Report for D&SIFCA Byelaw and Permitting Sub-Committee – May 2017

D&SIFCA Potting Permit Byelaw

Contents **Page**

Annexes

- Potting Permit Byelaw
- Category one Potting Permit

Part 1 Summary of D&SIFCA Officers' Recommendations

1. Fully Documented Fishery

Under Paragraph 17 of the Potting Permit Byelaw, those permit holders who wish to engage in the live wrasse pot fishery will be required to provide relevant fishery information to the Authority. This information will be provided in two formats:

- Firstly, permit holders will provide fisheries data through daily logbooks, to include the following information:

    a. Date and time of deployment and recovery of each string
    b. Start and end latitude and longitude of each string of pots hauled
    c. Number of strings fished
    d. Number of pots per string
    e. Number of times per day pots are hauled
    f. Number of each species of wrasse retained on board
    g. Number of live wrasse supplied direct to Salmon Farm Industry/Agent

This information from each fisherman will allow the IFCA to understand the location and level of effort and provide more detail on the removal of the different species of wrasse and numbers retained.

- Secondly, D&S IFCA officers will undertake on board catch surveys on a regular basis to observe the total catches. Fishermen will enable this data collection by allowing D&S IFCA officers on board their vessels.

2. Pot Limitations

The Authority believes that a limit on the number of pots per vessel should be set at 60 pots, which would allow a viable fishery to continue at this level and provide greater opportunity for diversification amongst members of the fishing industry.

3. Marking of Gear

The Authority requires the following measures relating to the marking of gear to be implemented:

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 the

letter 'W' together with the vessels 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 Authority believes that a closed season should be implemented to protect the spawning stock of each species of wrasse and allow for the sustainability of the stock of each species. The period between 1st April and 31st July will be closed to the live wrasse pot fishery.

A closed season, as a measure of management of the fishery, has been introduced in other live wrasse pot fisheries. From previous studies and research, the dates proposed reflect the main part of the spawning season for all five species and will support the continued sustainability of the fishery.

5. Minimum and Maximum Conservation Reference Sizes

From information gathered on the biology of the five wrasse species found in our district and to meet the demands of the Salmon farms, the Authority believes that the following minimum and maximum conservation reference sizes for each species will be appropriate:

Species of Wrasse	Minimum Conservation Reference Size mm	Maximum Conservation Reference Size mm
Rock Cook	120	230
Goldsinney	120	230
Corkwing	120	230
Ballan	150	230
Cuckoo	150	230

Part 2 Overview of the Byelaw and the consultation process

6. Overview of the Potting Permit Byelaw

The Potting Permit Byelaw came into force in March 2015. This Byelaw manages all fishing activity where pots are used to target sea fisheries resources. For the purposes of this Byelaw, "pot" means any folding or rigid cage device or structure with one or more openings or entrances capable of capturing any sea fisheries resources. Potting for live wrasse is therefore an activity that can be managed via this Byelaw and the permits that are issued to fishers.

One of the drivers for the development of this Byelaw was so that the D&SIFCA could meet its statutory responsibilities as defined in MaCAA section 153 and 154. European Marine

Sites (EMSs) have been designated to protect habitats and species in line with the EU Habitats Directive and Birds Directive. To bring fisheries into line with other activities, the Department for Environment, Food and Rural Affairs (Defra) announced on the 14th August 2012 a new approach to manage fishing activities within EMSs. This change in approach aims to promote sustainable fisheries while conserving the marine environment and resources, securing a sustainable future for both. Defra produced a high-risk activity matrix and as a result, the IFCA, as the competent Authority, must manage identified fishing activities (that present different risks) within European Marine Sites (EMSs).

Inherited Byelaws were identified as being too rigid to fit this ever-changing situation. The new permitting Byelaw replaced two inherited Byelaws that related to mobile fishing gear and incorporated management measures from other legacy Byelaws that have yet to be revoked.

It is prohibited for a person to use pots for fishing within the District otherwise in accordance with a permit.

In other words, you must have a valid potting permit to operate pots within the areas managed by D&SIFCA, which includes pots used for the capture of live wrasse.

The Potting Permit Byelaw has provided a new approach for inshore fisheries and conservation management. The permitting Byelaw has introduced the flexibility needed by setting out part of the management in the permit conditions rather than in the Byelaw itself. Those affected by the legislation are safeguarded by the introduction of an open and inclusive management review system within the Byelaw that describes the process by which changes to permit conditions will be made.

Through permitting Byelaws, the D&SIFCA is now able to limit the requirement for the possible introduction of emergency Byelaws for managing un-foreseen circumstances whilst also reducing the need for an overly pre-cautionary approach.

7. Permits and review of conditions

To date the D&SIFCA has introduced several permitting Byelaws. The introduction of activity based permitting Byelaws will produce a regular opportunity for all management measures contained within the flexible conditions to be reviewed. The D&SIFCA has a duty to review all of the flexible conditions at least every three years but can review conditions within a shorter time period as considered necessary. A timetable for mandatory review of all permit Byelaws is shown below in table 1.

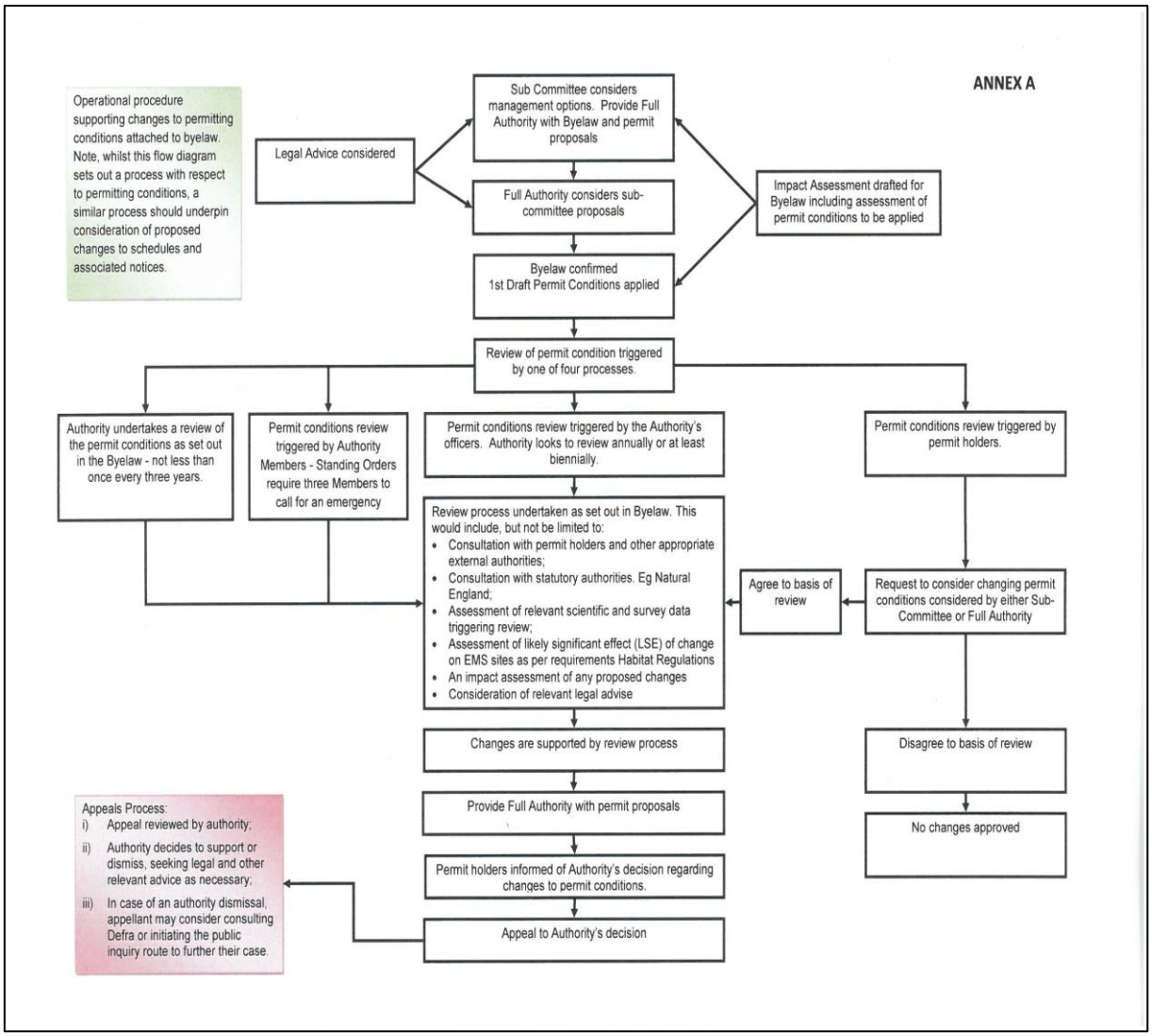
Table 1

D&SIFCA Potting Permit Byelaw

Byelaw	Review date	Process
Mobile Fishing Permit Byelaw	1st January 2017	Consult in writing with all permit holders.
		Consult with all organisations and stakeholders potentially affected by management
		Based on consultation - Authority make decision to introduce/remove/vary conditions
		After decision by Authority - all permit holders notified.
		Amend permits if required
Potting Permit Byelaw	1st March 2018	Consult in writing with all permit holders.
		Consult with all organisations and stakeholders potentially affected by management
		Based on consultation* - Authority make decision to introduce/remove/vary conditions
		After decision by Authority - all permit holders notified.
		Amend permits if required
Diving Permit Byelaw	1st March 2018	Consult in writing with all permit holders.
		Consult with all organisations and stakeholders potentially affected by management
		Based on consultation - Authority make decision to introduce/remove/vary conditions
		After decision by Authority - all permit holders notified.
		Amend permits if required
Netting Permit Byelaw	Not applicable	Byelaw not yet confirmed by the Secretary of State
Consultation information:		
Data from permit holders		
Scientific and survey data gathered by or provided to Authority		
Scientific advice (Cefas)		
An impact assessment of any proposed changed		
Advice from Natural England/Environment Agency etc.		
Any other information from relevant sources		

A review of conditions for any of the D&SIFCA permit Byelaws is not limited to either a three-year mandatory review or a direct trigger by permit holders. Other factors can influence a review of conditions including work undertaken by D&SIFCA officers such as Habitat Regulation Assessments (HRA) or MCZ assessments. The emergence of new fisheries such as the live wrasse fishery is another example where changes to permit conditions can be considered and implemented rather than the use of immediate pre-cautionary measures via an Emergency Byelaw.

The Annex A flow chart below provides a display of the review process.



The Potting Permit Byelaw provides scope for both fixed and flexible management measures via the conditions of use within the permits issued to fishers. The scope of the flexible conditions is limited to catch, gear, spatial and time restrictions as specified within paragraph 24 of the Byelaw. The review procedure of the flexible conditions is detailed within paragraphs 27 to 29.

Permits provide fishers with conditions of use, which help to simplify the legislative requirements for them. Annexes can be incorporated within the permits, which (via charts) refer to the spatial conditions.

