in growth and maturation (Villegas-Rios *et al.* 2013a), which raises the question of whether they represent one or two different taxonomic species. Alamada *et al.* (2016) found analyses of mitochondrial and nuclear markers revealed no genetic differences between the morphotypes in wrasse samples from Norway, North Spain, Portugal and the Azores. However, Quintela *et al.* (2016) used microsatellite markers for a genetic analysis of plain and spotted wrasse in Galicia (northwest Spain) and concluded there was significant genetic heterogeneity within the species, which		

			appears to be highly associated with the two forms, but not completely explained by them. Spotted individuals are under stronger selective pressure from fisheries because they attain larger mean sizes, and as a result have lower reproductive output, and unbalanced sex ratios due to male-biased overexploitation may occur since the ballan wrasse is a protogynous hermaphrodite (Almada *et al.* 2016; Villegas-Rios *et al.* 2013a). As a precautionary measure, it is recommended that plain and spotted morphotypes should be considered two independent management units (Almada *et al.* 2016). There is some information available regarding wrasse fisheries in other locations. Darwall *et al.* (1992) and Deady *et al.* (1993) looked at the impact of the first two years of a wrasse fishery in Mulroy Bay and Lettercallow Bay, Ireland. Catch Per Unit Effort (CPUE) decreased and was significantly lower in the second year, there was also a lower percentage frequency of larger wrasse and a reduction of corkwing males greater than 13cm in the second year. Halvorsen *et al.* (2016b) found corkwing males attained larger sizes compared to females and sneaker males and there was a higher capture probability for males, resulting in sex-selective harvesting. Additionally, there was a difference in growth between north and southern populations and the minimum size of 12cm in Norway failed to protect any mature nesting males in five out of eight populations (Halvorsen *et al.* 2016b). ***Social structure:*** The fishery could alter social structures through the removal of large males and subsequently change the sex ratios. Wrasse are highly territorial, occupying small spatial areas (Villegas-Rios *et al.* 2013b). Wrasse also have dominance hierarchies, and males have been found to grow faster, attain larger sizes and have a higher capture probability (Halvorsen *et al*. 2016c). The removal of large males may alter the social structures and subsequently change sex ratios within the population. There is also an unknown impact the removal of large, territorial males		

			will have on sneaker males; either decrease in numbers due to the removal of social inhibition for dominant status or increase in numbers through increased spawning success (Darwall *et al.* 1992). ***Spawning season:*** The need for wrasse in salmon production coincides with the spawning season of wrasse (Skiftesvik *et al*. 2015) which ranges from April through to September depending on the species. The removal of a significant amount of wrasse within this period would reduce spawning and egg production. Once eggs are laid in a nest, they may take up to 16 days to hatch (Potts, 1974) and during this period the male guards the nest. So the removal of nest guarding males may reduce egg survival (Darwall *et al.* 1992). Assessment of spawning state of wrasse during D&S IFCA's survey work, including fishery-independent surveys, has informed the current closed season of 1st May – 15th July each year. This closed season has been implemented, under Potting Permit Conditions, to encourage protection of spawning individuals during this time. ***Genetics:*** Additionally, it is likely that local populations are genetically isolated and removal would affect stock structure (Skiftesvik *et al.* 2014). Recorded home ranges of wrasse have been 91m² for ballan (Villegas-Rios *et al.* 2013b), territories of up to 2m² for goldsinny (Hillden, 1981) and >15m² for corkwing (Costello *et al.* 1995) but they do travel up to 50m away from their nest site (Potts, 1985). Wrasse's territorial behaviour and production of benthic eggs can suggest limited dispersal from nesting areas (D'Arcy *et al.* 2013). It has been shown that populations of goldsinny wrasse (Sundt and Jorstad, 1998) and corkwing wrasse (Knutsen *et al.* 2013) are genetically differentiated along the Norwegian coast, and between Atlantic and Scandinavian populations in ballan wrasse (D'Arcy *et al.* 2013) and corkwing (Robalo *et al.* 2011). A relatively long planktonic larval stage, 37-49 days in ballan (Ottesen *et al.* 2012) but only 25 days in corkwing and goldsinny (Darwall *et al.* 1992) may contribute to lowering genetic differentiation between adjacent areas (D'Arcy		

			et al. 2013). Water currents can vary in inshore waters and may be responsible for larval transportation along the coast (D'Arcy *et al.* 2013). However, Gonzalez *et al.* (2016) found habitat fragmentation from a long stretch of sand (26km) along the Norwegian coast is the cause of genetic differentiation between western and southern populations of corking. If wrasse populations are spatially fine structured, local populations experiencing high fishing intensity might be overfished. A PhD student at the University of Exeter is investigating the population structure of wrasse along the south coast of England using genetic techniques. **Ecology and habitat interactions:** ***Cleaning behaviour:*** Additionally, a reduction in cleaning behaviour from the removal of wrasse could have significant implications for parasite populations on other species of fish. Symbiotic cleaning behaviour has been recorded for the five species of wrasse, although not necessarily for both sexes or for all life stages (Costello, 1991). Wrasse cleaning behaviour seems to be instinctive, as wrasse that had never been exposed to salmon before were cleaning within minutes (Bjordal, 1988). Their signature swimming manner, which allows them to swim in any direction, may be recognised by host fish (Costello, 1991). Naylor (2005) noted rock cooks and goldsinny act as cleaner fish on the larger wrasse (i.e. Ballan wrasse) and will remove parasites from their flanks, sometimes in small groups. Certain locations, such as the boilers on a shallow-water wreck, act as 'cleaning stations' where this behaviour can regularly be observed (Naylor, 2005). Hilldan (1983) observed ballan wrasse enter goldsinny territory and adopt an invitation posture, before being cleaned by the resident goldsinny in Sweden. Hilldan (1983) found goldsinny were a facultative cleaner (diet not dependent on cleaning). Galeote and Otero (1998) found rock cook does not establish clear cleaning stations in Tarifa (Gibraltar Strait area) and they were facultative cleaners. Henriques and Almada (1997) watched rock cook, goldsinny and		

			corkwing wrasse cleaning behaviour at Arrabida, west coast of Portugal. Only rock cook was observed to clean and mostly cleaning corkwing and ballan wrasse. Rock cook were found to be a facultative cleaner, with only 7% of observed feeding acts from cleaning. Costello (1991) summarised the evidence of cleaning behaviour by wrasse in northern Europe. Corkwing, goldsinny and rock cook were observed (majority in aquariums) to clean ballan wrasse, plaice, black bream, mackerel, salmon, halibut, anglerfish and grey mullet (Costello, 1991). Henriques and Almada (1997) observed rock cook cleaning mullet, an ocean sunfish, six species of wrasse and four species of sea bream in Portugal. Observations of cleaning activity in the wild are difficult and attempts often disturb the activity (Hilldan, 1983). ***Habitat/ prey interactions:*** Wrasse are adapted for grazing hard animal growths on seaweeds and rocks, and eating shelled animals (crustaceans and molluscs) (Costello, 1991). The removal of a significant amount of wrasse populations could potentially impact their surrounding habitat. There could be a shift in community structure through loss of grazing small invertebrates. For instance, a negative impact may potentially be seen in kelp forests through an increase of epifaunal growth and/ or epifaunal grazing, as wrasse prey upon isopods, gastropods, amphipods and bryozoans (Norderhaug *et al.* 2005). Studies have been carried out in New Zealand exploring the relationship of wrasse predating on small invertebrate grazers living on brown seaweeds. Pérez-Matus and Shima (2010) used mesocosms to look at the interaction with the two Labridae, *Notolabrus celidotus* and *N. fucicola* and found they exerted positive indirect effects on the giant kelp, *Macrocystis pyrifera,* via the consumption or behavioural modification of amphipods. Newcombe and Taylor (2010) also used *N. celidotus* in mesocosms but containing three species of brown seaweed. They found predation on epifaunal species reduced epifaunal grazing on the seaweeds. In mesocosms without fish, seaweed		

			biomass was reduced (with increased damage). Additionally, in mesocosms with reduced epifaunal densities, seaweeds were larger but more heavily fouled than seaweeds with uncontrolled epifaunal densities (Newcombe and Taylor, 2010). These experimental results were not consistent with findings from field survey sites with varying fish density. Figueiredo *et al.* (2005) looked at the diet of ballan wrasse in relation to the predation of sea urchins in the Azores. Ballan wrasse were found to be important predators of sea urchins, and larger fish accounted for most of the predation on sea urchins. They concluded that a reduction in the abundance and mean size of fishes could result in a trophic cascade, with the proliferation of sea urchins, through a decrease in predation (Figueiredo *et al.* 2005). Algae forms part of the diet of all five wrasse species, but corkwing wrasse also utilise multiple algae species to make complex nests (Potts, 1985). Corkwing wrasse are highly selective of which species are used in the formation of the nests. One of the research projects being undertaken by a PhD student at the University of Exeter seeks to determine the degree of dietary overlap between species of wrasse, in order to assess whether there is a degree of functional redundancy between these species. ***Predation:*** The importance of wrasse as prey for predators is not known. However, wrasse are identified as prey for commercial species such as gadoids (Halvorsen *et al*. 2016a). They are known to be an important food source for marine birds such as shags and cormorants (Steven, 1933) and have been identified as prey for marine mammals such as the grey seal (Gosch *et al.* 2014). **<u>Non-target species:</u>** Repeated pot deployment may lead to changes in community structure. The selectivity of pots results in low by-catch of non-target species which are released back into the sea. Common		

			by-catch recorded in wrasse pots includes spiny starfish, rockling, sea scorpions, velvet swimming crabs and tompot blennies. Other species seen include conger eels, shrimp, brown crab, squat lobsters, common lobster, whelks, cushion starfish, dragonets, goby, blenny and juvenile gadoids (Pers observation). Benthic communities are thought to be relatively unaffected by static gear due to the footprint of the gear and the small area of the seabed in direct contact (Eno *et al*. 2001). However potential exists for epifauna to be damaged or detached and resistance to this varies with species (Roberts *et al*. 2010). For benthic sessile fauna, Eno *et al.* (2001) found some detachment of ascidians and sponges, and individual *P. fascialis* colonies were damaged by potting activity (Eno *et al.* 2001). See row above for more information on changes to abundance and community assemblage from potting.		

7. Conclusion

Potting activities are considered to be generally low impact when compared to demersal towed gear. However, there is potential for impact through gear dropping onto organisms on deployment; the movement of gear on the benthos due to tide, current, and storm activity; and as the gear is retrieved if dragged laterally when lifted. Benthic communities are thought to be relatively unaffected by static gear such as potting due to the footprint of the gear and the small area of the seabed in direct contact (Eno *et al.* 2001). Studies by Coleman et al. (2013) and Eno *et al.* (2001), both found epifaunal assemblages suffered little impact from pots and traps and could be considered generally insensitive to commercial potting. Walmsley *et al.* (2015) reviewed existing evidence and on-going studies to provide conclusions of whether potting could compromise the achievement of conservation objectives. The review concluded there was low to no sensitivity/impact on reef features from potting, and the wrasse pots used are lightweight, much lighter that pots used to target crustacea, and therefore may have less of an impact. Evidence suggests there are no adverse effects from the impacts of abrasion from potting, and at the current levels of activity in Plymouth Sound SAC the conservation objectives of the sub-features can be reached. A final summary of the evidence supporting this conclusion is detailed below, and an outline of the data collection and adaptive management commitments that will continue to support this conclusion is provided.

Wrasse stocks and their biology in the UK are poorly understood and whilst there has been some limited research in the past, currently no stock assessment exists. The removal of wrasse may affect their population and social structures. In the past wrasse have been treated as a single species by the fishery, however, they exhibit different life history strategies, requiring different management and monitoring measures (Skiftesvik *et al*. 2015). The impact of the wrasse fishery in Plymouth is largely unknown, and the need to collect data on the effort and the potential impacts is recognised. D&S IFCA has introduced management through permit conditions (see section 4) for the Live Wrasse Fishery, which include requirements under Paragraph 17 of the Potting Permit Byelaw for the fishers to submit relevant fisheries information as required by D&S IFCA. D&S IFCA Officers held a meeting with fishers and the salmon supply agent in March 2020 to reiterate the importance of submitting landings forms and allowing observers on board, in addition to providing sales notes that detail the numbers of wrasse sold on by the fishers. At this meeting, and in a follow-up letter dated 7th April 2020, D&S IFCA advised that if fishers do not provide this documentation they will be in breach of Paragraph 17 of the Potting Permit Byelaw, and made all fishers aware of their obligations to provide relevant data as requested and the implications of non-compliance with all Byelaw Conditions, which would be investigated and could result in prosecution. Data collection for 2020 onwards will be improved by increased compliance, and by observer surveys of Vessel 3, which has not previously received these surveys due to its small size. In 2019 D&S IFCA developed a method of observing this vessel and its catch using D&S IFCA's enforcement vessel. This will continue to allow observer surveys to be carried out for this vessel provided that sea state is reasonable. In addition, fishers have agreed to complete a sub-sample of the first 20 pots hauled on one day per week of fishing in order to complement the observer surveys and fishers' landings forms. These different data collection methods should increase the evidence provision of the IFCA and lead to greater compliance.

The fishery is highly restricted, being one of the most regulated and managed fisheries in the country. D&S IFCA has been carrying out on-board surveys to collect information about the fishery since 2017. The data collected were reviewed in annual reports produced in November 2017, November 2018 and February 2020. The Executive Summary from the most recent report (the Three Year Comprehensive Review of the Live Wrasse Fishery in D&S IFCA's District) report summarises the findings:

“A fishery for the live capture of wrasse for use as cleaner fish in Scottish salmon farms developed in the Devon and Severn Inshore Fisheries and Conservation Authority’s (D&S IFCA’s) District in 2015. Management was introduced in 2017 via the D&S IFCA Potting Permit Byelaw. These early management measures were largely based on best practice identified in the literature and included Minimum and Maximum Conservation References Sizes (CRSs), a closed season and a cap on effort. A fully documented fishery was also implemented and as such an intensive data collection programme has been conducted since 2017, consisting of on-board observer surveys and fishers’ landings forms. […]
Over the fishery as a whole, Landings Per Unit Effort (LPUE) and Catch Per Unit Effort (CPUE) have remained stable over the 2017–2019 period, indicating that the fishery as a whole is not overexploited and that the current management measures are an effective way to manage the fishery. However, the fishery-level measures of LPUE and CPUE mask other patterns at the species level, which need to be considered in more detail. LPUE and CPUE for ballan and goldsinny wrasse have remained stable through 2017–2019, while stable LPUE and increasing CPUE for corkwing suggests no detrimental effects of fishing on these species in the District. Both LPUE and CPUE have declined for rock cook, which is a cause for concern for this species, particularly as the fishery to date has been targeting the larger size classes. […]”

The report was presented to the D&S IFCA’s B&PSC and recommendations for management changes were proposed as outlined on page 10 of this assessment. D&S IFCA has consulted on changes to the permit conditions to prohibit the removal of rock cook from a fishery by all Potting Permit holders, including those prosecuting the Live Wrasse Fishery. This change to the conditions was confirmed at the B&PSC meeting on 18th June 2020. Through the 2020 consultation, concerns were raised regarding the sustainability of the fishery. D&S IFCA’s Officers have addressed these concerns in a paper submitted to the Byelaw and Permitting Sub-Committee; in the interests of transparency, this paper is included here as Annex 8. Triggers that would initiate a further review of management include: any increase in effort (number of boats), failure to meet permit conditions, failure to adhere to voluntary closed areas, on board surveys identify over half the proportion of the spawning season not protected, a significant decrease in CPUE or LPUE, and a shift in size distribution. Data from each year of the fishery (including 2020 and onwards) will continue to be reviewed at the end of each season, in order to inform management in a timely fashion.

D&S IFCA has been able to rapidly respond to evidence gathered from literature reviews, consultation and data from the Live Wrasse Fishery to apply adaptive management to prevent adverse effects of potting for Live Wrasse on attributes of EMS features. Specifically, the D&S IFCA B&PSC recommended the prohibition of removal of rock cook from a fishery by all Potting Permit holders, including those prosecuting the Live Wrasse Fishery; this measure is in addition to the initial management measures (2017), and the changes to management put in place in 2018 regarding the conservation reference sizes for corkwing and changes to the closed season, as outlined on page 9 of this assessment.

D&S IFCA is liaising with a PhD student at the University of Exeter who is studying the wrasse fishery. This assessment will also be reviewed should the PhD research present evidence that the fishery and it’s current management may be unsustainable.

8. In-combination Assessment

8.1 Other fishing activities

The following fishing activities are either occurring or have not been able to have been ruled out as occurring in the Plymouth Sound and Estuaries EMS.

Handworking – There are no records of this activity taking place commercially but it has not been able to be ruled out. Therefore no in-combination effect thought to be possible.

Crab tiling – Activity is occurring within Plymouth Sound and Estuaries EMS, and has been assessed by D&S IFCA. Crab tiling is not thought to occur on rock features, so no in-combination effect thought to be possible.

Digging with forks - Activity is occurring within Plymouth Sound and Estuaries EMS, though this activity is not thought to occur on rock features. Therefore, no in-combination effect thought to be possible.

Shrimp push nets - There are no records of this activity taking place but it has not been able to be ruled out. Therefore no in-combination effect thought to be possible.

Pots/ creels - Potting occurs on a low-medium level within Plymouth Sound and Estuaries SAC. Although potting for crustaceans occurs on similar habitats to wrasse pots (circalittoral and infralittoral rock), wrasse pots are not hauled in areas with a depth greater than 12m so predominantly target infralittoral rock. There are a maximum of 480 wrasse pots within D&S IFCA's District at any one time. With the existing level of crustacean pots and at the current level of the wrasse fishery, it is thought that no in-combination effects will lead to the conservation objectives not being met for the features assessed.

Cuttlepots – Activity not occurring, therefore no in-combination effect thought to be possible.

Commercial diving - Activity not believed to be occurring/ occurring at a very low level. Therefore, no in-combination effect thought to be possible.

Beach seine/ ring nets - There are no records of beach seine nets, but it has not been able to be ruled out. Therefore, no in-combination effect thought to be possible. Ring nets are occurring in Plymouth Sound with two Plymouth-based ring netters and sometimes visiting ring netters. Ring nets do not interact with the sub-features assessed, therefore, no in-combination effect thought to be possible.

Drift, gill, trammel & entangling nets - Drift netting occurring on a medium level, with several small dories drift netting for herring. Fixed nets (gill, trammel and entangling) are known to occur within and close to Plymouth Sound and Estuaries SAC. Static nets are rarely set directly on reef, therefore, no in-combination effect thought to be possible.

Purse seine - There are no records of this activity taking place, but it has not been able to be ruled out. Therefore, no in-combination effect thought to be possible.

Fyke and stakenets - There are no records of this activity taking place, but it has not been able to be ruled out. Therefore, no in-combination effect thought to be possible.

Longlines - Activity occurs at a very low level, with one long-liner operating around the mouth of the Tamar. Due to the low 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.

Handlines, Jigging and trolling - There are no records of these activities taking place commercially, but they have not been able to be ruled out. Therefore, no in-combination effect thought to be possible.

Therefore, in light of the above considerations, D&S IFCA concludes there is no likelihood of significant adverse effect on the interest features from in-combination effects with other fishing activities addressed within section 8.1.

8.2 Other Activities

Plymouth Sound and Estuaries EMS is a busy site, with other commercial ongoing plans/projects from different sectors where impacts could combine.

Currently there are proposed plans or projects in Plymouth Sound and Estuaries EMS which could theoretically interact with the sub-features addressed. These activities have been included following the informal advice from Natural England.

Description: Maintenance dredging within Western Mill Lake and North Yard at HMNB Devonport which is carried out twice yearly; the current marine license extends to 2028. Includes trailer suction hopper dredging carrying out the majority of maintenance and additional small-scale dredging techniques: plough, grab and submersible pump dredging. A maximum amount of 500,000m³ of silt and 50,000m³ of sand will be removed during the 10 year license period.

Pressures:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes – removal of substratum (extraction)
- Litter
- Organic enrichment
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
- Removal of target species
- Removal of non-target species
- Siltation rate changes, including smothering
- Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.
- Introduction of other substances (solid, liquid or gas)
- Introduction or spread of non-indigenous species
- Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.
- Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.

In-combination assessment: 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.

Description: Previously, D&S IFCA have granted dispensation for annual Marine Biological Association (MBA) scientific survey work on research vessel Sepia within the EMS to fish for scientific purposes. Activity involving 4m beam trawl in West Mud (Tamar) and Yealm Mouth, demersal otter trawl in Bigbury bay, and rectangle dredge in New Ground (Plymouth Sound), Mewstone and Stoke Point. This dispensation is currently under review for interactions with all sensitive features, and will require thorough assessments before being granted or declined.

Pressures:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Litter
- Organic enrichment
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
- Removal of target species
- Removal of non-target species
- Siltation rate changes, including smothering

- Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.
- Introduction of other substances (solid, liquid or gas)
- Introduction or spread of non-indigenous species
- Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.
- Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.

In-combination assessment: An HRA and MCZ assessment is currently being undertaken in order to establish any individual or in-combination effects. It is unlikely that in-combination effects will lead to the conservation objective's not being met for the features assessed.

Other: The impact of future plans or projects will require assessment in their own right, including accounting for any in-combination effects, alongside existing activities.

D&S IFCA concludes there is no likelihood of significant adverse effect on the interest features from in-combination effects with other plans or projects addressed within section 8.2.

9. Summary of consultation with Natural England

The original assessment (version 1) was formally signed off by Natural England on 03/05/2016. The activities (cuttlepots and fishtraps) were not believed to be occurring at that time. A reassessment for fishtraps was sent for informal advice to Natural England in April 2017 (version 2) after new information revealed an emergent Live Wrasse Pot Fishery. Version 3 contained amendments from the informal advice received from Natural England (which is inserted in Annex 2), and updated management measures. This version (version 4) accounts for the changes that have occurred in the two years since version 3, including the completion of the Comprehensive Review of the Live Wrasse Fishery and changes in management of the fishery implemented over time. Cuttlepots have been assessed in a separate HRA.

10. Integrity Test

It can be concluded that the activities assessed in this HRA, fish traps, alone or in-combination, do not adversely affect the assessed sub-features of the Plymouth Sound and Estuaries SAC and that future activity, at the levels anticipated, will not foreseeably have an adverse effect on these sub-features of the site. Due to the D&S IFCA's Potting Permit Byelaw the number of potters in the District can be monitored. The permitting system allows for adaptive management and changes have been made to the permit conditions, via a consultation.