Two separate types of permit are issued under the Potting Permit Byelaw:

- Category One – Commercial fishers
- Category Two – Recreational fishers

8. Habitat Regulations Assessments (HRAs) & MCZ Assessments

The D&S IFCA Environment team has undertaken HRAs on fishing activities taking place within European Marine Sites in the IFCA district. These have been undertaken to fulfil Defra's revised approach on the management of commercial fishing activities in these sites. 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. HRAs are used to determine whether there is a likely significant effect of the activity on the features of the site and an impact on site integrity. Conclusions and formal advice from Natural England will be used to inform any management measures that may be necessary to achieve the conservation objectives of the sites.

Similar assessments on the impact of commercial fishing activities in MCZs have also been undertaken. The IFCA's responsibilities in relation to management of MCZs are laid out in Sections 124 to 126, & 154 to 157 Marine and Coastal Access Act 2009. It is the IFCA's statutory responsibility to seek to further the conservation objectives of the site. Therefore, these assessments, their conclusions and formal advice from Natural England will be used to determine the future management of fishing activities in MCZ and therefore the conditions of use within the issued permits.

In regard to the use of pots for the live capture of wrasse, assessment work is currently being undertaken. Data relating to the location of the fishery are being fed into the assessments and the monitoring plan for a fully document fishery being developed to inform the HRA. Informal advice has been received from Natural England regarding the draft HRA for the live wrasse pot fishery within the MPA s in the known areas of fishing. This advice will be looked at and further information will be added to the HRA.

9. Communication for this consultation of permit conditions

To effectively communicate this consultation into a review of permit conditions, Officers have developed a communication strategy. Although engagement with commercial Potting permit holders is the priority, other stakeholders are also encouraged to respond if they need to do so. An area of the D&S IFCA's website is being used to display relevant information and provide an e-mail link for responses by the closing date of April 7th 2017.

Response e-mail: **office@devonandsevernifca.gov.uk**

On 4th November 2016, D&SIFCA sent an e-mail to all commercial Potting Permit holders. The email informed commercial potting permit holders that the D&SIFCA would be considering management measures for the fishery, which may include effort limitation, as well as other appropriate measures.

On the 24th of February 2017 D&SIFCA sent an e-mail (or letter for those permit holders who have not provided an e-mail) to all commercial potting permit holders. The information sent directly to commercial potting permit holders provided an explanation of the five separate proposals relating to the live wrasse fishery. The consultation material also explained the need for the submission of information by fishers already engaged in the fishery or those expecting to be involved in the fishery. The information provided would be used to assess the impact on fishers and in particular, the financial impact associated with the implementation of new management measures.

In addition to commercial potting permit holders, officers directly notified relevant organisations, interested parties and industry contacts. Meetings were also scheduled during the consultation phase with adjoining IFCAs and other stakeholders. The consultation material sent directly to commercial potting permit holders explained that the Byelaw and Permitting Sub-Committee is scheduled to meet on 15th May 2017, at which time it is hoped that a decision can be made on whether management measures (via changes to the potting

permit conditions) should be introduced to the live wrasse pot fishery for the remainder of the 2017 season**.**

It is important to recognise that Officers collect and prepare material to aid Sub-Committee members' deliberation of different aspects of the byelaw review work. Officers offer advice on certain aspects of the work, often present work on behalf of the Sub-Committee, but do not make decisions at any stage. Decisions taken by the Sub-Committee are in fact only "recommendations" that are then presented to members of the Full Authority at key stages for them to make decisions. The Full Authority can agree to delegate powers to the Byelaw and Permitting Sub-Committee to increase the speed that decisions can be taken and subsequent changes to permit condition implemented.

10. Approval of Recommendations for Consultation by the D&SIFCA Byelaw and Permitting Sub-Committee.

There was a meeting of the Byelaw and Permitting Sub-Committee on the 16th of February 2017. Minutes were taken at the meeting and will be made available when approved. The recommendations as set out in the report presented to the Sub-Committee were discussed and evaluated against the existing evidence base. It was agreed that immediate action be taken to manage the live wrasse pot fishery. The use of an Emergency Byelaw (to implement a closed season) was considered as a credible option. Subsequent to the meeting, a consultation to add to the existing evidence base has been recommended as the immediate action required rather than a more pre-cautionary emergency Byelaw option.

Officers have been given approval to consult on the proposals in order to build the existing evidence base.

The Full Authority has agreed to delegate powers to the Byelaw and Permitting Sub-Committee to increase the speed that decisions can be taken and subsequent changes to permit condition implemented.

Timetable for additional consultation

Date	Action
24th February 2017	Commercial permit holders notified for consultation
7th April 2017	Consultation period ends
	Responses summarised by officers/development of Impact Assessments
15th May 2017	Byelaw and Permitting Sub-Committee to consider options

Part 3 Evidence base for the Recommendations for Management of the Live Wrasse Pot Fishery

11. The Existing Evidence Base

Wrasse are used as cleaner fish in Scottish salmon farms to control sea lice populations. To meet demand, wild wrasse are being sourced from southwest England. In the Devon and Severn IFCA district, vessels have been operating out of Plymouth since 2015 and a fishery is expected to start in Torbay this year (2017). The fishery uses specially designed pots and targets five species of wrasse. Although the fishery emerged in the 1990s in Norway, Scotland, Ireland and England, there is little information on the impact of these fisheries. Where data exists, local depletions and changes to size structures and sex ratios have been noted. One of D&S IFCA's main duties is to seek to ensure that the exploitation of sea fisheries resources is carried out in a sustainable way.

Wrasse are coastal inshore species occupying habitats such as rocky reefs and seagrass beds. Most of these habitats in the Devon and Severn IFCA District are protected under Marine Protected Areas (MPA). The IFCA has a duty to assess the interactions of fishing activities on the habitats of the MPAs. These are in the form of Habitat Regulation Assessments (HRA) for Special Areas of Conservation (SAC) and Marine Conservation Zones (MCZs) Assessments. These assessments will include the impacts of abrasion, removal of wrasse and by-catch of species.

Wrasse pots are lightweight (~4kg) and due to the footprint of the gear and the small area of seabed in direct contact, habitats are generally thought to be unaffected by pots (Eno *et al.* 2001). Selectivity of the pots results in low by-catch of species and species can be returned to sea alive. Information from logbooks on the **location and level of effort** will help to inform the MPA assessments.

Impacts of the Removal of Wrasse

Wrasse are adapted to grazing small invertebrates such as isopods, gastropods, amphipods and bryozoans (Norderhaug *et al.* 2005). A negative impact of their removal may be seen in kelp forests with a shift in community structure. Two studies have looked at the relationship of wrasse predating on small invertebrate grazers living on brown seaweeds. The wrasse studied are native to New Zealand and experiments were carried out in controlled environments. Wrasse reduced epifaunal grazing on seaweeds and in experiments without wrasse seaweed biomass was reduced (Pérez-Matus and Shima, 2010; Newcombe and Taylor, 2010). However, these findings were not consistent with field survey sites. Verbal information from fishermen has suggested that in areas where there has been a significant removal of wrasse, there has been an increase in the presence of amphipods and isopods

Studies have found goldsinny and rock cook to be facultative cleaners, meaning their diet is not wholly dependent on cleaning activity (Henriques and Almada, 1997; Galeote and Otero, 1998; Hilldan, 1983). There have been some observations of the cleaning behaviour of wrasse in the wild and the removal of wrasse may have implications for parasite populations on other species of fish and fish health. Additionally, it is unknown their importance as prey for predators. Wrasse have been identified in the diet of a variety of species including cod (Halvorsen *et al.* 2016a), cormorants, shags (Steven, 1933) and grey seals (Gosch *et al.* 2014).

The five common species of wrasse all have relatively different life history characteristics such as habitat requirements, maximum age, size at sexual maturity, spawning season and depth range (Darwall *et al.* 1992). Wrasse have complex reproductive biology; with ballan and cuckoo changing sex from female to male, most have nest guarding males (exception of goldsinny) and corkwing and goldsinny have 'sneaker' males who mimic females to steal fertilisation of eggs from territorial males.

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.

Population structure may be altered by the removal of wrasse. For smaller wrasse species such as the goldsinny, corkwing and rock cook, their size at maturity is thought to be around 10cm so this would enable some spawning before removal and the population may be ensured as individuals under 12cm are returned. However, as mature species are targeted it is expected that the size and age of maturity would be expected to decrease over time (Darwall *et al.* 1992).

For the larger species, ballan and cuckoo, their size at sexual maturity is higher than 12cm (ballan: females 16-18cm, males 28cm; cuckoo: females 16cm, males 24cm) and therefore individuals are removed before maturing and hence having a chance to spawn. Therefore, the **minimum and maximum conservation reference sizes** proposed are important in maintaining a sustainable fishery. . A recognised management measure to protect a fish stock and allow for its sustainability is to allow a proportion of that stock a chance to spawn at least once before capture. The size of maturity of local populations will be identified during **on board catch surveys.**

Wrasse are territorial and occupy small spatial areas (Villegas-Rios *et al.* 2013b). Recorded home range for ballan wrasse is 91m² (Villegas-Rios *et al.* 2013b), <50m for corkwing (Potts, 1985) and a territory of 2m² for goldsinny (Hillden, 1981). Wrasse populations may be genetically isolated (Skiftesvik *et al.* 2014) and the production of benthic eggs (with exception of goldsinny) suggests limited dispersal from nesting areas. A relatively long planktonic larval stage and inshore water currents along the coast may contribute to lowering genetic differentiation between areas (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 corkwing. They concluded that if wrasse populations are spatially fine structured, local populations experiencing high fishing intensity might be overfished. Deady *et al.* (1993) also stated that their study of the wrasse fishery for goldsinny and corkwing in Ireland, demonstrates that overexploitation of wrasse stocks within a confined area (such as Lettercallow Bay) could occur in a relatively short time span (less than 2 years).

Wrasse 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 (Darwall *et al.* 1992). The catch composition and sex ratios of local populations will be identified during **on board catch surveys,** which will inform future management measures.

The fishery for wrasse coincides with the wrasse spawning season, which ranges from April to September depending on the species (Skiftesvik *et al*. 2015). 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. Therefore, the removal of nest guarding males may reduce egg survival (Darwall *et al.* 1992). Hence, the **closed spawning season** proposed will ensure sufficient reproduction within the population and sustainability of the fishery. More detailed information on the spawning season of local populations in Devon will be collected during **on board catch surveys.**

A recent report from Cefas relating to wrasse in regard of their commercial use, fisheries and implications for management summarises:

- The use of ‘cleaner fish’ (fish species that feed on ectoparasites) is of increasing focus to the salmon farming industry as an alternative to chemical (organophosphate) treatments. The preferred species of cleaner fish are various species of wrasse (Labridae), and there is also increasing interest in lumpfish *Cyclopterus lumpus*.

- As the use of wrasse (and lumpfish) as cleaner fish has increased, there is growing concern regarding the potential localised over-exploitation of wrasse populations around parts of the UK, and in relation to the potential impacts of transporting wrasse from one part of the country to another.

- There are very limited data on wrasse populations from existing survey programmes, as trawl surveys tend to avoid rocky inshore grounds where wrasses are usually most abundant. Therefore, there are insufficient data to examine 'stock trends'.

- Wrasse have biological characteristics (e.g. site fidelity, hermaphroditism in some species, nest guarding) that would make them susceptible to localised over-exploitation and potentially localised depletion.

- The scale of the wrasse fishery around the coasts of the UK is uncertain, and there are limited data on the species composition as well as the size range and sex ratio of landed fish.

- Whilst there is the potential for localised depletion, wrasse fisheries can be an important economic element of the diversification of inshore fisheries. Hence, options for precautionary management measures could usefully be developed with IFCAs and the fishing industry to ensure the sustainability of these fisheries.

- Precautionary management measures could include quota management (which could be applied over zonal areas of coastline), spatial management (especially if aligned with the current MCZ network) and seasonal restrictions (to minimise fishing impacts during the spawning season). Size restrictions would need more careful consideration, in order to

balance market demands with the need to ensure an appropriate size range and sex ratio of fish in the wild.

- Further studies on wrasse could usefully consider the population dynamics of wild populations (life history, movements, population structure and status, parasites and genetic structure), wild capture fisheries, transportation and husbandry, and captive breeding. Such work would require close cooperation of the various sectors involved in this fishery.

This report concurs with the proposed management options that D&S IFCA has documented in the live wrasse pot fishery consultation that management of the stock, fishing season or areas fished is needed. The report also highlights the need for further information about the fishery and the recommendation for a documented fishery will facilitate this.

D&S IFCA Potential Wrasse Management

The wrasse fishery can be managed through the D&S IFCA Potting Permit Byelaw, via the flexible permit conditions.

Management of this emerging fishery is seen as important as there are a number of risks that have been identified from the information gathered on the species ecology, biology, the expected fishing effort and data collection requirements. The risks are:

- Whilst information on the level of effort has been provided by the salmon farms directly or by their agents, the IFCA is aware that fishermen within the district can act independently to engage with the salmon farm companies to offer a supply of wrasse to them. One agent in Weymouth has advertised through the website 'Find a Fishing Boat' for more boats to supply wrasse to them. Therefore, the IFCA does not know if the effort in its district will increase further than currently predicted in 2017.
- There is uncertainty in the fishery, in terms of the impact of the removal of wrasse from the habitats and ecosystems in which they live. The uncertainty includes how the removal of mature wrasse will affect their population structure, reduction in their cleaning capability leading to disease prevalence/ infestation on other fish species, kelp epifauna ecosystem impacts and populations of those species wrasse currently predate on, such as amphipods and isopods – 'trophic cascade' impacts.
- For Ballan and cuckoo wrasse the impact on the populations of the removal of the dominant males is largely unknown.
- No stock assessment has been undertaken on this species so baseline data are not available.
- The wrasse fishery in the UK is largely undocumented although in Scotland it has been taking place for many years. This lack of data leads to the uncertainty on the impact of the fishery.
- Anecdotal evidence from fishermen targeting wrasse in Scotland suggests there is a decline in the wrasse numbers being landed. Work done in Ireland suggests that the fishery has declined in areas after two years of the fishery taking place.
- The fishery period partly coincides with the spawning period for all species

The benefits of the emerging fishery are:

- It allows small inshore vessels to diversify for some of the year.
- It potentially can remove or lessen the pressure on other fisheries and species

- This is an opportunity of the IFCA to help the development of a new fishery whilst introducing management that ensures its sustainability and increases the IFCA's knowledge of any impact on the inshore ecosystems where the activity takes place.

Management Options

Fully Documented Fishery

To date, the landings from the fishery appear to have gone unrecorded. The boats are under 10m in size and as such, the requirement for landings figures is not obligatory. However, sales notes for those purchasing the fish and the transport documents should be available. The MMO is looking at what data exists.

In order to ensure as much information is available, a fully documented fishery is recommended where data are made available to D&S IFCA including:

- daily records of fish removed from the fishery (landings to the shore / into store cages) are kept
- number of pots deployed
- frequency of hauling per day
- number of strings fished
- number of pots per string
- days at sea,
- areas worked (GPS location for start and end of strings).

These data will provide information on landings per unit effort (LPUE).

Part of the requirement for the fishery would be to allow observers on board the vessels on a regular basis to verify the logbooks and to collect further data on the whole catch rather than just those fish landed. The data would include catch composition by species, size distribution and determine size at sexual maturity and allow for catch per unit effort (CPUE) to be determined. This together with LPUE will help inform assessment of stock abundance and highlight changes over time.

In order to support the data collected from fishermen and on board survey work, it is important to have sales figures and transport document data so that additional movement mortality can be assessed.

Slot Size

From the information collected, the introduction of a formal slot size might appear appropriate. This could tally with the salmon farm industry sizes to reinforce these voluntary minimum and maximum sizes. It would also allow potential harmonisation with CIFCA and SIFCA should these IFCAs decide to manage the sizes of wrasse through a byelaw. Slot sizes allow the larger fish to remain in the population so affording protection to the breeding stock.

The salmon farms have informed the IFCA they ensure that the fishermen adhere to their industry led slot sizes, which are between 12 cm and 23 cm. The current industry slot size does allow a proportion of all species to reach sexual maturity. Protection is afforded to the larger Ballan and Cuckoo wrasse individuals as the maximum size is below the maximum size they grow too. There have been suggestions from the industry that an increase in minimum size for Ballan wrasse might be considered and acceptable. For Rock Cook,

Goldsinney and Corkwing wrasse the minimum size is close to the maximum size to which the species grow. These three species mature at 9 to 10 cm, which is 2 to 3 cm below the minimum industry size, and therefore a small proportion of the breeding stock is protected.

Effort Limitation

An estimate for the current and future level of effort in the South West is in the range 35 pots to a maximum of 150/200 pots per vessel. As the stock levels of wrasse, in areas where the wrasse fishery currently takes place and in areas where expansion is proposed, are unknown, quota management at this time is not appropriate as the demand by the salmon farms may impact the local populations. Therefore, in order to allow for a wrasse fishery to develop but avoiding over exploitation of the stock, effort control via pot limitations is a solution. This management of effort would establish a viable additional fishery, in the form of diversification, rather than a few vessels solely targeting the wrasse fishery. D&S IFCA officers are hoping to gather more data during on board surveys, as part of the fully documented fishery proposal. However, these data are not yet available to help inform management of the fishery and therefore a precautionary approach may be necessary.

Seasonal Fishery

From the literature reviewed wrasse spawn in spring and summer. For some species, the spawning season starts in April and continues to September, whereas the spawning season for other wrasse species is shorter extending from May to July inclusive. As there is no literature for the wrasse populations' spawning seasons in the South West, the on-board surveys will gather more data on this aspect of the biology of each species. The industry led slot sizes will take the larger breeding fish from three species of wrasse: rock cock, goldsinney and corkwing. Therefore, to provide some protection to these species, a closure for part of the spawning season might be a suitable management measure. In 2016, the fishery in Norway was prohibited until 11th July as a conservation measure to allow some nesting males and females to breed at least once before being harvested and allow nests to be protected. A closure during some of the spawning months would afford some protection but allow the fishery to progress later in the summer months.

12. References:

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., and Lysaght, S. (1992) Implications of life-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.

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.

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.

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.

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.

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.

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., and Mortensen, S. (2014) Wrasse (Labridea) as cleaner fish in salmonid aquaculture – the Hardanferfjord as a case study. Marine Biology Research: 10, 289-300.

Skiftesvik, A.B., Durif, C.M.F., Bjelland, R.M., and 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.

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.

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.

13. Additional reports used to inform the decision making process:

- A review of wrasse ecology and fisheries interactions.pdf
- Data collection priorities for an emerging multi-species fishery - wrasse 2017.pdf
- CEFAS Wrasse report v8.pdf

Part 4 Responses and Observations

14. Introduction to the collected evidence

The consultation and additional evidence collection was not limited to written responses alone. Meetings with adjoining IFCAs and industry participants were arranged to provide additional opportunities to build the existing evidence base and all information collected has been used to inform this summary. Detail of the communication strategy is provided in the communications section of this report. To supplement the written evidence submitted during the consultation phase, and the findings from meetings, D&SIFCA Environmental Officers conducted several on board surveys aboard fishing vessels already using pots to target live wrasse. All information has been collated and summarised to allow focus on all five of the original proposals and highlight additional discussion points. A full account of the D&SIFCA on board survey methodology and the initial observations recorded by the environmental staff has been documented and appears in part 5 of this report.

15. Overview of the written responses

Over 30 written responses were received during the six week consultation period, however several of these were duplicated responses, requests for more information or basic correspondence and therefore not of great use to add to the existing evidence base. The majority of written responses were provided via e mail. Responses of no significant use or no comment have been separated from other responses and the remaining 20 written responses used for further analysis.

Responses were submitted by a mixture of sources with 14 responses offered by diffing organisations as listed below. In addition, fishermen directly involved in the live wrasse fishery responded.:

- **South Devon & Channel Shellfishermen Ltd**
- **The Wildlife Trusts**
- **Devon Wildlife Trust**
- **Loch Duart**

- **Cefas**
- **Marine Harvest Scotland**
- **Cleaner Fish Company**
- **Eastern IFCA**
- **Natural England**
- **Native Marine Centre**
- **Northumberland IFCA**
- **Defra**
- **Wembury MCA Advisory Group**
- **The Scottish Salmon Company**

The Scottish Salmon Company reported that they have no intention to fish, or engage fishermen on their behalf to fish English waters for wrasse.

The implementation of at least some form of management is generally favoured by the majority of these organisations. By their nature, several organisations listed above were obviously inclined to take a pre-cautionary stance, and were therefore supportive of the introduction of a managed fishery via a mixture of control measures.

Although the level of detail relating to the specific proposals (as set out) differed, the clear theme within these responses was that more research is vital to assess stock levels, biology, ecology and effort levels directed at the fishery and the numbers of wrasse taken. Several supportive organisations recognised the need for more evidence to be collected and some recommended exploring funding opportunities to complete required research work. The Wildlife Trusts suggested that it was perhaps appropriate for funding to be provided by the Salmon Farms themselves.

In addition to on-going evidence collection (via a fully documented fishery), Natural England and the Wildlife Trusts also highlighted the importance of assessments on the fishing pressures on designated reef features. Although not directly protected by specific UK legislation and not listed as a designated feature of either SAC or MCZ areas, Natural England and The Wildlife Trusts raised concerns over a lack of knowledge about the wider ecosystem and the impact large scale removal of wrasse could have on reef habitats.

The introduction of a fully documented fishery is seen as vital by the majority of these organisations to help build and strengthen the evidence base. The flexibility that the potting permits (conditions of use) offer as a management tool, supports the opinions and advice offered by many, that appropriate local management measures should be implemented, reviewed and adjusted accordingly to manage the fishery over the longer term.

Although in the minority (due to the small number of fishermen involved in the fishery), responses representative of individual fishers were received. Objections were raised in relation to the proposed management measures being considered based on the existing evidence base D&SIFCA has at its disposal. Some individual responses indicated that they are dubious in regard to the existing evidence base and have concerns relating to management measures based on other non-local fisheries such as Norway. Written responses recommended that more information is collected over time to better inform longer term local management whilst also implying that to take an overly pre-cautionary stance in the first instant would have the potential to end the emerging fishery (and fishing opportunity

for small vessels) before it has really begun. The main concern of the fishermen was the extended closure for spawning and the limit on the number of pots proposed

South Devon & Channel Shellfishermen Ltd raised objections to the initial proposals as set out in the consultation material and their issues (and those of some individuals) are explored in more detail below.