Annex 1: Reference list

Almada, F., Casas, L., Francisco, S.M., Villegas-Rios, D., Saborido-Rey, F., Irigoien, X., and Robalo, J.I. (2016) On the absence of genetic differentiation between morphotypes of the ballan wrasse *Labrus bergylta* (Labridae). Marine Biology: 163, 86

Babcock, R.C., Shearsm N.T., Alcala, A.C., Barrett, N.S., Edgar, G.J., Lafferty, K.D., McClanahan, T.R., and Russ G.R. (2010) Decadal trends in marine reserves reveals differential rates of change in direct and indirect effects. Proceedings of the National Academy of Sciences of the United States of America, 107(43): 18256-18261.

Bjordal, A. (1988) Cleaning symbiosis between wrasses (Labridae) and lice infested salmon (*Salmo salar*) in mariculture. International Council for the Exploration of the Sea (ICES) F:17.

Bullimore, B.A., Newman, P.B., Kaiser, M.J., Gilbert, S.E., and Lock, K.M. (2001) A study of catches in a fleet of “ghost-fishing” pots. Fisheries Bulletin, 99(2): 247-253.

Clark, S (2008) South Devon potting effort survey. Devon Sea Fisheries Committee Research Report 200802

Coleman, R.A., Hoskin, M.G., von Carlshausen, E. and Davis, C.M. (2013) Using a no-take zone to assess the impacts of fishing: sessile epifauna appear insensitive to environmental disturbances from commercial potting. Journal of Experimental Marine Biology and Ecology. 440: 100-107.

Costello, M.J., Darwall, W.R., and Lysaght, S. (1995) Activity patterns of North European wrasse (Pisces, Labridae) species and precision of diver survey techniques. Biology and Ecology of Shallow Coastal Waters; 28th European Marine Biology Symposium, 343-350.

Costello, M.J. (1991) Review of the biology of wrasse (Labridae: Pisces) in Northern Europe. Process in Underwater Science, 16: 29-51.

D’Arcy, J., Mirimin, L., and FitzGerald, R. (2013) Phylogeographic structure of a protogynous hermaphrodite species, the ballan wrasse *Labrus bergylta*, in Ireland, Scotland, and Norway, using mitochondrial DNA sequence data. ICES Journal of Marine Science: 70, 685–693.

Darwall, W.R.T., Costello, M.J., Donnelly, R., Lysaght, S. (1992) Implications of light-history strategies for a new wrasse fishery. Journal of Fish Biology: 41, 111-123.

Deady, S., Varian, S., and Fives, J.M. (1993) The impact of a new fishery on wrasse populations in a small bay in the west of Ireland. International Council for the Exploration of the Sea. 81st Statutory Meeting: Dublin, Ireland.

English Nature (2000) PLYMOUTH SOUND AND ESTUARIES: European Marine Site. English Nature’s advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

Eno, N.C., MacDonald, D.S., Kinnear, J.A.M., Amos, C.S., Chapman, C.J., Clark, R.A., Bunker, F.St.P.D., and Munro, C. (2011) Effects of crustacean traps on benthic fauna. ICES Journal of Marine Science, 58: 11-20.

Figueiredo, M., Morato, T., Barreiros, J.P., Afonso, P., and Santos, R.S. (2005) Feeding ecology of the white seabream, *Diplodus sargus*, and the ballan wrasse, *Labrus bergylta*, in the Azores. Fisheries Research: 75, 107-119.

Galeote, M.D., and Otero, J.G. (1998) Cleaning behaviour of rock cook *Centrolabrus exoletus* (Labridae), in Tarifa (Gibraltar Strait Area). Cybium: 22(1), 57-68.

Gonzalez, E.B., Knutsen, H. and Jorde, P.E. (2016) Habitat discontinuities separate genetically divergent populations of a rocky shore marine fish. PLoS ONE 11(10): e0163052. doi:10.1371/journal.pone.0163052

Gosch, M., Hernandez-Milian, G., Rogan, E., Jessopp, M. and Cronin, M. (2014) Grey seal diet analysis in Ireland highlights the importance of using multiple diagnostic features. Journal of Aquatic Biology: 20, 155-167.

Gray, K (2015) Fishing Activities Currently Occurring in the Plymouth Sound and Estuaries European Marine Site (SAC and SPA), Devon and Severn IFCA Report

Halvorsen, K.T. (2016a) Selective harvesting and life history variability of corkwing and goldsinny wrasse in Norway: Implications for management and conservation. PhD Thesis, University of Oslo.

Halvorsen, K.T., Sørdalen, T.K., Durif, C., Knutsen, H., Olsen, E.M., Skiftesvik, A.B., Rustand, T.E., Bjelland, R.M., and Vøllestad, L.A. (2016b) Male-biased sexual size dimorphism in the nest building corkwing wrasse (Symphodus melops): implications for a size regulated fishery. ICES Journal of Marine Science, doi:10.1093/icesjms/fsw135

Halvorsen, K.T., Sørdalen, T.K., Vøllestad, L.A., Skiftesvik, A.B., Espeland, S.H. and Olsen, E.M. (2016c) Sex- and size-selective harvesting of corkwing wrasse (*Symphodus melops*) – a cleaner fish used in salmonid aquaculture. ICES Journal of Marine Science, doi:10.1093/icesjms/fsw221

Henriques, M. and Almada, V.C. (1997) Relative importance of cleaning behaviour in *Centrolabrus exoletus* and other wrasse at Arrábida, Portugal. Journal of the Marine Biological Association of the United Kingdom: 77, 891-898.

Hillden, N. (1983) Cleaning behaviour of the goldsinny (Pisces, Labridae) in Swedish waters. Behavioural Processes: 8, 87-90.

Hillden, N. (1981) Territoriality and reproductive behaviour in the goldsinny, *Ctenolabrus rupestris* L. Behavioural Processes: 6, 207-221.

Hoskin, M.G., Coleman, R.A., Carlshausen, E., Davis, C.M. (2011) Variable population response by large decapod crustaceans to the establishment of a temperate marine no-take zone. Canadian Journal of Fisheries and Aquatic Science, 68: 185-200.

Knutsen H, Jorde PE, Gonzalez EB, Robalo J, Albretsen J, et al. (2013) Climate Change and Genetic Structure of Leading Edge and Rear End Populations in a Northwards Shifting Marine Fish Species, the Corkwing Wrasse (Symphodus melops). PLoS ONE 8(6): e67492. doi:10.1371/journal.pone.0067492

MAGIC (2015) Multi-Agency Geographic Information for the Countryside interactive map http://magic.defra.gov.uk/magicmap.aspx?startTopic=magicall&chosenLayers=sacIndex&sggridref=SX472506&startscale=500000

Natural England (2015a) Marine conservation advice for Special Area of Conservation: Plymouth Sound and Estuaries (UK0013111)

Natural England (2015b) Marine conservation advice for Special Protection Area: Tamar Estuaries Complex (UK9010141)

Naylor, P. (2005). Great British marine animals. Second edition. Sound Diving Publications.

Newcombe, E.M. and Taylor, R.B. (2010) Trophic cascade in a seaweed-epifauna-fish food chain. Marine Ecology Progress Series: 408, 161-167.

Norderhaug, K.M., Christie, H., Fosså, J.H., and Fredriksen, S. (2005) Fish – macrofauna interactions in a kelp (*Laminaria hyperborea*) forest. Journal of the Marine Biological Association: 85, 1279-1286.

Ottesen, O.H., Dunaevskaya, E., and D'Arcy, J. (2012) Development of *Labrus bergylta* (Ascanius 1767) larvae from hatching to metamorphosis. Journal of Aquaculture Research and Development: 3, 1-4.

Pérez-Matus, A. and Shima, J.S. (2010) Density- and trait-mediated effects of fish predators on amphipod grazers: potential indirect benefits for the giant kelp *Macrocystis pyrifera*. Marine Ecology Progress Series: 417, 151-158.

Potts, G.W. (1974) The colouration and its behavioural significance in the corkwing wrasse, *Crenilabrus melops*. Journal of the Marine Biological Association: 54, 925-938.

Potts, G.W. (1985) The nest structure of the corkwing wrasse, *Crenilabrus melops* (Labridae: Teleostei). Journal of the Marine Biological Association: 65, 531-546.

Quintela, M., Danielsen, E.A., Lopez, L., Barreiro, R., Svasand, T., Knutsen, H., Skiftesvik, A.B., and Glover, K.A. (2016) Is the ballan wrasse (*Labrus bergylta*) two species? Genetic analysis reveals within-species divergence associated with plain and spotted morphotype frequencies. Integrative Zoology: 11, 162-172.

Robalo, J.I., Castilho, R., Francisco, S.M., Almada, F., Knutsen, H., Jorde, P.E., Pereira, A.M., and Almada, V.C. (2011) Northern refugia and recent expansion in the North Sea: the case of the wrasse *Symphodus melops* (Linnaeus, 1758). Ecology and Evolution: 2(1), 153-164.

Roberts, C., Smith, C., Tillin, H. Tyler-Walters, H. (2010) Review of existing approaches to evaluate marine habitat vulnerability to commercial fishing activities. November 2010.

Skiftesvik, A.B., Durif, C.M.F., Bjelland, R.M., Browman, H.I. (2015) Distribution and habitat preferences of five species of wrasse (Family Labridae) in a Norwegian fjord. ICES Journal of Marine Science: 72, 890-899.

Skiftesvik, A.B., Blom, G., Agnalt, A., Durif, C.M.F., Browman, H.I.,Bjelland, R.M., Harkestad, L.S., Farestveit, E., Paulsen, O.I., Fauske, M., Havelin, T., Johnsen, K., Mortensen, S. (2014) Wrasse (Labridea) as cleaner fish in salmonid aquaculture – the Hardanferfjord as a case study. Marine Biology Research: 10, 289-300.

Steven, G.A. (1933) The food consumed by shags and cormorants around the shores of Cornwall (England). Journal of the Marine Biological Association of the United Kingdom: 19, 277-292.

Sundt, R. C., and Jorstad, K.E. (1998) Genetic population structure of goldsinny wrasse *Ctenolabrus rupestris* (L.), in Norway: implications for future management of parasite cleaners in the salmon farming industry. Fisheries Management and Ecology: 5, 291-302.

Villegas-Rios, D., Alonso-Fernandez, A., Fabeiro, M., Banon, R., and Saborido-Rey, F. (2013a) Demographic variation between colour patterns in a temperate protogynous hermaphrodite, the ballan wrasse *Labrus bergylta*. PLoS ONE 8(8): e71591.

Villegas-Rios, D., Alos, J., March, D., Palmer, M., Mucientes, G., and Saborido-Rey, F. (2013b) Home range and diel behaviour of the ballan wrasse, *Labrus bergylta*, determined by acoustic telemetry. Journal of Sea Research: 80, 61-71.

Walmsley, S.F., Bowles, A., Eno, N.C., West. N. (2015) Evidence for Management of Potting Impacts on Designated Features. Final Report. MMO1086.