16. CIFCA and SIFCA Action

Defra has indicated that it would be preferable for regional IFCAs to work together with a harmonised approach where possible. In recognition that the emerging wrasse fishery has wider ranging implications for the South West region and to consider a more consistent approach to the potential implementation of management, a meeting was held between adjoining IFCAs on the 29th March 2017.

Neither CIFCA nor SIFCA have been able to provide a formal response at this time, but it is clear that due to the D&SIFCA Permit Byelaw model (flexible permits) and a Potting Permit Byelaw already established, D&SIFCA will be in a position to implement potential regulatory restrictions before either of the other two other IFCAs. Verbal summaries were provided by officers from CIFCA and SIFCA on the level of fishing currently being undertaken and existing evidence that both have collated. The severity of risk resulting from the emergence of the live wrasse fishery is not being considered the same by all Authorities at this time. Both CIFCA and SIFCA have indicated that they are less pre-cautionary in their approach at this time, and as such consider the immediate need for the introduction of management less of a priority. Neither CIFCA nor SIFCA are strongly opposed to the strategy (suggested measures) and prioritisation that D&SIFCA has taken in regard to the issue but an element of inconsistency in the short term is inevitable.

A lack of data and weaknesses in the existing evidence base has been highlighted as a concern for other IFCAs in considering how to manage the wrasse fishery within their districts over the longer term. Both intend to continue with on-going survey work this year to collect more data and see this as a priority. SIFCA has indicated that they are considering the formulation and introduction of a “policy” (guidance or code of conduct) to regulate the fishery on a voluntary basis in the first instant. CIFCA is currently developing guidance for the fishery in its district. CIFCA may well consider further management via a Byelaw, however the indications are that any such Byelaw will limit accessibility to the fishery via a limited permit scheme and therefore differing from the approach (and guiding principles) adopted by this Authority. Discussions extended into the potential impact on MPAs and the use of spatial control measures, where appropriate, to protect specific sites.

Industry input:

17. Focus on the proposals

<u>Fully Documented Fishery - written responses</u>

With few exceptions the proposal to collect more data via the introduction of a fully documented fishery received significant support in the written responses. Support is evident from both the organisations and individuals that additional data collection and on-going survey work will better inform management decisions. There were no recorded objections to allowing D&SIFCA officers to undertake on board catch surveys to collect their own data and

suggestions[1] were offered by organisations such as Cefas, Natural England and Eastern IFCA on specific requirements that could be captured within periods of research. Objections to how data is collected were raised by South Devon and Channel Shellfishermen Ltd. Although it has been recognised that there is a need to collect additional information, the mechanics of how data should be submitted to D&SIFCA was questioned by this organisation. Duplication of data and excessive burden to fishers recording information was a concern raised. Alternatives for data submission were presented in this response including the use of EU logbooks, Buyers and Sellers data bases and D&SIFCA collecting information and statistics directly from the MMO. In regard to gear position recording, South Devon and Channel Shellfishermen Ltd suggested that RFID tags be used and transmit relevant data via GPS.

Fully Documented Fishery – survey observations

The original survey forms have been simplified slightly from the original version created. Feedback to date suggests that fishers already engaged within the fishery are satisfied with the forms being used and have not raised concerns over excessive burden.

Fully Documented Fishery – meetings

Several fishermen contacted the IFCA in relation to the consultation. They expressed the difficulty they have with literacy and in the main found responding to consultations in writing difficult. In this respect, the officers of the IFCA are considering other methods of consulting with the industry to be more inclusive. In terms of the data collection forms. Officers have simplified the forms to make recording of daily landings as easy as possible. More detailed data are collected during the on-board surveys carried out by officers.

Pot limitations

Pot limitations - written responses

The concept of introducing pot limitations was strongly supported by the majority of organisations as part of a management package. However, the proposal of 60 pots per vessel did also raise objections, in particular by fishers already engaged in the activity. One fisherman raised concern about how this level was formulated by D&SIFCA considering so many unknown factors related to this fishery. The same response took the view that this was a knee jerk reaction to four boats working approximately 200 pots each for six months of the year. One fisher indicated that he had four vessels that may fish for wrasse using between 100 and 500 pots each. However, this fisherman did not respond to the proposals within the consultation and is now not believed to be fishing for wrasse. It has been suggested in the correspondence that a typical catch rate for wrasse is approximately 1.5 fish per pot and a 60 pot per vessel limit is not enough gear to offer financial viability for fishers engaged in this activity. One fisherman indicated that daily attention is required to make the practice viable and does not conduct this activity to subsidise earnings from other fishing ventures. Loch Duart Ltd (Salmon Farm) has stated that as a small company only targeting ballan wrasse, a 60 pot limit would not hamper their operation, but have recognised that this limitation may be more problematic for others requiring larger supplies and other wrasse species. Loch Duart do not take wrasse form the D&S IFCA district and have indicated that they do not intend to do so. South Devon and Channel Shellfishermen Ltd raised an objection to the proposed pot

[1] Sub sampling of catch, length, sex, maturity, age at sex change

limitation. In their view, lightweight and easily manageable wrasse pots could quite conceivably be hauled multiple times in a single day and enforcing this aspect of the proposed restrictions would present difficulties for D&SIFCA.

The Cleaner Fish Company, who is an agent for Marine Harvest and deals directly with the wrasse fishermen in Plymouth, has stated that, from the catches for last year's season for boats operating out of Plymouth, the number of wrasse caught per pot per day was 0.6 wrasse. This was based on 400-550 wrasse pots in total for the three fishermen. This agent and Marine Harvest felt that a 60-pot limit would not make it financially viable for the fishery to continue and would provide no incentive for the fishermen to take part. The agent has no intention to work with numerous fishermen who consider this a supplementary fishery. Currently in Scotland the vessels, supplying live wrasse to Marine Harvest, fish between 150-200 pots and provide the majority of the live wrasse to this company. A maximum of 200 pots has been suggested by the agent, whilst 150 would make the fishery viable.

Pot limitations – survey observations

The vessel, on which the surveys were conducted, was being fished single-handed and fishing 7 to 9 strings a day, with an average of 15 pots per string (approx. 120 pots a day). The fisherman reported that decreasing the amount of pots to 60 per day would make his business non-viable. Pots used by the fishermen were seen to have escape gaps allowing smaller fish to escape.

Pot limitations – meetings

A meeting was held between the SW IFCAs and Marine Harvest Cleaner Fish manager and the agent for Marine Harvest operating in Devon. They explained the plan for the future use of cleaner fish in the salmon farms. Currently 15% of the wrasse used is farmed. By 2019 they expect 100% of the cleaner fish used to be reared and none taken from the wild. Marine Harvest is investing heavily in new rearing facilities in Anglesey and expects this to be operation at the end of the summer. Their plan is to have this facility and others in Scotland, providing reared cleaner fish to all the Marine Harvest farms by 2019 and to supply cleaner fish to other salmon farm companies thereafter. Currently 500,000 wild wrasse are sourced from Scottish waters and they are looking to source 150,000 wild wrasse from the SW in 2017 with 60,000 coming from Devon.

Members of the fishing industry from Torbay who were hoping to be involved in the wrasse fishery supplying wrasse to Marine Harvest came into the office and explained to officers that the restriction in number of pots would stop the fishery out of Brixham. The proposed management measures have led to the agent for Marine Harvest to not invest in the boats in Brixham and instead keep the fishery focussed in the Plymouth area.

Marking of gear

Gear marking - written responses

Several of the written responses indicated that gear marking would be of use as part of the management package, but this proposal did generate significant interest. The most detailed observation to this proposal came from South Devon and Channel Shellfishermen Ltd. D&SIFCA have been encouraged to consider what materials are used for tagging as marine debris as a result of official marking of fish and gear is in their view an emerging pollution issue. This organisation would encourage D&SIFCA to collect tags at the end of the season.

In addition concerns have been raised over the amount of poorly marked gear already at sea that has been reported to D&SIFCA over the last 12 months, but has not yet been removed as part of enforcement work.

Marking of gear – survey observations

This proposal was not discussed in any great detail during the on-board survey work. D&SIFCA Environmental officers witnessed the use of some buffs marked with vessels PLN numbers. In addition, vessels supporting the on board surveys are currently working strings of pots that only contain wrasse pots.

Closed season

Closed season - written responses

The written responses indicate that the implementation of a closed season is considered to be an important element to managing the fishery; however objections were raised to the periods proposed in the consultation. Fishers involved in the live wrasse fishery have questioned why April 1st to 31st July was selected. Wrasse fishermen in the Plymouth area have reported that CIFCA has not considered the introduction of a closed season due to a lack of evidence and suggest that D&SIFCA work to build their own evidence base in regard to this proposal. One response suggested that UK data indicates that breeding and spawning predominately takes place through the winter and into late spring. A closure between November and June was suggested by one fisherman.

Support for a closed season was evident among several of the responses submitted from organisations; however there were differing views on how pre-cautionary D&SIFCA should be in establishing initial dates for the closure. Cefas welcome a closed season, but stated that the effectiveness of such a measure needs monitoring and should be subject to review. In addition, Cefas expressed a desire to work alongside D&SIFCA, discuss survey planning and additional data collection and also explore funding opportunities to facilitate extended research. Natural England is supportive of closed periods based on current evidence but do also support the collection of more site specific information on spawning of local stocks and recognise the need for flexibility in date selection to meet local circumstances. Defra has stated in their response that although of potential concern to those within the Industry, they support seasonal restrictions (as set out) as it coincides with the spawning periods of all five species of wrasse.

Responses were received from those connected with the Salmon farms. Although not completely opposed to a closed season, concerns were raised due to the timing of the proposed close season and their own demand and business requirements. One company stated that wrasse needs to be collected for mid to late spring in order to protect salmon before the onset of summer louse. Another industry response indicated that there would be some room for flexibility in regard to stocking strategy if a compromise could be achieved on the suggested closure dates. The agent for Marine Harvest suggested that the closure form the 1st May to 31st July would have a significant impact on the industry needs. He recommended a closure from December 1st to March 31st.

Closed season – survey observations

Spawning was hard to detect during the surveys. One goldsinny with eggs was observed. Some goldsinny appeared to have a swollen and translucent stomach, which may be a sign

of recent spawning activity, although there were no signs of eggs or milt. The majority of female corkwings were found to have a blue egg laying papilla near the anal fin and this is usually seen during the breeding season.

Closed season – meetings

During a meeting with the salmon farm industry, the proposed closed season was discussed. It was felt that a closure to the end of July will kill the fishery. A suggestion that the fishery to be opened between May and November inclusive was made.

Minimum and maximum conservation reference sizes

Minimum and maximum conservation reference sizes – written responses

More feedback was provided from organisations, rather than from individual fishers, realistically due to the small number of fishermen in D&S IFCA district involved in the fishery. The Wildlife Trusts, Cefas, Natural England and Defra were among those supportive of this conservation concept, but did not focus on the exact sizes that should be introduced in the first instant. Natural England suggested that this management measure should be introduced as soon as possible to reduce the risk of rapid reduction in stock. The Salmon farm industry already adheres to these minimum and maximum sizes. Natural England felt that as the literature review suggest that the size of sexual maturity for female ballan wrasse is 16cm then it feels that this is a more justifiable. Defra raised concern over the potential loss of large males during spawning periods and this management proposal will mitigate risk of significant impact on population and protect both large and juvenile fish.