Annex 2: Natural England's Consultation Advice

NE Informal advice Plym SAC Rock vs fish

NE response to DS IFCA HRA for Plymout

Annex 3: Site Map

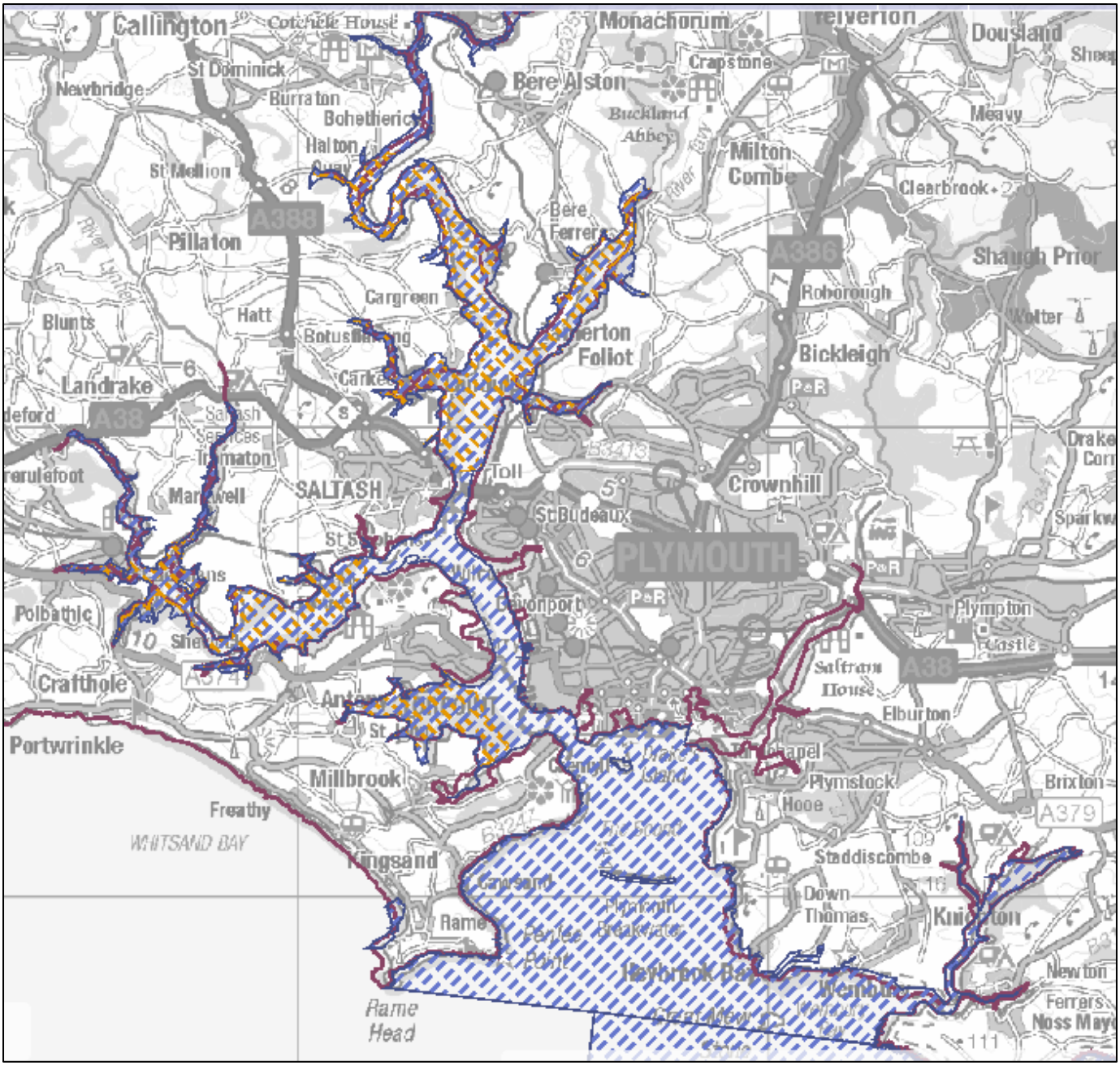

Figure 1 - Area of SAC (blue hatched) and SPA (Orange hatched) (MAGIC, 2015)