Minimum and maximum conservation reference sizes – survey observations

Size-frequency histograms of all wrasse caught on the on-board observer surveys are shown below: Larger wrasse (Ballan, Cuckoo and Corkwing) often show two peaks in frequency (Figure 1-3). These peaks appear to correspond to the male and female size at maturity, however as the sex could not be discriminated for the vast majority of wrasse, this cannot be confirmed and could equally relate to the distribution of size classes. As these results are taken from catches on three surveys only, further data are needed to get a better understanding of the distributions. The two smaller wrasse species (Rock Cook and Goldsinny) both show one modal size class (Figures 4 and 5) at around the size of maturity, as reported from the literature review undertaken by Davies, 2016.

The percentage of each wrasse species returned from the total catch were as follows; ballan 3%, cuckoo 100%, corkwing 0%, goldsinny 58%, and rock cook 56%. Cuckoo wrasse are not being kept, as an Industry-led measure, due to reports of poor survival during transportation in 2016. However, there was uncertainty in whether fishermen kept or returned wrasse, which were between 11cm and 12cm. During the first on-board observer survey the fisherman retained goldsinny and rock cook which were 11cm and over. However, on the second survey only wrasses of 12cm and over were retained. On the third survey wrasse between 11cm and 12cm were again retained. The size-frequency histograms show that the majority of goldsinny and rock cook caught were under 12cm. Therefore, if the minimum landing size was 12cm there would be a reduction in landings and a large increase in the discard rate for these species. This is quantified in Table 1, which compares, using the current data set, what percentage of goldsinny and rock wrasse would be returned with a MCRS of 11cm versus an MCRS of 12cm.

Table 1 - Proportion of wrasse returned with differing MCRS.

	% Returned MCRS of 11cm	% Returned MCRS of 12cm
Goldsinny	47	83
Rock Cook	43	78

Davies (2016) reports a size-at maturity of 9.5cm for goldsinny, but no-such published data exists for rock cook. However, the size frequency histogram for rock cook (Figure 7) looks very similar to that for goldsinny (Figure 6), suggesting they may have similar sizes at maturity.

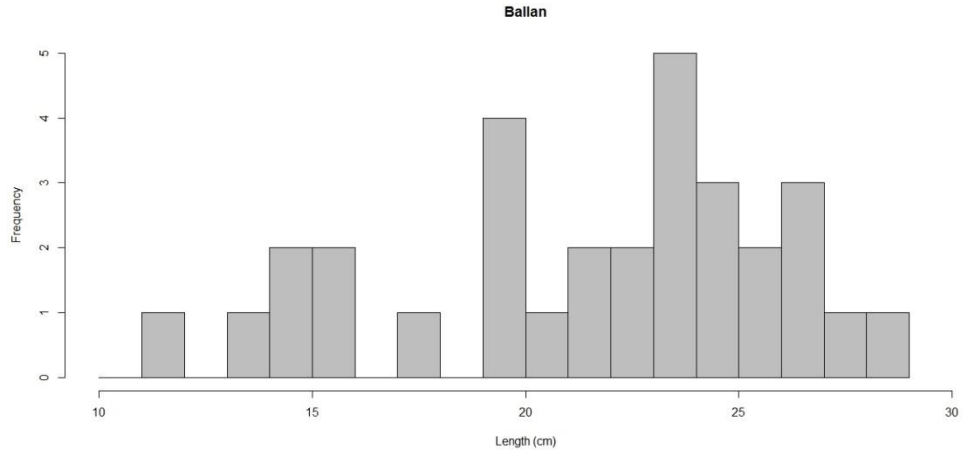


Figure 1 - Size-Frequency histogram for all ballan wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

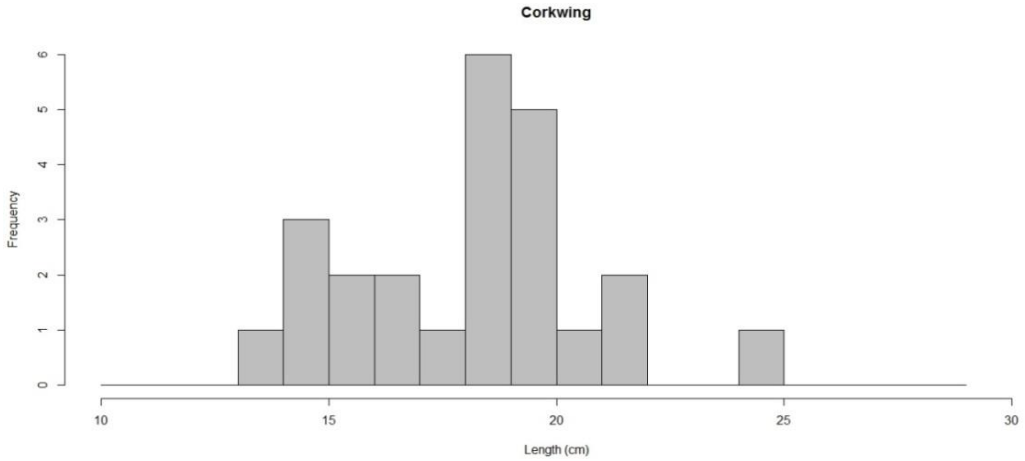


Figure 2 - Size-Frequency histograms for all corkwing wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

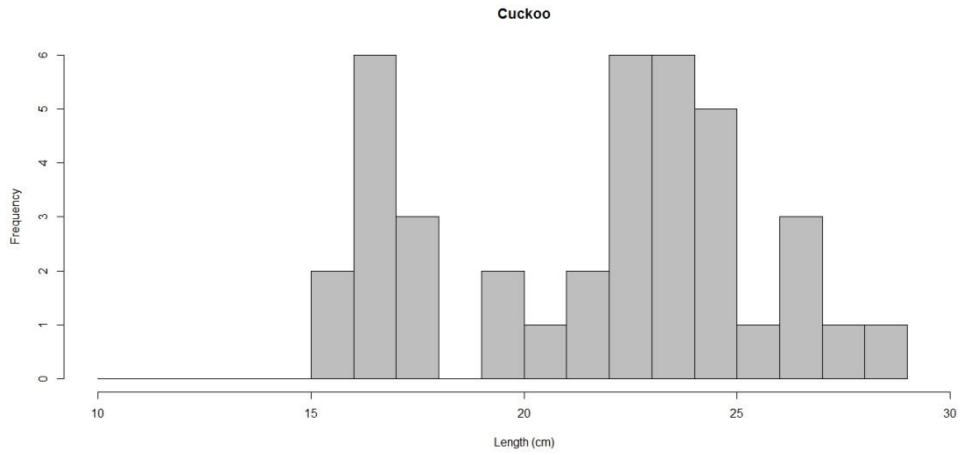


Figure 3 - Size-Frequency histograms for all cuckoo wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

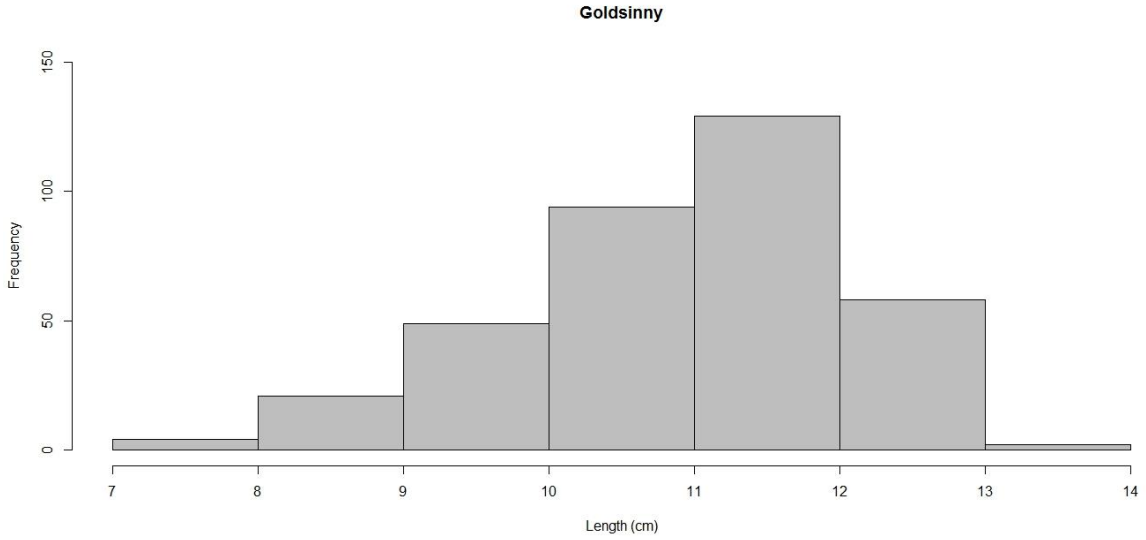


Figure 4 - Size-Frequency histograms for all goldsinny wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

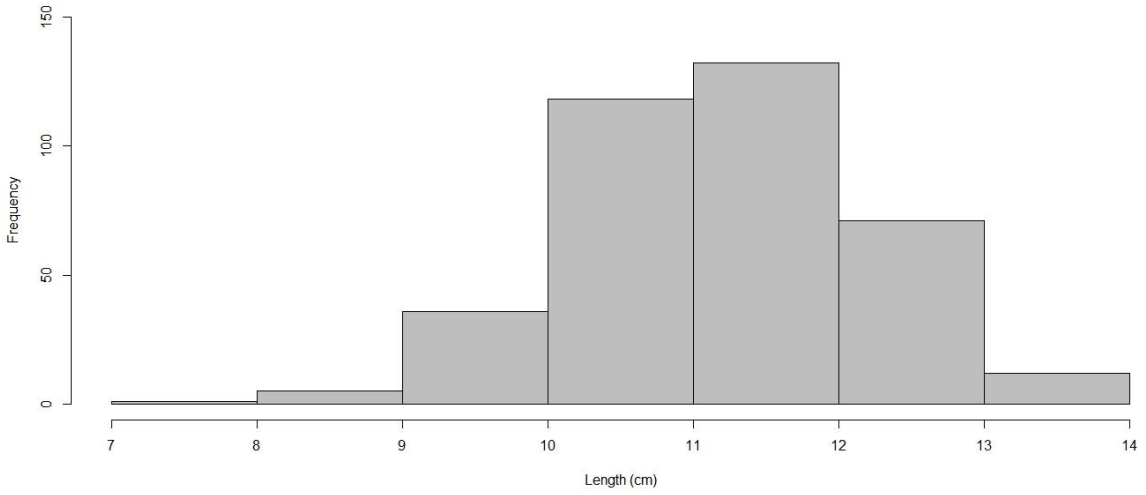


Figure 5 - Size-Frequency histograms for rock cook wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

The survival rate of returned undersized wrasse seems to be dependent on whether they have settled from coming up to the surface and their swim bladders have returned to normal. Many of the live undersized fish, being returned to sea floated, on the surface and were eaten by seagulls. If they could swim straight away, initial observations suggest a higher survival rate. IFCA officers are investigating ways of reducing these losses and a report by Native Marine Centre provides a suggestion to help mitigate loss to seabirds (see section 18). Storing the undersize fish in tanks during the hauling of the pots allows for some recoverability before release. Sometimes the boat will have moved a short distance between the site a wrasse is caught, and the site it is released. Due to the territorial nature of wrasse and their small home-range sizes (Davies 2016), it is not certain whether released wrasse will be able to return to their home territories or whether they would be able to establish new territories where they are released. Additionally, eggs in the nests of territorial males, which have been caught and kept or returned elsewhere, may be open to predation.

Released cuckoo wrasse were seen to swim away, without any floating on the surface and therefore were shown to have a high discard survival rate.

Minimum and maximum conservation reference sizes – meetings

The salmon farms and industry are supportive of the minimum sizes as they largely follow the functional sizes set by the salmon farms. The industry has indicated that they will not be retaining cuckoo wrasse and there other sizes match the requirement within the salmon farms. Any smaller and the wrasse will escape, any larger especially with Ballan wrasse and they become more territorial and compete with the salmon.

18. Other discussion points arising from the consultation

From the meetings with SIFCA and CIFCA, the desire to produce ‘guidance’ on the fishery was apparent. SIFCA is developing this guidance which will be in place prior to any formal management is considered or introduced. The guidance is currently in draft format and will include voluntary measures for the industry. There are seven key measures in the draft guidance, which include:

- Minimum and Maximum conservation reference sizes
- No take zones /Closed areas in MPA
- Maximum fishing depth
- Effort limitation
- Closed season
- Catch returns
- Biosecurity and husbandry

CIFCA is currently developing guidance too and once agreed will be shared with D&S IFCA.

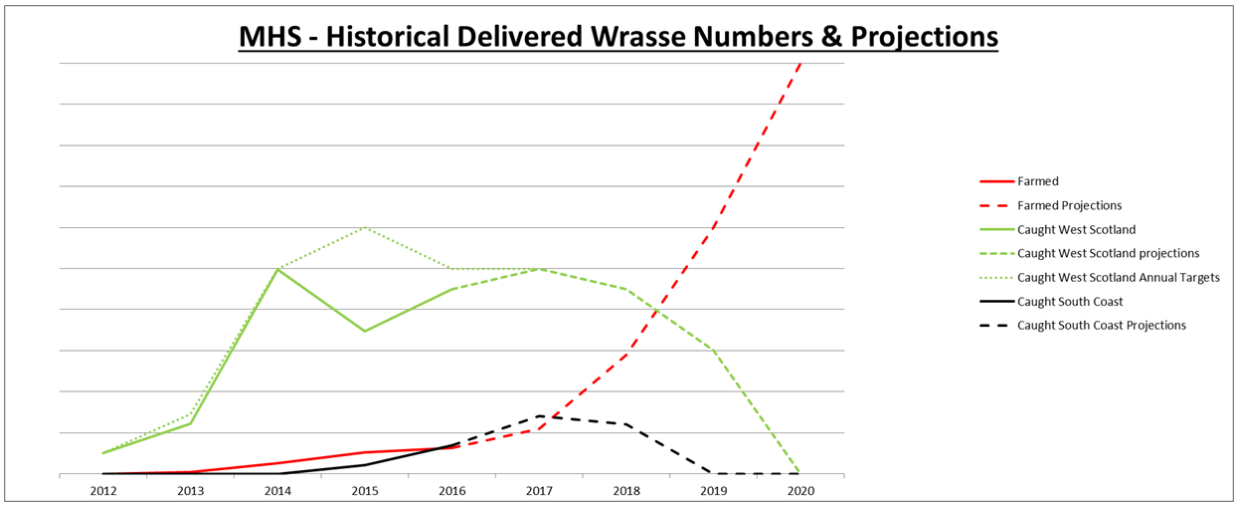
D&S IFCA could adopt certain measures within this guidance alongside our proposed permit conditions. Whist many of the measures are included in D&S IFCA management proposals, the main area for consideration would be the closure of areas to the wrasse fishery. Officers may consider small areas along the coast from Plymouth to Salcombe that might be appropriate for voluntary closure and potentially could allow areas for wrasse to spread into or allow recolonisation once the fishery has closed in the autumn. Whilst these may be

voluntary closed areas D&S IFCA officers would liaise with the Salmon Farm industry and fishermen to encourage adoption of those closed areas.

The Native Marine Centre has produced a report, which describes the fishery in Dorset, the holding facility at Weymouth and results of the wrasse staging facility project. Within this report it describes how fishermen have tried to mitigate the loss of undersize or returned fish to sea during the fishing operation by the predation by sea birds, A release trap was designed by one of the fishermen, which is weighted to sink down a few metres, tilts the end door open and releases smaller fish safely away from feeding birds.

The Cleaner Fish Company has provided figures for the Plymouth Wrasse Fishery for 2016. For the fishing period from June 1st to October 24th 2016 28,826 wrasse were landed. On arrival at the farm a total of 644 wrasse or 2.234% were dead and 556 or 1.929% were undersize. Therefore the percentage of fish surviving the transit from Plymouth Harbour store cages to the salmon farms and being used in the farms was 95.837%.

Marine Harvest's Cleaner Fish Manager provided a graph of historic figures of wrasse delivered to the farms and projection of and timescale envisaged for the live wrasse fishery. From the graph the prediction is that the live caught wrasse fishery supplying Marine Harvest will stop in 2019 and the rearing of farmed wrasse will increase to supply the salmon farms in place of wild caught wrasse.



Part 5 D&SIFCA survey program

19. On-board Survey Protocol:

D&S IFCA Wrasse On-Board Survey Planning Form

Survey Title: Wrasse on-board survey

Survey Description (brief description of survey purpose, data to be collected & methodology):

Survey timeframe:	*01/04/2017-01/11/2017*

Weather requirements:	*Fisherman dependent, otherwise not a factor*
Tide requirements:	*Fisherman dependent, otherwise not a factor*
Estimated no. days needed for completion:	*Need to capture data throughout fishing season. At least 2 surveys per week April –November, one officer per survey.*
Staff/volunteers required:	*Staff only. Surveys generally one-handed*
Staff/volunteer availability:	*Rostered prior to each month*

Survey Purpose:

A live-fish fishery for wrasse has been operating in the Devon and Severn IFCA district since 2015. The fishery started in Plymouth, and boats may start working out of Torbay this year (2017). The fishery uses specially designed pots and targets five species of wrasse. Wrasse have complex life histories, small home ranges and are a potentially important component of inshore ecosystems, especially reefs and seagrass beds (Davies, 2016). Other areas where similar fisheries exist (e.g. Ireland and Norway) have noted declines in abundance and changes in sex-ratios of some species (Davies, 2016). In order to assess the sustainability of the fishery the D&S IFCA needs to closely monitor fishing effort, abundance and size and sex and size ratios of wrasse (Ross, 2017). Because the majority of reefs, which will be targeted by wrasse fisherman, fall within European Marine Sites, fishery-specific Habitat Regulations Assessments (HRAs) may be required. D&S IFCA have proposed management measures to be introduced in 2017, including a closure of the fishery during the assumed spawning season, a slot size, a limit on the number of pots and the compulsory completion of a log book by all fishermen. The survey therefore has three purposes: 1. to gather information relating to the specific management measures proposed (such as the timing of spawning in different wrasse species); 2. Collect data that can inform sustainability assessments and future stock assessments: 3. Collect data to feed into specific Habitat Regulations Assessments.


A review of wrasse ecology.pdf


Data collection priorities.pdf

Data Collection:

- *CPUE*
- *Exact locations of fishing activity*
- *Detailed species catch composition*
- *Information on size and sex ratios*
- *Information on spawning seasons*
- *Information on by-catch when applicable/possible*

Methodology:

The pilot surveys (envisaged as the first surveys on each of the boats involved in the survey, and/ or the first survey undertaken by individual officers). Final survey design will be optimised after the pilot surveys. Therefore, the methodology below is an idealised view and represents the assumed maximum data collection capability. All this information can be recorded on the survey form. If possible record by-catch somewhere on the form.

- *Record the vessel name, PLN, home port, survey officer name, date, weather, soak time, time and height at HW and bait used*

- *Record the string number (arbitrary, starting at 1) and start lat and long (from personal GPS) for each string, record the depth of string if possible (if available from fisherman)*
- *Record the pot number (again arbitrary starting at 1).*
- *Record each individual fish on a separate line, recording species, sex and size.*
- *Record the fate of the fish – i.e. whether it was kept, returned or was captured dead*
- *Record the maturity by running your fingers along the ventral surface of the fish from head towards the tail and record the presence of milt or eggs.*
- *If possible record this data for every fish in every pot. NB If this is obviously not plausible, then try to record every fish from every other pot. Indicate this via the pot numbering (i.e. the first pot you sample is recorded as 'pot 1' under 'Pot no.' and the second pot you sample from the same string as 'pot 3').*
- *If you are unsure of the species ID, take a photo of the fish identifying what number fish it is from which pot it is (by including a label in the photo and include the label details on the sampling form). Correct species ID is critical for stock assessment and genetic work, so do this for all fish you cannot ID. NB Take a photograph of every fish if you have time.*
-

Equipment:

- *Measuring board – always wet before placing fish on the board*
- *GPS*
- *Batteries*
- *Wrasse ID cards*
- *Survey forms*
- *Weather writer*
- *Pencils & sharpener*
- *Waterproof paper squares for individual ID in photos*
- *Go-pro*
- *Go-pro batteries*
- *Dictaphone*
- *Dictaphone batteries*
- *Cold box*
- *Ice blocks*
- *Yellows*
- *Gloves*
- *Wellies/riggers*
- *Life jackets*
- *Epirbs*
- *Food*
- *Water*
- *Mobile phone*

20. Wrasse On-board Surveys – Initial Observations, April 2017

Report by D&S IFCA Environment Team - May 2017

Description of Fishing Activity

Three vessels are currently working out of Plymouth, two single-handed and one double handed.

The current areas known to be potted are squares M10, K13, L13, M13, L14 and M14, shown in yellow in Figure 1. This information was gathered from enforcement patrols and on-board surveys. It is known from personal communications that the potting also occurs from Mount Batten down to the Mewstone. This data will be added to with fishermen's self-recording sheets, but these are not yet available.

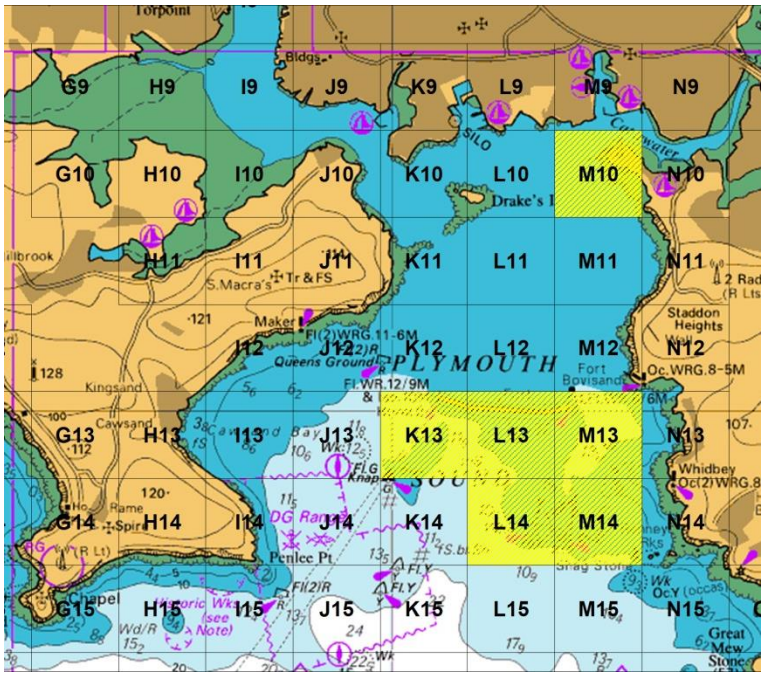


Figure 1 - Grid over the Plymouth Sound area

Survey Effort

On-board observer surveys were recommended by Ross (2017) to allow detailed estimates of CPUE and spatial mapping of the fishery. To date, surveys have taken place on one vessel, therefore results may not be representative of the whole fishery. A number of surveys did not take place due to vessels being delayed in the start of their fishing season, boats working double-handed not having sufficient space on-board to take officers and some difficulty in contacting skippers and confirming when fishing activities were taking place. Surveys on one of the other vessels are not possible due to the vessel size and it is envisaged that surveys on the third vessel will start shortly.