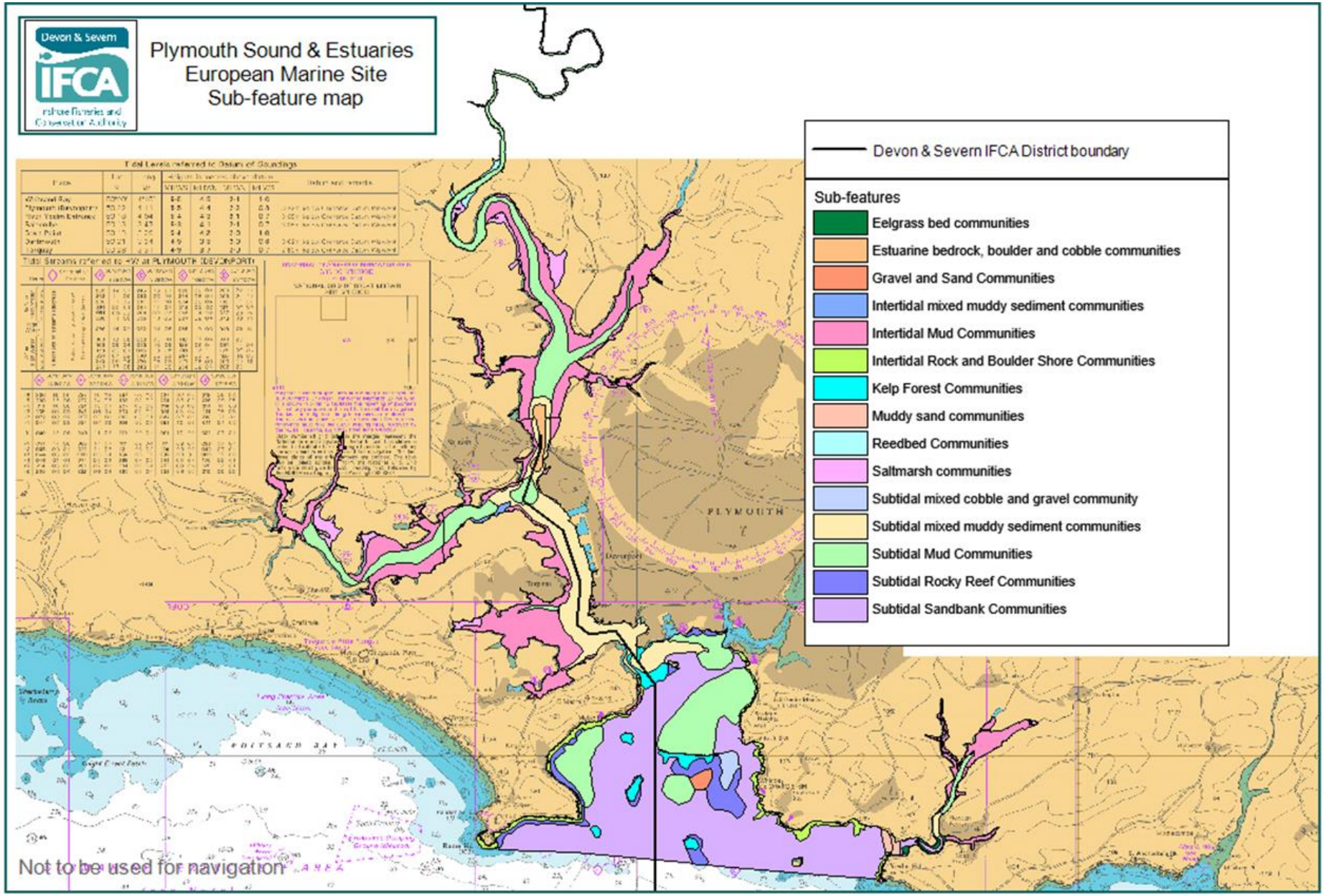

Figure 2 - Plymouth Sound & Estuaries EMS sub-features

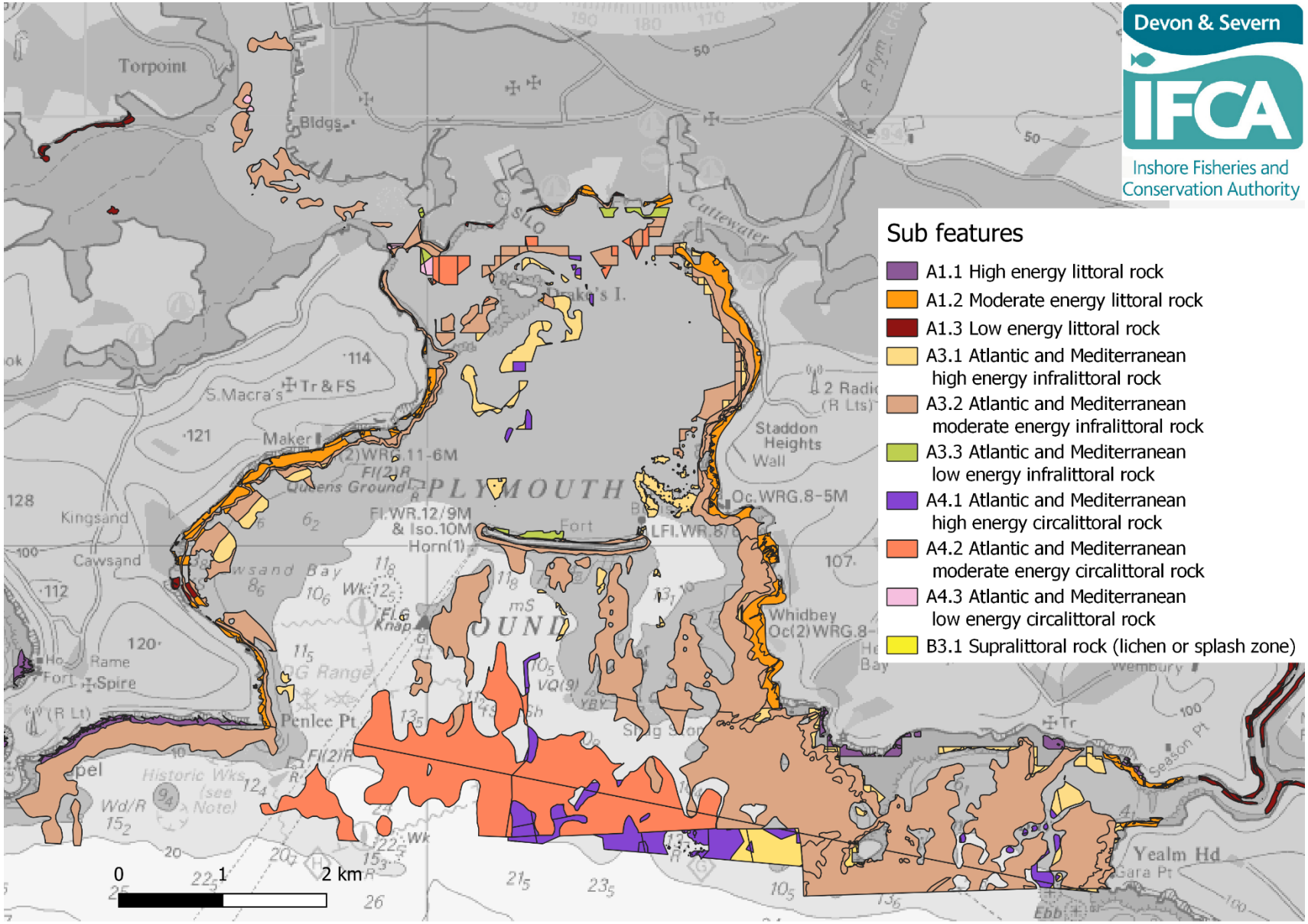

Figure 3: Plymouth Sound and Estuaries rock sub features

Annex 4: Fishing activity maps

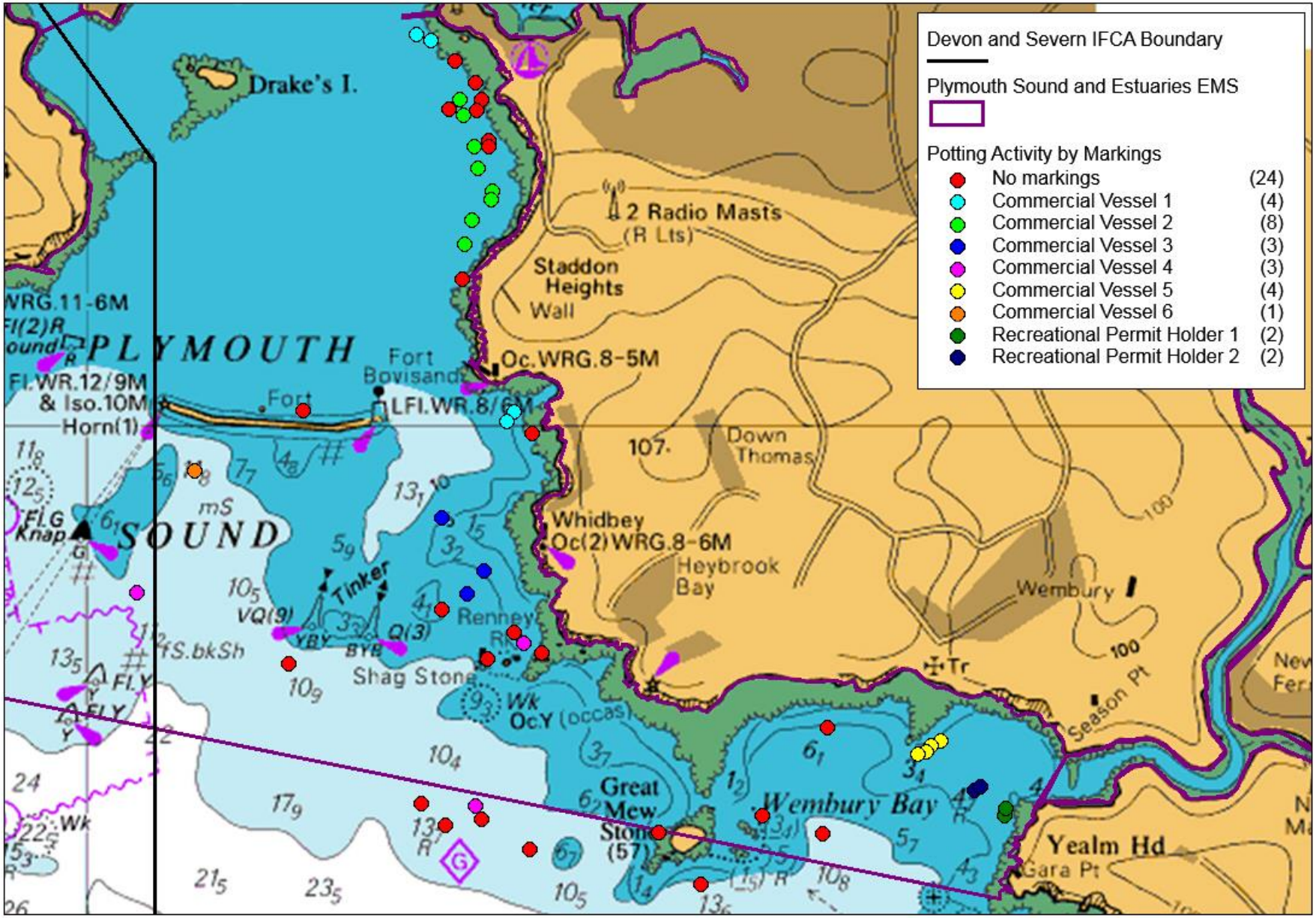

Figure 1 - Potting activity (markings on buoys) recorded within and near Plymouth Sound and Estuaries EMS in May 2016.

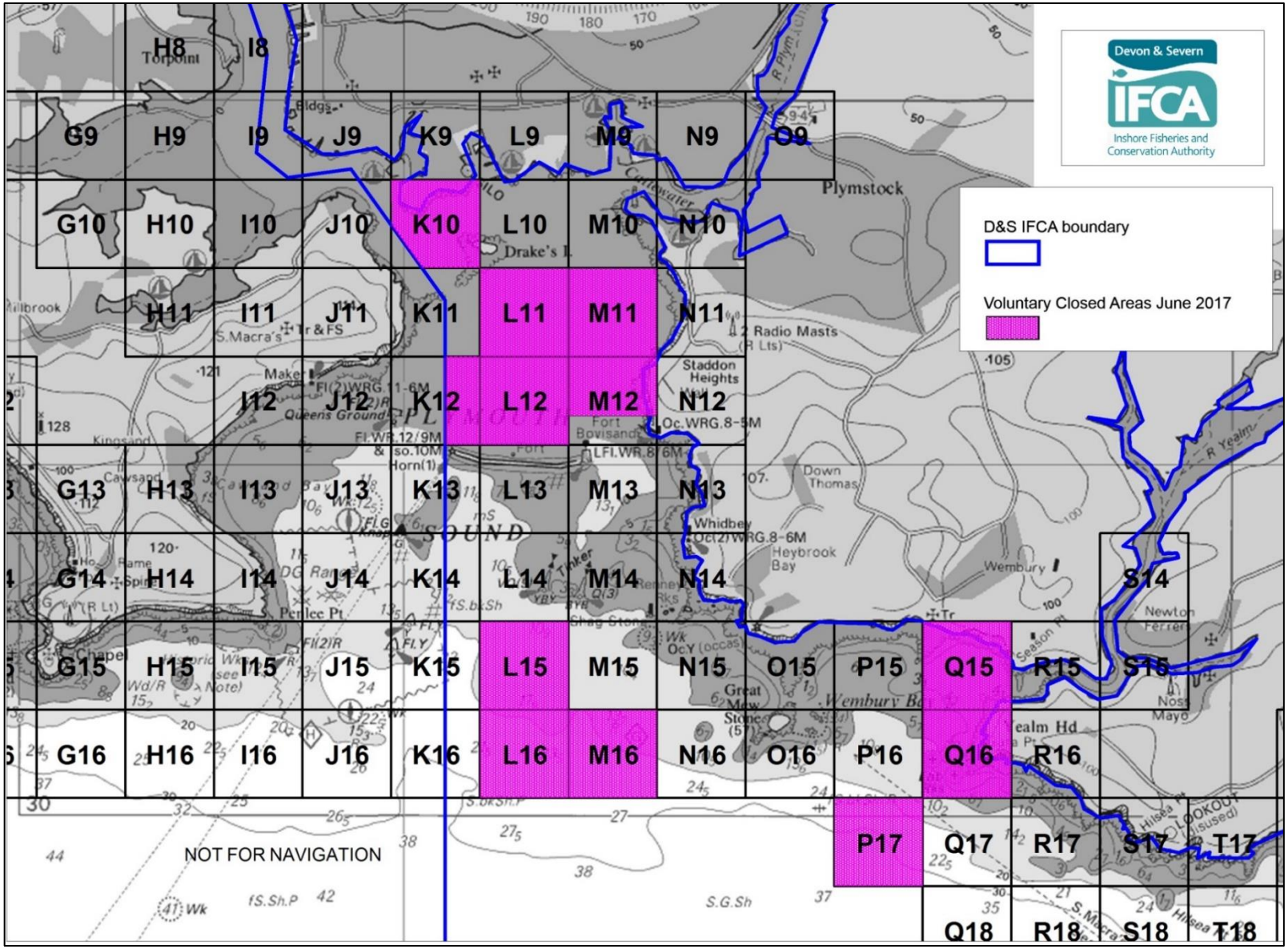

Figure 2 - Voluntary closed areas to the Live Wrasse Fishery (implemented end of June 2017). The eastern extent of the fishery is the same as that presented in Figure 3, below.

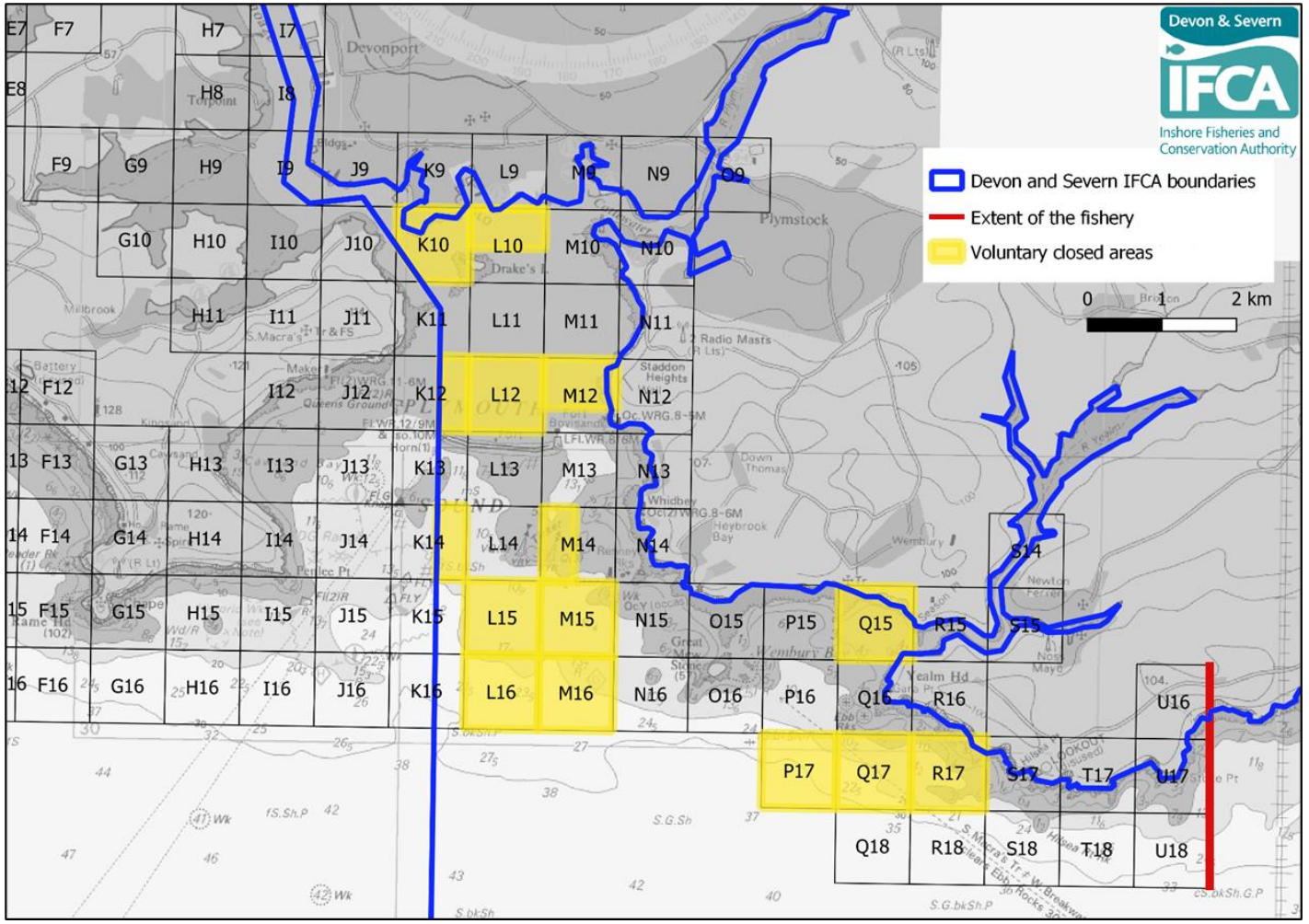

Figure 3 - Voluntary closed areas to the Live Wrasse Fishery (implemented 2018, superseding previous closed areas)

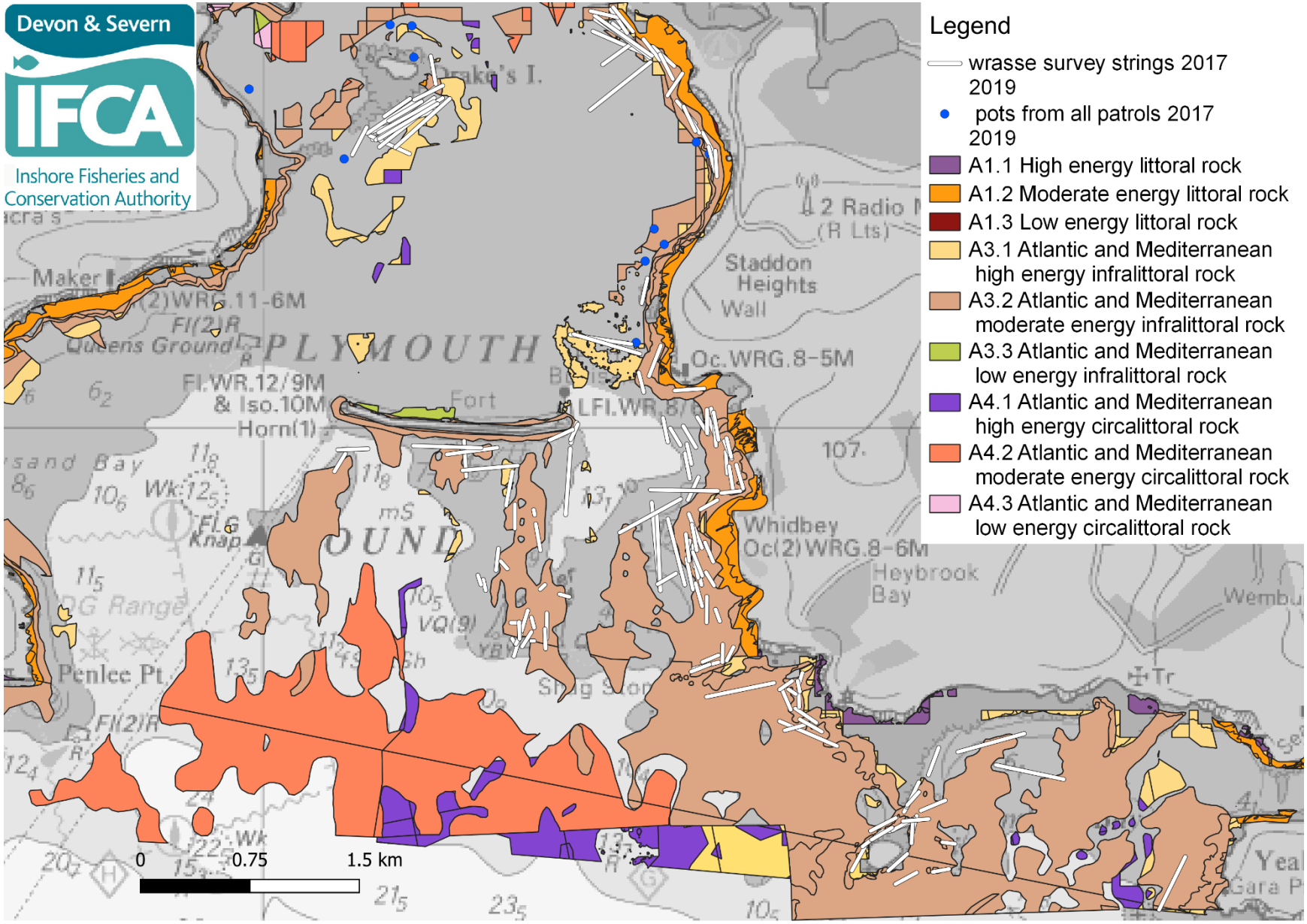

Figure 4 – Strings of wrasse pots surveyed during on board wrasse surveys during 2017–2019, and pots of all types noted on potting patrols during 2017–2019, superimposed on rock sub-features of Plymouth Sound and Estuaries SAC.

Annex 5: Mobile Fishing Permit Byelaw map

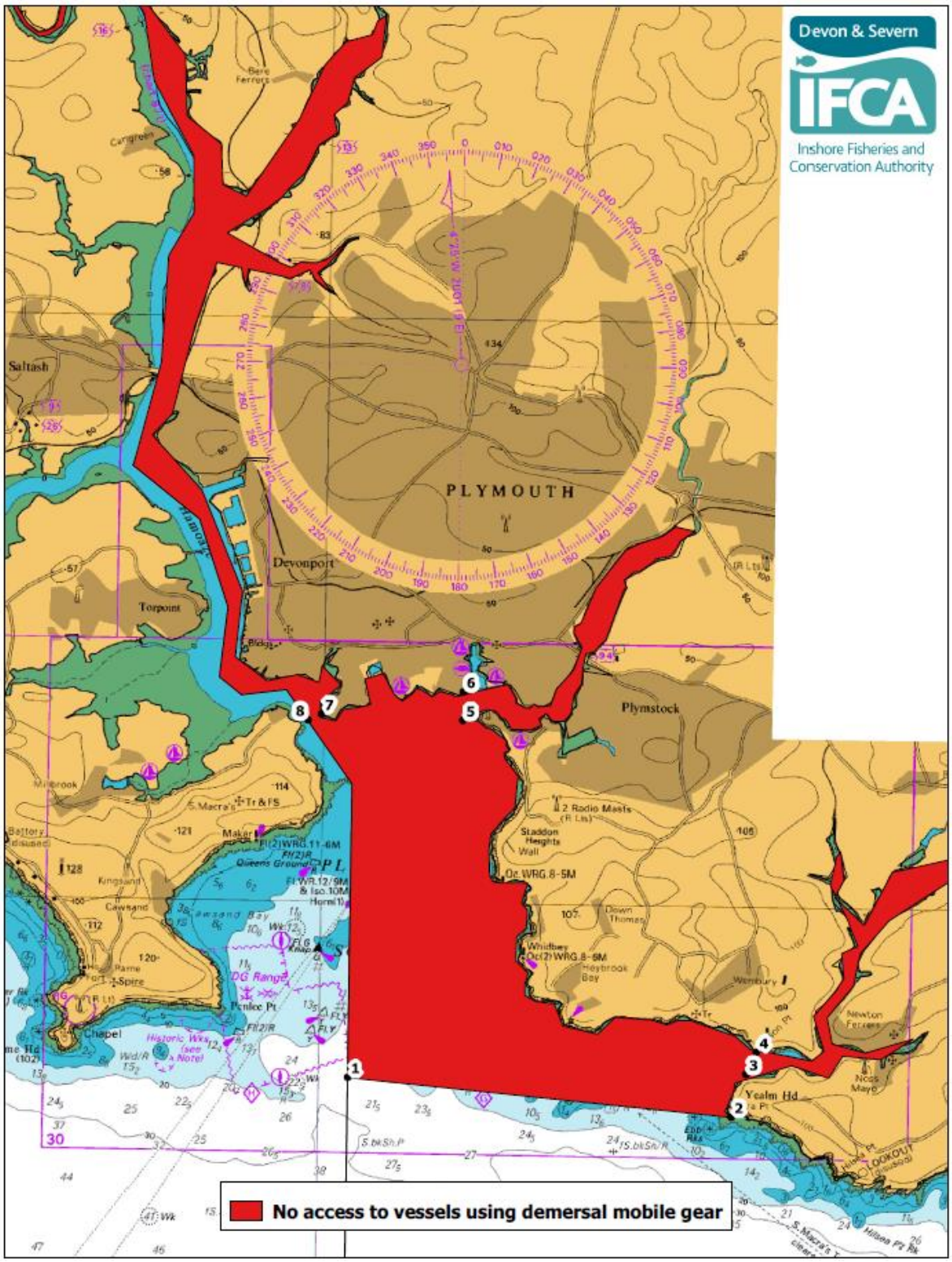

Figure 1. There is no access to demersal mobile gear within the areas of Plymouth Sound and Estuaries shown by the red bounding polygon. Coordinates of this area, marked by numbers in white circles, are given below.

Latitude and Longitude positions marked on Figure 1 (Annex 5) above:

Point Number	Latitude	Longitude

1	50°	18.484’	N	004°	09.600’	W
2	50°	18.192’	N	004°	04.458’	W

Landward boundary follows mean high water to Yealm Estuary Closing Line

Point number	Latitude			Longitude		
3	50°	18.560’	N	004°	4.268’	W
4	50°	18.749’	N	004°	4.133’	W

Landward boundary follows mean high water to Plym Estuary Closing Line

Point number	Latitude			Longitude		
5	50°	21.556’	N	004°	8.130’	W
6	50°	21.801’	N	004°	8.130’	W

Landward boundary follows mean high water to Tamar Estuary Closing Line

Point number	Latitude			Longitude		
7	50°	21.592’	N	004°	10.026’	W
8	50°	21.540’	N	004°	10.206’	W

Point 8 returning to point 1 is the Western District boundary.

Annex 6: Pressures Audit Trail

Traps Pressure(s)	Sub-feature		Screening Justification
	Infralittoral rock	Circalittoral rock	
Abrasion/disturbance of the substrate on the surface of the seabed	**S**	**S**	**IN** – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Genetic modification & translocation of indigenous species	**IE**	**IE**	**OUT** – the fleet operates in local area only so risk considered extremely low
Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	**NS**	**IE**	**OUT** - Insufficient activity levels to pose risk of large scale pollution event
Introduction of other substances (solid, liquid or gas)	**IE**	**IE**	**OUT** - Insufficient activity levels to pose risk of large scale pollution event
Introduction or spread of non-indigenous species	**S**	**S**	**OUT** - Fleet operates in local area only so risk considered extremely low
Litter	**IE**	**IE**	**OUT** - Insufficient activity levels to pose significant risk of concern
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	**S**	**S**	**OUT** – Penetration of the substrate from anchoring when potting, occurs on such an infrequent basis that the impact would be minimal.
Removal of target species	**Revised pressure – no sensitivity currently available**		**IN** – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species	**S**	**S**	**IN** – Mortality from very low incidental by-catch
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	**NS**	**IE**	**OUT** - Insufficient activity levels to pose risk of large scale pollution event
Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	**NS**	**IE**	**OUT** - Insufficient activity levels to pose risk of large scale pollution event

Annex 7: Three Year Comprehensive Review of the Live Wrasse Fishery in Devon and Severn IFCA's District

Curtin, Henly and Stewart (2020). Three

Annex 8: Paper provided to D&S IFCA's Byelaw and Permitting Sub-Committee, addressing concerns raised in the 2020 consultation on Amendments to the Permit Conditions to Manage the Live Wrasse Pot Fishery

1. Introduction

This officer paper has been prepared for members of the Devon and Severn Inshore Fisheries and Conservation Authority's (D&S IFCA's) Byelaw and Permitting Sub-Committee (B&PSC) and for all stakeholders to examine via its publication on the D&S IFCA website.