When officers are on board, pots are hauled slowly and the catch is tipped into a dry box. The catch is then sorted, with 'keepers' being placed into a tank, 'returns' are either released straight away or placed into a bucket before being released. Other bycatch was also returned to sea as soon as possible. The tank holding retained fish is topped up and refreshed from time to time with the deck hose.

The data presented is pooled from three surveys of a single vessel in April, during which 829 wrasse were caught, identified and measured before being kept or released.

Catch Description

Species composition

The catch composition on trips with an on-board observer, were heavily dominated by goldsinny and rock cook (Figure 1). Catches from pots set by other fishermen inside the breakwater may be quite different, and therefore the current data may not be representative of the whole fishery in Plymouth Sound. An average of approximately 275 wrasse were caught per day by this fisherman, and discard rates are described below.

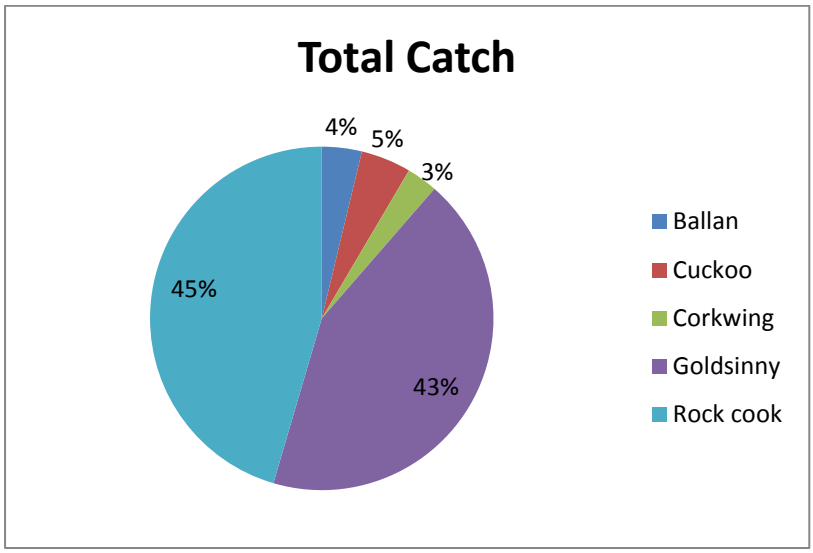


Figure 2 - Pie chart showing catch composition for wrasse species from on-board surveys

Size distributions

Size-frequency histograms of all wrasse caught on the on-board observer surveys are shown below. Larger wrasse (Ballan, Cuckoo and Corkwing) often show two peaks in frequency. These peaks appear to correspond to the male and female size at maturity (Figures 3, 4 and 5 and Table 2), however as the sex could not be discriminated for the vast majority of wrasse, this cannot be confirmed and could equally relate to the distribution of size classes. As these results are taken from catches on three surveys only, further data are needed to get a better understanding of the distributions. The two smaller wrasse species (Rock Cook and Goldsinny) both show one modal size class (Figures 6 and 7) at around the size of maturity, as reported from the literature review undertaken by Davies, 2016 (Table 2).

Discard rates

The percentage of each wrasse species returned from the total catch were as follows; ballan 3%, cuckoo 100%, corkwing 0%, goldsinny 58%, and rock cook 56%. Cuckoo wrasse are not being kept, as an Industry-led measure, due to reports of poor survival during transportation in 2016. However, there was uncertainty in whether fishermen kept or returned wrasse, which were between 11cm and 12cm. During the first on-board observer survey the fisherman retained goldsinny and rock cook which were 11cm and over. However, on the second survey only wrasses of 12cm and over were retained. On the third survey wrasse between 11cm and 12cm were again retained. The size-frequency

histograms show that the majority of goldsinny and rock cook caught were under 12cm. Therefore, if the minimum landing size was 12cm there would be a reduction in landings and a large increase in the discard rate for these species. This is quantified in Table 1, which compares, using the current data set, what percentage of goldsinny and rock wrasse would be returned with a MCRS of 11cm versus an MCRS of 12cm.

Table 1 - Proportion of wrasse returned with differing MCRS.

	% Returned MCRS of 11cm	*% Returned MCRS of 12cm*
Goldsinny	*47*	*83*
Rock Cook	*43*	*78*

Davies (2016) reports a size-at maturity of 9.5cm for goldsinny, but no-such published data exists for rock cook (Table 3). However, the size frequency histogram for rock cook (Figure 7) looks very similar to that for goldsinny (Figure 6), suggesting they may have similar sizes at maturity.

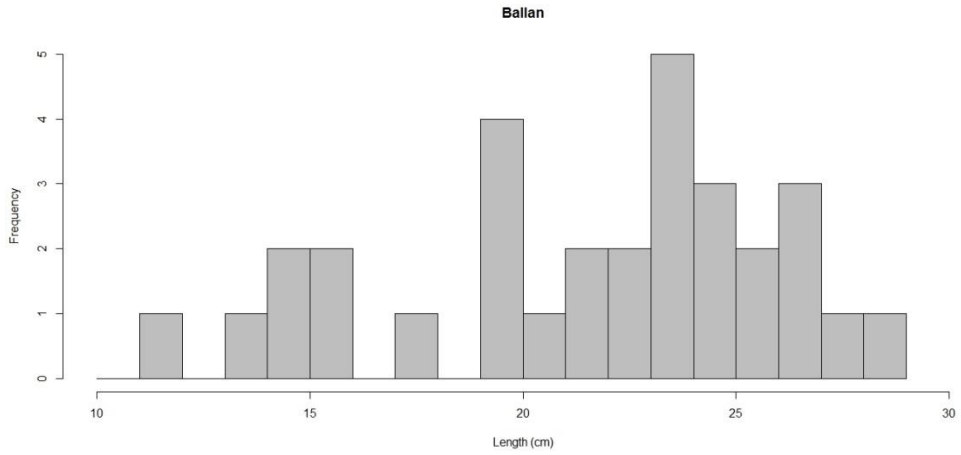


Figure 3 - Size-Frequency histogram for all ballan wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

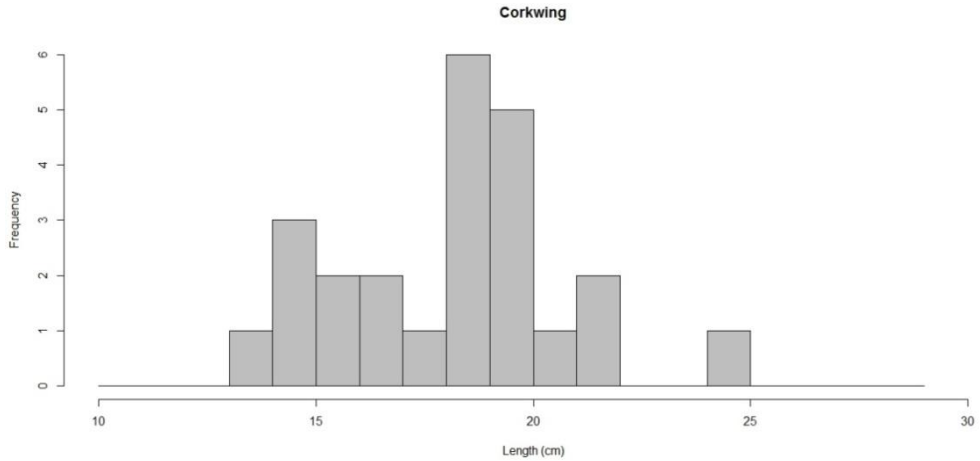


Figure 4 - Size-Frequency histograms for all corkwing wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

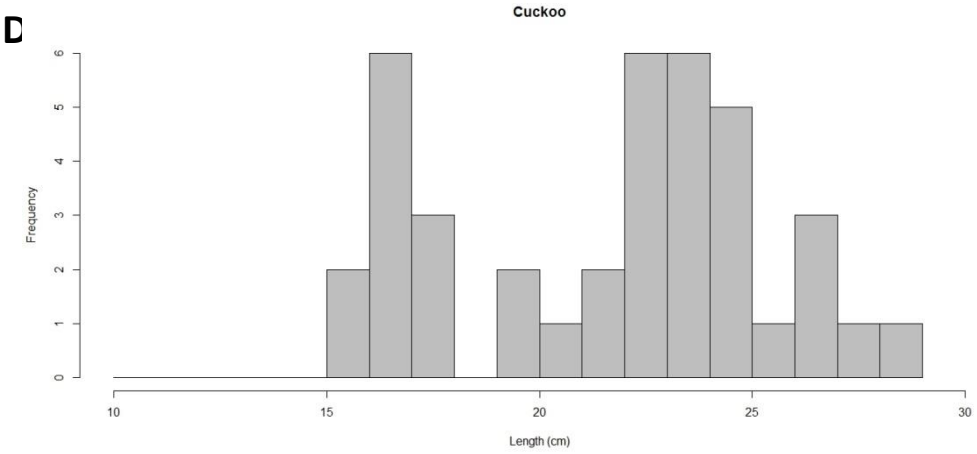


Figure 5 - Size-Frequency histograms for all cuckoo wrasse caught (regardless of whether they were retained) during initial surveys.