The Formal Consultation – Amendments to the Permit Conditions to manage the Live Wrasse Pot Fishery consultation response has been set out in a separate report and provides the backdrop for the resolutions set out in this paper. The task for the B&PSC is to consider both documents prior to voting.

2. Overview

The proposals developed for the formal consultation were relatively simple with the main focus being a proposed change in the Potting Permit Conditions to add rock cook wrasse to an established list of species that (as set out in the Potting Permit Conditions) are prohibited for removal from a fishery within D&S IFCA's District.

The consultation response was low in terms of numbers, but significant regarding the general theme of the response. Although responses contained differing levels of detail and reasoning for the views taken, the general theme was that there is support for the proposals, but not support for the continuation of the Live Wrasse Pot Fishery.

It was clear from the response provided by Devon Wildlife Trust (DWT) that the Three-Year Comprehensive Review of the Live Wrasse in Devon and Severn IFCA's District Report had been studied in depth. The detailed response that was provided to D&S IFCA challenged different aspects of the evidence base used for decision making and the position taken by D&S IFCA to continue with the management of the Live Wrasse Pot Fishery.

3. Officers' Analysis

On receipt of Devon Wildlife Trust (DWT) response to the formal consultation, D&S IFCA officers have considered the points that have been raised and have set out information in this report to provide clarification on the specific points. In doing so, the officers' analysis also recognises the underlying concerns highlighted in other responses submitted during the formal consultation.

3.1 Precautionary Principle

DWT cites D&S IFCA's statement that it may "be difficult to identify unsustainable fishing practices underlying apparently stable CPUE patterns" due to a phenomena referred to as hyperstability, and DWT letter suggests that this uncertainty is indicative of a need for a moratorium on this fishery, on the basis of the Precautionary Principle. D&S IFCA refers to this hypothetical situation regarding hyperstability occurring in Plymouth Sound in recognition of the fact that there may be underlying processes which are not possible to detect or measure; such processes occur in most fisheries and management scenarios but are not in themselves immediate cause for concern. D&S IFCA's report on the Three Year Comprehensive Review states that hyperstability appears to be unlikely due to relative consistency in the areas fished between years, with the added caveat that it is possible that the 1 km grid square resolution at which fishing effort is quantified may be too coarse to detect fine scale changes that may contribute to hyperstability. The report explains that there are also other drivers which may influence wrasse abundance (and therefore catch and/or landings per unit effort). D&S IFCA recognises that whilst it will never be possible to have perfect knowledge of the dynamics

underlying this or any other fishery, D&S IFCA has collaborated with a PhD student at the University of Exeter who is undertaking fine scale analyses of the wrasse fisheries along the south coast of the UK. This researcher is independently investigating a range of relevant topics, from drivers of catch and landings per unit effort, to the population genetics of wrasse and their relative ecological niches. Findings from these studies may be directly relevant to the management measures used by D&S IFCA, and its permit-based management system remains adaptive and agile enough to respond to new evidence as and when it becomes available.

D&S IFCA relies on evidence-based decision making for marine management, which is underpinned by sound evidence, monitoring and evaluation. In pursuing this approach, D&S IFCA must seek to ensure that our decisions can be justified objectively and take account of all relevant environmental, social and economic matters. In reaching decisions based on the best available evidence, D&S IFCA must take a risk-based approach that allows for uncertainty and that is in line with sustainable development policy, including consistent application of the Precautionary Principle while seeking to balance its statutory duties as set out within the Marine and Coastal Access Act 2009. . It is in this context that D&S IFCA has already introduced management measures and is proposing changes in management which are appropriate. A thorough literature review was undertaken, and the initial management measures introduced in 2017 were based on best evidence and practice from the literature. Some of these initial measures have now been amended through D&S IFCA's permit-based approach to the fishery, which allows for rapid changes to management in response to analysis of all data collected. In the past, D&S IFCA's adaptive management measures have included changes to the minimum and maximum conservation reference sizes and the closed season.

3.2 Non-Compliance

D&S IFCA is aware of the repeated non-compliance associated particularly with Vessel 3, which DWT highlights as contributing 38% of landings in 2019. Enforcement action against the offending vessel took place in 2019. The vessel owner was prosecuted on three breaches of Live Wrasse permit conditions. These offences, which included not marking his fishing gear correctly and two instances of not having tags on his pots were heard in the Magistrates' court in August and September 2019 and fines of £2,532 were issued.

D&S IFCA Officers held a meeting with fishers and the salmon supply agent in March 2020 to reiterate the importance of submitting landings forms and allowing observers on board, in addition to providing the sales notes. At this meeting, and in a follow-up letter dated 7th April 2020, D&S IFCA advised that if fishers do not provide this documentation they will be in breach of Paragraph 17 of the Potting Permit Byelaw and made all fishers aware of their obligations to provide relevant data as requested and the implications of non-compliance, which would be investigated and could result in prosecution. DWT points out that Vessel 3 did not receive observer surveys due to the small size of the vessel. In 2019 D&S IFCA developed a method of observing this vessel and its catch using our enforcement vessel. This will continue to allow observer surveys to be carried on this vessel in 2020, provided that sea state is reasonable. In addition, fishers have agreed to complete a sub-sample of the first 20 pots hauled on one day per week of fishing in order to complement the observer surveys and fishers' landings forms. These different data collection methods should increase the evidence provision of the IFCA and lead to greater compliance. However, DWT suggests alternative methods of monitoring vessels' activity and compliance, through IVMS or chest cameras. Whilst these are reasonable suggestions, they will not provide D&S IFCA accurate catch and landings data nor detail of size distributions of the different species.

3.3 Lack of Data

D&S IFCA Officers have managed a considerable monitoring effort for this fishery in the D&S IFCA's District, and have collected data which have, through robust statistical treatment, provided a more thorough understanding of the wrasse fishery in the District.

It remains a concern that Vessel 3 has a history of non-compliance regarding landings forms, and that this vessel has not been adequately monitoring via on-board surveys. It has been outlined above how this is to be addressed for 2020, and that failure to comply with the obligation to provide the requested data would be investigated and could result in prosecution.

DWT describes the discrepancies between the transport data provided to the MMO and the data provided via landings forms to D&S IFCA. D&S IFCA highlights this in the report, and the fact that there are several sources of this variability: i) the transport data provided to the MMO include those wrasse caught and landed from the Cornwall IFCA side of Plymouth Sound (these data are not included in landings forms provided to D&S IFCA), ii) the sales information from the MMO only provides data to October 2019, whereas fishers were fishing and providing landings forms until early December, iii) the landings data do not include data from Vessel 3.

The Three-Year Comprehensive Review does not include data from CIFCA's District because (i) D&S IFCA's management can apply only to the D&S IFCA's District and (ii) the data available to D&S IFCA from CIFCA's District are variable between years and may therefore provide spurious inter-annual comparisons. Therefore, whilst D&S IFCA is supportive of an ecosystem-based approach to monitoring and management, it was determined that the Three-Year Review would be of most use to the Authority if it contained the most robust data and comparisons that were available for the D&S IFCA's District.

The coverage of observer surveys reduced in 2019 due to an issue with D&S IFCA's insurance. This meant that no onboard observer surveys could be conducted at the start of the year prior to the closed season. However, surveys commenced after the 15th July 2019 when the fishery re-opened. Two surveys a week are rostered for this specific fishery, but this is subject to officer availability, weather and vessel availability. The D&S IFCA's Environment Team that carry out the on-board observer surveys consists of two full-time and two part-time officers, who also have substantial commitments to additional survey work during the same time of year, including multiple intertidal shellfish surveys, as well as many other workstreams, which are detailed in the D&S IFCA's Annual Plan. Limited resource was recognised by the B&PSC in February 2020 and although continuation of the on-board survey program was recommended, it would be done so having regard to the resources available.

3.4 Returns Mortality and Related Effectiveness of CRS

While D&S IFCA acknowledges that the mortality of fish caught and returned to the sea is unknown, D&S IFCA states in the report that "it appears unlikely that simple catch and release would be associated with high mortality". This inference is based on the best available evidence – the transport documents indicate that, of the 18,120 wrasse supplied in 2019, 108 were dead on arrival. This indicates a survival rate of 99.4% between holding pens and their final destination in Scotland after a long road journey and is based on a sample size larger than any study of catch and release mortality of which D&S IFCA is aware. In addition, anecdotal reports suggest low mortality of fish retained in holding pens between capture and transport. Fishers in the District are aware of the potential for the process of fishing to induce barotrauma if fish are brought up from depth too quickly and undertake their pot hauling in such a way to avoid this.

DWT suggests that grid cells O15 and O16 should be closed to protect rock cook. However, it is important to note that catch composition per grid square has varied substantially over the last three years, as can be seen in Figures 25, 29 and 30 in the report. This highlights a degree of uncertainty in the relative space use of specific species, which would undermine the specification of closed areas on this basis. In addition, D&S IFCA must seek to be proportionate in the management response, and take into account all environmental, social and economic impacts. These include, for example, the landings and income of vessels 2 and 6, which focus a large proportion of their effort in, and likely achieve a high proportion of their income from, these areas. Under D&S IFCA's proposed change in management to prohibit the removal of rock cook from the fishery this will negate the need to close grid cells to protect rock cook.

Whilst the Three-Year Comprehensive Review report drafted some recommendations for future management, it is not always possible for these to be implemented. For example, it is unlikely to be possible to encourage a short period of retention of non-landable fish on-board the vessel to allow for recovery of swim bladder function in affected fish, prior to returning them to the sea. This activity would be in contravention of the current byelaw conditions which prohibit retention of fish of certain size classes or species. A contradictory code of conduct would make the byelaw conditions impossible to adequately enforce.

The Potting Permit Conditions are structured in such a way to enable effective enforcement action. The provision that requires the immediate return of prohibited species that cannot be removed from a fishery provides the required clarity for both fishers and enforcement officers. Attempts to amend permit wording to allow short term retention on board, rather than immediate return, would be challenging, if not impossible to achieve without introducing significant weaknesses to control measures. Inspections at sea and their effectiveness would be compromised if prohibited species were able to be retained on board for short but non-defined periods before controlled release. A landing prohibition cannot be applied for rock cook wrasse as vessels fish in both D&S IFCA's and Cornwall IFCA's Districts, where control measures are different. Vessels engaged in potting for live wrasse, in both Districts, can and do land their catch in Plymouth.

3.5 Reduction in Fishing Effort

The large reduction on overall fishing effort from 2017 to 2019 in the D&S IFCA's District has been caused by a combination of mechanical issues with vessels, individual's circumstances (fishers not fishing as much for personal reasons), fishers targeting CIFCA's waters within Plymouth Sound during the D&S IFCA's closed season, and remaining there once D&S IFCA's waters reopened. Fishing effort is also affected by the weather conditions within Plymouth Sound. During 2019 a prolonged period of high winds resulted in damaged pots and fishers not fishing within Plymouth Sound. These poor weather conditions also reduced the number of observer surveys that could be conducted during this time.

In addition, the closed season to protect spawning individuals was amended after the second year of the fishery. In 2017 the closed season was from 1st April to 30th June. In 2019 this was amended to 1st May to 15th July, resulting in a shorter season over the summer months, during which weather conditions tend to be more conducive to fishing. This shorter fishing season over the summer may have also contributed to the reduction in LPUE as previous studies (Darwall *et al.* 1992, Gjøsæter 2002) have shown catch to be positively correlated to water temperature.

DWT also raises a concern that the number of days fished, and the number of pots hauled do not decrease in the same proportions between years. This is likely to be simply due to changing fishing patterns in terms of the number of pots fished per day between years. DWT also state that a reduction of 54% in potting effort combined with a 62% fall in landings over the same period (2017 – 2019) should be a cause for concern. However, as highlighted above, the change in potting effort refers only to D&S IFCA's District, while the overall landings data from the MMO refers to the landings from both D&S IFCA's District and CIFCA's District. Therefore, the two figures are not suitable for the comparison that are made in DWT's response. In contrast, within the Three-Year Comprehensive Review report, analysis of LPUE and CPUE over this period (2017 – 2019) for D&S IFCA's District concluded no significant change in either LPUE or CPUE over this period for the fishery as a whole. As highlighted by DWT, the figures do not include data for Vessel 3, however this will be rectified for 2020 by the return of landings data and collection of observer data (or by increasing punitive action for this vessel).

3.6 Spawning/ Closed Season

In their response, DWT questions the spawning times of corkwing. Unfortunately, D&S IFCA's Officer had not clarified in the report that the corkwing reported as spawning were showing signs of blue around the anal fin (between July and October), but showed no evidence of milt or eggs. This blue colouration is a somewhat subjective measure of this species being near to spawning season and is unlikely to be entirely reliable on its own. As reported in the Three-Year Comprehensive Review, a small number of corkwing were observed spawning in 2017 – these individuals showed evidence of milt or eggs. In 2017, approximately 80 additional individuals were showing blue colouration around the anal fin. In 2018, D&S IFCA undertook additional fishery-independent surveys during the closed season, which included collection of spawning data. This allowed collection of data during May and June, which is normally not possible. All corkwing that showed evidence of milt or eggs in 2018 did so during May and June, with the only tangential evidence of spawning outside of this time coming from blue colouration. Previous studies have also indicated that the spawning period for Corkwing is from May to mid-June (Halvorsen *et al*., 2016, Matland 2015, Skiftesvik *et al*., 2015).

In terms of Ballan wrasse, few have been observed to be spawning during the on-board observer surveys over the last three years. D&S IFCA is aware of some research CEFAS has been involved in looking at the spawning period of ballan wrasse in the Dorset area. Early indications from this research would suggest that ballan spawn as early as April but this is yet to be confirmed. D&S IFCA has requested a report from CEFAS on several occasions but this has not been forth coming. Should there be evidence to suggest that a substantial proportion of ballan wrasse spawn in April in the D&S IFCA's District then amendments to the closed season will be discussed by D&S IFCA's Byelaw and Permitting Sub-Committee.

3.7 Voluntary Closed Areas

Fishers have complied well with the voluntary closed areas, with the exception in 2019. However, these fishers were informed of their non-compliance and strings were then moved accordingly. Given the general compliance of the voluntary closed areas it would undermine the fishers to make the closed areas mandatory. Having voluntary closed areas allows D&S IFCA to involve the stakeholders resulting in a valued co-management approach that is thought to improve compliance over entirely top-down imposition of management measures. Several studies (Costanza et al., 1998, Rodwell et al., 2014, Ostrom, 1990), suggest that this type of management of inshore fisheries

management leads to a sustainable fishery and helps promote a shift in the incentive structure from defensive to proactive (Arlinghaus *et al*., 2019).

Following DWT's letter, which pointed out strings in grid cell M12 near to seagrass, D&S IFCA's Officers have plotted these using GIS. The resultant chart can be seen in Figure 1 below, which shows that the strings (red) were not over the known distribution of the seagrass (green), as provided by Natural England:

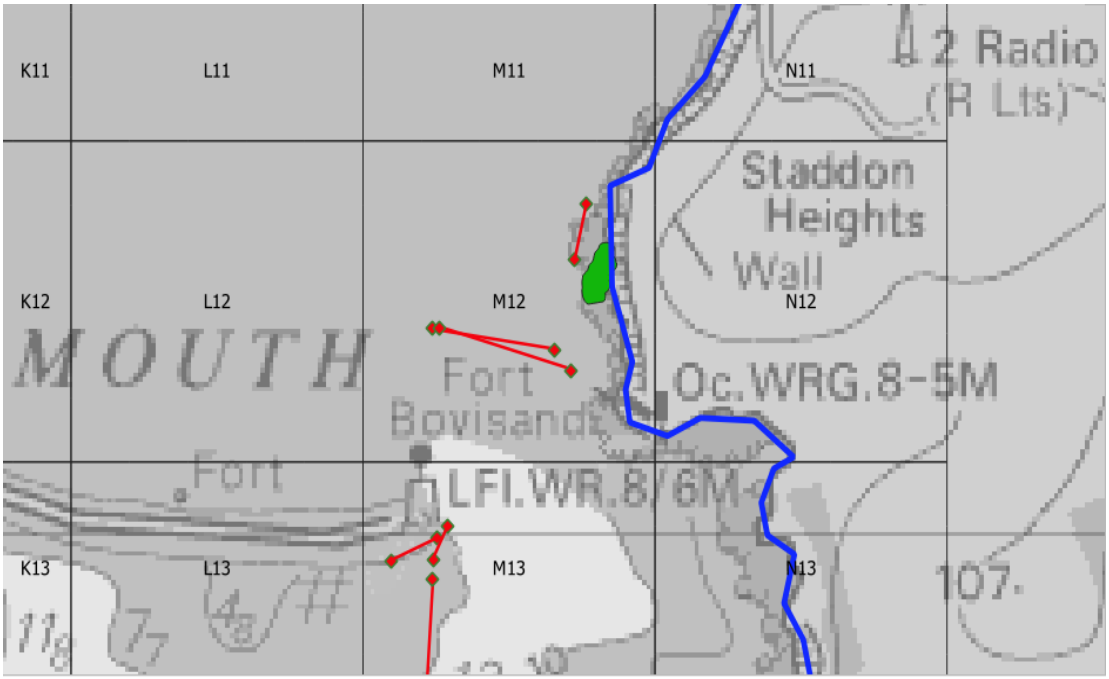

Figure 2 Fishers' strings of pots in relation to seagrass

In addition, as part of monitoring recommended by Natural England in its formal advice relating to the HRA carried out by D&S IFCA on the possible interaction of potting on seagrass, D&S IFCA has been conducting patrols to monitor this potential gear: feature interaction, and our report is available online at https://www.devonandsevernifca.gov.uk/Resource-library/H-Environment-and-Research under the section "European Marine Sites > Plymouth Sound and Estuaries EMS > Monitoring of Potting on Seagrass". This report is specific to the patrols undertaken and does not include the GIS locations of potting in the wrasse fishery.

3.8 Falling Populations

DWT raises concern regarding population declines. The direct comparisons that DWT quote in this section of its response (e.g. catch of > 800 goldsinny in 2017 vs > 500 in 2019) are not corrected for fishing effort. D&S IFCA acknowledges in the report that overall effort declined substantially over the 2017 – 2019 period. It is therefore inappropriate to draw the interannual comparisons that DWT has made and incorrect to state, as it does, that the "effort should not be relevant". In these analyses, it is always relevant to consider effort: it is not possible to begin to understand trends in catches and landings without acknowledging the effect that variation in effort has on these figures. The patterns DWT suggests for other species, including the "plateauing" of corkwing and a decline in ballan wrasse (and a later reference e.g. to a 37% decline in goldsinny catch), are similarly skewed by not considering effort. This is why the results that D&S IFCA presents throughout the Three Year Comprehensive Review report are based on fish caught and/ or landed *per unit effort*. Using this

unbiased approach D&S IFCA has shown that, over the fishery as a whole, landings per unit effort and catch per unit effort have remained stable over the 2017–2019 period, indicating that the fishery as a whole is not overexploited and that the current management measures are an effective way to manage the fishery. While the same is largely true on a species-by-species basis, these measures have declined for rock cook. It is on this basis that D&S IFCA has suggested the prohibition on the removal of rock cook from the fishery, which DWT has indicated its support for in its response.

3.9 Habitat Regulation Assessment (HRA)

With reference to the points DWT makes regarding the HRA and Natural England's formal advice as detailed in their letter dated 21st February 2018, Natural England has stated that: 'It is our understanding that an assumption has been made within the assessment that as long as wrasse stocks are maintained within the SAC, then whatever ecological function they do perform will continue to be carried out. Doing this will ensure important attributes such as species composition of the SAC reef communities (and therefore the Conservation Objectives of the site) will be maintained. The assumption that maintaining wrasse stocks within the SAC is important, despite the current lack of evidence base that wrasse are essential to maintaining a healthy reef ecosystem, appears to be a suitably precautionary approach to take when managing this fishery.' The results of the survey work and the comprehensive review show that analysis of landings and catch per unit effort (LPUE and CPUE) over this period (2017 – 2019), as a whole for D&S IFCA's District, concluded no significant change in either LPUE or CPUE.

Where there have been concerns highlighted through the analysis of data, D&S IFCA has implemented changes to the management measures through the Potting Permit conditions, for example, changing the slot size for corkwing and the recommendation for the prohibition of the removal of rock cook from the fishery in 2020. The use of this adaptive management mechanism has been highlighted in Natural England's advice where they suggest the close monitoring of LPUE and CPUE and size distribution should inform management decisions and would be an essential part of managing the fishery to avoid adverse impact. Natural England also supports the continued annual review of the fishery using all year's data, which would give confidence that management changes should be introduced should there be any indication in the current level of exploitation not being sustainable.

D&S IFCA agrees with DWT's point that having a fully monitored fishery is essential in meeting Natural England's recommendations and D&S IFCA has implemented measures to ensure that continues. Natural England has been involved and supported the changes in management measures introduced to date, which have been highlighted through the data analysis undertaken each year and detailed in the 'Three Year Comprehensive Review of the Live Wrasse Fishery' report. DWT suggests that NE reviews the HRA, however the process for reviewing the HRA lies with D&S IFCA. Five HRAs, on the interaction of fish traps on features of the Plymouth Sound and Estuaries SAC, were completed in January 2018 and sent to NE for their formal advice. As this was over two years ago and a Comprehensive review of the fishery has taken place, with changes in management of the fishery implemented over time, it may now be an appropriate time for D&S IFCA Officers to revisit the HRAs, review them and request revised formal advice from Natural England. If the Authority decide that it is appropriate to revisit the HRAs to determine if they are still valid after the Three-Year Review, then officers can undertake this task and request advice from NE prior to reopening of the fishery.