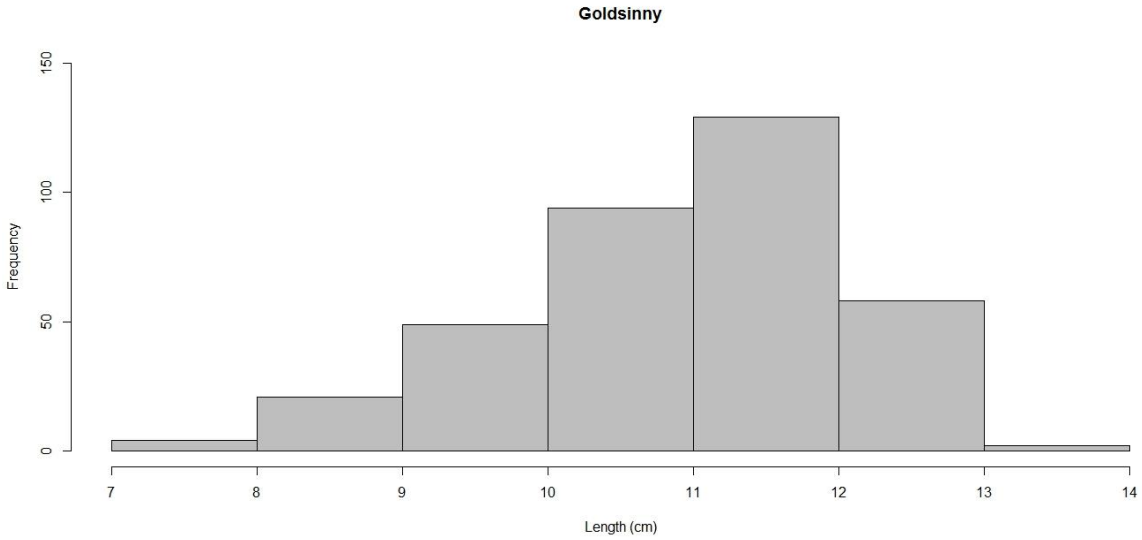


Figure 6 - Size-Frequency histograms for all goldsinny wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

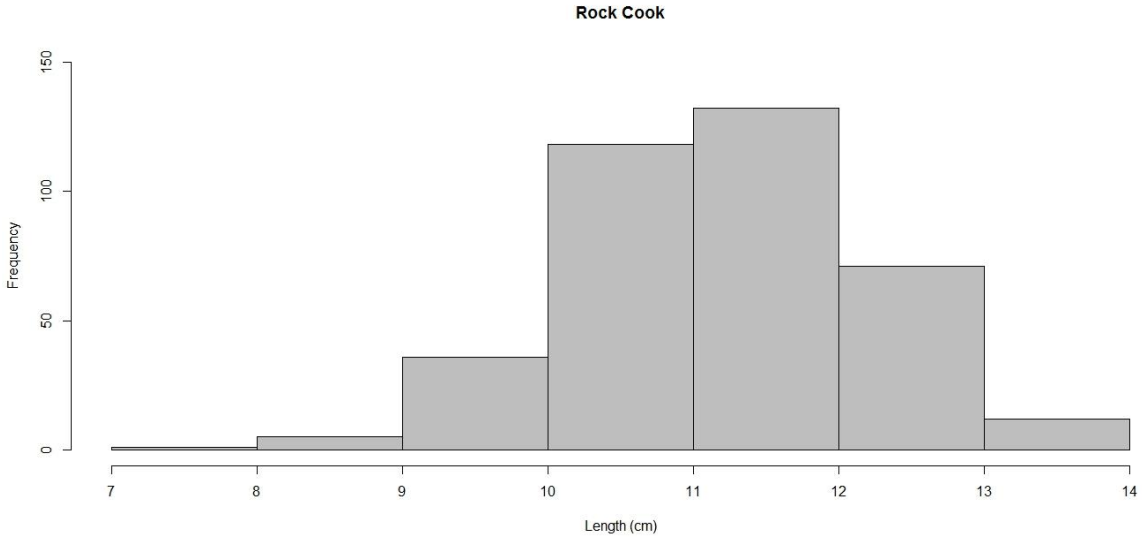


Figure 7 - Size-Frequency histograms for rock cook wrasse caught (regardless of whether they were retained) during initial surveys. Axis numbers relate to the column to their right.

Survival observations

The survival rate of returned undersized wrasse seems to be dependent on whether they have settled from coming up to the surface and their swim bladders have returned to normal. Many of the live undersized fish, being returned to sea, floated on the surface and were eaten by seagulls. If they could swim straight away, initial observations suggest a higher survival rate. Storing the undersize fish in tanks during the hauling of the pots allows for some recoverability before release. Sometimes the boat will have moved a short distance between the site a wrasse is caught, and the site it is released. Due to the territorial nature of wrasse and their small home-range sizes (Davies 2016), it is not certain whether released wrasse will be able to return to their home territories or whether they would be able to establish new territories where they are released. For those nest-building species during the nesting period, eggs in the nests of territorial males, which have been caught and kept or returned elsewhere, may be open to predation.

Released cuckoo wrasse were seen to swim away, without any floating on the surface and therefore were shown to have a high discard survival rate.

The pots used in the wrasse fishery, as supplied by the agent for the salmon farm, have escape gaps fitted to allowing the smaller or juvenile fish to escape.

Bycatch observed

Common bycatch included starfish, rockling, sea scorpions, velvet swimming crabs and blennies. Other species seen included conger, gobies, weever fish, and juvenile gadoids.

Signs of spawning

Spawning was hard to detect during the surveys. One goldsinny with eggs was observed. Some goldsinny appeared to have a swollen and translucent stomach, which may be a sign of recent spawning activity, although there were no signs of eggs or milt. The majority of female corkwings were found to have a blue egg laying papilla near the anal fin and this is usually seen during the breeding season.

Bait

Spider crab is the main bait used on one of the vessels. Other bait used is velvet swimming crabs and edible crab. The spider crab is sourced from a local potting vessel. Some of the velvets caught in the wrasse pots are used as bait.

Pot Numbers

The vessel the surveys were conducted on was being fished single-handed and fishing 7 to 9 strings a day, with an average of 15 pots per string (approx. 120 pots a day). The fisherman reported that decreasing the amount of pots to 60 per day would make his business non-viable. As mentioned previously pots used by the fishermen were seen to have escape gaps allowing smaller fish to escape.

Storage of Catch

Wrasse are stored in converted blue barrels in Plymouth Harbour, alongside the vessel moorings at depths of around two metres. They are being stored for up to a week and are fed smashed up crab while in the store barrels. Waste is removed when required. Fishermen have adapted the barrels to ensure survivability of the wrasse in storage.

Landing and Transport

The landing of the fish was a joint effort between the fishers and agent. Fish were moved from the store barrel to large box filled with water on the deck of the boat. They were then counted into a larger landing net and once there were 50 fish in the net this was passed to someone on the fish quay and they were placed in the transport tanks. This was repeated until all the wrasse had been sorted and counted. Any dead, damaged, or cuckoo wrasse would be returned to the harbour at this point, although very few mortalities were seen at this point.

The transport consisted of a pickup truck with one tank in the truck bed and the other tank on an attached trailer (Figure 8). Oxygen levels and temperature are continual measured from the cab of the vehicle. The fish seemed to be swimming ok in the tanks from brief observations. The fish were being transported straight to Scotland.

Figure 8 – Transport system of live wrasse, showing tanks and movement by landing net.

Characteristics	Ballan wrasse (*Labrus bergylta*)	Cuckoo wrasse (*Labrus mixtus*)	Rock cook (*Centrolabrus exoletus*)	Goldsinny (*Ctenolabrus rupestris*)	Corkwing (*Symphodus melops*)
Size range (cm)	Typical size 30-40cm (Campbell, 2004; Irving, 1998; Dipper, 1987). Grows to over 50cm (Naylor, 2005; Bagengal, 1985). Up to 60 (Gibson, 2001; Darwall *et al.* 1992; Dipper, 1987).	Grows to 35cm (Campbell, 2004; Gibson, 2001; Darwall *et al.* 1992; Dipper, 1987; Bagengal, 1985) and females generally smaller (Naylor, 2005; Irving, 1998).	Usually grows to 12cm (Dipper, 1987), but some reach 15cm (Naylor, 2005; Campbell, 2004; Darwall *et al.* 1992; Bagengal, 1985; Dipper, 1987).	Usually 12cm, some reach 18cm (Gibson, 2001; Irving, 1998; Dipper, 1987). Up to 15cm (Kay, 2009; Campbell, 2004; Darwall *et al.* 1992). Up to 20cm (Naylor, 2005).	Usually 15cm, some reach up to 25cm (Kay, 2009; Naylor, 2005; Campbell, 2004; Gibson, 2001; Irving, 1998; Darwall *et al.* 1992; Dipper, 1987). Rarely grows above 18cm (Bagenal, 1985).
Maximum age (years)	29 (Dipper *et al.* 1977)	17	9 (Treasurer, 2005)	16 (Treasurer, 2005)	9
Age at maturity (years)	Females & males 6-9	Females 2, males 6-9	Females 2	Females 2	Females 2-3
Size at maturity (cm)	Females 16-18, males 28	Females 16, males 24	?	9.5	10
Sex change	Yes	Yes	?/No	No	No
Accessory males	No	No	?	Yes	Yes
Territorial	Yes	Yes	Yes	Yes	Yes
Spawning season (Atlantic)	April - August	May - July	May - August	April - September	April - September
Spawning place	Nest (gravel & rock)	Nest (gravel)	?	Mid-water	Nest (algae)
Egg type	Benthic	Benthic	Benthic	Planktonic	Benthic
Nest building by	Female	Male and female	?	N/A	Male
Parental care	Male	Male	?	None	Male
Key habitat	Juveniles found in the intertidal and rock pools, adults found in sublittoral rocky areas (Dipper *et al.* 1977), reef and kelp forests.	Sublittoral rocky reefs (Naylor, 2005; Dipper, 1987).	Rocky reefs and seaweed (Naylor, 2005; Dipper, 1987). Often found in seagrass beds (Dipper, 1987).	Rocky reefs and boulder slopes, with holes, caves and crevices for refuge (Sayer *et al.* 1993). Distribution unaffected by macroalgal cover (Sayer *et al.* 1993).	Common in the intertidal and rock pools, with dense seaweed. Subtidal rocky areas with dense seaweed. Often found in seagrass beds (Dipper, 1987).
Depth (m)	Depth range from 5m to at least 30m (Ager, 2008; Dipper, 1987). Juveniles can be in <5m.	Depth range from 2-200m, but mainly between 20-80m (Gregory, 2003).	Depths of 3-25m (Galeote *et al.* 1998; Dipper, 1987).	Occasionally found <10m, mostly juveniles (Sayer *et al.* 1993). Prefer deeper water between about 10 to 50m (Campbell, 2004; Gibson, 2001; Irving, 1998; Sayer *et al.* 1993; Dipper, 1987).	More commonly found at depths <5m (Darwall *et al.* 1992; Costello, 1991), although they can occur to depths of 30m (Gibson, 2001; Irving, 1998; Bagenal, 1985) or up to 50m (Skewes, 2008).
Exposure	All conditions of exposure (Gibson, 2001). Mostly found in intermediate wave exposure stations (Skiftesvik *et al.* 2015).	No specific exposure level, found at all stations (Skiftesvik *et al.* 2015).	Relatively more abundant at more exposed stations, Smaller fish (<11cm) occurred mainly in sheltered areas (Skiftesvik *et al.* 2015).	Mostly found in intermediate wave exposure stations, Smaller fish (<11cm) occurred mainly in sheltered areas (Skiftesvik *et al.* 2015). Distribution unaffected by current speed (Sayer *et al.* 1993).	More abundant in sheltered area (Skiftesvik *et al.* 2015). Nests found in sheltered north facing crevices (Potts, 1985).
Main diet type	Crustacea and Mollusca	Crustacea and Mollusca	Crustacea and Mollusca	Crustacea and Mollusca	Crustacea and Mollusca

Table 2 - Life-history characteristics of five wrasse species caught in the live-wrasse fishery. Taken from Davies (2016).

Annexes

- Potting Permit Byelaw
- Category one Potting Permit